ARCHITECTURAL MANUAL

1946

WESTERN ASBESTOS CO.

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WESTERN ASBESTOS CO.

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675 Townsend Street • Telephone Hemlock 4884
San Francisco 3, California

Engineers and Contractors:
HEAT INSULATION
COLD INSULATION
SOUND CONDITIONING
MOVABLE STEEL PARTITIONS AND PANELING
CORRUGATED TRANSITE ROOFING AND SIDING

Distributors:
BUILDING MATERIALS
INDUSTRIAL PRODUCTS

September 3, 1946

Here is your copy of our

1946 "ARCHITECTURAL MANUAL"

This manual is presented to you as a ready source of information on the various products and contracting services available throughout Northern California and Western Nevada from Western Asbestos Co. Additional information may be obtained from any of our conveniently located offices.

Our contracting service covers four principal fields: Sound Conditioning, Corrugated Transite Roofing and Siding, Heat Insulation, and Cold Insulation. Our building materials and industrial products include a wide variety of items produced by nationally known manufacturers.

For over thirty-eight years, ours has been a tradition of service to the architectural profession. This Manual is a continuation of our endeavor to maintain that tradition.

We are also looking forward to the development of new products and more efficient methods of application. These will be presented to you as they become available.

Yours very truly,

WESTERN ASBESTOS CO.

Clarke E. Wayland

Clarke E. Wayland
Vice President

CEW:fh

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SINCE 1908 Western Asbestos Co. has served industry in Northern California and Western Nevada as engineers and contractors for Sound Conditioning, Heat and Cold Insulation, Corrugated Transite Roofing and Siding . . . and as distributors for Building Materials and Industrial Products. This manual is provided as a ready source of information on these products and services.

ARCHITECTURAL MANUAL

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WESTERN ASBESTOS CO.

Main Office:
675 TOWNSEND STREET, SAN FRANCISCO 3, *Telephone:* HEmlock 4884
Latham Square Building, Oakland 12, *Telephone:* TEmplebar 7474
1224 Eye Street, Sacramento 14, *Telephone:* Sacramento 2-8993

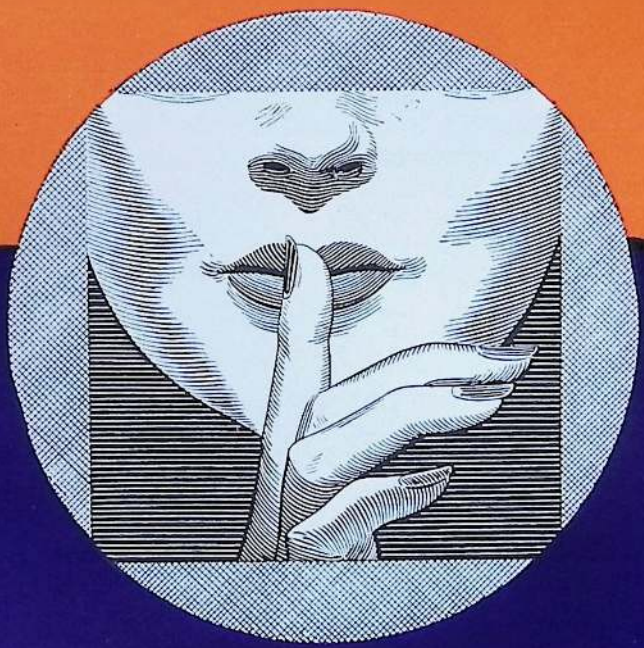
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CELOTEX

REG. U.S. PAT. OFF.

BUILDING PRODUCTS

1945



Acoustical Materials

SECTION

For Other Celotex Catalog Sections, See Manufacturers Index

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EXPERIENCE in the field of acoustics means lessons already learned in product behavior problems. First to undertake mass-production of acoustical materials for national distribution, The Celotex Corporation has actively engaged in their manufacture for more than twenty years. Its pioneering efforts have played a major part in bringing sound conditioning to its present place in the building industry. To perpetuate an active interest in developments in the field of architectural acoustics, the company cooperated in establishing the Acoustical Society of America, the Acoustical Materials Association and the National Noise Abatement Council.

Acoustical Materials Association statistics on acoustical tile sales reveal the leadership long ago won and ever since consistently maintained by Celotex. By vigilant effort we are going to try to continue to lead.

ADAPTABILITY is an important attribute possessed by Celotex Acoustical Products. Designed as interior finish for the sound conditioning of buildings, they offer a range of sound absorption characteristics sufficient for satisfactory treatment of a wide variety of rooms. Offices, schools, hospitals, churches, auditoriums, restaurants, bowling alleys, factories, homes and many other buildings can be treated with effective results.

Acousti-Celotex cane fibre tile, most widely known and used of all acoustical products, is truly a multiple-function material. Besides its sound absorbing properties and its value as an interior finish, it is also an effective thermal insulator.

In determining the type, quantity and location of acoustical material to be used, architects may find it helpful first to obtain an acoustical analysis, available without obligation. This may be requested from any distributor of Celotex Acoustical Products.

NATIONWIDE REPRESENTATION is an essential factor in properly servicing the acoustical needs of many architects. It also helps create an even distribution of products that stabilizes manufacturing operations and promotes economical supervision, with a resulting lowering of costs.

In every part of the United States there is an exclusively franchised distributor for Celotex Acoustical Products. These privately owned and operated distributing firms provide prompt service, readily accessible. Competent assistance is always available from the Field Staff of the Celotex Acoustical Department. Dependable information regarding all Celotex Acoustical Products—their proper application, estimates of cost, etc.—is supplied promptly. By this policy, users are assured of a nearby responsibility for satisfactory results, backed by the industry's leading manufacturer.

BY ACTIVE, SUBSTANTIAL SUPPORT WE ENCOURAGE THESE ACTIVITIES

ACOUSTICAL MATERIALS ASSOCIATION

NATIONAL NOISE ABATEMENT COUNCIL

ACOUSTICAL SOCIETY OF AMERICA

SOUND CONDITIONING

CELOTEX
REG. U. S. PAT. OFF

IN CHURCH INTERIORS the use of Celotex Acoustical Products assures the maximum in hearing conditions. Each installation is engineered to properly correct the reverberation to the most desirable point.

New or old structures can be the subject of a survey by the trained personnel of our distributors. Outstanding leadership in this branch of architectural acoustics is the result of years of painstaking effort in this field.

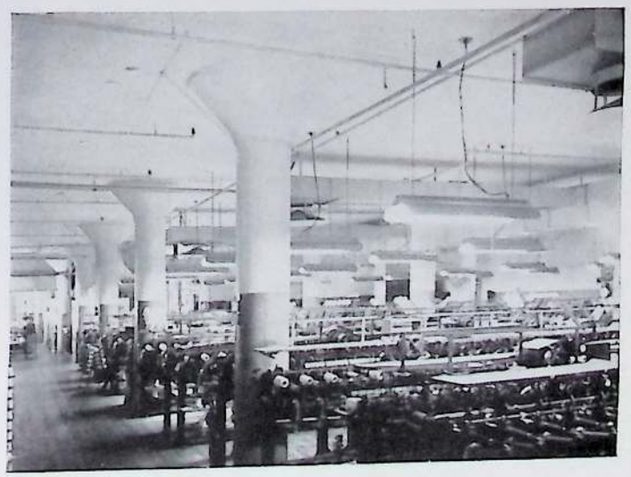




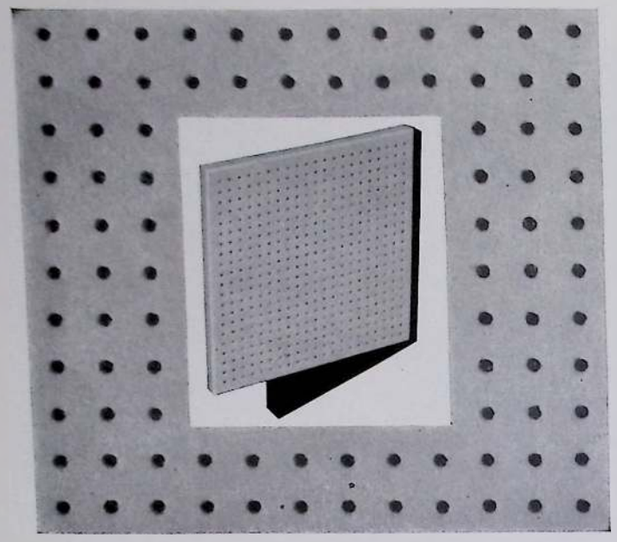
IN OFFICES, SCHOOLS AND HOSPITALS, true sound conditioning is made possible through proper use of Celotex Acoustical Products. Effective control of noise and irritating din promotes efficient use of each structure. Regardless of the functional use of the structure, the investment therein pays a new high return in satisfaction when sound conditioning is included. Celotex Acoustical Products have long been established as the most widely used corrective materials.

RECENT INSTALLATIONS prove that sound conditioning with Celotex Acoustical Products pays dividends in the industrial field. Reduction of harmful noise levels plays an important part in reducing fatigue and loss of productive efficiency. Our distributor personnel leads the field in this new and important endeavor.

To interested architects, engineers and executives of industry we offer, without obligation, regular mailing of FACTORY NOISE, a supplement to the "Quiet Forum" magazine.



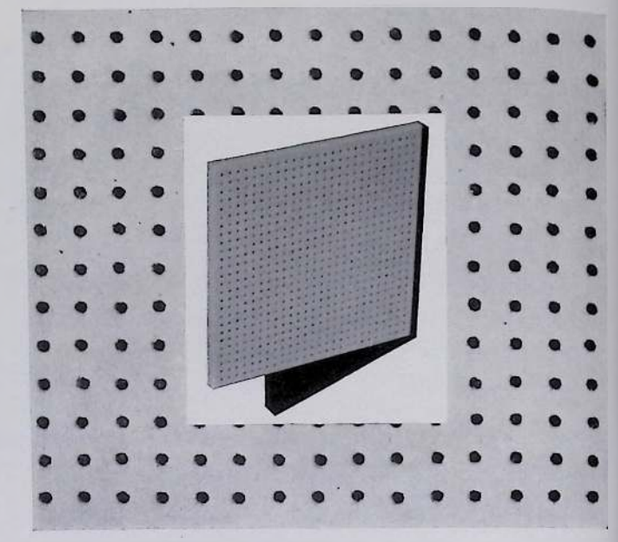
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***ACOUSTI-CELOTEX CANE FIBRE TILE** is a light weight, rigid unit combining excellent acoustical efficiency with a durable, smooth, surface. Perforated to within 1/8" of the back, the diameter of the perforations assures repeated paintability and subsequent ease of maintenance. The fibres are treated to increase moisture resistance and the patented Ferox Process makes them proof against termites and dry rot.

Available in #5 finish, which is a smooth, light colored surface of high light reflectivity, and suitable for subsequent decoration.

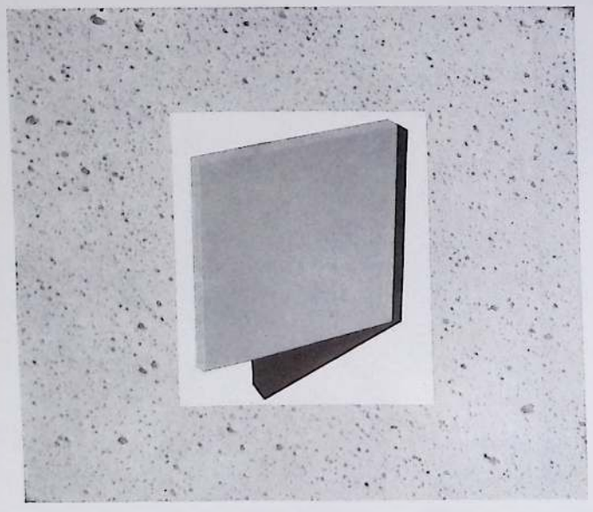
The light reflection factor of this surface is .74 (AMA).
Thermal conductivity 0.33—sizes 6" x 12", 12" x 12", 12" x 24" —Thickness (See Page 7).



***ACOUSTI-CELOTEX MINERAL TILE**—(M Series) is composed of mineral fibre felted with a binder to form a rigid tile with a universal rating of incombustibility. Perforated with small holes extending almost to the back of the tile, high acoustical absorption is provided together with unrestricted paintability.

Mineral Tile is available in standard FP (Factory Primed) finish, the light reflection factor of which is .79 (AMA). Mineral Tile should preferably be finish painted after erection, but is available with sprayed on flat paint or enamel finishes.

Thermal conductivity 0.35—sizes 12" x 12", 12" x 24" (scored to 12" x 12")—Thickness (see Page 7).



STANDARD MUFFLETONE is a cast gypsum product which provides a rigid, lightweight sound absorbing tile with beveled edges. It is rated as incombustible. A corrugated paper backing adds strength and also prevents "breathing".

Standard Muffletone has a uniformly fine textured porous surface, and is available in white, as well as several integrally colored pastel shades.

Sizes 12" x 12" in thickness of 3/4" and 1", and 12" x 18" in 1" thickness.

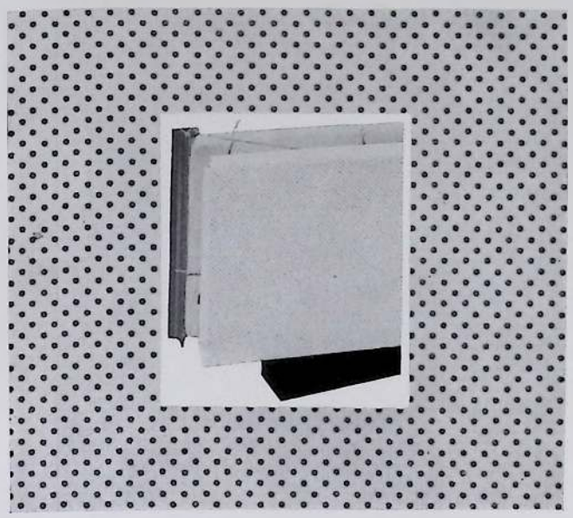
*Registered U. S. Patent Office.



FISSURED MUFFLETONE like the standard type is a cast gypsum product which provides a sound absorbing tile of light weight and desirable rigidity. It is rated as incombustible, and also has a corrugated paper backing.

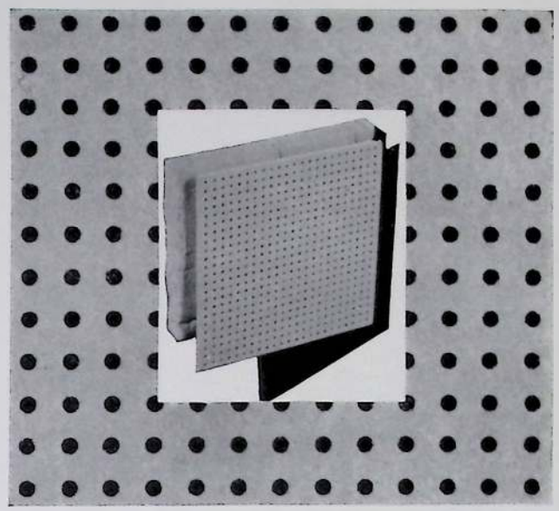
Fissured Muffletone has a fine textured surface which has fissures varying in size and location in each tile. This type of Muffletone is also available in white or several pastel shades.

Sizes 12" x 12", and 12" x 18" in thickness of 1" only.



ACOUSTEEL combines a face of perforated steel with a wrapped pad of sound absorbing rock wool to provide excellent sound absorption together with attractive appearance and incombustibility. This combination is supported by steel sections which permit removability of individual units. The exposed surface of the perforated steel is finished in two coats white, baked-on enamel, with a light reflection coefficient of .70 (AMA), and is washable, cleanable and paintable.

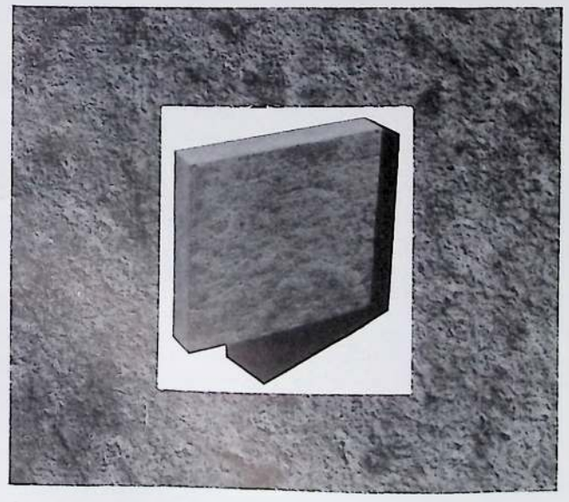
Acousteel is available in bevelled 12" x 24" units with center scoring to represent 12" x 12" tile. Component parts of this material are completely impervious to attack by vermin or dry rot. Thickness of metal facing and pad assembled to supports is 1 5/8" exclusive of furring.



CELOTEX BRAND PERFORATED PANEL BOARD and CEMESTO BRAND PERFORATED ASBESTOS BOARD are products adaptable to a great variety of sound absorption problems. Frequently they are used as a facing for CELOTEX BRAND ROCK WOOL BLANKETS (Type MK).

The type and thickness of the sound absorbing blanket will depend on the requirements of the individual job. Impact resistance and degree of combustibility must be considered in choosing the type of facing and the blanket for each application.

The Celotex Acoustical Distributor in your region will gladly give you suggestions and recommendations.



Q-T DUCTLINER is an acoustical material designed especially for use in absorbing sounds usually transmitted through ventilating and air conditioning ducts. Composed of rock wool and a special binder, it is prepared in rigid block form, and will not support combustion.

Q-T Ductliner satisfies the need for moisture resistance when used in air conditioning ducts. It is available in 24" x 36" size and in 1/2" and 1" thicknesses. The density averages 1 1/2 lb. per sq. ft. per 1" thickness, and the coefficient of thermal conductivity is 0.30.



Architects and Engineers are invited to request a copy of "Less Noise—Better Hearing", a 93-page authoritative treatise on Architectural Acoustics.

The Celotex Acoustical Distributor in your region will send it to you without charge or obligation and will also welcome an opportunity to give you engineering advise or estimating and installation service.

Current news in the field of sound conditioning is reported in "The Quiet Forum" magazine. This free periodical is yours for the asking.

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CONSTRUCTION DETAILS

CELOTEX ACOUSTICAL PRODUCTS are installed by any one of three methods, (1) adhesives, (2) nails or screws, (3) metallic suspension. Following are POINTS TO NOTE—

(1) Adhesives

Celotex Acoustical Distributors may be depended upon to employ only approved acoustical adhesives of proper consistency.

Old plaster should be cleaned to eliminate loose or peeling paint, calcimine or cold water paint, grease, etc.

In new construction a sound, level brown coat of plaster is acceptable.

In the case of *Acousti-Celotex Cane and Mineral Tile the supplemental use of nails may be left to the discretion of the Celotex Acoustical Distributor.

In new construction panels may be designed to allow use of a definite number of full size tile, thereby eliminating most cutting.

(2) Nails or Screws

Acousti-Celotex Cane Tile may be nailed or screwed to wood decks or furring, the nail or screw being countersunk in special perforations provided for that purpose.

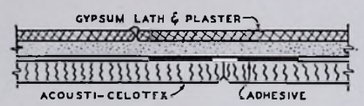
Where application is on furring, a membrane of building paper or felt will increase resistance to breathing between joints.

Acousti-Celotex Cane Tile may also be screwed to a rigid insulating board backing or to plywood where used as interior sheathing.

(3) Metallic Suspension

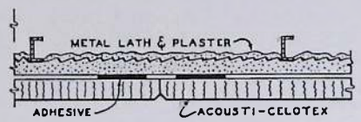
The Acousti-Celotex Metal Suspension System provides a means of establishing the entire ceiling construction when erecting the acoustical tile. Minimum thickness is ¾" because tile are kerfed.

Acousteel may be installed as a suspended ceiling, against 1½" furring channels 4'-0" o.c. Removability of tile provides access to utilities.



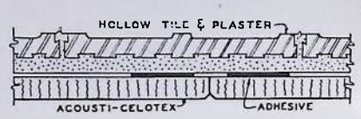
DETAIL A

Acousti-Celotex Cane or Mineral Tile cemented (by means of approved adhesives) to plaster on gypsum lath.



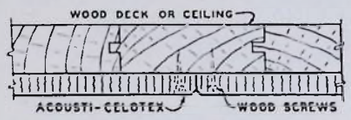
DETAIL B

Acousti-Celotex or Muffletone tile cemented direct to a metal lath and plaster surface.



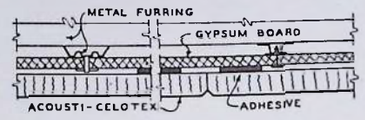
DETAIL C

Flaster on hollow tile is an ideal surface for application of Acousti-Celotex sound absorbing tile by adhesives.



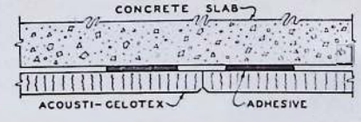
DETAIL D

Application of Acousti-Celotex tile to timber or plank construction using wood screws, offers an improved detail.



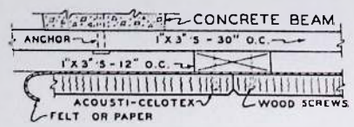
DETAIL E

The acoustical tile cemented to a suspended gypsum board ceiling. This method has the advantage of light weight.



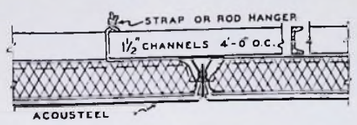
DETAIL F

Acousti-Celotex tile applied on concrete ceiling surfaces with a heavy bodied adhesive.



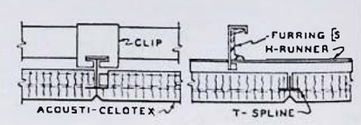
DETAIL G

Application of Acousti-Celotex Cane Tile to wood furring. Use of wood screws provides improved anchorage.



DETAIL H

Acousteel installed as a suspended ceiling. The T-bars may be applied to other suitable surfaces.



DETAIL J

The Acousti-Celotex Metal Suspension System as a means of establishing the entire ceiling construction.

NOTE: Since an efficient acoustical absorbent may also be an efficient thermal insulator, care should be exercised to prevent condensation on the underside of roof decks or slabs. A complete thermal analysis is suggested.

†Registered U. S. Patent Office.

SELECTING AN ACOUSTICAL PRODUCT

Having determined by means of an acoustical analysis and survey the extent of treatment required in a given interior, the architect will find it possible to choose among Celotex Acoustical Products a material and among the suggested application details a logical method of application to suit the structural conditions involved.

For sound conditioning of all spaces other than church or auditorium the noise reduction coefficient (NRC) should be considered. This coefficient is the average, to the nearest 5%, of the coefficients at 256, 512, 1024, and 2048 cycles.

For the acoustical correction of church or auditorium, the coefficient of sound absorption at 512 cycles should be considered in satisfying the requirements of the analysis.

APPLICATION SELECTOR

NRC	SOUND ABSORPTION COEFFICIENTS						PRODUCT—TYPE		THICK.	ADAPTABLE DETAIL
	128	256	512	1024	2048	4096				
.50	.07	.14	.57	.59	.64	.63	Acousti-Celotex	C-1	½"	A, B, C, D, E, F.
.60	.08	.19	.72	.94	.59	.46	Acousti-Celotex	C-9	¾"	A, B, C, D, E, F.
.70	.13	.35	.99	.81	.60	.50	Acousti-Celotex	C-4	1¼"	A, B, C, D, E, F.
.80	.19	.41	.91	.92	.92	.....	Acousti-Celotex	C-6	1¼"	A, B, C, D, E, F (¼" holes)
.60	.10	.15	.55	.85	.89	.76	Acousti-Celotex	M-1	⅝"	A, B, C, E, F (12"x12" only)
.70	.12	.26	.82	.99	.80	.67	Acousti-Celotex	M-2	1"	A, B, C, E, F (12"x12" only)
.60	.17	.29	.63	.75	.74	.80	Muffletone		¾"	A, B, C, E, F.
.70	.18	.40	.72	.79	.79	.77	Muffletone		1"	A, B, C, E, F.
.60	.14	.38	.43	.76	.75	.75	Q-T Ductliner		½"	Tested against 24 ga. steel
.75	.29	.41	.78	.89	.88	.78	Q-T Ductliner		1"	Tested against 24 ga. steel
.55	.11	.54	.45	.53	.58	.64	Acousti-Celotex	C-1	½"	G
.70	.14	.42	.83	.89	.66	.46	Acousti-Celotex	C-9	¾"	G
.70	.27	.59	.77	.85	.61	.48	Acousti-Celotex	C-9	¾"	J (12'x24' only)
.75	.28	.56	.98	.78	.59	.49	Acousti-Celotex	C-4	1¼"	G, J (Coefficients similar)
.80	.30	.56	.94	.96	.69	.56	Acousti-Celotex	C-6	1¼"	G (¼" holes), J (Coefficients similar)
.70	.37	.50	.69	.84	.77	.83	Acousti-Celotex	C-7	1"	J (12"x24" only)
.65	.31	.47	.58	.73	.73	.60	Acousti-Celotex	C-8	1"	G (24"x24") (24"x48")
.65	.17	.43	.53	.79	88	.66	Acousti-Celotex	M-1	⅝"	G (omit paper-use nails and adhesive pad)
.75	.22	.53	.69	.99	.74	.63	Acousti-Celotex	M-2	1"	J (12"x24" only)
.65	.25	.66	.71	.71	.55	.49	Acousteel		1⅜"	H (50-50-perf. & unperf.)
.85	.29	.57	.98	99	.85	.57	Acousteel		1⅜"	H

Reprint from 1945 Sweet's File—Architectural

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ACOUSTI-CELOTEX SOUND CONDITIONING SERVICE

Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, The Celotex Corporation in 1925 chose to seek out, school, and establish in all principal market centers an authorized engineering, sales, and contract service by independent, locally owned and operated enterprises.

The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry.

This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained.

The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing acoustical problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are what we mean by service ideals. They constitute plus values in every specification for a Celotex Acoustical Product.

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THE CELOTEX CORPORATION



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CELOTEX Sound Conditioning PAYS DIVIDENDS

CELOTEX SOUND CONDITIONING quiets noise and provides good hearing conditions. To accomplish these purposes, any of several different acoustical materials, which offer a variety of decorative effects, may be used.

Of these, ACOUSTI-CELOTEX* is the world's most famous acoustical material.

In the noise-quieting field consisting mainly of offices, hospitals, schools and restaurants, the paintability of Acousti-Celotex is an outstanding feature, insuring easy maintenance of high light reflection and permanence of original noise-quieting properties.

In the acoustical correction field, such as churches and theatres, the product's acoustical efficiency is enhanced by its adaptability to various kinds of decoration.

Acousti-Celotex is available in two types: C-Series, made of cane fibre, and M-Series, made of mineral fibre, the latter admitted in all construction where non-combustible materials are required.

Today the benefits of sound conditioning are economically possible with Acousti-Celotex, the material that hushes noise where people congregate for work or relaxation.

*A perforated acoustical tile. U. S. Patents 1483365, 1554179, 1554180.

Copyright 1942—The Celotex Corporation.



In the Ambassador Theatre, Baltimore, Maryland, Architect John J. Zink used Acousti-Celotex on ceiling and walls. Here Acousti-Celotex not only serves to correct acoustics, but adds distinctive decoration.

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Sound Condition With

ACOUSTI-CELOTEX

Reg. U. S. Pat. Off.

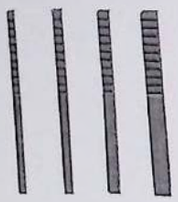
The Original Perforated Fibre Acoustical Tile

Acousti-Celotex has been recognized as the leading acoustical material, in volume of sales, since 1933. During that period purchases of this product have ranged from 40 to more than 50 per cent of all acoustical tile sold by Acoustical Materials Association members.

THE registered trade mark Acousti-Celotex identifies a Celotex Acoustical Product whose most distinguishing characteristics are its perforations. These perforations are of definite diameter, depth and spacing.

Because of this feature, Acousti-Celotex can be repeatedly painted, with any standard paint, without impairing its sound-absorbing efficiency. Paint does not seal the openings to the tubular channels through which the sound waves enter the porous block and are absorbed.

When light reflection is important, the paintability feature is of paramount importance. When Acousti-Celotex has been painted with an oil-base paint and then calcimined, light reflection can be easily maintained by washing when dirty (the dirt readily coming off with the calcimine) and then recalcimining. This process may be repeated several times before the oil paint base needs renewing.



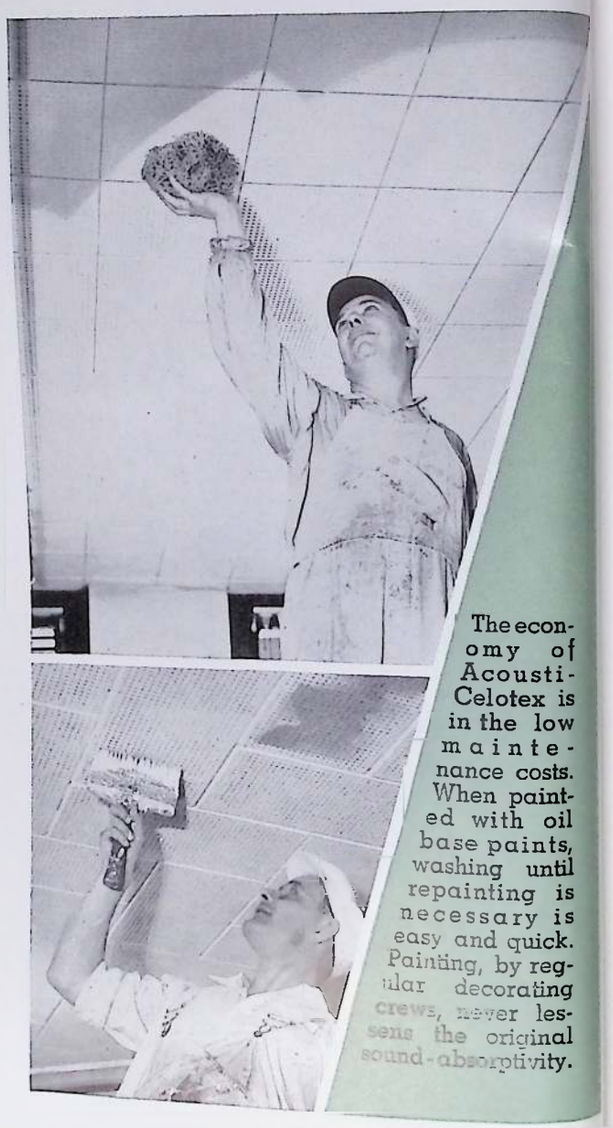
Patented perforations distinguish Acousti-Celotex. Cane Tile has 441 holes per sq. ft. Mineral Tile has 676 holes per sq. ft. Beyond certain limits, more perforations mean a decrease in absorption as well as in strength.

Acousti-Celotex, C-Series

C-Series Acousti-Celotex is made of tough cane fibres called bagasse. In the minute interstices between the fibres, sound is dissipated by friction.

The most important technical advantages of bagasse fibre are purity, resistance to decay, length, strength, springiness, bulk, and the sawtooth character of the fibre. Owing to the deficiency in nitrogen and mineral salts, the bagasse is much more resistant to decay than other vegetable fibres.

Because acoustical material is usually applied on ceilings it is desirable to combine lightness in weight with structural strength. Manufacturing methods may aid in achieving the desired results, but in bagasse fibres we have the peculiar advantages of length, strength, toughness and durability, resiliency, air-spaces within fibre particles and serrated sawtooth surfaces which will permit proper felting.



The economy of Acousti-Celotex is in the low maintenance costs. When painted with oil base paints, washing until repainting is necessary is easy and quick. Painting, by regular decorating crews, never lessens the original sound-absorptivity.

Absorption

Examination of the table Absorption Coefficients immediately reveals that these coefficients vary widely according to the frequency or pitch of sound, according to the method of application (mounting) and also according to thickness and weight. They also depend on the diameter, depth and spacing of the perforations; and on the composition (density) of the material itself.

All of these complex problems have been studied by Celotex—originator of perforated fibre boards for acoustical correction—since 1925, and the current product reflects these studies.

Thermal Conductivity

The thermal conductivity of a material is a measure of its heat resistance or insulating value and is the number of heat units (B.t.u's.) that will pass through one square foot of the material in one hour for each degree difference in temperature between the two sides of a one inch thickness. The lower the conductivity of a material the greater its heat resistance for a given thickness.

The conductivity of C-Series Acousti-Celotex is 0.33 B.t.u. per hour per square foot per degree Fahrenheit per inch thickness.

Moisture Resistance

The cane fibres used in the C-Series Acousti-Celotex tile are thoroughly coated during the manufacturing process with chemicals that make them water resistant. The practical value of this treatment has been demonstrated by the performance of this product in the

Absorption Coefficients and Specifications of Test Samples

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Methods of Mounting

1. Cemented to plaster board. Considered equivalent to cementing to plaster or concrete ceiling.
2. Nailed to 1"x2" wood furring 12" o.c. unless otherwise indicated.
7. Attached to special metal supports mounted on 2"x2" wood furring.

Material	Thickness	(a) Type	Mounting	Coefficients 128	256	512	1024	2048	4096	(b) Noise Red. Coef.	Unit Size Tested	Test No.	Wt. (lbs.) Sq. Ft.	Light (c) Reflection Value		Surface
Acousti-Celotex, Type C-1	1/2"	V	1	.07	.14	.57	.59	.64	.63	.50	12" x 12"	41-55	.76	W	.83	Painted by mfr. Perforated 441 holes per sq. ft. 3/16" diameter, 3/8" deep.
Acousti-Celotex, Type C-1	1/2"	V	2	.11	.54	.45	.53	.58	.64	.55	12" x 12"	41-52	.76	W	83	Same as above
Acousti-Celotex, Type C-9	3/4"	V	1	.08	.19	.72	.94	.59	.46	.60	12" x 12"	41-58	.98			Painted by mfr. Perforated same as above, 5/8" deep
Acousti-Celotex, Type C-9	3/4"	V	2	.14	.42	.83	.89	.66	.46	.70	12" x 12"	41-56	.98			
Acousti-Celotex, Type C-9	3/4"	V	7	.27	.59	.77	.85	.61	.48	.70	12" x 12"	41-60	1.00			
Acousti-Celotex, Type C-4	1-1/4"	V	1	.13	.35	.99	.81	.60	.50	.70	12" x 12"	41-26	1.48	W	.82	Painted by mfr. Perforated same as above, 1-1/8" deep.
Acousti-Celotex, Type C-4	1-1/4"	V	2	.28	.56	.98	.78	.59	.49	.75	12" x 12"	41-25	1.48	C I	.77 .63	
Acousti-Celotex, Type C-6	1-1/4"	V	2	.30	.56	.94	.96	.69	.56	.80	12" x 12"	41-31	1.45	W C I	.79 .72 .59	Painted by mfr. Perforated same as above, 1-1/8" deep.
Acousti-Celotex, Type C-8	1"	V	2	.31	.47	.59	.73	.73	.60	.65	24" x 24"	41-29	1.3	I	.60	Painted by mfr. Perforated same as above, 7/8" deep.

(a) To assist architects and others who desire to specify materials by types, the A.M.A. has established a number of classifications. All of the Acousti-Celotex, Type C-Series, are listed as Type V by the A.M.A. Type V is defined as follows: units which are mechanically perforated, the perforations extending into the sound absorbent material.

(b) The noise reduction coefficient is the average of the coefficients at frequencies from 256 to 2048 cycles inclusive, given to the nearest 5%. This average coefficient is recommended for use in comparing materials for noise quieting purposes as in offices, hospitals, banks, corridors, etc.

For auditorium treatment, attention should be directed to the coefficients at 512 cycles and other frequencies.

(c) The A.M.A. lists the light reflection value of Acousti-Celotex, Type C-1, painted with white oil base paint by the manufacturer (see test number 41-55 above) as 83%. The same light reflection value can naturally be obtained on all thicknesses of Acousti-Celotex that have the same surface design as the Type C-1.

W—White paint finish

C—Cream white paint finish

I—Standard rolled-in ivory surface coating (RI finish)

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thousands of installations in all parts of the world. Only in rooms where conditions of excessive humidity exist for long periods is this product not recommended.

Ferox Process

The Ferox Process (patented), now being used in the manufacture of C-Series Acousti-Celotex, is a method whereby the individual fibres, in their wet state and before formation into a board, are coated with a chemical complex which is toxic to fungi, termites and other cellulose destroying organisms. This chemical complex is non-volatile, odorless, permanent, and in no way alters the physical properties or utility of the finished product. The Ferox processed Celotex product presents no hazard to humans or domestic animals, but provides valuable protection against termites and dry rot.

Rodent and Vermin Resistance

C-Series Acousti-Celotex contains no food for rats, mice or other rodents or vermin. Rodents will only attack it when food or water on the opposite side attracts them, in which case they may gnaw a hole through the material as they would through plaster, wood or even concrete. When this is done it will be noted that the fibres are left lying at the hole and are not eaten.

Fire Resistance

While it is not claimed that C-Series Acousti-Celotex is "fireproof" it does stand up well in actual service and in several respects may act as a fire retardant.

The seriousness of any fire depends primarily upon three factors, (1) the amount of combustible materials, (2) the rate at which these materials burn and (3) the effectiveness with which fire-stop partitions function. Building materials should contribute as little combustible gas as possible, and if they burn it is highly desirable that they burn slowly so as to give as much time as possible in which to extinguish the fire.

C-Series Acousti-Celotex is a valuable building material when viewed from each of these aspects because:

1. It does not flame readily as does wood, because it does not contain pitches or rosins, which under the influence of the temperature of combustion, may generate inflammable gases that accelerate the fire to the point where explosions result. C-Series tile burn or smolder at a very slow rate.

2. As this material has a high heat insulating value it retards the passage of the heat of the fire to combustible matter beyond. There is, therefore, a tendency to confine the fire to the room in which it originates and to hold the fire until proper steps can be taken to put it out.

3. It is usually applied against a solid incombustible backing without open joints or cracks through which a flame can pass and ignite inflammable material beyond.

Resistance to Impact and Abrasion

Because of its toughness and resiliency, C-Series Acousti-Celotex is not easily damaged in service and will withstand considerable body contact. In gymnasiums where subjected to the impact of indoor baseballs, basketballs, etc., the tile should be placed directly against a solid backing such as wood or plaster board.

Sizes

Standard sizes are 12″ x 12″, 12″ x 24″. Also available, at additional cost, in 6″ x 12″, 6″ x 18″, 6″ x 24″, 6″ x 36″, 24″ x 24″. Acousti-Celotex, Type C-8, 1″ in thickness, is manufactured in two standard sizes: 24″ x 24″, 24″ x 48″.

A ⅛″ bevel on all four sides of the tile face is standard. Bevels can be omitted or changed at added expense if desired.

A continuous, unbroken treatment can be obtained, with perforations equi-distant from each other in the entire treated area, by the use of special trimmed-edge tile.

Finishes

1. Unless otherwise specified, C-Series tile (except C-8) are furnished with a standard ivory coating rolled into the surface (RI finish). C-8 is furnished with a *84* finish which is slightly different from the RI finish.

2. RI plus flat white (Standard Paint Finish).

3. One undercoat and two finish coats of white enamel, semi-gloss.

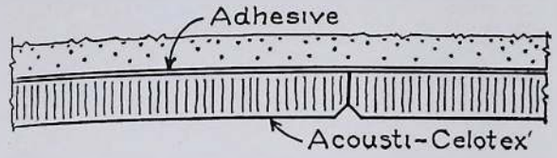
See Page 5 for Acoustical Materials Association data on sound absorption and light reflection.

INSTALLATION

ACOUSTI-CELOTEX CANE AND MINERAL TILE

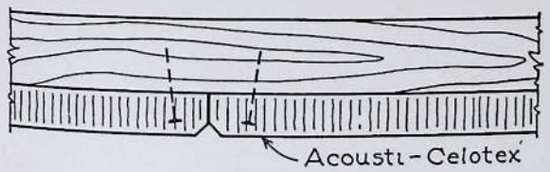
The Celotex Corporation maintains its original policy, inaugurated more than fifteen years ago, of providing the public with acoustical installation service, as well as engineering and sales service, through exclusive territory distributors. These locally owned and operated enterprises have proved their ability to serve satisfactorily and economically.

Their knowledge has been acquired through long experience in this business. Their responsibility to please every customer is underwritten by the value they place on the Celotex Acoustical Franchise... These are valuable considerations to any prospective buyer of acoustical material.



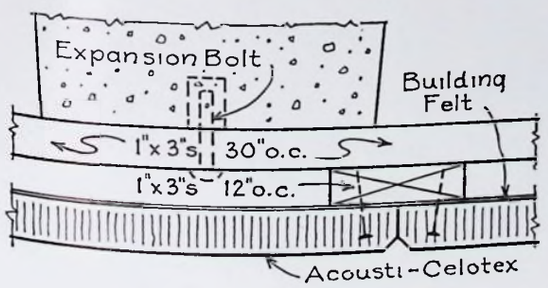
PLASTER OR CONCRETE CEILING

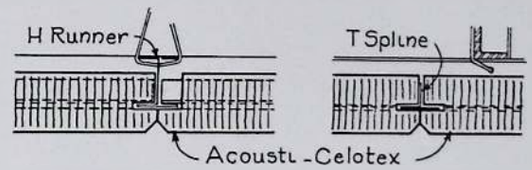
On plaster ceilings Acousti-Celotex (C and M-Series) is usually cemented (using an approved adhesive) and nailed, where possible, directly to the plaster. If desired, Acousti-Celotex may be applied with a heavy bodied adhesive alone to the plaster or flat concrete surfaces, provided the installation is made by experienced workmen exercising necessary precautions.



WOOD DECK

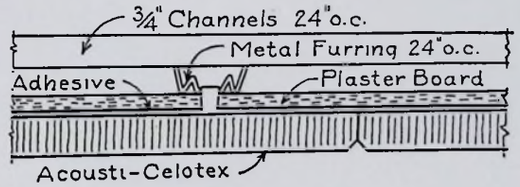
On ceilings of wood, as in churches or gymnasiums having an exposed wood roof deck, the Acousti-Celotex is nailed directly to the deck.





METAL SUSPENSION

Where it is desired to use Acousti-Celotex as the suspended ceiling by itself, the tiles are supported by metal members fastened to suspended metal furring, as shown above. Details of this type of construction are available on request.



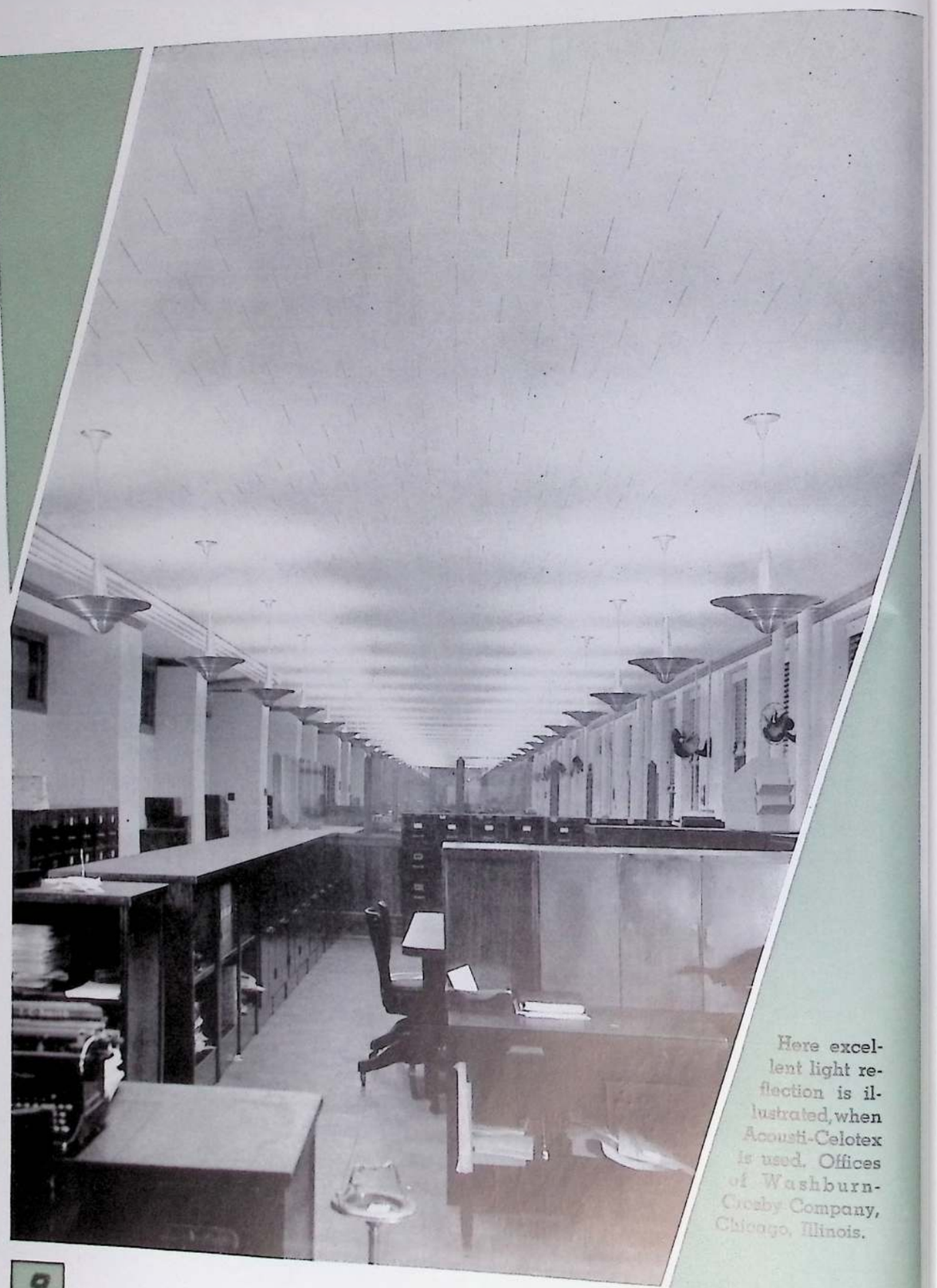
PLASTER BOARD CEILING

Where a suspended ceiling of lighter construction than metal lath and plaster is desired, Acousti-Celotex (C and M-Series) may be fastened directly to gypsum board held by approved plaster board suspension systems.

WOOD FURRING

On concrete surfaces or other surfaces where it is desired to fur down, 1″ x 3″ wood furring strips may be attached to the concrete with expansion plugs and the Acousti-Celotex nailed to the furring strips. Ordinarily a first course of strips, 30″ on center, is used, to which is nailed the second course, 12″ on center, to receive the 12″ x 12″ tiles. A backing of building felt is used directly behind the Acousti-Celotex to prevent "breathing" between joints.

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Here excellent light reflection is illustrated, when Acousti-Celotex is used. Offices of Washburn-Crosby Company, Chicago, Illinois.

Acousti-Celotex, M-Series

M-SERIES Acousti-Celotex is made of mineral fibres (Rockwool) felted in a manner similar to that used in the manufacture of C-Series Acousti-Celotex, but with the addition of a suitable binder. This binder is added to provide strength and toughness in the finished product.

As in C-Series Acousti-Celotex, sound is dissipated by friction in the minute interstices between the fibres.

Maintenance

M-Series Acousti-Celotex can be repeatedly painted with any standard paint without impairing its sound-absorbing efficiency.

Conductivity

The conductivity of M-Series Acousti-Celotex is 0.35 B. t. u. per hour per square foot per degree Fahrenheit per inch thickness.

Moisture Resistance

M-Series Acousti-Celotex tile are integrally waterproofed during manufacture by means of a chemical treatment which prevents disintegration where the tile is accidentally submerged in water.

However, M-Series Acousti-Celotex is not recommended for use in rooms where conditions of continual excessive humidity exist.

Rodent and Vermin Resistance

M-Series Acousti-Celotex contains no food for rats, mice or other rodents or vermin. Rodents will only attack it when food or water on the opposite side attracts them, in which case they may gnaw a hole through the material as they would through plaster, wood, or even concrete. When this is done it will be noted that the fibres are left lying at the hole and are not eaten.

Fire Resistance

M-Series Acousti-Celotex is rated as incombustible.

Resistance to Impact and Abrasion

M-Series Acousti-Celotex is not recommended for traffic bearing surfaces as on lower wall areas, or where subjected to impact or abrasion.

Sizes

Standard sizes are 6″ x 12″, 12″ x 12″. A 12″ x 24″ size is manufactured for use with the Celotex Suspension System in 1″ thickness only.

The 1/8″ bevel on all four sides of the tile face is standard.

The bevels can be changed at added expense if desired.

Finishes:

1. White factory paint finish (F. P. Finish).
2. F. P. plus flat white paint (Standard Paint finish).
3. F. P. plus white enamel (Standard Enamel finish).

Light Reflection

Finish	Light Reflection	Authority
FP	.76	Curtis Lighting, Inc.
Standard Paint, White	.84	A.M.A.
Standard Paint, Cream	.79	A.M.A.

Absorption Coefficients and Specifications of Test Samples

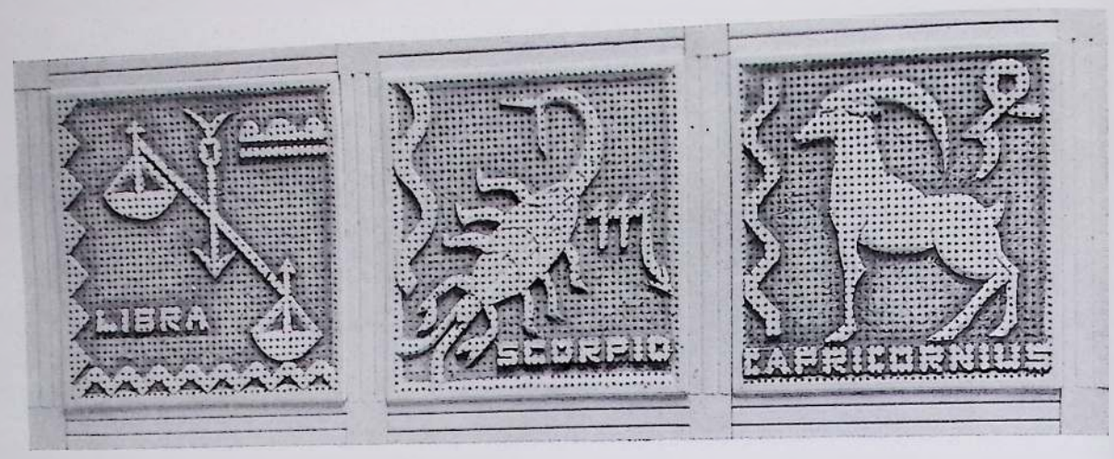
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Methods of Mounting 1. Cemented to plaster board. Considered equivalent to cementing to plaster or concrete ceiling.
2. Nailed to 1″x2″ wood furring 12″ o.c. unless otherwise indicated.
7. Attached to special metal supports mounted on 2″x2″ wood furring.

Material	Thickness	Type	(a) Mounting	Coefficients 128	256	512	1024	2048	4096	(b) Noise Red. Coef.	Unit Size Tested	Test No.	Wt. (lbs.) Sq. Ft.	(c) Light Reflection Value		Surface
Acousti-Celotex, Type M-1	5/8″	V	1	.10	.15	.55	.85	.89	.76	.60	12″ x 12″	41-21	1.57			Painted by mfr. Perforated 676 holes per sq. ft. 5/32 diameter, 1/2″ deep.
Acousti-Celotex, Type M-1	5/8″	V	2	.17	.43	.53	.79	.88	.66	.65	12″ x 12″	320	1.54			
Acousti-Celotex, Type M-2	1″	V	1	.12	.26	.82	.99	.80	.67	.70	12″ x 12″	41-22	2.52	W	.84	Painted by mfr. Perforated same as above, 7/8″ deep.
Acousti-Celotex, Type M-2	1″	V	7	.22	.53	.69	.99	.74	.63	.75	12″ x 24″	40-44	2.5	C	.79	

See table notes—page 8 Data shown there are applicable to Acousti-Celotex, M1 and M2.

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The signs of the Zodiac, shown above, are carved directly on Acousti-Celotex, then painted in colors. This illustrates the unusual decorative possibilities of this material.



Looking up into the dome of Monument Methodist Church, Richmond, Virginia, the twelve ribs are made of 12" x 12" and 6" x 12" Acousti-Celotex tiles, with a herringbone field of 6" x 12".



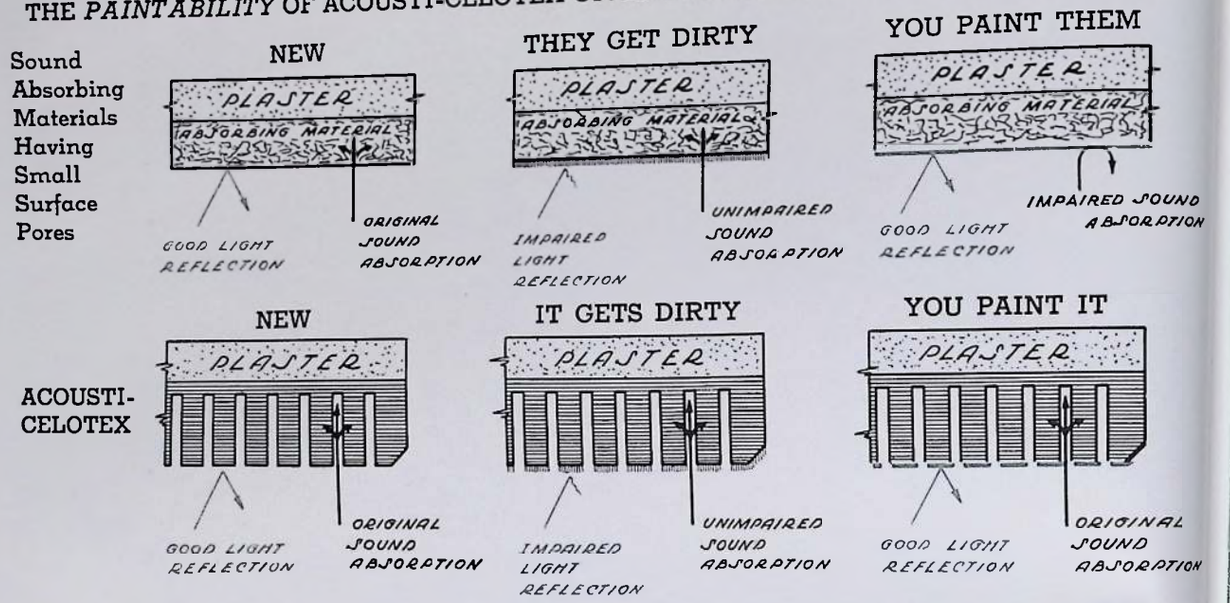
In the ceiling of the First English Lutheran Church, Baltimore, Maryland, the decorative flexibility of Acousti-Celotex is beautifully illustrated in the plank effect ceiling, using 6" x 12" tiles beveled on longer sides only.

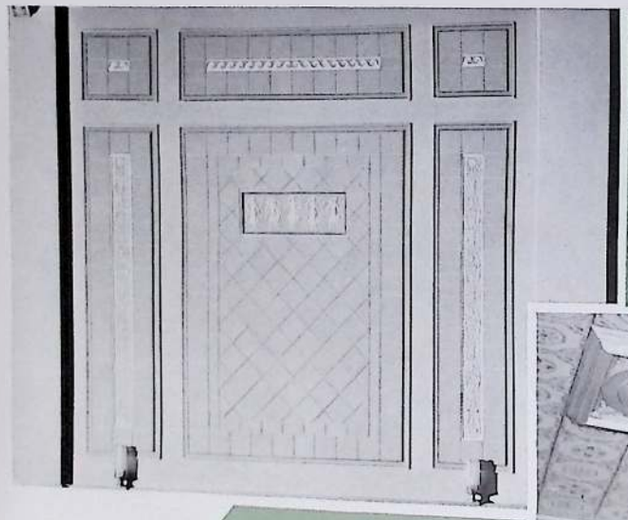
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Easy to Maintain

Because Acousti-Celotex is perforated it may be repeatedly painted without impairing its acoustical efficiency. Special paints and special cleaning equipment are not required.

THE *PAINTABILITY* OF ACOUSTI-CELOTEX GIVES YOU PERMANENT SOUND ABSORPTION

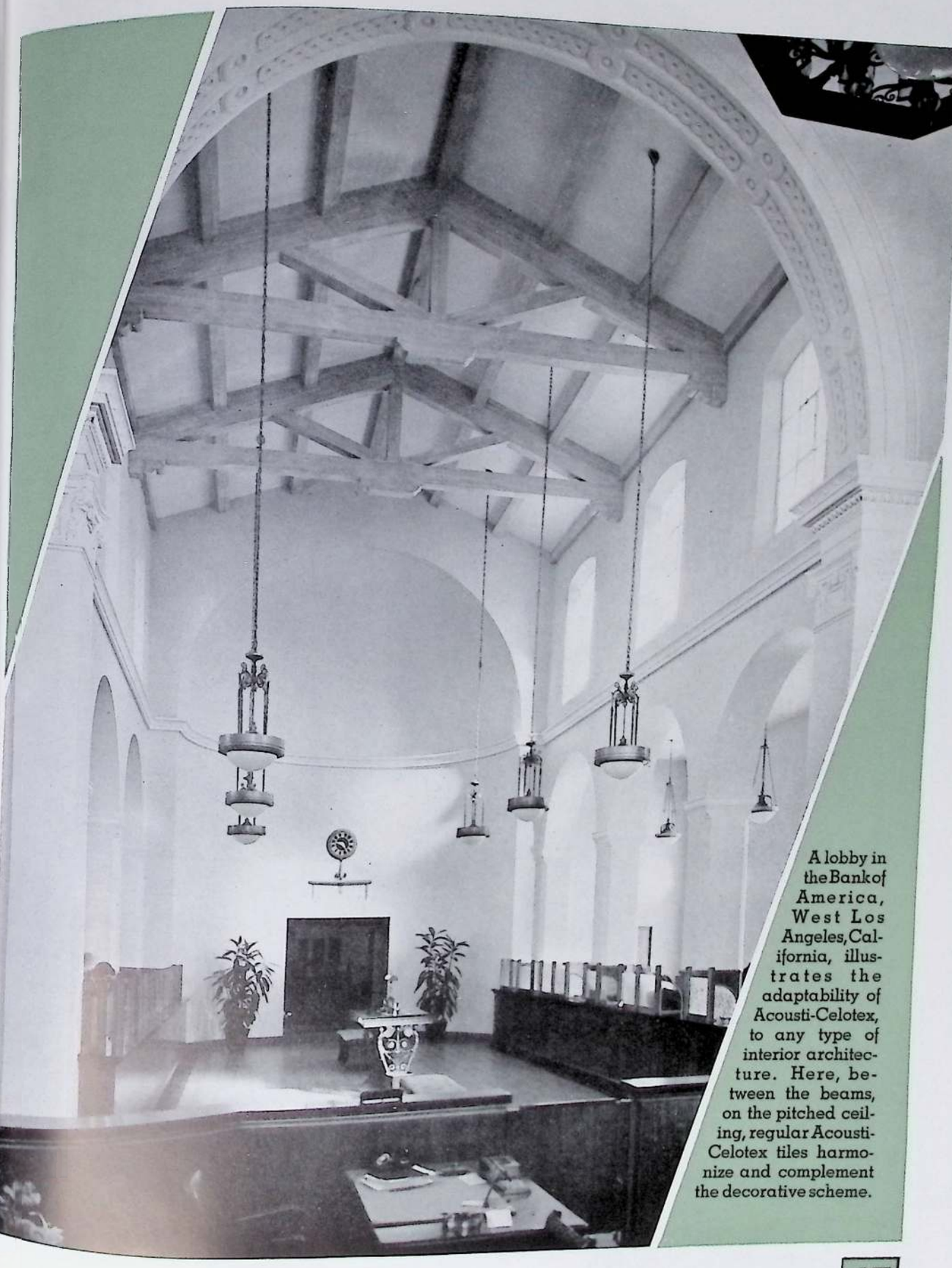




Left: Acousti-Celotex wall panel in the Edgewood Theatre, Baltimore, Maryland, shows attractive combination of 6"x12" and 12"x12" tile in diamond and straight line pattern, classic design.



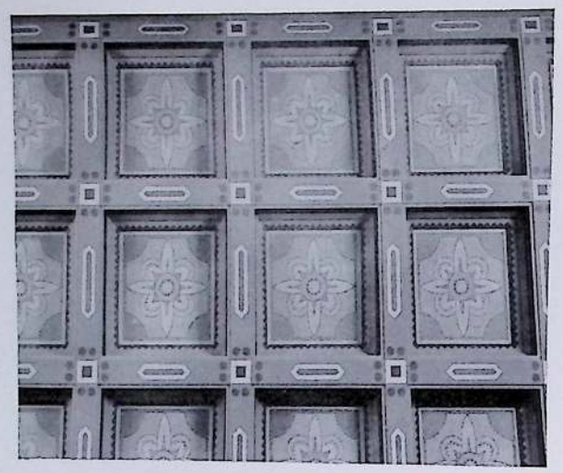
Right: New London High School Library, New London, Texas, has decorated Acousti-Celotex on the ceiling, furnishing quiet plus attractive color and design. Architect, Preston M. Geren.



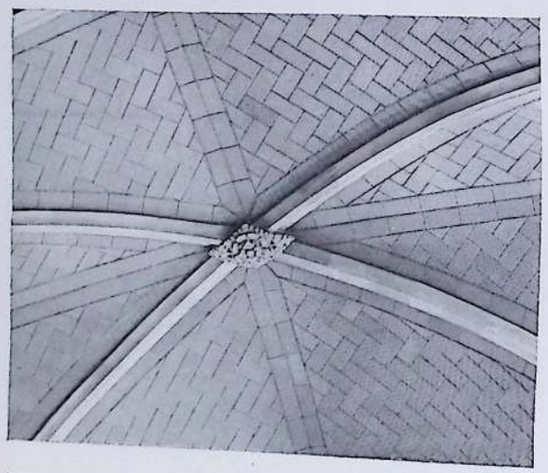
A lobby in the Bank of America, West Los Angeles, California, illustrates the adaptability of Acousti-Celotex, to any type of interior architecture. Here, between the beams, on the pitched ceiling, regular Acousti-Celotex tiles harmonize and complement the decorative scheme.

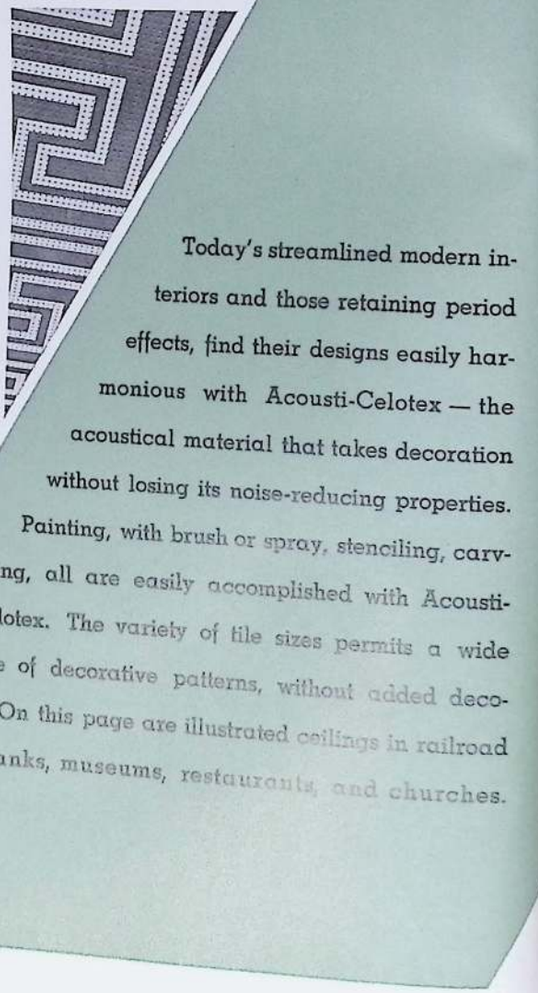
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Some Examples of Decorative Effects Obtained With Acousti-Celotex



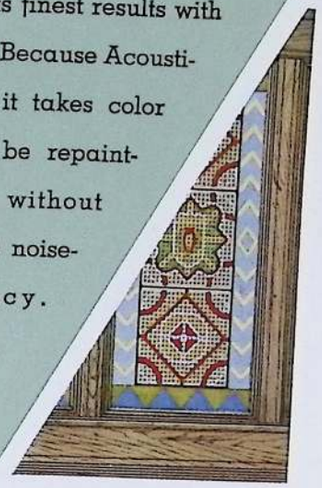






Today's streamlined modern interiors and those retaining period effects, find their designs easily harmonious with Acousti-Celotex — the acoustical material that takes decoration without losing its noise-reducing properties. Painting, with brush or spray, stenciling, carving, all are easily accomplished with Acousti-Celotex. The variety of tile sizes permits a wide choice of decorative patterns, without added decorating. On this page are illustrated ceilings in railroad depots, banks, museums, restaurants, and churches.

Decoration achieves its finest results with judicious use of color. Because Acousti-Celotex is paintable, it takes color beautifully, and may be repainted time and again, without ever losing its original noise-reducing efficiency.

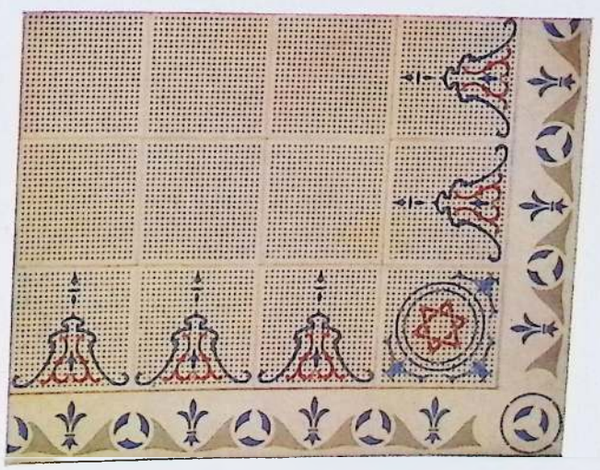




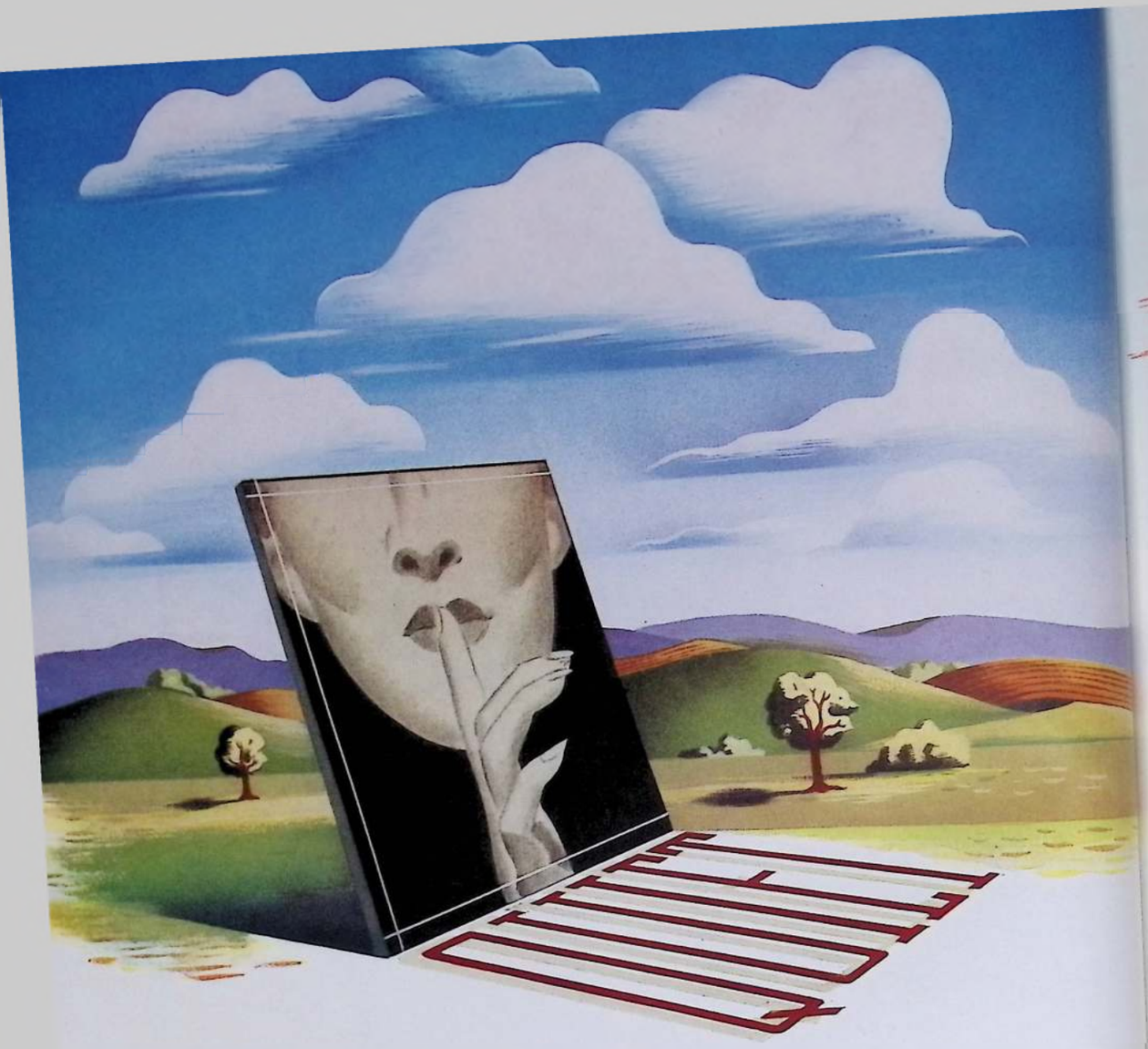








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The benefits of Celotex Sound Conditioning are now within the means of every business, large or small. Complete information is yours upon request without obligation. Just write or call the distributor shown below.

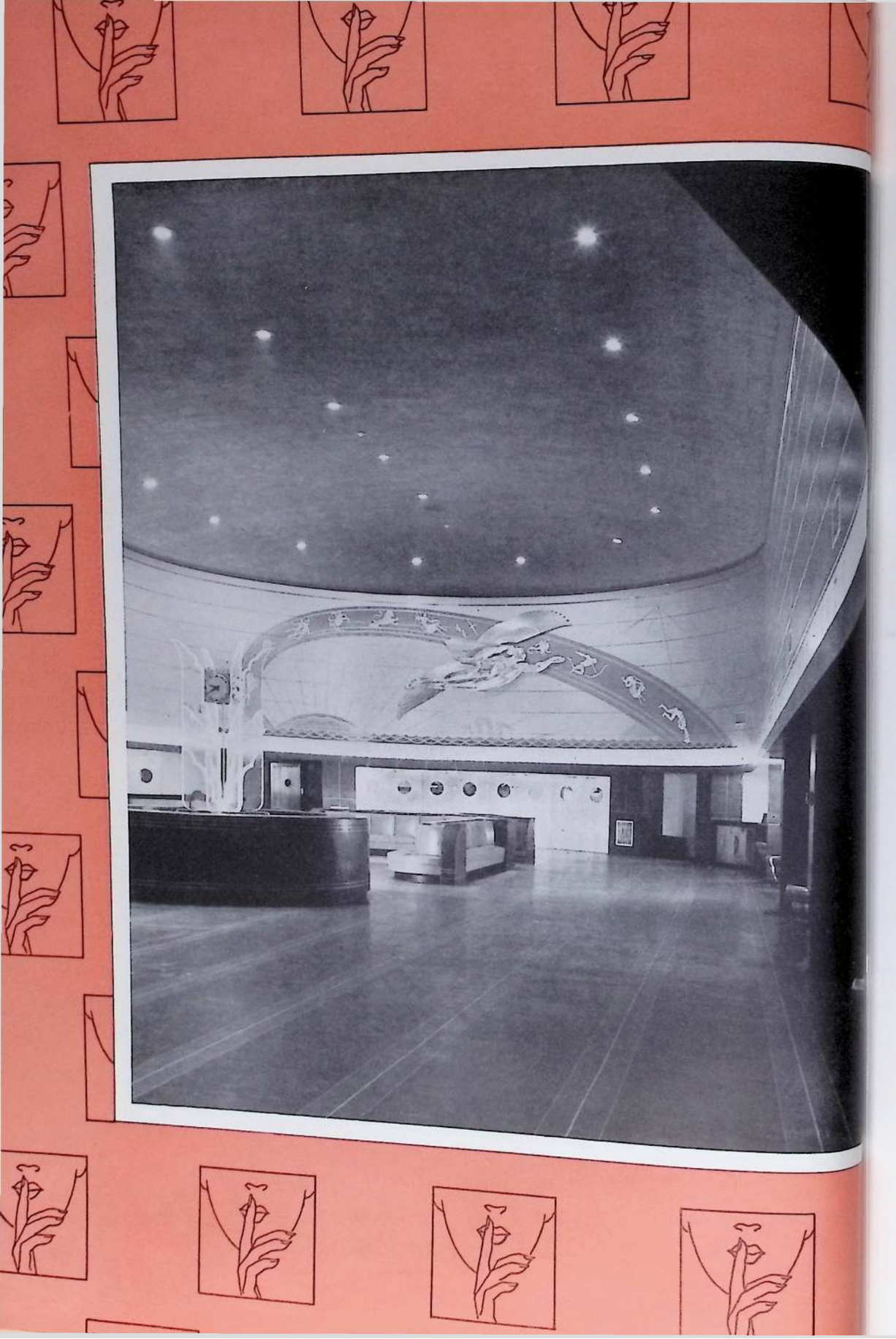
THE CELOTEX CORPORATION CHICAGO

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The Peace of Quiet—The Beauty of Color

Are Combined in Muffletone—The Modern Acoustical Tile

THE high sound absorptivity of Muffletone, together with its stone-like texture, and softly glowing pastel colors, provides for unusual leeway in combining acoustical treatment with modern interior decoration and design.

Muffletone sound-absorbing tile is cast from a mixture of materials, principally gypsum and a foaming agent, then cured in kilns. This results in a porous, incombustible material that readily absorbs sound, provides quiet.

Available in integrally colored finishes, including white, ivory, cream, buff, pale green, coral and yellow, Muffletone brings the muted music of color to increase the desirability of a material scientifically designed to aid living conditions through quiet. Two distinct and pleasing surface textures are available, Standard and Fissured.

In offices, schools, hospitals, theatres, restaurants, public buildings, and other structures, beautiful Muffletone permanently serves the noise-conscious public by hushing disturbing, unwanted sounds.

Muffletone Quiets Newest Terminal of the Skyways

This busy air terminal in New York City, newest of air-line stations, has Muffletone sound-absorbing tile on the ceiling, providing a restful quiet so necessary where the traveling public is served every moment of the day and night.—Architect John B. Peterkin.

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Painting Muffletone

MUFFLETONE may be painted by the spray gun method, but care must be taken to employ an experienced operator so that the paint is not permitted to film over the surface. Paints of lithopone and oil, or non-bridging lacquers, which are diluted for spray gun application to a very thin consistency are satisfactory. Application of any paints by the brush method is not recommended.

Finishes

Standard Muffletone is made with a porous, fine-textured surface. Fissured Muffletone (available only in 1″ thickness) has surface pores and deep fissures varying in size and location in each tile, producing a travertine-like appearance. Both types are available in a white finish as well as in integrally-colored pastel shades, as shown on these pages.





Muffletone Quiets Office and Restaurant

Harmonizing with the elegance of wood panelling and imported wallpaper, the Ivory Muffletone ceiling in this executive office quiets unwanted noise. Architect, W. J. McCauley. Decorated by Ivo C. Meucci. The sleek lines of the Sterling Restaurant, New York City, are ably enhanced with a Muffletone ceiling. The quiet it brings pleases patrons of this popular rendezvous.

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Muffletone Meets Specific Requirements



Muffletone Cast Gypsum Sound-absorbing Tile, 12" x 12", Standard Finish.



Muffletone Cast Gypsum Sound-absorbing Tile, 12" x 12", Fissured Finish.

Absorption Coefficients and Specifications of Test Samples.
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TYPE OF MOUNTING

1. Cemented to plaster board. Considered equivalent to cementing to plaster or concrete ceiling.

Material	Thickness	Mounting (Described Above)	Coefficients 128	256	512	1024	2048	4000	*Noise Reduction Coefficient	Unit Size Tested	Weight (lbs.) Sq. Ft.	Surface	Test No.
Muffletone	1"	1	.18	.32	.73	.90	.83	.85	.70	12"x12"	2.32	Unpainted	286
Muffletone	¾"	1	.17	.29	.63	.75	.74	.80	.60	12"x12"	1.48	Unpainted	39-66

*The noise reduction coefficient is the average of the coefficients at frequencies from 256 to 2048 cycles inclusive, given to the nearest 5%. This average coefficient is recommended for use in comparing materials for noise quieting purposes as in offices, hospitals, banks, corridors, etc. For auditorium treatment, attention should be directed to the coefficients at 512 cycles and other frequencies.

Available Sizes

Standard Tile—¾"
6"x12", 12"x12"

Standard Tile—1"
6"x12", 12"x12", 12"x18"

Fissured Tile—1"
6"x12", 12"x12", 12"x18"

LIGHT REFLECTION

Light reflection factor by authority of Curtis Lighting, Inc.

Muffletone

Finish	Factor
L1—(White)	67%

Suggestions For Applying Muffletone*

Installation by Adhesives

Muffletone is attached in position with approved heavy bodied acoustical adhesives. The procedure used in applying the adhesive and installing the tile is the same as recommended for other similar acoustical materials manufactured by The Celotex Corporation, as Acousti-Celotex Cane or Mineral Tile.

Paper Backing on Muffletone

Muffletone tile are formed in manufacture on an absorbent, indented paper backing. This paper backing provides a good bonding surface for the adhesive, strengthens the tile, and seals the back so "breathing" is thereby minimized.

Cutting and Beveling Muffletone

Muffletone may be easily cut on the job with a fine tooth keyhole saw or hack saw blade, or with a knife.

**The word Muffletone is a brand name identifying a porous, gypsum acoustical tile marketed by The Celotex Corporation.*

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MUFFLETONE

REG. U.S. PAT. OFF.



Quiet Beauty

For Offices, Schools, Hospitals, Restaurants

For complete details on Muffletone, the acoustical material that permanently reduces noise, and beautifully glows with color, telephone or write to the distributor whose name appears below.

THE CELOTEX CORPORATION - - - CHICAGO

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A selected list of Sound Conditioning installations in

BANKS

CLUBS AND ASSOCIATIONS

COMMERCIAL AND INDUSTRIAL ORGANIZATIONS

CHURCHES

EDUCATIONAL INSTITUTIONS

GOVERNMENT
FEDERAL, STATE, COUNTY
AND MUNICIPAL

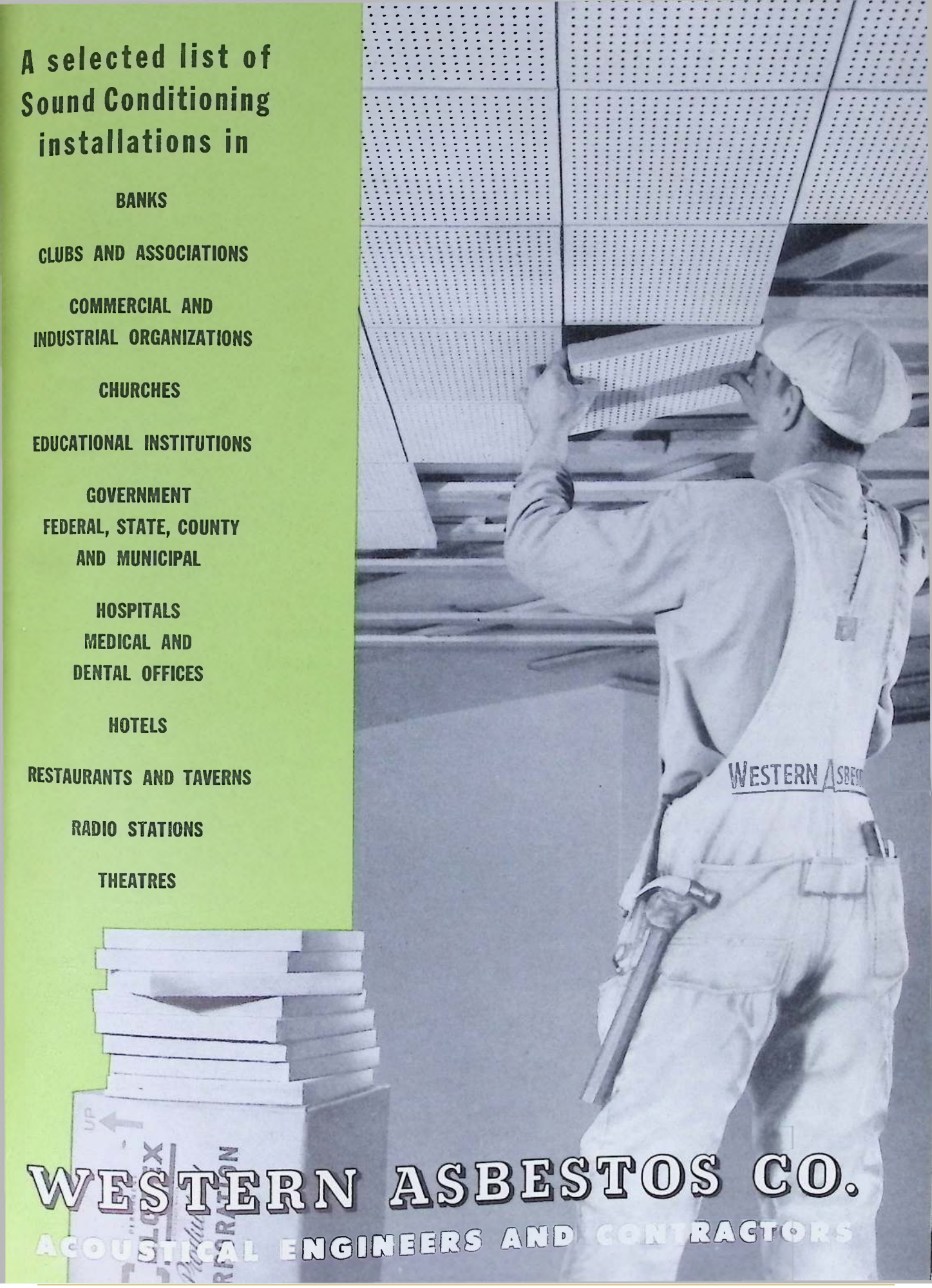
HOSPITALS
MEDICAL AND
DENTAL OFFICES

HOTELS

RESTAURANTS AND TAVERNS

RADIO STATIONS

THEATRES



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QUIET...is enjoyed by the organizations listed here. Permanently effective, these sound conditioning and acoustical installations by Western Asbestos Co. are within the means of every business, large or small



BANKS

ALAMEDA
Bank of America
ANGELS CAMP
Bank of America
BERKELEY
American Trust Co.
Bank of America
BURLINGAME
Bank of America
COLUSA
Bank of America
DINUBA
Bank of America
FRESNO
Bank of America (2 locations)
GRIDLEY
Bank of America
HAMILTON FIELD
Bank of America
HOLLISTER
Hollister National Bank
JACKSON
Bank of America
KERMAN
Bank of America
LODI
Farmers & Merchants National Bank
LOS GATOS
First National Bank of Los Gatos
MANTECA
Bank of America
MARYSVILLE
Central Bank
MENLO PARK
Bank of America
MONTEREY
Bank of America
NAPA
Bank of America
OAKLAND
Bank of America (3 locations)
Central Bank
OROVILLE
First National Bank
PALO ALTO
Bank of America
REDDING
Bank of America
REDWOOD CITY
Bank of America
RENO
Reno National Bank
RICHMOND
Bank of America
Mechanics Bank
SACRAMENTO
Bank of America
Capital National Bank
SAN JOSE
Anglo-California National Bank
Bank of America
SALINAS
Bank of America
SAN FRANCISCO
Anglo-California National Bank
Bank of America (10 locations)
Bay View Federal Savings
Crocker First National Bank
Federal Reserve Bank of S. F.
Hibernia Savings & Loan Society
Pacific National Bank
Wells Fargo Bank & Union Trust Co.
SANGER
Bank of America
SAN LEANDRO
First National Bank
SAN MATEO
Bank of America
SAUSALITO
Bank of America
SONORA
Bank of America
STOCKTON
Bank of America
First National Bank
TURLOCK
Bank of America
VALLEJO
Bank of America
VISALIA
Bank of America
WATSONVILLE
Bank of America



HOSPITALS, MEDICAL AND DENTAL OFFICES

AUBURN
Dr. W. M. Miller
BERESFORD
Community Hospital
BERKELEY
Dr. E. H. Benson
CARMEL
Peninsula Community Hospital
COLMA
Junipero Serra Hospital
CONCORD
Concord Hospital
FRESNO
Burnett Sanitarium
FORT MILEY
U. S. Veterans Administration
HOLLISTER
Hazel Hawkins Memorial Hosp.
LIVERMORE
St. Paul's Hospital
LODI
Mason Hospital
MARYSVILLE
Marysville Community Hospital
OAKLAND
Dr. Dorothy Allen
Dr. Herbert C. Archibald
Children's Hospital
Dr. A. L. Gleason
Samuel Merritt Hospital
Oak Knoll Hospital
Peralta Hospital
Permanente Foundation Hospital
Providence Hospital
Dr. Samuel Yabroff
PALO ALTO
Palo Alto Hospital
PETALUMA
Petaluma Hospital
PITTSBURG
Pittsburg Community Hospital
PORTERVILLE
New Porterville Hospital
RICHMOND
Richmond Hospital
SAN FRANCISCO
Dr. H. C. Archibald
Children's Hospital
Chinese Hospital
Dr. Felix Cunha
Dante Hospital
Fitzhugh Building
Four-Fifty Sutter Building
Greens' Eye Hospital
Hahnemann Hospital
Dr. Frank Hand
Hospital for Minor Surgery
Dr. George A. Jarvis
Lane Hospital
Dr. Ernest G. Lion
Mary's Help Hospital
Medico-Dental Building
Mt. Zion Hospital
Dr. Frederick Niemand
Painless Parker
St. Francis Hospital
St. Luke's Hospital
St. Mary's Hospital
San Francisco Hospital
Dr. Melvin Somers
Stanford University Hospital
University of California Hospital
Dr. Hans Waine
SAN JOSE
Dr. E. Amaral
San Jose Hospital
SAN MATEO
San Mateo Community Hospital
SANTA CRUZ
Santa Cruz County Hospital
STOCKTON
St. Joseph's Hospital
VALLEJO
Vallejo Community Hospital
WATSONVILLE
Watsonville Hospital
YREKA
Siskiyou County Hospital



CLUBS AND ASSOCIATIONS

BERKELEY
Delta Gamma Sorority
Womens Faculty Club
FRESNO
Woodmen of the World Hall
OAKLAND
Athens Athletic Club
Shipwrights and Joiners Union
Womens City Club
RICHMOND
Machinists Union
SACRAMENTO
Calif. Almond Growers Assn.
SAN FRANCISCO
Boy Scouts of America
California Club
California State Bar Association
Commonwealth Club
Canon Kip Community House
Cooks Union
Employers Council of S. F.
Engineers' Club
Family Club
Islam Temple
Musicians Hall Association
Olympic Club
S. F. Bodies of the Scottish Rite
S. F. Commercial Club
S. F. Tuberculosis Association
State Bar Association
Town & Country Club of S. F.
Warehousemen's Union
Womens City Club
Young Men's Christian Association
SANTA ROSA
Santa Rosa Labor Temple



EDUCATION AND SCIENCE

ALAMEDA
Maritime School
AUBURN
Auburn Union High School
BATTLE MOUNTAIN, NEVADA
Lander County High School
BERKELEY
Armstrong College of Business Administration
Berkeley High School
California School for the Blind
University of California
California Hall, Bacon Hall, LeConte Hall, International House, Administration Building, Chemical Building, Life Science Building, Radiation Laboratory and Physics Building, Men's Gymnasium, Hospital Kitchen, Offices and Classrooms
BISHOP
Bishop Union Elementary School
CARMEL
Sunset Elementary School
CEDARVILLE
Surprise Valley Union High School
CHICO
Chico High School
Chico State Teachers College
CHOWCHILLA
Chowchilla Union High School
CLOVERDALE
Cloverdale Union High School
COALINGA
Sunset School
CORCORAN
Corcoran High School
DALY CITY
Jefferson Union High School
DAVIS
University of California
Administration Building, Dairy Industry Building, Chemical Building, Library, Lecture and Club Room
ELK GROVE
Elk Grove Union High School
EXETER
Exeter School District
FRESNO
Roosevelt High School
GUSTINE
Gustine Union High School
HOPLAND
Hopland Union High School
LINDEN
Linden Union High School
MADERA
Madera Union High School
MARYSVILLE
Marysville Union High School
MILLBRAE
Millbrae Elementary School
MODESTO
Modesto Junior College
MT. HAMILTON
University of California
NEVADA CITY
Nevada City Elementary School
OAKLAND
Alexander Hamilton Junior High School
Castlemont High School
Cole School
Elmhurst School
Fremont High School
Glenview Grammar School
Golden Gate Junior High School
Hamilton Junior High School
Hawthorne School
Lakeview Grammar School
McChesney School
Mills College
Oakland High School
Technical High School
University High School
University of California
Westlake Junior High School
PALO ALTO
Stanford University
Assembly Hall, Encina Hall, Physics Building, Accounting, Comptroller, Mathematics, Dining Rooms and Cafeterias.
PETALUMA
Petaluma High School
RICHMOND
Richmond School District
ROSEVILLE
Roseville Union High School
SACRAMENTO
Kit Carson Junior High School
Sacramento Junior College
Sacramento Junior High School
SALINAS
Salinas Grammar School
SAN ANSELMO
Presbyterian Orphanage
SAN FRANCISCO
Aptos Junior High School
Balboa High School
College of Physicians & Surgeons
Commerce High School
Girls High School
Glenn Park School
Gough School
Francis Scott Key School
Lawton School
James Lick School
Marina Junior High School
Naval Aids Training Library
Outer Mission Junior High School
Park-Presidio High School
Polytechnic High School
Portola Junior High School
Presbyterian Orphanage
San Francisco Junior College
Stanford University
Sutro School
University of California
George Washington High School
Daniel Webster School
West Portal Elementary School
SAN JOSE
San Jose State Teachers College
SAN MATEO
San Mateo Union High School
SAN RAFAEL
San Rafael High School
SANTA CLARA
University of Santa Clara
SANTA CRUZ
Santa Cruz High School
SANTA ROSA
Santa Rosa Junior College
SONORA
Sonora Union High School
SPRECKELS
Spreckels School
STRATHMORE
Strathmore Union Elementary School
TRACY
Tracy Union High School
TURLOCK
Turlock Union High School
UPPER LAKE
Upper Lake Union High School
VALLEJO
Lincoln School
Vallejo Union High School
VISALIA
Visalia Junior College
WALNUT GROVE
Walnut Grove Grammar School
WOODLAKE
Woodlake Union High School



HOTELS

LONE PINE
Dow Hotel
RENO
El Cortez Hotel
SAN FRANCISCO
Bellevue Hotel
Clift Hotel
Drake Wiltshire Hotel
Fairmont Hotel
Golden State Hotel
Hotel California
Hotel Mark Hopkins
Hotel Oxford
Hotel Stewart
Palace Hotel
St. Francis Hotel
Sir Francis Drake Hotel
Whitcomb Hotel
SAN JOSE
Hotel Saint Claire



CHURCHES

FRESNO
First Church of Christ Scientist
LOS GATOS
Christian Science Church
OAKLAND
Chapel of the Chimes
PETALUMA
First Methodist Church
SAN FRANCISCO
Glide Memorial Methodist Church
Our Lady of Lourdes
St. Gabriels Church
West Side Christian Church
SAN JOSE
First Christian Church
SAN RAFAEL
St. Raphael's Church
WOODSIDE
Woodside Church



RADIO STATIONS

BERKELEY
Radio Station KRE
FRESNO
Radio Station KARM
Radio Station KMJ
MERCED
Radio Station KYOS
OAKLAND
Radio Station KLS
Radio Station KROW
Radio Station KTAB
SACRAMENTO
Radio Station KROY
SAN FRANCISCO
Radio Station KFRC
Radio Station KGGC
Radio Station KSAN
Radio Station KFSO
Radio Station KWID
Radio Station KYA
SANTA ROSA
Radio Station KSRO
STOCKTON
Radio Station KWG
WATSONVILLE
Radio Station KHVR



RESTAURANTS AND TAVERNS

BERKELEY
Black Sheep Restaurant
Drake Catering Company
True Blue Cafeteria
OAKLAND
Mannings, Inc.
Mayflower Donut Shop
RICHMOND
Johns Rendezvous
SACRAMENTO
Tiny's Motel & Waffle Shop
SAN FRANCISCO
B/G Restaurants (2 locations)
Bellevue Hotel Coffee Shop
Bob's Steak House
Bunnys Waffle Shop
Gene Compton's (4 locations)
El Jardin Restaurant
Emmets Hub Tavern
Emporium Cafeteria
Fables Restaurant
Fern Garden
Fosters Lunch (5 locations)
Golden Pheasant
Grand Dairy Lunch
Maison Paul
Mannings (6 locations)
Mayflower Donut Shop
Pig'n Whistle (2 locations)
Simpson's Restaurant
Townsend's
Travelers Inn

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Sound Conditioning in these executive offices of the Bank of America, San Francisco, results in increased efficiency, production and health.

Our Acoustical Dept. has the necessary experience for the precise requirements of broadcasting studios. Left, an installation in KFRC.

Below, James Denman Junior High School, where Acousti-Celotex provides comfortable quiet . . . efficient for student and teacher alike.

Lobby of the Peralta Hospital, Oakland. Modern, efficient hospitals protect their patients from noise by the use of Acousti-Celotex.





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Useful knowledge in science grows with practical experience. Such experience in the field of Sound Conditioning and Architectural Acoustics consists in the number and variety of problems dealt with. Since 1925 Western Asbestos Co. has been associated with The Celotex Corporation as their Northern California and Nevada acoustical engineers and contractors. During this period, from the early developments in acoustical materials to the present position of leadership in the industry, thousands of installations of Acousti-Celotex Sound Conditioning have been made in this area.



Design . . . The basis requirement for practical sound conditioning is the proper use of the materials involved. Western Asbestos Co. offers the services of competent engineers to make noise surveys, sound level and reverberation tests; prepare recommendations and specifications for installations.



Fabrication . . . Sound conditioning involves not only the installation of acoustical materials on ceilings and walls but extends to the fabrication of telephone booths, teletype booths, sound-deadened partitions, etc. Western Asebestos Co. maintains complete shop facilities for these specialized developments.

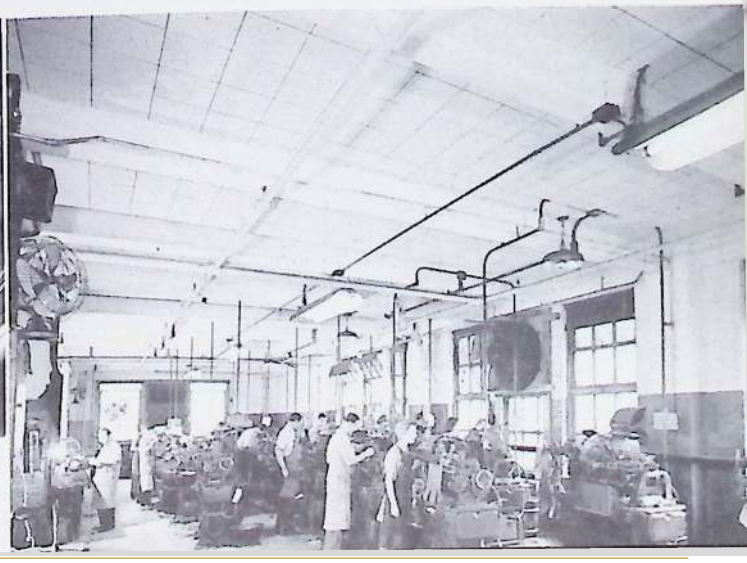


Installation . . . Every installation presents a different problem. Here is where the practical experience of skilled workmen results in a smooth and efficient job. Western Asbestos Co. equipment in scaffolding, staging, drills and tools is the best available. Complete service such as painting, adjustment to sprinklers and electric fixtures results in a coordinated installation made with a minimum of interruption to the customer's activities.

The Golden Pheasant Restaurant in San Francisco is a typical Acousti-Celotex installation where patrons enjoy quiet surroundings.



Less noise in factory and shop results in greater alertness, concentration, production. Acousti-Celotex confines noise and softens it.



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THEATRES

ALAMEDA
Alameda Theatre

AUBURN
Auburn Theatre

BERKELEY
Lorin Theatre

CHICO
State Theatre

JACKSON
Amador Theatre

LIVERMORE
California Theatre

MARTINEZ
State Theatre

OAKLAND
Newsreel Theatre
Uptown Theatre

OROVILLE
State Theatre

PLACERVILLE
Empire Theatre

SACRAMENTO
Fox Senator Theatre

SAN FRANCISCO
Alhambra Theatre
Castro Theatre
Golden Gate Theatre
Peerless Theatre
Orpheum Theatre
Telenews Theatre

SELMA
Selma Theatre

STOCKTON
Rialto Theatre



COMMERCIAL AND INDUSTRIAL ORGANIZATIONS

ALAMEDA
Bethlehem Steel Company
N. Clark & Sons
Encinal Terminal
General Engineering & Drydock Co.
Johnson, Drake & Piper, Inc.

AVON
Tidewater Associated Oil Co.

BALTIMORE PARK
Northwestern Pacific Railroad Co.

BERKELEY
California Corrugated Culvert Co.
Continental Baking Company
Cutter Laboratories
Penicillin Building, Maintenance Office, Experimental Department, Corridors and Offices
Durkee Famous Foods, Inc.
Hall-Scott Motor Company
Langendorf United Bakeries
Morgan Building
New Center Street Store
Northrup, King & Company
Pacific Guano Company
Pacific Steel Casting Company
Pacific Telephone & Telegraph Co.
Roll-Away Window Screen Co.
State Farm Insurance Company
State Farm Mutual Auto Insurance Co.
Steel Tank & Pipe Co. of Calif.

BURLINGAME
Pacific Telephone & Telegraph Co.

CHICO
Diamond Match Company

CONCORD
Coast Counties Gas & Electric Co.

CROCKETT
California & Hawaiian Sugar Refining Corp.

DOS PALOS
Dos Palos Telephone Company

EMERYVILLE
Besler Systems
California Container Corporation
Haas Candy Company
Hubbard & Company
Industrial Equipment Company
Pacific Manifold Book Company
Shell Development Company
Motor Laboratory, Engine Room, Control Room, Compressor Room, Corridors, Miscellaneous Rooms and Offices
Westinghouse Electric & Mfg. Co.
Westinghouse Pacific Coast Brake Co.

EXETER
Rocky Hill Packing Company

FRESNO
R. C. Hamilton & Company
Pacific Telephone & Telegraph Co.
San Joaquin Light & Power Corp.
Tay Holbrook, Inc.

FRUITVALE
California Packing Corporation

GALT
Sego Milk Products Company

HAYWARD
Pacific Telephone & Telegraph Co.
Peterson Tractor & Equipment Co.

LIVERMORE
Coast Manufacturing & Supply Co.

LODI
Foster & Wood Canning Co.

MANTECA
Manteca Telephone Company

MARTINEZ
Contra Costa County Title Co.
Shell Chemical Company
Shell Oil Company, Inc.

MARYSVILLE
Coca Cola Bottling Plant

MODESTO
Barium Products Company

MT. VIEW
Pacific Press Publishing Co.

NEWARK
Jas. Graham Mfg. Company

NILES
Pacific States Steel Company

OAKLAND
Albers Milling Company
Alberts Millinery
American Brass & Copper Co.
Broadway Bowl
California Cotton Mills
California Crematorium
California Packing Corporation
Cameron's Garage
H. C. Capwell Company
Adjustment Office, Cafeteria, Tube Room, Miscellaneous Offices
Caporgno & Company
Christensen & Lyons
Cobbledick-Kibbe Glass Company
Coca Cola Bottling Company
Colbourn Studio
Dewy Almy Chemical Company
Electrical Products Corporation
Ferro Enameling Company
Franciscan Fathers
W. P. Fuller Company



General Electric Company
General Metals Corp.
Laboratory Room, Timekeeper's Office, Shipping Office, Miscellaneous Offices
General Petroleum Company
Gilro Machine Works
Glenn-Roberts Company
Golden State Co., Ltd.
Auditorium and Offices
Insurance Building
International Harvester Company
Jackson Furniture Company
Hans C. Jensen
H. J. Kaiser Company
Key System Building
Langendorf United Bakeries
Langley & Michaels
Lucky Stores, Inc.
Marshall Steel Company
Merchants Express Corporation
Moore Dry Dock Company
Morris Drayage Company
Northern Life Insurance Company
Oakland Title Insurance Co.
Oakland Tribune
Pacific Gas & Electric Company
Pacific Mutual Insurance Co.
Pacific Telephone & Telegraph Co.
J. B. Peterson
Phoenix Iron Works
S & W Fine Foods, Inc.
Safeway Stores, Inc.
San Jose Building & Loan Assn.
Scofield Twaits Company
Ray Smith Company
Tay Holbrook, Inc.
John F. Tullock
Union Ice Company
United Air Lines
Van Bokkelen Construction Co.
Weaver-Paps Company
Yellow-Checker Cab Company

OLEUM
Union Oil Company

PALO ALTO
Mackay Radio & Telegraph Co.
Pacific Telephone & Telegraph Co.

PERMANENTE
Permanente Metals Corporation

PITTSBURG
Great Western Electro Chem. Co.

RADUM
H. J. Kaiser Company

RENO, NEVADA
Pacific Telephone & Telegraph Co.
Saviers & Sons

RICHMOND
H. J. Kaiser Company
Parr Richmond Terminal Corp.
Standard Oil Co. of California
Administration Building, Octane Engineering Room, Refinery Office, Telephone Room, Miscellaneous Offices

SACRAMENTO
Bruni & Fitzwilliams
California Packing Corporation
Coca Cola Bottling Company
Cordano Realty Company
East Lawn, Inc.
D. F. Ferguson Company
Fidelity Title Insurance Co.
Hale Bros.
Morrissey Company
Mull Building
Pacific Telephone & Telegraph Co.
Machine Room, Test Center Room, Miscellaneous Offices
Parker Homes Management
Sacramento Bee Building
Sacramento Box & Lumber Co.
Slakey Bros.
Standard Oil Building
State Box Company
F. J. Twaits Company
Watrous-McClory Company
Western Pacific Railroad Co.
Western States Life Insurance Co.
Wright Building

SALINAS
Salinas Valley Vegetable Exchange

SAN FRANCISCO
Ace Sheet Metal Works
Aetna Life Insurance Company
Alaska Commercial Building
Alexander & Baldwin, Ltd.
Alexander Building
American Can Company
American Electric Construction Co.
American Factors, Ltd.
American-Hawaiian Sugar Co.



American Import Company
American Motorists Insurance Co.
American Tobacco Company
Amiot & Boehm
Anderson & Rowe
Armour & Company
Armstrong Tool Company
Associated Insurance Co.
Atchison, Topeka & Santa Fe Rail Road Company
Edward R. Bacon Company
Balboa Building
Baldwin Piano Company
Balfour Building
E. Geoffrey Bangs

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Barrett & Hilp
Bay & River Navigation Co.
Bay Cities Box Company
Bell Brook Dairies
Benatar's Cut Rate Drug Store
Benioff Bros.
Bethlehem Steel Company
Bigelow-Sanford Carpet Company
Board of Trade Building
Borden's Dairy Delivery Company
W. B. Brandt Company
Braun-Knecht-Heimann Co.
Bridge Investment Company
Broemmels Building
Bronson, Bronson & McKinnon
Edward Brown & Sons
Charles Bruning Company, Inc.
Buckbee, Thorne & Company
Buckwald Products Company
E. D. Bullard Company
California Barrel Company
Calif. Commercial Union Bldg.
California Electric Supply Co.
California & Hawaiian Sugar Refining Corp., Ltd.



California Mutual Building & Loan Association
California Packing Corporation
California Physicians Service
California State Automobile Assn.
Capital Company
Chain Belt Company
Challenge Cream & Butter Assn.
Chanslor & Lyon Company
Cherry-Burrell Corporation
C. F. Childs Company
Cleveland Twist Drill Company
Cluett-Peabody Company
Coast Equipment Company
Coldwell, Banker & Company
Coca Cola Bottling Company
Continental Insurance Co. of N. Y.
E. C. Cooley Company
Corn Products Company
Craig Carrier Company
Crane Company
Crocker Building
Crocker Estate Co.
Crocker First National Bank Bldg.
Crown Zellerbach Corporation
Crum & Forster
Cudahy Packing Company
Cyclops Iron Works
Dairy Delivery Company
Dalziel Building
Davis & Dunn
Davis Realty Company
Dean Building
Del Monte Meat Company
De Young Building
Eugene Dietzgen Company
Doe Building
Dohrmann Hotel Supply Company
Robert Dollar Building
Dun & Bradstreet, Inc.
C. L. Duncan Company
Fred J. Early, Jr.
George H. Eberhard Company
Dwight Edwards Company
Edwards Dental Supply Company
The Emporium
Directors Room. Cafeteria, Class Room, Committee Room, Radio Room, Tabulating Room, Telephone Room, Tube Room, Accounting Office, Cashier's Office, Merchandise Office, Miscellaneous Offices
Engineers, Ltd.
Enterprise Engine & Foundry Co.
Ets, Hotkin & Galvin
Farber's Jewelers
Fairbanks-Morse & Company
D. N. Ferry Company
Flatiron Building
Fibreboard Products, Inc.
Fidelity Insurance & Casualty Co.
Field Ernst Envelope Company
Financial Center Building
Fink and Schindler
Fireman's Fund Insurance Co.
Fireman's Insurance Co. of Newark
First Boston Corporation
Fitzhugh Building
Four-Fifty Sutter Building
W. P. Fuller & Company
Daniel Gallagher Company
General Electric Company
General Electric Supply Corp.
General Foods Sales Corporation
General Paint Corporation
Gilmore Oil Company
Glencourt Building
Glenn-Rowe Vending Machine Co.
Glens Falls Insurance Co.
Julius Godeau, Inc.
Golden Nugget Sweets Company
H. W. Gould & Company
Granat Bros.
M. Greenberg & Sons



Grinnell Co. of the Pacific
Haas Bros.
Hammond Lumber Company
Hart Distilleries
Hastings
Hawaiian Pineapple Company
Hearst Building
Hearst Publications
Heller, Bruce & Company
Heller, Ehrman, White & McAuliffe
C. J. Hendry Company
Hillcone Steamship Company
Hills Bros. Coffee, Inc.
Hinchman, Rolph & Landis
Hobart Building
Holbrook Building
Holmes Sales Company
Homestead Bakery
Honolulu Oil Company
Hub Pharmacy
Humboldt Building
Insurance Co. of North America
International Printing Ink Corp., Ltd.
Jenkel-Davidson Optical Company
Kamm Building
Keyes & Erskine
Kilpatrick's San Francisco Bakery
Kockos Bros.
Koret of California
Kortick Manufacturing Company
Kraft Cheese Company
Lachman Bros.
Langendorf Bakeries
C. C. Langevin & Company
Langley-Michaels Div., McKesson & Robbins, Inc.
Lawrence Warehouse Company
William Lee Company
Libby, McNeill & Libby
Limited Mutual Compensation Insurance Co.



Livingston Bros.
Loyalty Group
Lyon & Hoag
M. J. B. Company
Mackay Radio & Telegraph Co.
Maffei Seed Company
I. Magnin & Company
Market Street Van & Storage
Matson Building
Matson Navigation Company
Otis McAllister Company
McCann-Erickson, Inc.
McCormick Steamship Company
R. D. McElroy & Son
McGregor & Ingram
Medico-Dental Building
Mercantile Acceptance Corporation (2 locations)
Merchants Exchange Building
Metropolitan Life Insurance Co.
Michel & Pfeffer Iron Works, Inc.
Mills Building
Mills Estate, Inc.
Mission Foundry & Stove Works
H. Moffatt Company
Monadnock Building
Montgomery & Sutter Building
Morris Plan Company of Calif.
Mountain Copper Corporation
R. N. Nason Company
National Fire Insurance Co.
National Professional Bureau
Newmark & Strong
New England Mutual Life Ins. Co.
New San Francisco Laundry
N. H. Nishkian
Northern Calif. Hdw. & Steel Co.
Norris, Beggs & Simpson
O'Connor-Moffatt & Co.
Old Homestead Bakery
One-Eleven Sutter Building
Ortega Investment Company
Pacific Bridge Company
Pacific Coast Steel Company
Pacific Dental Laboratories, Inc.
Pacific Fruit Express Company
Pacific Greyhound Lines
Pacific National Fire Insurance Co.
Pacific Optical Company
Pacific Pumping Company
Pacific Sales & Equipment Co.
Pacific States Savings & Loan Co.
Pacific Telephone & Telegraph Co.
Parr Richmond Terminal Corp.
Peerless Laundry
Paterson Pacific Parchment Co.
Neil H. Peterson Company
Petri Wine Company
Phelan Building
Phoenix Assurance Co. of London
Phoenix Mutual Life Insurance Co.
Pioneer-Flintkote Company
Purity Stores, Ltd.
Rathbone, King & Seeley
Ray Oil Burner Company
Reliable Sheet Metal Company
Retail Credit Association
Riggs Optical Company
E. H. Rollins & Sons
Roma Wine Company
Roos Bros.
Angelo J. Rossi Company
Russ Building
Safeway Stores, Inc.
St. Paul Fire & Marine Ins. Co.
St. Paul-Mercury Indemnity Co.
S. F. Bay Exposition Building
San Francisco Brewing Corp.
San Francisco Chronicle
San Francisco Examiner
San Francisco Federal Savings & Loan Association
San Francisco Remedial Loan Association
San Francisco Stock Exchange
Scatena Building
A. Schilling & Company
Schmidt Lithograph Company
Schwabacher-Frey Company
Schwabacher & Company
M. Seller & Company
Sheldon Building
Shell Building
Shell Chemical Company
Shell Development Co.
Shell Oil Company, Inc.
Sherman Clay & Company
Sherwood & Company
Sierra Candy Company
Signal Oil Company
Simon Mattress Manufacturing Co.
Simonds Machinery Company
Simonds Saw & Steel Company
Sloss & Brittain



Soulé Steel Company
South End Warehouse Company
South San Francisco Packing Co.
Southern Pacific Company
Sperry Flour Company
Sperry Gyroscope Company, Inc.
Spreckels Sugar Company
Wm. R. Staats Company
Standard Oil Building
Standard Oil Company of Calif.
State Compensation Insurance Fund
Stock Exchange Building
Douglas Dacre Stone
Sussman-Wormser & Company
Sutter Investment Company
Tay-Holbrook, Inc.
Taylor & Spotswood Company
Tilden Sales Building
Transamerica Corporation

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Commercial & Industrial—Cont.

Traders' Building
Tubbs Cordage Company
Two-Eighty-Five California
Two-Sixty-Five Bush
Underwood Building
Union Ice Company
Union Lumber Company
Union Oil Company
United Air Lines
United Grocers, Ltd.



U. S. Building & Loan Association
U. S. Envelope Company
U. S. Pipe & Manufacturing Co.
U. S. Tobacco Company
Universal Credit Company
Universal Film Exchange
The Upjohn Company
Victor Equipment Company
Walkup Drayage & Warehouse Co.
D. N. & E. Walter & Company
Edward B. Ward & Company
Weeden & Company
Weeks-Howe-Emerson Company
West American Insurance Co.
West Coast Life Insurance Co.
Western Air Lines, Inc.
Western Condensing Company
Western Crown Cork & Seal Co.
Western Furniture Exchange
Western Pacific Railroad Co.
Western Pipe & Steel Co. of Calif.
The White House
Tabulating Room, Accounting Offices, Radio Department, Lecture Rooms, Conference Rooms, Cafeteria
Paul W. Wood Company
F. W. Woolworth Company
Yellow Cab Company
Zellerbach Paper Company

SAN JOSE
California Water Service Co.
Food Machinery Corporation
S. H. Kress Company
Mercury Herald Newspaper Co.
Pacific City Lines Building
Pacific Telephone & Telegraph Co.
Southern Pacific Company

SAN LEANDRO
Caterpillar Tractor Company
Machine Shop, Conference Room, Cafeteria, Miscellaneous Offices
Friden Calculating Machine Co.
Nelson Specialty Company
Nicholson Corporation

SAN MATEO
Levy Bros.
Paddock Engineering Company

SAN RAFAEL
San Rafael Creamery

SANTA CRUZ
Coast Counties Gas & Electric Co.

SANTA ROSA
Sonoma County Land Title Co.

SHELL POINT
Shell Chemical Company

SOUTH SAN FRANCISCO
United Airlines

STOCKTON
Mercantile Acceptance Corporation
Moore Equipment Company
State Building & Loan Association
Stockton Abstract & Title Co.
Stockton Savings & Loan

SUISUN
Sheldon Oil Company

SUNNYVALE
Joshua Hendy Iron Works

TREVARNO
Coast Manufacturing & Supply Co.

VALLEJO
Pacific Telephone & Telegraph Co.

VISALIA
Retailers Credit Association
Southern California Gas Co.



GOVERNMENT
Federal, State, County and Municipal

ALAMEDA
Alameda Police Station
U. S. Coast Guard
Band Room. Control Room, Trainer Building
U. S. Naval Air Station
Engine Test Building, Supply Office, Storehouses, Lounge and Lobby, Theatre, Miscellaneous Offices

ALCATRAZ
U. S. Department of Justice

ANDERSON
Shasta County

BENICIA
U. S. War Department

BERKELEY
City Hall

CARSON CITY, NEVADA
Carson City Civic Auditorium
State of Nevada

EL PORTAL
U. S. Department of Interior

FAIRFIELD
Solano County Court House

FORT BARRY
U. S. War Department

FORT McDOWELL
U. S. War Department

FORT MILEY
U. S. Veterans Administration

FRESNO
City of Fresno
Fresno County Jail
Fresno Memorial Auditorium
U. S. War Department
Filter Centers

HAMILTON FIELD
U. S. Army Air Force
U. S. War Department

MARE ISLAND
U. S. Navy
Supply Department. Laboratory Building, Building No. 215. Administration Building 47

MOFFETT FIELD
U. S. Navy

OAKLAND
Alameda County Court House
City Hall
County of Alameda
Fourth Interceptor Command
Naval Supply Depot
Oakland Municipal Airport
U. S. Naval Air Base

PALO ALTO
Palo Alto Library
Palo Alto Police Department
Palo Alto Post Office
U. S. Veterans Administration

POINT MONTARA
U. S. Navy

REDDING
U. S. War Department
Filter Centers

REDWOOD CITY
Redwood City City Hall

SACRAMENTO
Sacramento City Hall
Sacramento Civil Defense Headquarters
State of California
Capitol Building, Senate Chamber, Assembly Chamber, Governor's Office, Motor Vehicle Building, Tabulating Room, Public Works, Bureau of Purchases, State Agricultural Park Auditorium.
U. S. Army (McClelland Field)
Engine Test Building. Inspection Room
U. S. Army Air Force
Auditorium, Office
U. S. Post Office
U. S. War Department
U. S. War Department
Filter Centers

SALINAS
Monterey County Court House

SAN FRANCISCO
American Red Cross
Federal Bureau of Investigation
Federal Office Building
Inspector of Naval Material
Mills Field Weather Bureau
Municipal Car Barn
Northern District Police Station
Offices of Coordinator of Information
Office of Emergency Management
Office of War Information
Park Police Station
San Francisco Municipal Airport Administration Building, Control Tower, Offices, Dining Room
San Francisco Board of Education
San Francisco City Hall
Assembly, Assessor, Controller, Court Room, Grand Jury, Purchasing, Registrar, Tabulating Room, Department of Public Works, Miscellaneous Offices
San Francisco Civic Auditorium
San Francisco Hall of Justice
San Francisco Health Center Bldg.
San Francisco Housing Authority
San Francisco Juvenile Detention Home
San Francisco War Memorial Bldg.
San Francisco Water Department
Sea Cliff Pumping Station
Social Security Board
State of California
Railroad Commission, Harbor Commission, Division of Labor, Division of Corporations, Miscellaneous Offices
State Compensation Ins. Fund
U. S. Appraisers Building
U. S. Army—Fort Mason
U. S. Army—Fort Scott
U. S. Army—Presidio of S. F.
U. S. Army Signal Corps
U. S. Coast Guard
U. S. Department of Interior
U. S. Department of Justice
U. S. Engineers
U. S. Marine Corps
U. S. Navy—12th Naval District
U. S. Navy Purchasing Office
U. S. Post Office
U. S. Treasury Department
War Production Board

SAN JOSE
San Jose Water Works

SAN MATEO
U. S. Merchant Marine

SANTA CRUZ
Santa Cruz City Hall

SONORA
Tuolumne County Court House

STOCKTON
Stockton Memorial Auditorium

SUNNYVALE
City of Sunnyvale
U. S. Naval Air Station

TREASURE ISLAND
U. S. Navy
Lecture Rooms, Damage Control Room, Plotting Room, Radio Rooms, Teletype Room, Telephone Exchange

UKIAH
Mendocino County Court House

VALLEJO
Vallejo City Hall

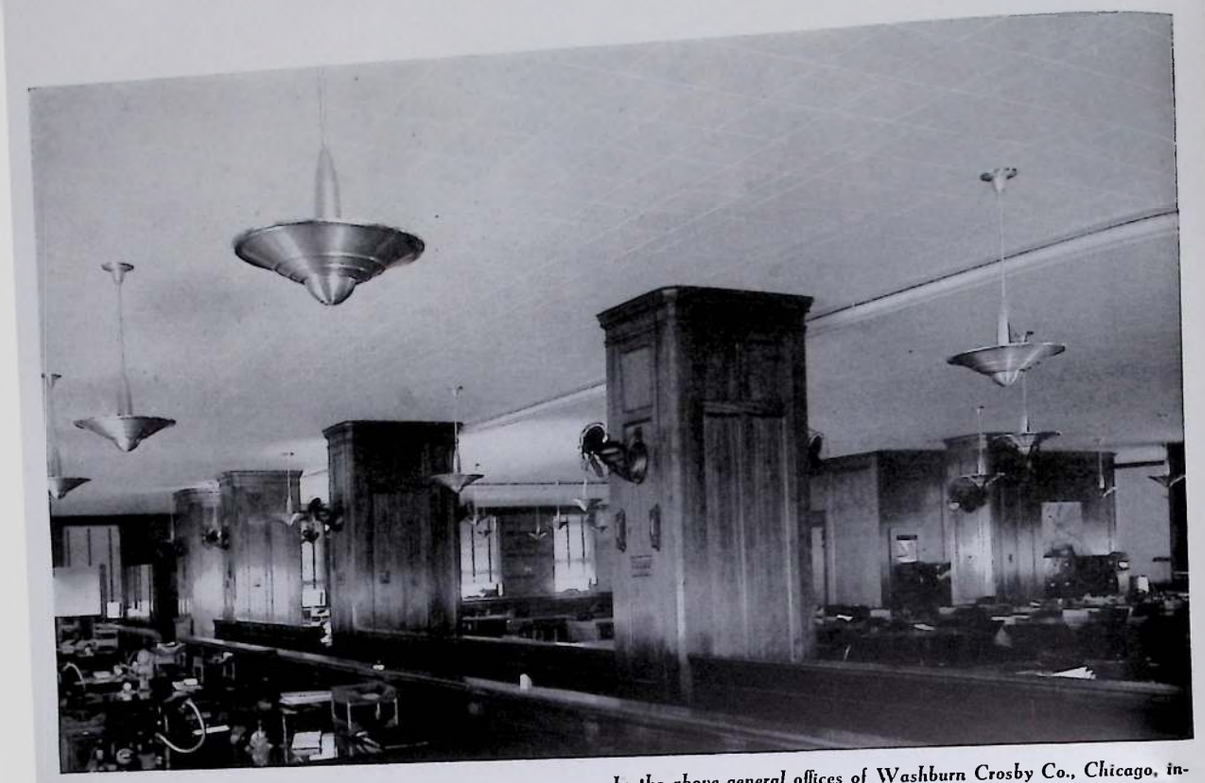
WATSONVILLE
U. S. Navy

WESTERN ASBESTOS CO.
Acoustical Engineers and Contractors
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OAKLAND · RICHMOND · SACRAMENTO

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In the above general offices of Washburn Crosby Co., Chicago, involved business routine is greatly helped by the quiet provided from the installation of Acousti-Celotex fibre tile on the ceiling.

TODAY twenty million people in the U. S. earn their living by working in offices. Business—once a simple routine of make-and-sell or buy-and-sell has become increasingly complex. New regulations of commerce—necessary provisions governing employee regulations and relationships—volumes of rules governing shipments of goods—city, county, state and federal tax schedules—approved modern regulation of services sold by companies, all require even the small business today to have a well-organized efficient office staff. . . . Despite improvements in office machines, more and more people each year are required to fill these office positions.

The office manager's budget requires that he organize his work and see that each assignment is handled efficiently by competent employees, otherwise overhead will be badly out of proportion to his company's business. . . . Personnel directors, office managers, department heads and officials are constantly confronted with turnover of employees—days lost by office workers—general and specific inefficiencies among employees—sometimes general lack of interest.

The office worker himself is vitally interested in doing his work well to insure advancement and security.

Noise Has Been Found to be a Powerful Force Working Against Office Efficiency

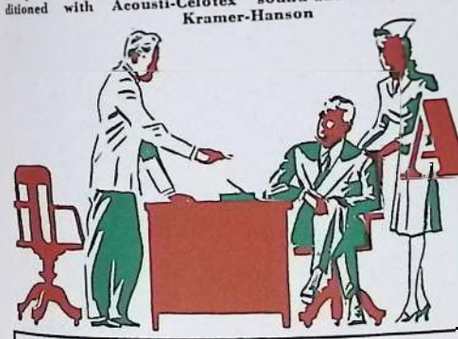
On this subject, the following pages are designed to inform the company official, the personnel director, the office manager, the department manager, the assistant managers and office personnel.



Reception room, National Aluminate Corp., Chicago, sound conditioned with Acousti-Celotex sound-absorbing tile. *Archt.*: Kramer-Hanson

"*Noise interferes with the efficiency of the worker. It lessens attention and makes concentration upon set tasks difficult . . .*"—Dr. Foster Kennedy in report published by Department of Health, New York City.

"*Injury measurable and immeasurable from noise as now widely attends human life, is real and not a matter for speculation. Relief from noise is procurable.*" Carey P. McCord, M.D., in the Journal of American Medical Association.



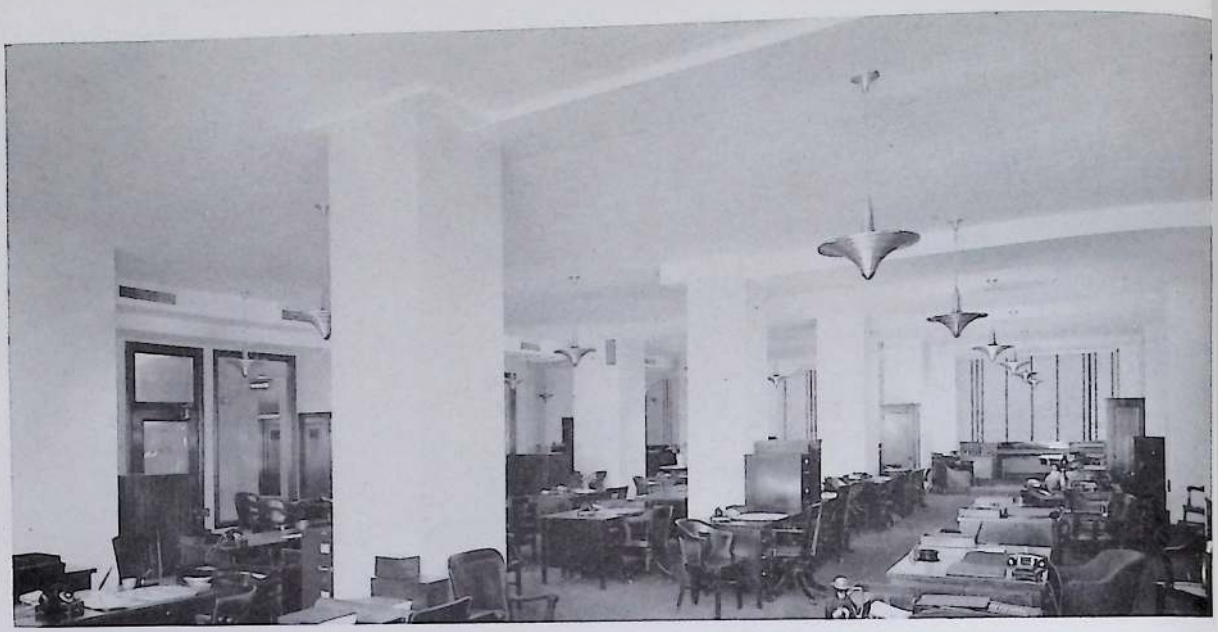
AUTHORITIES PRONOUNCE NOISE AN EXPENSIVE ITEM OF OFFICE OVERHEAD, BECAUSE IT IS THE ARCH ENEMY OF EFFICIENCY

"*Noise . . . exacts even a greater toll upon the nervous systems of mental workers and others who are noise sensitive.*" Dr. Vern O. Knudsen, Dean of Graduate Division, U.C.L.A.

"*Noise is in the same class with bad ventilation and poor lighting in its effect on human efficiency.*"—Dr. Paul E. Sabine, Director Riverbank Laboratories.

"*Noise lowers all of our faculties. It slackens and dulls our mental processes. It clouds judgment, reduces the precision of our actions and decreases general efficiency.*"—Dr. James L. McCartney, Neuro-Psychiatrist, in the Pennsylvania Medical Journal.

EXCESSIVE NOISE *in the office can be readily eliminated by sound conditioning with Acousti-Celotex. The investment is small . . . the returns liberal.*



In the above large main office of Ross Browne & Fleming, one of the largest real estate firms in Chicago, noise-reducing Acousti-Celotex fibre tiles, sound condition the offices so that no matter how many people are busy at once, all can hear clearly and concentrate easily.



BEFORE Above picture shows section of offices of Colgate-Palmolive-Peet Co., Jersey City, N. J. before application of Acousti-Celotex sound conditioning.



AFTER Improved light reflection and impressive new interior appearance are just two of the plus values in each installation of Acousti-Celotex.

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QUIET



RESULTS IN INCREASED VOLUME OF WORK IN THE OFFICE . . .

QUIET *reduces the percentage of errors in office work.* One company reports a reduction in errors after sound conditioning with Acousti-Celotex . . . typists—29%, other machine operators,—52%. *(See page 9.)*

QUIET *saves money on telephone bills.* In a quiet atmosphere there is less need for repetition . . . fewer call-backs because of misunderstandings, because each phone message is clearly understood. In many offices where long distance is extensively used, this alone is an important item.

QUIET *insures a reduction in absenteeism.* One office recorded a 37½% reduction in days lost in the departments of the office which were sound conditioned.

QUIET *eliminates the need for many partitions,* thus making fuller use of floor space, lighting, heating and ventilation systems. In many offices sound conditioning has allowed the removal of partitions, which needlessly cut up floor space, interfere with heating, ventilation and lighting.

QUIET *creates a stimulating atmosphere,* by improving the disposition of workers, and their attitude toward their assignments. Sound conditioning relieves the workers and officials from the strain of confusion caused by excessive noise. Quiet obtainable by sound conditioning with Acousti-Celotex will pay for itself quickly by reduction of errors and increase in efficiency of each individual worker.

The following two pages are devoted to pertinent information about sound conditioning offices. Study these carefully.



In private offices sound conditioning with Acousti-Celotex noise-reducing tile, adds an extra privacy by reducing noise from outer-offices; as well as quieting the room itself. *Left*—Office designed by the office planning division; Horders, Inc., Chicago.

Western Asbestos Co.: Architectural Manual (1946)
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25 QUESTIONS AND ANSWERS ABOUT SOUND CONDITIONING OFFICES

1 *What is Sound Conditioning?*

Sound Conditioning is the art and practice of treating rooms and the interiors of buildings so as to minimize the annoying effects of noise . . . "unwanted sound."

2 *What does Sound Conditioning contribute to office administration?*

Every office needs the full efficiency of each person. It has been proved that Sound Conditioning reduces errors, increases efficiency, eliminates excessive employee turnover and days lost. Conferences may be held at any desk without raising voices to surmount office din. (See study page 9.)

3 *How does the office employee benefit by Sound Conditioning?*

In a sound conditioned office the employee is relieved of the tension and strain caused by excessive noise. He makes fewer mistakes; finishes a full day of work with less fatigue.

4 *How does Sound Conditioning benefit the small office?*

In the small office, conversation by phone and in person may proceed while a typewriter or adding machine is being operated, even if there are no partitions provided. Hundreds of small offices with only two or three employees find sound conditioning a good investment.

5 *Is Sound Conditioning in offices something new?*

No, thousands of offices have been sound conditioned with Acousti-Celotex entirely or in part in the past 20 years.

6 *What is Acousti-Celotex?*

Acousti-Celotex is the registered trademark identifying sound absorbing perforated fibre tiles pioneered by The Celotex Corporation, since 1925, and developed into the world's most widely used material in its field.

7 *Is it practical to Sound Condition offices progressively as funds can be made available?*

Yes, this is often done.

8 *Can offices be Sound Conditioned after hours?*

Many office areas can be sound conditioned without any interruption of the regular work schedule. Overnight and over-the-week-end installations are frequently made in offices by the Celotex Sound Conditioning distributor.

9 *Is Sound Conditioning with Acousti-Celotex expensive?*

No. Quality, efficiency and appearance of the products has been improved over the past twenty years—yet the price today is substantially less than that of the early installations.

10 *How fast does sound travel in air?*

Eleven hundred and twenty feet per second.

11 *In what form does sound travel?*

In the form of spherical waves, increasing in size as they leave the source.

12 *In an office what happens when the sound waves reach the walls?*

Only a small part of the sound energy is absorbed at each contact and the remainder is reflected back into the room, resulting in an accumulation of unwanted sound-noise.

13 *Is there a method of testing materials to determine their ability to absorb sound?*

Yes, here are the absorption coefficients of some common building materials and furnishings:

MATERIAL	*Absorbs*	*Reflects*
Plaster	.025	.975
Concrete	.015	.985
Wood Paneling	.03	.97
Glass	.027	.973
Carpet	.20	.80
Acousti-Celotex Type C-4	.70	.30

14 *Why do Acoustical Materials absorb so much sound?*

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body either through the natural interstices on the surface or through mechanical perforations made in the face of the material expressly for the admission of those sound waves.

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In penetrating and traveling through this maze, the sound wave encounters just enough resistance to create friction which transforms the acoustic energy into heat.

Practically, the sound is "soaked up" by the material rather than reflected back into the room.

15 *How does Sound Conditioning "stop" noise?*

Sound Conditioning itself does not stop noise; a cough, a typewriter, a bookkeeping machine, a ringing telephne bell, loud conversation or any other noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface as light is reflected by a mirror. In the average room with hard plaster walls and ceilings, the sound traveling at an approximate speed of 1120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated, or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials, thereby hastening the silencing of the sound.

16 *How is "Adequate Absorption" determined for a room?*

The Sound Conditioning Engineer knows the present sound absorption capacities of the materials and furnishings in a room, and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

17 *In auditoriums used for employee mass meetings, social and business meetings, conventions, etc., is it possible to calculate the length of time sound will remain audible after the source has ceased?*

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$T = \frac{.05V}{a}$$

T = reverberation time measured in seconds.
V = volume of room expressed in cubic feet.
a = all existing sound absorbing units.

On request, The Celotex Corporation will be glad to supply detailed information.

18 *If the period of reverberation is too long, what are the effects?*

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound, or sounds, from the same source, creating a complex mixture of the several sounds. When this effect is pronounced, the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire phrases "blurred," "fuzzy" and unintelligible.

19 *Is Celotex Sound Conditioning used in offices only?*

No, Acousti-Celotex has been used to sound condition more offices, schools, hospitals, churches, stores, auditoriums, restaurants, factories, radio studios, and theatres than any other type of acoustical material.

20 *What is required to maintain areas sound conditioned with Acousti-Celotex?*

Acousti-Celotex requires no extra maintenance. It is repeatedly paintable, by any method, without loss of absorption. Just the care required of ordinary painted wall and ceiling areas will keep Acousti-Celotex new in appearance.

21 *Does the treatment differ for offices of varying sizes and uses?*

Yes. Each office should be analyzed and engineered for the proper amount of the right material. Through training and years of experience, the distributor of Celotex Acoustical Products is equipped to render this important service.

22 *Will Sound Conditioning improve the office lunch room or cafeteria?*

Yes. Where office employees eat in a restaurant provided by the company, the lunch period is more restful—there is less clatter and confusion. Employees are in better mental and physical condition for the rest of the day.

23 *Can Acousti-Celotex Sound Conditioning be installed in designs to suit individual taste?*

Yes, a wide variety of patterns are available in standard materials. The decorative possibilities are without limits.

24 *Does installation of Acousti-Celotex require structural changes in existing buildings?*

No, absolutely no structural changes are required.

25 *Who applies Acousti-Celotex Sound Conditioning?*

Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors selected by The Celotex Corporation are given thorough training in acoustical engineering and Sound Conditioning practices. See back page "Celotex Sound Conditioning Service."

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SOUND CONDITIONING OFFICES WITH ACOUSTI-CELOTEX IS NOT AN EXPERIMENT

Thousands of offices throughout the nation enjoy Acousti-Celotex sound conditioning—read what some of them have to say:

"Our office employees are able to accomplish much more work with less fatigue."

CONDUITS NATIONAL COMPANY, Ltd.,
Toronto, Canada

"At the end of the day we now go home minus that 'all gone' feeling which we previously had."

CAMDEN TRUST COMPANY,
Camden, New Jersey

"Our employees sent a round robin to the Management expressing their appreciation for the improved working conditions."

LEEDS & NORTHRUP COMPANY,
Philadelphia, Pa.

"There is no doubt that sound conditioning has a beneficial result on workers' nerves and that they have less sickness, hence putting in more hours in the year . . . . Some months ago when we had to move about 200 of our office staff to another area, the one thing I was asked for more often than anything else was, can we have a sound conditioning ceiling in the new space."

THE ROBERT SIMPSON COMPANY, Ltd.,
Toronto, Canada

"Now we can carry on conversations in the office without having to yell."

HARPER & McINTIRE COMPANY,
Ottumwa, Iowa

"Immediately after the installation, worker efficiency has been vastly improved, irritating noises subdued, and the entire personnel reacted instantly to the improvement."

UNITED EXCHANGE BUILDING CORP.,
Seattle, Washington

"The benefits of increased efficiency, improved morale and the pleasant atmosphere have returned more than the cost of the installation, made a little over a year ago."

AMERICAN CASUALTY COMPANY,
Reading, Pennsylvania

"The nerve-wracking clatter has disappeared, and now we wonder why we didn't do this long ago."

BOWEN, PERRY & FOBES, Inc.,
Syracuse, New York

"In the main office . . . makes it possible for private conversations to be held at each of the executives' desks without disturbing any of the others."

PYRAMID LIFE INSURANCE CO.,
Little Rock, Arkansas

"The factor most appreciated is the absence of the sharp, staccato sounds of typewriters and time stamps. . . . They have been reduced to such an extent that they are no longer an annoyance."

CONCORDIA PUBLISHING HOUSE,
St. Louis, Missouri

"Individual conferences and private conversations previously audible in many parts of the banking room have been isolated to a large degree. . . . This installation is the seventh we have made in our head office and branches."

NATIONAL BANK OF WASHINGTON,
Tacoma, Washington

"Celotex Sound Conditioning has saved our ears and our nervous systems if not our lives!"

THE AMERICAN NATIONAL RED CROSS,
Brooklyn Chapter

"There is a concentration of mechanical equipment in our Accounting and Credit Departments, including the Hollerith tabulating room and the electrically-operating accounting machines, in addition to a number of typewriters. . . . The improvement following your installation is very marked and is highly satisfactory in every respect."

WELLINGTON SEARS COMPANY,
New York, New York

"After several months experience, I would say it has cut the noise approximately 75%, with the result that I am obtaining greater efficiency from our employees in the late hours of the day."

MUTUAL BANK & TRUST COMPANY,
St. Louis, Missouri

"We can actually talk in a low tone of voice, no matter how many come into the office, with posting machine and five or six typewriters in operation, while before we could hardly hear ourselves think."

FIRST FEDERAL SAVINGS & LOAN ASSN.,
of San Antonio



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View of branch office Aetna Life Insurance Company, Los Angeles, Acousti-Celotex Sound Conditioned

AN ACTUAL STUDY OF SAVINGS EFFECTED BY CELOTEX SOUND CONDITIONING...

The following excerpts are taken from a published report of the experience of the Aetna Life Insurance Company, Hartford, Conn., by an official of that company.

"Before moving into a new building we made a careful and complete study of the effect of noise on employees in order to determine to what extent we should treat the building with sound-absorbing material.

"The department where we made the main test is known as the control department, where 30% of the employees had been on a bonus for more than a year prior to treating the ceiling. There were also several other classes of workers in this same room, such as typists, clerical checkers, machine operators, and so on. Our tests, therefore, show the effect on different types of jobs.

"Records of efficiency based on the bonus record were kept for a year in the control department before applying the sound-proofing and then for a year after sound-proofing was applied. The second year showed an increase in efficiency of 9.2%.

"In addition to this complete test, we also made tests in two other rooms which had been working under similar conditions.

"One of these rooms showed an increase in efficiency of 9.4% and the other showed an increase of 7.7%. The average of the three tests shows a 8.8% increase.

"At the end of the second year, the ceiling was covered with plaster board and records were kept for that year.

"Every period during this time the sound treatment was effective showed increased output, and immediately following the elimination of the effectiveness of sound absorption (by covering with plaster board), there was a drop in output.

"During the entire test period of two years four months, we kept a very careful record of errors as well as efficiency and the result shows as follows:

	Reduction in errors after treatment for sound absorption	*Increase after covering sound absorption with plaster board*
TYPISTS	29%	12%
MACHINE OPERATORS	52%	37%

"We found also that our employment department records showed that while the sound conditioning was effective, compared with a corresponding period before treatment, there was a *reduction of 47% in employee turnover and 37½% in days lost* in the departments where the experiment was carried on.

"The matter of reduced salary cost could be answered in the following manner: Increased efficiency of 8.8% if taken advantage of on an average of $1,000 would be a saving of $88 per year. The cost of sound conditioning at a price of 60c per square foot,* considering about 50 square feet to each person, would be $30, *saving $58 the first year per employee. In addition, consideration should be given to the saving by less errors, turnover, days lost.*"

*The cost is now substantially lower.

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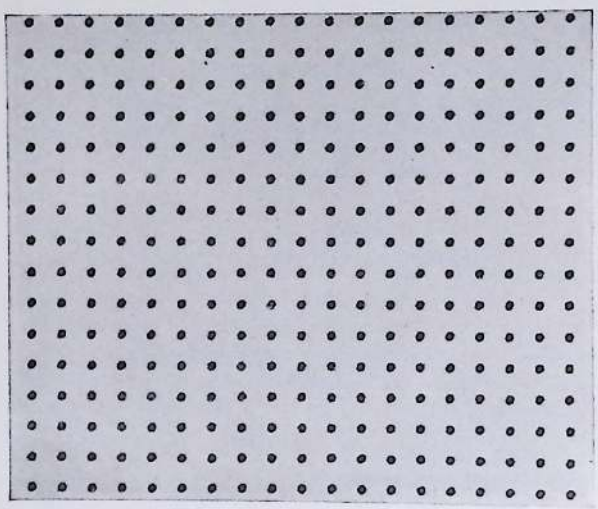
Selecting the Proper Materials

The sound conditioning of building interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as *acoustical products*.

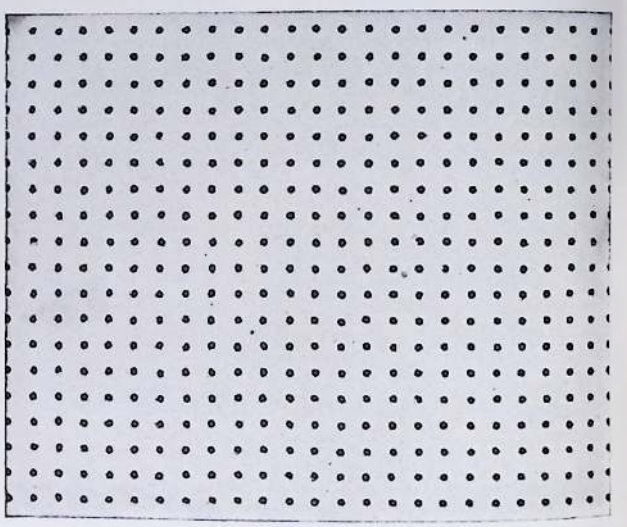
Celotex acoustical products include Acousti-Celotex cane and mineral tiles (top two pictures) and Mufletone standard and fissured tiles (two lower pictures). Both are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

Each area to be sound conditioned should be accurately analyzed and engineered so that the right material may be specified to produce the results desired.

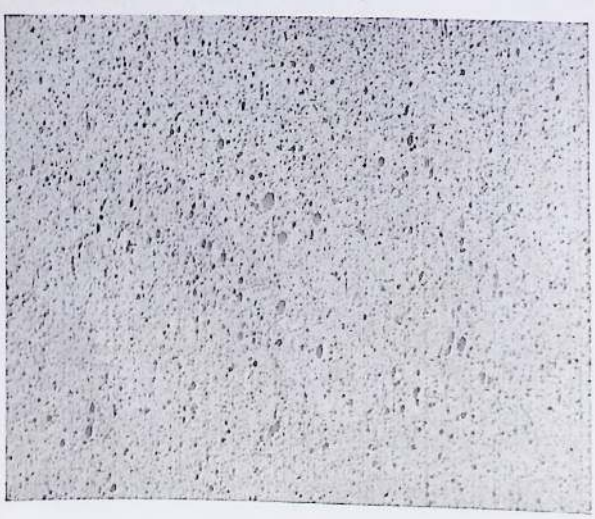
Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection—these important questions may be safely left in the hands of the local Celotex Sound Conditioning distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.

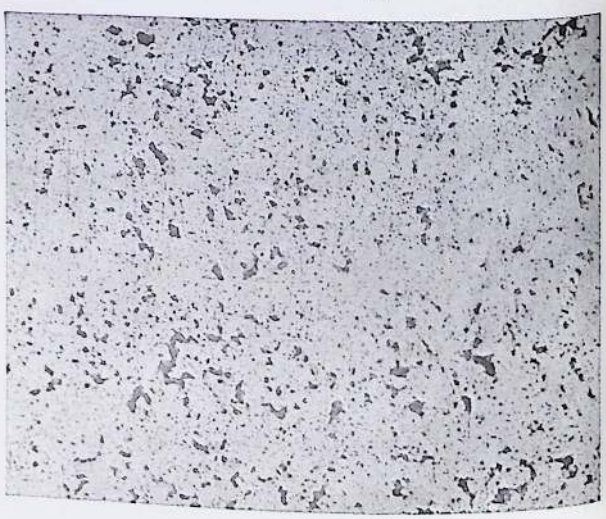


Above—Acousti-Celotex Cane Fibre Tile
Below—Mufletone Standard Type

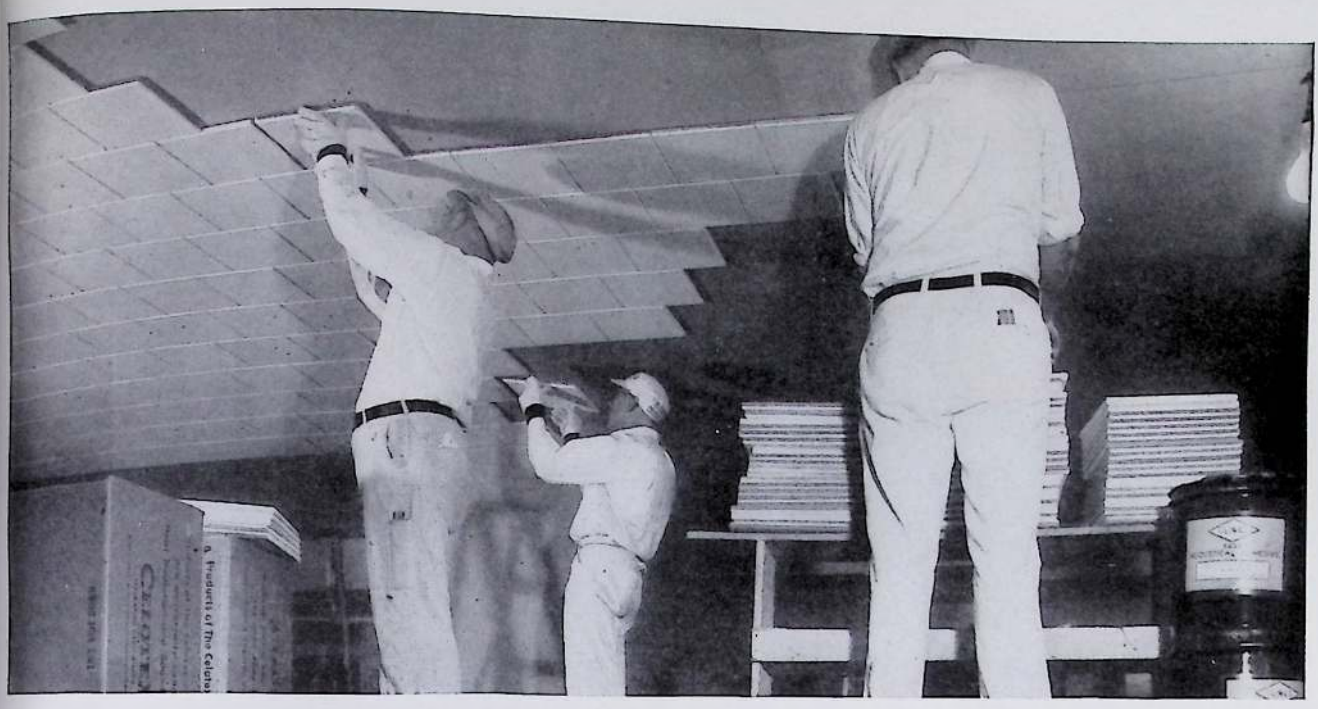


Above—Acousti-Celotex Mineral Fibre Tile
Below—Mufletone Fissured Type





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Sound Conditioning

WITHOUT INTERRUPTING OFFICE ROUTINE

The process of sound conditioning offices is not an ordeal. Many offices are treated after hours or over-the-week-end. The work is done by skilled trained mechanics without any interruption to the office work.

Acousti-Celotex is repeatedly paintable without loss of sound absorption.

No extra maintenance costs with Acousti-Celotex. Areas sound conditioned with Acousti-Celotex demand only the care and treatment of ordinary wall and ceiling surfaces. Nothing extra is required. Painting may be done without damage to the sound absorption materials.



Acousti-Celotex is washable



Acousti-Celotex is paintable

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CELOTEX SOUND CONDITIONING SERVIC



Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, *The Celotex Corporation in 1925 chose to seek out, school, and establish in all principal market centers an authorized engineering, sales, and contract service by independent, locally owned and operated enterprises.*

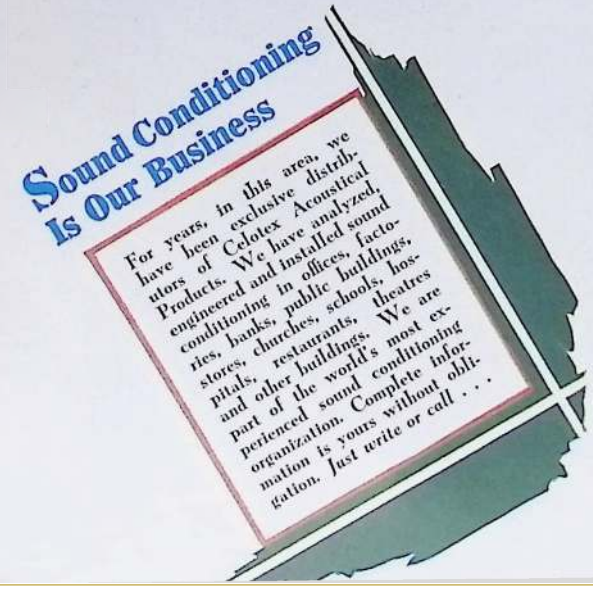
The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry.

This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained.

The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. *Ability in diagnosing acoustical problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are what we mean by service ideals.*

They constitute plus values written into every specification for a Celotex Acoustical Product.

THE CELOTEX CORPORATION · CHICAGO 3



Sound Conditioning with
ACOUSTI-CELOTEX
Perforated REG. U. S. PAT. OFF. *Fibre Tile* SINCE 1923

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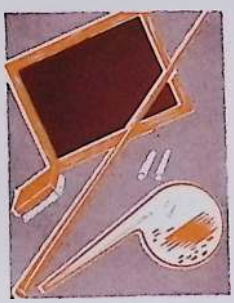
OUND CONDITIONING

an aid to those responsible for EDUCATION



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Few people realize the complexity of the problems assigned to those who are charged with the responsibility of properly operating an educational unit or system.

Operation and maintenance of grounds and buildings, sanitation, safety, health, recreation facilities and planning, designation of proper textbooks . . . selection of instructors . . . the purchase of supplies ranging from the right blackboard crayon to elaborate laboratory equipment . . . heating and ventilating . . . office and clerical organization . . . proper lighting . . . environment surrounding schools . . . these are but a few of the many things to be handled . . . all are necessary to accomplish the effective education of students.

The members of school boards, public and private . . . boards of regents . . . college and university corporations . . . school administrators and faculty organizations . . . deserve high praise and undying gratitude for able administration and for the tireless efforts expended to keep today's educational institutions and methods abreast of the times.

Efficiency in teaching is the ultimate goal of these moulders of good citizenship.

☆ ∘ ☆ ∘ ☆ ∘ ☆

Because noise has been found to be one of the greatest obstacles to effective teaching . . . those responsible for education are eliminating this condition . . . quickly, easily . . . and at small cost . . . by sound conditioning with Acousti-Celotex.

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Only those who teach know the experience of well prepared lectures and outlines resulting in little or no effect on the students. Lack of interest is a discouraging reward for careful planning of subject matter.

Lack of thought on the part of students . . . their failure to concentrate . . . is often the fault of noise . . . not the fault of the student or the instructor.

☆ ☆



Young minds are provided with every opportunity to learn in this quieted classroom in the East Bethesda Elementary School, Bethesda, Md., because architect A. Hamilton Wilson used Acousti-Celotex Sound Conditioning on the ceiling.

Noise discourages thinking and interferes with concentration. Few students have the mental toughness required to think and concentrate in an atmosphere disturbed by the noises of a restless class . . . of student traffic in corridors . . . of band and choral practice rooms nearby . . . of street traffic noises filtering in through open windows, and the hum of activity throughout the building.

Noise causes a fear reaction. This fact has long been accepted by the medical profession. Dr. Herman N. Bundesen, Health Editor of The Chicago Herald American has reported ". . . loud noise causes about the same reaction as a great fright... it may be followed by what we call shock . . . there is a general feeling of depression and a loss of vitality."

Noise interferes with accurate hearing. Investigation shows that a surprising amount of classroom procedure is misunderstood or entirely lost to the average student in ordinary classrooms, due to reverberation of unwanted sounds.

Noise causes early fatigue and irritation. The din of echoing conversations . . . banging of doors and windows . . . the shuffling of feet . . . the inevitable traffic noise of students passing in corridors . . . all build up into a column of noise that causes mental strain on both instructor and student . . . that results in early fatigue.

Excessive noise is one of the greatest handicaps to those who teach . . . yet it can be readily eliminated though the budget is limited.

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Band directors experience great difficulty in attempting to develop smooth working, well disciplined bands and orchestras . . . when they are forced to work against the excessive reverberation of ordinary practice rooms. With Acousti-Celotex sound conditioning as shown in the Edgerton Public School, Edgerton, Wis., individual musicians, instruments, and sections are clearly distinguishable . . . and direction is simplified.

Cafeterias and lunch rooms are veritable "noise mills." Joyful but loud conversations of students . . . attempting to be heard above the crash and clatter of dishes, silverware . . . and foot traffic of passing patrons . . . produce an almost unbearable condition. Acousti-Celotex sound conditioning solved this irritating problem in the cafeteria of the University of North Carolina, Chapel Hill, N. C.





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School corridors act as tunnels of noise. As students pass, going from one class to another, the noise of their voices . . . the shuffling and tread of their feet . . . reflected from one hard surface to another . . . build up a mounting din. Sound Conditioning with Acousti-Celotex as shown here in the Junior High School, Mamaroneck, N. Y., subdues this noise and minimizes penetration and disturbance of classrooms off the corridor.

QUIET AIDS STUDENT AND TEACHER

Quiet permits the student to apply his full mental energy to the subject at hand. Distracting noises do not delete his attention. He is able, therefore, to accomplish better results in his studies. Quiet enables the student to develop the habit of concentration—so valuable to him throughout his entire life.

Quiet insures correct hearing, by the student, of all classroom procedure. It gives him a better chance to learn.

Quiet is a natural curb to boisterous conduct on the part of students—in corridors at between-class periods —in lunch rooms and cafeterias—in the gymnasium—and other places where confusion is otherwise the rule. He can hear and be heard without effort. Better conduct results from quiet than from excessive regulation.

Quiet aids the instructor because the students hear clearly and are not distracted by class-restlessness, the creaking of seats, the crackling and rustling of many papers, shuffle of feet, and noises from the corridors. As noise destroys the power of teaching, quiet builds it up into an art.

Quiet allows both student and instructor to work a full day's schedule with more energy. Noise causes early fatigue—quiet protects the nervous system from this excessive "wear" and eliminates "afternoon-class-static."

Sound Conditioning is a practical, scientifically proven method of reducing noise and producing the quiet so essential to efficient educational methods.

More schools, colleges and universities have been Sound Conditioned with Acousti-Celotex products than with any other make or type of materials.

There are, perhaps, many things you may want to know about sound conditioning your school buildings. The following two pages are devoted to pertinent information. Study these carefully.

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QUESTIONS and ANSWERS About Sound Conditioning Schools

1 What is Sound Conditioning?

Sound Conditioning is the art and practice of treating rooms and the interiors of buildings so as to improve hearing conditions and to minimize the annoying effects of noise, . . . "unwanted sound."

2 What does Sound Conditioning contribute to school administration?

It is one of the greatest agencies for mental hygiene that can be introduced into the school house.

3 How does the Instructor benefit by Sound Conditioning?

It helps the instructor to present oral instruction more effectively because of better hearing conditions. It is also an aid to better discipline because confusion is reduced.

4 How does the Student benefit by Sound Conditioning?

It enables the Student to better understand oral instruction and class discussion. He works in an atmosphere that is quiet, not tense; this is conducive to better deportment and easier concentration.

5 Is Sound Conditioning in Schools something new?

No—over 4500 School Buildings have been sound conditioned with Acousti-Celotex entirely or in part in the last 20 years.

6 What is Acousti-Celotex?

Acousti-Celotex is the registered trademark identifying sound absorbing perforated fiber tiles, pioneered by The Celotex Corporation and developed into the world's most widely used material in its field.

7 Is it practical in already erected School Buildings to Sound Condition them progressively as funds can be made available?

Yes, this is often done. At least 50 per cent of Sound Conditioning materials are applied in this way.

8 What is a recommended progressive program for Sound Conditioning an existing school building?

Start with a noisy corridor, lunch room or band practice room. Auditoriums, gymnasiums, swimming pools, manual training rooms, laboratories, classrooms and administrative offices can follow in whatever order individual circumstances and funds may indicate.

9 Is Sound Conditioning with Acousti-Celotex expensive?

No, in the average installation Sound Conditioning represents a fraction of 1 per cent of the building cost.

10 How fast does sound travel in air?

Eleven hundred and twenty feet per second.

11 In what form does sound travel?

In the form of spherical waves, increasing in size as they leave the source.

12 In a walled-in enclosure what happens when the sound waves reach the walls?

Part of the sound energy is absorbed and the remainder is reflected back into the room.

13 Is there a method of testing materials to determine their ability to absorb sound?

Yes, here are the absorption coefficients of some common building materials and furnishings:

MATERIAL	ABSORBS	REFLECTS
Plaster	.025	.975
Concrete	.015	.985
Wood	.03	.97
Glass	.027	.973
Carpet	.20	.80
Acousti-Celotex Type C-9	.70	.30

14 Why do Acoustical Materials absorb so much sound?

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body either through the natural interstices on the surface or through mechanical perforations made in the face of the material expressly for the admission of those sound waves.

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In penetrating and traveling through this maze, the sound wave encounters just enough resistance to create friction which transforms the acoustic energy into heat.

Practically, the sound is "soaked up" by the material rather than reflected back into the room.

15 How does Sound Conditioning "stop" noise?

Sound Conditioning in itself does not stop noise; a cough, a footstep, a typewriter, a dropped tray, a bookkeeping machine, a ringing telephone bell, or any other noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface just as light is reflected by a mirror. In the average room with hard plaster walls and ceilings, the sound traveling at an approximate speed of 1120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated, or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials, thereby hastening the silencing of the sound.

16 How is "Adequate Absorption" determined for a room?

If your car travels 14 miles on one gallon of gasoline and you now have five gallons in the tank, with a journey of 182 miles before you—you can easily calculate that eight gallons more will be required to make the trip.

Likewise, the Sound Conditioning Engineer knows the present absorption capacities of the materials and furnishings in a room, and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

17 Is it possible to calculate the length of time sound will remain audible in an auditorium after the source has ceased?

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$T = \frac{.05V}{a}$$

T equals reverberation time measured in seconds.
V equals volume of room expressed in cubic feet.
a equals all existing sound absorbing units.

18 If the period of reverberation is too long, what are the effects?

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound, or sounds, from the same source, creating a complex mixture of the several sounds. When this effect is pronounced, the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire phrases "blurred," "fuzzy" and unintelligible.

Music is scrambled in the same way by the "echoes" in an excessively reverberant room. In rehearsals, the conductor or instructor finds difficulty in locating and correcting mistakes.

19 Is Reverberation the sole cause of poor acoustics?

In the majority of instances it is. With few exceptions, removal of excessive reverberation will create good hearing conditions.

In occasional cases the shape of a room or unwisely placed curved surfaces which focus sound at specific points will interfere with satisfactory sound distribution.

20 Is all Reverberation undesirable?

No. A certain amount is essential if speaking and music are to have a pleasing "live" quality.

21 Can Loud Speakers overcome faulty hearing conditions in an auditorium?

As a general rule, no. If reverberation is excessive, speech can not be understood no matter how much it is amplified. The function of loud speakers is to increase the power of the natural voice, when necessary.

22 Is there a proper reverberation time for auditoriums of different sizes and capacities, and how is it determined?

Yes. This is known as the Optimum Reverberation time.

Through painstaking experiment and years of experience and observation, the most satisfactory length of time, in seconds, for sounds to die out in auditoriums of various sizes has become known. This is a matter of record and is used as a base in correcting auditorium acoustics.

23 Does Acousti-Celotex Sound Conditioning cost more to install in existing school buildings than in new ones?

No, in most installations the cost is the same.

24 Does installation of Acousti-Celotex require structural changes in existing buildings?

No, absolutely no structural changes are required.

25 Who applies Acousti-Celotex Sound Conditioning?

Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors are selected by The Celotex Corporation and given thorough training in Acoustical engineering and Sound Conditioning practices. See back page on Celotex Sound Conditioning Service.

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Sound Conditioning Schools With Acousti-Celotex Is Not An Experiment

Hundreds of Schools, Colleges and Universities throughout the nation enjoy Acousti-Celotex sound conditioning. *Read what some of them have to say.*

"I am writing in connection with the acoustical treatment of the Britannia High School auditorium.

"Numerous tests which we have carried out in connection with the improvements in the acoustical qualities of this auditorium have been most gratifying.

"The Vancouver Board of School Trustees and its officials are very satisfied indeed with the most excellent job which you did in connection with the Britannia High School auditorium."

H. N. MacCorkindale,
Superintendent of Schools
Vancouver, B. C.

* * * *

From Charles A. Smith, Kansas City, Architect, "For a number of years I have been using acoustical treatment in the Auditoriums, Music and Expression rooms, Gymnasiums and Swimming Pool rooms of all school buildings, wherever the funds available would allow its use. The beneficial results more than justify the cost.

"I have used Acousti-Celotex treatment in twenty-five school buildings in Kansas City, Missouri, and in many other buildings in the surrounding territory, with uniformly satisfactory results."

* * * *

"The Irvington School has Acousti-Celotex ceilings throughout and the difference in quietness between that building and all other school buildings of the city, is amazing. There is a peace and a relaxed atmosphere which not only simplifies the task of administration, but also improves the disposition and temperament of teachers and pupils. It is one of the greatest agencies for mental hygiene that can be introduced into the school house."

H. M. Barr, Director Research Dept.,
Portland, Oregon, Public Schools

* * * *

"Iowa State College has installed a considerable amount of acoustical treatment in the past few years and among the rooms which have been treated are lecture and classrooms, accounting offices, small radio broadcasting booth, playing room for the carillon, and a dormitory recreation room. Persons who have occasion to use these rooms are apparently very well pleased with the results which have been obtained.

B. H. Platt, Superintendent

"I am writing to congratulate you on the excellent job of sound conditioning the new University High School . . .The contrast between this school and the other schools not so treated is very evident and is remarked upon by all visitors. The noise-subduing effect of the treatment in corridors and halls is most evident and we are highly pleased with the work," *writes* B. F. Pittenger, Dean of the School of Education, The University of Texas at Austin.

* * * *

Brother Anthony, Superior of Morris Institute at Searcy, Arkansas, *comments*, "We derive quite a little amusement from visitors and inspectors by whom we are frequently asked, 'why we do not allow the boys to be as noisy in the gym as in the adjoining playhalls.' Although they saw the boys run and romp as only boys can do with mouths wide open, the visitors felt that restrictions had been imposed until we explained to them the effect of Acousti-Celotex on the ceiling."

* * * *

"One of the most appreciated features of our new Greeley Junior High School building is the Acousti-Celotex sound conditioning. Pupils, teachers, and school patrons are universal in their commendation.

"Having moved our general school offices from the High School building which is not so treated to this building, I can assure you that the difference is very noticeable. Hundreds of students passing in hallways and coming out of classrooms will cause a certain amount of noise. In this building that noise is cut to a minimum. This treatment, plus the large amount of natural lighting which we have, has made our building one of the most modern in this part of the country."

H. D. Eldridge, Superintendent,
City Schools, Greeley, Colorado

* * * *

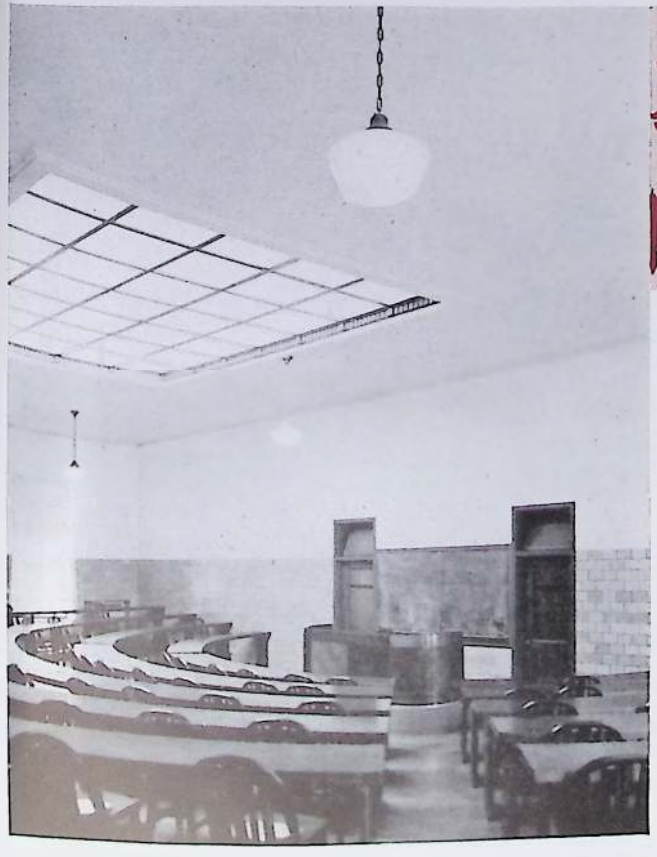
"Three years ago we placed pre-painted Acousti-Celotex on the ceiling of the Lincoln School auditorium. This treatment changed the room from a 'rainbarrel' to an auditorium with perfect acoustics. Two years ago we treated the ceilings of all corridors, music rooms, and office quarters in the Lincoln Building. Our new $300,000 addition has complete Acousti-Celotex Sound Conditioning. The latter includes all classrooms, corridors, gymnasium-auditorium, music rooms, etc. The band room is perfect. It confines all sound. In general, may I say that it prevents teachers' and pupils' nerves from getting on edge. It is conducive to quiet concentration."

Reede Gray, Superintendent,
The Public Schools,
Redwood Falls, Minnesota

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Quiet for Study and Play

Certainly a gymnasium is no place in which to curb the noise of athletic youth—yet without sound conditioning noise becomes a problem not only for the gym instructor but for instructors and students in *adjoining* classrooms as well. Illustrated is the gymnasium of Eastern High School, Baltimore, sound conditioned with Acousti-Celotex. No better way to lure young people into a library than to provide and insure quiet, without imposing strict rules. Preston M. Geren did just this by using decorated Acousti-Celotex on the ceiling in the New London High School Library, New London, Texas . . . Architects Weiss, Dreyfous & Feiferth, used Acousti-Celotex Sound Conditioning to make lecturing and the taking of notes a simple, easy pleasure in the Leche Hall Lecture Room, Louisiana State Univ.

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SELECTING THE PROPER MATERIALS

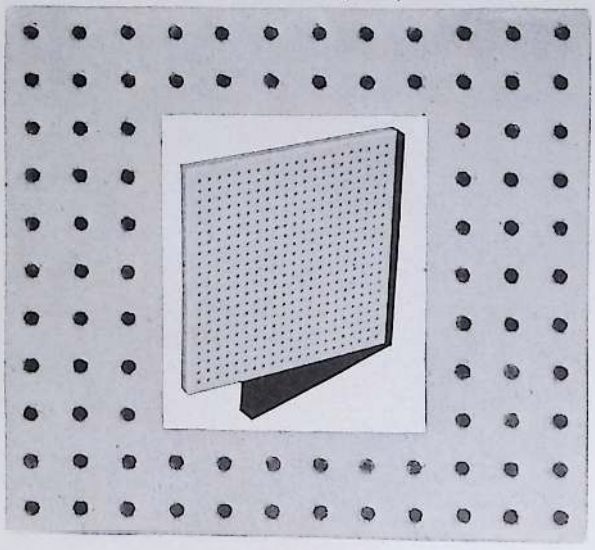
The sound conditioning of building interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as *acoustical products.*

Celotex acoustical products include Acousti-Celotex cane and mineral tiles (top two pictures) and Muffletone standard and fissured tiles (two lower pictures). Both are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

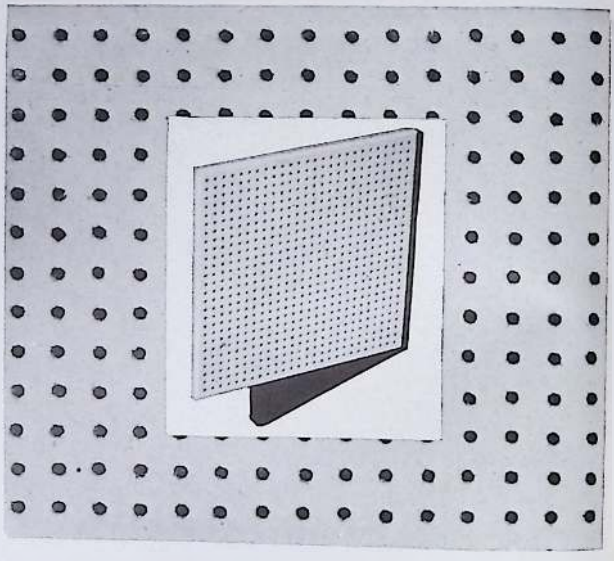
Each area to be sound conditioned must be accurately analyzed and engineered so that the right material may be specified to produce the results desired.

Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection—these important questions may be safely left in the hands of the local Celotex Sound Conditioning distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.

Acousti-Celotex (Cane)



Acousti-Celotex (Mineral)



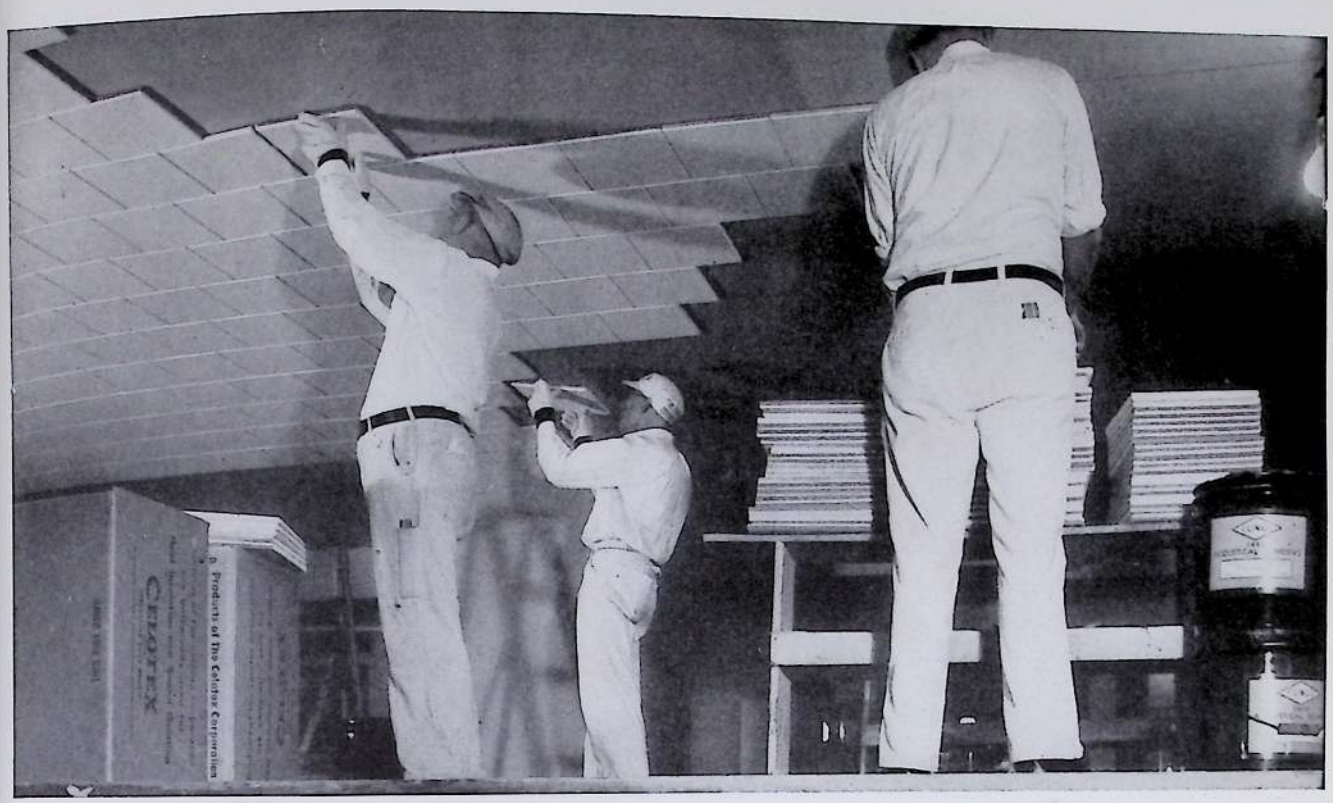
Muffletone (Standard)

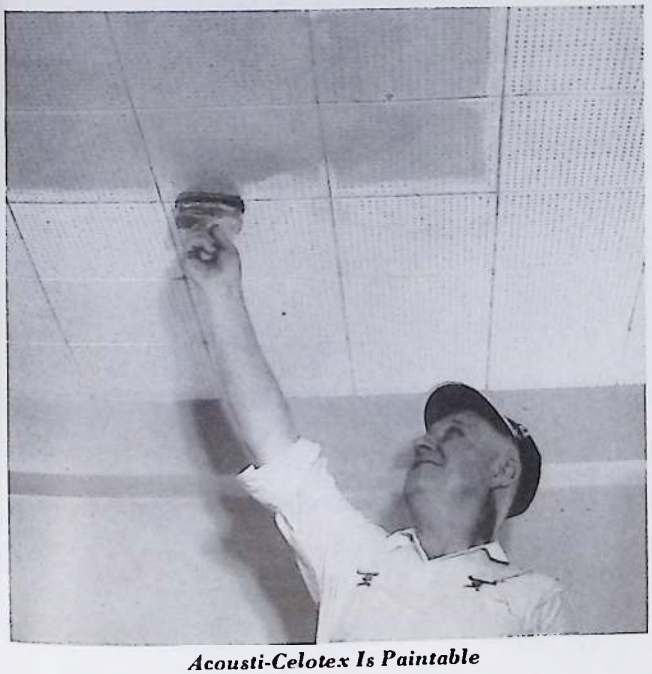


Muffletone (Fissured)

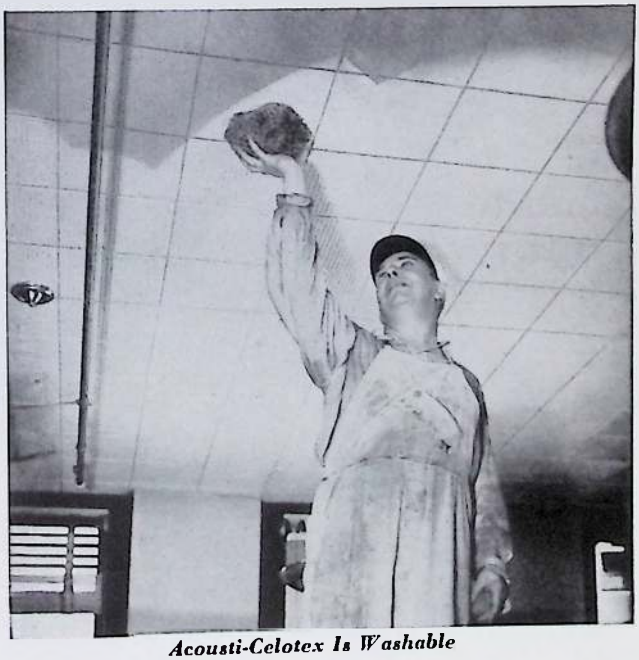


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Acousti-Celotex Is Paintable



Acousti-Celotex Is Washable

IT'S AS QUICK TO QUIET AS OVERNIGHT

The process of transforming a noisy room into a quiet one with Celotex Sound Conditioning is not an ordeal. In occupied quarters, the work can be done overnight by skilled, trained mechanics.

"Thank your representatives . . . we appreciate very genuinely the prompt and courteous manner in which your workmen functioned"—this kindly expression is typical of many addressed to Celotex Sound Conditioning distributors. Service to them is a solid asset, painstakingly built up over many years' experience in this field.

No Extra Maintenance Costs with Acousti-Celotex—Areas sound conditioned with Acousti-Celotex demand only the care and treatment of ordinary wall and ceiling surfaces. Nothing extra is required. Painting may be done without damage to the sound absorption of the materials.

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Celotex Sound Conditioning Service

Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, The Celotex Corporation in 1925 chose to seek out, school, and establish in all principal market centers an authorized engineering, sales, and contract service by independent, locally owned and operated enterprises.

The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry.

This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained.

The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing acoustical problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are what we mean by service ideals.

They constitute plus values written into every specification for a Celotex Acoustical Product.

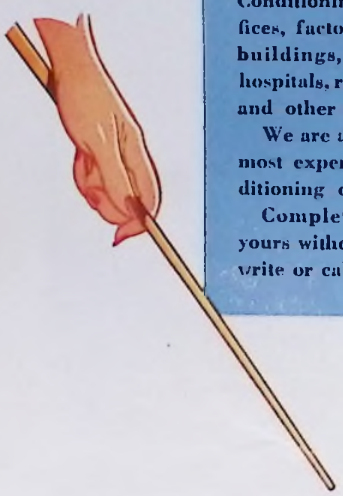
THE CELOTEX CORPORATION • CHICAGO

Sound Conditioning Is Our Business

For years, in this area, we have been exclusive distributors of Acousti-Celotex Products. We have analyzed, engineered and installed Sound Conditioning in schools, offices, factories, banks, public buildings, stores, churches, hospitals, restaurants, theatres and other buildings.

We are a part of the world's most experienced sound conditioning organization.

Complete information is yours without obligation. Just write or call . . .



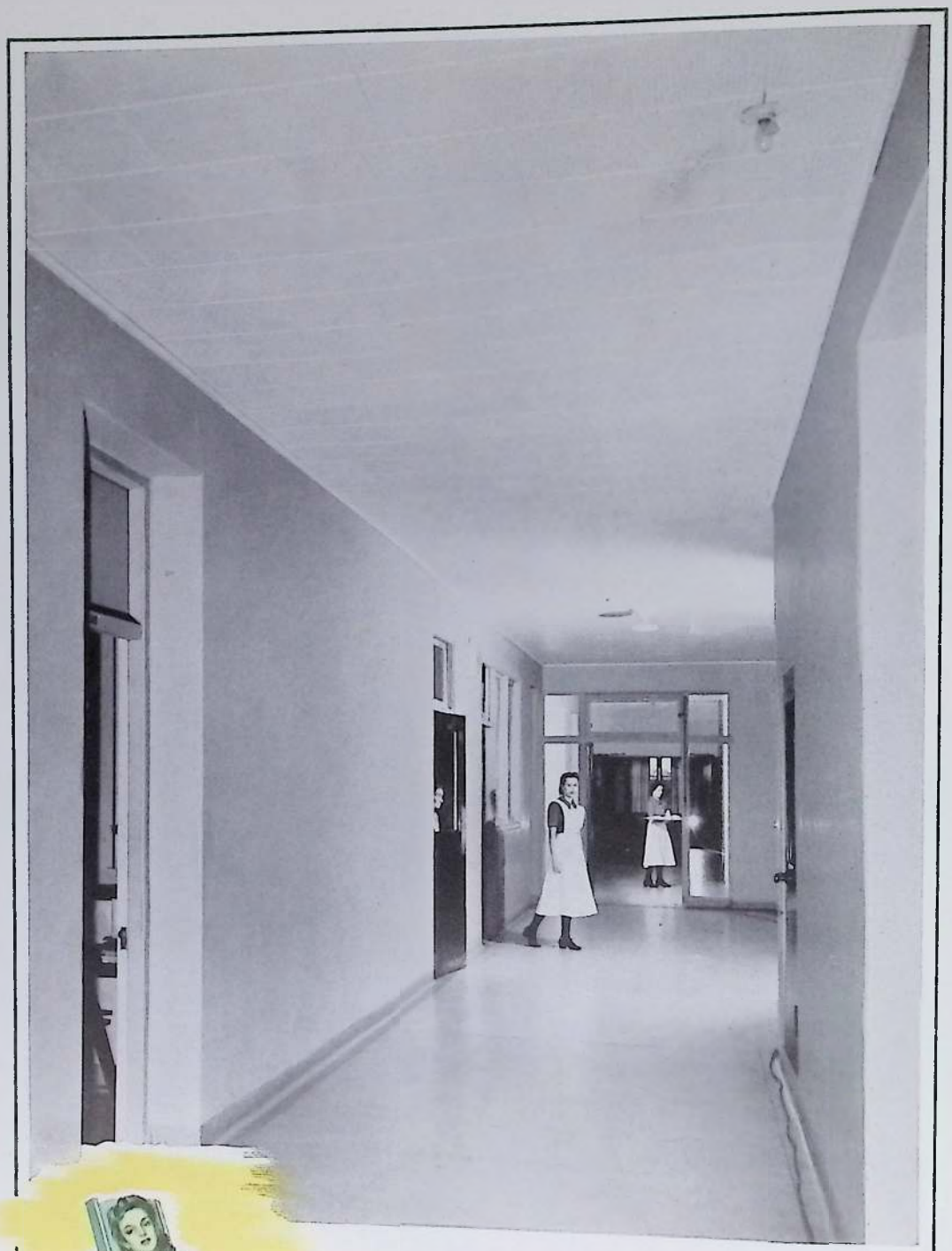
Sound Conditioning with
ACOUSTI-CELOTEX
REG. U. S. PAT. OFF.
Perforated Fibre Tile SINCE 1923

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THE QUIET HOSPITAL

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Corridor in Eve ton Hospital, Eve ton, Illinois, Acou Celotex Sound C ditioned for rest healthful, quiet.



The Quiet Hospital Is Quiet Inside

Street zoning for quiet around a hospital is not quiet enough. Hospitals must be quiet *inside* too. The hospital that provides "inner room quiet," through sound conditioning, gains patients' gratitude, and on such considerate service, builds prestige.

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Noise Is An Irritant

The public has learned from the medical profession that noise interferes with human welfare because it causes a fear reaction. The noise in our environment does not have to be of deafening proportion to start a long-continued fear reaction that is undesirable for the health and welfare even of healthy people. There is a growing awareness that we cannot control our biological reactions to noise and that its effects upon us are automatic, of a reflex nature, and are more than likely ineradicable.

Says Dr. Herman N. Bundesen, Health Editor, The Chicago Evening American: "At the recent anti-noise conference held in England, Dr. Dan McKenzie revealed the interesting fact that during the world war some men were really killed by noise itself. The shock of the sound waves, resulting from high explosives, was actually able to produce death. This gives us unmistakable evidence that noise kills. And we are equally certain that excessive noise generally has an injurious effect on the mind and the body. Not only that—but loud sounds may also be painful or harmful to the ear or to the brain, or to both. As a matter of fact, a sudden, loud noise causes about the same reaction in a person as does a great fright, and if this reaction is bad enough, it may be followed by what we call shock—that is, there is a general feeling of depression and a loss of vitality."

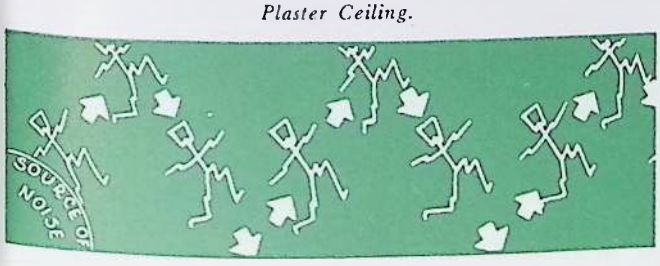
In hospitals where nerves are taut, and minds and bodies indisposed, the effects of noise are greatly magnified. Even though vigilant efforts are made by hospital personnel to be as quiet as possible, all sounds are needlessly magnified and carried by reflection unless sound conditioned ceilings promptly hush them.

Visitors conversing, people constantly walking, patients being moved about, elevator doors opening and closing, the clatter of trays and dishes, noises from dining rooms, utility rooms, nurseries, cries of suffering, street and traffic noises—all are effectively hushed by Acousti-Celotex Sound Conditioning.

Noise vs. Quiet

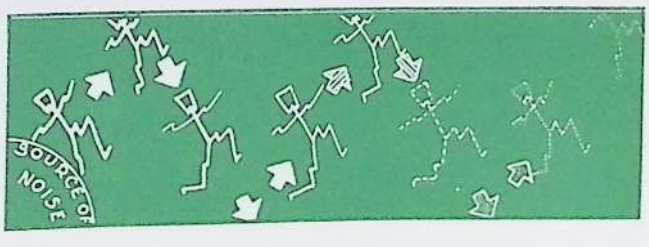
The diagram directly below illustrates how sound originating in corridors and rooms with ordinary plaster ceilings is constantly reflected from one non-absorbent surface to another, thus filling the rooms with noise and, in the case of corridors, freely transmitting it to other areas.

Plaster Ceiling.



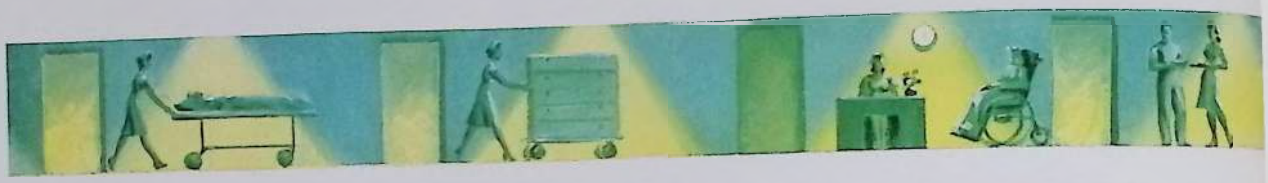
In the diagram below, sound originating at the same source is reflected to the sound conditioned ceiling, where it is quickly subdued by sound-absorbing properties of the material, in this manner confining the spread of sound and quickly quieting the room. Corridors cease to act like huge speaking tubes.

Plaster Ceiling covered with Acoustical treatment.



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These Hospitals Traded Noise for Quiet



How Acousti-Celotex Sound Conditioning effectively transforms noisy conditions to quiet comfort is told in the following testimonials:

Evanston Hospital Association,
Evanston, Illinois, *writes:*

"As you know, the job of applying Acousti-Celotex to General IV has been completed. I want to tell you how very pleased we are with the result. I also want to compliment your men on the quietness with which they worked. It would have been impossible for them to have used greater care or have been more considerate of the patients."

Ada Belle McCleery, *Superintendent.*

Harry Beal Torrey, M.D.,
Director of Children's Hospital
of the East Bay, Oakland,
California, *tells us:*

"Satisfaction is being expressed on all sides for the comfort that is being experienced from your recent installation of Acousti-Celotex in this Hospital and the way in which the work was done. Please accept our appreciation."

The Union Memorial Hospital,
Baltimore, Maryland,
sends this letter:

"Results from the installation of Acousti-Celotex tile here have been more than satisfactory. Installation was started four years ago, and selection of this medium was made after comparison with other materials on the market . . . The first installation was in our serving kitchens and utility rooms . . . Installation in the cafeteria eliminated the bedlam and confusion, almost unbearable at times, and substituted an atmosphere of peace and quiet . . . The corridors on all the floors where patients are cared for have now been soundproofed, as has the main floor where the administrative offices are located.

"We have painted and repainted and so far have found no discernible loss in efficiency . . . .

"We feel that soundproofing has been a step forward in improving service to patients."

Clyde D. Frost, M.D., *Director.*

The General Hospital of Syracuse,
116 East Castle Street,
Syracuse, New York, *writes:*

"Your men have just completed acoustical treatment of our main corridor, four offices, and the visitors' room. I am amazed at the extent of noise elimination which has been accomplished by this treatment. We have made a major improvement in the hospital.

"I wish to record my appreciation of the way in which this job was handled. There was little if any inconvenience to our people or the many visitors."

Carl P. Wright, *Superintendent.*

Souer Sylvain, *Provincial Treasurer,*
Hospital St. Joseph,
Lachine, Quebec, *writes:*

"The acoustical material installed in our new hospital by your company has proved to be very satisfactory . . . The feature of Acousti-Celotex

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which appealed to us was its paintability. This is important to a hospital where cleanliness is so necessary."

From Santa Monica Hospital, Inc.,
Santa Monica, California:

"It gives me great satisfaction to write and tell you how well satisfied we have been with the sound-proofing of our lobby, the nursery, and delivery room. The delivery room has been particularly appreciated, both by doctors, nurses, and patients.

"The part we particularly appreciate about the Acousti-Celotex treatment is our ability to give it a coat of paint when necessary and still not destroy the acoustic properties." W. S. Martensen.

Heacock & Hokanson, Scheuringer,
Philadelphia architects, *say:*

"Acousti-Celotex as well as other sound-deadening materials have been used by this office for many years, and it is a pleasure to state that we find the Acousti-Celotex particularly adaptable to hospital use by reason not only of its sound-quieting value, but especially because your product can be repainted without materially reducing its efficiency.

"This is a very important detail in hospital construction where cleanliness and sanitation require frequent paint applications.

"We find it as well, very attractive in appearance, easy to apply, and the cost is not excessive."

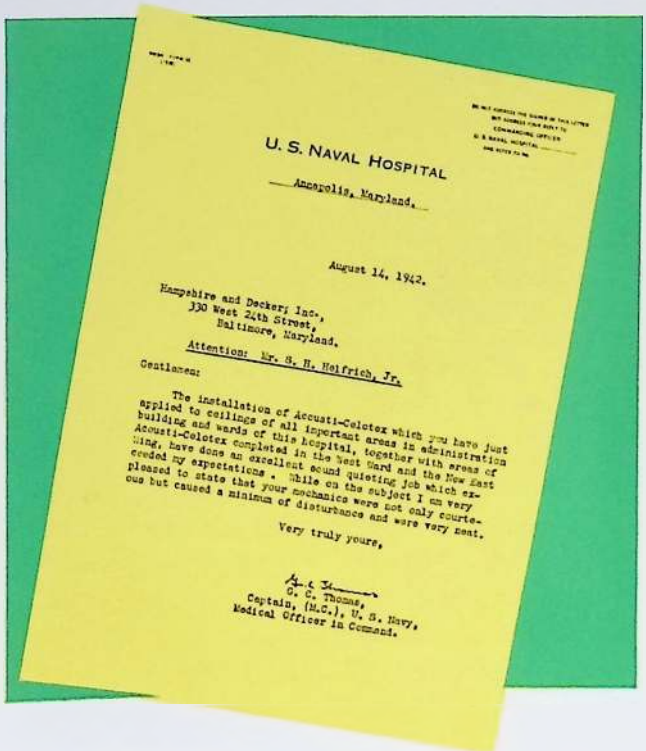
J. Moss Beeler, M.D., *Superintendent,*
Spartanburg County Dept. of Health,
Spartanburg, South Carolina, *writes:*

"Our building is constructed of brick and hollow tile with terrazzo floors, fire-proof; and, of course, noise has been one of our biggest problems since it was opened. In fact, the halls and corridors have been so noisy that our patients have complained continuously . . . . we opened up the first floor for children and at that time realized that we would have to do something if we were to keep children in the building and not have continuous complaints from our patients. As you know, we called in your firm, you surveyed the hall and treated the ceiling with Acousti-Celotex and also our main diet kitchen and another hall. From that time until this year we have kept the children on this floor with no complaint from patients on other wings of the building. This material has proven very satisfactory."

From W. D. Barker, *Superintendent*
of Georgia Baptist Hospital and
School of Nursing, Atlanta, Georgia:

"We wish to take this opportunity of informing you that over a year ago we installed Acousti-Celotex in the corridors of our hospital, and the officials of the hospital have been exceptionally well pleased with this improvement, as well as the many patients that are continually passing through our hospital.

"In our new addition to the hospital we specified Acousti-Celotex, which has been installed in all ceiling areas of this new addition, and we are very well pleased with the quieting results as well as the appearance of this material."



U. S. NAVAL HOSPITAL

Annapolis, Maryland,

August 14, 1942.

Hampshire and Decker, Inc.,
330 West 24th Street,
Baltimore, Maryland.

Attention: Mr. S. H. Helfrich, Jr.

Gentlemen:

The installation of Acousti-Celotex which you have just applied to ceilings of all important areas in administration building and wards of this hospital, together with areas of Acousti-Celotex completed in the West Ward and the New East Wing, have done an excellent sound quieting job which exceeded my expectations. While on the subject I am very pleased to state that your mechanics were not only courteous but caused a minimum of disturbance and were very neat.

Very truly yours,

C. C. Thoms,
Captain, (M.C.), U. S. Navy,
Medical Officer in Command.

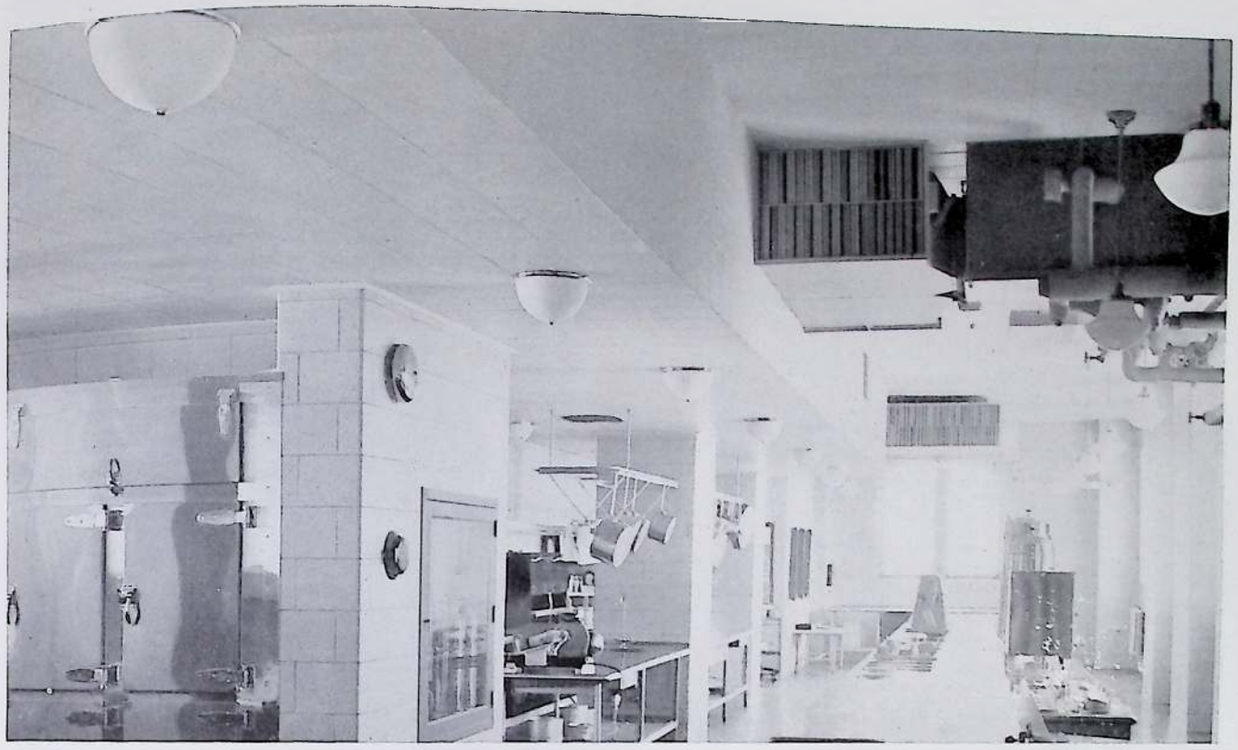
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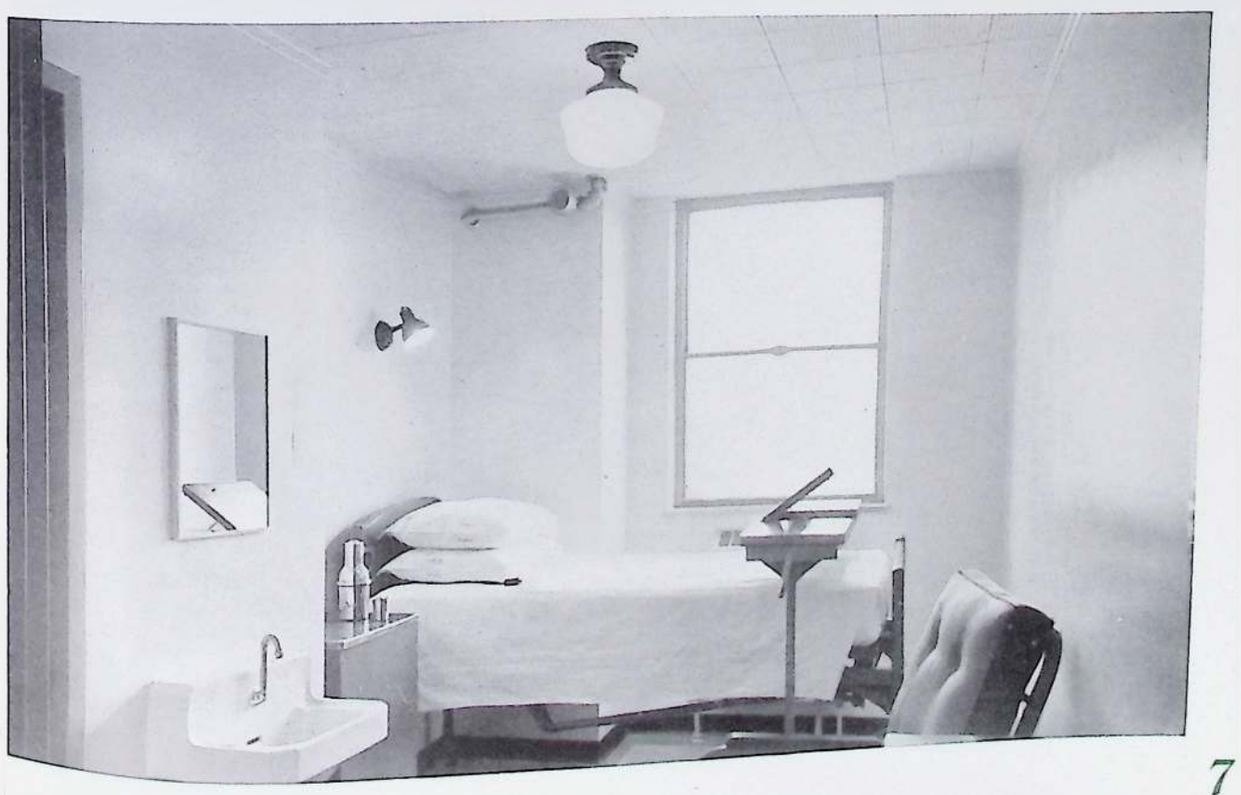
ABOVE: *Ward in Charity Hospital, New Orleans. Here Acousti-Celotex Sound Conditioning provides a feeling of privacy through quieting all unwanted, irritating noise. Architects, Weis, Dreyfous & Seiferth, used this sound conditioning throughout this 2500 bed institution.* BELOW: *A dining room in the Ellis Hospital, Schenectady, New York, with Acousti-Celotex ceiling—assuring efficiency and quiet. Architects: Heacock, Hokanson & Scheuringer.*





ABOVE: *Kitchen in Delaware Hospital, Wilmington, Delaware, where the constantly busy staff do their work faster and more efficiently, thanks to the Acousti-Celotex ceiling.*

BELOW: *A private room in Broadlawn's Polk County Public Hospital, Des Moines, Iowa, excellently sound conditioned with an Acousti-Celotex ceiling, affording an extra measure of comfort. Architects: Dougher, Rich & Woodbury.*



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How Noise is Quieted by Acousti-Celotex Sound Conditioning

Quiet in hospitals promotes health, more rapid recuperation, eases nerves of the sick, aids doctors, nurses and staff in giving and executing orders. An Acousti-Celotex Sound Conditioned Hospital operates more smoothly and in many instances, more economically than a noisy hospital.

How Noise is Measured and Defeated

The ear accommodates a tremendous range of sound intensities which for convenience are expressed logarithmically in Decibels, and it is common engineering practice to state the noise quieting effect of sound conditioning of rooms in terms of decibel reduction. Comparative decibel readings — with their corresponding intensity levels—of familiar noises are shown in this simple scale:

Intensity—amount of energy in the sound	*Decibels*	*Type of Noise*
1,000,000,000,000	120	
100,000,000,000	110	Airplane Engine
10,000,000,000	100	
1,000,000,000	90	Heavy Traffic, Pneumatic Drill
100,000,000	80	
10,000,000	70	Noisy Office, Telephone
1,000,000	60	Conversation, Ordinary Traffic
100,000	50	Average Office
10,000	40	Ordinary Conversation
1,000	30	Quiet Home, Quiet Conversation
100	20	
10	10	Rustle of Leaves, Whisper
1	0	

In sound conditioning the existing hospital building where the advantages of pre-planning for noise reduction is denied, and extensive remodeling cannot be done, the key question is always, "To obtain the greatest immediate benefit, where shall we begin?" That is, assuming the budget appropriations do not permit the entire hospital to be treated at one time.

Until widespread experience with sound conditioning in all of the various hospital areas became common, the logical approach seemed to be that of first giving attention to specific noise centers. The thought being, of course, partially one of "sound-proofing." Consequently the centrally located diet kitchens, utility rooms and other service areas were generally accepted as the primary points at which to begin acoustical treatment. And by cutting down the noise levels in these rooms, the volume of sound that escaped into the corridors and adjacent areas was considerably lessened.

The current practice of planning for isolated locations for such areas rather than having them centrally located, has shed much new light on the problem of spreading noise. Experience has shown that in thinking of the hospital noise problem as a whole, the frequently overlooked corridors are probably the outstanding offenders in most hospitals.

The average corridor acts as a huge speaking tube not only for those sounds that are generated by clicking heels, conversations, service carts, etc., within the corridor itself, but also for all of the noises that leak into it from other areas. And since all areas open into a corridor, a free passage-way for noise throughout the entire floor is provided.

Unlike light waves, which travel in straight lines, sound waves flow freely around corners. Consequently a sound in any part of a reverberant corridor will flow into every opening off that corridor unless some means is taken to check it enroute. In a properly sound conditioned corridor, sound energy is exhausted before it travels far and ordinary hospital noises are completely blocked by turns from one section of the building to another.

This explains why such immeasurable relief is frequently obtained by treatment near elevators, nurses' stations and other busy spots located near corridor intersections.

There is no intention here to under-estimate the value of sound conditioning in nurseries, maternity rooms, dining rooms, kitchens, wards or private rooms where indicated. The purpose is to point out that as a general rule greater immediate relief for the entire hospital will be achieved by first eliminating the corridors' noise-carrying power.

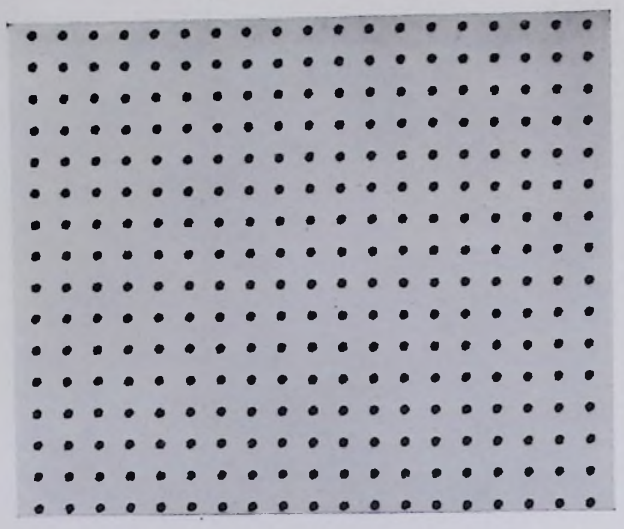
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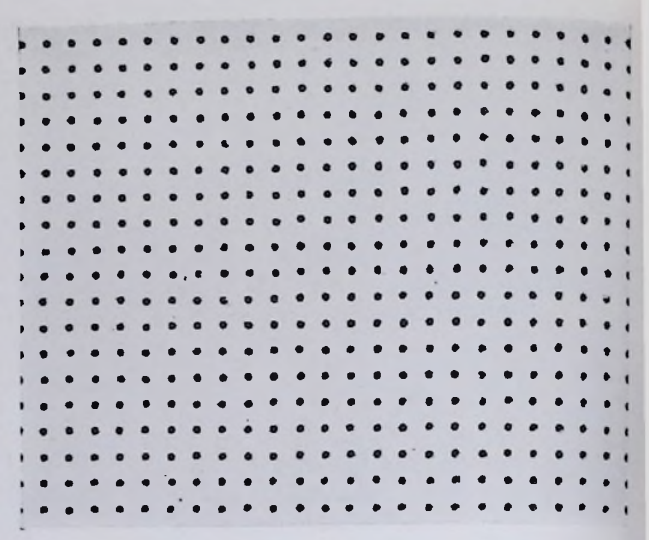
LOBBY OF *Peralta Hospital, Oakland, California. Writes this hospital, "About three years ago we were faced with a serious problem . . . regarding reflected sounds in our corridors, dining room and surgery. The first test of your product was made in the dining room . . . the noisiest dining room in the City of Oakland. The results . . . you well know . . . The Board of Trustees authorized sound conditioning with Acousti-Celotex throughout the entire building."*



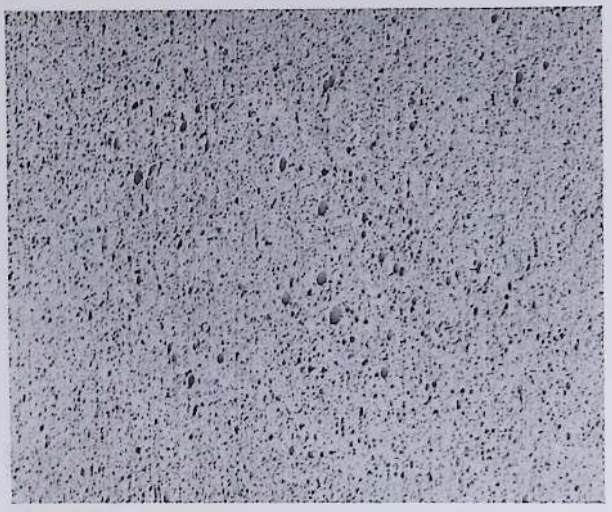
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Acousti-Celotex (Cane)



Acousti-Celotex (Mineral)



Muffletone (Standard)



Muffletone (Fissured)

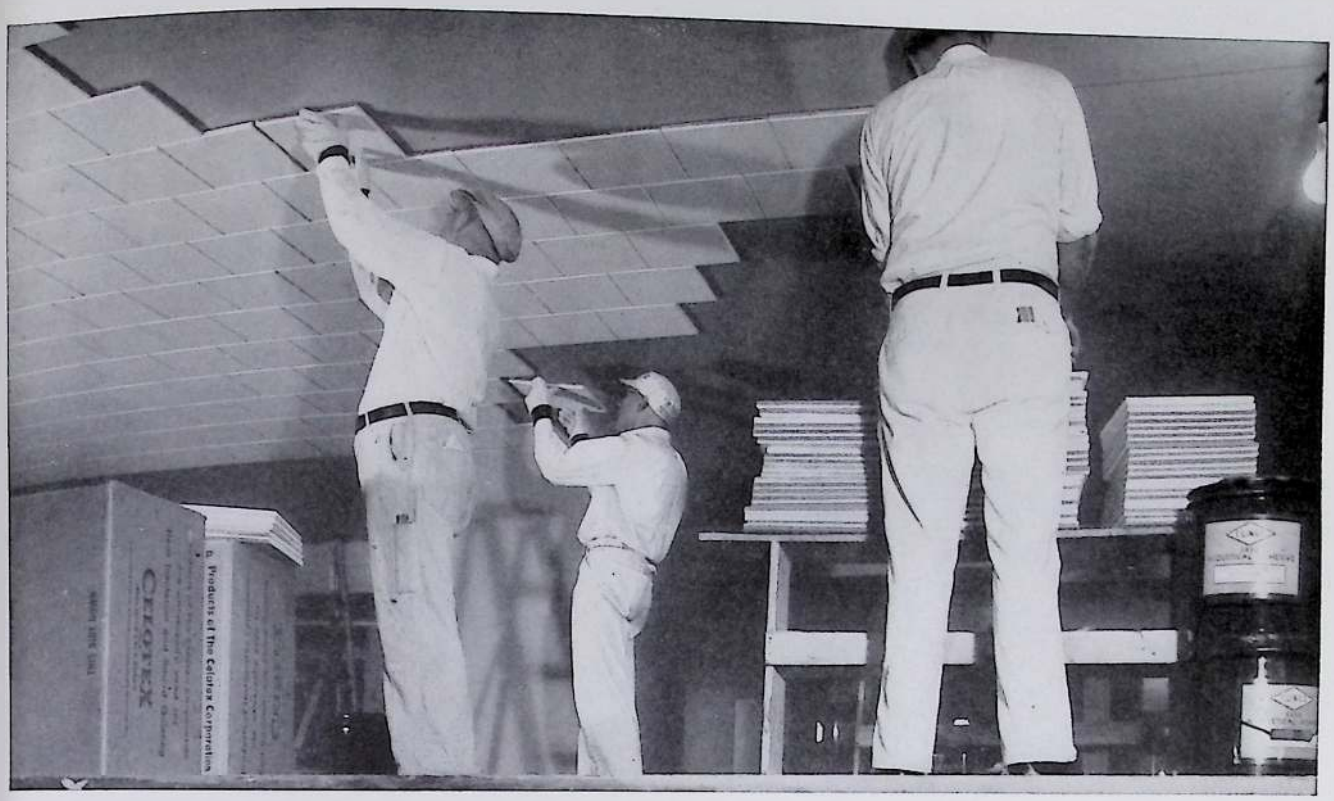
Sound Conditioning With Acousti-Celotex

The sound conditioning of hospital interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as acoustical products.

Celotex acoustical products include ACOUSTI-CELOTEX cane and mineral tiles (top two pictures) and Muffletone standard and fissured tiles (two lower pictures). Both are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection—these important questions may be safely left in the hands of the local Acousti-Celotex Sound Conditioning distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.

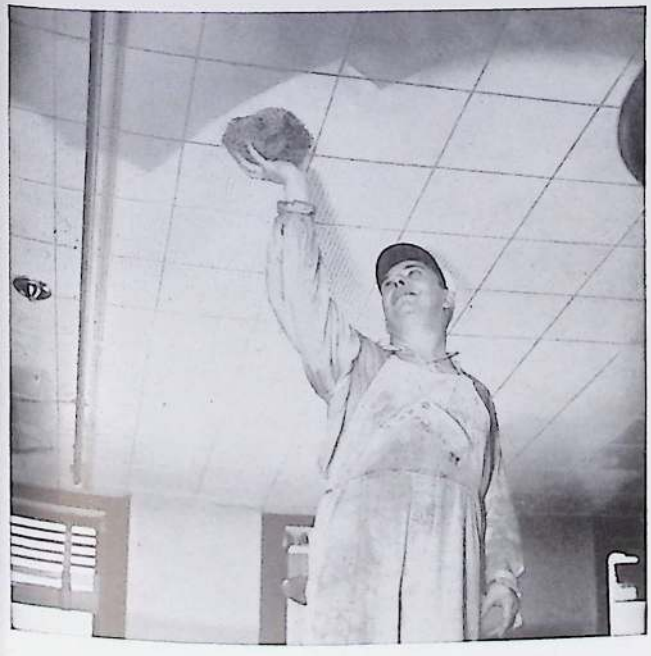
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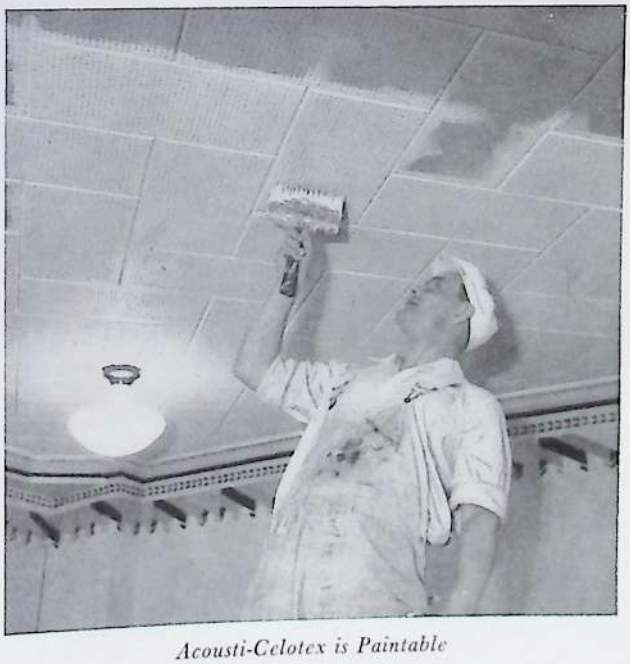
It's as Quick to Quiet as Overnight

The process of transforming a noisy room into a quiet one with Acousti-Celotex Sound Conditioning is not an ordeal. In occupied quarters, the work is usually done over-night by skilled, trained mechanics.

"Thank your representatives . . . we appreciate very genuinely the prompt and courteous manner in which your workmen functioned"—this kindly expression is typical of many addressed to Celotex Sound Conditioning distributors. Service to them is a solid asset, painstakingly built up over many years' experience in this field—a tradition to be cherished and kept vital because it earns buyers' confidence.



Acousti-Celotex is Washable



Acousti-Celotex is Paintable

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Sound Conditioning with

ACOUSTI-CELOTEX

PERFORATED FIBRE TILE — SINCE 1923

REG. U. S. PAT. OFF.

Has served the need for quiet in over 800 hospitals in the United States alone. This Sound Conditioning service is equally efficient in offices, factories, banks, public buildings, schools, theatres, churches and restaurants. For complete information without obligation, write or telephone the Acousti-Celotex distributor shown below.

THE CELOTEX CORPORATION

CHICAGO

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ADD CELOTEX SOUND CONDITIONING TO YOUR MENU



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Would you like to have these "Specialty of the House" Recipes?

Breast of Chicken Kiev

(Kuebekar Komilema)

Courtesy of

YAR—Chicago

Prepare the breast of chicken, approximately 3 to 4 pounds. Skin and flatten, similar to Wiener Schnitzel. Close the breast around a piece of butter and form into a shape somewhat like that of a torpedo. Roll the shaped breast in bread crumbs, then dip in very hot butter for 2 to 2½ minutes. Then put immediately into a hot oven (400° F.) and bake for 10 to 12 minutes. Serve at once. When Chicken Kiev is set before the guest, have waiter split open top with knife. This causes the melted butter to run out, adding a tempting attraction to the dish.

Gourmet Rarebit

Courtesy of

LE PETIT GOURMET—Chicago

2 lbs. sharp American cheese, ground
5 eggs
1 cup cream
1 teaspoon Worcestershire sauce
1 or 2 drops Tabasco sauce

Put cheese in mixer and beat well. Add eggs, one at a time, and mix. Add cream to make a thick paste, salt and other seasoning. Place a piece of round toast in the bottom of individual casserole. Heap with cheese mixture. Bake in oven until puffed up and browned. Place strip of cooked bacon on top.

Creamed Chicken on Baked Avocado a'la Kungsholm

Courtesy of

KUNGSHOLM Scandinavian Restaurant—Chicago

Slice into flakes a breast of a boiled five pound hen. Slice thick six large fresh mushrooms. Simmer the flaked chicken and sliced mushrooms in butter, together with a dash of salt and a pinch of paprika, celery salt and Indian curry. After the chicken, mushrooms and the ingredients have simmered in butter for three minutes, pour in two cups of pure cream. Bring contents to a boiling point.

In a separate bowl beat firmly four yolks of egg together with a sherry wine glass full of sherry wine. Stir into chicken mixture. Leave over fire until the sauce thickens. Do not boil mixture as the sauce will curdle.

Peel outsides of two large avocados, and cut into halves; remove stone. Sprinkle halves of avocados with a little butter. Bake in a moderate oven for four minutes.

Fill baked halves of avocados with creamed chicken. Sprinkle with grated American cheese. Bake in a moderate oven until cheese has melted and has taken on a light brown color.

It is appropriate to serve shoe string potatoes with the Creamed Chicken on Baked Avocado a'la Kungsholm.

Oven Smothered Chicken Baked in Cream

Courtesy of

VERA MEGOWEN—Evanston

Select fine quality young chickens of 3½ lbs. Cut in quarters and dredge in the following mixture.

¼ cup bread flour
1 tablespoon fine colored red paprika (Spanish or Hungarian)
1 teaspoon salt

In a heavy iron frying pan add ¼ cup of corn oil. Heat, then add the floured chicken, including all the extra flour mixture. Place in hot oven (400° F.) and allow bottom side of chicken to become a nice golden brown—this requires about ½ hour. Carefully turn the chicken and brown other side (this will require about 20 minutes). Now add ½ cup of regular white sauce; reduce oven temperature to 250° F. Continue cooking for one hour at this lower temperature, occasionally stir the sauce so that all the browned flour will be mixed with the sauce. At the end of the hour the sauce should be golden brown and very smooth and creamy. For a perfect food combination this oven smothered chicken should be served with 3% carbohydrate vegetable such as tiny green beans, Brussels sprouts, asparagus, spinach or broiled fresh tomato. (Serves four persons)

Brown Derby Lobster Thermidor

Courtesy of

BROWN DERBY—Beverly Hills

Cut live lobster in two, lengthwise
Sprinkle with olive oil, salt and pepper
Put in oven and bake

When done, remove the meat from the shell and cut in pieces. Then make a sauce as follows:

Chop two shallots, a little parsley and tarragon. If possible, add one spoonful of meat extract or some good meat gravy and reduce by boiling until nearly dry. Then add one spoonful of dry mustard, one cup cream sauce and two ounces of butter. Put some of the sauce in the bottom of the shells. Put the lobster in the sauce and pour the remainder over the top.

Sprinkle with grated cheese and bake in the oven until brown. Boiled lobster may be used in place of live lobster.

Creole Gumbo

Courtesy of

THE ROOSEVELT—New Orleans

8 green peppers
1 stalk celery
6 white onions
1 head garlic
1 lb. butter
1 doz. hard shell crabs
5 lbs. shrimps
1 No. 10 can tomato puree
6 lbs. boiled rice
2 No. 10 cans okra
1 ham bone
2 oz. gumbo fillet (dissolved in water)
2 oz. paprika
2 gals. very good stock
salt—to taste
pepper—to taste

Dice first three ingredients, pound garlic and smother in butter. Add hard shell crabs cut in pieces and shrimps. Sprinkle with paprika and cook for a few minutes. Add remaining items except rice and cook for 2 hours. At that time rectify the seasoning to taste. Serve with boiled rice.

Turtle Soup

Courtesy of

GLUCKS RESTAURANT—New Orleans

To make 1 gal. Turtle Soup—

Use: 2 lbs. turtle meat—braised (braise about ½ hour)
1 large onion, cut—fried
1 No. 2 can tomatoes
Thyme and bayleaf to season
Salt and pepper to taste
2 tablespoons flour to thicken

Add 2 quarts water. After it begins to boil, add two lemons cut in slices. Chopped egg and parsley. Add sherry wine before serving.

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CELOTEX SOUND CONDITIONING

Welcomes Customers
With a Quiet
Well-bred Air

People
Should Relax
When Eating

AIDS SERVICE

Orders
Spoken in Normal Tones
Are Clearly Heard

Mistakes
Are
Costly

PLEASES CUSTOMERS

Who Like to Converse
Comfortably With
Reasonable Privacy

Noise Irritates
Quiet
Pleases

EASES KITCHEN DIN

Help
Works
Better

Helps
Keep
Help

MIRACULOUS

So Say Users

Evidence Follows

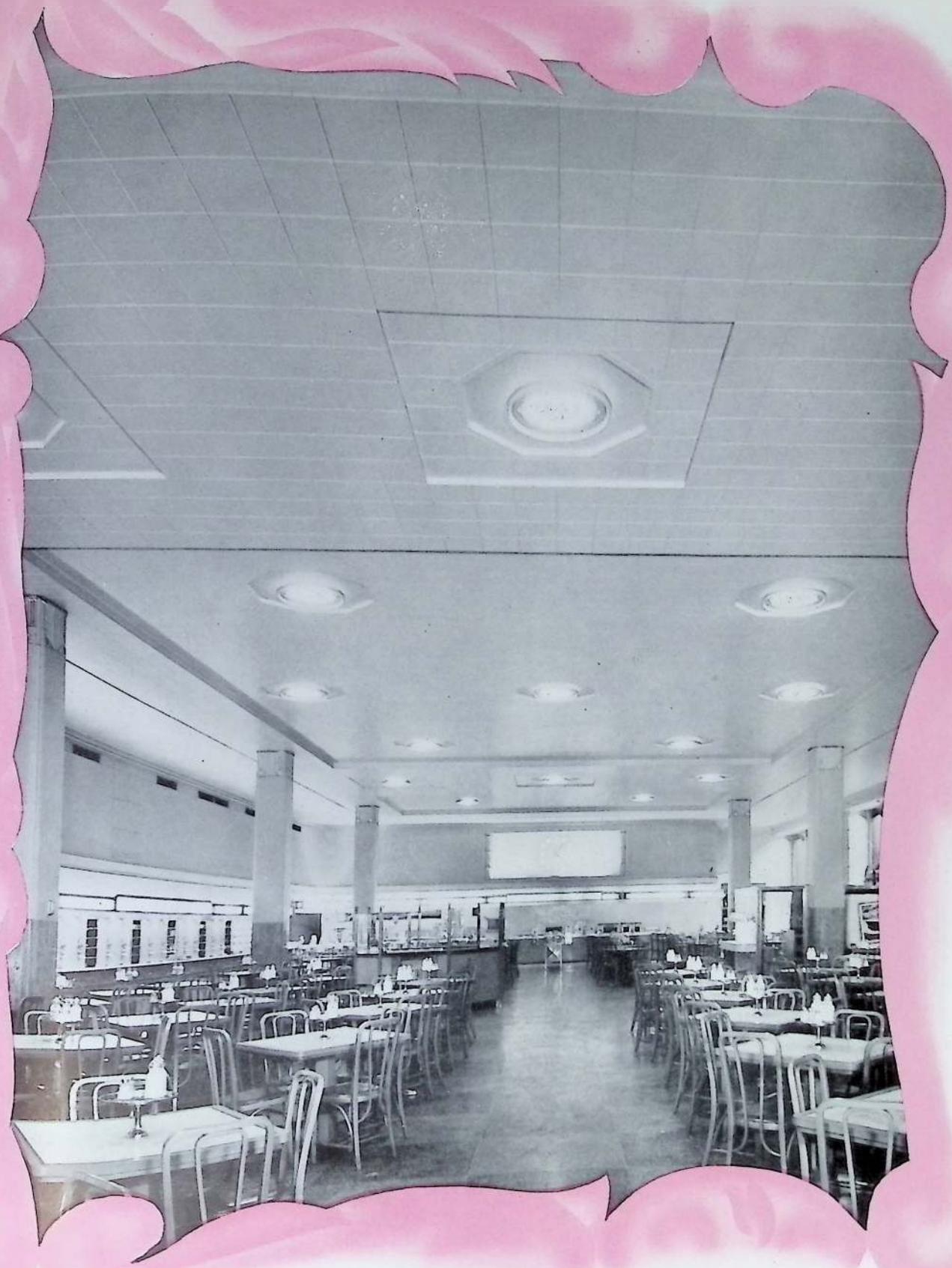


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AT LAWRY'S The Prime Rib, Beverly Hills, Celotex Sound Conditioning is praised by the management. They say: "The service you performed in making the installation over night was a life saver . . . a real miracle of sound-deadening."

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THE AUTOMATS, famous for food and service, use Celotex Sound Conditioning in their many restaurants in New York City and Philadelphia. This extra service of quiet aids in the tremendous job of feeding thousands of people quickly. Architect, Ralph B. Bencker.

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THE MANAGEMENT of Boston's oldest restaurant—the Union Oyster House—established 1826, says of their Celotex Sound Conditioning: "We are very pleased with the results . . . many of our customers have noticed that we have provided for their comfort . . . ." Architect, C. Francis Roberts.

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GREEN ROOM Restaurant in E. W. Edwards Department Store, Rochester, New York, caters to customer-comfort with Celotex Sound Conditioning. Shoppers may linger over a table or eat a quick snack at the counter, unhurried or annoyed by noise.

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DUBROW Cafeteria, Brooklyn, after unhappy experiences with certain types of acoustical materials, is now enthusiastic over the results of installing Celotex Sound Conditioning as specified by Architect Charles Shilowitz.

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THE TULSA CLUB Grill Room, Tulsa, is an excellent example of a dignified, quiet dining room. The design, furnishings and photo-murals provide the dignity—the Celotex Sound Conditioning provides the suitable quiet.

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Above: The Penguin Room, Hotel Continental, Kansas City, Missouri. Architect: Eugene John Stern. *Below:* S & W Cafeteria, Raleigh, North Carolina. Architect: M. E. Boyer, Jr. Celotex Sound Conditioning quiets both.

Above: Rail Restaurant and Bar, Albany, New York. *Below:* Putnam & Thurston's Cocktail Lounge, Worcester, Massachusetts. Architect for Putnam's, A. Stephen Demoojian. Celotex Sound Conditioning for both.





THIS IS WHAT USERS SAY ABOUT CELOTEX SOUND CONDITIONING

CRAWFORD'S SEA GRILL—Seattle

We had you sound condition our main dining room only, less than thirty days ago. We took this step to reduce the very excessive amount of noise in this room during the busiest hours.

The quieting effect was almost unbelievable. In fact, it was so noticeable an improvement that there was an immediately increased demand for seats in the main dining room. What was even more surprising, we began to get complaints for the first time from patrons about the noisiness of the two smaller banquet rooms. This completely convinced us of the merits of Celotex Sound Conditioning, and we at once gave you the order for the balance of our restaurant, including the kitchens.

You may be interested to know that I have just finished calculating the cost of our Celotex Sound Conditioning in relation to meals served. My figures show that the complete job is costing us less than 25c per thousand meals served—actually 22.8c to be exact. Even at several times this cost we feel it would still be a very satisfactory investment.—C. C. Crawford

RAIL BAR AND RESTAURANT—Albany

It gives me much pleasure to report to you our complete satisfaction with the Acousti-Celotex ceiling recently installed in our remodeled bar and restaurant. The effectiveness of this treatment in the reduction of noises is most noticeable, for it has created a quiet and restful atmosphere for our patrons and diners from whom we have received many favorable and complimentary comments and we feel that these results have justified our investment.—H. Bernstein, *Pres.*

STERLING RESTAURANTS—New York City

You no doubt are aware that we have used Acousti-Celotex at our 75th Street and 94th Street locations with great success as to maintenance and efficiency after painting. We did try another non-perforated material of rock wool at our 85th Street location but found the maintenance problem so great that we are convinced your material is superior to any other on the market.—Milton Meister, *Secy.*

FRANCES VIRGINIA TEA ROOM—Atlanta

After a very satisfactory experience in the dining room, we had Celotex Sound Conditioning installed in our kitchen. Our guests immediately noticed a decided improvement and many favorable comments were heard. We wish to add, too, that the installation work was handled with a high degree of workmanship and with every possible co-operation with us so as not to interfere with the conduct of our business.—Mrs. Will R. Beck

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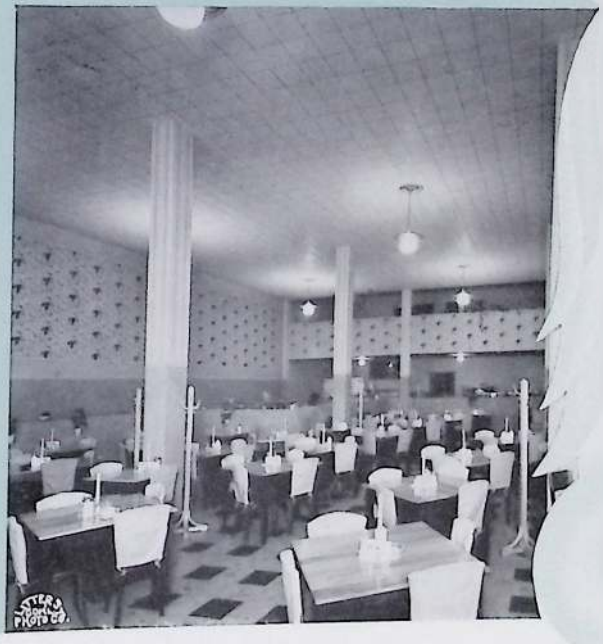




Above: Fountain Room, Roosevelt Hotel, New Orleans. *Below:* Victor Hugo Cafe, Beverly Hills. Celotex Sound Conditioning quiets both restaurants, pleasing patrons, assuring comfort.

Above: Lunch counter, Stop & Shop, Chicago, famous grocery store. *Below:* A. W. Weldon Cafeteria, Houston, Texas. Celotex Sound Conditioning brings welcome quiet to both.





ARMSTRONG SCHROEDER CAFE—Beverly Hills

When you told me several months ago that you could eliminate the noise in our cafe, I thought that you were joking. However, after discussing the matter further and visiting some of your installations, I changed my mind.

Now that you have installed Acousti-Celotex in the ceiling of our cafe, I want you to know that the results are even better than we had anticipated. The noise and clatter have been eliminated and in their place we now have an atmosphere of quiet and restfulness.

We also find that many of our patrons who refused to eat here on account of the noise are returning. In addition, our employees find that they are considerably less tired at the end of their day's work now than they were before.

—Arthur F. Armstrong

SIBLEY FARMS—Worcester

I consider the installation of our new Acousti-Celotex ceiling the finest of all our recent improvements.

Our restaurant was very noisy before we put in this ceiling, but is now exceptionally quiet, and many patrons have complimented us on the change. We do not notice the rattle of dishes and the continual buzz of people talking nearly as much as we did before.

We have increased our business about 3% since we reopened on February first and have had many compliments on the appearance of our new place.

—Frederick W. Flint, *Pres.*

BASSEL'S LUNCH LIMITED—Toronto

Your company recently completed the installation of Acousti-Celotex in my restaurant, and I feel that the result has been so remarkable that it deserves due recognition.

The reduction of the noise caused by the rattle of silver and clatter of dishes is most noticeable and, judging from the remarks of our patrons, is greatly appreciated in that it has provided a quiet and restful atmosphere in our dining room.

—Peter Bassel, *Pres.*

KUNGSHOLM RESTAURANT—Chicago

The results of the recent installation of Acousti-Celotex in our main dining room has exceeded all my expectations. Before we installed this material, the noise was quite disturbing, but now that it is acoustically treated the room is a quiet and restful place to dine. Many of our patrons have commented on this fact.

—Frederick A. Cramer

BISHOP CAFETERIA—Des Moines

Our place was extremely noisy, especially back of our serving counters and in the dishwashing room. Acousti-Celotex has deadened the excessive clatter of dishes, trays, etc., to a marked degree of success.—S. I. Park, *Mgr.*

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A FAMOUS RESTAURANT CHAIN MAKES THIS STATEMENT ABOUT CELOTEX SOUND CONDITIONING...

ASHEVILLE
CHARLOTTE
CHATTANOOGA
RALEIGH

ROANOKE
KNOXVILLE
WASHINGTON
ATLANTA

S & W
CAFETERIAS
HOME OFFICE
116 WEST TRADE STREET
Charlotte, N. C.

September 17, 1937

Acousti Engineering Company
401 Red Rock Building
Atlanta, Georgia

Gentlemen:

Several years ago when our business began to grow rapidly we had a desire to provide a surrounding for our patrons that would make them went to come back and eat with us all the time. We decided that sound conditioning of our cafeterias was one way that would create a most pleasant condition, and after our first installation of acoustical material we were thoroughly convinced that such a procedure was wise and paid big dividends.

After making such a decision it was, of course, necessary for us to investigate the field of acoustical materials to find a material that would best suit our needs, and, naturally, the problem of redecoration and light reflection was very important as well as the absorbing value of the material. We finally decided on the use of Acousti-Celotex, primarily because it had a guaranteed amount of absorption, was paintable, and could be depended upon for light reflection where indirect lighting fixtures were used. Acousti-Celotex has been used in practically all of our cafeterias and it has proven very satisfactory in every way. It might be interesting for you to know that our first installation has been painted many times without any appreciable reduction in efficiency.

Our new cafeteria in Knoxville, Tennessee, has just recently been completed and we used Acousti-Celotex through the main cafeteria and all of the private dining rooms, banquet halls and kitchens.

We would be glad to recommend this material and your services to any one who might be interested.

Yours very truly,

HOME OFFICE
S. & W. CAFETERIAS
BY Frank O. Sherrill
FRANK O. SHERRILL, PRES.

FOS:MD

AN ORGANIZATION SPECIALIZING EXCLUSIVELY IN THE PRODUCTION AND SERVING OF WHOLESOME FOODS



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KITCHENS and bars benefit greatly when Celotex Sound Conditioning quiets the atmosphere. In kitchens, orders are clearly heard; in bars, conversations are private and enjoyable. Above kitchen is in the Union Oyster House, Boston. The bar is the Men's Bar, Waldorf-Astoria, New York City—both are agreeably free from unwanted noise.

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CELOTEX SOUND CONDITIONING PROVIDES WIDE CHOICE IN PRODUCT, TREATMENT AND DECORATION

YOU ARE NOT limited to one product when you buy Celotex Sound Conditioning.

For there are many Celotex acoustical products, varying widely in texture, color and sound-absorbing efficiencies. There is wide latitude, also, in pattern effects that may be achieved in the product application.

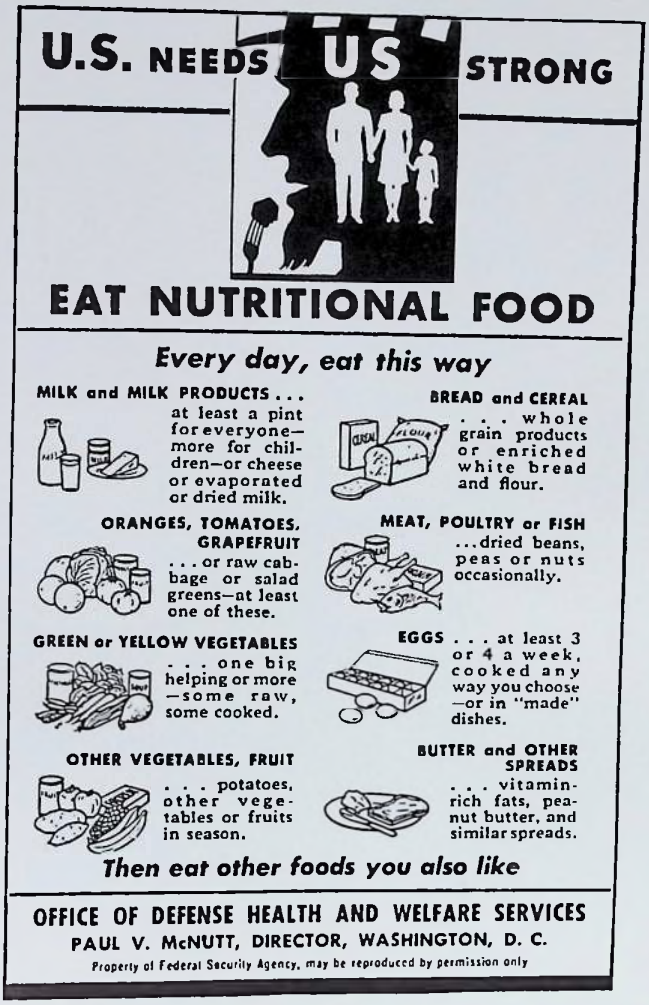
What results acoustically may be obtained with each of the different types and thicknesses available, on what surfaces and to what extent acoustical material should be used, the proper method of installation for best appearance and permanency—these are questions on which the Celotex Sound Conditioning representative will be glad to inform you, without obligation.

That practical, technical knowledge has been accumulated in more than fifteen years of actual restaurant experience by the Celotex Sound Conditioning organization.

The Celotex Corporation is proud of the service ideals which its acoustical distributors, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing acoustical problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are maintained service ideals that account for such experiences as about 50 separate installations for one restaurant chain.

THE CELOTEX CORPORATION • Chicago

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Above Chart Contributed in the Interest
of the National Nutrition Program

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Sound Conditioning

STORES and SHOPS



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Those Who Serve Us Daily . . .

in stores and shops . . . taken collectively represent the nation's biggest industry.

When we consider the value of inventories, real estate, equipment and fixtures . . . the number of people directly employed . . . the size of the aggregate payroll . . . the dollar volume of sales . . . the taxes paid . . . the advertising and display expenditures . . . building, maintenance and remodeling programs . . . and many other direct and indirect transactions . . . then we begin to realize the enormity of the business of stores and shops.



To survive and to grow under a free competitive system, store owners, managers and their staffs are constantly planning ways and means to attract more customers and build good will by improved service . . . new and better goods . . . attractive store arrangements . . . pleasing store atmosphere . . . and increased efficiency of courteous, well trained, loyal employees.

Progressive store management has found that excessive noise interferes with many important phases of modern store operation.

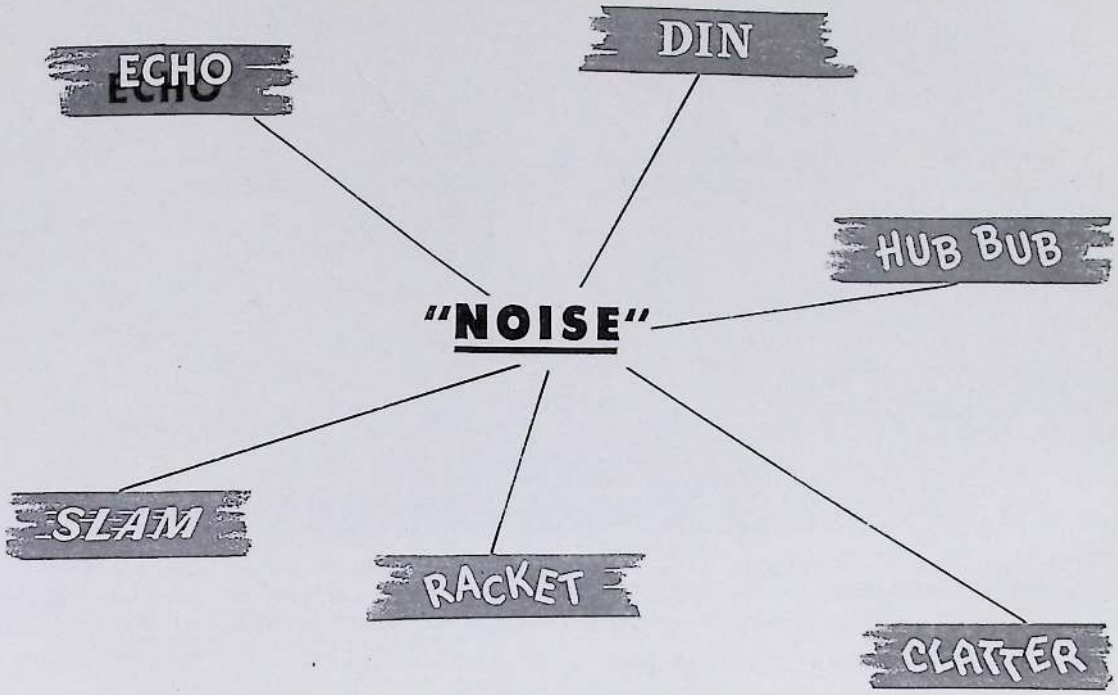
Hundreds have solved this perplexing problem quickly and easily with Celotex Sound Conditioning.

This booklet has been prepared for owners, managers and others responsible for profitable operation of stores, shops or departments of sales and service within them.

The information has been condensed, simplified and aligned for easy reading and quick understanding of Sound Conditioning.

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Noise is an Expensive Nuisance



Noise (unwanted sound) in stores and shops defeats good will . . . loses business. It irritates customers and employees alike . . . engenders discourtesy.

Noise in a store creates an inferior atmosphere. Many otherwise fine stores leave a wrong impression with the customer because of the din, clatter and confusion within.

Noise causes misunderstandings . . . mistakes . . . dissatisfied customers.

Noise causes undue fatigue . . . frayed nerves and frayed tempers . . . discontented employees. It causes the same nervous reaction as fear.

Noise is in the same class with bad ventilation and poor lighting in its effect on human efficiency.

Noise increases telephone bills, particularly in stores where a large number of orders are placed by phone. It makes necessary many call-backs and repeated messages that would otherwise be avoided.

Noise is a costly addition to the payroll. It causes excessive "time off." Absence from work due to fatigue or nervousness is often directly traceable to excessive noise.

Noise is a prime source of confusion—and confusion is a raider of good will and profits.

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Sound Conditioning Produces Quiet



One of the most satisfied users of Acousti-Celotex sound conditioning is the Vogue Drapery Shoppe in Chicago. Street traffic noises, particularly in summer with open doors, combined with the normal noise of a busy store, made a serious problem until Acousti-Celotex sound absorbing tile was installed.



The Green Cigar Store in Seattle is an excellent example of the profitable employment of quiet, through Acousti-Celotex sound conditioning, in a small shop.



The Model Shoe Rebuilders, Nashville, Tennessee, is another small store that has discovered the many advantages of Acousti-Celotex sound conditioning.

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An Investment in Quiet Pays Liberally

Quiet in stores and shops promotes good will . . . builds business. The quiet store has a restful, yet efficient air about it. The result is more repeat customers . . . because buying is a pleasure . . . not a chore.

Quiet gives a store an atmosphere of quality that can be obtained in no other way. It intensifies and supplements the effects produced by modern interior treatment, decoration and display.

Quiet makes it possible to hear and understand clearly customers' orders and requests spoken in an ordinary tone. This helps to eliminate costly mistakes and the irritation of customers.

Quiet increases the efficiency of clerks and sales people as much as 19%, according to studies made by the Noise Abatement Committee of New York City.

Quiet allows employees to work a full day with more energy. It decreases the strain on their nervous systems.

Quiet in the store is as desirable as proper lighting and good ventilation.

Quiet saves money on telephone bills. This saving is often a considerable sum. In a quiet atmosphere there is less need for repetition . . . fewer call-backs because of misunderstandings . . . fewer errors . . . because each phone message is clearly understood.

Quiet saves payroll money. Employees require less "time off," fewer days at home due to nervous fatigue, headaches and similar illnesses.

Sound Conditioning with Acousti-Celotex makes the right kind of quiet that brings you these benefits.



One of the nation's most modern and progressive department stores is Hutzler's, in Baltimore. In creating their attractive "Quixie Lunch Room," Hutzler's provided the added charm of quiet, by means of Acousti-Celotex sound conditioning, to make the store a truly inviting place to shop.

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25 Questions and Answers About

1 What is Sound Conditioning?

Sound Conditioning is the art and practice of treating rooms and the interiors of buildings so as to minimize the annoying effects of noise . . . "unwanted sound."

2 What does Sound Conditioning contribute to store management?

It attracts new customers and helps hold the old. Shoppers appreciate the atmosphere of *quality* which only Sound Conditioning produces. It increases the efficiency of employees. It reduces the amount of "time-off" and employee turnover.

3 How does the employee benefit by Sound Conditioning?

In a Sound Conditioned store, the employee is relieved of the tension and strain caused by excessive noise and confusion. He makes fewer mistakes; finishes a full day of work with less fatigue.

4 How does Sound Conditioning benefit the store office?

In a store office, conversation by phone or in person may proceed while typewriters, adding machines and cash registers are being operated, even if no partitions are provided. Even the smallest stores find Sound Conditioning a good investment.

5 Is Sound Conditioning stores and shops new?

No, hundreds of stores have been Sound Conditioned with Acousti-Celotex sound absorbing tile, entirely or in part . . . in the past 20 years.

6 What is Acousti-Celotex?

Acousti-Celotex is the registered trademark identifying sound absorbing perforated fibre tiles pioneered by The Celotex Corporation since 1923, and developed into the world's most widely used material in its field.

7 Is it practical to Sound Condition stores progressively as funds can be made available?

Yes, this is often done in cases where a store is laid out in departments or has several rooms or floors.

8 Can stores be Sound Conditioned after hours?

Many stores and shops can be Sound Conditioned without interruption of the regular work schedule. Over night and over-the-week-end installations are frequently made by the Celotex Sound Conditioning distributor. He is especially equipped for this service.

9 Is Sound Conditioning with Acousti-Celotex tile expensive?

No. Quality, efficiency and appearance of the products have been improved over the past twenty years—yet the price today is substantially less than that of the early installations.

10 How fast does sound travel in air?

Eleven hundred and twenty feet per second.

11 In what form does sound travel?

In the form of spherical waves, increasing in size as they leave the source.

12 What happens in a store when the sound waves reach the walls?

Only a small part of the sound energy is absorbed at each contact and the remainder is reflected back into the room, resulting in an accumulation of unwanted sound . . . noise.

13 Is there a method of testing materials to determine their ability to absorb sound?

Yes, here are the absorption coefficients of some common building materials and furnishings:

MATERIAL	ABSORBS	REFLECTS
Plaster	.025	.975
Concrete	.015	.985
Wood Paneling	.03	.97
Glass	.027	.973
Carpet	.20	.80
Acousti-Celotex Type C-4	.70	.30

14 Why do Acoustical Materials absorb so much sound?

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body of the material either through the natural interstices on the surface or through mechanical perforations made in the face of the material expressly for the admission of those sound waves.

Practically, the sound is "soaked up" by the material rather than reflected back into the room.

15 How does Sound Conditioning "stop" noise?

Sound Conditioning itself does not stop noise. Conversations, shuffling of feet, coughing, telephone bells, typewriters or bookkeeping machines generate as much sound in one location as another.

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The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface as light is reflected by a mirror. In the average room with hard plaster walls and ceilings, the sound traveling at an approximate speed of 1120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated, or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials. The sound dies out faster.

16 How is "Adequate Absorption" determined for a room?

The Sound Conditioning Engineer knows the present sound absorption capacities of the materials and furnishings in a room and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

17 In larger stores, auditoriums used for employee mass meetings, social and business meetings, etc., is it possible to calculate the length of time sound will remain audible after the source has ceased?

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$T = \frac{.05V}{a}$$

T = reverberation time measured in seconds.
V = volume of room expressed in cubic feet.
a = all existing sound absorbing units.

On request, The Celotex Corporation will be glad to supply detailed information.

18 If the period of reverberation is too long, what are the effects?

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound, or sounds, from the same source, creating a complex mixture of the several sounds. When this effect is pronounced, the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire phrases "blurred," "fuzzy" and unintelligible.

19 Is Celotex Sound Conditioning used in stores and shops only?

No, Acousti-Celotex sound absorbing tile has been used to sound condition more offices, schools, hospitals, churches, stores, auditoriums, restaurants, factories, radio studios and theatres than any other type of acoustical material.

20 What is required to maintain areas sound conditioned with Acousti-Celotex tile?

Acousti-Celotex tile requires no extra maintenance. It is repeatedly paintable, by any method, without loss of absorption. The care required of ordinary painted wall and ceiling areas will keep Acousti-Celotex new in appearance.

21 Does treatment differ for stores of varying sizes and uses?

Yes. Each store should be analyzed and engineered for the proper amount of the right material. Through training and years of experience, the distributor of Celotex Acoustical Products is equipped to render this important service.

22 Will Sound Conditioning improve the store lunch room or cafeteria?

Yes. Where employees eat in a restaurant provided by the company, the lunch period is more restful—there is less clatter and confusion. Employees are in better mental and physical condition for the rest of the day.

23 Can Acousti-Celotex Sound Conditioning be installed in designs to suit individual taste?

Yes, a wide variety of patterns is available in standard materials. The decorative possibilities are without limits. Sound Conditioning is a "natural" in remodeling.

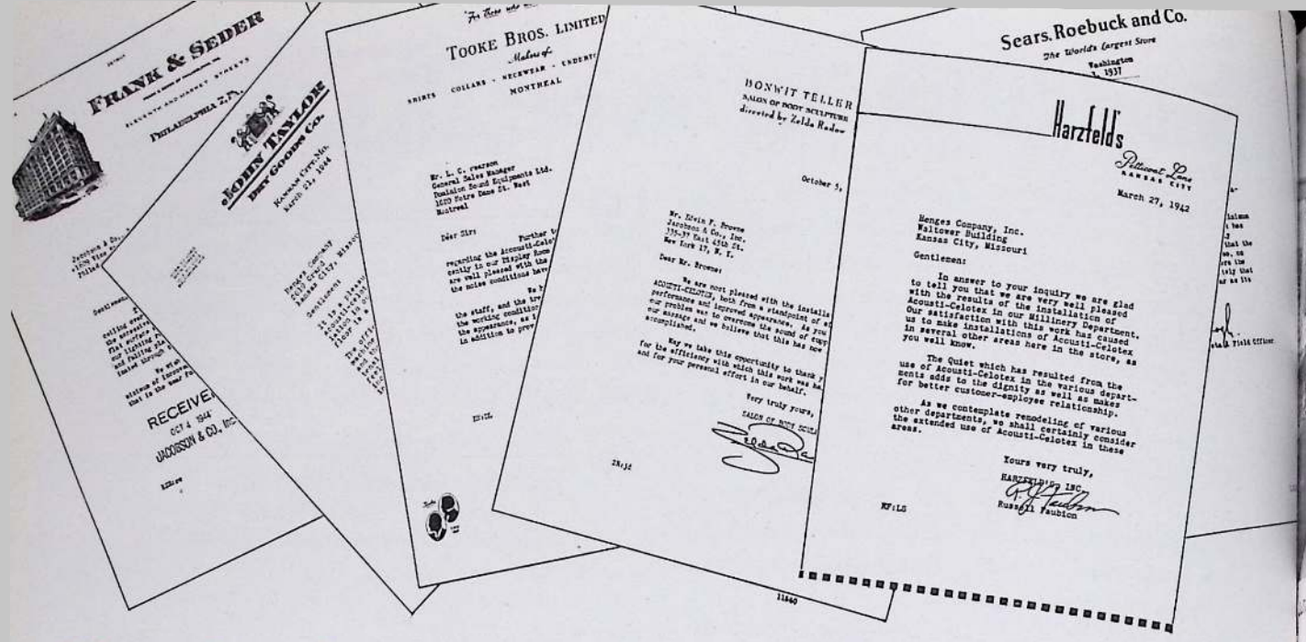
24 Does installation of Acousti-Celotex Sound Conditioning require structural changes in existing buildings?

No, absolutely no structural changes are required.

25 Who applies Acousti-Celotex Sound Conditioning?

Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors selected by The Celotex Corporation are given thorough training in acoustical engineering and Sound Conditioning practices. Today they constitute the world's largest and most experienced organization in architectural acoustics.

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Lis Goodman & Son Jewelry Co., Memphis, Tenn., is sound conditioned for modern comfort with Acousti-Celotex tile.

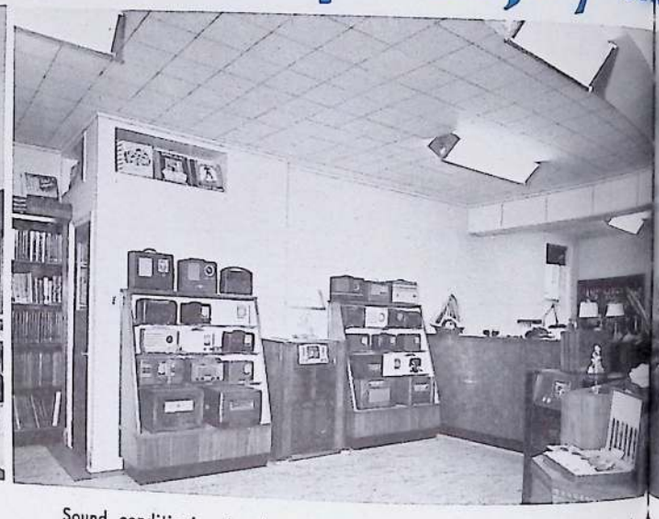


S. S. Reynolds Store, Boston—an attractive crystal shop made even more inviting with Acousti-Celotex sound conditioning.

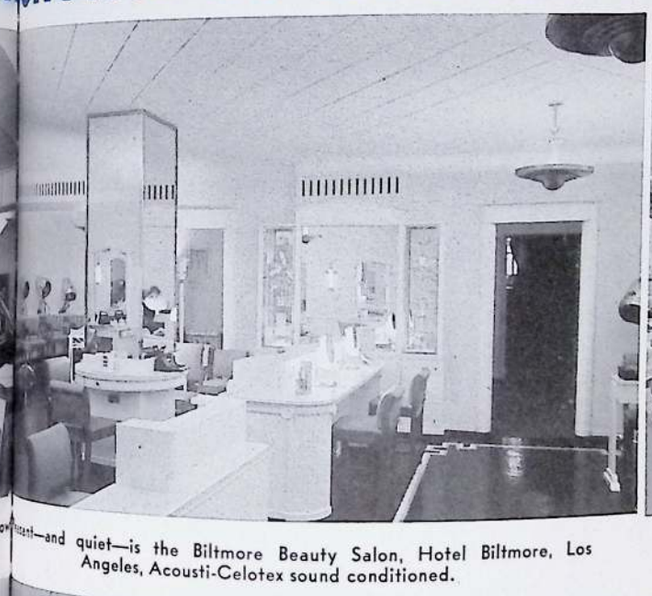
Hundreds of Stores and Shops Enjoy the Benefits of Celotex Sound Conditioning



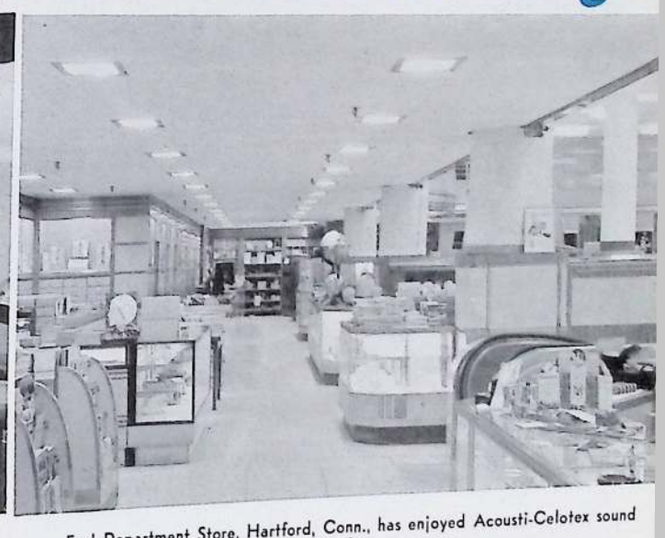
The Whelan Drug Store, Glen Falls, N. Y., sound conditioned with Acousti-Celotex fibre tile.



Sound conditioning is almost a "must" in a radio shop. Here is shown S. Smith Sons' Store, Philadelphia.



...t—and quiet—is the Biltmore Beauty Salon, Hotel Biltmore, Los Angeles, Acousti-Celotex sound conditioned.



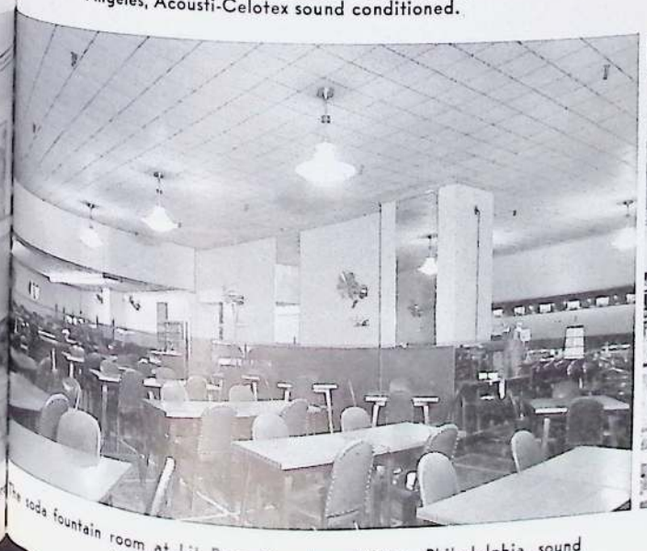
Fox' Department Store, Hartford, Conn., has enjoyed Acousti-Celotex sound conditioning for many years.



The Eagle Market, Hartford, Conn., is one of many small stores enjoying the comforts of Acousti-Celotex sound conditioning.



Many Liggett's Drug Stores enjoy the Acousti-Celotex brand of quiet. He... is a branch at Miami Beach, Fla.



The soda fountain room at Lit Bros. Department Store, Philadelphia, sound conditioned with Acousti-Celotex tile.



Another modern department store with Acousti-Celotex sound conditioning is Hochschild Kohn & Co., Baltimore.

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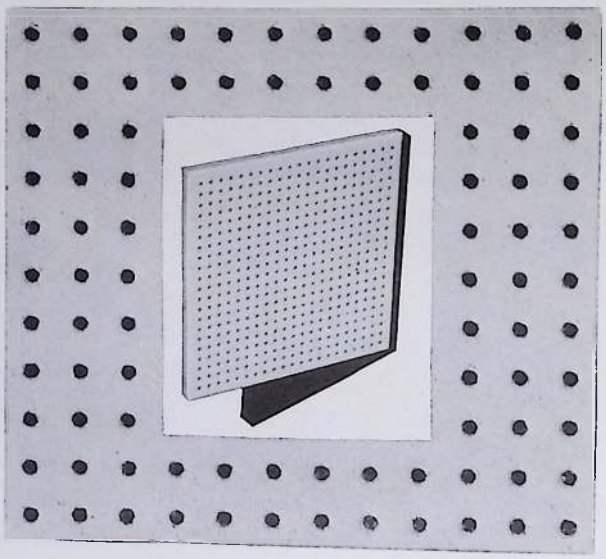
Selecting the Proper Materials

The sound conditioning of building interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as acoustical products.

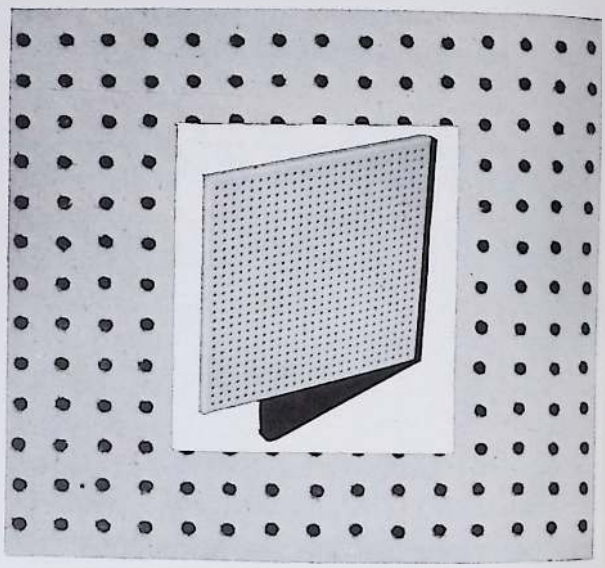
Celotex acoustical products include Acousti-Celotex cane and mineral tiles (top two pictures) and Muffletone standard and fissured gypsum tiles (two lower pictures). Both are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

Each area to be sound conditioned must be accurately analyzed and engineered so that the right material may be specified to produce the results desired.

Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection —these important questions may be safely left in the hands of the local Celotex Sound Conditioning distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.



Acousti-Celotex Cane Fibre Tile



Acousti-Celotex Mineral Fibre Tile



Muffletone, Standard Type



Muffletone, Fissured Type

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Installed Without Interrupting Business

Acousti-Celotex Distributors Have Special Equipment and the "Know How"



A common method of applying Acousti-Celotex tile is shown above. Tiles are being set in place on plaster ceiling, using special acoustical adhesive.

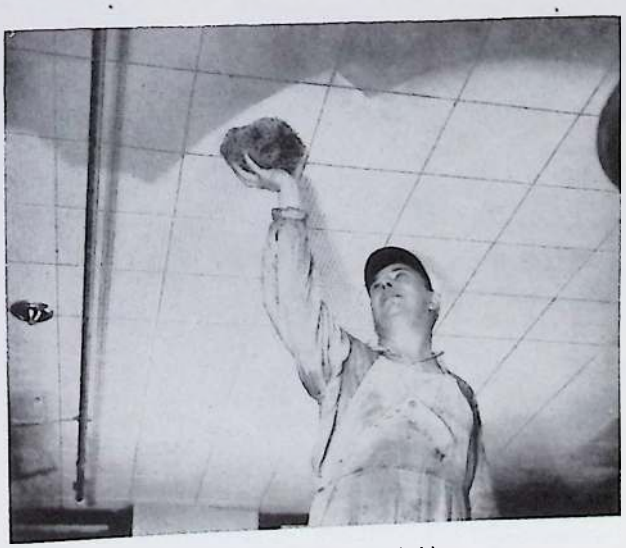


The Acousti-Celotex distributor's equipment includes special scaffolds and tools, to help him complete the job quickly with little inconvenience to the store owner.

The process of sound conditioning stores and shops is not an ordeal. Many stores are treated after hours or over the week end. The work is done by skilled mechanics without interrupting the store's normal routine. There are standard methods of application for any type of ceiling construction.



Acousti-Celotex tile is paintable



Acousti-Celotex tile is washable

To paint Acousti-Celotex tile, use any standard paint or calcimine. Follow the manufacturer's specifications in applying. Where washability is desired, oil base paint or enamel is recommended. Apply by either brush or spray method. Acousti-Celotex tile is repeatedly paintable without loss of sound absorption.

There are no extra maintenance costs with Acousti-Celotex tile. Areas sound conditioned with this material demand only the care and treatment of ordinary wall and ceiling surfaces. Nothing extra is required.

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Acousti-Celotex Sound Conditioning Service



Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, The Celotex Corporation in 1925 chose to seek out, school and establish in all principal market centers an authorized engineering, sales and contract service by independent, locally owned and operated enterprises.

The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry.

This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained.

The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are what we mean by service ideals.

They constitute plus values written into every specification for a Celotex Acoustical Product.

THE CELOTEX CORPORATION • CHICAGO

Sound Conditioning Is Our Business

For years, in this area, we have been exclusive distributors of Acousti-Celotex Products. We have analyzed, engineered and installed Sound Conditioning in schools, offices, factories, banks, public buildings, stores, churches, hospitals, restaurants, theatres and other buildings.

We are a part of the world's most experienced sound conditioning organization.

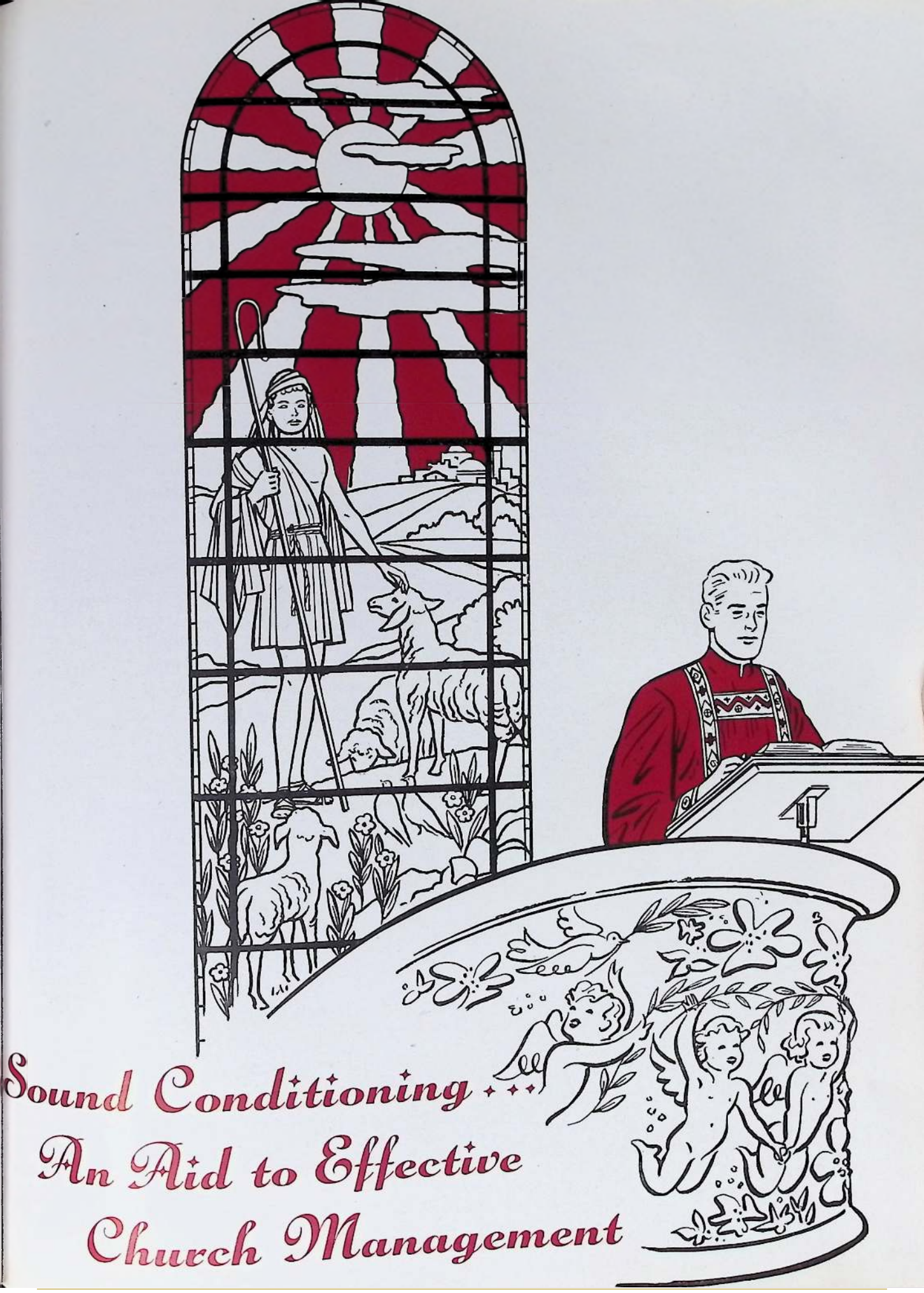
Complete information is yours without obligation. Just write or call . . .

Sound Conditioning with
ACOUSTI-CELOTEX
Perforated REG. U. S. PAT. OFF. *Fibre Tile* SINCE 1923

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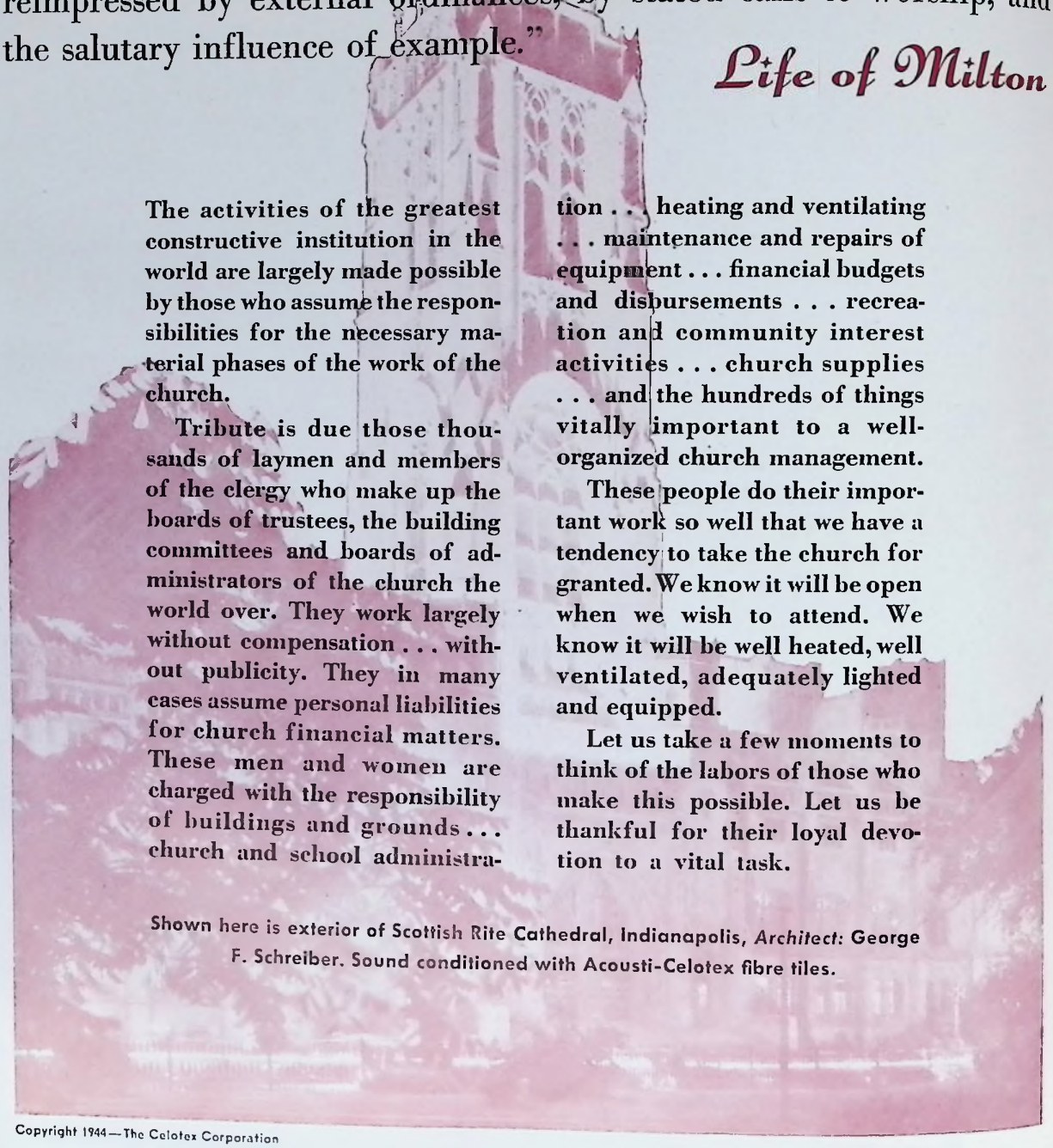


Sound Conditioning An Aid to Effective Church Management

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"To be of no church is dangerous. Religion, of which the rewards are distant, and which is animated only by faith and hope, will glide by degrees out of the mind unless it be invigorated and reimpressed by external ordinances, by stated calls to worship, and the salutary influence of example."

Life of Milton



The activities of the greatest constructive institution in the world are largely made possible by those who assume the responsibilities for the necessary material phases of the work of the church.

Tribute is due those thousands of laymen and members of the clergy who make up the boards of trustees, the building committees and boards of administrators of the church the world over. They work largely without compensation . . . without publicity. They in many cases assume personal liabilities for church financial matters. These men and women are charged with the responsibility of buildings and grounds . . . church and school administration . . . heating and ventilating . . . maintenance and repairs of equipment . . . financial budgets and disbursements . . . recreation and community interest activities . . . church supplies . . . and the hundreds of things vitally important to a well-organized church management.

These people do their important work so well that we have a tendency to take the church for granted. We know it will be open when we wish to attend. We know it will be well heated, well ventilated, adequately lighted and equipped.

Let us take a few moments to think of the labors of those who make this possible. Let us be thankful for their loyal devotion to a vital task.

Shown here is exterior of Scottish Rite Cathedral, Indianapolis, *Architect:* George F. Schreiber. Sound conditioned with Acousti-Celotex fibre tiles.

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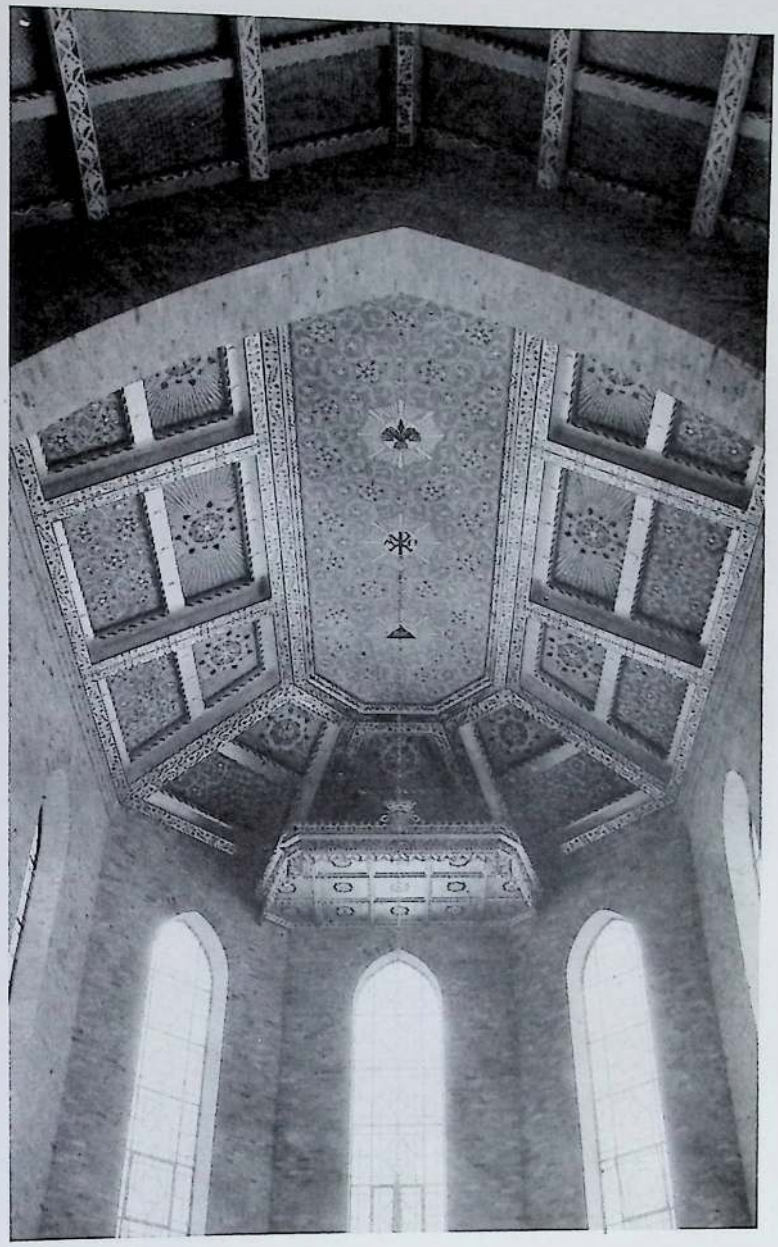
Noise is in conflict with desirable church atmosphere. It handicaps the effectiveness of many of the principal functions of the church organizations.

Noise interferes with the clergyman. Only those who must prepare and deliver messages of comfort and encouragement, advice and admonition . . . know the discouragement of bad acoustics in the auditorium or chapel. Excessive reverberations of the speaker's voice and noise from the congregation have defeated many well prepared sermons and lectures.

Noise ruins good music. Beautiful church music, by the best talent, with the most thorough preparation, may be reduced to confusion by faulty acoustical conditions. Choir directors, organists, soloists and members of the choir know what noise can do to their best efforts.

Noise makes teaching difficult. The sincere church member who has assumed the responsibility of teaching a class in the church school knows how noise interferes with the attention of the students. Noise may make teaching difficult and at times ineffective. It disrupts class discipline.

Noise discourages church attendance. Churches where hearing conditions are faulty suffer in attendance. Where the spoken word cannot be clearly heard and where the music is distorted . . . it is disturbing to those who attend.



Church of St. Catherine of Siena, New York City, comfortably sound conditioned with Acousti-Celotex fibre tile handsomely decorated. Architect: Wilfred E. Anthony

Noise is unfair to the student. It is difficult for the average member of a church class to pay proper attention under noisy conditions.

Noise (unwanted sound) handicaps the clergyman . . . the teacher and the students . . . the church musicians and the attending members . . . but good hearing conditions can be readily provided by sound conditioning even though the budget is limited.

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St. Hyacinth's Church, Chicago, is an outstanding example of sound conditioning, as planned and executed by experts. In many cases costly paintings had to be removed and re-applied on the Acoustical material. *Right:* View of main auditorium, looking toward rear, and showing intersection of nave and crossing below dome. *Below, left:* View showing partial application of Acousti-Celotex fibre tile (white) on side wall areas. Here trimmed-edge Acousti-Celotex units are used. After decoration the joints are scarcely perceptible. *Below, right:* View showing "pipe" scaffold structure with wood decking used for installation of Acousti-Celotex tile on ceiling and wall areas. This important detail was so handled as to permit uninterrupted use of the church auditorium.







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Quiet aids the clergyman, because every word can be clearly heard by those attending, and distracting noises do not compete for attention and otherwise disturb the listeners.

Quiet helps the church school teachers, in maintaining willing, attentive discipline in classes.

Quiet is the perfect setting for good music. It allows the songs of worship and adoration to be enjoyed without distortion. Choir directors, organists, and choir members appreciate good hearing conditions in the church or chapel.

Quiet induces reverence at church services. It allows those attending to enjoy to the fullest the messages of comfort and encouragement intended by the services.

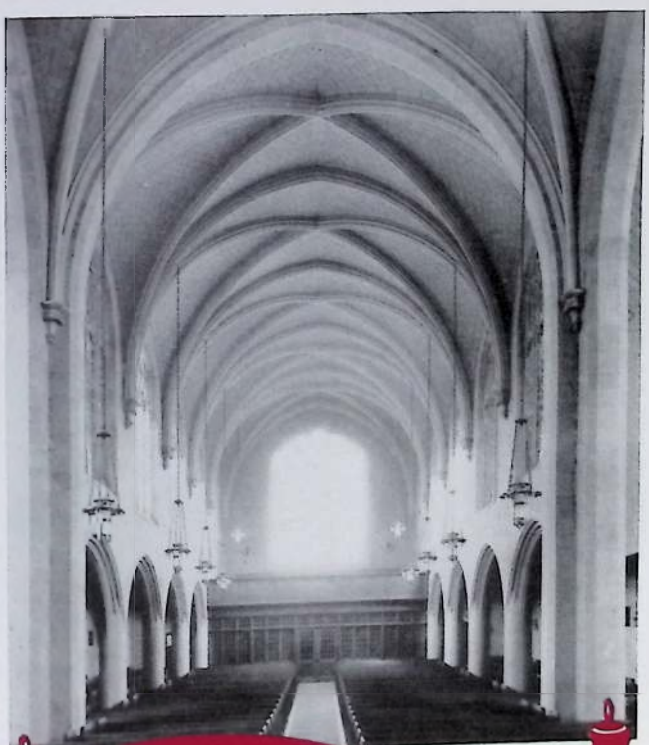
Quiet in church generally increases attendance. People will attend a church more regularly where they can hear the services without strain or effort.

Quiet corridors and church schoolrooms . . . and auditoriums with good hearing conditions are easily and quickly obtainable by sound conditioning with Acousti-Celotex.

More churches have been sound conditioned with Acousti-Celotex than with any other type or brand of acoustical material.

The following two pages are devoted to pertinent information about sound conditioning churches. A study of these will perhaps answer the questions you have in mind.





Top: First Church of Christ, Scientist, Boston, Massachusetts; Architect: Charles C. Coveney. *Bottom:* Bethlehem Lutheran Church, Minneapolis, both sound-conditioned with Acousti-Celotex Fibre Tile. Architects for Bethlehem Lutheran Church: Lang, Raugland and Lewis.

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Basement Assembly Room — First Methodist Church, Ann Arbor, Michigan. Architect, Fry and Kasurin. Sound conditioned with Acousti-Celotex Fibre Tile.

25 Questions and Answers About Sound Conditioning Churches

1 What is Sound Conditioning?

Sound Conditioning is the art and practice of treating rooms and the interiors of buildings so as to improve hearing conditions and to minimize the annoying effects of noise, . . . "unwanted sound."

2 What does Sound Conditioning contribute to Church administration?

It allows all church building space to be used more efficiently. It is one of the greatest agencies for mental hygiene that can be introduced to the church.

3 How does the clergyman benefit by Sound Conditioning?

It helps the clergyman to present his sermons and lectures more effectively because of better hearing conditions. It is also an aid to better attention because confusion is reduced.

4 How does church music benefit by Sound Conditioning?

Sound Conditioning produces good hearing conditions. It stops excessive reverberation, which ordinarily detracts from and sometimes ruins good music.

5 How does the church student benefit by Sound Conditioning?

It enables the student to better understand oral instruction and class discussion. He works in an atmosphere that is quiet and not tense. This is conducive to better deportment and easier concentration.

6 Is Sound Conditioning in churches something new?

No, hundreds of churches, of all denominations have been Sound Conditioned with Acousti-Celotex, entirely, or in part, in the last twenty years.

7 What is Acousti-Celotex?

Acousti-Celotex is the registered trademark identifying sound absorbing perforated fibre tiles, pioneered by The Celotex Corporation and developed into the world's most widely used material in its field.

8 Is it practical in already erected church buildings to Sound Condition them progressively as funds can be made available?

Yes, this is often done. A recommended procedure is to start with a noisy corridor, church classroom, auditorium, church offices, amusement or dining room areas in whatever order individual circumstances and funds may indicate.

9 Is Sound Conditioning with Acousti-Celotex expensive?

No, in average installations Sound Conditioning represents a small percent of the building cost.

10 How fast does sound travel in air?

Eleven hundred and twenty feet per second.

11 In what form does sound travel?

In the form of spherical waves, increasing in size as they leave the source.

12 In a walled-in enclosure what happens when the sound waves reach the walls?

Part of the sound energy is absorbed and the remainder is reflected into the room.

13 Is there a method of testing materials to determine their ability to absorb sound?

Yes, here are the absorption co-efficients of some common building materials and furnishings:

MATERIALS	ABSORBS	REFLECTS
Plaster	.025	.975
Concrete	.015	.985
Wood Paneling	.03	.97
Glass	.027	.973
Carpet	.20	.80
Acousti-Celotex Type C-9	.70	.30

14 Why do Acoustical Materials absorb so much sound?

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body either through the natural interstices on the surface or through mechanical perforations in the face of the material made expressly for the admission of those waves.

In penetrating and traveling through this maze, the sound wave encounters resistance. Practically, the sound is "soaked up" by the material rather than reflected into the room.

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15 How does Sound Conditioning stop noise?

Sound Conditioning in itself does not stop noise; any noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface just as light is reflected from a mirror. In the average room with hard plaster walls and ceilings, the sound, traveling at an approximate speed of 1,120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated, or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials, thereby hastening the silencing of the sound.

16 How is "Adequate Absorption" determined for a room?

The Sound Conditioning Engineer knows the present absorption capacities of the materials and furnishings in a room, and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

17 Is it possible to calculate the length of time sound will remain audible in an auditorium after the source has ceased?

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$T = \frac{.05V}{a}$$

T equals reverberation time measured in seconds.
V equals volume of room expressed in cubic feet.
a equals all existing sound absorbing units.

18 If the period of reverberation is too long, what are the effects?

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound, or sounds from the same source, creating a complex mixture of the several sounds. When this effect is pronounced, the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire phrases "blurred," "fuzzy" and unintelligible.

Music is scrambled in the same way by the "echoes" in an excessively reverberant room. In rehearsals, the conductor or director finds difficulty in locating and correcting mistakes.

19 Is Reverberation the sole cause of poor Acoustics?

In the majority of instances it is. With few exceptions, removal of excessive reverberation will create good hearing conditions.

In occasional cases the shape of a room or unwisely placed curved surfaces which focus sound at specific points will interfere with satisfactory sound distribution.

20 Is all Reverberation undesirable?

No, a certain amount is essential if speaking and music are to have a pleasing "live" quality.

21 Can loud speakers overcome faulty hearing conditions in an auditorium?

As a general rule, no. If reverberation is excessive, speech cannot be understood no matter how much it is amplified. The function of loud speakers is to increase the power of the natural voice, when necessary.

22 Is there a proper reverberation time for auditoriums of different sizes and capacities, and how is it determined?

Yes, this is known as the Optimum Reverberation time.

Through painstaking experiment and years of experience and observation, the most satisfactory length of time, in seconds, for sounds to die out in auditoriums of various sizes has become known. This is a matter of record and is used as a base in correcting auditorium acoustics.

23 Does Acousti-Celotex Sound Conditioning cost more to install in existing church buildings than in new ones?

No, in most installations the cost is the same.

24 Does installation of Acousti-Celotex require structural changes in existing buildings?

No, structural changes are seldom required.

25 Who applies Acousti-Celotex Sound Conditioning?

Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors are selected by The Celotex Corporation and given thorough training in acoustical engineering and sound conditioning practices. See back page, "Celotex Sound Conditioning Service."

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Sound Conditioning Churches with Acousti-Celotex Is Not an Experiment



It is today serving in hundreds of churches and chapels, church schools, and offices, in all parts of the nation. . . *Read what some of them have to say.*



". . . The Acousti-Celotex ceiling which you installed in our Sunday School room last summer, has proved very satisfactory. For Sunday School purposes the room is now much more quiet . . . The room has also been used for church business meetings . . . The improvement in acoustics over former conditions was remarked upon by many who listened downstairs."

(signed) Mrs. Elsie T. Beebe, *Clerk*
Board of Directors
Sixth Church of Christ Scientist
Minneapolis, Minnesota

"Perfect, is the answer to your inquiry about the acoustical qualities of our new church auditorium on which your services and materials were used.

"The Acousti-Celotex in the foyer is laid out in an attractive pattern and is effective in quieting the noise."

(signed) Jno. B. Thompson
For The Building Committee
First Baptist Church
Little Rock, Arkansas

"On behalf of the Third Presbyterian Church of Trenton, New Jersey, I am sending this voluntary expression of thanks for the fine work done by your company to correct the acoustics of our auditorium. We are so delighted with the almost miraculous change in the hearing qualities that we feel you merit a unanimous vote of gratitude."

(signed) John McNab, *Pastor*
The Third Presbyterian Church
Trenton, New Jersey

"Our Sanctuary possesses the best acoustics of any church or auditorium in which I have spoken. Although it is a large Gothic room, the speaking and singing voices carry to near perfection. I have never heard any but the highest commendation from singers and speakers as well as auditors."

(signed) T. H. McDowell, *Minister*
The First Presbyterian Church
Enid, Oklahoma

"An essential factor in good church and auditorium construction is the acoustical properties attained. Sound conditioning is often overlooked by contractors and sometimes sacrificed by architects in their choice of materials.

"Thanks to your gentle but persistent persuasion, the building committee of the new Holy Trinity Church, Dallas, Texas was led to the selection of Acousti-Celotex . . . the perfection in the acoustical properties is far beyond our expectations."

(signed) James F. O'Dea, CM
Holy Trinity Church
Dallas, Texas

"For the past several years . . . With very few exceptions it was quite impossible to hear a speaker under what should have been normal conditions.

"With the installation of your material in our sanctuary, it is now possible for the speaker to be heard distinctly. We are just beginning to realize what we have been missing all these years."

(signed) Anthony Meengs, *Minister*
First Presbyterian Church
Elkhart, Indiana

"This is to express my appreciation for the services you have rendered in connection with the acoustics of our new Holy Trinity Church auditorium.

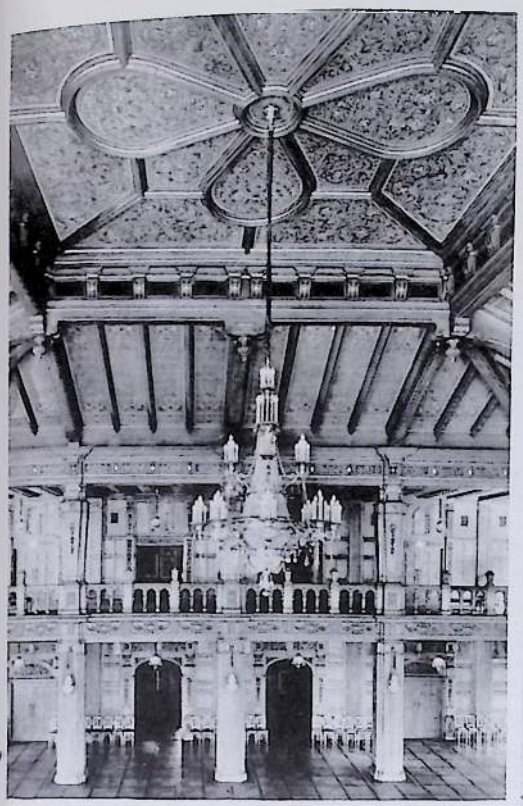
"By the use of Acousti-Celotex on the segment ceiling and for the coffers of the main ceiling and sanctuary ceiling you have achieved an atmosphere that satisfies every requirement we had hoped for.

"You have successfully preserved the speaking work, enhanced the organ music and suppressed noise to a minimum . . . The finish of the material harmonizes perfectly with the decorative treatment of the auditorium.

"You have also solved a problem of echoes and re-echoes of sound in our basement auditorium."

(signed) M. C. Kleuser, *Architect*
Dallas, Texas

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Top: Interior of Scottish Rite Cathedral, Indianapolis, Architect. George Schreiber. Sound-conditioned with Acousti-Celotex sound-absorbing tile. Note rich color decoration on Acousti-Celotex tiles. Bottom: Temple Sholom, Chicago; Architects. Loebl, Schlossman and Demuth. Acousti-Celotex installed in flat wide wall areas below ornamental plaster cornice and above wood panelling, and above cornice in segments of the dome.



Top: Trinity Baptist Church, Minneapolis, Minnesota, showing Acousti-Celotex fibre tile on upper wall and ceiling areas in interesting patterns. *Middle:* Sunday School Room, First Methodist Church, Ann Arbor, Michigan, sound conditioned with Acousti-Celotex ceiling. *Bottom:* First Baptist Church, Forsyth, Georgia, ceiling finished with Acousti-Celotex fibre tile in interesting and varied patterns.

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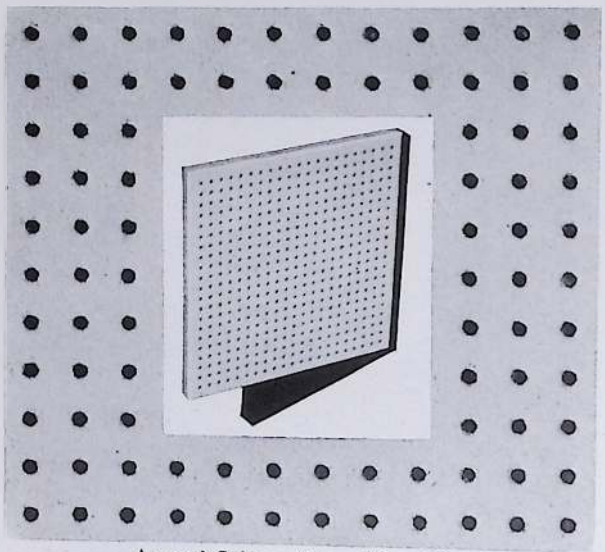
Selecting the Proper Materials

The sound conditioning of building interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as acoustical products.

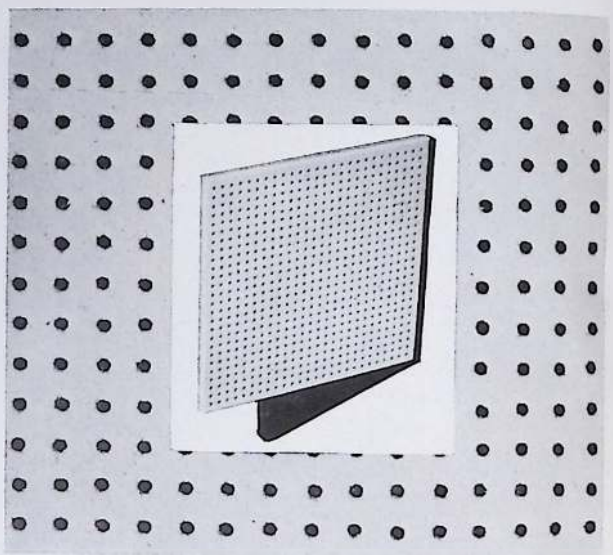
Celotex acoustical products include Acousti-Celotex cane and mineral tiles (Top two pictures) and Muffletone standard and fissured gypsum tiles (Two lower pictures). Both are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

Each area to be sound conditioned must be accurately analyzed and engineered so that the right material may be specified to produce the results desired.

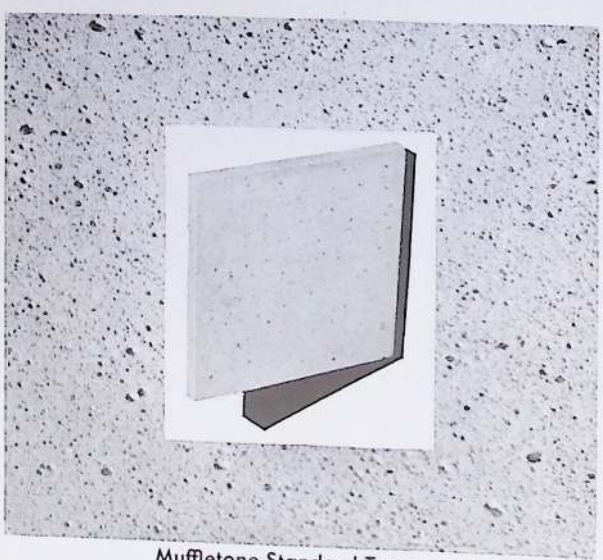
Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection—these important questions may be safely left in the hands of the local Celotex Sound Conditioning distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.



Acousti-Celotex Cane Fibre Tile



Acousti-Celotex Mineral Fibre Tile



Muffletone Standard Type



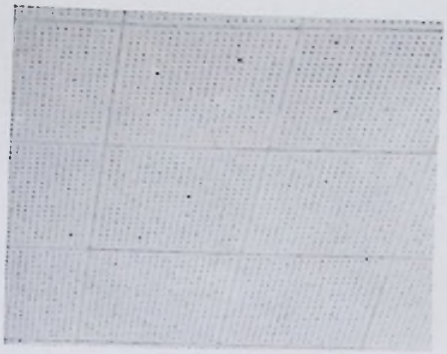
Muffletone Fissured Type

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Decorative Possibilities of Celotex Acoustical Products

Sound conditioning makes possible interesting new decorative effects at no additional cost.

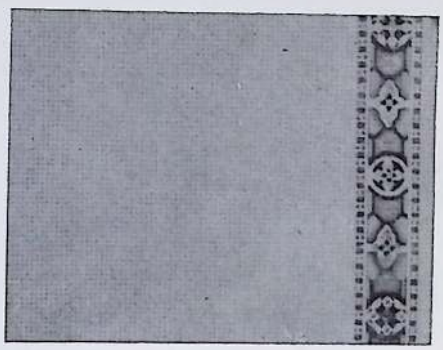
Patterns Acousti-Celotex fibre tile, or Muffletone gypsum tile, with beveled edges can be applied in a variety of interesting tile patterns; or the joint lines between adjacent tile can be minimized by omitting the beveled edges.



Acousti-Celotex tile with beveled edges

Colors Acousti-Celotex is repeatedly paintable without loss of sound absorption, and either brush or spray may be used.

Muffletone is available in a variety of pastel colors, integrally mixed. It can be repainted by spray application.



Acousti-Celotex with square edges

Textures The 441 perforations in each square foot of Acousti-Celotex fibre tile, measuring about 3/16″ each in diameter, viewed closely have a texture that is modern, and bold in design, but seen from a distance, the individual holes seem to merge and present a surface texture that is soft, distinctive and desirable for its decorative quality alone.

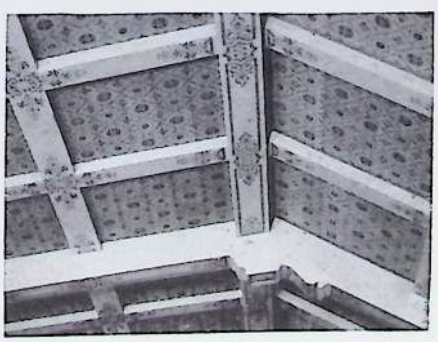
In Muffletone a choice of texture is offered between the finely indented surface of the Standard Type, a smooth stone-like surface and the coarser fabric of the Fissured Type, a livelier, more varied design.



Acousti-Celotex takes paint easily

Thermal Insulation Acousti-Celotex fibre tile is an efficient thermal insulator, and when applied to ceilings directly below roofs will produce fuel savings in winter and shut out unwanted sun heat in summer.

Sound Condition Without Interruption to Services. The process of sound conditioning church auditoriums and auxiliary rooms under expert supervision is not an ordeal. The work can be done by skilled, trained mechanics usually without interruption to church services. To the Celotex Sound Conditioning Distributor, such expert service is a solid asset, painstakingly built up over many years' experience in the field.



Acousti-Celotex takes decoration perfectly

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Celotex Sound Conditioning Service



Sound Conditioning is Our Business

For years, in this area, we have been exclusive distributors of Celotex Acoustical Products. We have analyzed, engineered and installed sound conditioning in churches, schools, offices, factories, banks, public buildings, stores, hospitals, restaurants, theatres and other buildings. We are part of the world's most experienced sound conditioning organization. Complete information is yours without obligation. Just write or call.

Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, The Celotex Corporation in 1925 chose to seek out, school, and establish in all principal market centers an authorized engineering, sales, and contract service by independent, locally owned and operated enterprises.

The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry.

This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained.

The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing acoustical problems, honesty in surveys, and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job —these are what we mean by service ideals.

They constitute plus values written into every specification for a Celotex Acoustical Product.

Sound Conditioning with

ACOUSTI-CELOTEX

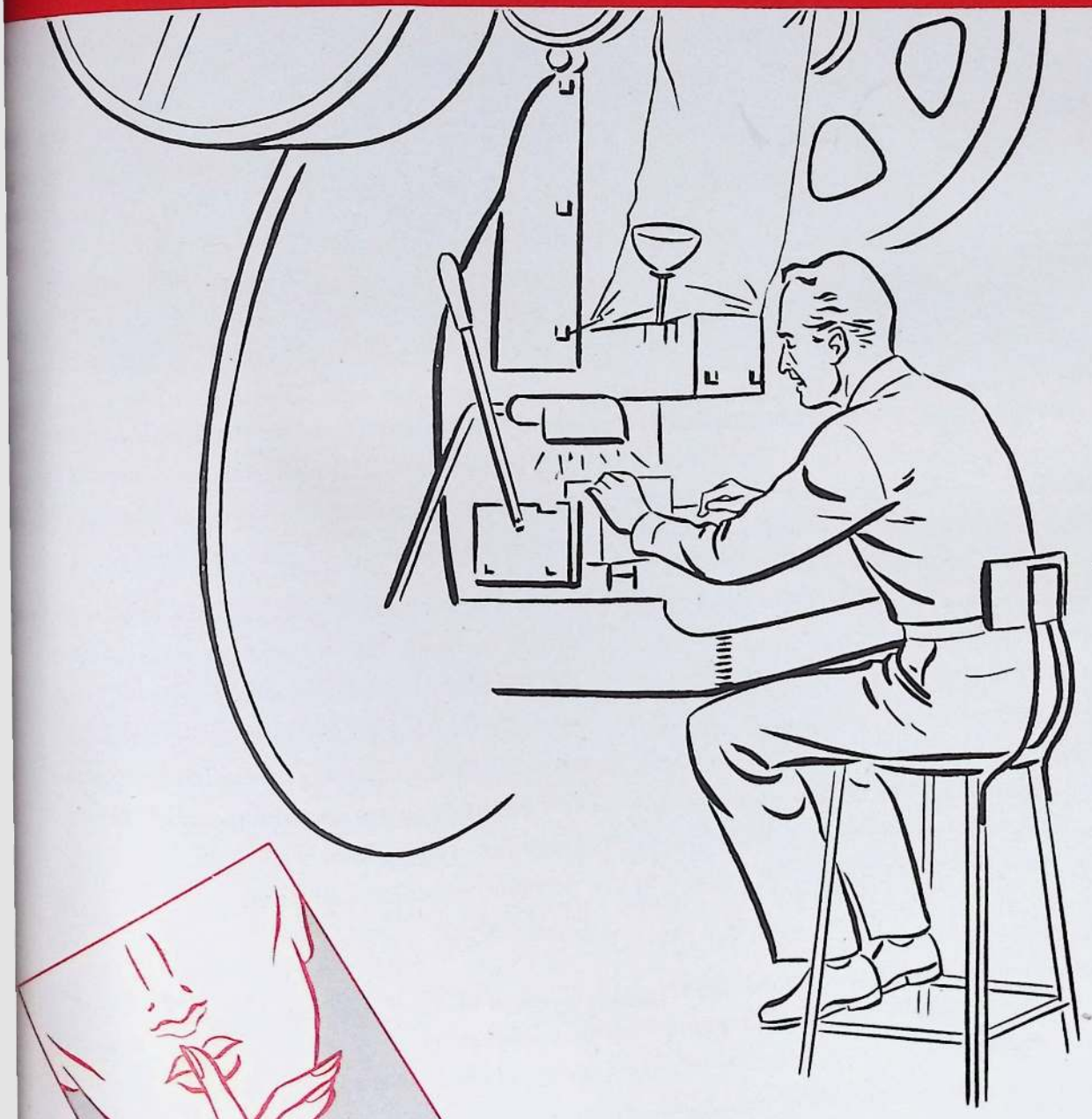
REG. U. S. PAT. OFF.

* *Perforated*  *Fibre Tile* SINCE 1923

THE CELOTEX CORPORATION • CHICAGO

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LESS NOISE IN FACTORY AND SHOP



with Acousti-Celotex Sound Conditioning

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NORTH AMERICA is the greatest industrial section of the world. Under free competitive enterprise we have shown the way to advanced freedom of the individual and to standards of living unknown to other parts of the globe. This position of leadership has been earned. It is not a matter of chance.

The greatest share of credit for our progress belongs rightfully to the production managers, superintendents, foremen . . . skilled craftsmen and farsighted executives of our factories and shops. These men of industry wage relentless war on waste and inefficiency. They are constantly effecting ways and means to produce more and improve the quality and utility of our manufactured goods . . . and to keep costs within the reach of the majority of potential buyers.

Working conditions for employees have received the same concentrated attention as have the mechanical developments. Health—hygiene—safety—are advancing to their deserved position of importance through the efforts of production experts who are cooperating with Industrial Hygienists and medical men to improve the environment in which men work.

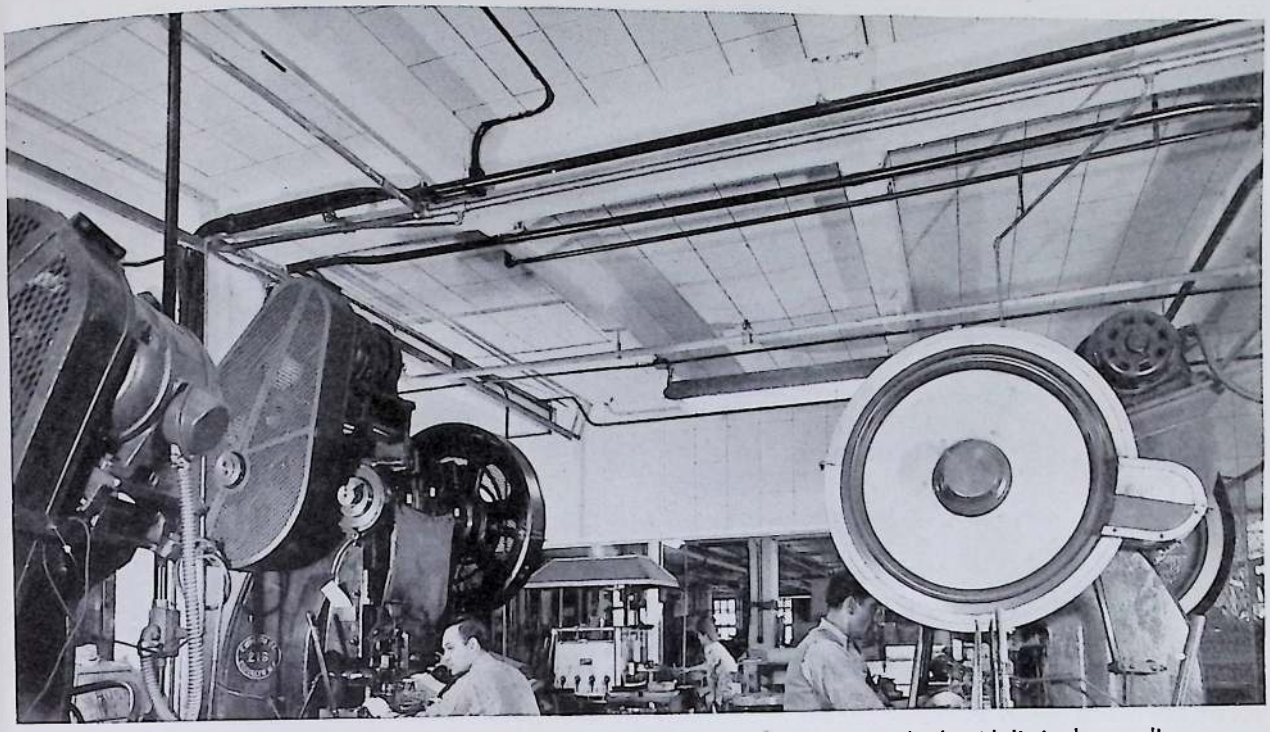
☆ • ☆ • ☆ • ☆

To quote from the Manual of Industrial Hygiene (United States Public Health Service, 1943) . . . "*There is both practical and experimental evidence to indicate that noise produces fatigue, decreased efficiency, impaired hearing, emotional disturbances and neuroses.*"

Progressive factory and shop management is today turning to Celotex Sound Conditioning Service to solve the problems of needless or excessive noise.

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CHECK YOUR PLANT FOR NOISE COSTS



Heavy impact noises from these huge punch presses were reduced to inoffensive thuds with limited spreading . . . by the use of Acousti-Celotex Sound Conditioning.

Noise lowers work output . . . increases work spoilage . . . hampers the worker . . . causes early fatigue.

Noise causes excessive turnover of employees.

Noise increases absenteeism. Employees exposed to unrestrained noise will take unauthorized time off from work.

Noise causes frayed nerves . . . impaired hearing.

Noise lessens attention and makes concentration upon set tasks difficult.

Noise lowers all faculties of the worker. It slackens and dulls mental processes. It distracts the worker . . . increases the hazard of accidents.

Noise clouds judgment . . . reduces precision of action.

Noise is in the same class with bad ventilation and poor lighting in its effect on human efficiency.

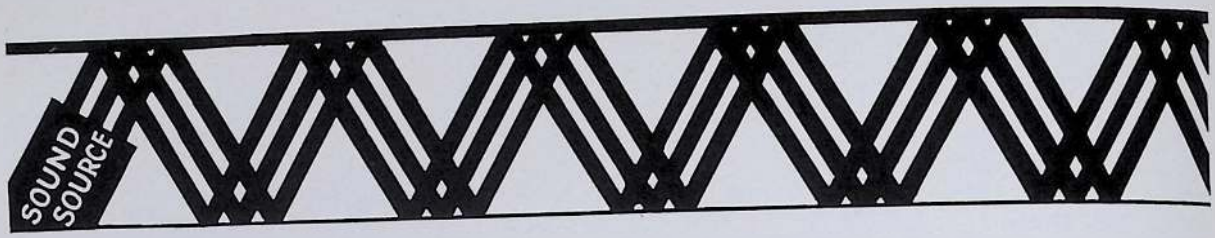
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Excessive NOISE is a costly entry on the payroll of the factory and shop. Its annoying effects can be reduced quickly and easily by Sound Conditioning with Celotex Acoustical Products.

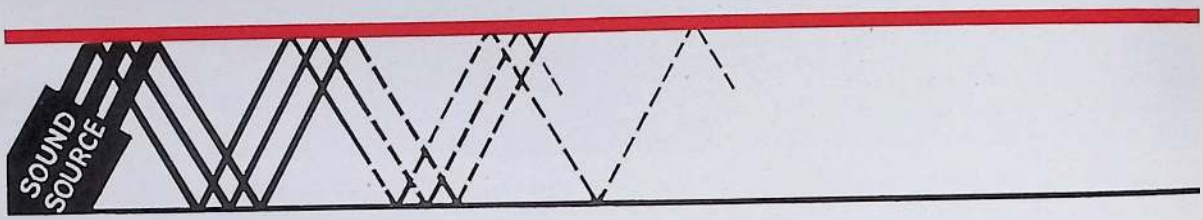
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HOW CELOTEX ACOUSTICAL PRODUCTS EASE ANNOYANCE FROM FACTORY NOISE

Common materials used in buildings permit noise to spread from its original source practically undiminished.



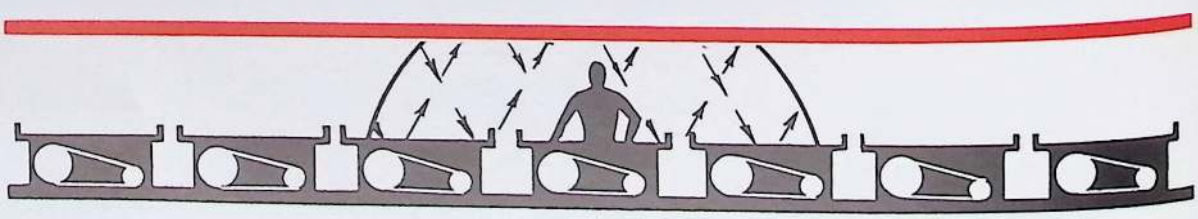
Celotex Acoustical Products, installed on necessary wall and ceiling areas, rapidly soak up sound.



HOW SOUND CONDITIONING PROTECTS THE WORKER



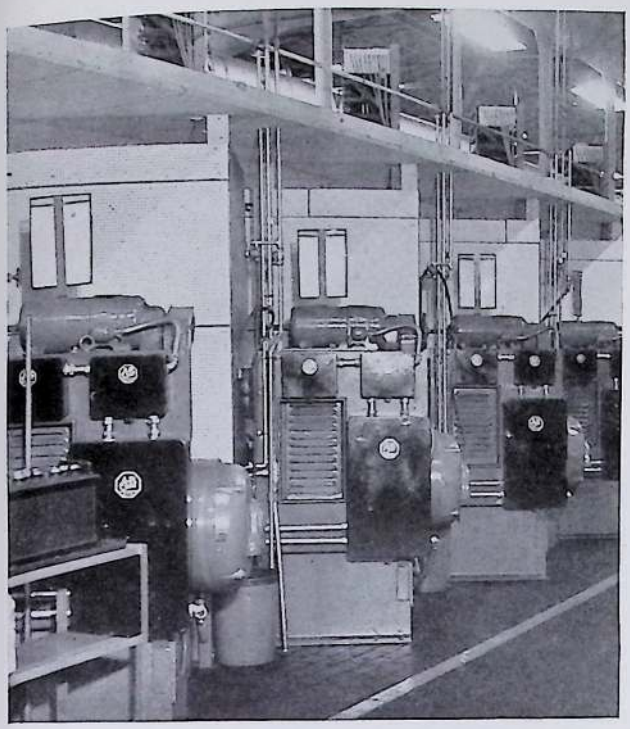
Workers in an ordinary factory or shop environment are bombarded continuously by noises from all sources within the room.



Sound conditioned rooms "hold back" noise and sound, restricting it to the immediate vicinity of the source. Workers hear only the machines close at hand.

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SOUND CONDITIONING WITH CELOTEX ACOUSTICAL PRODUCTS



The whine of the generator test machines pictured above is softened and muffled by the surrounding sound absorbent baffles of Acousti-Celotex fibre tile, and overhead treatment with the same material.



Here 79 bench-mounted small punch presses in an area 50 feet square created a nerve-wracking din. Acousti-Celotex sound conditioning changed the noise pattern to one like that of quietly operating sewing machines.

Sound Conditioning increases work output . . . reduces spoilage . . . allows the worker to complete a full day with more energy.

Sound Conditioning lowers the rate of employee turnover.

Sound Conditioning protects workers from unrestrained noise, reducing the amount of time-off and days lost, caused by noise-induced nerve strain.

Sound Conditioning saves workers from undue fatigue . . . frayed nerves and impaired hearing.

Sound Conditioning allows workers to concentrate on set tasks. It improves overall efficiency . . . promotes safety.

Sound Conditioning enables the worker to use all his faculties to best advantage . . . to do his job with judgment and precision.

Sound Conditioning is as vital to working conditions as good ventilation and proper lighting.

☆ • ☆ • ☆ • ☆

SOUND CONDITIONING with Celotex Acoustical Products improves the disposition of workers and their attitude toward their work. It relieves them from undue strain and tension. It will pay for itself by reduction of errors and by increasing workers' efficiency.

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25 QUESTIONS AND ANSWERS ABOUT

1 What is Sound Conditioning?

Sound Conditioning is the art and practice of treating rooms and the interiors of buildings so as to minimize the annoying effects of noise . . . "unwanted sound".

2 What does Sound Conditioning contribute to factory operation?

Every factory and shop strives to get full efficiency of each employee. Sound Conditioning reduces errors, eliminates excessive turnover of workers and days lost due to fatigue and frayed nerves.

3 How does the factory employee benefit by Sound Conditioning?

He is relieved of the tension and strain caused by excessive noise. He makes fewer mistakes; finishes his day with more energy, less fatigue.

4 How does Sound Conditioning benefit the small shop?

In the small shop the accuracy and full efficiency of each employee is vital to obtaining competitive costs and finished products with high quality. Sound Conditioning reduces excessive noise which interferes with many shop operations.

5 Is Sound Conditioning factories and shops something new?

No. Many factories and shops have been Sound Conditioned with Acousti-Celotex and found it a good investment.

6 What is Acousti-Celotex?

Acousti-Celotex is the registered trademark identifying sound absorbing perforated fibre tiles pioneered by The Celotex Corporation, since 1923, and developed into the world's most widely used material in its field.

7 Is it practical to Sound Condition progressively as funds can be appropriated?

Yes, this is often done.

8 Can factories and shops be sound conditioned without interrupting normal working schedules?

Many factories and shops can be sound conditioned without interfering with the regular schedule. The Celotex Sound Conditioning distributor is equipped for over-night and over-the-week-end installations.

9 Is Sound Conditioning with Acousti-Celotex expensive?

No. Quality, efficiency and appearance of the products have been improved over the past twenty years—yet the price today is substantially less than that of the early installations.

10 How fast does sound travel in air?

Eleven hundred and twenty feet per second.

11 In what form does sound travel?

In the form of spherical waves, increasing in size as they leave the source.

12 In a factory or shop—what happens when the sound waves hit the walls and ceilings?

Only a small part of the sound energy is absorbed at each contact and the remainder is reflected back into the room, resulting in an accumulation of unwanted sound — noise.

13 Is there a method of testing materials to determine their ability to absorb sound?

Yes, here are the absorption coefficients of some common building materials and furnishings:

MATERIAL	ABSORBS	REFLECTS
Plaster	.025	.975
Concrete	.015	.985
Wood Paneling	.03	.97
Glass	.027	.973
Carpet	.20	.80
Acousti-Celotex Type C-4	.70	.30

14 Why do Acoustical Materials absorb so much sound?

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body either through the natural interstices on the surface or through mechanical perforations made in the face of the material expressly for the admission of those sound waves.

In penetrating and traveling through this maze, the sound wave encounters just enough resistance to create friction which transforms the acoustic energy into heat.

Practically, the sound is "soaked up" by the material rather than reflected back into the room.

15 How does Sound Conditioning "stop" noise?

Sound Conditioning itself does not stop noise: a hammer, drill, punch, ringing phone bell, automatic

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screw machine, loom or any other noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface as light is reflected by a mirror. In the average room with hard plaster walls and ceilings, the sound traveling at an approximate speed of 1120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials, thereby hastening the silencing of the sound. See diagram on page 4.

16 How is "Adequate Absorption" determined for a room?

The Sound Conditioning Engineer knows the present sound absorption capacities of the materials in the factory or shop room, and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

17 In auditoriums used for employee mass meetings, social and business meetings, etc., is it possible to calculate the length of time sound will remain audible after the source has ceased?

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$T = \frac{.05V}{a}$$

T = reverberation time measured in seconds.
V = volume of room expressed in cubic feet.
a = all existing sound absorbing units.

On request, The Celotex Corporation will be glad to supply detailed information.

18 If the period of reverberation is too long, what are the effects?

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound. or sounds. from the same source, creating a complex mixture of the several sounds. When this effect is pronounced. the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire phrases "blurred", "fuzzy" and unintelligible.

19 Is Celotex Sound Conditioning used in factories only?

No, Acousti-Celotex* fibre tile has been used to sound condition more offices, schools, hospitals, churches, stores, auditoriums, restaurants, radio studios, and theatres than any other type of acoustical material.

20 What is required to maintain areas sound conditioned with Acousti-Celotex?

Acousti-Celotex requires no extra maintenance. It is repeatedly paintable, by any method, without loss of absorption. Just the care required of ordinary painted wall and ceiling areas will keep Acousti-Celotex new in appearance.

21 Does the treatment differ for factories and shops of varying sizes and uses?

Yes. Each manufacturing area should be analyzed and engineered for the proper amount of the right material. Through training and years of experience, the distributor of Celotex Acoustical Products is equipped to render this important service.

22 Will Sound Conditioning improve the factory lunch room or cafeteria?

Yes. Where office employees eat in a restaurant provided by the company, the lunch period is more restful —there is less clatter and confusion. Employees are in better mental and physical condition for the rest of the day.

23 How does Sound Conditioning affect light reflection?

Acousti-Celotex fibre tile is paintable by any standard method. Light reflection may be controlled by surface painting without loss of absorption.

24 Does installation of Acousti-Celotex materials require structural changes in existing buildings?

No structural changes are required.

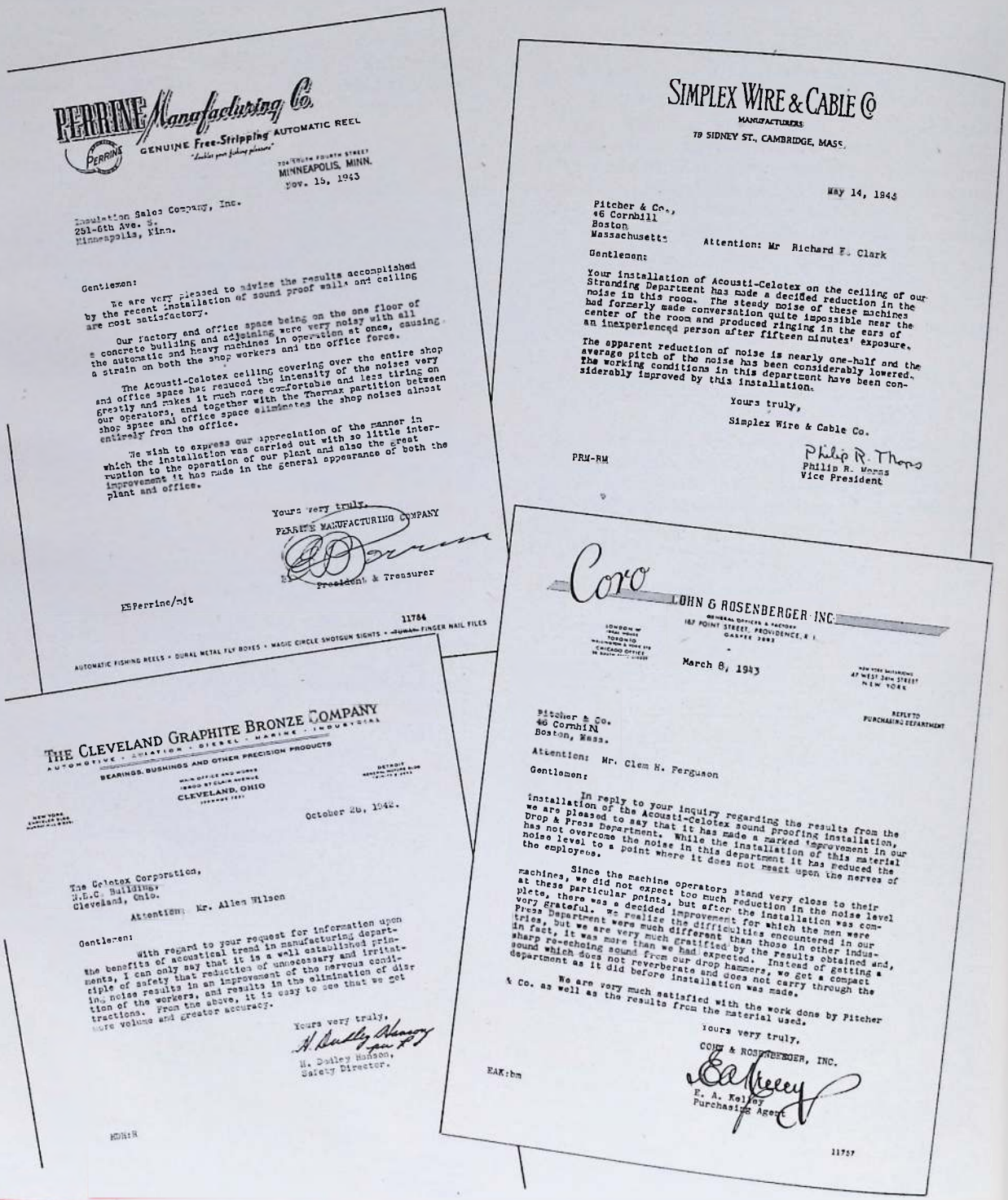
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Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors selected by The Celotex Corporation are given thorough training in acoustical engineering and Sound Conditioning practices. See back page: "Celotex Sound Conditioning Service."

*Trade Mark Reg. U. S. Pat. Off.

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HERE'S WHAT THEY SAY ABOUT SOUND CONDITIONING WITH CELOTEX ACOUSTICAL PRODUCTS



PERRINE Manufacturing Co.
GENUINE Free-Stripping AUTOMATIC REEL
MINNEAPOLIS, MINN.
Nov. 15, 1943

Insulation Sales Company, Inc.
251-6th Ave. S.
Minneapolis, Minn.

Gentlemen:

We are very pleased to advise the results accomplished by the recent installation of sound proof walls and ceiling are most satisfactory.

Our factory and office space being on the one floor of a concrete building and adjoining were very noisy with all the automatic and heavy machines in operation at once, causing a strain on both the shop workers and the office force.

The Acousti-Celotex ceiling covering over the entire shop and office space has reduced the intensity of the noises very greatly and makes it much more comfortable and less tiring on our operators, and together with the Thermax partition between shop space and office space eliminates the shop noises almost entirely from the office.

We wish to express our appreciation of the manner in which the installation was carried out with so little interruption to the operation of our plant and also the great improvement it has made in the general appearance of both the plant and office.

Yours very truly,
PERRINE MANUFACTURING COMPANY
President & Treasurer

ES Perrine/mjt

11784

AUTOMATIC FISHING REELS • DURAL METAL FLY BOXES • MAGIC CIRCLE SHOTGUN SIGHTS • HUMAN FINGER NAIL FILES

SIMPLEX WIRE & CABLE Co
MANUFACTURERS
79 SIDNEY ST., CAMBRIDGE, MASS.

May 14, 1943

Pitcher & Co.,
46 Cornhill
Boston
Massachusetts

Attention: Mr Richard E. Clark

Gentlemen:

Your installation of Acousti-Celotex on the ceiling of our Stranding Department has made a decided reduction in the noise in this room. The steady noise of these machines had formerly made conversation quite impossible near the center of the room and produced ringing in the ears of an inexperienced person after fifteen minutes' exposure.

The apparent reduction of noise is nearly one-half and the average pitch of the noise has been considerably lowered. The working conditions in this department have been considerably improved by this installation.

Yours truly,
Simplex Wire & Cable Co.
Philip R. Thorn
Philip R. Morris
Vice President

PRM-RM

THE CLEVELAND GRAPHITE BRONZE COMPANY
AUTOMOTIVE • AVIATION • DIESEL • MARINE • INDUSTRIAL
BEARINGS, BUSHINGS AND OTHER PRECISION PRODUCTS
MAIN OFFICE AND WORKS
14600 ST. CLAIR AVENUE
CLEVELAND, OHIO

October 26, 1942.

The Celotex Corporation,
N.B.C. Building,
Cleveland, Ohio.

Attention: Mr. Allen Wilson

Gentlemen:

With regard to your request for information upon the benefits of acoustical trend in manufacturing departments, I can only say that it is a well established principle of safety that reduction of unnecessary and irritating noise results in an improvement of the nervous condition of the workers, and results in the elimination of distractions. From the above, it is easy to see that we get more volume and greater accuracy.

Yours very truly,
H. Dudley Hudson,
Safety Director.

HDH:R

Coro
JOHN G ROSENBERGER INC.
GENERAL OFFICES & FACTORY
167 POINT STREET, PROVIDENCE, R. I.
GASPEE 3883

March 8, 1943

REPLY TO PURCHASING DEPARTMENT

Pitcher & Co.
46 Cornhill
Boston, Mass.

Attention: Mr. Clem H. Ferguson

Gentlemen:

In reply to your inquiry regarding the results from the installation of the Acousti-Celotex sound proofing installation, we are pleased to say that it has made a marked improvement in our Drop & Press Department. While the installation of this material has not overcome the noise in this department it has reduced the noise level to a point where it does not react upon the nerves of the employees.

Since the machine operators stand very close to their machines, we did not expect too much reduction in the noise level at these particular points, but after the installation was complete, there was a decided improvement for which the men were very grateful. We realize the difficulties encountered in our Press Department were such different than those in other industries, but we are very much gratified by the results obtained and, in fact, it was more than we had expected. Instead of getting a sharp re-echoing sound from our drop hammers, we get a compact sound which does not reverberate and does not carry through the department as it did before installation was made.

We are very much satisfied with the work done by Pitcher & Co. as well as the results from the material used.

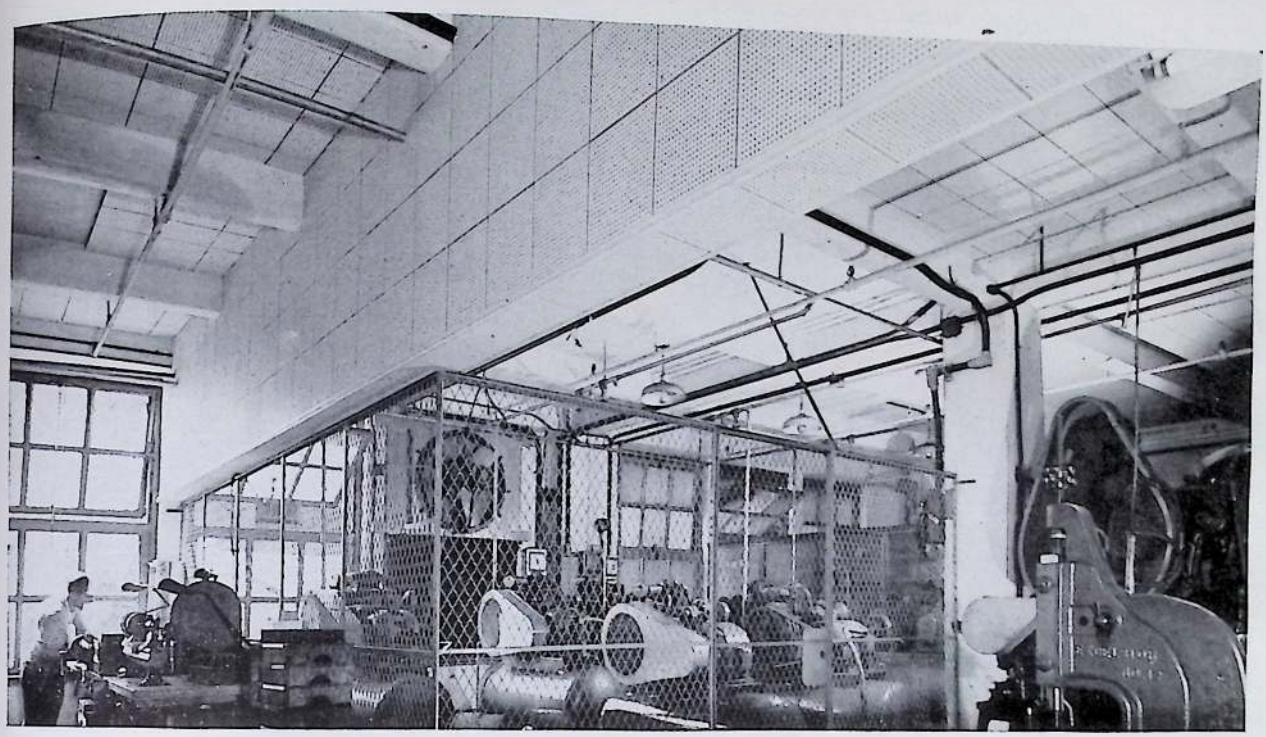
Yours very truly,
CORO & ROSENBERGER, INC.
E. A. Kelley
Purchasing Agent

EAK:bm

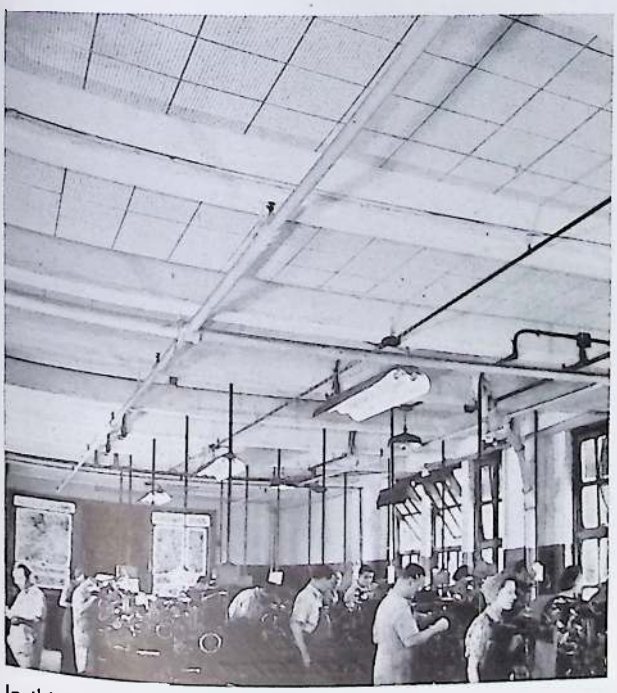
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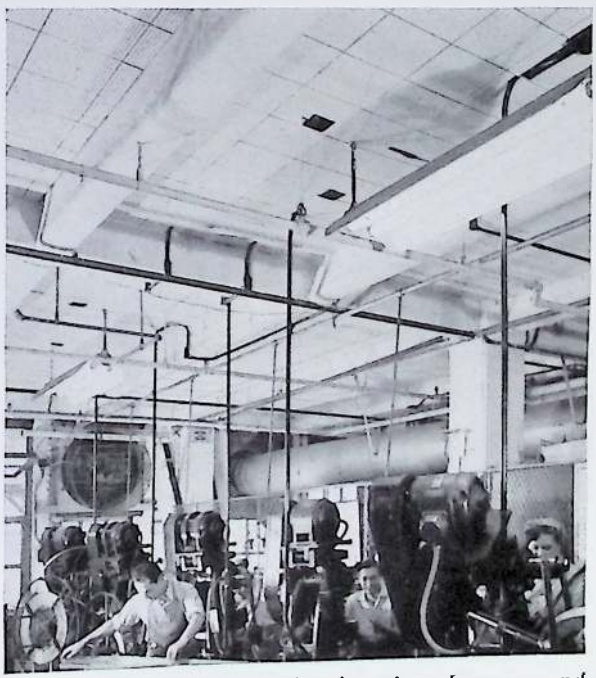
SOUND CONDITIONING WITH ACOUSTI-CELOTEX SOLVES MANY FACTORY NOISE PROBLEMS



Compressor noise is a common offender in many factories. Here the noise is suppressed and its spread prevented by the Acousti-Celotex baffle and ceiling.



In this automatic screw machine department, the Acousti-Celotex tile ceiling confines noise to immediate vicinity of machines, preventing spread to other work areas.



Here the alternating, irregular thumping of presses and the hiss of the air ejectors are softened by the Acousti-Celotex sound absorbing tile on the ceiling.

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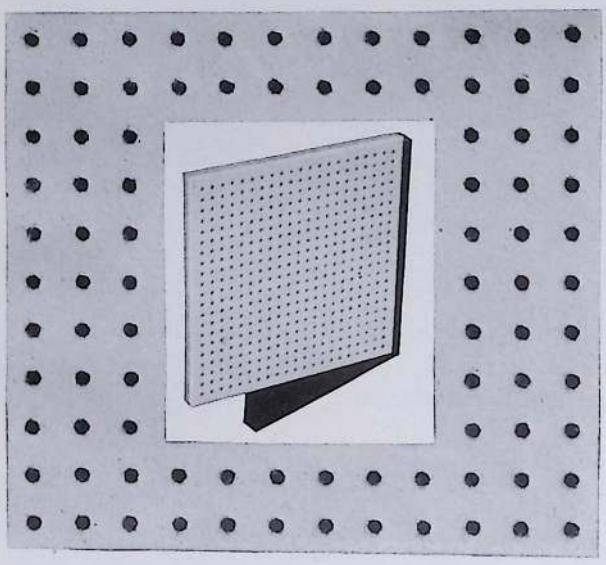
SELECTING THE PROPER MATERIALS

The sound conditioning of building interiors usually requires the introduction of sound-absorbing materials for comfortable and efficient use. Products designed specifically for this purpose are commonly known as acoustical products.

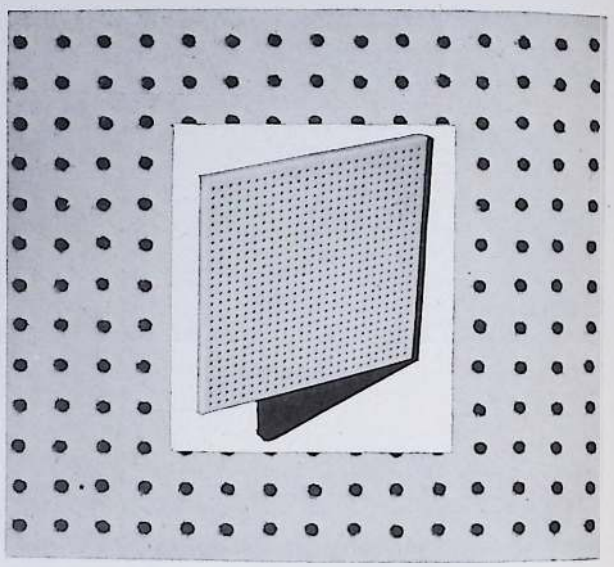
Celotex acoustical products include Acousti-Celotex cane and mineral tiles. These and other products are made in different thicknesses, thus providing a range of sound absorption from which proper selection can be made in each case.

Each area to be sound conditioned must be accurately analyzed and engineered so that the right material may be specified to produce the results desired.

Which material to use, how and where to install it for best results, the mechanics of efficient, economical erection—these important questions may be safely left in the hands of the local Celotex Sound Conditioning Distributor. Part of the world's most widely experienced organization in this field, he can be depended upon for competent, efficient service.



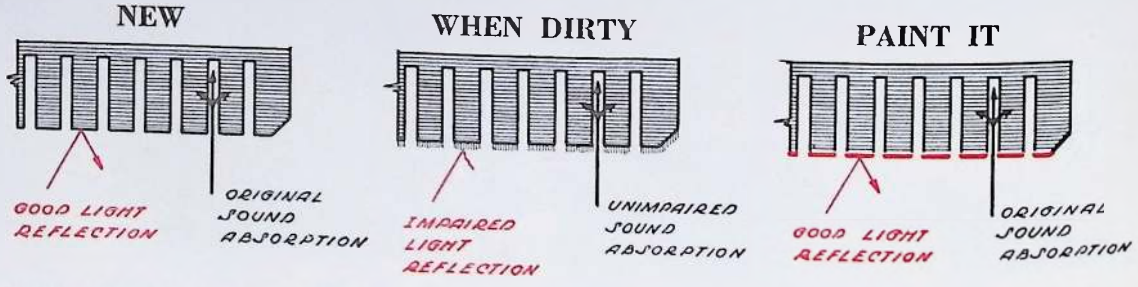
Acousti-Celotex Cane Fibre Tile



Acausti-Celotex Mineral Fibre Tile

EASY TO MAINTAIN

Acousti-Celotex perforated fibre tile may be painted repeatedly by any standard method without loss of sound absorbing efficiency. The following cross-sectional views, through a typical Acousti-Celotex tile, show the effect of paint in providing a new, light-reflecting surface without sealing the perforations.



Since 1923, scientific tests and thousands of painted installations of Acousti-Celotex fibre tile confirm the paintability and permanence of this material.

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HOW NOISY IS YOUR PLANT?

The ear accommodates a tremendous range of sound intensities which for convenience are expressed logarithmically in Decibels. Comparative decibel readings (with their corresponding intensity levels) of familiar noises are shown in this simple scale.

Intensity—amount of energy in the sound	*Decibels (Loudness)*	*Type of Noise*
1,000,000,000,000	120	
100,000,000,000	110	Airplane Engine
10,000,000,000	100	
1,000,000,000	90	Heavy Traffic, Pneumatic Drill
100,000,000	80	
10,000,000	70	Noisy Office, Telephone Conversation, Ordinary Traffic
1,000,000	60	
100,000	50	Average Office
10,000	40	Ordinary Conversation
1,000	30	Quiet Home, Quiet Conversation
100	20	
10	10	Rustle of Leaves, Whisper
1	0	

FAMILIAR FACTORY NOISES

Table 1—*Noise levels of various machines at distance of 3 ft.*

	Decibels (Loudness)
Punch presses, various types	96-103
Headers	101-105
Drop Hammers	99-101
Bumping Hammer	100
Hydraulic press	130
Automatic riveters	95 - 99
Lathes (average)	80
Automatic screw machines	93-100
Airplane riveting guns	94-105
Airplane propeller grinding	100-105
Cotton spinning	84 - 87
Looms	94-101
Sewing machines	93 - 96
Wood planers	98-110
Wood saw	100
Wire rope stranding machines	100-104
Ball mill	99

☆ • ☆ • ☆ • ☆

Because factory noise has become a major problem in most manufacturing plants, much has been written by scientific and medical authorities on the subject. Studies of individual factories have been made and are now in progress. Industrial Hygienists have given great impetus to this important work.

The Celotex Sound Conditioning Distributor has up-to-date information at all times on matters pertaining to industrial noise.

The Distributor's organization is especially trained and equipped to evaluate noise conditions in YOUR plant . . . to analyze and engineer each area in order to specify the materials which will produce the desired results . . . and to install Celotex Sound Conditioning with the minimum of cost and inconvenience.

If you have excessive turnover of employees . . . too many accidents . . . costs that are too high . . . too many rejects and seconds . . . or general inefficiency . . . noise is generally an important factor.

Consult your Celotex Sound Conditioning Distributor. The benefits of his years of experience are yours for the asking. If your plant has one of the few areas where Sound Conditioning will not satisfactorily solve the problem, he will tell you. He has built a reputation for accurate, honest surveys and recommendations.

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CELOTEX SOUND CONDITIONING SERVICE



Useful knowledge in science grows with practical experience. Such experience in the field of architectural acoustics consists in the number and variety of problems dealt with. To develop this experience rapidly, The Celotex Corporation in 1925 chose to seek out, school, and establish in all principal market centers an authorized engineering, sales, and contract service by independent, locally owned and operated enterprises. ¶The combination of this merchandising policy with Celotex Acoustical Products rapidly won and has steadily maintained a position of leadership in this industry. ¶This policy, controlled through territory franchises, has been the means of providing architect and owner dependable engineering and application service. With profits coming only from material sales, The Celotex Corporation has the same interest as architect and owner in seeing fair job prices established and maintained. ¶The Celotex Corporation is proud of the service ideals which its acoustical distributor organization, no less than its own personnel, have woven into the fabric of this business. Ability in diagnosing acoustical problems, honesty in surveys and recommendations, considerateness as well as promptness in contract application work, and timeless interest in the satisfactory performance of every job—these are what we mean by service ideals. ¶They constitute plus values written into every specification for a Celotex Acoustical Product.

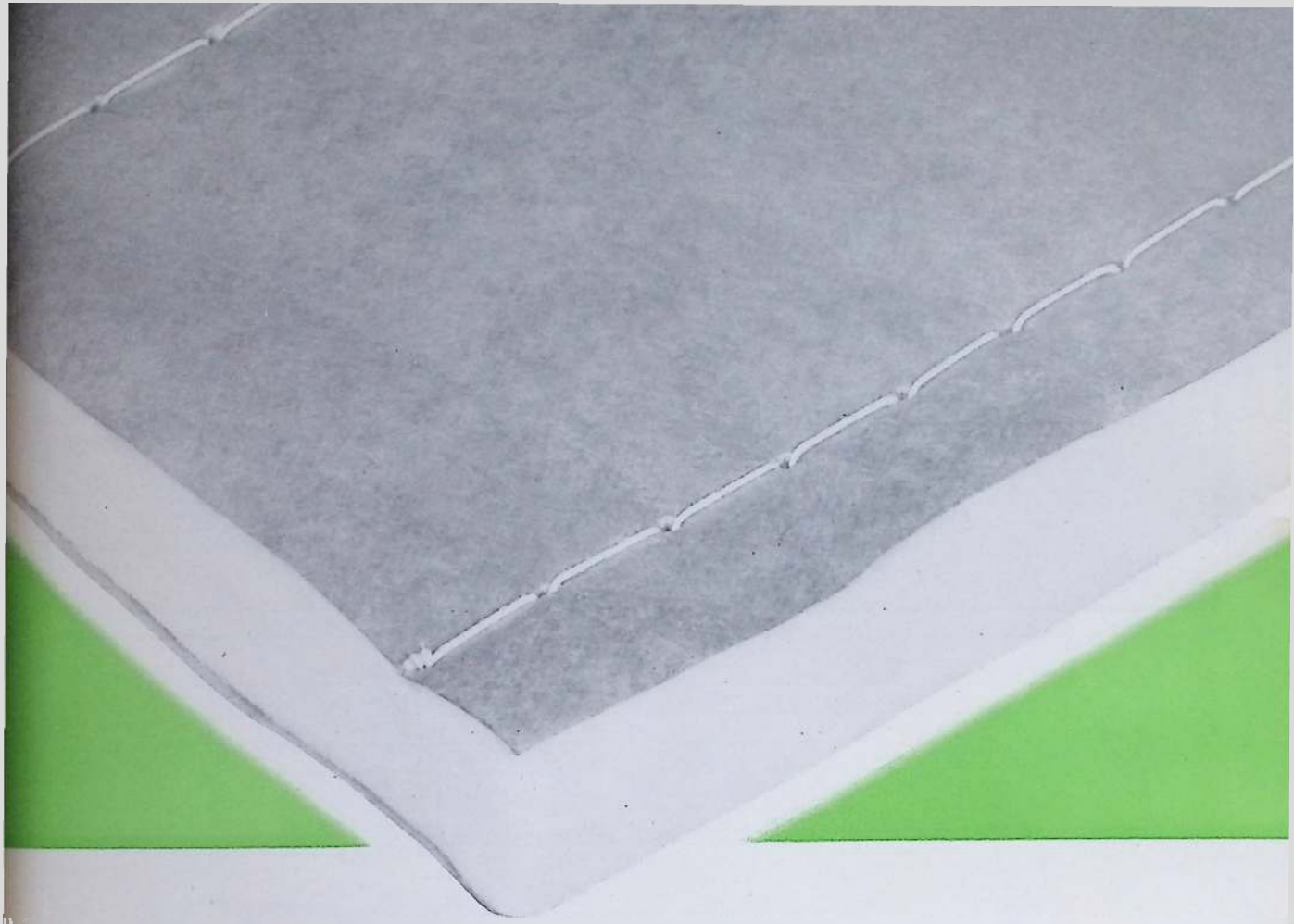
THE CELOTEX CORPORATION • CHICAGO

Sound Conditioning with
ACOUSTI-CELOTEX
* Perforated Fibre Tile SINCE 1923

Sound Conditioning Is Our Business

For years, in this area, we have been exclusive distributors of Celotex Acoustical Products. We have analyzed, engineered and installed sound conditioning in factories, churches, schools, offices, banks, public buildings, stores, hospitals, restaurants, theatres and other buildings. We are part of the world's most experienced sound conditioning organization. Complete information is yours without obligation. Just write or call.

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WESTROC SOUND ISOLATION BLANKETS

Westroc Sound Isolation Blankets are made in three types, all using rock wool as the basic material. Rock Wool is a durable, rot-proof, fire-proof and odorless material that will not corrode or settle. Westroc Blankets are furnished in rolls 4 feet wide and 25 feet long and are available in a number of thicknesses to meet job requirements. Stitches 4″ apart run lengthwise on the blankets, and side edges are turned and stitched.

TYPE KK . . . Rock Wool blanket completely enclosed on both sides and edges with heavy kraft paper. This type of blanket is particularly adapted for installation in walls, ceilings, plumbing piping, etc., to provide control of sound transmission. This blanket is also utilized for thermal insulation in buildings and for wrapping air conditioning ducts.

TYPE BB . . . Rock Wool blanket completely enclosed on both sides and edges with tough, water-proof Brownskin paper. This type has superior sound isolation value than Type KK and also has the added water-resistant quality of the Brownskin paper.

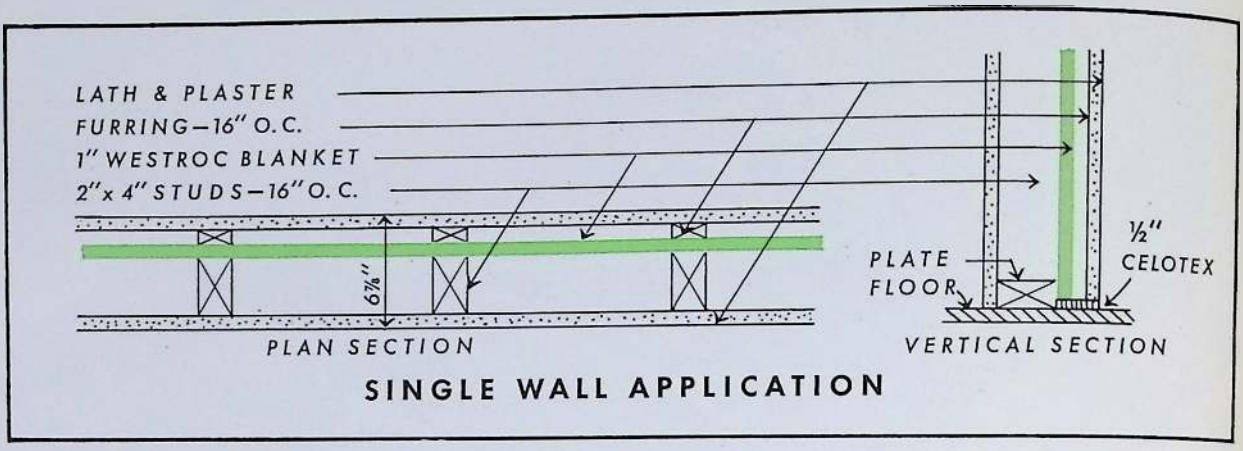
TYPE MK . . . Rock Wool blanket completely enclosed with muslin on one side and kraft paper on the other side. This combination of surfaces provides a sound absorbing medium of high efficiency to be utilized in combination with various types of perforated facing materials to provide sound control and acoustical correction.

WESTERN ASBESTOS CO.
Building Materials · Industrial Products
675 Townsend Street, San Francisco 3, California
OAKLAND · SACRAMENTO · RICHMOND

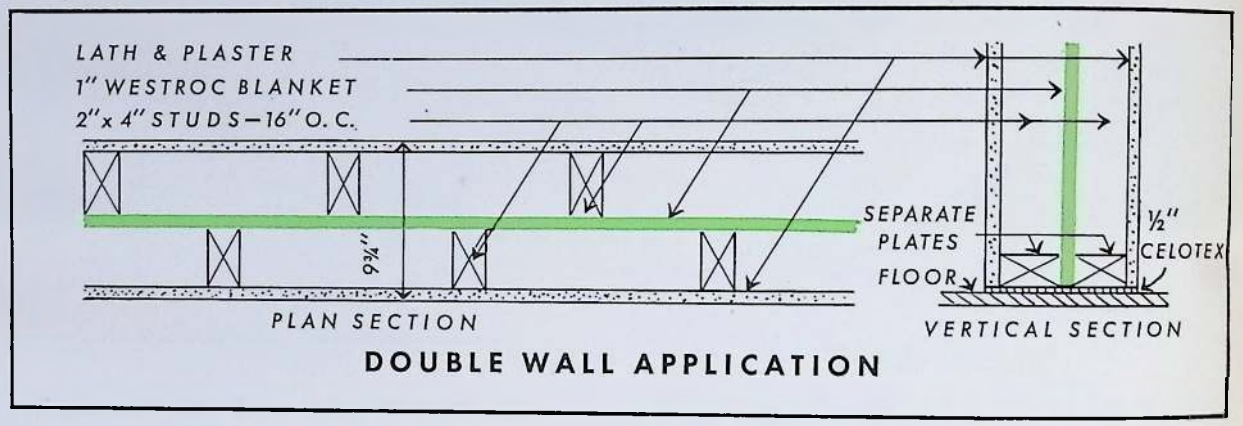
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TYPICAL SOUND ISOLATION APPLICATIONS WITH WESTROC BLANKETS TYPE KK AND TYPE BB

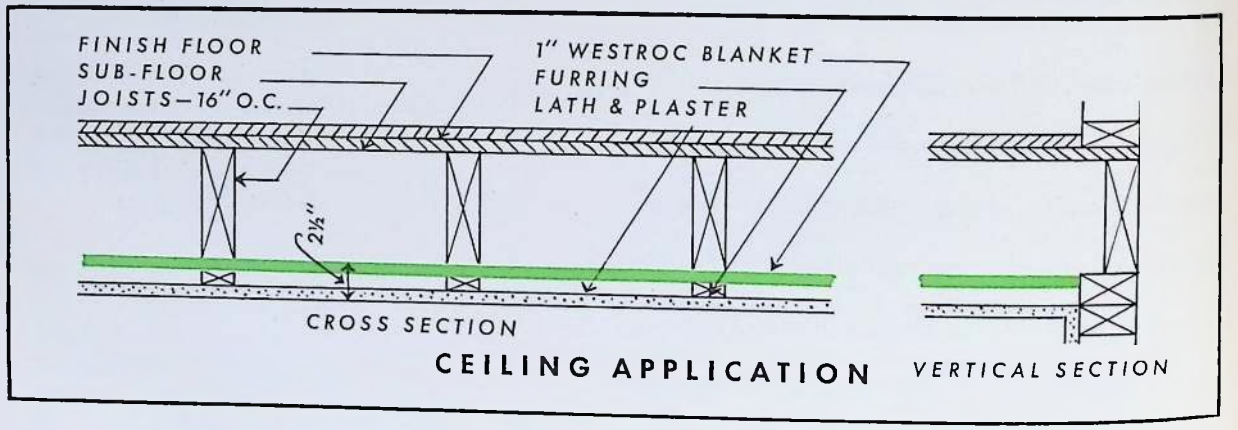
Complete information on specific sound isolation applications upon request



SINGLE WALL APPLICATION



DOUBLE WALL APPLICATION



CEILING APPLICATION

SPECIFICATIONS OF WESTROC SOUND ISOLATION BLANKETS

Type	Thickness	Width	Length	Sq. Ft. per Roll	Approx. Weight per 1000 Sq. Ft.
KK, BB	½ Inch	4 Feet	25 Feet	100	375 lbs.
KK, BB, MK	1 Inch	4 Feet	25 Feet	100	650 lbs.
MK	2 Inch	4 Feet	15 Feet	60	1,000 lbs.

WESTERN ASBESTOS CO.

Building Materials · Industrial Products

675 TOWNSEND STREET, SAN FRANCISCO 3, CALIFORNIA

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Celotex Products for Sound Insulation

IN WALLS AND FLOORS

Technical Note No. 10-e

THE CELOTEX CORPORATION, CHICAGO 3, ILL.

A common acoustical problem in building construction is the transmission of sound through walls, floors, and ceilings. In practically all types of construction, transmission of sound from one room to another through the dividing wall or floor takes places as a result of diaphragmatic vibration. The surface may be set into vibration either by direct mechanical impact, as by a footstep on a floor, or by the alternating air pressure due to sound waves incident on the surface. The former case is referred to as *impact transmission* and the latter is termed *airborne transmission*. In either case the vibrating surface generates new sound waves of reduced intensity in the room on the other side.

In discussing the problem of sound insulation, it is necessary to carefully avoid loose expressions, such as the common term "sound-proof", and define the subject in precise terms. No one ever refers to a material as being "heat-proof", but knowing all materials retard the flow of heat in some degree, a material is rated as a heat "insulator" with some particular definite degree of efficiency. Likewise in sound insulation, we must rate various types of construction by their sound insulating efficiency, rather than by calling them "sound-proof" or "not sound-proof".

To meet the requirement of good sound insulating construction, a partition separating two rooms is expected to act in such a way that sound created in one room shall not be loud enough to be heard in the other room, or if heard, shall not be markedly disturbing. Whether this requirement is met depends not only on the sound insulating efficiency of the partition, but also on the original loudness of the sound, and on the amount of interfering noise already existing on the other side of the partition. The effect of these various factors will be explained in the following.

All Celotex Cane Fibre Products are manufactured under

THE FEROX PROCESS

(PATENTED)

An integral chemical treatment toxic to

FUNGUS GROWTH
DRY ROT TERMITES
(WHITE ANTS)

and which effectively protects Celotex Cane Fibre Products against these and similar agencies of destruction.

THE FEROX PROCESS is fully described in Tech. Note 42b

Decibel Scale

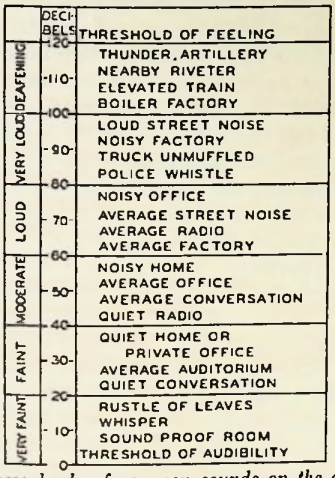


Figure 1. Loudness levels of common sounds on the decibel scale. At zero decibels, sound is too faint to be audible; at 120 decibels, sound is loud enough to produce a sensation of feeling.

It has become standard practice in acoustical engineering to measure the loudness of sound in units called "decibels" (db.), which are somewhat analagous to degrees on the temperature scale. The higher the loudness level in decibels, the louder is the sound. Figure 1 shows the loudness level of common sounds on the decibel scale.

Rating of Efficiency—Transmission Loss

The sound insulating efficiency of a wall or floor construction is called its "transmission loss" (T.L.) and is also measured in decibels. The transmission loss is simply the number of decibels which a sound loses in being transmitted through a wall. For example, if a sound of 70 db. loudness level passes through a partition having a transmission loss of 30 db., it will have a loudness level of 70 less 30, or 40 db. on the other side. (See Figure 2).

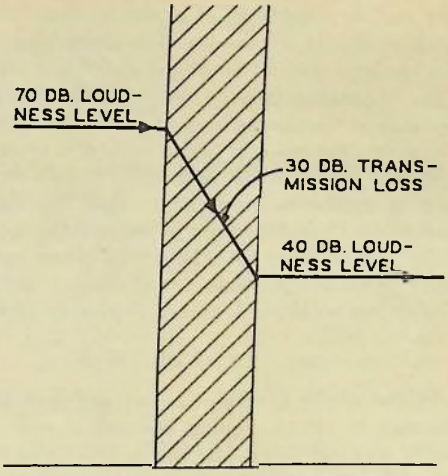


Figure 2. A wall having a transmission loss of 30 db. reduces the loudness level of sound passing through it from 70 db. to 40 db.

The transmission loss of any wall is a physical property of that wall, just as its weight or rigidity, and depends only on the materials and methods of construction used in erecting the wall, and not on the loudness of the sound striking it nor on the size or acoustical properties of the rooms on either side of it.

The transmission loss of a given wall does, however, vary considerably with the pitch frequency of the sound. In general, partitions and floors are much more efficient for high pitched sounds than for low pitched sounds. Constructions are therefore tested at a number of pitches covering the entire scale, and the figure given for the transmission loss is the average of the values thus obtained. This varying efficiency with pitch explains why conversation sometimes is heard through a wall as a low pitched rumble of sound, but cannot be understood. The higher pitched overtones of the speech sound, on which intelligibility depends, are not transmitted as readily as the low pitches.

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Original Loudness of Sound

The loudness of the sound heard through a partition depends of course on the loudness of the sound striking it on the other side. Figure 3 shows the performance

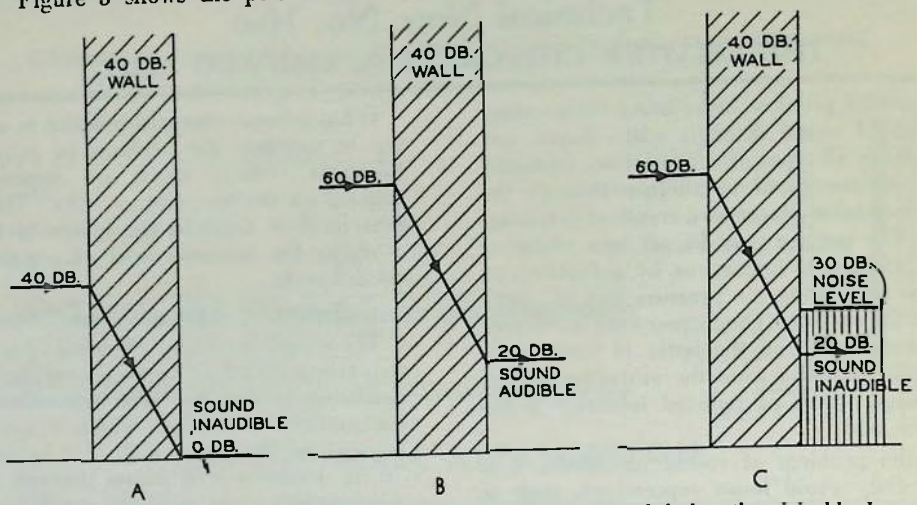


Figure 3. Whether sound can be heard through a wall of given efficiency depends both on the original loudness of the sound and on the loudness of extraneous noise on the "listening" side of the wall.

under various conditions of a wall having a transmission loss of 40 db. In Figure 3-a, the sound striking the wall has a loudness level of 40 db., it undergoes a reduction of 40 db. in passing through the wall, and emerges on the other side at a loudness level of 0 db., which is inaudible. If, however, the original sound is 60 db., as in Figure 3-b, the 40 db. wall will reduce it to 20 db. on the other side, where it can be heard faintly. Thus the wall would be "sound-proof" provided the sound striking it was not over 40 db., but it would not be sound-proof against sounds louder than 40 db., and a wall having a higher transmission loss would be required to give satisfactory results.

Effect of Noise

In the above example it was assumed that we were listening to sound coming through a wall into a room which was otherwise absolutely quiet. In reality, there are very few places in which there is not at least a slight amount of noise, such as the ticking of a clock, the rumble of distant street traffic, and sounds from many different sources. (See Figure 1.) The human ear behaves in such a way that it cannot hear a faint sound when a loud sound is present at the same time. No one can hear a whisper in a boiler factory, because it is drowned out or "masked" by the surrounding noise. In the case of sound coming through a wall we can hear it only if the room is quiet enough. Usually we do not hear the neighbors' radio through the wall when our own radio is turned on, in which case the wall is "sound-proof." But if we turn off our radio and are trying to go to sleep, the wall is no longer "sound-proof," and the neighbors' radio is heard all too plainly. This is illustrated in Figure 3-c. A 60 db. sound is reduced to 20 db. by the wall, exactly the same as in Figure 3-b, but the noise level of 30 db. drowns out the sound coming through the wall and it cannot be heard. (Experiments on hearing have shown that one sound must be at least 10 db. louder than a second sound in order to drown it out.) In Figure 3-b, there is no interfering noise, and the sound can be heard through the wall.

Fallacy of Percentage Ratings

A common question is, "If a wall has a transmission loss of 40 decibels, by what percentage will it reduce the sound?" There is no definite answer to this question, since the sound insulating efficiency of a wall cannot be stated on a percentage basis. This question is exactly the same as saying, "If you lose 40 dollars, what percent of your money have you lost?" Just as the percentage of money lost would depend on the original amount of money, so would the percentage reduction of sound level depend on the original loudness of the sound. The same wall has a 100% reduction in loudness level in Fig. 3-a, and only a 66% reduction in Fig. 3-b. Obviously either of these percentage figures is misleading.

As a matter of fact, one is not really interested in the percentage of sound reduction, but instead wants to know whether sound can be heard through the wall, and if so, how loud it will be. By rating partitions in terms of a *reduction in decibels*, and comparing these ratings with the loudness of sounds *in decibels* as shown in Figure 1, the desired information is given more directly and definnitely than by any kind of percentage rating.

Estimating Sound Insulating Requirements

The foregoing shows that a given wall construction may or may not give satisfactory sound insulating performance, depending on the conditions in individual cases, and that in order to determine the efficiency that a wall must have in order to be satisfactory one must know approximately both the loudness of the sound which will strike one side, and the loudness of the interfering noise which will be present on the other side. As an approximate working rule, the following may be given:

Subtract the loudness level of the interfering noise on one side of the partition from the loudness level of the sound which strikes the other side, and add 10 decibels. The result is the transmission loss which the wall must have in order to be reasonably satisfactory.

This rule is not rigid, and in case of doubt it is advisable to provide a wall 5 or 10 db. better than the rule indicates. The data in Figure 1 furnishes a rough guide to the loudness levels of commonly encountered sounds. Actual experience, however, is of the most value in estimating sound insulating requirements. Observations on the transmission of speech through walls of known efficiency have shown the results given in Figure 4, quiet conditions on the "listening side" being assumed in each case.

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Transmission Loss of Wall	Hearing Conditions	Rating
30 db. or less	Normal speech can be understood quite easily and distinctly through the wall.	Poor
30 to 35 db.	Loud speech can be understood fairly well. Normal speech can be heard but not easily understood.	Fair
35 to 40 db.	Loud speech can be heard, but is not easily intelligible. Normal speech can be heard only faintly, if at all.	Good
40 to 45 db.	Loud speech can be faintly heard but not understood. Normal speech is inaudible.	Very good—recommended for dividing walls between apartments.
45 db. or greater	Very loud sounds, such as loud singing, brass musical instruments, or a radio at full volume can be heard only faintly or not at all.	Excellent—recommended for band rooms, music practice rooms, radio and sound studios.

Figure 4. Classification of sound insulating properties of partitions according to their transmission loss in decibels. Quiet conditions on the listening side of partition are assumed in each case.

Effect of Openings in Partitions

The published values of transmission loss for partitions and floors are based on tests made on constructions having no openings of any kind. If a door or window having a low transmission loss is placed in a wall of high efficiency, the overall transmission loss of the combination will be intermediate between the two values, depending on the area of the door or window in relation to that of the wall, and on the difference in efficiency between the two. The effect of cracks or holes, such as those occuring around doors, pipes, phone or outlet boxes, etc., is especially serious, as they may greatly reduce the efficiency of an otherwise satisfactory wall construction. Any leakage of sound through ventilating ducts may be alleviated through the use of Q-T Ductliner.

Sound Insulating Properties of Partitions

Tests on the sound insulating properties of partitions have established the following facts:

1. For solid masonry partitions such as brick, concrete, or tile, the transmission loss depends only on the weight of the wall per unit area. The heavier the wall the better the sound insulation. As an approximate rule, starting with a solid masonry partition weighing 10 lbs. per sq. ft, and having a transmission loss of 26 db., each successive doubling of the weight adds 9 db. to the transmission loss.

2. An exception to the above weight law is found in the case of porous concrete masonry. The efficiency of such walls is consistently higher than that of ordinary masonry walls of the same weight. It is important to note, however, that porous concrete partitions show this superiority *only when they are plastered on both sides.* If plaster is omitted, sound waves pass readily through the pores of the material, with the result that the sound insulation is generally unsatisfactory.

3. A masonry partition having the plaster base and plaster furred out on both sides is considerably better than a partition of the same weight with plaster applied direct.

4. The efficiency of single wood or steel stud walls cannot be accurately predicted, but in every case is greater than that of an equal weight of solid masonry. The efficiency may be increased by making the connection between the plaster base and the studding as flexible as possible. Placing a rock wool blanket between the studs and the the plaster base, spacing the blanket from the plaster base by means of furring strips, also raises the efficiency considerably.

5. Double walls separated by a continuous air space have considerably higher sound insulation than single walls of the same total weight and type of materials. The sound insulating value depends on the weight and rigidity of the two units, and particularly on the degree of structural separation. The fewer the points at which the units are rigidly tied together, the better the sound insulation. For best results, double walls should be connected only at the edges. Even a small connection, such as a single nail driven through both sides of a double wall, reduces its efficiency by conducting vibration directly across the air space. The efficiency may be increased somewhat by inserting pads of Celotex Building Board at the top and bottom edges so as to further decrease the transmission of vibration at these points.

6. Wall fills, such as slag, loose rock wool, etc., should never be used in a structurally separated double wall, since they act as a bridge across the air space and thus reduce the sound insulation value. Porous materials in the air space are of some value, however, when they are placed so as not to create bridging action. For example, a rock wool blanket may be attached to the inner faces of staggered wood studs, or may be adhered to one inner face of a double masonry wall without touching the other side. Sheets of Celotex Building Board stood loosely in the air space provide increased sound insulation.

For hollow walls which are not structurally separated, such as ordinary wood stud partitions, a fill between the studs improves the efficiency slightly by increasing the

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weight per unit area.

7. Results comparable to those obtained with completely separated double walls can also be achieved by attaching furred plaster construction to a structural wall by means of special resilient members, employing felt pads or steel springs. These units hold the furred construction in place, and reduce the intensity of vibration conducted to the structural wall.

Sound Transmission Test Data on Partitions

Listed in Table I are the results of tests of the sound insulating efficiencies of various partitions embodying both standard and special constructions. Each figure shown is the average of measurements made at a series of frequencies covering the audible range. These tests were made at nationally recognized laboratories, and except where otherwise noted were conducted under the sponsorship of the Insulation Board Institute.

Tests 1 to 5 indicate that high sound insulating value cannot be obtained on standard wood stud constructions if they are left unplastered. Application of plaster to both sides effects considerable improvement. due to the large increase in weight. Of the plastered walls in this group, Celotex Lath as a plaster base is seen to be superior in sound insulation to either wood lath or gypsum lath.

The double 2x2″ stud partitions (Tests 6 and 7) have remarkably high sound insulating efficiency in relation to their weight. thickness. and cost, and are comparatively easy to erect. The two sides of the wall are structurally separated at all points except the floor and ceiling, where the studs are nailed to 2x6″ plates. Note again that the plastered wall is considerably better than the unplastered one. This construction is recommended only for *non-load bearing partitions of normal height.*

The staggered stud construction (Test 8) is recommended as a load bearing double wall having high sound insulation. Frequently a rock wool blanket is woven between the studs for obtaining somewhat higher efficiency.

Test 9 shows the effect of improving an existing wall of standard 2x4″ stud construction by erecting an auxiliary 2x2″ stud partition on one side of it. Comparison with Test 3 shows that the added construction increases the efficiency by about 10 db., which is a decidedly worthwhile improvement. As in the case of the 2x2″ double stud wall (Tests 6 and 7), structural separation should be maintained at all points except the floor and ceiling. Further improvement can be obtained by standing loose sheets of Celotex Building Board in the air space, and also by erecting a second auxiliary partition either on the same side or the opposite side of the existing wall.

The Cemesto party wall shown in Test 10 has been developed in connection with low cost housing embodying dry wall construction. It is comparable in efficiency with a standard 2x4″ stud partition with Celotex Lath and plaster on both sides, and has high enough sound insulating value to make it suitable as a dividing wall between apartments. All joints must be caulked to prevent sound leakage.

Tests 11 to 14 on solid masonry partitions are listed for comparison with the wood stud constructions and to illustrate the effect of weight in determining the sound insulating efficiency of solid masonry as previously described. It is seen that high sound insulation is obtained only by the use of excessive weight as compared with double constructions, such as that shown in Test 15.

The double 3″ gypsum tile partition with loose sheets of Celotex Building Board stood in the air space (Test 15) provides excellent sound insulation in masonry construction comparable to the 2x2″ double stud or the 2x4″ staggered stud partitions. As in all double walls, structural separation must be maintained throughout. It is important that care be exercised in laying the tile so that none of the mortar is squeezed out into contact with the Celotex Building Board so as to bind the Building Board between the two sections.

The 4″ Celocrete partition shown in Test 16 illustrates the superiority of lightweight concrete masonry to ordinary masonry of the same weight, as previously referred to. According to the weight law, a solid masonry wall weighing 30 lbs, per sq. ft. would have a transimssion loss of about 40 db, as compared with 43.8 db for the Celocrete wall. In common with all porous concrete constructions, *the Celocrete wall must be plastered on at least one side, and preferably on both sides,* in order for its sound insulating value to be realized.

TABLE I. Sound Transmission Tests on Partitions. All Tests Except those Marked (*) Were Sponsored by the Insulation Board Institute.

Test No.	Construction	Weight, Lbs. per Sq. Ft.	Transmission Loss, Db.	Class
1.	½″ INSULATING BOARD; 2″×4″ STUDS 16″ O.C	3.8	32.2	Fair
2.	2″×4″ STUDS 16″ O.C; ¾″ INSULATING BOARD	4.3	32.7	Fair
3.	½″ INSULATING LATH; ½″ PLASTER; 2″×4″ STUDS 16″ O.C	12.6	40.9	Very Good
4.	WOOD LATH; ½″ PLASTER; 2″×4″ STUDS 16″ O.C	17.1	37.5	Good
5.	2″×4″ STUDS 16″ O.C; ½″ PLASTER; ⅜″ GYPSUM LATH	15.0	34.9	Fair to Good
6.	2″×2″ STUDS 16″ O.C-ON 2″×6″ PLATE; ½″ INSULATING BOARD-STOOD LOOSE-6″ LAP; ½″ INSULATING BOARD	6.2	42.8	Very Good
7.	2″×2″ STUDS 16″ O.C-ON 2″×6″ PLATE; ½″ INSULATING BOARD-STOOD LOOSE-6″ LAP; ½″ PLASTER; ½″ INSULATING LATH	14.3	52.3	Excellent
8.*	2″×4″ STUDS STAGGERED 16″ O.C ON 2″×6″ PLATE; ½″ PLASTER; ½″ INSULATING LATH	13.1	53.7†	Excellent
9.	2″×2″ STUDS 16″ O.C.-ON 2″×4″ PLATE; 2″×4″ STUDS 16″ O.C; ½″ INSULATING LATH; ½″ PLASTER; EXISTING CONSTRUCTION	18.2	51.3	Excellent
10.*	4′-0″; 1⅛″-THICK MILLED SECTION; 1⅛″ CEMESTO; CAULKING	8.2	39.8	Good to Very Good
11.*	1½″ SOLID METAL LATH AND PLASTER	13.9	29.6	Poor
12.*	2″ SOLID GYPSUM TILE; ½″ PLASTER	19.6	34.2	Fair
13.*	4″ HOLLOW CLAY TILE; ½″ PLASTER	27.0	39.8	Good
14.*	8″ BRICK; ½″ PLASTER	88.0	53.8	Excellent
15.*	½″ PLASTER; DOUBLE 3″ HOLLOW GYPSUM TILE - 2″ AIR SPACE; ½″ INSULATING BOARD-STOOD LOOSE-6″ LAP	32.0	47.8	Excellent
16.*	4″ CELOCRETE; ½″ PLASTER	30.0	43.8	Very Good

†This value was obtained some years ago by a method now obsolete, and is not strictly comparable to other values in this table. The figure shown is probably somewhat high.

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Sound Insulating Properties of Floors

Transmission of sound through floors may be either of the airborne or impact type. Fireproof floor constructions such as concrete or tile are very efficient against airborne sound, due to their necessary weight and rigidity. Transmission losses of 45 to 60 db. are typical. Impacts, however, when made on a bare concrete floor surface, are transmitted very readily. The best method of reducing impact transmission is to cover the floor with a soft resilient material, such as heavy carpet or cork tile, which acts to muffle and absorb the shock of the impact.

The addition of a suspended lath and plaster ceiling below the tile or concrete slab provides high insulation against both impact and airborne sound. Still better results can be obtained by suspending the ceiling from resilient hangers which tend to absorb rather than conduct vibration.

Additional insulation against both airborne and impact sound may also be obtained by installing a "floating" floor over the structural floor. The floating floor may be a separate concrete slab separated from the main slab by spring isolators, or it may be a wood floor nailed to sleepers which are supported either by steel springs or by sheets of resilient material such as Celotex Building Board. In any case, the efficiency of such construction depends both on the weight of the floating floor and on the degree of vibration isolation achieved by the resilient mountings.

Ordinary wood joist floor constructions, with lath and plaster on the under side of the joists and rough and finish flooring on top, have efficiencies for airborne sound averaging around 40 to 45 db, which are somewhat higher than standard wood stud partitions. Higher insulating value may be obtained by using a floating floor or separate ceiling joists, or preferably both.

The insulation of impact transmission in wood joist construction is a much more difficult problem, and under severe conditions such as running and jumping or the vibration and impact of heavy machinery on the floor above it is virtually impossible to secure completely satisfactory results. Light impacts such as ordinary footsteps, which are not heavy enough to shake the whole floor, can be muffled satisfactorily by means of heavy carpet or resilient floor material or by installation of a floating floor. These measures are not effective against heavy impacts, because the usual frame construction is not massive and rigid enough to resist being set into vibration as a whole. The only construction which will do any good at all under heavy impacts is the erection of a completely separated ceiling with joists anchored only in the side walls. Even this may be inadequate when the walls are of ordinary frame construction, since vibration may be transmitted through the wall connections. If the walls are of heavy masonry, however, better results may be expected.

Sound Transmission Test Data on Floors

The wood joist floor constructions shown in Table II were tested under the auspices of the Insulation Board Institute.

Comparison of Tests 1 and 2, on standard 2x8" wood joist floors, shows that elimination of a plaster finish on the ceiling reduces the efficiency by about 5 db. The value shown for Test 2 is typical of standard floor construction using Celotex Lath as a plaster base.

In Test 3, an auxiliary ceiling of insulating lath and plaster on 2x2" joists has been suspended from the existing construction of Test 2, resulting in an improvement in sound insulation of about 10 db. and providing efficiency equivalent to heavy masonry construction. In this construction, transmission of vibration between the existing and auxiliary ceilings is minimized by the blocks of insulating board which prevent the 2x2" members from being pulled into rigid contact with the screw eyes.

Tests 4 and 5 are variations of standard floor construction which are applicable to new work. In Test 4, illustrating "floating" construction, the finish flooring is nailed to wood sleepers which are separated from the sub-flooring by a sheet of Celotex Building Board. The high efficiency of this construction depends on the sleepers being nailed only into the Building Board and not through the Building Board into the sub-flooring. An alternative method is to nail the sleepers through into the sub-flooring but only at intervals of 6 to 8 feet.

A combination of a floating floor and a completely separate ceiling, as shown in Test 6, results in extremely high sound insulating efficiency. The ceiling joists are not connected to the floor joists at any point but are supported only at the side walls or at the intermediate points at which the floor joists are supported. This construction represents about the maximum efficiency obtainable in frame buildings within reasonable limits of thickness and cost. The vibration isolating action of the separate ceiling makes it particularly effective against heavy impacts, up to the point where the entire building structure is set into vibration.

TABLE II. Transmission Tests for Airborne Sound on Floor Construction Sponsored by the Insulation Board Institute.

Test No.	Construction	Weight, Lbs. per Sq. Ft.	Transmission Loss, Db.
1.	1"x4" T&G PINE FINISH FLOOR; 1"x6" D&M PINE SUB FLOOR; ¾" INSULATING BOARD; 2"x8" JOISTS 16" O.C	9.6	40.2
2.	1"x4" T&G PINE FINISH FLOOR; 1"x6" D&M PINE SUB FLOOR; ½" INSULATING LATH; 2"x8" JOISTS 16" O.C; ½" PLASTER	14.3	45.1
3.	1"x4" T&G PINE FINISH FLOOR; 1"x6" D&M PINE SUB FLOOR; 2"x8" JOISTS 16" O.C; EXISTING CONSTRUCTION; ½" INSULATING LATH; 5"x5" INSULATING BOARD BLOCKS TO SEPARATE SCREW EYE & 2"x2"; ½" PLASTER; 2"x2" - 16" O.C - WIRED TO SCREW EYE	20.3	55.5
4.	1"x4" T&G PINE FINISH FLOOR; 1"x6" D&M PINE SUB FLOOR; 1"x3" SLEEPERS; ½" INSULATING BOARD; 2"x8" JOISTS 16" O.C; ½" INSULATING LATH; ½" PLASTER	16.2	49.7
5.	1"x4" T&G PINE FINISH FLOOR; 2"x8" JOISTS 16" O.C; 1"x6" D&M PINE SUB FLOOR; ½" INSULATING BOARD; ½" INSULATING LATH; 1"x3" FURRING; ½" PLASTER	15.9	47.4
6.	1x4" T&G PINE FINISH FLOOR; ½" INSULATING BOARD; 1"x3" SLEEPER; 1x6" D&M PINE SUB FLOOR; 2"x8" JOISTS 16" O.C; 2"x4" JOISTS 16" O.C; ½" INSULATING LATH; ½" PLASTER	16.7	54.1

Doors

Obviously the overall sound insulating efficiency at a partition is limited by the characteristics of the doors within the partition. This efficiency can be increased by sealing any cracks or openings which may exist, as by providing felt or rubber gaskets on the door stops at the head and jambs, and installing a special metal bound felt strip threshold closer. See Figures 5 and 6.

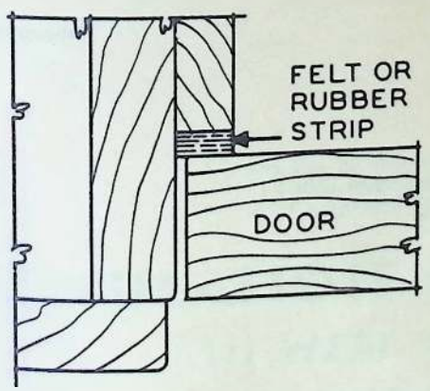


Figure 5. Detail of door jamb showing how a felt or rubber gasket is applied to door stop to stop leakage of sound thru cracks.

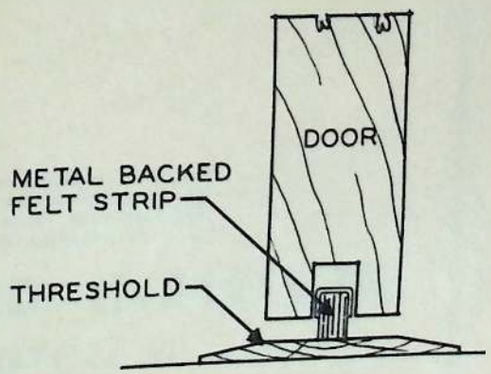


Figure 6. Section thru door showing metal bound felt strip threshold closer which drops when door is closed and raises into door out of sight when door opens. This increases sound insulation efficiency of a door.

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A heavy flush door is more efficient than a light panel door, but generally speaking, ordinary door construction does not have a sound reduction of more than 25 db. If more reduction is necessary, either double door construction with a small vestibule is necessary, or one of the special sound insulating doors specifically manufactured for that purpose.

Given in Table III are test values obtained by Dr. P. E. Sabine at Riverbank Laboratories. All the units were sealed tightly into place except No. 5, which was mounted loosely as in actual practice.

	Transmission Loss, Db.
1. Steel, ¼″ thick	35
2. Wood refrigerator door, 5½″ thick, filled with cork	29
3. Solid oak, 1¾″ thick	25
4. Fabricated, hollow flush or sanitary door, 1¾″ thick	27
5. No. 4, hung in usual manner	24
6. Light 4-panel birch veneer	22
7. Two doors, panelled maple veneer, hung with 2″ separation in single casement	30
8. Special soundproof door, 1¾″ thick	35
9. Special soundproof door, 2½″ thick	40
10. Special soundproof door, 3″ thick	43

TABLE III. Riverbank Laboratories Tests on Sound Transmission of Doors.

High sound insulation in windows is seldom required except for observation windows in radio and recording studios. These should be constructed with double or triple panes of heavy glass, with each pane isolated completely from the frame by gaskets of felt or rubber around all four edges. It is advisable to have the panes of slightly different thickness, to avoid resonance effects. When a double window is placed in a double wall, the structural separation should be maintained at the window by constructing separate rough bucks and frames in each side of the double wall.

Improving Existing Constructions

The best methods of increasing the sound insulation of an existing partition is to erect an auxiliary partition which is spaced an inch or two away and does not touch the existing partition at any point. The auxiliary partition may be built as shown in Test 9 of Table I, or may be constructed of masonry.

In the case of floors, best results are obtained, particularly for impact transmission, by erecting an auxiliary ceiling completely separated from the existing ceiling and supported only at the side walls. When ceiling spans are too large to permit this, or when the required reduction in ceiling height is too great, the next best procedure is the addition of a new floating floor over the existing floor in a manner similar to that shown in Test 4 of Table II, or the erection of an auxiliary suspended ceiling as in Test 3 of the same table.

Acoustical Treatment

The question is frequently asked whether the sound insulation between two rooms can be increased satisfactorily by the use of acoustical treatment in one or both rooms. The answer is in general "No". Covering the surface of a ceiling or wall with acoustical material adds inappreciably to its transmission loss. An acoustical treatment properly applied will produce a satisfactory quieting effect in the room in which it is installed, and will naturally reduce the amount of sound to be transmitted, thus increasing indirectly the apparent sound insulating efficiency of the wall. However, experience has shown that a considerably greater reduction in the transmitted sound is usually necessary for satisfactory results than is possible to obtain by acoustical treatment.

Released October, 1945

NOTE: For additional sound transmission test data on wall and floor constructions, refer to Bureau of Standards report BMS #17 and Supplement. Write to Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

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SOUND INSULATION VALUES *of* FLOORS AND WALLS

INSULATION BOARD INSTITUTE
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FIG. 1. 25 DECIBELS: *Normal speech can be understood quite easily and distinctly through a wall or partition.*



FIG. 2. 30 DECIBELS: *Loud speech can be understood fairly well on the opposite side of the partition if conditions are quiet.*

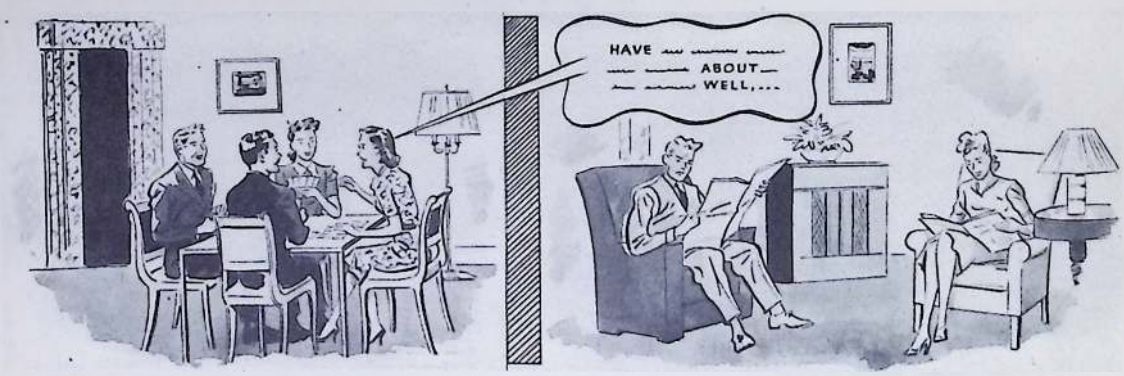


FIG. 3. 35 DECIBELS: *Loud speech is audible but not intelligible on the opposite side.*

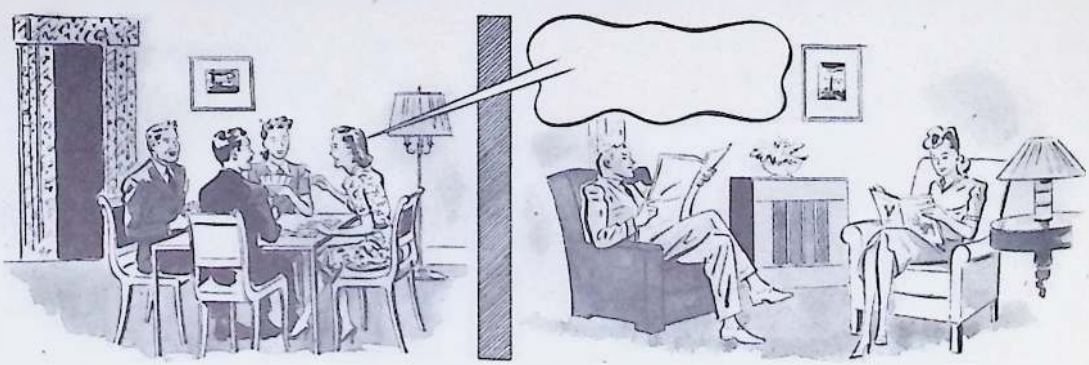


FIG. 4. 40 DECIBELS: *Normal speech is not audible and loud speech can be heard faintly, but cannot be understood.*

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SOUND INSULATION VALUES OF FLOORS AND WALLS

SOUND is transmitted through floors and walls in various degrees depending on the nature of the materials and the method of construction used. Structural insulating board when properly installed effectively reduces sound transmission.

Sound insulation tests of various types of walls, partitions and floors with and without insulating board have been made by a nationally known and recognized bureau of standards. The results of these tests are given on pages 4 to 7 inclusive, the various panels tested being described and illustrated. The data are summarized in Tables 1 and 2 on the back cover. The procedure for conducting these tests is similar to that described in U. S. Department of Commerce report BMS 17 entitled, "Sound Insulation of Wall and Floor Constructions."

It will be noted that the sound insulation values are expressed in terms of the sound transmission loss in decibels (abbreviated db), which is the unit used for expressing the loudness level or intensity of a sound. Thus if a wall has a rating of 30 decibels (db), it reduces the loudness level so that the level will be 30 decibels less on one side than on the other. This reduction factor or transmission loss for a wall is measured from a point very close to one side of the wall to a point very close to the other side. In an average case in practice, the sound created would be somewhere within a room, a few feet from a wall, and the person hearing the sound on the other side would be a short distance from the wall. The sound may thus be diminished in loudness by the combined effect of distance and sound absorption in the rooms, as well as by the partition.

The relative effectiveness of various sound insulation values is illustrated by Figs. 1, 2, 3 and 4. Thus with an average reduction of 25 db, normal speech can be understood quite easily and distinctly through a wall or partition. With a reduction of 30 db, loud speech can be understood fairly well on the opposite side of the partition if conditions are quiet. With a reduction of 35 db, loud speech is audible but not intelligible on the opposite side. With a reduction of 40 db, normal speech is not audible and loud speech can be heard faintly, but cannot easily be understood and such walls may be considered as relatively efficient from a sound insulation standpoint.

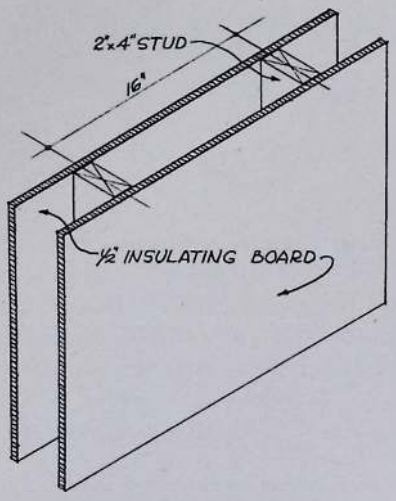
The results reported herewith are based on the assumption that there are no sound leaks. A considerable amount of sound energy will flow through even a small opening in a wall, such as the crack under a door or an enlarged hole around a pipe. This means that good sound insulating construction requires careful workmanship. All masonry and plaster work should be free from cracks and flaws. If phone or light boxes are to be installed, they should be calked tight, and should not be placed back to back.

Frequently rooms are connected by a common ventilating duct, which may provide a clear path for sound transmission unless it is properly lined with sound absorbing material. In double wall construction special care must be taken to avoid bridging the air space solidly with nails, extruded mortar, etc. Good overall sound insulation cannot be expected from a wall construction of high rated efficiency in which an inefficient door is placed. In such a case, the overall efficiency is not much better than that of the door alone, and in order to obtain the desired results, a door must be used which has an efficiency comparable to that of the wall.

The data in this folder are based on air-borne noises. Sounds caused by impact, such as walking or moving of furniture form another class of noises which depend largely on the character of the floor surface. Impact sounds can be effectively reduced at the source by covering the floor with surfacing materials such as carpeting or resilient floor tile.

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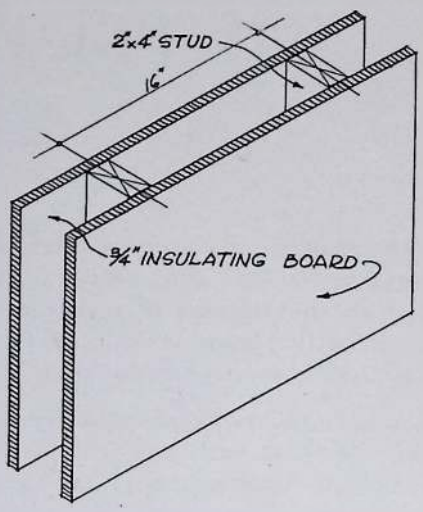
WALL PANELS



Wall Panel No. 1

½" insulating board on both sides of 2 x 4 studs on 16" centers.

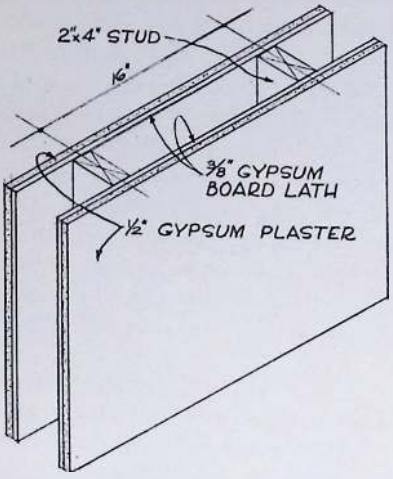
Sound insulation value.....32.2 db



Wall Panel No. 2

¾" insulating board on both sides of 2 x 4 studs on 16" centers.

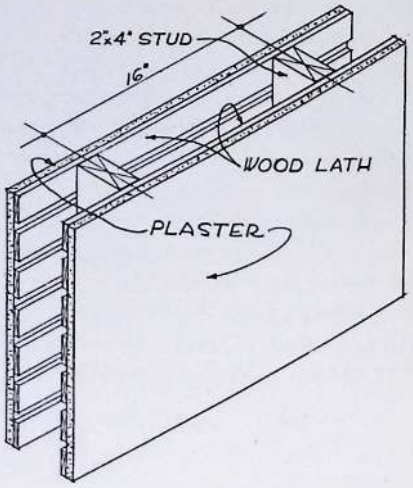
Sound insulation value.....32.7 db



Wall Panel No. 3

Gypsum board lath (⅜") and ½" gypsum plaster on both sides of 2 x 4 studs on 16" centers.

Sound insulation value.....34.9 db



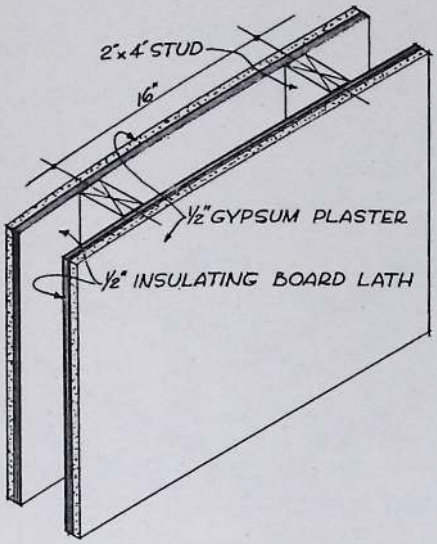
Wall Panel No. 4

Wood lath and plaster on both sides of 2 x 4 studs on 16" centers.

Sound insulation value.....37.5 db

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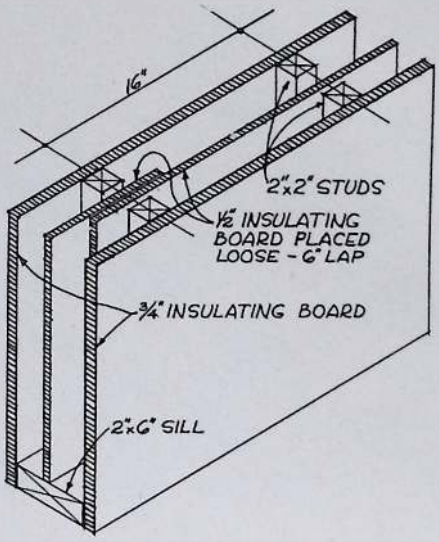
WALL PANELS



Wall Panel No. 5

½" insulating board lath and ½" gypsum plaster on both sides of 2 x 4 studs on 16" centers.

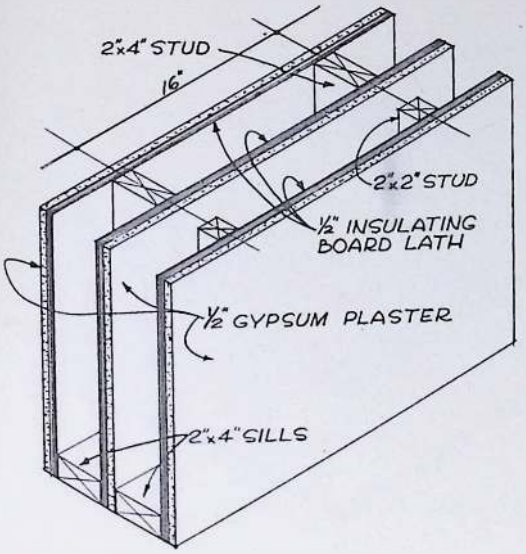
Sound insulation value.....40.9 db



Wall Panel No. 6

Double stud partition consisting of double row of 2 x 2 studs on 16" centers with ¾" insulating board nailed thereto and with a layer of ½" insulating board placed loosely between studs. Partition nailed to 2 x 6 sills.

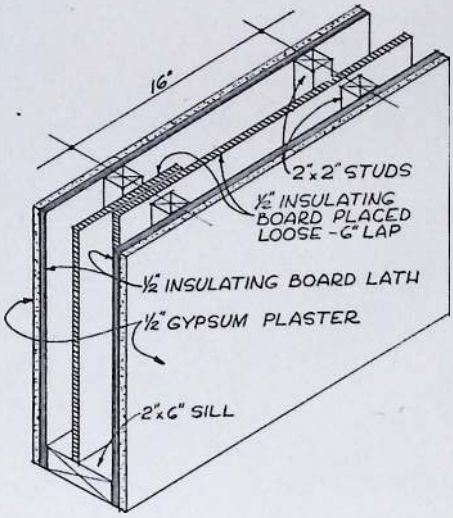
Sound insulation value.....42.8 db



Wall Panel No. 7

Wall consisting of ½" insulating board lath and ½" gypsum plaster on both sides of 2 x 4 studs on 16" centers with an auxiliary partition consisting of ½" insulating board lath and ½" gypsum plaster on 2 x 2 studs on 16" centers, the auxiliary wall separated from the original wall except at the plate.

Sound insulation value.....51.3 db



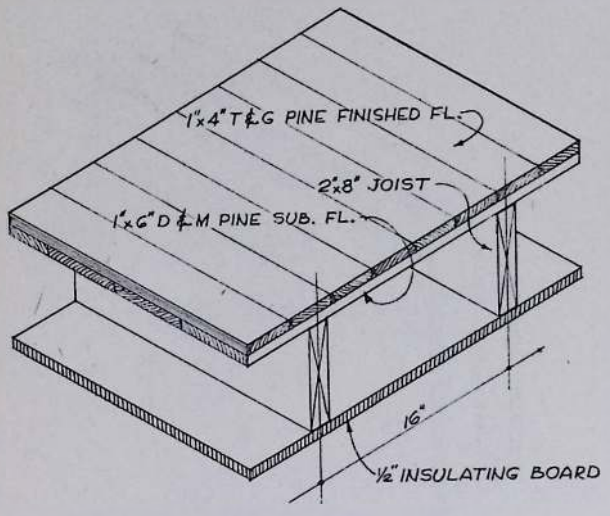
Wall Panel No. 8

Double stud partition consisting of double row of 2 x 2 studs on 16" centers with ½" insulating board lath and ½" gypsum plaster and with a layer of ½" insulating board placed loosely between the studs. Partition nailed to 2 x 6 sills.

Sound insulation value.....52.3 db

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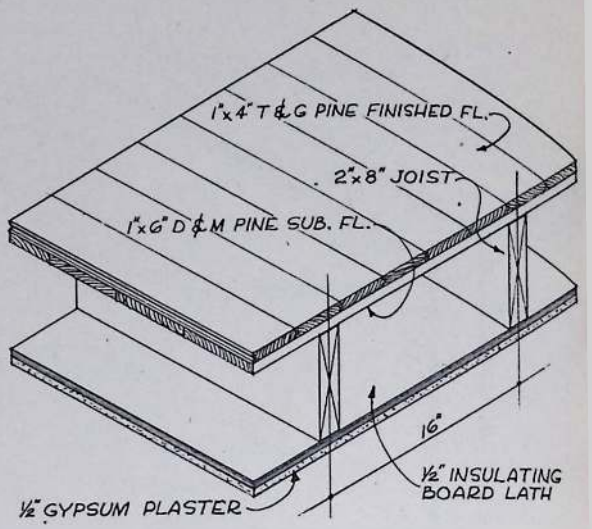
FLOOR PANELS



Floor Panel No. 1

1 x 4" T&G pine flooring on 1 x 6" D&M pine sub-flooring on 2 x 8 joists on 16" centers with ¾" insulating board ceiling applied directly to under side of joists.

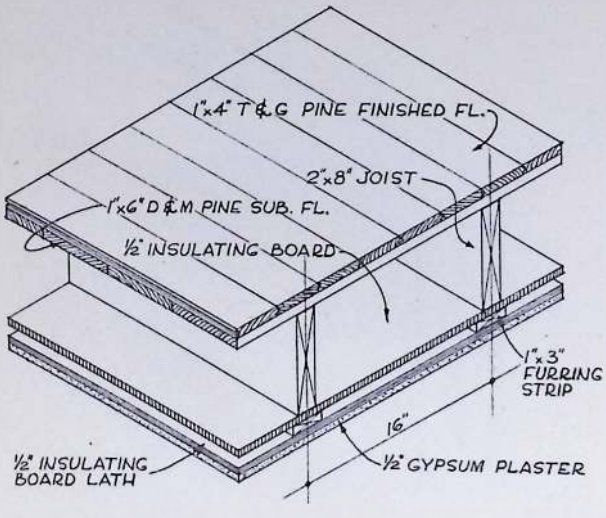
Sound insulation value.....40.2 db



Floor Panel No. 2

1 x 4" T&G pine flooring on 1 x 6" D&M pine sub-flooring on 2 x 8 joists on 16" centers with ½" insulating board and ½" gypsum plaster ceiling applied directly to under side of joists.

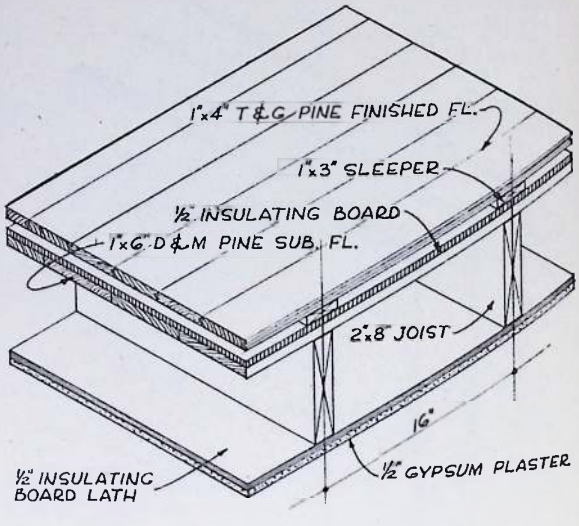
Sound insulation value.....45.1 db



Floor Panel No. 3

Floor same as No. 2: ceiling as follows: ½" insulating board nailed directly to joists, then 1 x 3 furring strips parallel with and nailed to joists, then ceiling finish of 1" insulating board lath and ½" gypsum plaster.

Sound insulation value.....47.4 db



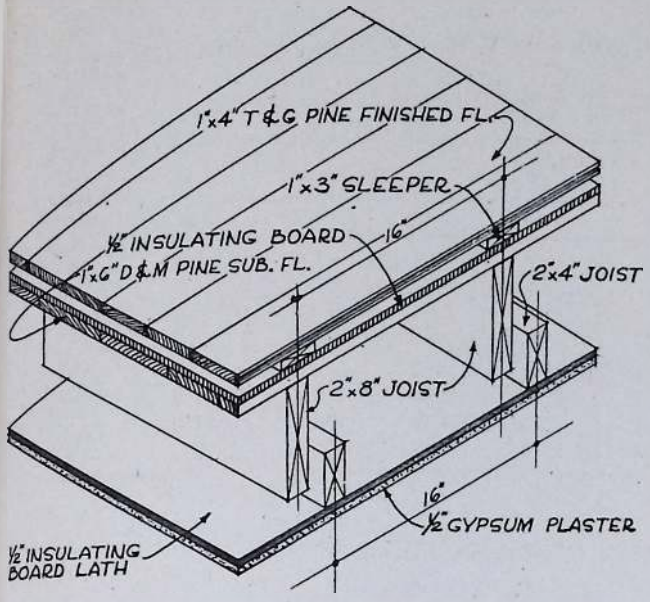
Floor Panel No. 4

Floor of 1 x 6" D&M pine sub-flooring on joists, then ½" insulating board, then 1 x 3 sleepers over and parallel with joists, then 1 x 4" T&G pine flooring nailed to sleepers; ceiling of ½" insulating board lath and ½" gypsum plaster.

Sound insulation value.....49.7 db

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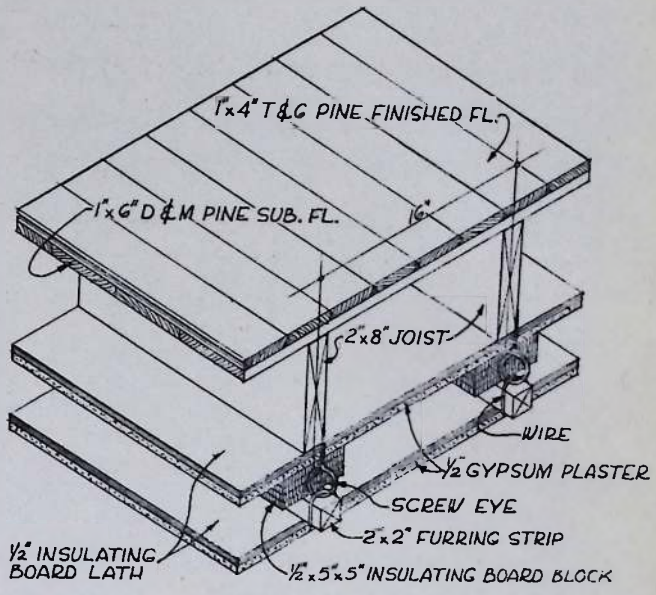
FLOOR PANELS



Floor Panel No. 5

Floor same as No. 4; suspended ceiling of ½" insulating board lath and ½" gypsum plaster on 2 x 4 joists on 16" centers—ceiling joists separate from floor joists.

Sound insulation value.....54.1 db



Floor Panel No. 6

Floor same as No. 2; ceiling as follows: ½" insulating board lath and ½" gypsum plaster applied to 2 x 4 furring strips 16" on centers wired to screw eyes and with a block of insulating board (5 x 5") on 3 foot centers separating screw eyes and ceiling.

Sound insulation value.....55.5 db

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TABLE 1. SOUND INSULATION VALUES OF VARIOUS TYPES OF WALL PANELS OR PARTITIONS

NOTE: These results are expressed in terms of the transmission loss in decibels for the frequencies indicated.

WALL PANEL NO.	FREQUENCY (Cycles per second)										WEIGHT (lb/sq. ft.)
	128	192	256	384	512	768	1024	2048	4096	AV.	
1	15.9	19.0	21.9	32.4	28.1	33.3	37.9	49.7	51.8	32.2	3.8
2	20.7	17.8	21.4	26.6	20.7	32.1	37.6	49.3	52.7	32.7	4.3
3	33.4	23.9	24.5	30.2	28.3	37.7	35.5	41.7	58.8	34.9	15.0
4	35.3	31.6	24.1	36.7	34.4	31.7	37.4	45.3	61.0	37.5	17.1
5	28.3	27.3	30.9	37.8	40.7	44.4	46.3	46.7	65.6	40.9	12.6
6	27.9	28.8	28.2	39.4	40.3	42.9	48.3	61.6	67.5	42.8	6.2
7	41.2	45.6	44.4	48.6	50.2	51.4	52.1	55.8	72.1	51.3	18.2
8	42.4	47.5	47.5	50.8	49.3	51.4	55.0	53.5	73.1	52.3	14.3

TABLE 2. SOUND INSULATION VALUES OF VARIOUS TYPES OF FLOOR PANELS

NOTE: These results are expressed in terms of the transmission loss in decibels for the frequencies indicated.

FLOOR PANEL NO.	FREQUENCY (Cycles per second)										WEIGHT (lb/sq. ft.)
	128	192	256	384	512	768	1024	2048	4096	AV.	
1	21.8	27.9	31.2	38.1	39.7	41.1	43.6	54.9	62.4	40.2	9.6
2	23.4	28.3	33.7	44.2	46.7	51.6	54.7	54.0	69.0	45.1	14.3
3	23.7	32.5	37.5	42.8	49.1	50.5	55.8	58.2	76.6	47.4	15.9
4	30.2	30.2	36.9	46.7	49.7	52.4	56.8	65.3	79.1	49.7	16.2
5	48.1	49.8	49.1	50.7	50.5	52.3	53.6	57.9	74.6	54.1	16.7
6	46.1	44.5	50.5	53.2	54.9	56.6	56.4	63.1	74.6	55.5	20.3

Insulating Board Products Used for Sound Insulation

The principal insulating board products used for sound insulation purposes are the building board and the lath (plaster base). The building board is 4 ft. wide and is available in lengths of 6 to 12 ft. and in thickness of ½", ¾" and 1". The lath sizes are 16" x 48", 18" x 48" and 24" by 48", and the thicknesses are ½" and 1".

Other insulating board products include the sheathing, roof insulation, tile-board (panels), plank and thin board. Insulating board has been used successfully in all types of building construction for over 30 years as a combined structural, decorative and heat and sound insulating material.

Complete application instructions will be furnished upon request by writing the Insulation Board Institute, 111 W. Washington St., Chicago 2, Illinois.

MEMBERS OF THE INSULATION BOARD INSTITUTE

Armstrong Cork Company, Lancaster, Pa.
Bird & Son, inc., East Walpole, Mass.
Celotex Corporation, Chicago 3, Ill.
Flintkote Company, New York 20, N. Y.
Hawaiian Cane Products Ltd., San Francisco 5, Cal.
Insulite Division of M & O Paper Co., Minneapolis 2, Minn.
Johns-Manville Sales Corporation, New York 16, N. Y.
Maizewood Insulation Co., Dubuque, Iowa
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J-M Airacoustic Sheets are quickly and easily applied at the time the duct is installed—they may be cut and handled with ordinary carpenter's tools.

J-M AIRACOUSTIC SHEETS

A FIRE-SAFE, SOUND-ABSORBING LINING FOR VENTILATING DUCTS

EFFICIENT AIR CONDITIONING is recognized today as a valuable advantage in every type of building. Yet, unless proper precautions are taken, ventilating ducts may often be the cause of a serious noise problem that largely offsets the many advantages of the system. For, while carrying clean, fresh air throughout the building, the ducts may also act as "speaking tubes" that convey sounds and noises from room to room, from one end of the building to the other, destroying privacy and reducing comfort.

To overcome this irritating noise problem, ducts must be lined with a sound-absorbing material specially designed to "soak up" or deaden noises generated by, or entering, the system. A satisfactory material for this purpose must, however, meet other exacting requirements in addition to sound-absorption. It must be fire-resistant,* moisture resistant and have a surface that will not materially increase friction losses in the duct system.

Johns-Manville Airacoustic Sheets are just such a material. Developed exclusively for this type of work, they meet every requirement, effectively and economically. By absorbing more than 75% of all sound that strikes it, this modern material prevents noise from traveling through the system — assures restful quiet, increased privacy and better working conditions. Furthermore, J-M Airacoustic Sheets possess high insulating value. And, being basically mineral in composition, they assure complete fire-safety and virtual freedom from moisture troubles.

In most cases, it is unnecessary to line the entire duct system. Generally speaking, Airacoustic Sheets, applied for a distance of at least ten times the average cross-sectional dimensions of the duct, will provide a completely satisfactory noise reduction. Thus, a duct 8"x12" should be lined for a distance of at least 8' 4" from every grill or opening. However, under extremely noisy conditions, or where maximum quiet is required, it is advisable to line the entire duct, regardless of dimensions and length.

*In discussing the desirable properties of duct-lining materials, emphasis must be placed on fire resistance. Bulletin No. 10 of the National Board of Fire Underwriters, dated January 22, 1935, describes several serious fires in which the combustible materials used for the lining of ducts caught fire and caused extensive damage. As a result, the National Board of Fire Underwriters has taken the stand that only fire-resisting materials shall be used for such purposes.

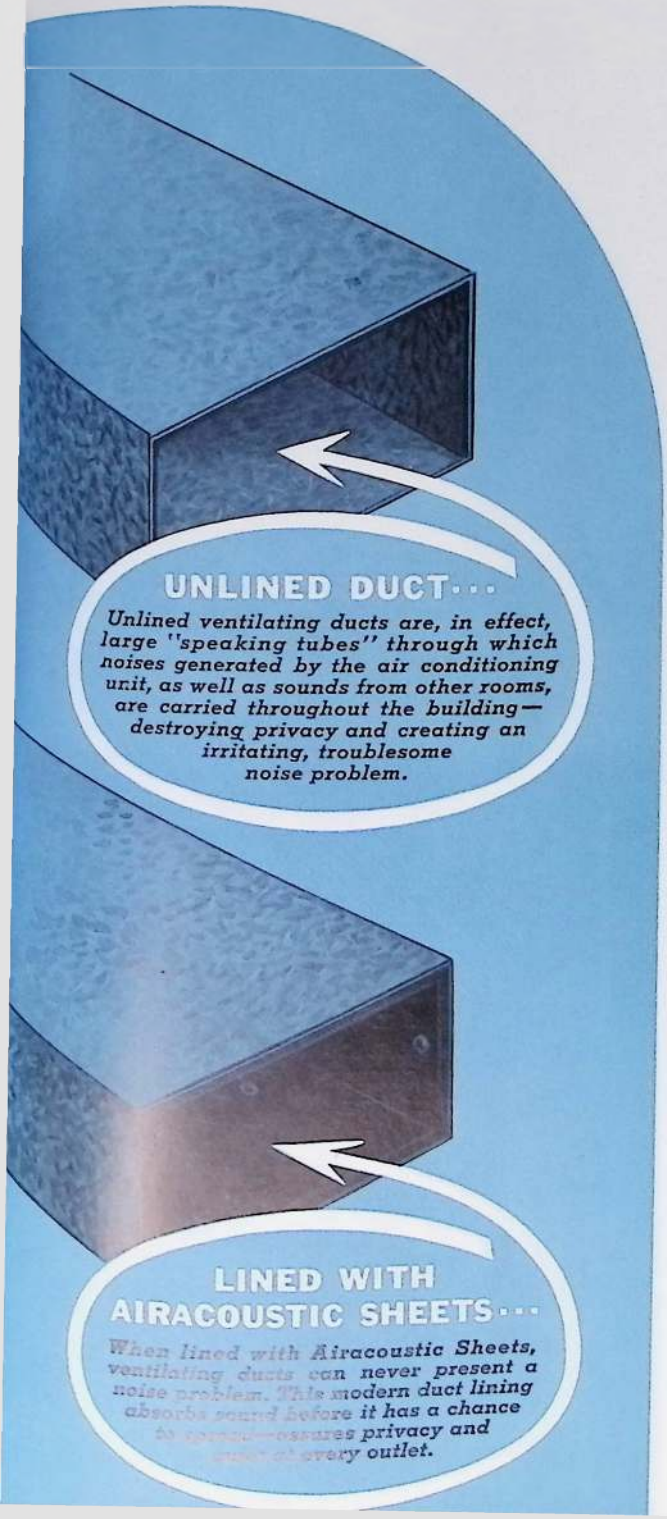
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EVERY VENTILATING SYSTEM NEEDS THIS MODERN DUCT LINING

IN many buildings, quiet and privacy is a vital and necessary operating requirement; in all others they are a decided advantage. Broadcasting studios, for example, must take every precaution to keep noises and outside conversations from entering the studio and interfering with program transmission. Schools, hospitals, office buildings and factory office areas are other locations where freedom from noise is an essential requirement. Fire-safety, of course, is of extreme importance in every type of building.

For these reasons, Airacoustic Sheets should be specified for all such buildings, in every type of ventilating system. By absorbing noises generated by the air conditioning unit, and preventing sounds created in one room from traveling through the duct to other sections of the building, this modern lining eliminates noise in the ducts . . . keeps rooms quiet and restful.

Made of rock wool and a suitable binder, Airacoustic is supplied in large, rigid sheets that combine all the following features:



ABSORBS SOUND

Developed by the Johns-Manville Acoustical Engineering Laboratory after extensive research and field testing, J-M Airacoustic is a highly efficient sound-absorbing material specially designed for lining air conditioning ducts. *It absorbs up to 75% of all noise that strikes it*—soaks up sound before it has a chance to spread.

PROTECTS AGAINST FIRE

Airacoustic Sheets are basically mineral in composition—therefore, they will not support flame and cannot contribute to the spread of fire. This is an important advantage in view of the great fire hazard presented by combustible lining materials.

MAINTAINS HIGH AIR FLOW

J-M Airacoustic Sheets provide unusually low resistance to air flow—only 16% higher than that of bare sheet metal.

EASILY INSTALLED

Light in weight (¾ lb. per sq. ft., per ½" thick) and easy to handle and apply, Airacoustic Sheets should be mechanically fastened to the metal duct with sheet metal screws or with bolts. In either case, galvanized discs should be used to increase the bearing surface. Furnished in large 24"x36" sheets and in ½", 1" and 1½" thicknesses, J-M Airacoustic Sheets may be easily cut and worked with ordinary tools.

ECONOMICAL

For general office areas, the ½" thickness usually does a completely satisfactory job. However, in private offices, conference rooms and similar locations where maximum quiet is desired, the 1" thickness is recommended. In every case, the use of Airacoustic Sheets adds only a fraction to the cost of the system and more than pays for itself in added comfort and fire-safety.

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ANY TYPE OF DUCT

may be lined with J-M Airacoustic Sheets. Note how smoothly this material was fitted into the typical bend illustrated above. Its adaptability and ease of handling assure rapid, economical and efficient installation.

32 J-M OFFICES AT YOUR SERVICE

ALBANY, N. Y.
ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DALLAS, TEXAS
DENVER, COL.
DETROIT, MICH.
HARTFORD, CONN.
HOUSTON, TEXAS
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
PHILADELPHIA, PENNA.
PITTSBURGH, PENNA.
PORTLAND, ORE.
ROCHESTER, N. Y.
ST. LOUIS, MO.
ST. PAUL, MINN.
SAN FRANCISCO, CAL.
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AN ACOUSTICAL PRODUCT BY

CELOTEX

REG. U. S. PAT. OFF.



THE CELOTEX CORPORATION
Acoustical Department
CHICAGO

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Q-T DUCTLINER

ABSORBS AIR-BORNE SOUND IN ALL DUCT SYSTEMS

Because a duct is more or less a "speaking tube", sounds entering it are freely transmitted through the system. Q-T Ductliner is an acoustical material designed especially for duct lining in air conditioning systems to absorb these noises.

IT'S MOISTURE-RESISTANT

Because materials used for lining ducts of air conditioning systems are constantly subjected to humidity, it is vital that the acoustical lining used be moisture resistant. Q-T Ductliner amply satisfies this requirement.

IT'S FIRE-RESISTANT

Prepared in rigid block form, composed of rock wool and a special binder, it will not smoulder or support combustion.

LOW THERMAL CONDUCTIVITY

Q-T Ductliner has a conductivity of 0.30 Btu per hour, per sq. ft. per 1" thickness at a mean temperature of 60 degrees F. Not only does Q-T Ductliner provide sound absorption, but also thermal insulation, eliminating the need of thermal insulation to be applied on the outside of the duct.

SOUND ABSORPTION COEFFICIENTS

Frequency in cycles per sec.	128	256	512	1024	2048	4000	N. R. C.	A. M. A. Test
Per cent absorption ½" thick	.14	.38	.43	.76	.75	.75	.60	40-97
Per cent absorption 1" thick	.29	.41	.78	.89	.88	.78	.75	40-70

SIZES: Q-T Ductliner is available in one standard size, 24" x 36" and in thicknesses of ½" and 1". Weight is approximately 1½ lb. per sq. ft. 1" thick.

APPLICATION

Mechanics have no difficulty in cutting and fitting Q-T Ductliner. It may be cut with a knife, and fastened mechanically with bolts or spot cemented with an approved adhesive.

THE CELOTEX CORPORATION

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QUIETING VENTILATING NOISE WITH Q-T DUCTLINER

The rapid growth of air conditioning has brought increasing attention to the problem of noise control. Of particular importance is the elimination of noise transmission through ventilating ducts into air conditioned spaces. To meet this problem, the family of Celotex Acoustical Products now includes Q-T Ductliner, a sound absorbing material designed specifically to reduce airborne noise in ducts. This material effectively absorbs noise which enters the duct system from any source, and prevents it from causing annoyance in air conditioned spaces.

Types and Sources of Ventilating Noise

Noise which may enter a room through the ducts may be classified as follows (see Fig. 1):

1. Grille Noise. This is a high pitched whistling or rushing noise caused by the passage of air through the outlet grilles. The intensity of this noise depends on the air velocity through the grille, and on the grille design. Noise from this source will generally be negligible for the range of outlet velocities commonly used in good ventilating practice. Excessive grille noise can be reduced only by increasing the grille area, thereby lowering the air velocity through the grille, and by substituting a more quiet type of grille.

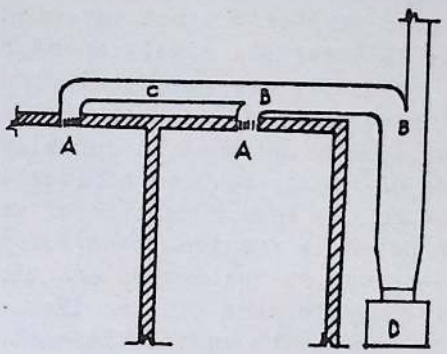


Fig. 1. Sources of ventilating noise.
A. Grilles.
B. Air turbulence.
C. Cross talk.
D. Fan

2. Air Turbulence in Duct System. Noise due to air turbulence is similar to grille noise except that it is caused by obstructions at other points in the duct system. Like grille noise, it increases with air velocity. The main sources will, therefore, be found in the large main ducts near the blower, where velocities are the highest. Noise due to turbulence is best controlled by minimizing the turbulence itself through proper design of elbows, branches, splitters, dampers, and similar elements which direct the air flow. In other words, a duct system which is well designed from the standpoint of air flow will also be a quiet system.

Q-T Ductliner is effective in reducing turbulence noise, provided it is installed between the outlets and the points at which the noise is created.

3. Cross-talk Between Rooms. By this is meant the transmission of sound such as speech or music from one room to another through a common duct. This type of noise transmission demands special attention in radio studios and schools. Cross-talk is best controlled by lining the connecting ducts with Q-T Ductliner.

4. Equipment Noise. The fan is usually the major source of duct noise. The amount of noise introduced by the fan into the duct system depends mainly on the size and type of fan and on the speed at which it is operated. In order to prevent excessive fan noise, the fan should be of a capacity suited to the duct system which it feeds, and it should be operated at its most efficient speed. Increasing the fan speed beyond the point of maximum efficiency produces excessive turbulence and consequent unnecessary noise.

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Recommended Noise Reductions.

The primary objective in controlling ventilation noise by the use of Q-T Ductliner is to reduce the noise introduced into a given room through the duct outlets to a level where it is either inaudible or does not add noticeably to the normal noise level existing in that room with the ventilating system shut off. This means that the amount of noise reduction required will depend partly on the noisiness of the untreated ventilating system, but mainly on the normal noise level of the room without ventilation. In other words, the quieter the room without ventilation, the greater will be the required reduction of ventilating noise.

Although there are too many variables involved to permit exact recommendations to cover all cases, an approximate guide for average requirements can be formulated, as shown in Fig. 2. It will be noted that in normally noisy types of rooms, such as offices and restaurants, less reduction of ventilation noise is required than for quiet spaces such as residences and studios. In rooms which are noisier than any of those shown, the ventilation noise without treatment will generally be less than the normal room noise, so that no quieting is necessary.

Type of Room	Reduction in Decibels
Studios, Residences	30
Hospitals, Auditoriums, Private Offices	20
Quiet General Offices, Quiet Restaurants	10

Fig. 2. Recommended reductions of ventilation noise.

In the case of cross-talk between rooms, a reduction of about 20 to 30 db. will usually take place without duct lining. This reduction should be increased by the proper amount of lining until it equals the reduction effected by the walls separating the rooms.

Calculating Noise Reduction with Q-T Ductliner.

Experiments have shown that the reduction, in decibels, of sound traveling inside a duct lined with sound absorbent material is directly proportional to the length of duct lined, and directly proportional to the ratio of the perimeter of the duct to the cross sectional area. Therefore, the greater the length of lined duct, and the smaller the duct, the greater will be the noise reduction. The noise reduction also increases with the sound absorbing coefficient of the lining material, but is proportional approximately to the 1.4 power of the absorption coefficient. For example, doubling the absorption coefficient will increase the noise reduction about 2.7 times. These facts can be expressed by the following approximate formula, which is accurate within plus or minus 10 per cent for absorption coefficients between .20 and .80,

$$R = 12.6\ L\ \frac{P}{A}\ a^{1.4}$$

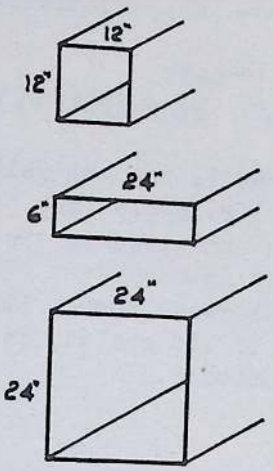
where

R = reduction in decibels
L = length of lined duct, feet
P = duct perimeter, inches
A = cross sectional area, square inches
a = absorption coefficient of lining

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Several useful facts may be obtained from this formula (see Fig. 3).

1.) The smaller the duct, the larger will be the ratio P/A, and therefore the more effective will be each linear foot of lining. 2.) Each linear foot of lining will be less effective in a square or circular duct than in any rectangular shape of the same cross sectional area. 3.) Each square foot of lining material will produce the same noise reduction in any two ducts of the same cross sectional area, regardless of their shape. In other words, the same amount of material is required to quiet ducts of the same capacity, although the length of duct to be lined will depend on the shape.



	Linear Ft.	Sq. Ft.
	10	40
	8	40
	20	160

Fig. 3. Amounts of 1" Q-T required to give 10db. reduction at 256 cycles.

Effect of Frequency.

Since the absorption coefficient of any material varies with the frequency of the sound, the noise reduction in an absorbent lined duct will likewise depend upon the frequency. Fig. 4 lists the absorption coefficients of ½-inch and 1-inch Q-T Ductliner at the various frequencies, together with the corresponding decibel reduction formula for each frequency.

Freq.	½" Q-T Abs. Coef.	½" Q-T Db Red. =	1" Q-T Abs. Coef.	1" Q-T Db Red. =
128	.14	0.8 L P/A	.29	2.2 L P/A
256	.38	3.3 " " "	.41	3.6 " " "
512	.43	3.9 " " "	.78	8.9 " " "
1024	.76	8.6 " " "	.89	10.7 " " "
2048	.75	8.4 " " "	.88	10.5 " " "
4096	.75	8.4 " " "	.78	8.9 " " "

Fig. 4. Decibel reduction formulae for Q-T Ductliner at single frequencies, based on approximate general formula $R = 12.6\ L \frac{P}{A} - a^{1.4}$

For example, suppose we have a duct 12 in. x 12 in. x 18 ft. long, lined throughout with 1-inch Q-T Ductliner. The value of P/A will be 48/144, or 1/3. Referring to Fig 4, the reduction for a sound of 256 cycles frequency entering the duct will be

$$3.6 \times 12 \times 1/3 = 21.6 \text{ db.}$$

For a 2048 cycle sound entering the same duct, the reduction will be

$$10.5 \times 18 \times 1/3 = 63.0 \text{ db.}$$

In general, the noise transmitted through a duct system is not a single frequency tone, but contains a large number of frequencies spread over most of the audible range. The overall reduction of such noise by an absorbent lined duct will depend both on the frequency distribution of the original noise and by the reduction at those frequencies at which the absorbent material is least efficient. Frequency analyses of fan noise have shown that the loudest part of the noise generally lies in the frequency band centering around 256 cycles. Therefore, it is recommended that in calculating overall decibel reductions for fan noise, the formulae given in Fig. 4 for 256 cycles can be used, namely:

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For ½" Q-T
Db reduction = 3.3 L P/A

For 1" Q-T
Db reduction = 3.6 L P/A

If the noise to be reduced is due entirely to air turbulence, rather than fan noise, the formulae for 1024 cycles may be used, since nearly all of the energy in noise of this type is contained in the high frequencies.

For reducing cross-talk between rooms, it is recommended that reductions be calculated on the basis of 256 cycles, in order to cover all types of sound or noise which may be encountered.

Use of Splitters.

It is often found that the length of duct available for lining is too short to allow the desired reduction to be obtained. In these cases it is necessary to divide the duct into smaller channels by means of splitters made of Q-T Ductliner, as shown in Fig. 5. These should always be installed so that they lie parallel to the widest side of the duct. Both sides of the Q-T Ductliner forming the splitters should be exposed, and the walls of the main duct should be lined as usual. The reduction which can be obtained by installing splitters is calculated as follows:

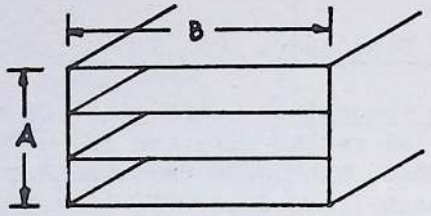


Fig. 5. Use of Q-T splitters to increase quieting.

$$R_s = R_o \frac{A + BN}{A + B}$$

where

R_o = decibel reduction in lined duct without splitters.
R_s = decibel reduction in same length of duct with splitters.
A = length of short side) in inches or feet
B = length of long side)
N = number of channels formed by splitters.

For example, suppose an 18 x 24 inch duct is long enough to permit only a 10 db reduction by lining all sides, and that a 30 db. reduction is required. If 4 splitters are installed parallel to the 24-inch side so as to form 5 channels, the reduction will be

$$R_s = 10 \times \frac{18 + (24 \times 5)}{18 + 24} = 32.9 \text{ db.}$$

Baffles

Where space is still further limited, effective reductions can be obtained by constructing baffles of Q-T Ductliner in a zig-zag arrangement so as to offer a direct obstacle to sound waves with a comparatively small resistance to air flow. One arrangement is shown in Fig. 6, in which the baffles are formed of 1-inch Q-T Ductliner with both sides exposed. Tests were made on an assembly of four of these units

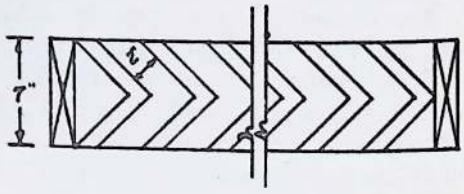


Fig. 6. Construction of baffles.

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placed in a tandem so as to occupy a distance of 28 inches along the length of the duct, with results as follows:

Frequency	128	256	512	1024	2048	4096
Sound Reduction through baffles, db.	6	7	15	34	47	48

It should be pointed out that this method of treatment is practical only where space is at a minimum and where a certain amount of air flow may be sacrificed.

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Acousti-Celotex Sound Conditioning Service



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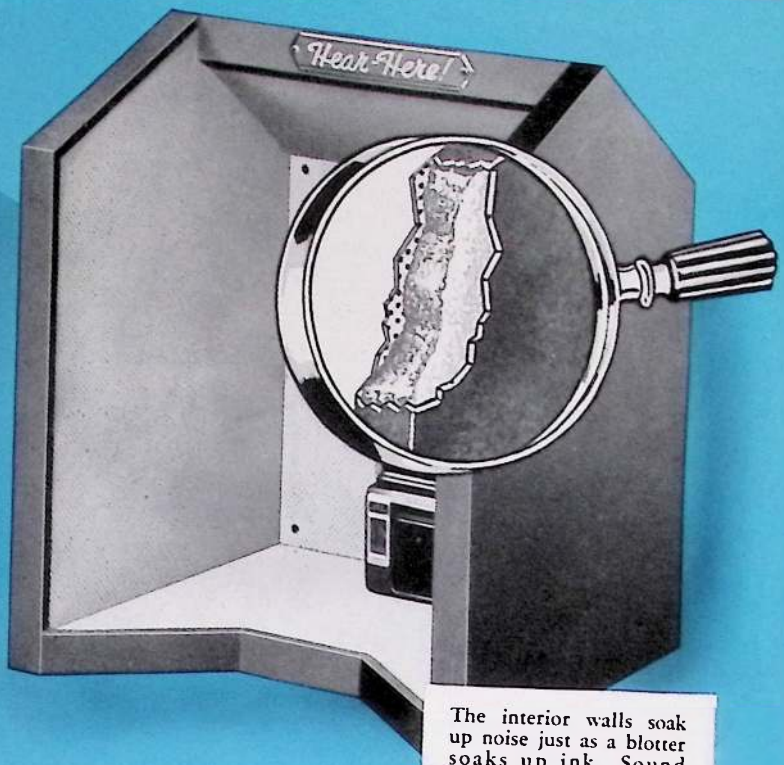
BURGESS

Acousti-Booth

The

SCOUT

MODEL NO. 602



The interior walls soak up noise just as a blotter soaks up ink. Sound waves passing through the perforated wall surfaces, are absorbed by the thick acoustic blanket behind the perforations. A remarkable "zone of quiet" is created within the booth walls, even in the noisiest locations. Dimensions: 28" wide, 32" high, 26" deep. Shelf 29" x 17". Net weight 85 lb, shipping weight 120 lb.

RIGID ALL STEEL CONSTRUCTION



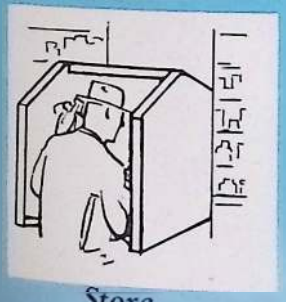
Factory



Office



Ship



Store

The Burgess Scout Model No. 602 Acousti-Booth is a sturdy, all-steel telephone booth for wall or shelf type installations in factories, shipping rooms, stores, offices, and other places requiring a small booth of rugged construction.

Thick walls of sound-absorbing material soak up direct and reflected noises which enter the Burgess Acousti-Booth. Heavy gauge perforated steel sheets protect the acoustic material in the walls and provide a surface that is not readily defaced or damaged.

Like all Burgess Acousti-Booths, the Scout Model No. 602 has no door. It is light, airy, and well ventilated. When the user steps up to the booth, he is immediately aware of the comparative quiet that prevails within. The hushed interior provides the user with ideal telephoning conditions even in congested and noisy areas.

Each Scout Booth is a unit in itself. When installed in gangs or close groupings, adjoining telephones can be used without interference. Each user enjoys privacy of person and speech.

The Burgess Scout Model No. 602 Acousti-Booth has many exclusive features which will help you solve your telephone booth problems. Thousands of Burgess Acousti-Booths are now in use, and reorders are frequent from satisfied customers.

$65.00 F.O.B. CHICAGO

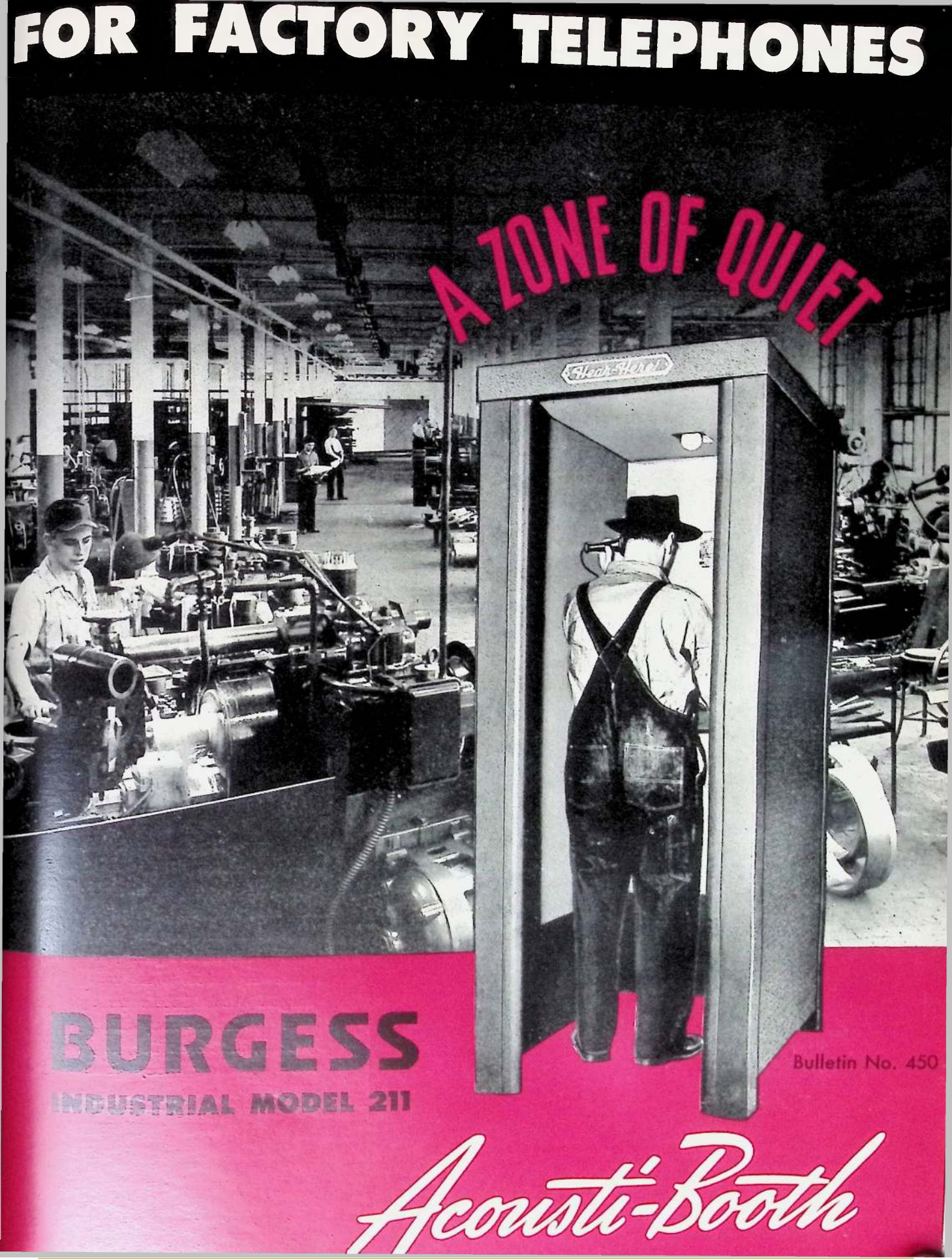
Bulletin No. 460

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FOR FACTORY TELEPHONES



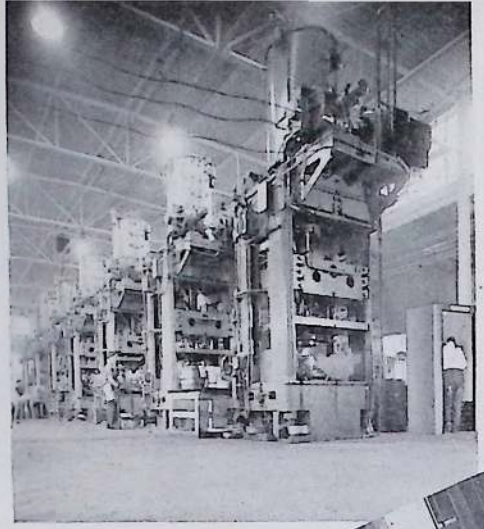
BURGESS

INDUSTRIAL MODEL 211

Bulletin No. 450

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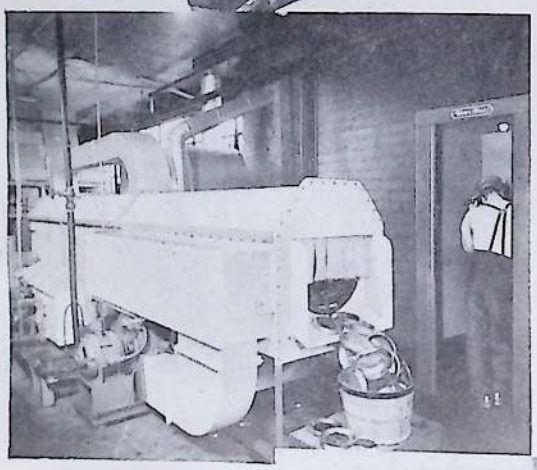
YES, you can HEAR in these noisy locations with BURGESS *Acousti-Booths*



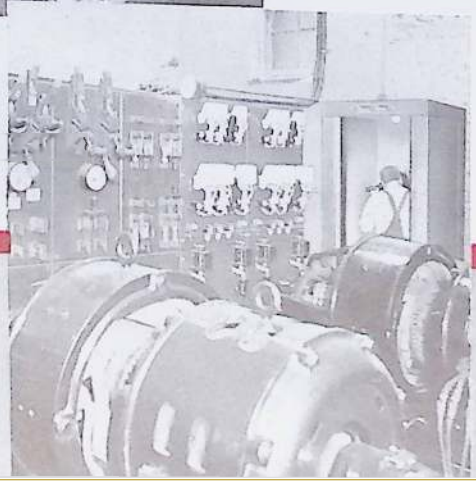
Burgess Acousti-Booth in hydraulic press room



Burgess Acousti-Booth in drill press department



Burgess Acousti-Booth in metal-cleaning room



Burgess Acousti-Booth in electric sub-station

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BURGESS-MANNING COMPANY

To use a telephone in noisy industrial plants, power stations, factories, and mills has always been a problem. Orders and instructions are easily misunderstood due to noise interference. To get highest plant efficiency industrial telephones should be placed in a "zone of quiet" to exclude the "sea of noise" that makes conversation difficult.

Burgess Acoustic Engineers have approached this problem scientifically and have provided a dependable solution. The answer is the Burgess Acousti-Booth — a doorless telephone booth which provides a real "zone of quiet" so that the incoming messages can be heard with clarity. The transmission of voice is substantially improved, due to the reduced level of noise reaching the mouthpiece.

Here are the outstanding benefits from the use of a Burgess Acousti-Booth: First, it is quiet. Second, it has no door, so it is airy and relieves the stuffiness of the conventional booth. Third, it can be easily moved in case of outlet changes. Fourth, it can be located in the noisiest places, if those places are most convenient to the user.

Burgess Acousti-Booths are equally desirable in crowded and noisy offices, public waiting rooms, and stores. They may be installed without reference to noisy surroundings.

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A Doorless Booth that stops noise interference

HEAR-*HERE* in the BURGESS *Acousti-Booth*

Telephoning in a Burgess doorless Acousti-Booth is far more pleasant and comfortable than in a conventional closed or door type booth. Normal conversations can be carried on with clarity and there is no discomfort or stuffiness due to inadequate ventilation. The sound absorbing material in the booth walls blots up direct and reflected noise inside the booth, and greatly improves the transmission and reception of voice.

INDUSTRIAL MODEL 211

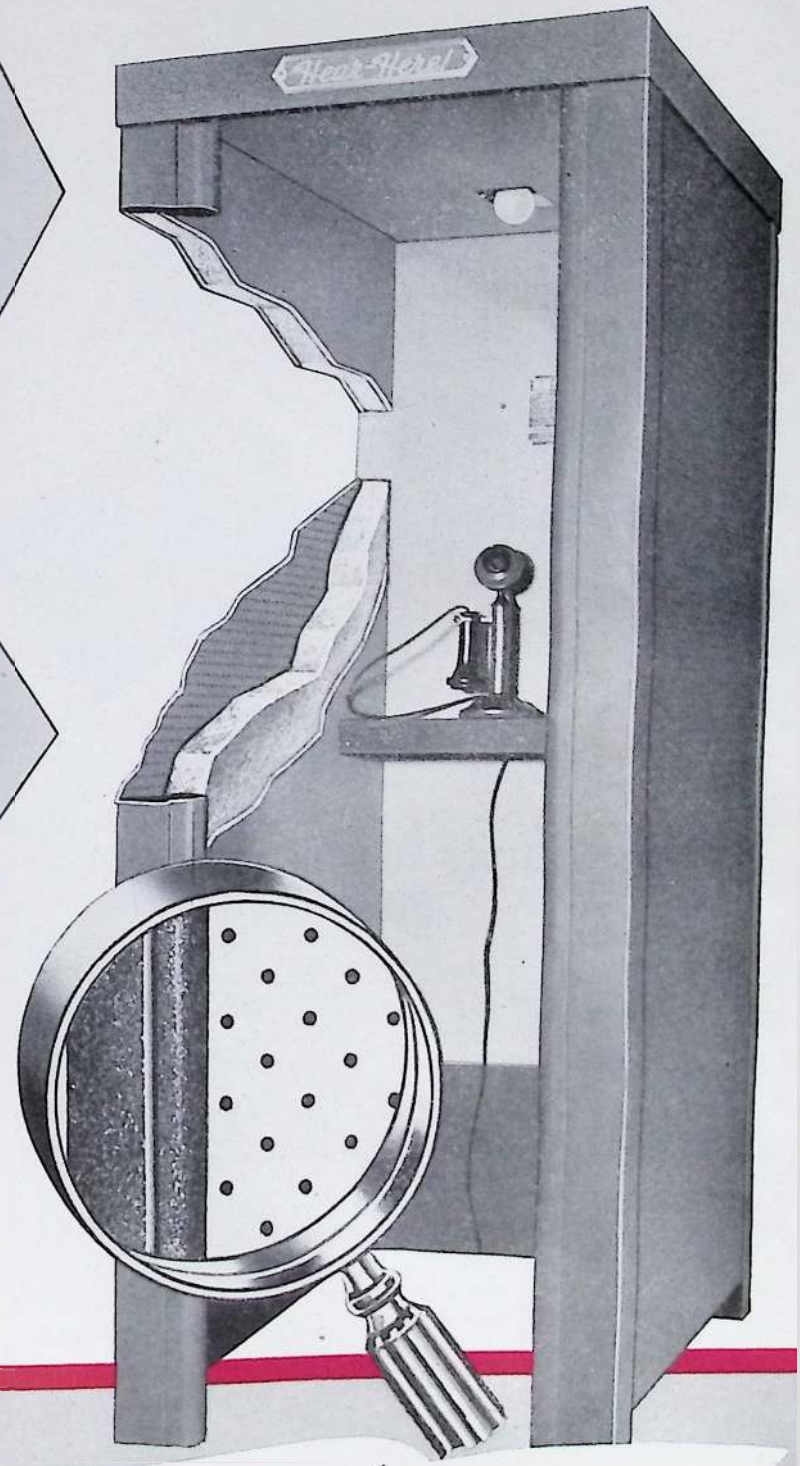
HEAVY DUTY ALL STEEL CONSTRUCTION

SPECIFICATIONS

The industrial Model No. 211 Burgess Acousti-Booth is constructed of heavy gauge steel throughout. The inside is finished in steel gray; the outside is finished in black. A steel instrument shelf 24" x 8" provides a convenient place for taking notes. An electric fixture in the ceiling complete with switch provides good illumination. The open base assures ease in cleaning and a sanitary interior.

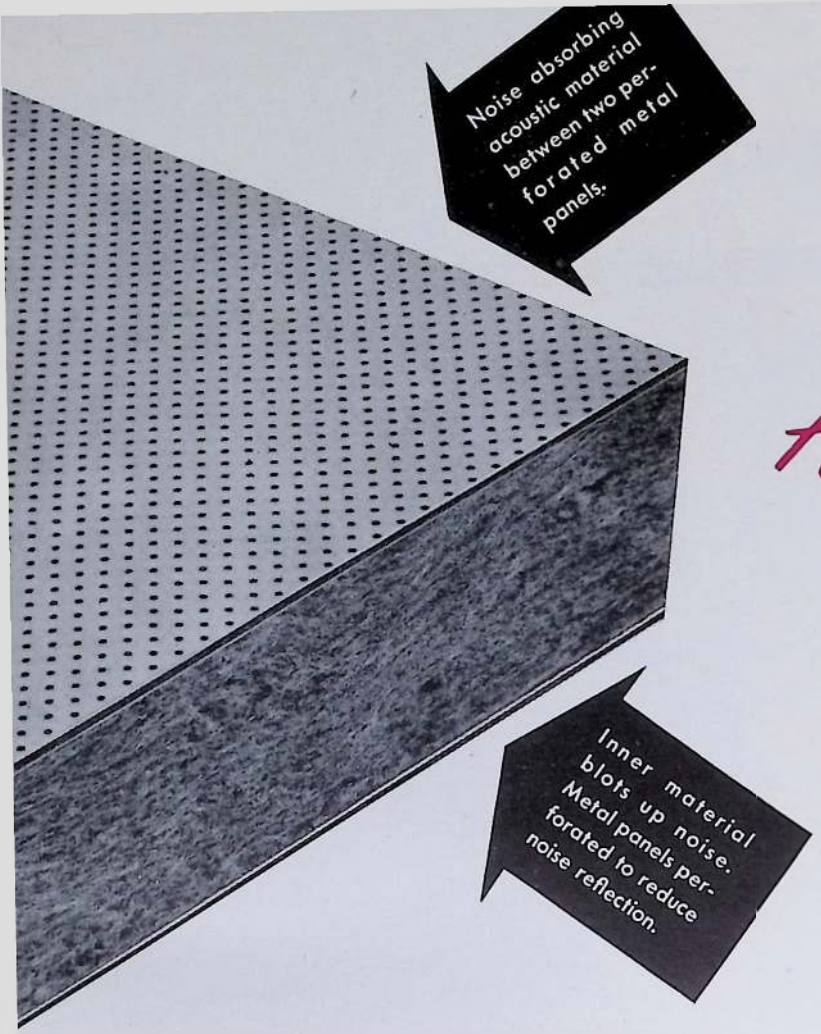
PRICE $110.00 FOB CHICAGO

Outside Dimensions: 31" wide, 79½" high, 38½" deep. Inside Dimensions: 24" wide, 76½" high, 35" deep. Net weight: 350 pounds. Shipping weight: approximately 410 lbs.



BURGESS *Acousti-Booth* MODEL NO. 211

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Here's Why YOU CAN HEAR in a BURGESS Acousti-Booth

The high efficiency of the Burgess doorless Acousti-Booth is due to its patented acoustic construction. Walls of thick sound-absorbing material, protected on both sides by perforated sheet steel facings, soak up the noise . . . just as a blotter soaks up ink.

Therefore, the sound waves, that ordinarily are reflected by the inner walls of a telephone booth, become absorbed by the walls of the Burgess Acousti-Booth, leaving a "zone of quiet" in a sea of factory noise. The sensation of stepping into a Burgess Acousti-Booth is always surprising, especially in a noisy location, because the hushed interior of the booth provides a striking contrast to the distracting noises surrounding it. Only through the actual experience of using a Burgess Acousti-Booth can anyone adequately appreciate its noise-absorbing efficiency.

One BURGESS ACOUSTI-BOOTH user says

"Regarding the Acousti-Booth which we purchased from you three years ago, wish to say that this has been installed in our cleaning department where it is very noisy. We had difficulty in hearing over the telephone before this booth was installed, but this has been entirely eliminated with your booth.

"We would not hesitate to recommend this booth as it is well worth the investment."

Another Customer Comments

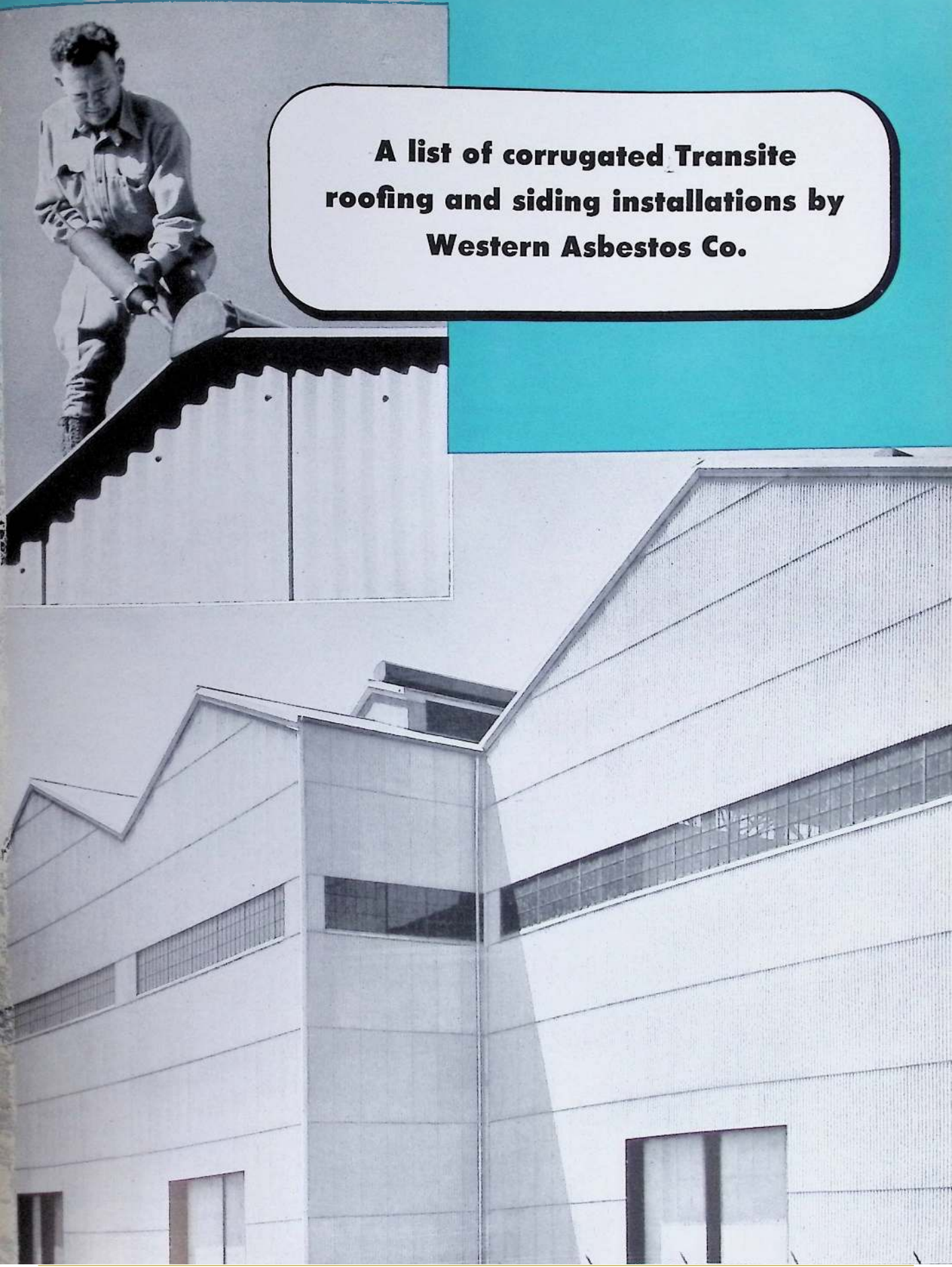
"During the last few years, we have installed 7 Burgess Acousti-Booths in various parts of our steel plant.

"These booths have been a boon to operating men who have occasion to use telephones in those parts of our plant where noisy conditions exist. This has been particularly true in the hot and cold strip rolling departments of our mill. No matter how much noise or clatter is going on outside of the booth, as soon as the person enters the same, it is possible to carry on a conversation over the telephone without any serious inconvenience."

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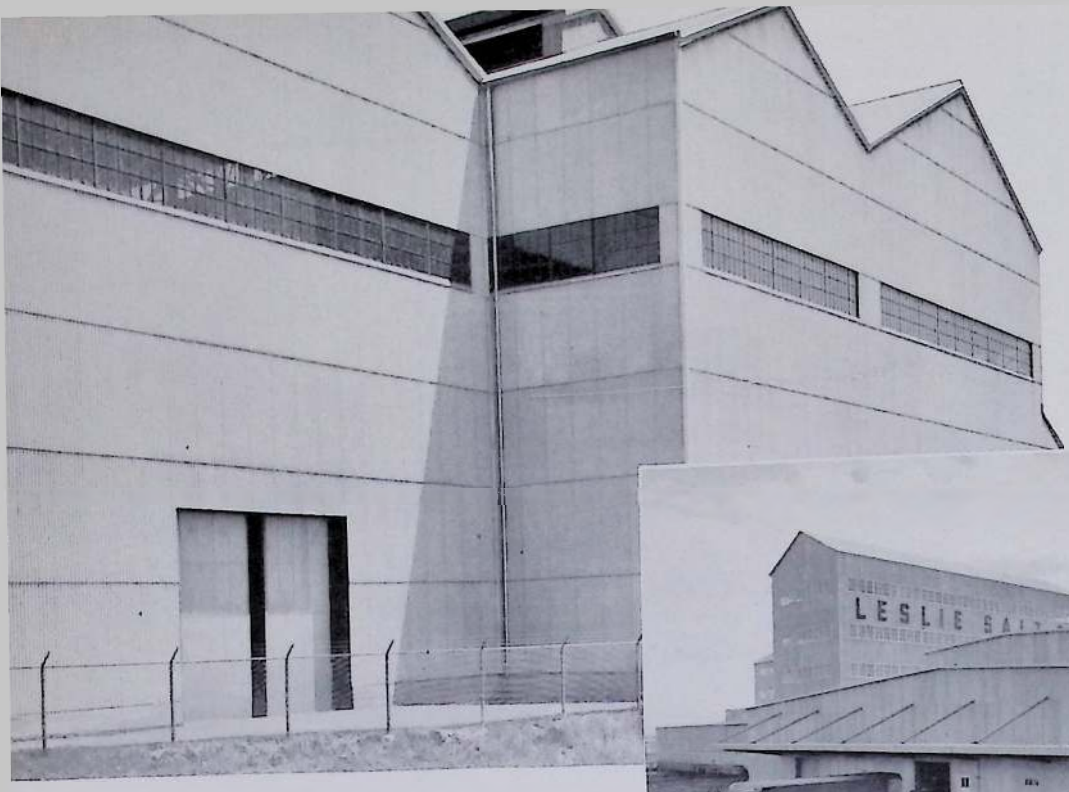
BURGESS-MANNING COMPANY

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A list of corrugated Transite roofing and siding installations by Western Asbestos Co.

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For over 25 years Johns-Manville Corrugated Transite has continually proved its value as the most efficient industrial roofing and siding material, particularly over skeleton frame construction. Because of its amazing durability and fireproof characteristics, Corrugated Transite has been used extensively, and with outstanding success. This listing represents the installations made by the Construction Dept. of Western Asbestos Co.



Above—installation by Western Asbestos Co. of Corrugated Transite for the American Forge Company, Berkeley, California. Right—Leslie Salt Company, Newark, California. These installations are typical of the use of Corrugated Transite in industrial construction. Because of its attractive appearance and beautiful, symmetrical lines it is equally adaptable to every type of modern building.

INDUSTRIALS

INSTALLATION	Square Feet	Date
American Brake Shoe Company, South San Francisco, Calif.		
Foundry building	2,200	1933
American Forge Company, Berkeley, Calif.		
Factory building	46,500	1942
American Smelting & Refining Co., Selby, Calif.		
Sinter plant	2,100	1939
Bethlehem Steel Company, San Francisco, Calif.		
Sub-station building	2,400	1943
Coen Company, San Francisco, Calif.		
Factory building	1,300	1943
Columbia Steel Company, Geneva, Utah		
Mill buildings	90,000	1943
Columbia Steel Company, Iron Mountain, Utah		
Mill buildings	22,000	1943
Columbia Steel Company, Payson Quarry, Utah		
Mill buildings	18,000	1943
Garden City Pottery Company, San Jose, Calif.		
Kiln building	22,500	1944
Warehouse building	18,600	1944
General Cable Company, Oakland, Calif.		
Loading shed	949	1938
The Glidden Company, San Francisco, Calif.		
Paint manufacturing building	24,000	1936
Warehouse addition	1,200	1937
Hall Scott Motor Company, Berkeley, Calif.		
Machine shop building	11,500	1944
Hurley Marine Works, Oakland, Calif.		
Plate shop building	17,300	1943
Kingwell Bros., San Francisco, Calif.		
Foundry building roof	1,600	1942
Linde Air Products Co., Richmond, Calif.		
Warehouse building	1,000	1942
Marinship Corporation, Sausalito, Calif.		
Oil storage building	1,890	1942
Machine shop building addition	1,750	1942
Merco-Nordstrom Company, Oakland, Calif.		
Factory building	5,000	1943
Moore Dry Dock Co., Mare Island, Calif.		
Boiler and compressor house	10,000	1942
Pacific Inter-Mountain Express, Emeryville, Calif.		
Office and freight terminal	4,700	1944
Par Soap Company, Oakland, Calif.		
Dust collector housing	4,200	1944
Peterson Tallow Company, Emeryville, Calif.		
Fertilizer plant	9,450	1933
Philadelphia Quartz Company, Berkeley, Calif.		
Factory building	1,700	1943
Pioneer Soap Company, Oakland, Calif.		
Boiler house pump	1,000	1944
Richmond Shipyard, Kaiser No. 2, Richmond, Calif.		
Fire pump station	2,900	1942
Santa Cruz Portland Cement Co., Stockton, Calif.		
Cement packing plant	8,400	1934
Southern Pacific Company, Oakland, Calif.		
Freight shed	22,300	1936
Southern Pacific Company, Reno, Nevada		
Freight shed	8,000	1931
Southern Pacific Company, San Francisco, Calif.		
Battery charger building	200	1937
Electric shop	1,750	1944
Union Diesel Engine Co., Oakland, Colif.		
Pattern storage building	5,000	1944
Westinghouse Electric & Mfg. Co., Emeryville, Calif.		
Warehouse	7,000	1937
Addition to manufacturing building	7,300	1942

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CHEMICAL INDUSTRY

INSTALLATION	Square Feet	Date
Dewy-Almy Chemical Company, Oakland, Calif.		
Warehouse	1,700	1936
The Dow Chemical Company, Pittsburg, Calif.		
Ammonia plant	15,500	1942
E. I. du Pont de Nemours & Co., Hanford, Washington		
Conveyor housings	88,100	1943
General Chemical Company, Nichols, Calif.		
Alum building	5,900	1934
Hercules Powder Company, Hercules, Calif.		
Power house building	10,300	1930
Sulphur burner house	8,000	1930
Shell Chemical Company, Martinez, Calif.		
MEK distillery plant	2,100	1933
MIBK plant	5,000	1943
Trichlor propane plant	1,150	1944
Shell Chemical Company, Shell Point, Calif.		
Ammonium sulphate building	20,000	1931
Addition to ammonium sulphate building	5,000	1933
Change house extension	1,500	1941
Anhydrous ammonia plant	3,500	1941
Switch house building extension	5,000	1941
Compressor building extension	50,000	1942
Compressor building extension	10,000	1944
Ammonium sulphate plant	5,000	1944
Synthisis plant	500	1944
Anhydrous ammonium plant	1,000	1944
Main change house	500	1944
Switch house	500	1944
Benzol plant	500	1944
Soda plant	500	1944
Gas reform plant	500	1944
Catalyst plant	500	1944
Stauffer Chemical Company, San Francisco, Calif.		
Storage building and dust chamber building	7,000	1932
Acid storage house	6,000	1932
United States Potash Co., Carlsbad, New Mexico		
Power house	21,500	1932
Refinery building	35,720	1932
Unloading shed	11,800	1932
Machine shop	14,350	1932
Hoist house	16,322	1932
Conveyor housings	15,100	1932
First addition to power house	6,900	1933
First addition to refinery building	5,058	1933
Second addition to power house	7,650	1934
Second addition to refinery building	41,450	1934
Wheeler, Reynolds & Stauffer, Stege, Calif.		
Manufacturing building	2,400	1931

PETROLEUM INDUSTRY

INSTALLATION	Square Feet	Date
Shell Development Company, Emeryville, Calif.		
Research sheds	1,400	1943
Pilot plant	1,000	1943
Loading dock awning	1,000	1944
Motor laboratory building	300	1944
Special products building	500	1944
Shell Oil Company, Martinez, Calif.		
Control house	500	1930
Edeleanu plant	7,180	1933
Fire wall	1,500	1940
Fire wall	1,000	1941
Fire wall	400	1943
Dubbs furnace roofs	2,000	1944
Standard Oil Company of California, Richmond, Calif.		
Power house	28,720	1936
Control house and switch shelter	2,400	1936
Bridge for conveyor	6,000	1936
Compressor control house	3,100	1937
Heater roof	4,850	1938
Locker building	1,200	1938
Compressor and refinery building	6,109	1938
Pump and filter house	12,364	1938
Laboratory building	4,365	1939
Pilot and plant building	970	1939
Filter house	2,000	1941
Deoctanizer—control house	1,000	1942
Deoctanizer—furnace roof	1,000	1942
Solvent refining unit—furnaces, heaters	12,000	1942
Control room building—dewaxing unit	1,000	1942
Electrical shed—dewaxing unit	500	1942
Compressor building—dewaxing unit	3,000	1942
Centrifuge building—dewaxing unit	10,000	1942
Toluene plant—furnace roof	2,000	1942
Filter house—filter unit	1,000	1942
Rerun unit	500	1942
Toluene plant—filter house	3,000	1942
Battery No. 11—control house	1,000	1942
Battery No. 11—furnace roof	1,000	1942
Toluene plant—chemical building	500	1942
Toluene plant—blower house	2,000	1942
Power plant extension	20,000	1942
Toluene plant—compressor building	3,500	1942
SO2 building	4,000	1944
Dye mixing building	2,088	1944
Refine pump house	1,000	1944
Office and locker room building	1,100	1944
Materials laboratory shed	1,142	1944
Reclamation yard storage building	5,000	1944
Phthalic anhydride haybarn	400	1944
Acid works pump shed	700	1944
Acid concentrate building	4,000	1944
100 octane gas unit buildings	70,000	1944
Chemical laboratory group	3,000	1945
Cracking plant furnace roof	2,000	1945
Tide Water Associated Oil Company, Avon, Calif.		
Refrigerator house	4,000	1930
Boiler and pump house	4,000	1931
Addition to refrigerator building	3,900	1933
Cracking plant tool room	1,600	1937
Drum repair building	3,500	1937
Wash room buildings	1,114	1938
Laboratory building	726	1939
Acid lube treating plant	4,000	1942
Isomerization plant—reactor building	1,500	1942
Storage building	2,500	1942
Isomerization plant reactor	12,000	1943
Isomerization plant—HCL storage building	500	1943
Isomerization plant—alkylation unit	1,000	1943
Cracking unit roofs	3,078	1943
Union Oil Company of California, Oleum, Calif.		
Mechanical shops	31,000	1939
Hydroformer and coking unit	50,000	1941
Wax deoiling plant	1,000	1941
Change house	10,000	1941
Switch and control house	2,000	1942
Toluene plant—control house	5,000	1942
Furnace roof	2,000	1943
Change house extension	1,500	1943
Filter structure	1,400	1943
Cracking plant furnace roof	2,800	1943
Asphalt plant switch control house	1,300	1943
Wax deoiling plant—clay house	500	1943
Wax deoiling plant—clay house extension	1,700	1944
Furnace roof	2,500	1944
Furnace roof	3,000	1944
Black oil furnace roof	3,000	1944
Doctor plant control house	800	1944
Tractor shed	900	1944
Machine shop building addition	4,000	1945

FOOD PRODUCTS

INSTALLATION	Square Feet	Date
Albers Milling Company, Oakland, Calif.		
Head houses	20,000	1943
American Cream Tartar Co., San Francisco, Calif.		
Factory building	350	1944
Durkee Famous Foods, Berkeley, Calif.		
Warehouse building	18.000	1934
Garage and warehouse	7,000	1934
Holly Sugar Company, Tracy, Calif.		
Warehouse building	13,500	1933
Hovden Food Products Company, Monterey, Calif.		
Refrigerator and catsup building	13,200	1944
Fish meal cooling shed	4,100	1944
Leslie Salt Company, Newark, Calif.		
Mill building	69,700	1940
Machine shop building	9,900	1940
Boiler house building	9,200	1940
Morton Salt Company, Newark, Calif.		
Addition to manufacturing building	3,340	1936

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PUBLIC UTILITY

INSTALLATION	Square Feet	Date
Pacific Gas & Electric Co., Avon, Calif.		
Steam plant extension	3,900	1940
Pacific Gas & Electric Co., Bakersfield, Calif.		
Pump station	7,000	1943
Pacific Gas & Electric Co., Bellota, Calif.		
Sub-station building	6,000	1944
Pacific Gas & Electric Co., Dutch Flat, Calif.		
Control house	1,000	1942
Pacific Gas & Electric Co., Herndon, Calif.		
Pump house	900	1944
Pacific Gas & Electric Co., Martinez, Calif.		
Steam plant extension	3,900	1940
Pacific Gas & Electric Co., Oakland, Calif.		
Compressor building	8,300	1935
Pacific Gas & Electric Co., Oleum, Calif.		
Steam plant extension	3,300	1941
Power plants No. 1 and 2	20,000	1942
Power plant	6,000	1943
Pacific Gas & Electric Co., Potter Valley, Calif.		
Power plant	10,000	1940
Pacific Gas & Electric Co., San Francisco, Calif.		
Booster building	1,500	1942
Pacific Gas & Electric Co., Sausalito, Calif.		
Sub-station building	3,000	1942
Sub-station building	1,200	1943

GOVERNMENT

INSTALLATION	Squore Feet	Date
National Advisory Committee for Aeronautics, Moffett Field, Calif.		
Wind tunnel	44,400	1940
Paint shop building	7,215	1942
Airplane hangar and shop	23,100	1944
U. S. Army, Hamilton Field, Calif.		
Paint and spray building	3,000	1944
U. S. Army Air Depot, McClellan Field, Calif.		
Ordnance magazine	1,600	1937
U. S. Army Ordnance Depot, Ogden, Utah		
Renovating plant and boiler house	25,615	1941
Locomotive repair building	39,075	1941
Inter ammunition building, dunnage and equipment building	21,575	1941
Elevator building	2,400	1941
U. S. Army Ordnance Depot, Hackstaff, Calif.		
12 storage magazines	340,000	1942
U. S. Army Flying School, Stockton, Calif.		
Ordnance storage facilities	9,500	1942
U. S. Engineers, Porterville, Calif.		
Airport roof	2,275	1942
U. S. Marine Corps, Depot of Supplies, San Francisco, Calif.		
Warehouse building	58,460	1943
Warehouse building	20,700	1944
U. S. Maritime Commission, Richmond Shipyard Railroad, Richmond, Calif.		
Power sub-station	14,000	1942
U. S. Naval Air Station, Alameda, Calif.		
Inert store house	5,900	1943
U. S. Naval Ammunition Depot, Hawthorne, Nevada		
Storage facilities	994,500	1940
Mine filling plant	46,515	1941
Mine filling plant	1,500	1941
Pyrotechnic building	13,360	1942
Mine filling plant	500	1942
Inert storage magazines	561,600	1942
U. S. Naval Dry Docks, Hunters Point, Calif.		
Pump house	1,000	1943
Theatre building	17,300	1944
U. S. Navy Yard, Mare Island, Calif.		
Boiler plant	5,300	1943
Truck overhaul building	5,600	1944

INSTALLATION	Square Feet	Date
U. S. Naval Air Station, Moffett Field, Calif.		
Hangar building	40,000	1943
Storehouse	2,825	1943
U. S. Naval Supply Depot, Oakland, Calif.		
Warehouse building No. 221	13,935	1941
Warehouse building No. 222	13,935	1941
Warehouse building No. 223	12,800	1941
Warehouse building No. 331	21,790	1941
Warehouse building No. 332	21,790	1941
Warehouse building No. 333	21,790	1941
Warehouse building No. 431	21,510	1941
Warehouse building No. 433	21,820	1941
Warehouse building No. 522	38,400	1941
Warehouse building No. 341	21,790	1942
Warehouse building No. 342	21,800	1942
Warehouse building No. 432	21,510	1942
Pier shed—building No. 131	6,800	1942
Pier transit shed	20,300	1942
Warehouse building No. 441	5,700	1943
Warehouse building No. 443	25,500	1943
Warehouse building No. 444	25,500	1943
3 fire pump shelters	1,700	1943
Paint and oil storage building	3,300	1943
Garage building	6,300	1943
Incinerator building	1,500	1944
U. S. Naval Ordnance Depot, Pocatello, Idaho		
Shop building	37,000	1943
U. S. Navy, Point George, Calif.		
Direction finder building	500	1937
U. S. Naval Ammunition Depot, Port Chicago, Calif.		
9 inert buildings	103,500	1945
Boiler house No. 2	6,200	1945
Segregation buildings	36,000	1945
Combined shops building	28,900	1945
Boiler house	2,200	1945
Locomotive storage building	15,100	1945
Inert storage building	11,500	1945
Stripping and joiner building	10,800	1945
Smoke drum storehouse	8,100	1945
Fire house building	2,300	1945
Pumping plant	800	1945
U. S. Naval Net Depot, Tiburon, Calif.		
Pump house	1,500	1943
U. S. Naval Training Station, Treasure Island, Calif.		
Powder magazine	900	1941
Hangar building	24,000	1943
U. S. Naval Receiving Station, Yerba Buena Island, Calif.		
Power house	9,900	1939

MISCELLANEOUS

INSTALLATION	Square Feet	Date
Alisal Sanitary District, Alisal, Calif.		
Sewage disposal plant	2,400	1942
Berkeley French Laundry, Berkeley, Calif.		
Boiler plant	600	1937
Hale Bros. Stores, Inc., San Francisco, Calif.		
Garden shop	400	1944
Garden shed	700	1944
Modesto Irrigation District, Modesto, Calif.		
Garage building	5,300	1931
San Francisco-Oakland Bay Bridge, Oakland, Calif.		
Tie stations	3,694	1938
Inspection buildings	48,714	1939
University of California, Berkeley, Calif.		
Incinerator building	300	1932
Cyclotron building	24,000	1941
Switch house addition	1,370	1942

Contractors and Distributors for Johns-Manville Corporation

WESTERN ASBESTOS CO.

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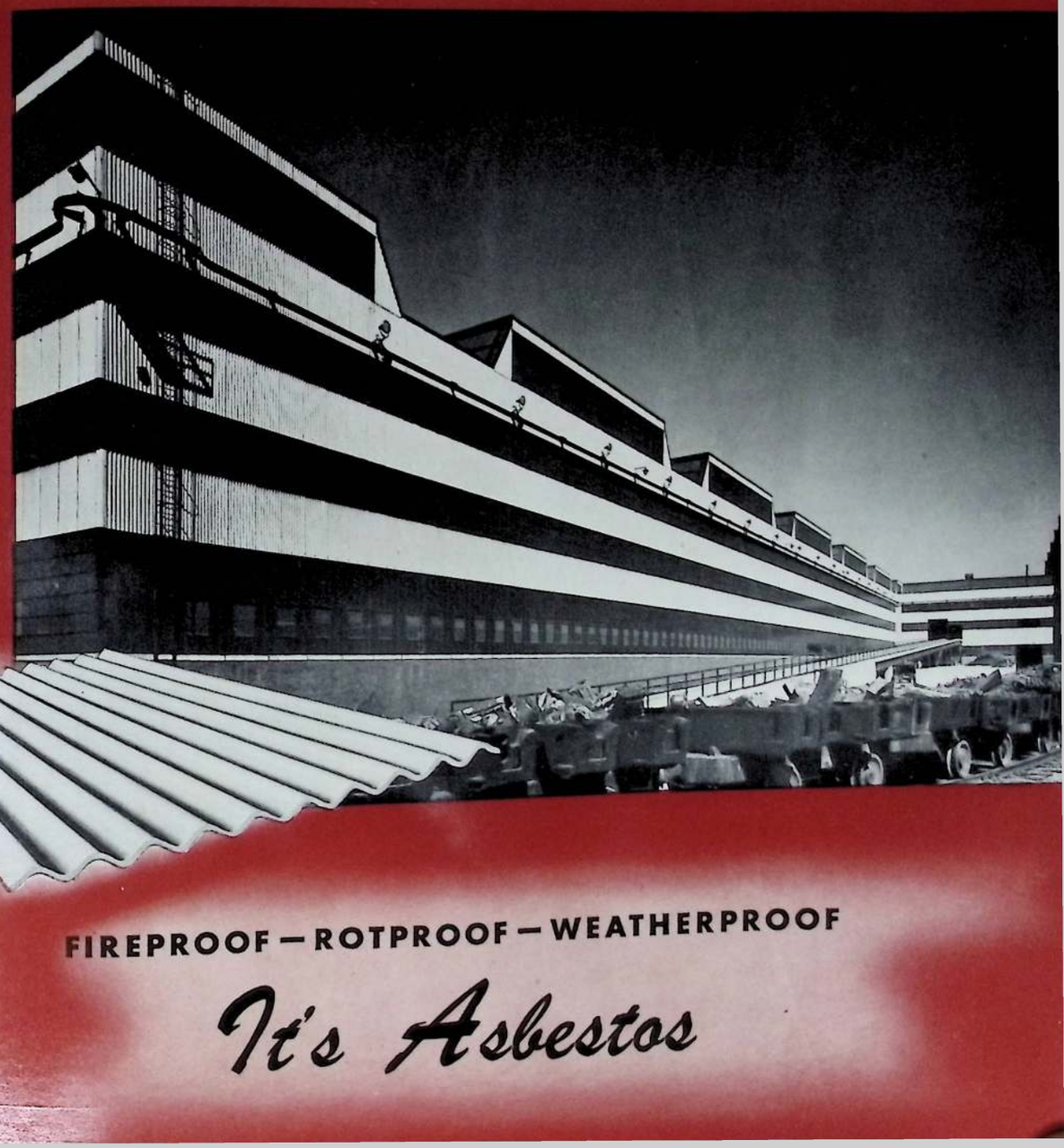
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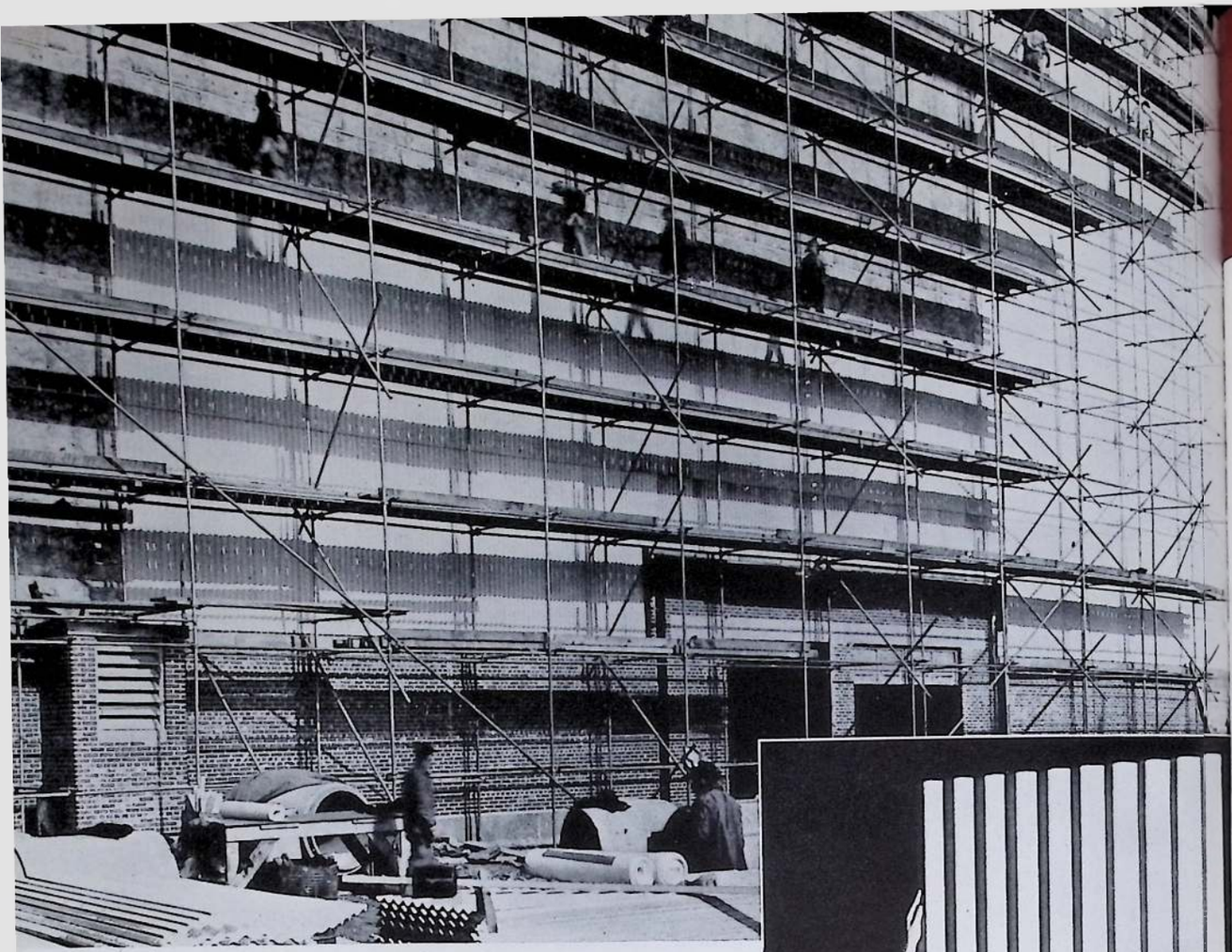
CORRUGATED ASBESTOS

TRANSITE



FIREPROOF—ROTPROOF—WEATHERPROOF

It's Asbestos





Johns-Manville

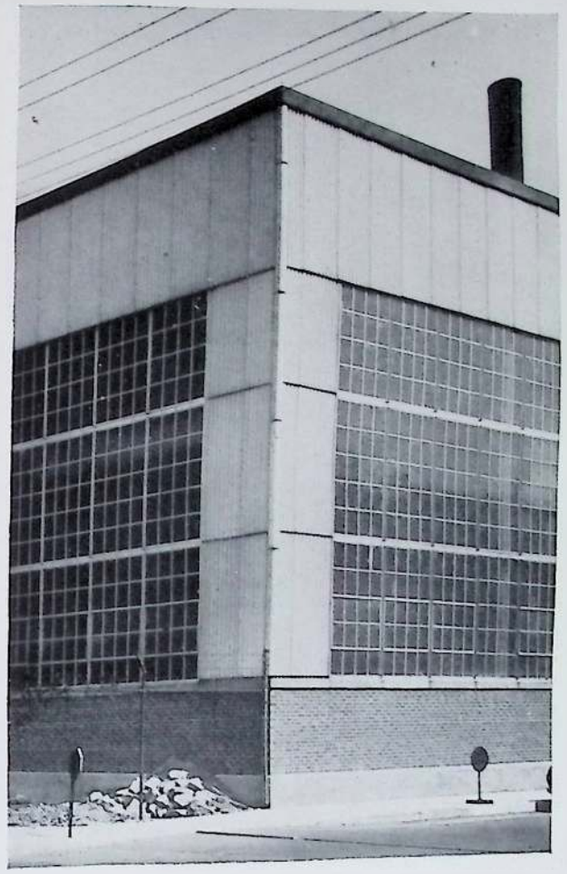
CORRUGATED ASBESTOS TRANSITE

The purpose of this brochure is to show that Corrugated Transite not only fulfills functional structural requirements but also that its streamlined attractive appearance offers great possibilities in the field of modern construction where simplicity of design is emphasized.

Composed of asbestos fibre and cement, moulded under tremendous pressure into unlaminated, monolithic sheets, corrugated for strength, this durable material can be applied to any skeleton-frame structure. Its natural light gray color in combination with the lines and shadows of the corrugations, gives an unusually striking appearance. It is furnished in sheets from 3 ft. to 11 ft. long and 42 in. wide.

For the lining of buildings and the fabrication of ducts, louvres and other special equipment, Transite is also available in flat sheets. Since Flat Transite is the same composition as Corrugated, it offers all the advantages of the latter material.

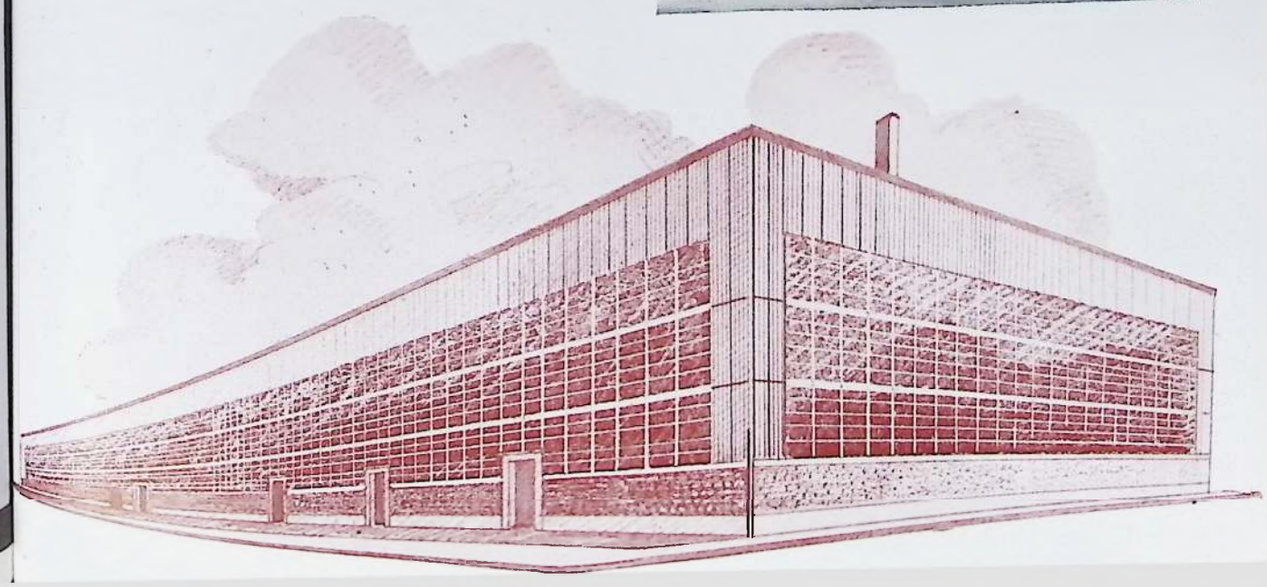
Complete erection instructions, flashing details, painting and cleaning information and other data for the application of Flat and Corrugated Transite sheets are available upon request.



25 YEARS OF OUTSTANDING SERVICE

In the past quarter century, Johns-Manville Corrugated Transite has proven an ideal material for roofs and for sidewalls of industrial, commercial and institutional buildings. Today, Transite is constantly finding new uses in many diverse fields — such as for interior decoration, greenhouse growing benches and for agricultural structures. It would be difficult to find a building material that offers as many advantages as are combined in Corrugated Transite. It is

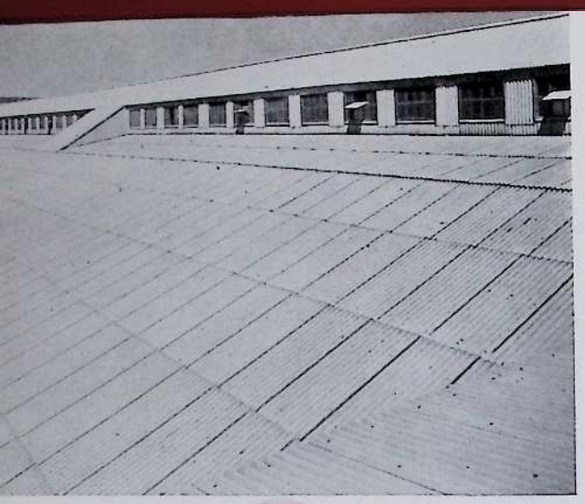
fireproof **weatherproof** **rotproof**
unaffected by temperature changes
highly resistant to chemical fumes
maintenance free
quickly and easily erected
economical



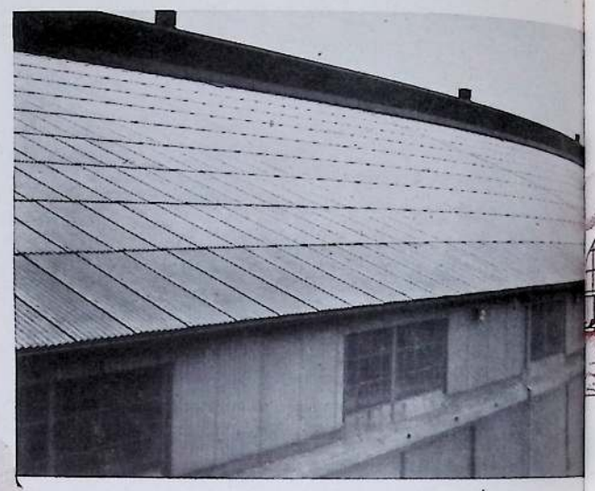
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TRANSITE IS VERSATILE

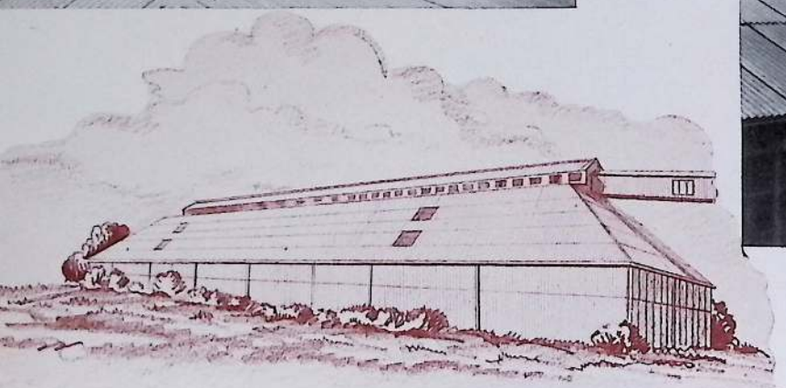
For roofs and sidewalls Corrugated Transite offers outstanding advantages in all types of structures



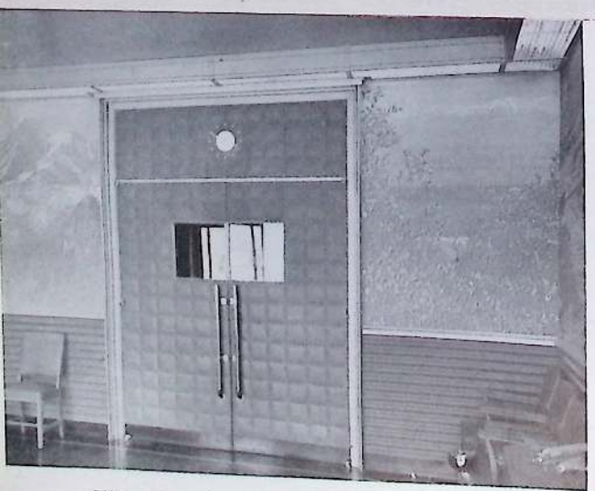
IN INDUSTRY: Photo at left shows a large Canadian packing house. Note how adaptable Corrugated Transite is to roof construction where monitors and penthouses project from main roofing area.



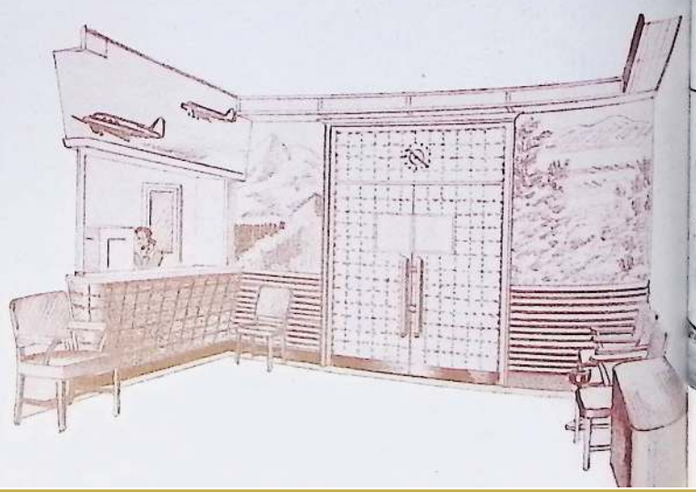
IN THE TRANSPORTATION FIELD: Corrugated Transite has proved eminently satisfactory for dock buildings, railroad structures and aviation hangars as well as for bus terminals. For buildings near the sea coast, it is one of the few materials that can be used successfully since it is totally unaffected by the deteriorating action of severe wind and salt spray conditions.



FOR INTERIORS, TOO

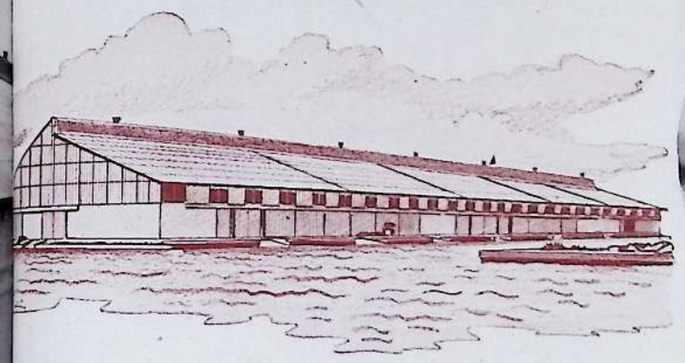


The attractive lines of Corrugated Transite have stimulated many architects to use this material as decorative interior walls. In this airline lobby, it is used horizontally to gain the desired effect.

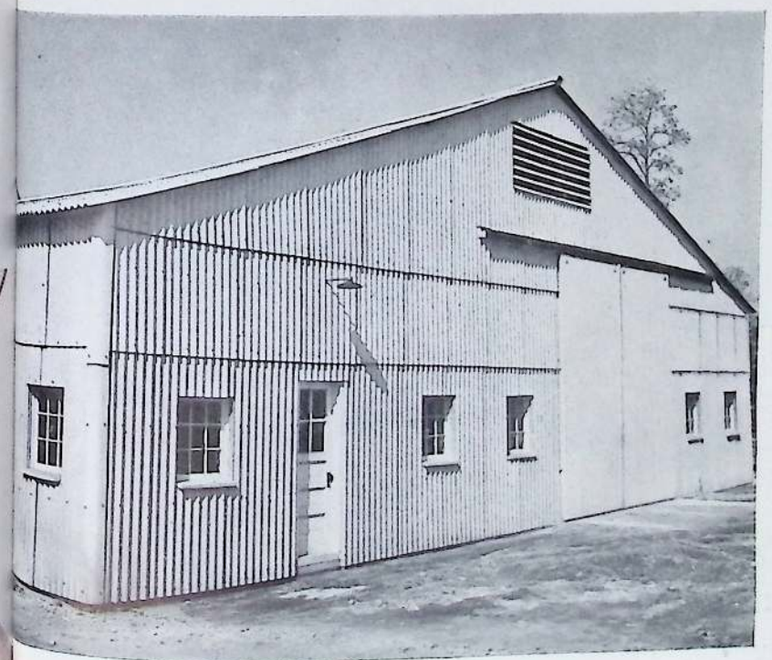


Corrugated Transite may be applied with tools normally found on the average construction job.

Where large quantities of this material are involved, greater speed is attained by using an electric saw instead of a hand saw. In such cases, a carborundum blade should be used.

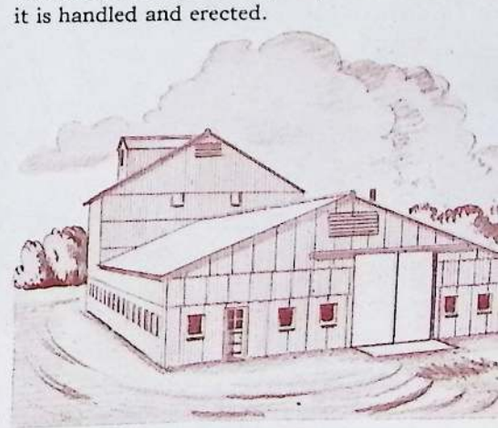






IN AGRICULTURE: The fireproof, permanent, maintenance free qualities which have made Corrugated Transite so acceptable in the industrial field led to its use for farm buildings.

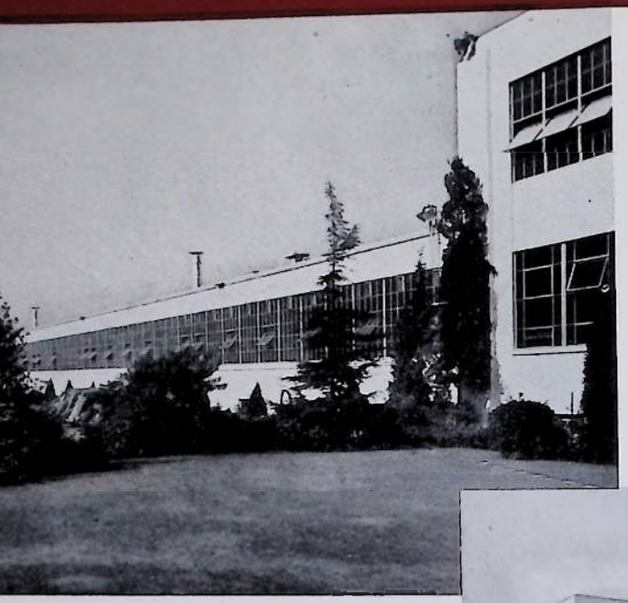
Since most farms are far removed from fire fighting apparatus, Transite, made of two fireproof materials, asbestos and cement, meets a long existing need. Farmers also like the ease and simplicity with which it is handled and erected.



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FOR INDUSTRIAL PLANTS

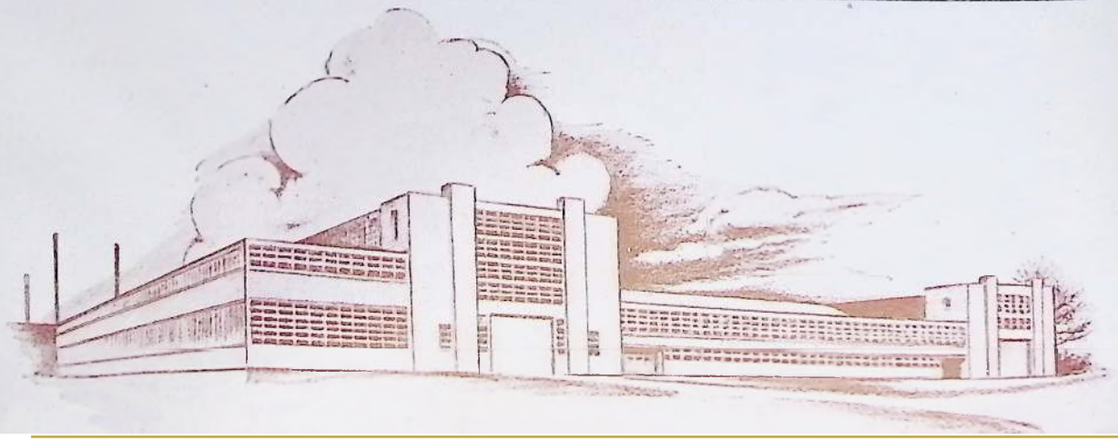
For 25 years Corrugated Transite has protected industrial buildings from fire, weather and time



In the streamlined plant shown at left, Corrugated Transite serves a dual purpose — utilitarian and architectural. The unusual effect was attained by applying the sheets horizontally. This method of application is finding increasing favor among architects.



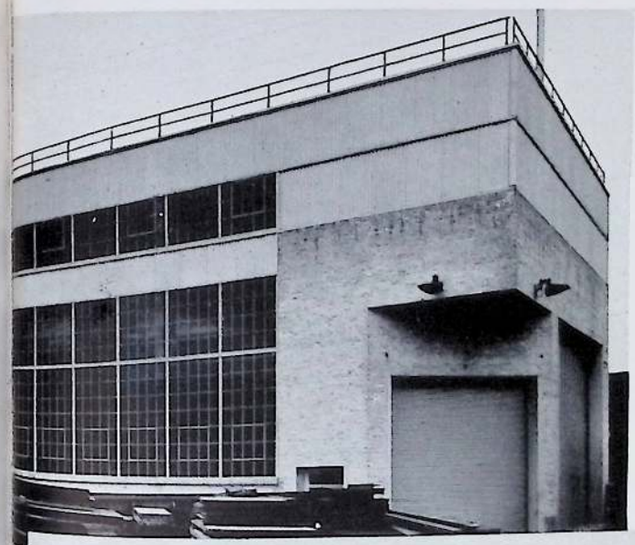
Corrugated Transite was first used for the walls and roofs of industrial buildings. At right is shown a bottling works in the Hawaiian Islands. The heat of the tropics and rapid changes in weather conditions have no effect on Transite. Yet note that while fulfilling its functional purpose, it adds to the appearance of this modern looking plant.



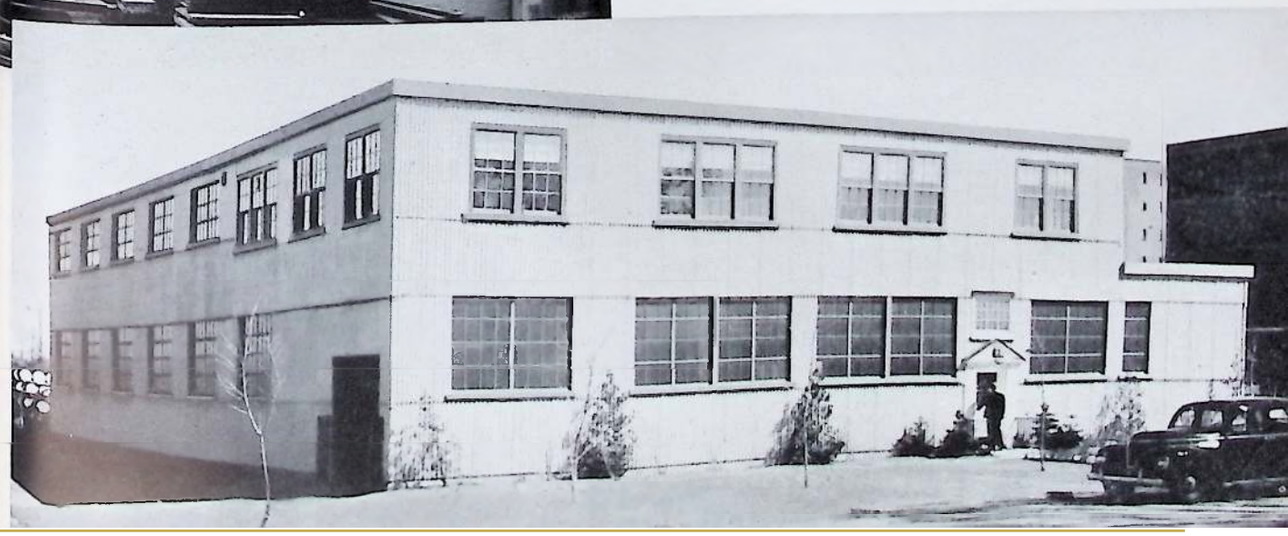
Sheets may be drilled for the fastener bolts either by hand or with an electric drill. The latter method is more economical when a large quantity of sheets are to be drilled.



Because of its immunity to chemical corrosion, Corrugated Transite has found wide usage in structures exposed to these conditions. Note below how effectively the spandrel area between the sash was enclosed with a single course of Corrugated sheets.



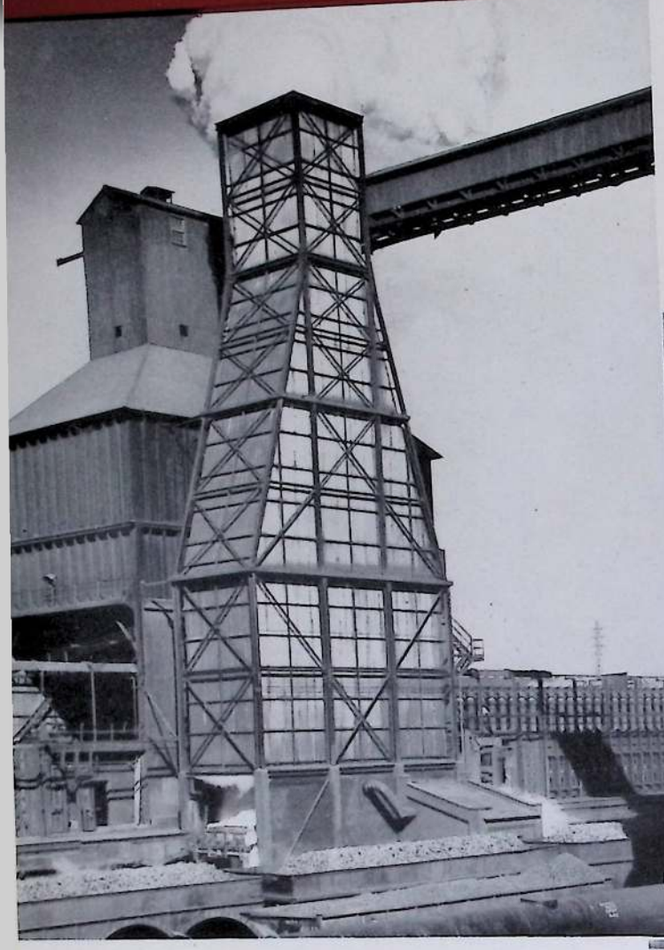
Long recognized as one of the most economical materials for plant construction, Corrugated Transite, combined with insulation and an interior finish, now is being used for office buildings and similar structures. Here is shown an administration office in a northern chemical plant.



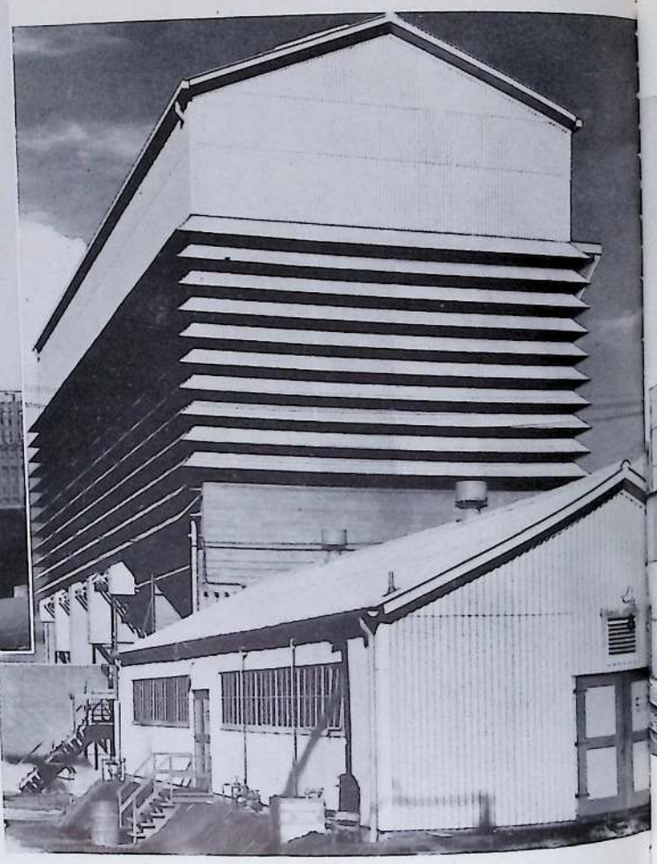
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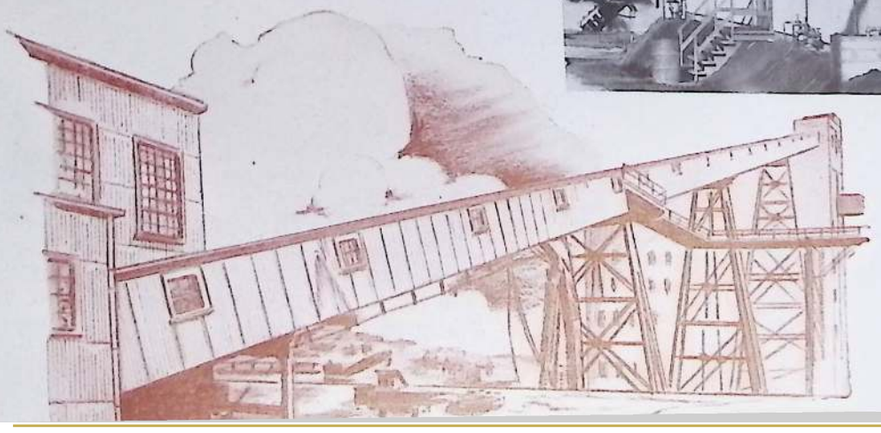
FOR SPECIAL CONSTRUCTION

The sturdy, corrosion-resisting qualities of Transite are highly valued by the process industries for specialized buildings

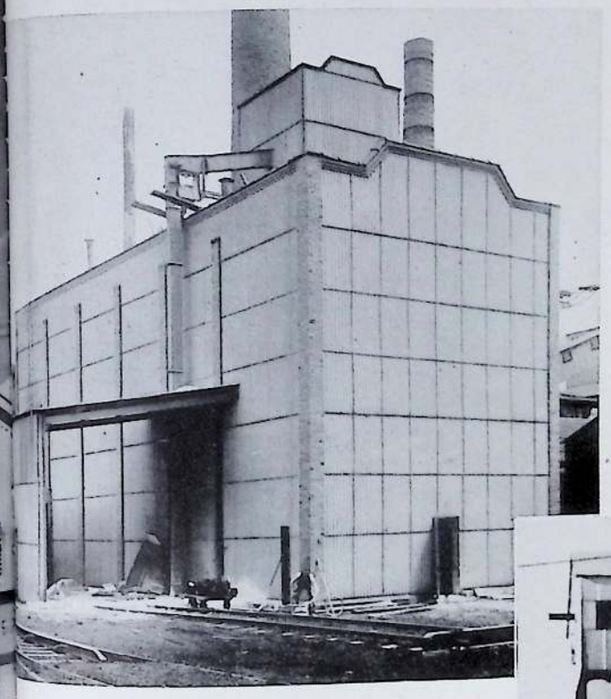


Nowhere are the inherent advantages of Corrugated Transite more acceptable or needed than in the field of heavy industry. At left is shown a coke quencher station where the steam and fume conditions are so severe that the heavy structural steel framing is on the outside, and protected by the Transite.



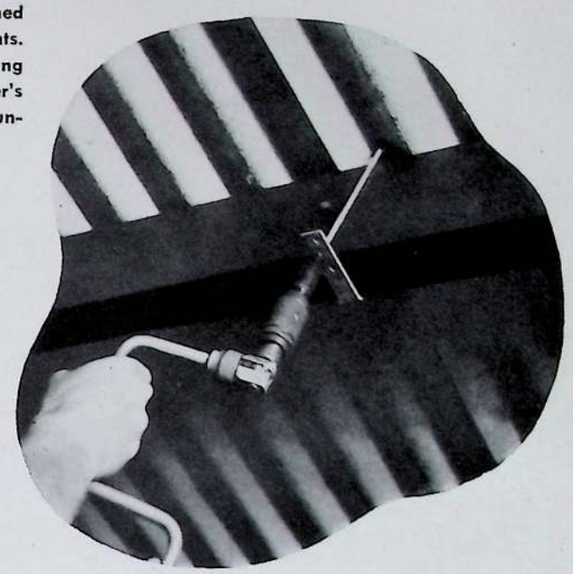


In the oil refinery building shown above, both Flat and Corrugated Transite are combined to withstand the severe conditions encountered in this industry.

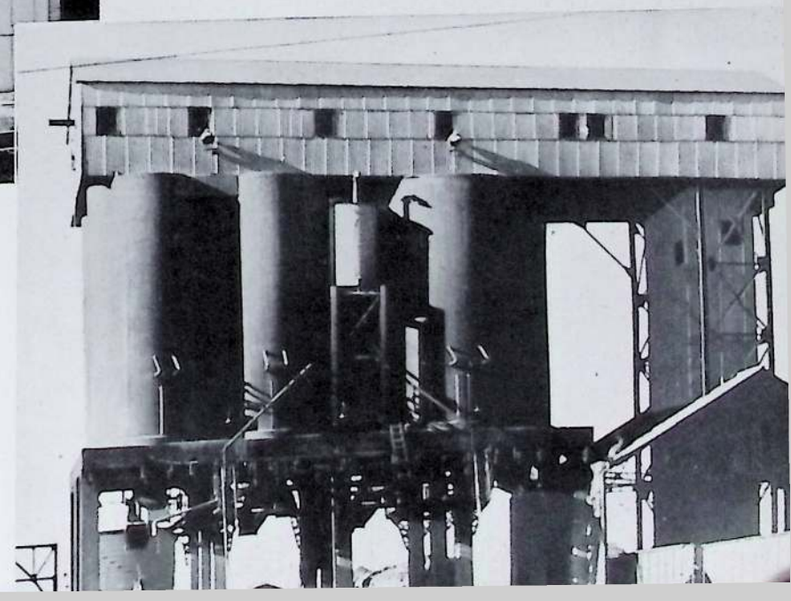


The boiler house shown above is still giving satisfactory service and still offers a presentable appearance after many years of exposure to the smoke and soot of the adjacent railroad. In fact, it was under conditions such as this, where smoke and acid fumes are prevalent, that Transite first established its reputation as an outstanding product.

Lead headed bolts and clips are furnished to meet structural framing requirements. Here the nut is being tightened on a long bolt and clip, using an ordinary carpenter's brace. For larger jobs, an electric nut runner will save time.



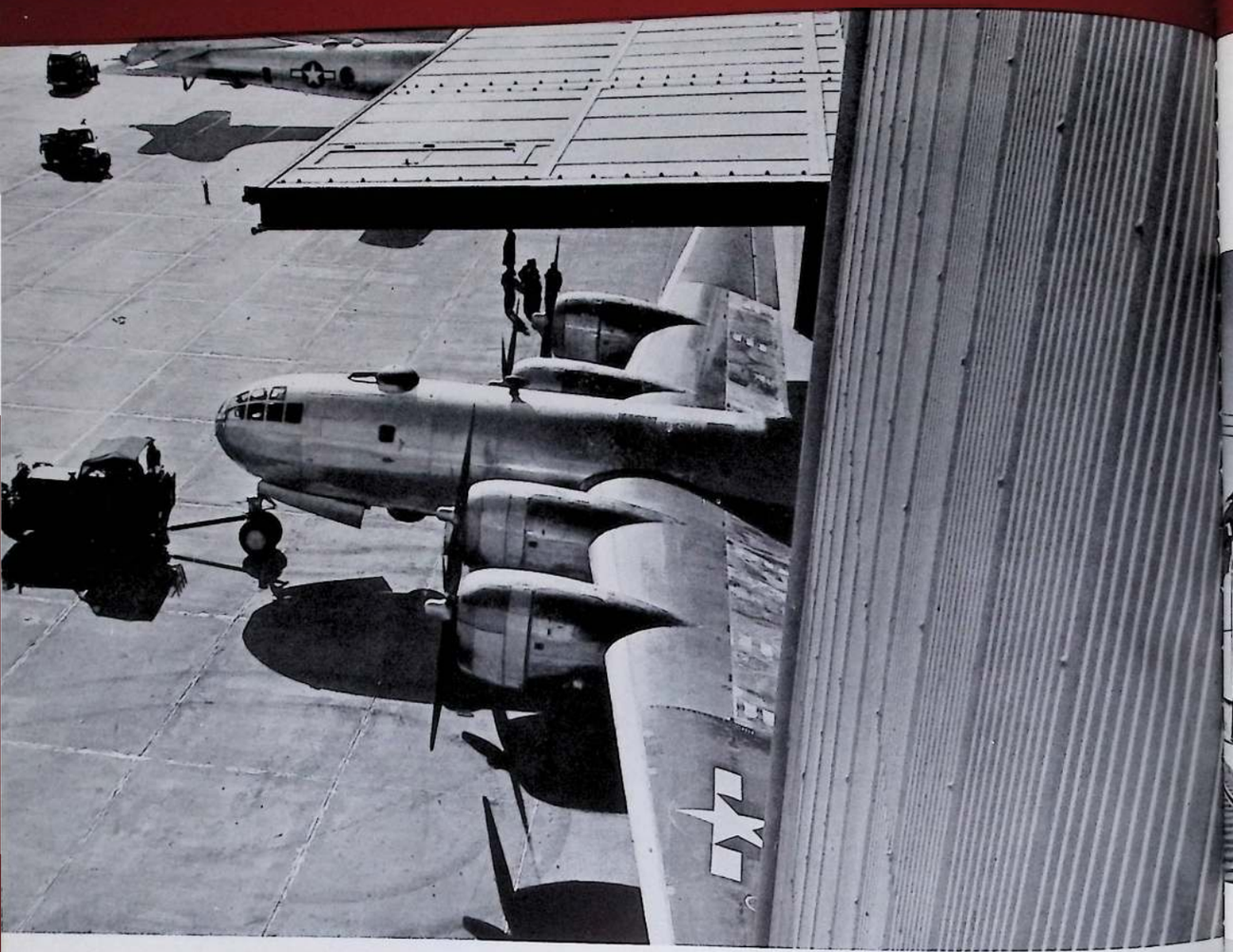
Here again, the ability of Corrugated Transite to withstand the adverse conditions met in railroad yards is evident. Photo below shows a coal hoist and conveyer on one of our large railroad systems.



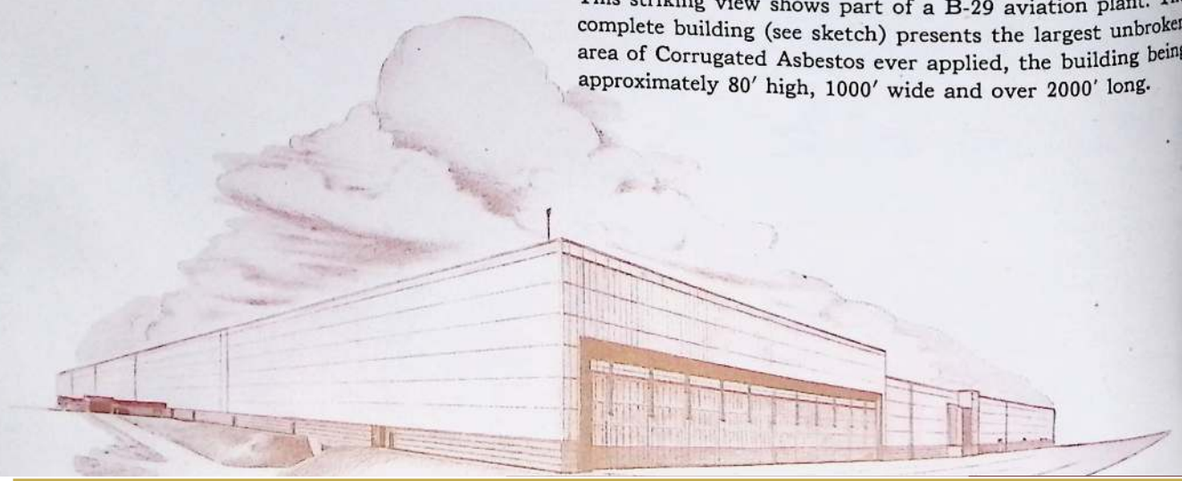
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IN THE TRANSPORTATION FIELD

Durable and maintenance free, Transite is ideal for hangars, railroad and dock structures—quickly and easily erected

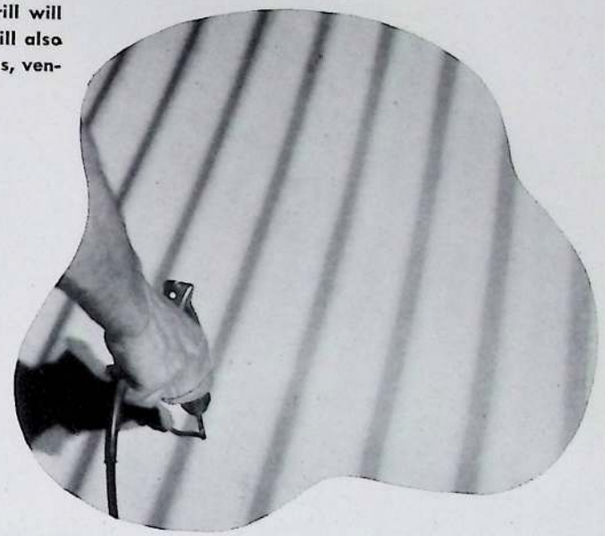


This striking view shows part of a B-29 aviation plant. The complete building (see sketch) presents the largest unbroken area of Corrugated Asbestos ever applied, the building being approximately 80′ high, 1000′ wide and over 2000′ long.



Where there is considerable cutting and fabricating, a light hand electric drill will be found most useful. This type drill also can be used to apply metal flashings, ventilators and so forth.





At left is shown the engine house of a Diesel locomotive, the Denver Zephyr. Transite is also used for round houses, car shops, smoke jacks and like structures.

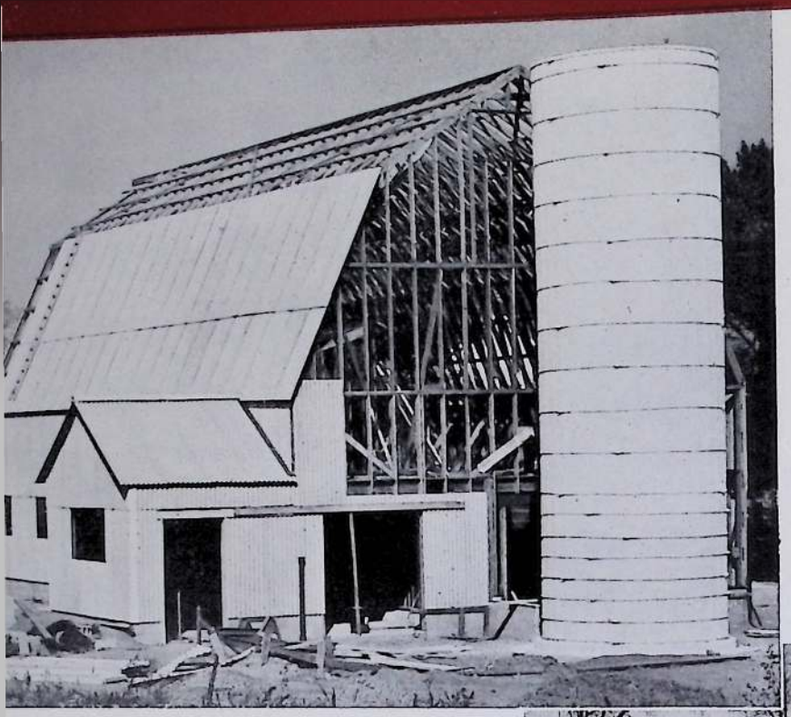
A very practical use of Corrugated Transite is shown below where two single courses of sheets pitching towards the gutter in the center, serve as a roof for the platform.



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FOR AGRICULTURE

Fireproof—vermin-proof—rust-proof—farmers like Transite for their buildings large or small



Farmers find that Corrugated Transite gives them the fireproof, rotproof and weatherproof qualities which are so necessary for sound and safe farm buildings. In addition, Transite is rodent-proof and, since it never needs painting, it is practically maintenance free. Moreover, these strong, sturdy sheets, light grey in color, lend an attractive appearance to the farm.

At left is given an idea of how Corrugated Transite is applied to conventional wood framing.

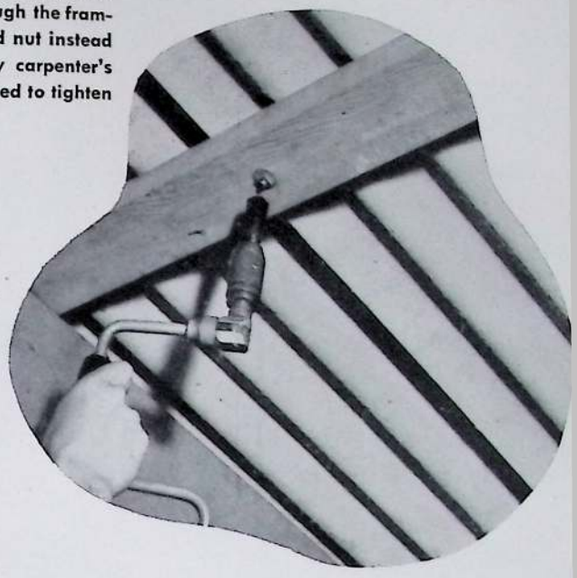


Corrugated Transite is often combined with other asbestos materials. On the hatchery building at right, Corrugated is used on the first floor sidewalls and J-M Asbestos shingles on the roof. The exterior of the second floor is covered with J-M Asbestos siding shingles. The building is insulated with J-M Rock Wool and finished on the inside with Flexboard.



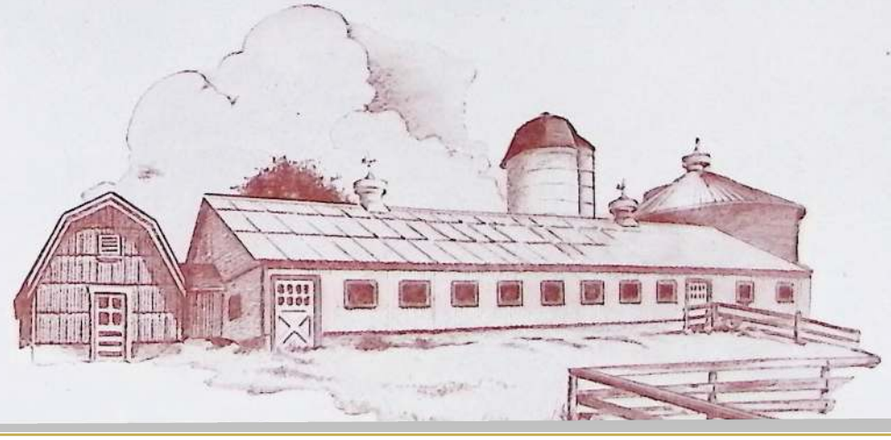
An increasing use for Corrugated Transite has developed in the greenhouse industry where its moisture resistance and immunity to rot make it unsurpassed as a material for the beds and sidewalls of greenhouse growing benches. The valleys formed by the corrugations produce the natural drainage system desired for this type of work. It is also widely used as the curbs under the sash on the greenhouse itself.

While lead head drive screws are normally used for application of Corrugated Transite over wood framing, it is common practice on farm buildings to drill through the framing members using a bolt and nut instead of drive screws. An ordinary carpenter's brace and socket wrench is used to tighten the nuts.





Outside of drought, the farmers' greatest dread is fire. The photo opposite shows a very large barn of Corrugated Transite rebuilt on the site of the old wood barn which was entirely consumed by fire. Now the farmer has one building less to worry about.



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FOR SCHOOLS AND OTHER BUILDINGS

The stone-grey, attractive appearance of Transite makes it especially adaptable to simplified modern construction

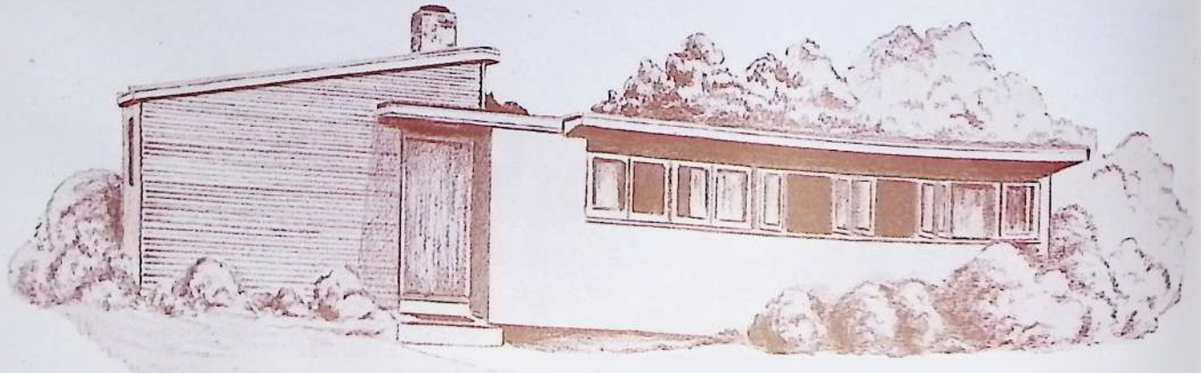


Although the inherent qualities of Transite are recognized and well established in industry, and in recent years in agriculture, the trend towards simple lines in modern construction has led to its ever increasing use in institutional, office and other non-industrial buildings.

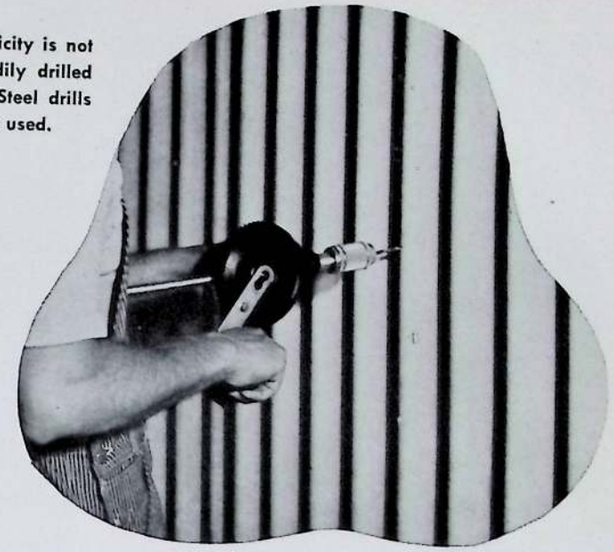
At the left is shown the modern functional dormitory built by the students and faculty of Black Mountain College in Black Mountain, North Carolina.



To the right is another example showing this modern trend in school buildings. Here the wall area is divided very simply into a horizontal band of masonry at the foundation; a continuous belt course of sash to produce maximum lighting; and a spandrel course of Corrugated Transite between the sash and the roof line.

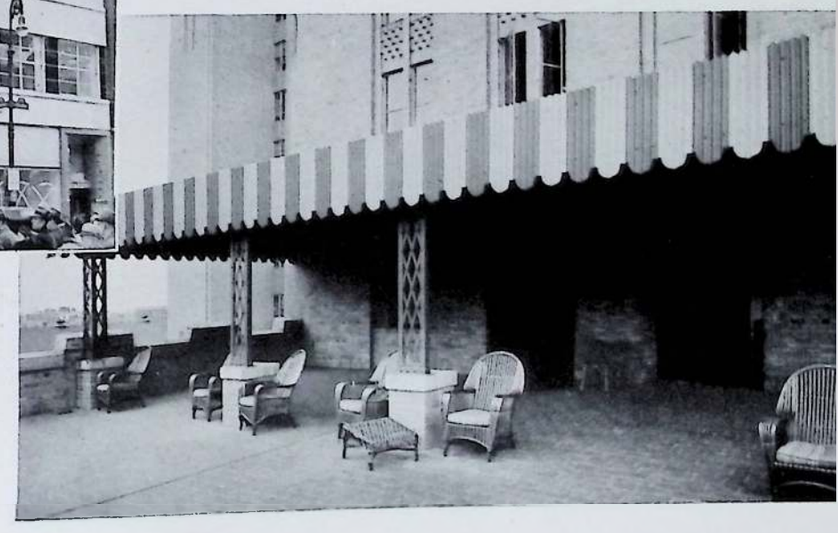


In those locations where electricity is not available, sheets may be readily drilled with an ordinary breast drill. Steel drills rather than wood bits should be used.





The entire outside of this six-story, New York office building is composed of only two modern building materials — glass and Flat Transite.



A unique treatment of a penthouse awning utilizing Corrugated Transite. The awning-like appearance was obtained by painting the Transite.



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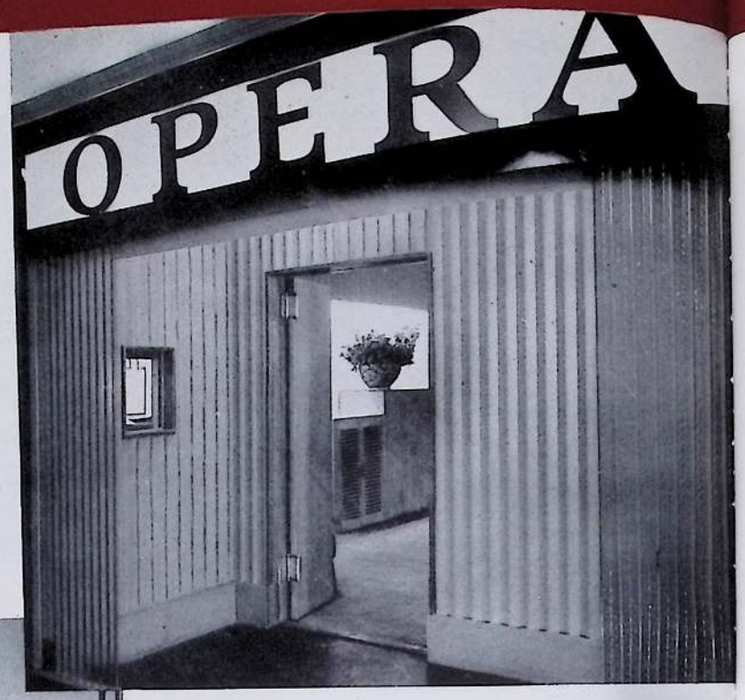
FOR INTERIOR TREATMENT

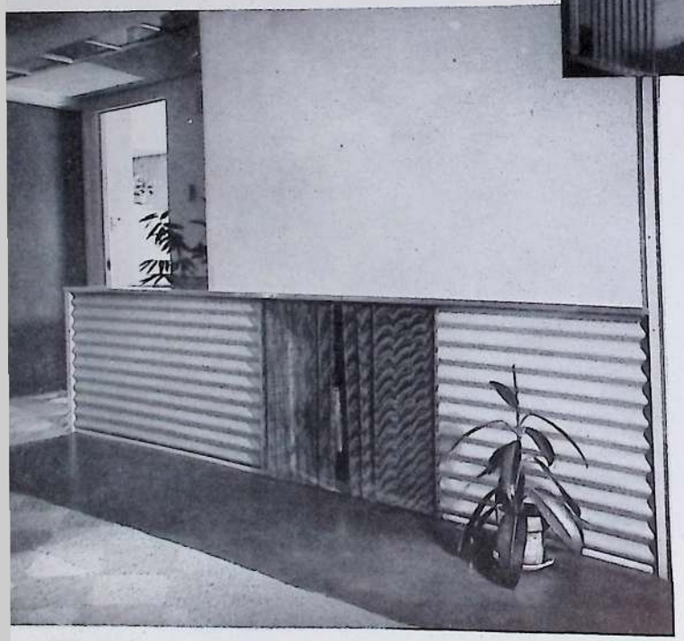
Transite, used horizontally or vertically, furnishes streamlined modern interiors—easily kept clean

Industrial designers, architects and interior decorators have found that Corrugated Transite presents a pleasing variation from the usual flat surfaces, and that it can be combined with other materials to form interesting and effective interiors.

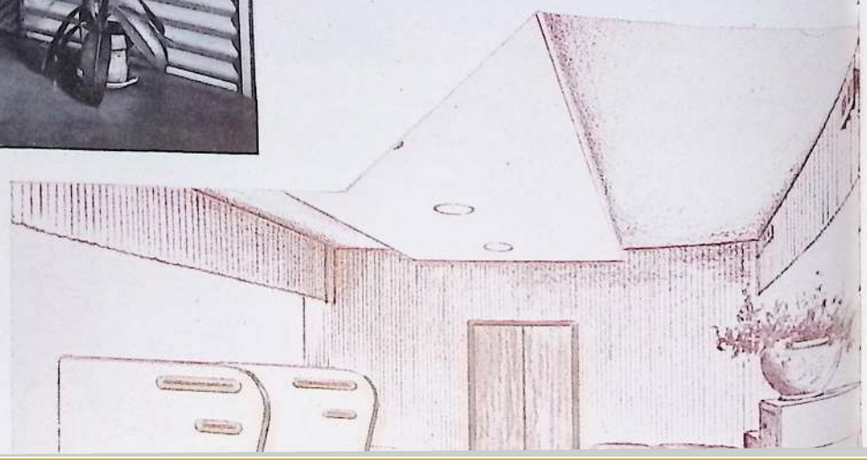
At the right, Corrugated Transite is combined with corrugated glass to form a novel wall treatment between the entrance hall and sales room of a modern dress shop.

In the sketch of this sales room, shown below, note the valence of Corrugated Transite, used to mask the indirect lighting.

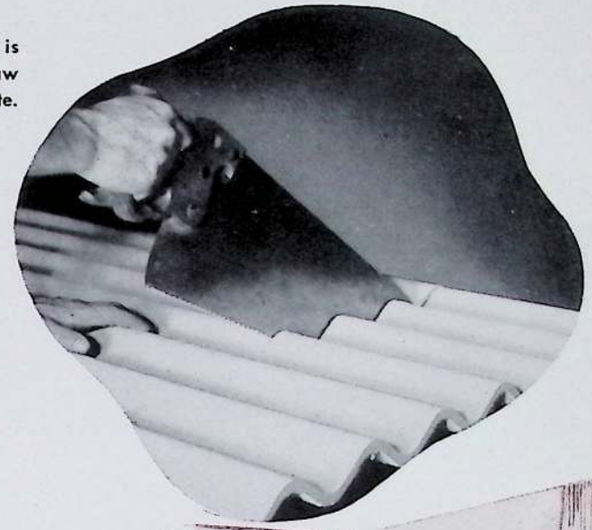




In this interior shot of a modern home, Corrugated Transite forms the wainscoting around the fireplace. To harmonize with the existing surroundings, the Transite can be readily decorated.



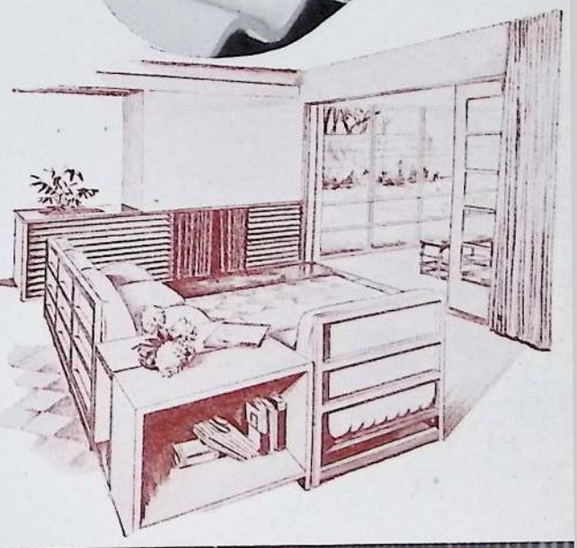
Where only a small amount of cutting is involved, an ordinary carpenter's hand saw with a coarse set will be found adequate.

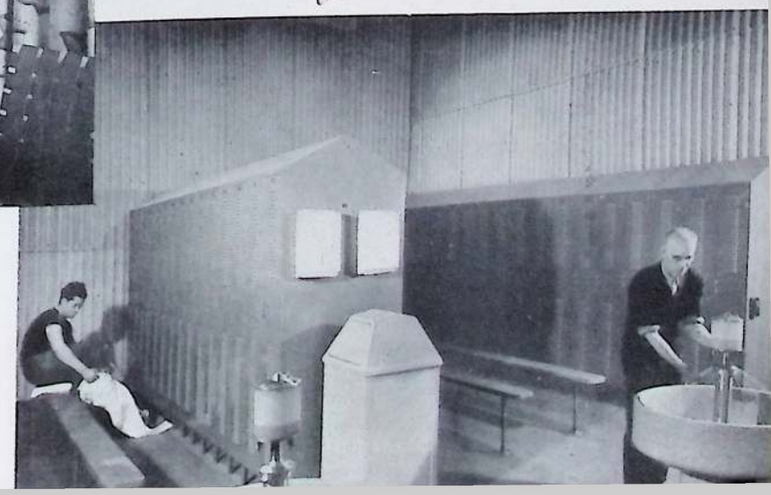


Here in this women's lounge, Corrugated Transite is the basic material used to achieve a striking and luxurious effect. Note how the designer has skilfully blended plaster, fabrics, furniture and Transite to create a restful and harmonious atmosphere.

Courtesy, Lester C. Tichy, Architect, N. Y.





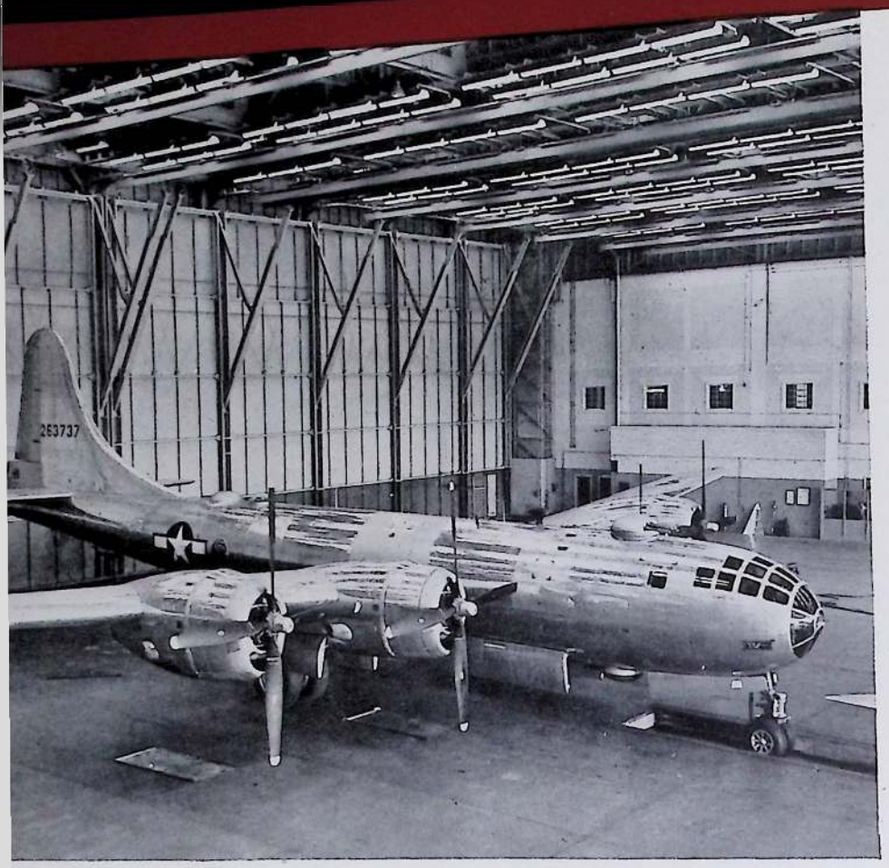


At the right is shown a factory locker room. Note how the dividing partitions of Corrugated Transite form an economical, fireproof wall. Its high strength, produced by the corrugations, permits a minimum of framing

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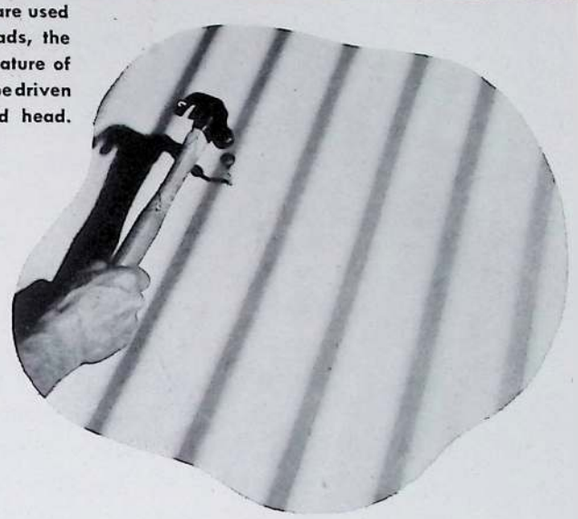
OTHER USES FOR TRANSITE

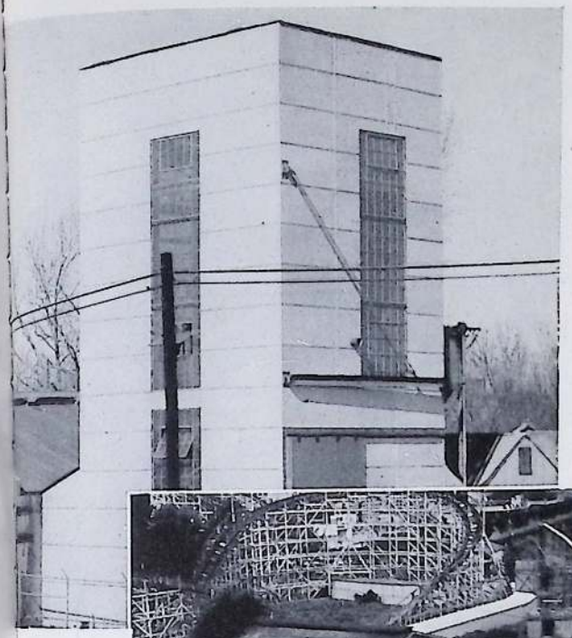
Today this strong, weatherproof, fireproof and attractive building material is serving successfully in many fields

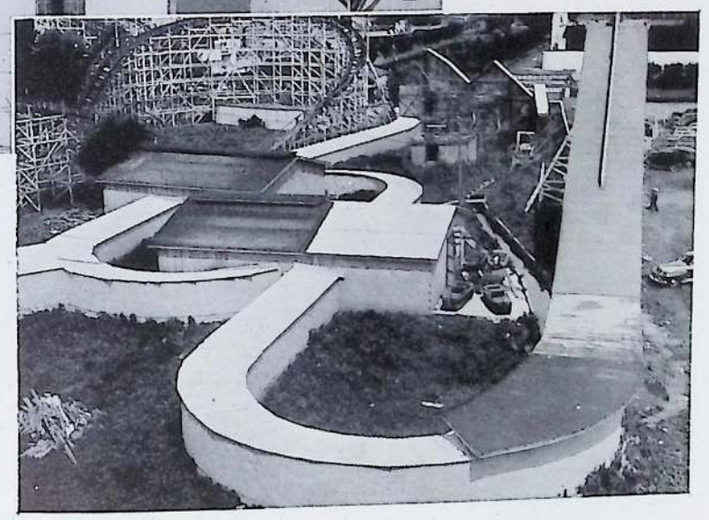


For hangars and administration buildings the aviation industry requires materials that are fireproof, maintenance free and sufficiently strong to withstand the high wind pressures encountered in the open locations of airports. Corrugated Transite for the siding of these buildings and Flat Transite for lining the doors is an ideal combination. The door shown in this hangar is 45 feet high and 300 feet wide, and is raised as a unit.

Over wood framing, drive screws are used with special self-sealing lead heads, the same as on the bolts. A unique feature of these drive screws permits them to be driven home without damaging the lead head.







On the electric communication building shown at left Flat Transite was used to obtain a modern appearance which would not detract from the surroundings. At lower left is shown a water tunnel ride roofed with Corrugated Transite. The constant danger of fire in summer recreation centers has recommended the use of this material for the protection of enclosed rides and like structures.





On this small roadside stand the Corrugated Transite has been applied horizontally to obtain the unique effect shown. This easily handled material is widely used in many types of small structures.

In the foregoing, we have suggested a few of the many places where Johns-Manville Corrugated or Flat Transite can be used to advantage. Undoubtedly, many other uses will occur to the architect or engineer desirous of a fireproof, economical, maintenance free product which is at the same time attractive and modern in appearance.

Corrugated Transite has proved its value as a building material. Its use should be given thoughtful consideration by anyone having a building problem.

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CONSTRUCTION SERVICE

THE services of approved contracting organizations, with thoroughly trained erection crews, are obtainable in various parts of the country for the erection of J-M Transite. The many years' experience of these men in the design and layout of industrial roofing and siding jobs can help you cut your construction costs.

ENGINEERING SERVICE

To help you in the solution of problems involving Transite, particularly for new and special uses, Johns-Manville maintains competent engineers at all its District Offices who are available for consultation and advice.

For either of these services, call on any of the Johns-Manville offices listed below:

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JOHNS-MANVILLE JM PRODUCTS

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Everlasting PROTECTION



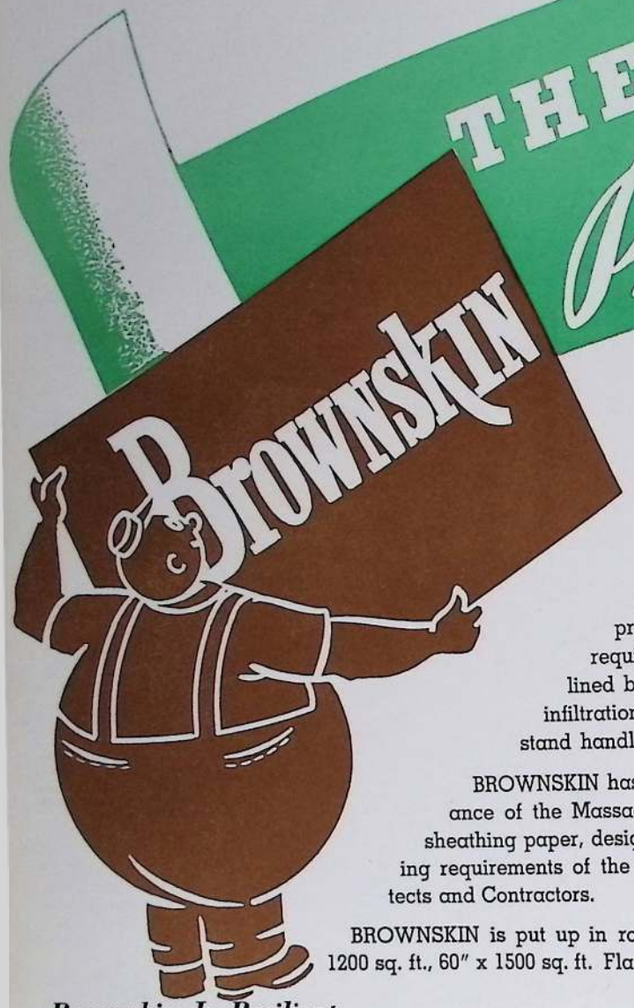
Angier

Brownskin

SHEATHING • DAMPPROOFING • FLASHING • VAPORSEALING • TARPAULINS

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THE RESILIENT Permanent SHEATHING THAT GIVES Protection!



Why BROWNSKIN?

ANGIER BROWNSKIN was developed for specific building purposes. Ordinary sheathing papers, designed primarily for wrapping and packing, inadequately fulfill the requirements placed upon a sheathing paper. These are outlined by the Bureau of Standards as a paper impervious to the infiltration of water, air and vapor . . . with strength enough to withstand handling in application.

BROWNSKIN has been developed in our own laboratories, with the assistance of the Massachusetts Institute of Technology, to meet the needs of a sheathing paper, designed for that specific purpose — and also to meet the exacting requirements of the Bureau of Standards, Forest Products Laboratories, Architects and Contractors.

BROWNSKIN is put up in rolls up to 60″ in width. Stock sizes 36″ x 500 sq. ft., 48″ x 1200 sq. ft., 60″ x 1500 sq. ft. Flashing rolls—8½″ x 167 lineal feet.

Brownskin Is Resilient

Ordinary building papers used for sheathing may shrink, pull away from nails and corners, leaving tears and holes which defeat the original purpose of application. BROWNSKIN will *not* pull away, will *not* tear and leave holes. Why? Because it S-T-R-E-T-C-H-E-S. BROWNSKIN expands or contracts with building stress and strain.

Brownskin Protects Permanently

BROWNSKIN, when exposed to weather for a year, under analysis, showed no deterioration at all. BROWNSKIN will continue to give protection for the life of a house. BROWNSKIN resists vermin and fungi.

Brownskin Is Tough—Can Take It!

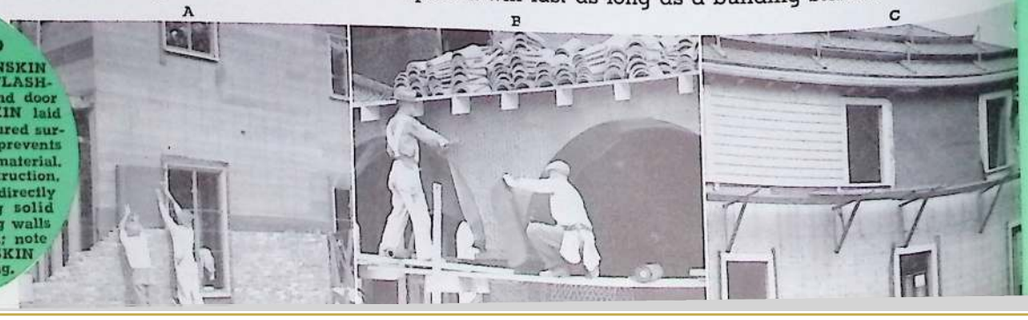
BROWNSKIN is composed of laminated tough sulphite kraft papers, each layer impregnated with a bituminous compound, creped, then inseparably bonded together with asphalt. It will *give* and *take* with the building . . . and affords a tight and permanent seal.

Why Brownskin Won't Deteriorate

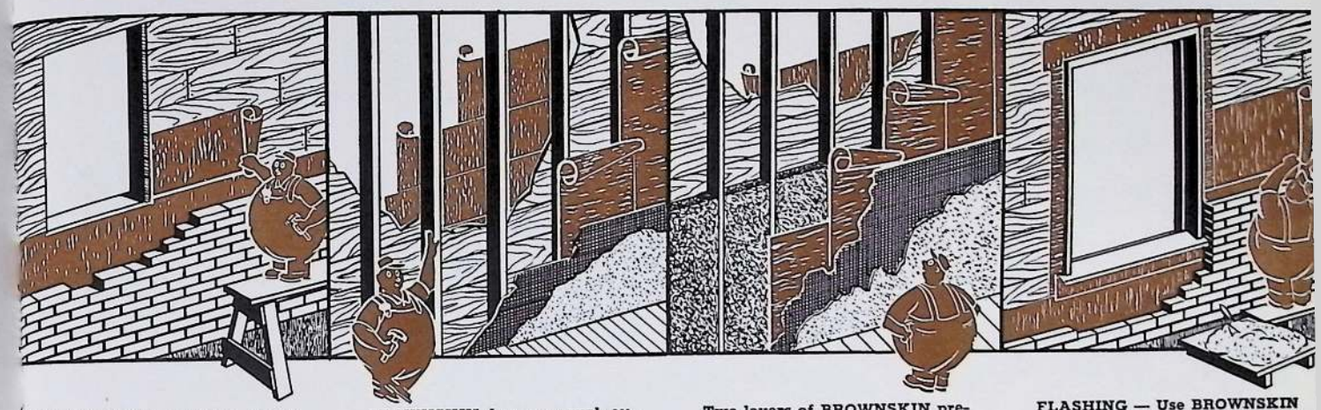
The cavities or pores in the fibres of kraft paper (from which BROWNSKIN is made) are freed from moisture and filled with asphalt by the Angier heat, pressure and vacuum process. So BROWNSKIN does not rot or fall apart. It will last as long as a building stands.

On The Job

A. An 8½″ width of BROWNSKIN is ideal for continuous FLASHINGS around window and door openings. **B.** BROWNSKIN laid under wire mesh; its textured surface bonds with stucco, prevents droppings and waste of material. In some Southern construction, BROWNSKIN is nailed directly to studs, eliminating solid sheathing. **C.** Preparing walls for frame construction; note again use of BROWNSKIN for window flashing.



I-T S-T-R-E-T-C-H-E-S



BROWNSKIN outside rough boarding cuts down fuel by eliminating wind penetration. A second layer between studs and plaster base forms a well-sealed dead air space.

BROWNSKIN has no equal except COPPERSKIN as a protective sheathing for side walls under wood finishes, stucco or brick veneer. BROWNSKIN will last the life of the house.

Two layers of BROWNSKIN prevent inner and outer moisture affecting insulating fillers. If sheet material is used, apply inner layer of BROWNSKIN between it and plaster base.

FLASHING — Use BROWNSKIN in narrow strips (approximately 10″ wide) around all window and door openings to stop moisture, dust and air infiltration.

SHEATHING SPECIFICATIONS: All exterior sheathing, or studs (where no solid sheathing is used), shall be covered with a layer of BROWNSKIN SHEATHING PAPER stretched over the entire exposed wall surface and thoroughly nailed with large head galvanized nails before any siding, indicated in the plans or elsewhere in the specifications, is applied. All weather laps shall be not less than 2″. The BROWNSKIN shall be carried over the studs, sills, heads, and jambs of all openings, and securely nailed. **FLASHING SPECIFICATIONS:** FLASH windows, doors and all other exterior openings with 8½″ BROWNSKIN CONTINUOUS FLASHING before BROWNSKIN SHEATHING PAPER is applied.

ECONOMY BROWNSKIN



Economy BROWNSKIN is composed of 1 ply single BROWNSKIN bonded with a waterproof bituminous compound to a sheet of smooth Kraft paper. Recommended for use between rough and finished flooring, it forms a permanent barrier against dust, dirt and moisture. Economical, it resists tearing and permits walking on without fear of puncturing.

Economy BROWNSKIN should be laid BROWNSKIN side down over rough flooring. The smooth kraft surface on top makes it easier to lay finished flooring. Lap seams not less than 2″, and as shown above, turned up at least 2″ under all baseboards and moldings at floor and wall intersections.

ECONOMY BROWNSKIN REINFORCED

Use for Extra Strength

. . .

This is a durable, all-purpose waterproof building paper, especially useful for temporary partitions, coverings and the protection of all types of floors during construction.

It is similar to ECONOMY BROWNSKIN, but with the addition of crossed reinforcing fibres between the laminated sheets for greater strength.

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Angier

Permanence . . . Protection

Angier believes that these are the two words which best express the idea of a structure, whether its purpose is for living or for industry. Shoddiness, therefore, in any material used, including Building Papers, has no rightful place in the picture.

Mounting fuel bills, stained ceilings and walls, damp cellars, leaks, draughty rooms, faulty insulation and decaying structural materials — these are a high price to pay for a little money saved in the original cost of Building Papers — because, perhaps, they are hidden and unseen when a structure is completed.

There is no "Permanence" or lasting "Protection" in a Building Paper that disintegrates to a pulp in a few years. Or in one that tears, splits or punctures from such causes as settling, temperature changes, etc.

Pioneering for better protection, as they have done in Industry for a half century, Angier engineers carried the same high quality of purpose and achievement into the Building Paper field.

In their development of BROWNSKIN — creped to S-T-R-E-T-C-H, and impregnated and treated to resist deterioration and the passage of water or moisture — they set a new standard that is known wherever better buildings are built.

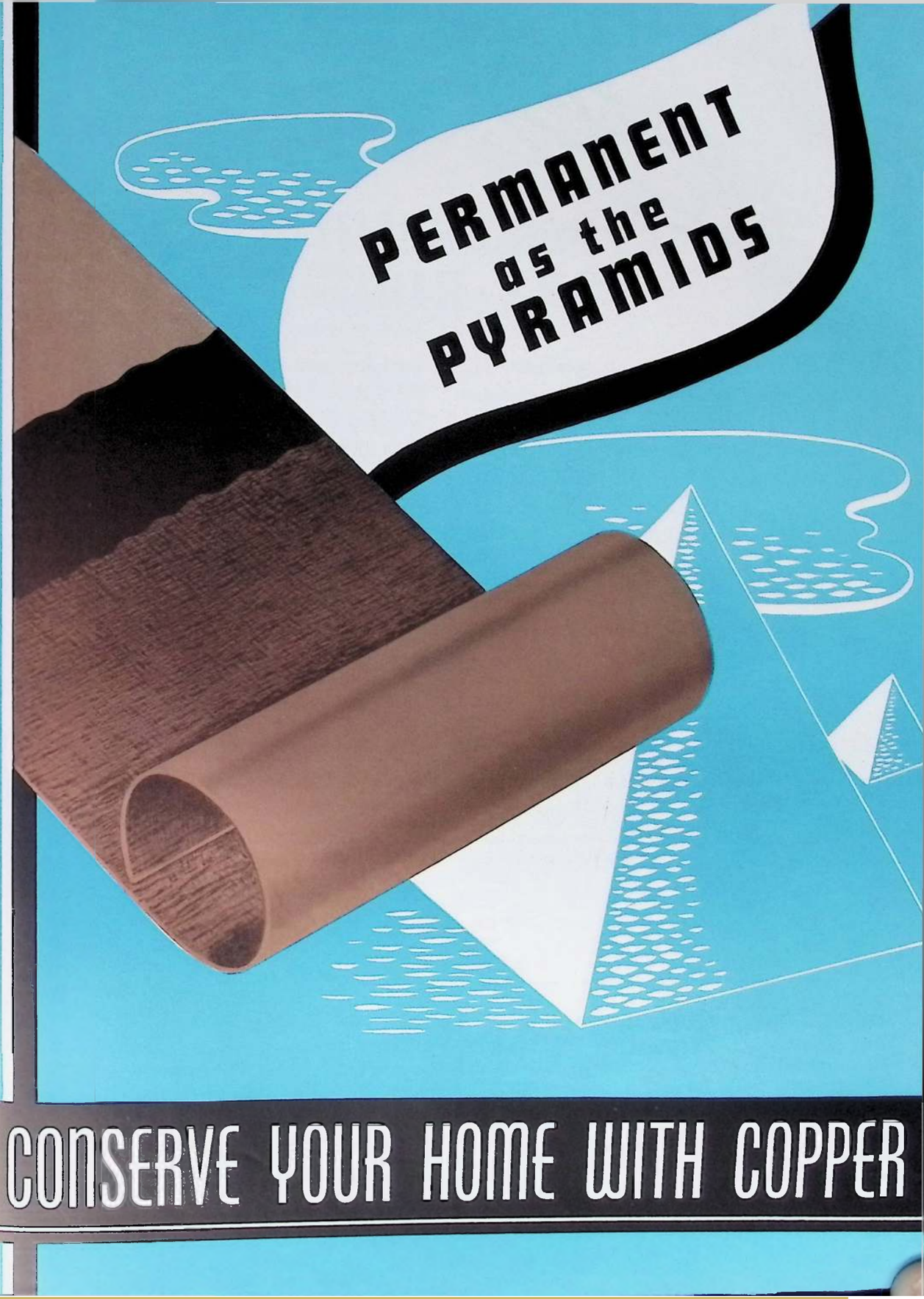
It is not an Angier ambition to match in competition every type of Building Paper that is offered for sale. A few select specialties — each the best for its purpose — each offering the utmost available in "Permanence" and "Protection" — constitute our sole bid for the business of those seeking these qualities.

MANUFACTURED BY

ANGIER CORPORATION

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Angier



CONSERVE YOUR HOME WITH COPPER

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Copperskin PERMANENTLY PROTECTS THE HIDDEN HAUNTS

. . . Haunts where tiny destroyers hide and, like termites, work ceaselessly to loosen plaster, deteriorate paint, rust metal, stain ceilings and walls, promote fungoid growth, dampen attics and cellars, boost fuel bills, decay structural materials and ruin the effectiveness of insulation.

That's a high price to pay for neglect of the "hidden places" when the cost of permanently preventing them all with COPPERSKIN Vaporseal is so small.

What are these tiny "destroyers" and how do they operate? They are millions of invisible water vapor molecules which live in air. Warm air contains many more of them than air that is cool. Warm air migrates to cool places—walls are like a sieve to it, it goes right through — out to the cool spots in hidden spaces, where its excess moisture condenses and turns to water. And then the damage begins, unless you prevent it. You can do this effectively with COPPERSKIN, a vapor barrier which is 100% effective.

COPPERSKIN, an exclusive Angier product, is a continuous layer of pure Electro Sheet Copper inseparably bonded to non-deteriorating BROWNSKIN, the waterproof Sheathing Paper that S-T-R-E-T-C-H-E-S. This "stretch" gives and takes as the opposite copper surface expands, contracts or is bent one way or the other.

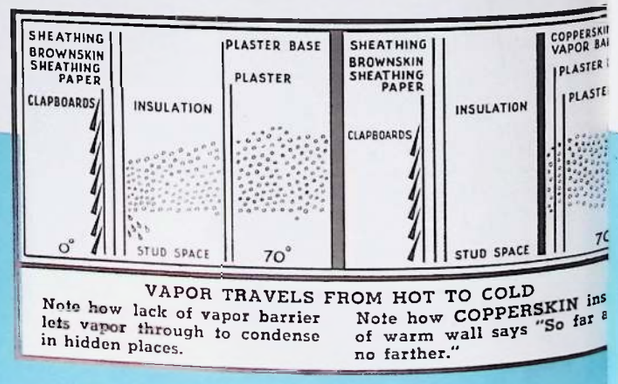
Easy to fold, form or solder, COPPERSKIN will not kink or tear. It has most of the advantages of heavy copper at one-fifth the cost. As long as any type of building stands, COPPERSKIN will insure the safety of its hidden vitals. *Include it in your plans.*

PAY 15% FOR PERMANENT PROTECTION

Cost Aircondition System (Average House)	$700.
Cost of Insulating Material	300.
	$1,000.
Cost of COPPERSKIN Vaporseal (15% of $1,000.) . .	150.

★

For that much more you can "be sure" as long as your home lasts. It's low cost insurance.



VAPOR TRAVELS FROM HOT TO COLD

Note how lack of vapor barrier lets vapor through to condense in hidden places.

Note how COPPERSKIN ins of warm wall says "So far no farther."

Where and How to install Copperskin

1 SILL DAMPPROOFING AND TERMITE SHIELD

Use COPPERSKIN over the wall foundations to prevent the passage of water and moisture into the wooden sills. This keeps them from rotting. Extend COPPERSKIN out from the wall at least two inches as a barrier to termites seeking to enter the wood above.

2 WATERPROOFING BASEMENT WALLS AND FLOORS

COPPERSKIN applied on the outside of foundation wall and over the cement floor stops seepage of water and moisture into the floors and foundation. When laid over a rough floor, it should be lapped two inches and soldered.

3 SPANDREL THRU-WALL FLASHING

In constructions where a spandrel is used, it should be protected against Corrosion. This is vitally important. COPPERSKIN makes this protection permanent because copper itself is permanent.

4 FLASHING AROUND WINDOWS AND DOORS

To permanently stop the infiltration of air, moisture and water around all openings, flash them with COPPERSKIN. Use COPPERSKIN for (A) window head flashing and dry pan in brick veneer construction — for (B) window and door flashings — and for (C) window sill and drip pan.

5 EAVES AND CONCEALED RIDGE FLASHING

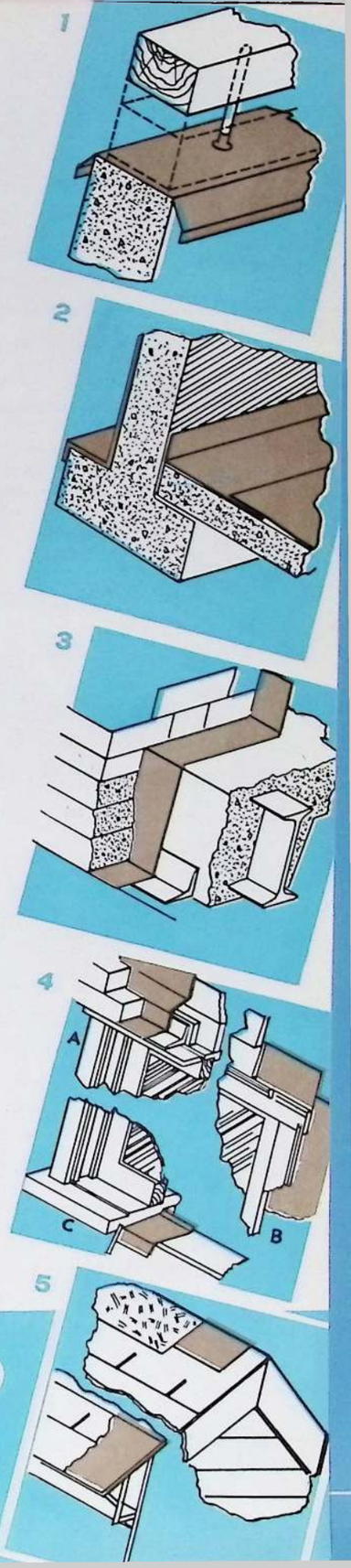
The two most vulnerable spots in roof construction are the ridge and the eaves. COPPERSKIN along the ridge protects it permanently. If it is run two feet up from the eaves, water won't seep up under the shingles and work down from there into the walls and ceilings.

SPECIFICATIONS

All exterior rough boarding on side walls, roof and elsewhere, as shown in sketches, shall be covered with COPPERSKIN, laid Copper side up. Lap courses and ends at least two inches and fasten with copper nails. Before sheathing paper is applied, flash windows, doors and all exterior openings with strips of COPPERSKIN 8½" wide.

COPPERSKIN is supplied in standard rolls 30" x 120 lineal feet (300 sq. ft.). Also in special widths that cut without waste from 30" or 60" rolls. There are three grades:

TYPE 11 — 1 oz. Copper combined with 1-ply BROWNSKIN.
TYPE 22 — 2 oz. Copper combined with 2-ply BROWNSKIN.
TYPE 33 — 3 oz. Copper combined with 3-ply BROWNSKIN.



WHY KEEP INSULATION *Dry?*

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DRY INSULATION IS A MUST

Air conditioning engineers are agreed that one of the most vital aims of modern construction is to prevent moisture from reaching the insulation.

If the vapor in the humid air that passes through the warm, inner wall of a house, as it always does, is permitted to reach the cooler spaces where your insulation is located — and condense there — the insulation will become damp, soggy, and cease to function properly.

Your insulation is no better than its protection. With COPPERSKIN it will enjoy 100% Vaporsealing protection during the entire life of your home.

NOTE — In studying sketches at right, please keep in mind that when there is a space between the insulation and the COPPERSKIN the copper side of the latter should face away from the room. When fill-type insulation is used the copper side should face towards the room.

OTHER "BEST BETS" FOR BUILDING

BROWNSKIN VAPORSEAL — *Second Best for Vaporsealing*

Protects all kinds of insulation. While it gives protection against the penetration of water vapor to a slightly lesser degree than COPPERSKIN, yet its effectiveness is so great that it is entirely practical for most vaporsealing purposes. Like all grades of BROWNSKIN it is creped to S-T-R-E-T-C-H.

BROWNSKIN — *Best for Sheathing*

Its S-T-R-E-T-C-H sets it apart from ordinary sheathing papers, as does also its special treatment against deterioration, passage of water or moisture. There is no sheathing paper like it. As long as a building lasts, so will non-deteriorating BROWNSKIN.

ECONOMY BROWNSKIN — *Best for Flooring*

One side is crinkled BROWNSKIN, the other smooth, flat kraft. Between flooring, the BROWSKIN side goes down against the rough boards. Also unexcelled as a protector of the upper surfaces of finished floors in rooms where men are still working. Here the BROWNSKIN side goes up, its crinkled surface providing non-slipping grips for the feet.

ECONOMY BROWNSKIN REINFORCED — *Best for Extra Strength*

Similar to ECONOMY BROWNSKIN, but with the addition of crossed reinforcing fibers between the laminated sheets for greater strength. A durable, all-purpose waterproof building paper, especially useful for temporary partitions, coverings, and the protection of all types of floors during construction.

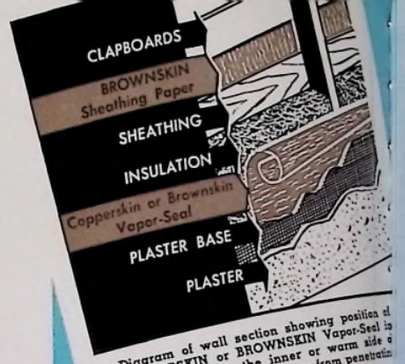
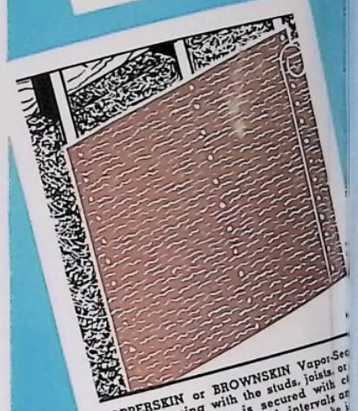
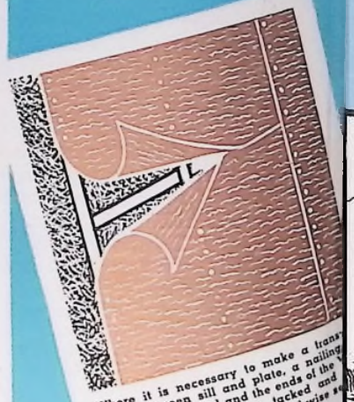


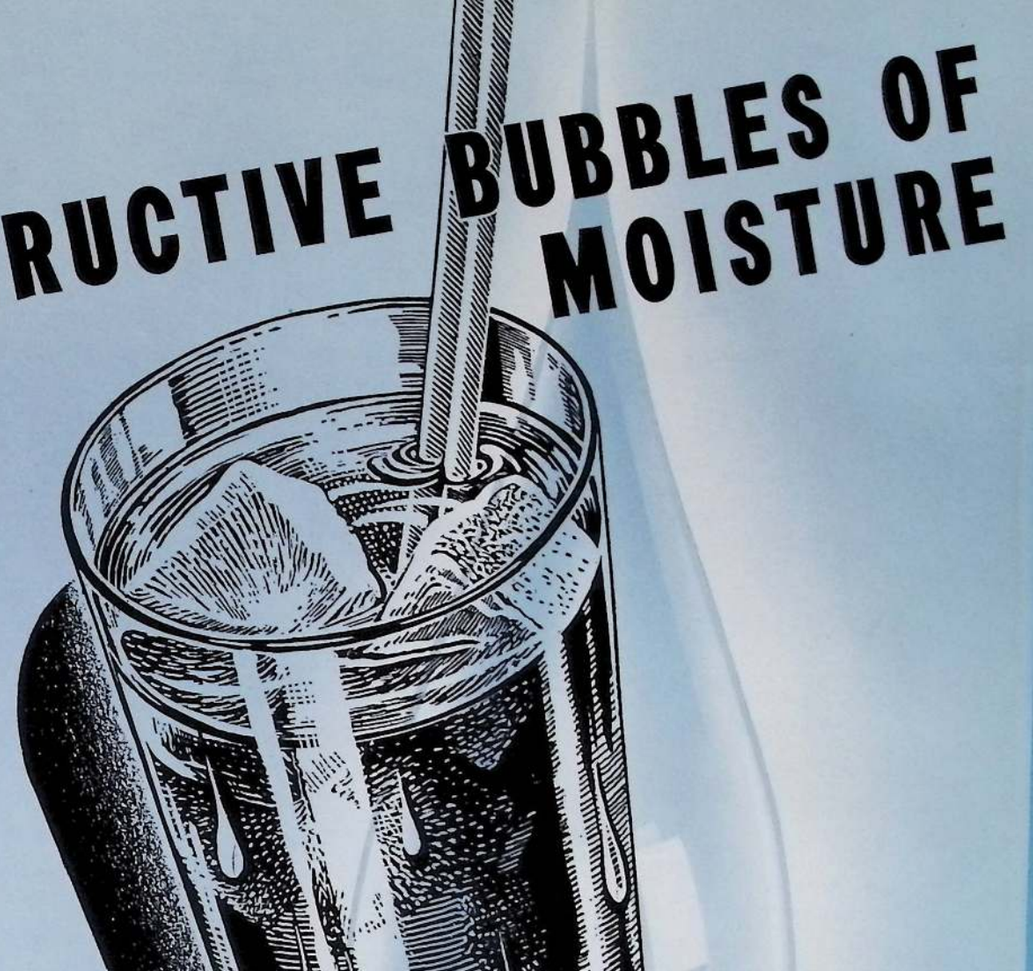
Diagram of wall section showing position of COPPERSKIN or BROWNSKIN Vapor-Seal in the section — on the inner or warm side of the wall, preventing moisture from penetrating into the cold space between walls.



COPPERSKIN or BROWNSKIN Vapor-Seal applied running with the studs, joists, or rafters. The 2-inch lap is secured with closely spaced tacks at approximate 2-inch intervals and the seam is wiped with a mastic to make it completely tight.



Where it is necessary to make a transverse seam between sill and plate, a nailing flange should be provided and the ends of the Vapor-Seal lapped two inches, tacked and sealed with mastic as is done on lengthwise seams.



ANGIER CORPORATION

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YOUR INSULATION IS NO BETTER THAN ITS PROTECTION



WHY does the outside of a cold glass of liquid drip? Because, as everybody knows, air contains moisture, but cool air holds less of it than warm air. So when warm air near the glass touches it and cools, its excess moisture condenses and turns to water.

And that's what happens when warm, humid air passes through a wall and comes in contact with cooler surfaces — where your *insulation* is located. Then paint deteriorates, plaster loosens, walls stain, wood structure decays, insulation becomes damp, soggy and ceases to function properly.

Or, rather, that's what happens unless you keep the moisture-laden warm air away from your insulation — by adequately and permanently *vaporsealing* it.

★ ★ ★ ★

AIR conditioning and construction engineers are agreed that one of the most vital aims of modern building will be to prevent moisture from reaching the insulation which will be an essential part of the better post-war homes.

Insulation is hidden between walls. Therefore, you cannot see it, or check up on it, after construction is completed. If the vaporsealing material breaks or falls apart through deterioration, thus letting moisture intrude, you pay. When you find it out, usually after much interior damage is done, considerable tearing down of structure to make repairs is necessary. That's costly in more ways than one.

In considering what kind of vaporseal to use, too much emphasis cannot be placed upon the importance of selecting a material that's creped to S-T-R-E-T-C-H — that absorbs, without rupture, the stresses and strains of structural settling and shrinkage, due to temperature changes and other causes.

You can depend upon BROWNSKIN VAPORSEAL (BVS) to do this — because it S-T-R-E-T-C-H-E-S. And in addition, before they are bonded together with a continuous asphalt seal, the kraft paper sheets from which BVS is made are thoroughly impregnated with asphalt to resist deterioration. Consequently, BVS will not rot away and fall apart.

With BROWNSKIN VAPORSEAL on the warm side of your insulation, and with the cold side protected by BROWNSKIN Sheathing Paper, which permits *breathing*, ideal dry conditions will be maintained, and your insulation will continue to function indefinitely at maximum efficiency.

BROWNSKIN VAPORSEAL is practically impervious to the passage of vapor. Both papers are absolutely waterproof. Both S-T-R-E-T-C-H. Both are treated to resist vermin and fungus. Neither will deteriorate. When properly installed they are guaranteed for the life of the building. *Include them in your plans.*

BROWNSKIN VAPORSEAL • BVS

how to install . . See Three Sketches on Right

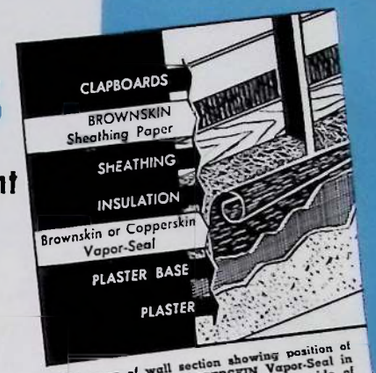


Diagram of wall section showing position of BROWNSKIN or COPPERSKIN Vapor-Seal in the section — on the inner or warm side of the wall, preventing moisture from penetrating into the cold space between walls.

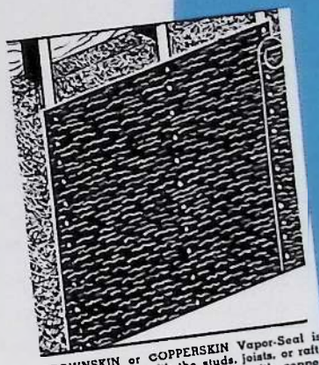
INSTALL it vertically, so as to form a complete seal around the *warm* side of insulation. All laps should be at least 4" and sealed. At corners and angles, cement laps with asphalt emulsion.

When used over sheathing, or between sheathing and rigid insulation, BVS may be placed horizontally and lapped. In applying over ceiling joists, you lap, cement and finish with 1" x 2" wood strips. Where existing floor sheathing is on top of ceiling joists, apply BVS to its *under* side, extend around joists and use lath to keep in place.

When wall, floor and ceiling are wood finish, the BVS should be continuous, extending over the existing floor under wall plates, up *warm* side of wall and over ceiling. This provides a thorough seal at all intersections.

In masonry construction, on *warm* side of insulation, apply BVS vertically over a finish coat of asphalt emulsion, lap and cement. When masonry walls have tile finish, apply BVS over primer and asphalt emulsion on inside face of brick wall. If wall is double tile, apply BVS over primer and emulsion, lap and cement. Do the same with plaster walls having steel studs. With plaster wall and concrete floor, BVS is continued under wall plate and up exterior face of wall, being lapped on the studding.

To insure an especially tight job, an extra 36" wide strip of BVS may be applied lengthwise on all corners and angles. Be sure to seal with BVS and asphalt emulsion around all openings made in the vapor barrier for pipes, electrical conduits, etc.



BROWNSKIN or COPPERSKIN Vapor-Seal is applied running with the studs, joists, or rafters. The 2-inch lap is secured with copper tacks at approximate 2-inch intervals and the seam is wiped with a mastic to make it completely tight.



Where it is necessary to make a transverse seam between sill and plate, a nailing strip should be provided and the ends of the Vapor-Seal lapped two inches, tacked and wiped with mastic as is done on lengthwise seams.

Three Sketches Below Show BROWNSKIN — The Waterproof Sheathing Paper that S-T-R-E-T-C-H-E-S



WNSKIN outside rough boarding cuts down by eliminating wind penetration. A second between studs and plaster base forms a sealed dead air space.



BROWNSKIN has no equal except COPPERSKIN as a protective sheathing for side walls under wood finishes, stucco or brick veneer. BROWNSKIN will last the life of the house.



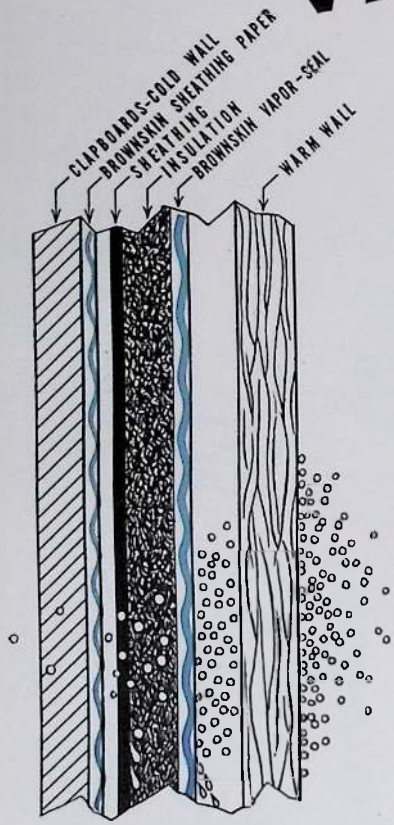
FLASHING — Use BROWNSKIN in narrow strips (approximately 10" wide) around all window and door openings to stop moisture, dust and air infiltration.

ALSO MANUFACTURERS OF COPPERSKIN VAPORSEAL ★ samples and information sent upon request

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THE UNTIMELY END OF VAPOR THE VILLAIN



VAPOR MOVES FROM WARM TO COLD

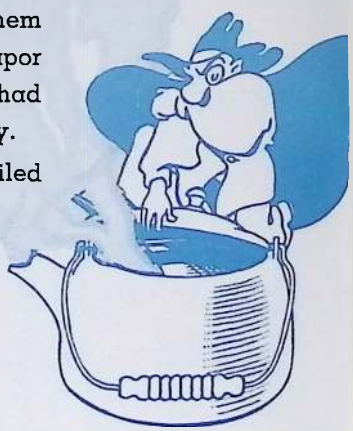
"LET'S get away from here," growled Vapor the Villain to his pals. "Here in this hot, humid atmosphere we're invisible and about the worst damage we can do is to make folks sweat."

"Right," cried a fellow Villain. "We were water once and we can be water again. Come on, Gang, let's go through this wall and attack Mr. Insulation. He's in a cool spot where we'll all turn back to water and give him a good soaking."

Through the wall they went, millions of these grim little gremlins of discomfort and destruction, headed straight for Mr. Insulation — to wet him down, make him soggy-groggy, ruin his power to insulate.

But they got the surprise of their lives. They passed through the wall easily — as they always do — but then all but a small percentage of them bumped blindly and piled up against the vapor barrier line of defense which the wise owner had installed to protect his Insulation permanently.

"Curses," they groaned, "we're foiled — foiled by BROWNSKIN VAPORSEAL."



PUT YOUR VAPORSEAL PROBLEMS UP TO ANGIER ENGINEERS

Angier

ANGIER CORPORATION

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A new and more beautiful

JOHNS-MANVILLE INSULATING BOARD

BUILDING MATERIAL FOR DECORATIVE WALLS AND CEILINGS

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from pinforest to your home

...THE STORY OF J-M INSULATING BOARD, THE IMPROVED WOOD-FIBRE BOARD THAT BUILDS, DECORATES, INSULATES

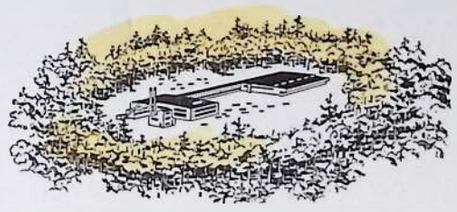
From the pine forests of Virginia come the tough wood fibres which are processed into one of the most practical, economical and versatile of modern building materials for the home—Johns-Manville Insulating Board.

Copyright 1944 by Johns-Manville Corporation

One of the most important contributions of the building materials industry in recent years is the development of the product which we call insulating board. In its original form, however, it was a material of somewhat limited uses. As perfected by Johns-Manville after years of experimentation and research, it has today become one of the most versatile and widely used of all structural building materials.

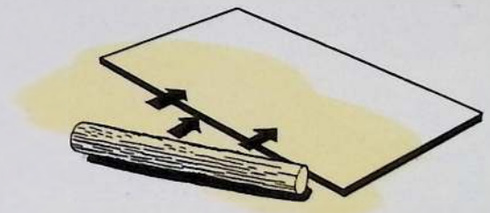


Early recognizing the values and virtues of an all-wood product, Johns-Manville engineers selected pine fibres as the basic material with which to manufacture this improved Insulating Board. To insure a constant supply of quality fibres, a tract of pine



forest was purchased and a factory was built at a cost of over a million dollars at Jarratt, Va.—literally in the heart of the forest itself. Here, through a remarkable process of manufacture, the long tough pine fibres are processed into a homogeneous board made to any desired size—a structural building material that improves on mother nature herself.

An interesting insight into the details of this process is the fact that a pine log 6½ feet long and only 6 inches in diameter can be made into a strong structural board 8 feet long and 4 feet wide.



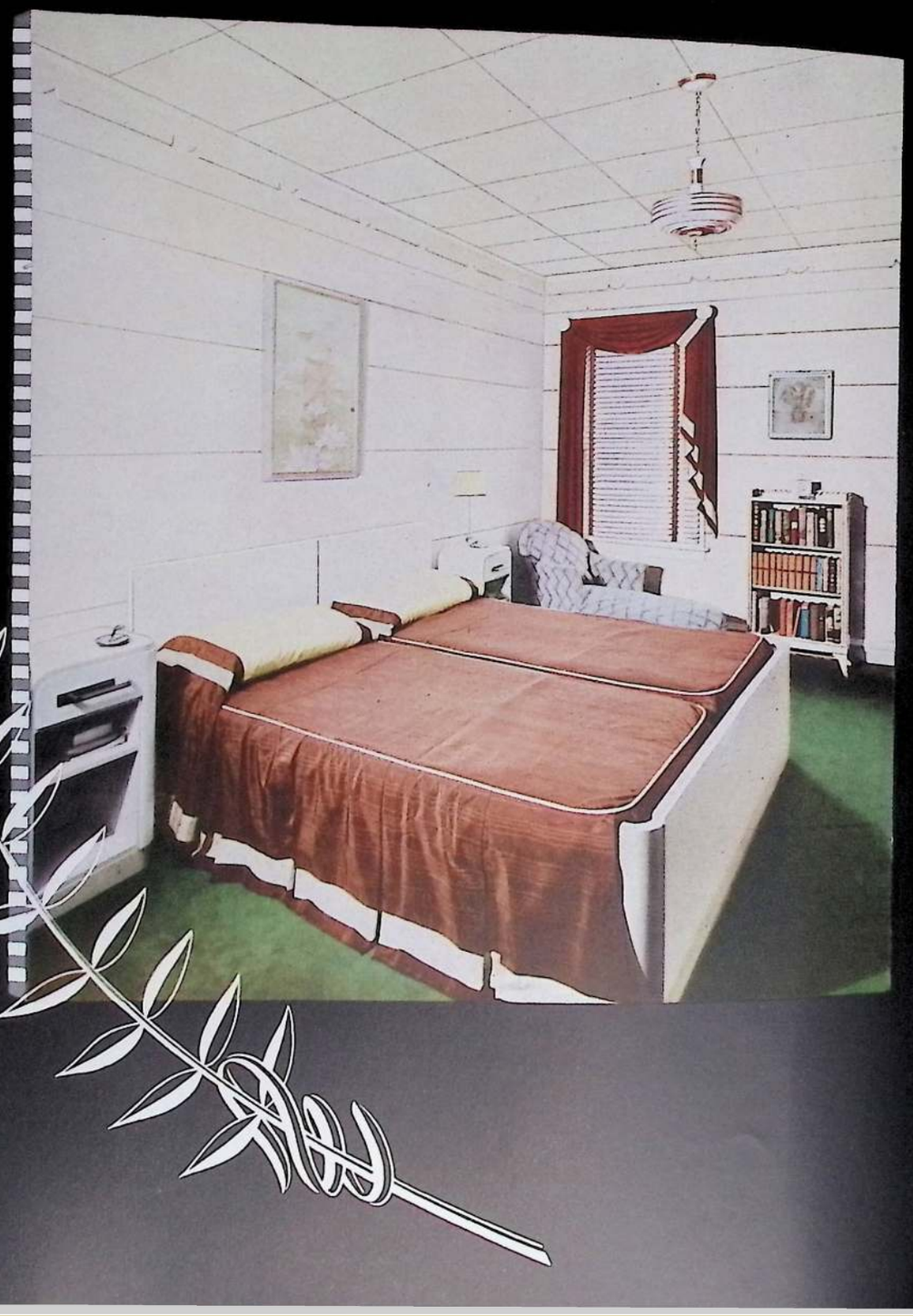
In addition to its inherent qualities as a structural building material with a remarkable degree of insulating efficiency, J-M Insulating Board provides one of the most versatile and practical of interior finishes for the walls and ceilings of both new and existing homes and other buildings. Refinements in finish, the development of beautiful new pastel colors, and a new method of application that contributes both to economy and beauty in the finished job are features which make J-M Insulating Board one of the marvels of modern industrial research.



The illustrations on the following pages of this brochure indicate a few of the many possibilities for achieving beautiful interiors at low cost with Johns-Manville Insulating Board—the improved wood fibre board that builds, decorates, insulates.

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BEAUTIFUL INTERIORS easily achieved with JOHNS-MANVILLE DECORATIVE INSULATING BOARD



STRIKING A COLORFUL NEW NOTE IN WALL AND CEILING TREATMENT...

J-M Bevel Panels

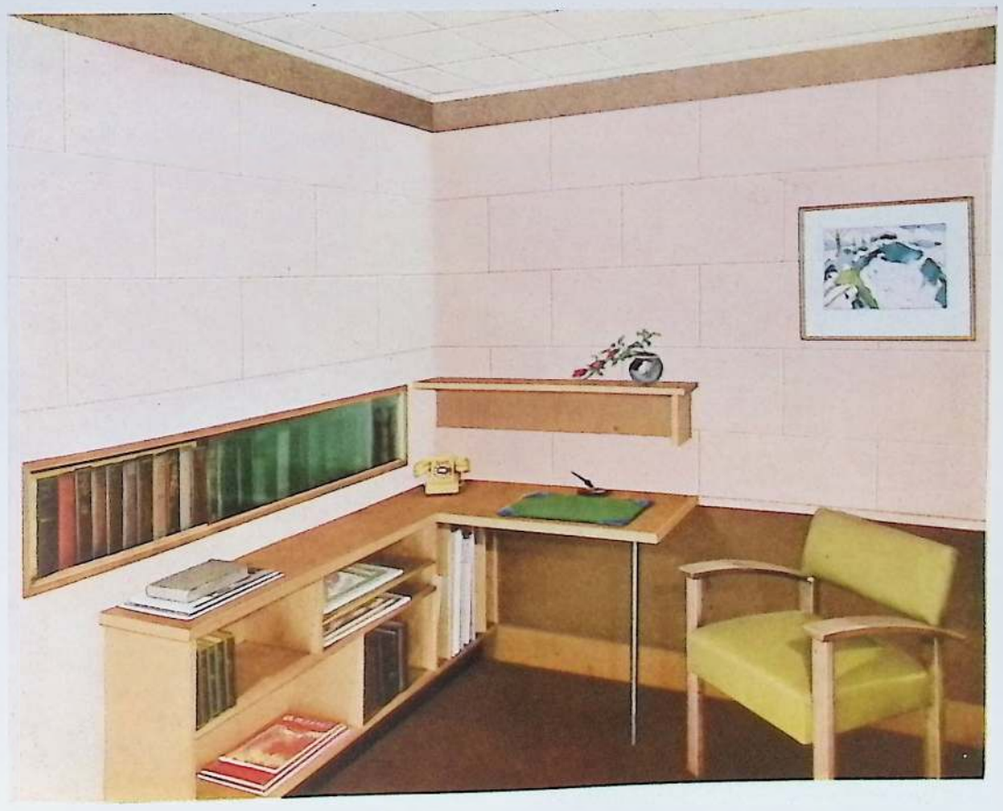
These beautifully colored, ready-finished and ready-cut panels of J-M Insulating Board open up many new and interesting opportunities for decorative wall and ceiling treatments.

Their smooth Glazecoat surface is both durable and cleanable. Their handsome colors offer many possibilities for the creation of smart decorative interiors. Easy to handle and apply, yet strong and rigid, they are equally well adapted for re-decorating over old surfaces, for the building of extra rooms in attics or basements or for finishing off walls and ceilings throughout a new building.

In common with the other forms of Johns-Manville Insulating Board described in this book, Bevel Panels simplify the problems of interior decoration to a remarkable degree. When refinishing over old walls or ceilings, it is not even necessary that the furniture be moved out of the room! The panels are simply fastened to furring strips right over the old surfaces. Once they are in place, the room is immediately ready for use.

Bevel Panels are provided with the improved new Lightning Joint—a feature which not only speeds up application, but offers the important advantage of concealed nailing. A wall or ceiling built with these attractive panels does not have a single exposed nailhead to mar its beauty!

An interesting wall treatment achieved with J-M Bevel Panels. The contrasting moulding and dado are of Hard Board.



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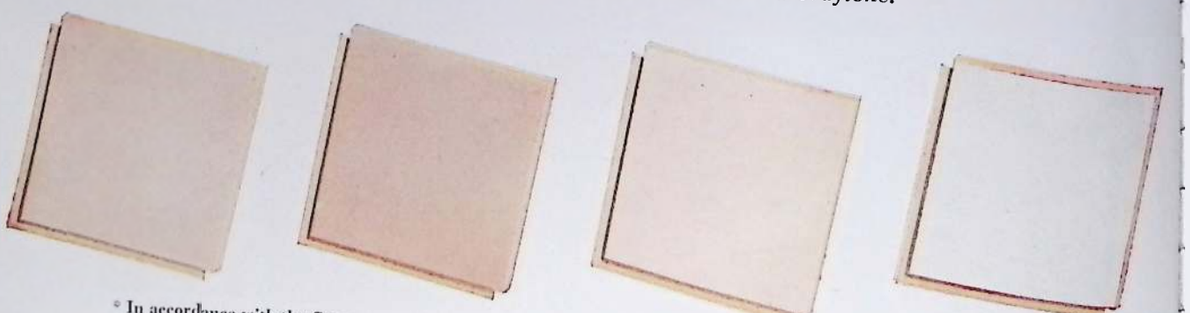


To permit the design of a suitable decorative scheme for any size room, Bevel Panels are furnished in a variety of sizes ranging from 12″x 12″ to 16″x 32″ for each individual unit. Each size is available in four beautiful colors — Ivory, White, Rose Tan and Graytone,* as reproduced below. These soft, harmonizing tones may be used either singly or in combination to create interesting effects, as shown in the ceiling above.

Like all J-M Insulating Board products, J-M Bevel Panels insulate as they build and decorate. Rooms are cooler and more comfortable in summer, warmer and easier to heat in winter.

DIMENSIONS, COLORS AND FINISH OF BEVEL PANELS
Sizes: 12″x12″, 16″x16″, 16″x32″ · Thickness: ½″ · Colors: Ivory, White, Rose Tan, Graytone* · Finish: Improved Glazecoat

BELOW: *The four colors of J-M Bevel Panels are Graytone, Rose Tan, Ivory and White*. Bevel Plank (see page 8) is furnished in Ivory, Rose Tan and Graytone.*



* In accordance with the Government's simplification program, we have temporarily discontinued manufacturing the J-M Panels in Rose Tan and Graytone.

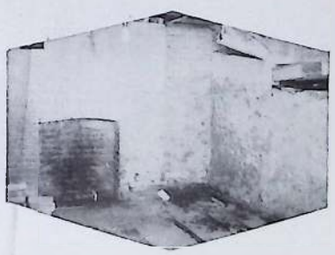
HOW J-M INSULATING BOARD ENDS THE PROBLEM OF CRACKED CEILINGS



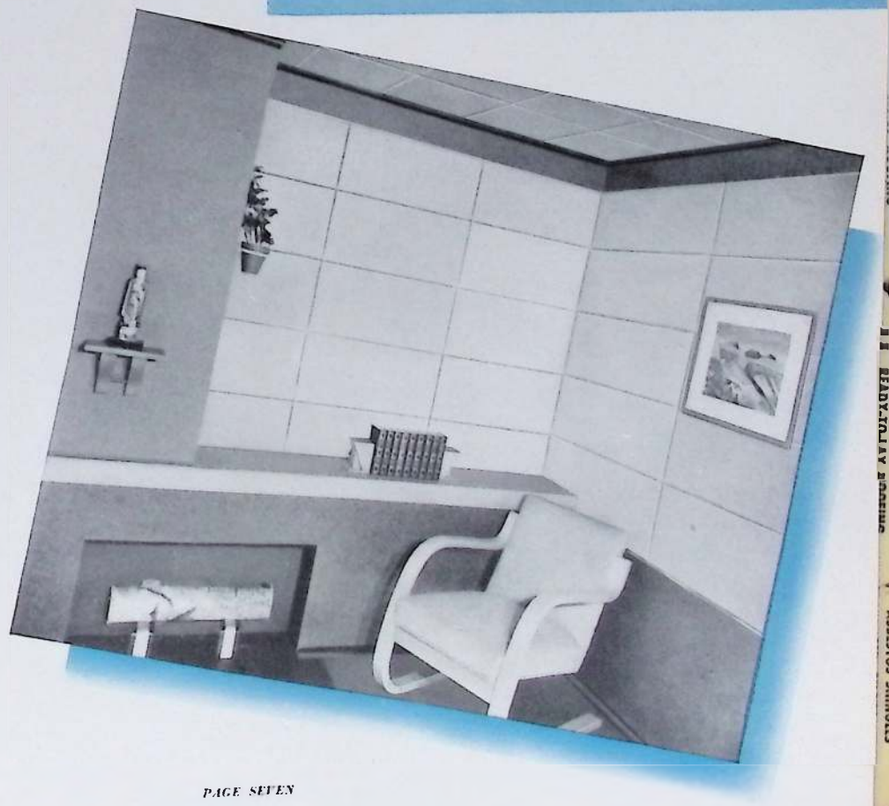


Do you have an unsightly cracked plaster ceiling in your home? Then you'll be glad to learn of this simple, inexpensive remedy. Just apply Johns-Manville Insulating Board Bevel Panels to wood furring strips nailed over the old plaster, as shown at left. The cost is amazingly low—and, if the room is of average size, it will be ready for use again within a day after the work is started.

NEW ROOMS FOR OLD...



Unsightly walls are no more of a problem than cracked ceilings with J-M Insulating Board Bevel Panels or Planks. Rooms may be completely "done over" in a remarkably short time and without even removing the furniture! The modern study at the right suggests how attractively an old room may be re-decorated with these convenient, ready-to-apply units.



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ONE OF THE MOST DISTINCTIVE OF MODERN WALL TREATMENTS

J-M Bevel Plank

These handsome J-M Insulating Board units, designed for finished wall treatments, come in three beautiful pastel colors: Rose Tan, Graytone and Ivory. Created by a noted interior designer and color expert, these colors provide attractive backgrounds when used either singly or combined, and have the high light-reflecting values so important in an interior finish. They permit an almost unlimited variety of wall treatments that are suitable for any size or type of room.

Another interesting feature of this material is the fact that planks may be applied either vertically or horizontally. Applied vertically in random widths, they simulate the appearance of Early American painted paneling, at the same time helping to create the illusion of additional height in a room. Applied horizontally, they form a wall which makes a perfect background for a modern interior and also helps to achieve the desirable effect of making a small room look wider and longer.

To provide contrast, Bevel Plank is often used with a darker dado or wainscoting of Hard Board, another wood fibre board product. If desired, natural wood may be used in place of the Hard Board to produce

an effect like that shown in the living room opposite.

Possessing the same high insulating qualities as all Johns-Manville Insulating Board products, Bevel Plank makes any room warmer and less drafty in winter, cooler and more comfortable in the hottest summer weather.

No unsightly nailheads can mar the appearance of a room built with these attractive planks because they are provided with the new Lightning Joint — the exclusive J-M feature which insures speedy application and entirely eliminates exposed nails in the completed job. Bevel Planks also have the improved Glazecoat surface, which is unexcelled for smoothness, beauty and durability among insulating board finishes.

DIMENSIONS, COLORS AND FINISH OF BEVEL PLANK

Widths: 10", 12", 16"
Length: 8', 10', 12'
Thickness: ½"
Colors: Ivory, Rose Tan, Graytone
Finish: Improved Glazecoat
Packed in one color, one width and one length



Building a room with Johns-Manville Bevel Plank is simply a matter of applying the units over furring strips as shown in the photograph above. Here the random width planks are being used. Below, a corner of the finished room.





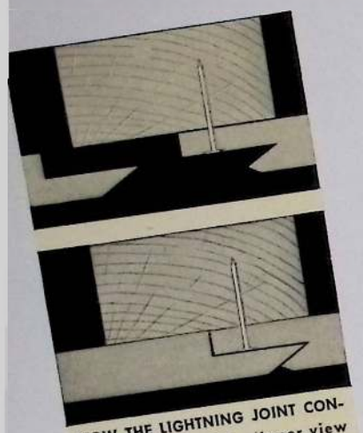
The colonial living room on the opposite page is one example of how J-M Bevel Planks in their soft pastel colors may be combined to produce wall treatments of outstanding beauty and charm. Here random width Planks of Rose Tan, Graytone and Ivory were used above a wainscoting of stained wood.

The living room at the left has Ivory Bevel Planks applied in random widths, with a ceiling of Bevel Panels, also in Ivory.

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J-M INSULATING BOARD HAS TWO IMPORTANT FEATURES

Lightning Joint



HOW THE LIGHTNING JOINT CONCEALS NAILHEADS — Upper view shows how nails are driven through the tongue into framing or furring. Lower view shows how adjacent panel fits snugly into groove and is held in place without further nailing.

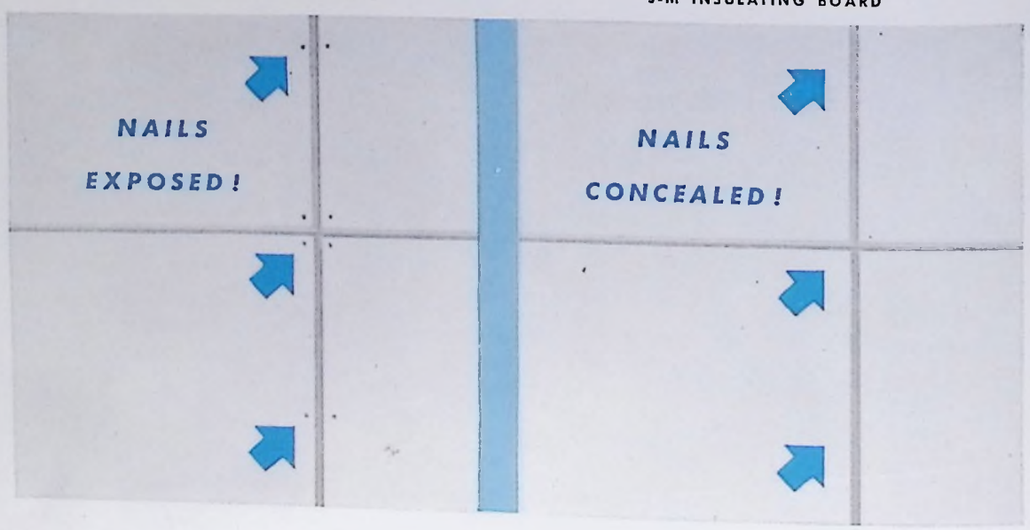
One serious objectionable feature which has heretofore marred the beauty of walls and ceilings built with wall board materials has been the presence of unsightly nail heads in the finished job. The Lightning Joint, an exclusive Johns-Manville development, now eliminates this undesirable feature! (See diagrams at the left.)

By an ingenious construction method, this new joint completely conceals the nails used during application. A glance at the photographs below will show the difference between ordinary insulating board with its ugly exposed nailing and J-M Insulating Board with its Lightning Joint that completely conceals the nails used for fastening! All J-M decorative Insulating Board units designed for wall and ceiling use (both Bevel Panels and Bevel Planks) are now provided with this important improvement *at no additional cost.*

In addition to *invisible* nailing, the Lightning Joint requires *fewer* nails than ordinary methods of fastening. This saves time and reduces application costs, adding a real money-saving advantage to the many other practical features of this remarkable all-wood fibre board.

Compare

ORDINARY INSULATING BOARD — J-M INSULATING BOARD



Glazecoat Surface

The improved "Glazecoat" finish of Johns-Manville Insulating Board represents a real achievement in wall board manufacture. Developed after a thorough study of the shortcomings of ordinary insulating board finishes, this new finish is amazingly smooth and uniform. Compare the two unretouched photographs at the right! Note the coarse texture of the ordinary insulating board, the beautifully smooth surface of the J-M Glazecoat finish. The difference is even more striking when you compare actual samples! Is it any wonder that this improved finish is remarkably durable, has superior dirt-repellant qualities — is easier to clean and to keep clean—than any ordinary insulating board finish?

And — another important advantage — Glazecoat's smooth texture has enabled J-M to offer an insulating board in lovely new pastel colors—colors which would have been impractical with former types of finishes. Selected by a noted authority on interior decoration, these delicate new colors open up a whole new field of possibilities for the use of Johns-Manville Insulating Board as a decorative interior finish. Color photographs of some of the beautiful effects now possible with these lovely colors are shown on the preceding pages.



THE CAMERA SHOWS THE DIFFERENCE! Note the coarse textured surface of the ordinary insulating board—then compare it with the smooth Glazecoat surface of the J-M Board in the unretouched photographs above.

Remember ...WHEN YOU BUILD OR REMODEL WITH J-M INSULATING BOARD YOU ALSO INSULATE

When you build new rooms or remodel old ones with Johns-Manville Insulating Board, you are using one of the best barriers to heat and cold in the form of a structural building material it is possible to obtain. Laboratory tests prove that the insulating value of this wood-fibre board in its standard ½" thickness is at least several times that of most building materials ordinarily used in the construction of a home.

Rooms decorated with Johns-Manville Insulating Board are, therefore, cooler in summer, warmer and freer from drafts in winter. This is especially true of second floor and attic rooms and those having outside walls which are directly exposed to the weather.

You pay no more for this valuable "plus" feature of J-M Insulating Board—but it is one that will mean increased comfort to you and your family, plus real economy in the operation of your heating system.

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Finished rooms CAN BE BUILT LIKE

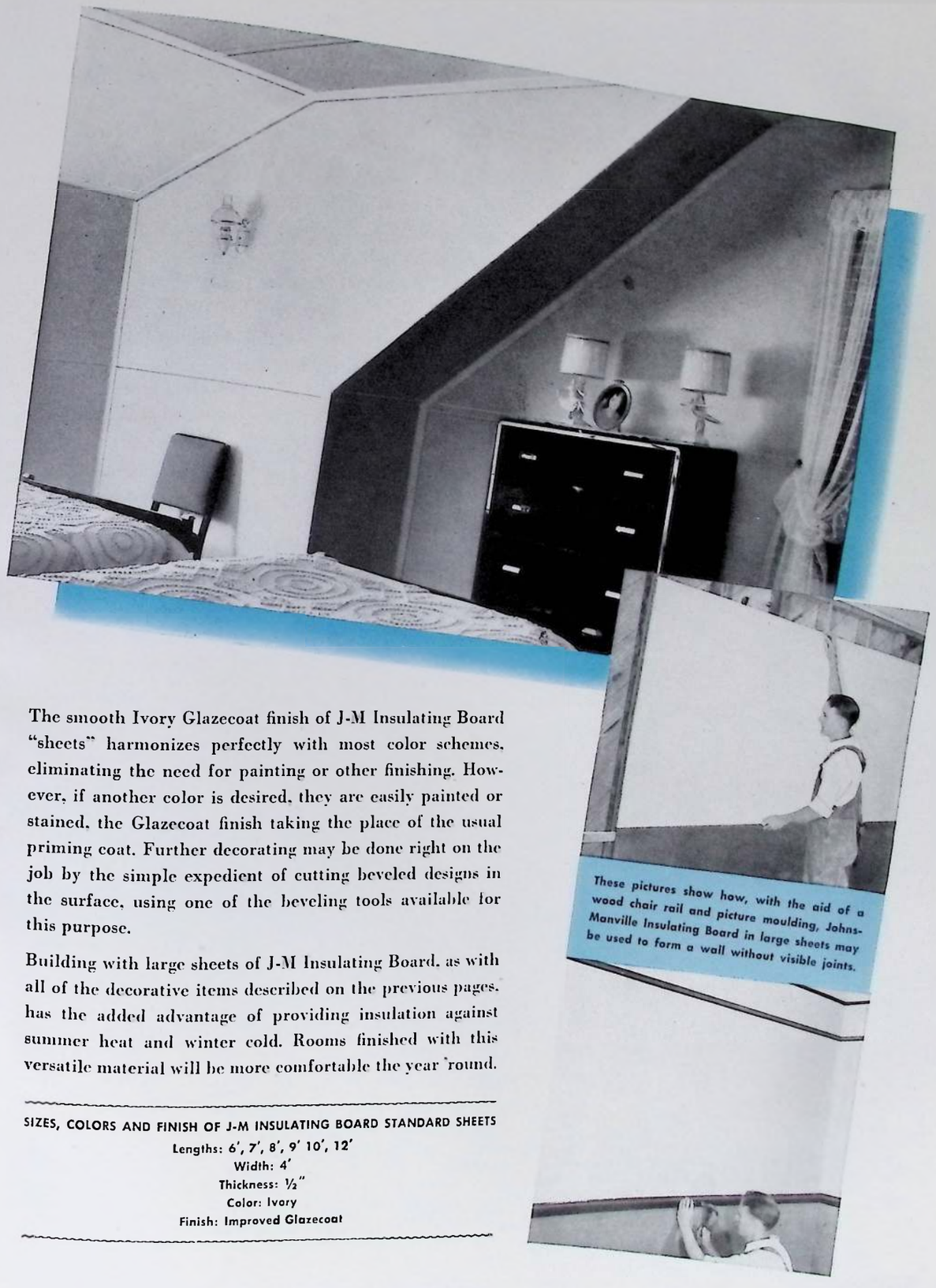
MAGIC WITH LARGE SHEETS OF J-M INSULATING BOARD

Anyone who has ever built an extra room in the attic or basement with Johns-Manville Insulating Board in its familiar "sheet" form knows that it is one of the easiest of all interior building materials to apply. Panels 4 feet wide and up to 12 feet in length permit large areas to be covered with amazing speed and economy!

Although they are widely used as a general utility interior building board, these versatile panels are equally well adapted to decorative wall and ceiling treatments. Besides making it possible to build extra rooms out of waste space at little expense, they provide a practical and inexpensive means of re-decorating over old plaster walls and ceilings, thus eliminating the necessity of re-plastering with its attendant inconvenience. The attractive bedroom shown on the facing page is one example of an old room that was "done over" with these large, easily-applied units. Where a different treatment is desired for the walls than for the ceiling, they are often used in combination with Bevel Panels or Bevel Plank, as exemplified by the large one-room apartment pictured below.

This spacious one room apartment is one example of how building and re-modeling costs may be held to a minimum through the use of large sheets of J-M Insulating Board. Note the large ceiling area covered by each individual "sheet". The walls are of Bevel Plank applied in random widths.





The smooth Ivory Glazecoat finish of J-M Insulating Board "sheets" harmonizes perfectly with most color schemes, eliminating the need for painting or other finishing. However, if another color is desired, they are easily painted or stained, the Glazecoat finish taking the place of the usual priming coat. Further decorating may be done right on the job by the simple expedient of cutting beveled designs in the surface, using one of the beveling tools available for this purpose.

Building with large sheets of J-M Insulating Board, as with all of the decorative items described on the previous pages, has the added advantage of providing insulation against summer heat and winter cold. Rooms finished with this versatile material will be more comfortable the year 'round.

SIZES, COLORS AND FINISH OF J-M INSULATING BOARD STANDARD SHEETS

Lengths: 6', 7', 8', 9' 10', 12'
Width: 4'
Thickness: ½"
Color: Ivory
Finish: Improved Glazecoat

These pictures show how, with the aid of a wood chair rail and picture moulding, Johns-Manville Insulating Board in large sheets may be used to form a wall without visible joints.

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J-M Insulating Lath

.....A BETTER PLASTER BASE AND AN EFFICIENT INSULATION IN ONE MATERIAL!



No one likes unsightly cracked plaster walls and ceilings. No one wants ugly-looking "lath marks" either.

You can minimize the hazard of the former and completely eliminate the latter of these two common evils by using J-M Insulating Lath as the plaster base in your new home.

This Johns-Manville Insulating Board product provides a much stronger and more effective bond for plaster than the key on key-type lath. Cracking is thus reduced to a minimum. Furthermore, since the plaster is applied against a solid, unbroken surface, lath marks are eliminated, the plaster goes on easier and there is a desirable saving in material and labor.

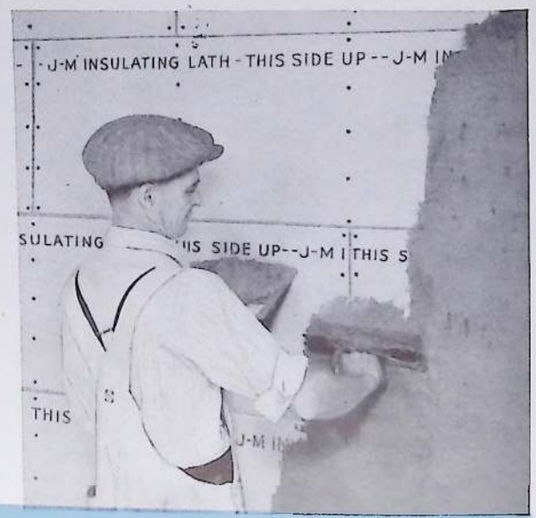
And the fact that J-M Insulating Lath also provides increased insulating value at no extra cost is another reason why more and more modern homes are being built with this improved plaster base.

SPECIFICATIONS OF J-M INSULATING LATH
Size: 18"x 48" • Thickness: ½" • Joint: Bevel and shiplap

ABOVE: *Use J-M Insulating Board on both sides of the exterior walls of your new house! When you insist on J-M Insulating Lath and J-M Weathertite Sheathing (see opposite page) you not only get superior materials for these important parts of your house—you get a double thickness of structural insulation as well, and at no extra cost! Builders and architects everywhere recommend this specification for sound construction.*



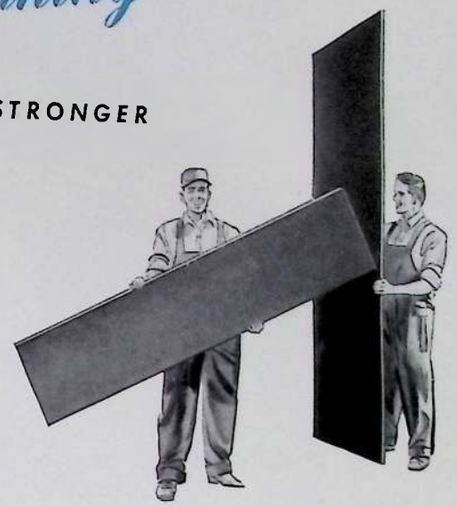
This picture shows how J-M Insulating Lath is applied to the studs in a new home. Note the large 18"x 48" units—a feature of this improved plaster base which makes for real economy of application.



The plasterer saves time too, when J-M Insulating Lath is used as the plaster base. Plaster is easier to apply—goes on quicker over its solid, unbroken surface than it does over ordinary wood lath.

J-M Weathertite Sheathing

THIS ASPHALT COVERED SHEATHING IS STRONGER ...COSTS LESS TO APPLY...INSULATES!



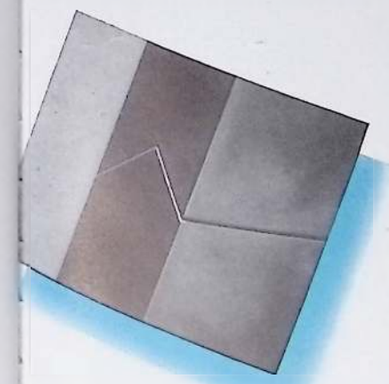
In line with the modern trend in building construction toward the use of stronger, more weather-resistant materials, J-M provides another Insulating Board product — Asphalt Covered Weathertite Sheathing.

This material offers several important advantages to the builder of a new home. Sealed with a high grade coating of black asphalt on both sides and all edges, it provides a greater measure of protection against moisture penetration, assuring a house which is virtually wind and water tight. Its superior insulating value is an advantage that means increased comfort and lower fuel bills. And because it comes in large, easy to handle units, it can be applied in about one-third the time necessary for wood sheathing!

J-M Weathertite Sheathing is available in two types. For vertical application, it is supplied in square edged sheets which provide a bracing strength equal to that of diagonal wood sheathing. For horizontal application, the sheets are provided with a "V-Tite" joint (see diagram) designed to reduce the infiltration of dirt and moisture. This type gives a bracing strength equal to horizontal sheathing. To facilitate application, the 4′ wide sheets are marked for nailing.

SPECIFICATIONS OF J-M WEATHERTITE SHEATHING

For Vertical Application	For Horizontal Application
Sizes: 4′x 8′, 4′x 8½′, 4′x 9′, 4′x 10′, 4′x 12′	Size: 2′x 8′
Thickness: 25/32"	Thickness: 25/32"
Joint: Square	Joint: V-Tite



RIGHT: *The two houses shown under construction at right are being protected against wind and moisture penetration with J-M Asphalt Covered Weathertite Sheathing. The upper house is being sheathed with the 2′ wide units designed for horizontal application: the lower house with the 4′ wide units designed for vertical application.*

LEFT: *The V-Tite Joint, a feature of J-M Asphalt Covered Weathertite Sheathing (horizontal type) which provides an effective seal against infiltration of moisture.*



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TRY THIS EASY LOW-COST WAY TO MODERNIZE *Business Interiors*

Are you faced with the problem of modernizing an out-of-date store, office or other commercial interior—quickly and inexpensively?

Johns-Manville Insulating Board provides a practical answer. The same pre-finished decorative units described on the inside pages are just as adaptable to business interiors as to homes. In their attractive colors and Glazecoat finish, these easy-to-apply materials offer many interesting possibilities. And the fact that they may be applied right over old surfaces and with a very minimum of disturbance are even more important advantages to the business man than to the home-owner.

An illustrated brochure "Modern Business Interiors" contains many helpful suggestions. Your Johns-Manville Building Materials Dealer will be glad to provide you with a free copy of this interesting book.

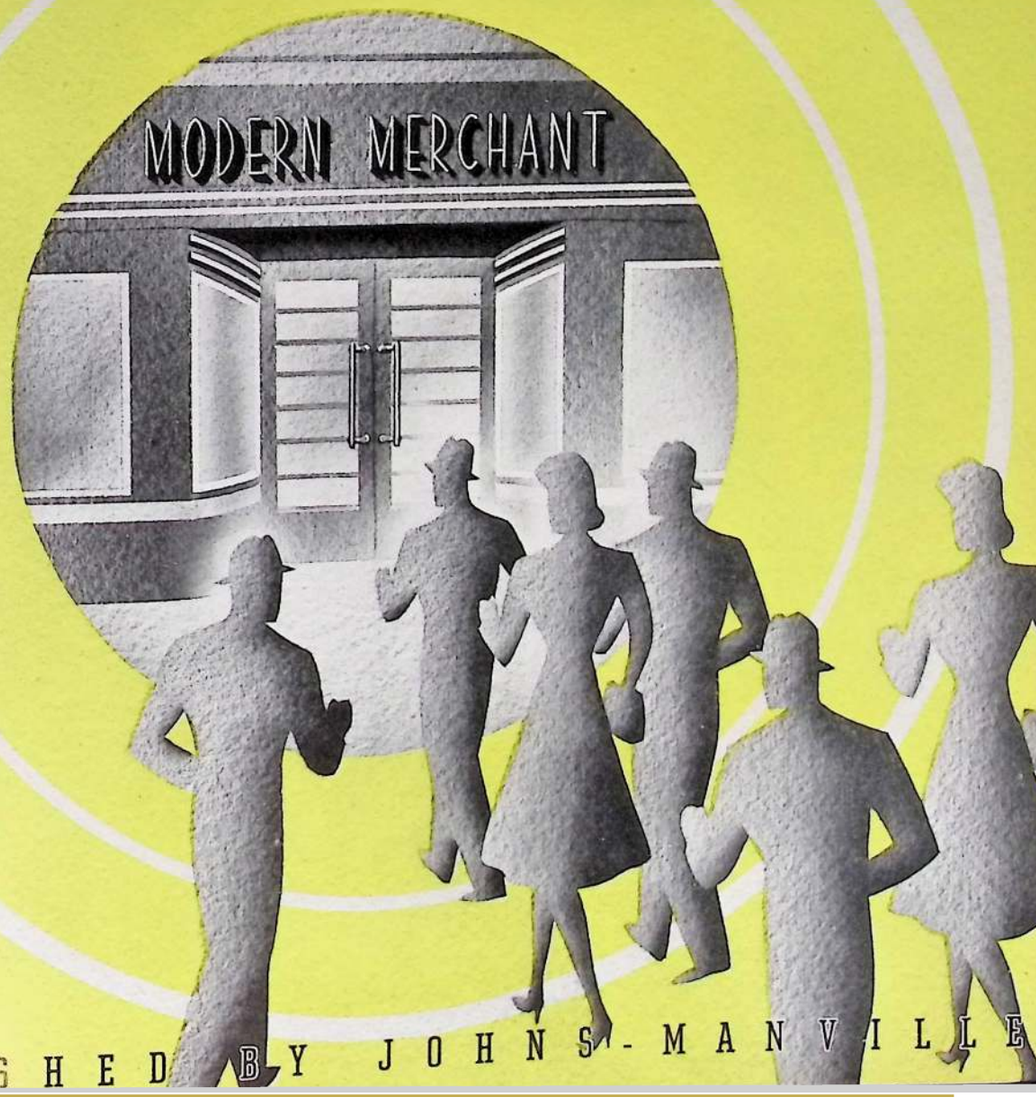


These photographs suggest some of the interesting effects possible by re-decorating with Johns-Manville Insulating Board. The attractive grill room at top has walls of J-M Bevel Plank; the modern theatre above was remodeled with Bevel Panels and large sheets of J-M Insulating Board.

Complete specifications for the application of Johns-Manville Insulating Board Products are available on request from your J-M Building Materials Dealer. Ask for Form IB-25A.

IB20A—2-45

IDEAS *for modern business interiors*

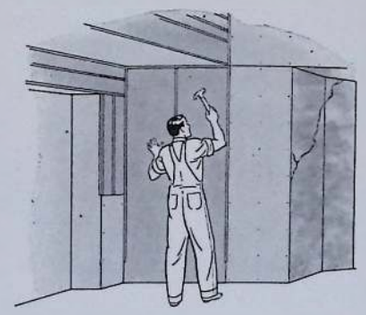


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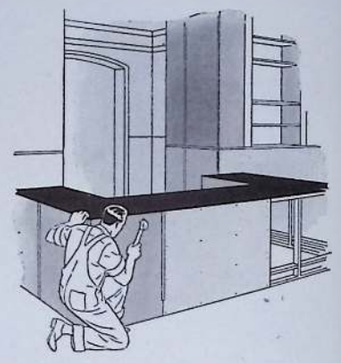
SMART INTERIORS APPLIED RIGHT OVER THE OLD WALLS



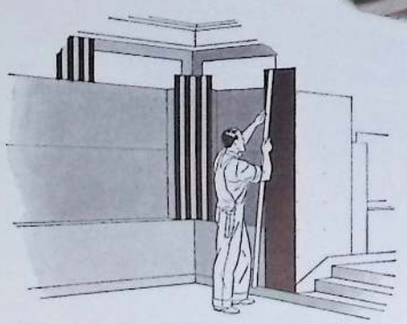


Above: Making an old store into the attractive women's shop shown at the left, by nailing sheets of J-M Decorative Asbestos Flexboard over the old walls, with decorative metal mouldings at the joints. Plywood is used under the Flexboard.

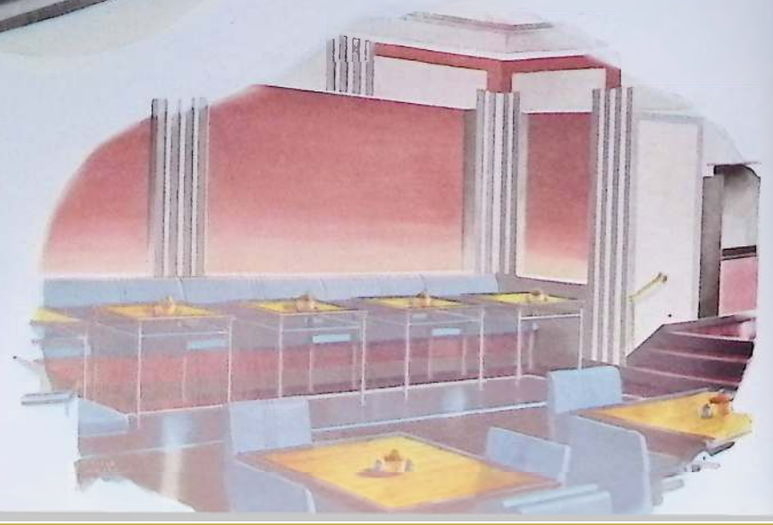




Method of constructing the appointment desk shown in the color illustration. Plywood is applied over the framing to furnish a rigid backing for the Green Asbestos Flexboard. The walls of the room are also of Decorative Flexboard in Green and Slate to harmonize.



Ultra-modern effect achieved entirely with Decorative Asbestos Flexboard in Rose, Light Gray and Slate. Vertical columns are made with strips of Gray Asbestos Flexboard applied over a background of the same material in Slate. Indirect lighting casts a pleasant glow over the warm Rose Flexboard walls.



What the well-dressed business interior will wear

"MY merchandise, my service and my location are good! How can I attract more trade?" Perhaps you are asking yourself this question.

There may be a thousand and one answers, but there is one trend in modern business and especially in neighborhood business, that might readily offer the solution to the major problem. That trend is the growing tendency toward 'style-consciousness' on the part of the public. So far as the neighborhood place of business is concerned, it all started some ten or fifteen years ago when *new* buildings and their ground floor stores went "modern." Stream-lined fixtures, futuristic designs, new materials that could be bent, molded and shaped to meet a modernistic architectural demand, all contributed to the transition.

Today the "well-dressed" place of business provides an atmosphere that is not only inviting and pleasant to the shopper, but also an interesting setting for the merchandise or services offered for sale. Stores that are veritable symphonies in color, harmony and appointments . . . restaurants with exteriors and interiors that would compare favorably with the dining salons of the most exquisite ocean liners or hotels . . . department stores . . . theatres . . . business offices . . . all have felt the influence. The wide-awake, foresighted business man has accepted this trend, not as a necessary evil, but as a long stride forward in increasing patronage and creating new desires and new consumer demands.

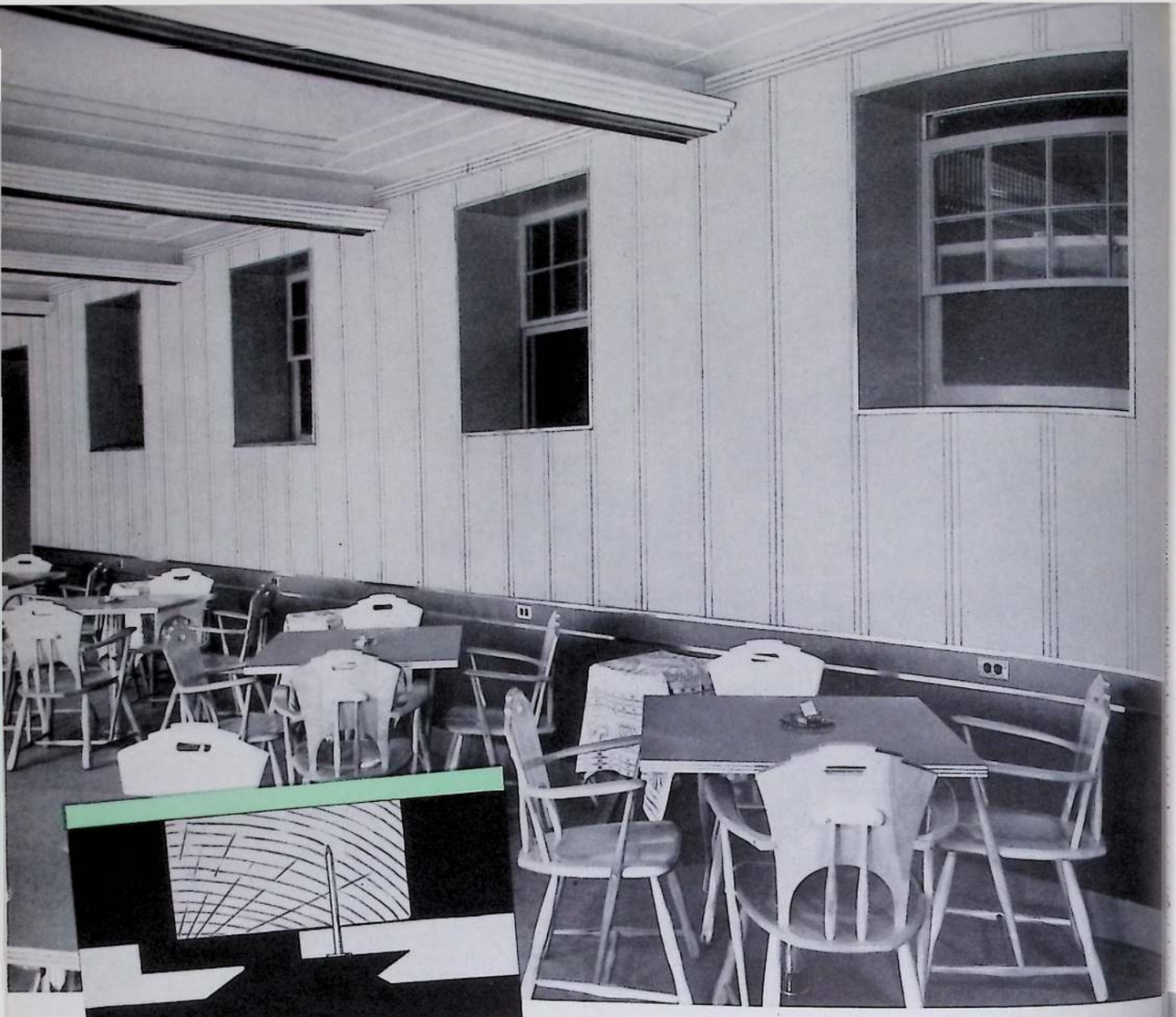
As the level of public taste has been definitely raised to higher and higher standards, the neighborhood merchant of 1940 should, if he would keep his present patronage and attract the necessary transient and new trade, give serious thought to this question of what the well-dressed business will wear. He should think in terms of better lighting, better store arrangement, better seating accommodations, better flow of store traffic, better display of merchandise, and above all, a generally improved and more attractive interior atmosphere that will make shopping a leisurely and pleasurable adventure rather than a hurried, uninteresting chore.

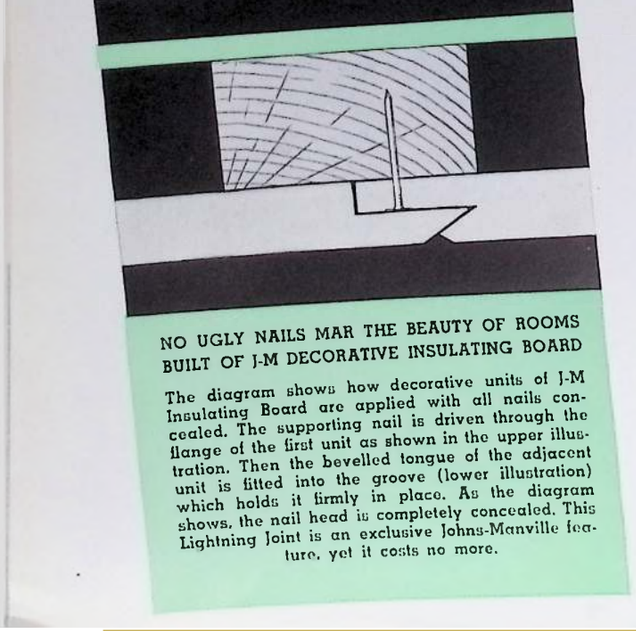
Fortunately, the materials available to-day to do this remodeling and modernization can effect the transformation quickly, economically, with a minimum of interruption to business and with such amazing and startling decorative results, that it is no longer something to be dreaded or indefinitely put off.

As you examine the illustrations on these pages, it is readily apparent that Johns-Manville materials can be adapted to a wide range of applications that are modern, decorative and sanitary, as well as extremely durable. These materials are illustrated and described on pages 18 and 19.

The following pages of this book may serve as a guide as to what others in your line of business have accomplished in 'colorful ensembles' to meet the modern competitive condition and the new conception of what the well-dressed business will wear.

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NO UGLY NAILS MAR THE BEAUTY OF ROOMS BUILT OF J-M DECORATIVE INSULATING BOARD

The diagram shows how decorative units of J-M Insulating Board are applied with all nails concealed. The supporting nail is driven through the flange of the first unit as shown in the upper illustration. Then the bevelled tongue of the adjacent unit is fitted into the groove (lower illustration) which holds it firmly in place. As the diagram shows, the nail head is completely concealed. This Lightning Joint is an exclusive Johns-Manville feature, yet it costs no more.

The walls of this attractive restaurant are Bevel Planks of Johns-Manville Insulating Board above a wainscot of J-M Hard Board. Note the rich effect obtained through the use of polished metal mouldings around the window frames and at the wainscot line. One of the outstanding features of J-M Decorative Insulating Board is that no ugly exposed nails mar its rich beauty. The J-M Lightning Joint shown in the diagram at the left conceals all nails.

Smart Interiors for the RESTAURANT • CAFETERIA TAVERN and BAR

WITH the highly competitive conditions existing in the business of catering to the public's demand for good things to eat and drink, it is vitally essential that the surroundings be as attractive, dignified and quiet as possible.

The public will continue to patronize those restaurants, cafeterias, taverns and bars where they find quality in what they order and good taste in the surroundings. Many of the best places in town are those that have been in existence for many years, but naturally with the steady march in decorative progress, the appointments of these long-established places are often outmoded. This is a problem, yet not as serious as might be imagined.

Today, old or outmoded interiors can be made as attractive, colorful and dignified as the very newest place in town. Modern, easy-to-apply Johns-Manville materials in sheet form, offer a wide range of color and design selections; they can be applied right over the old walls and ceilings in a minimum of time and with little confusion or impediment to business. Even the kitchens can be modernized with materials that are permanent and impervious to the ravages of steam, hot water and the many conditions that quickly ruin ordinary wall and ceiling finishes.



Above
The owner of this tavern, confronted with the problem of inexpensively modernizing an outmoded interior, found the ideal solution in green and rose paneled walls of J-M Decorative Flexboard, with polished metal mouldings over the joints. J-M Insulating Board Bevel Panels formed an equally modern and attractive ceiling.

Where wide floor space permits the placing of tables down the center, it is desirable to provide divisions that offer privacy. A gracefully curved, low partition, such as is shown in this sketch, effectively accomplishes this purpose and makes these otherwise less desirable tables just as inviting as any of the preferred locations. J-M Hard Board and J-M Asbestos Flexboard offer the flexibility necessary to construct durable partitions of this type with a minimum of labor.



In this formerly shabby lunchroom a few sheets of J-M Asbestos Flexboard were quickly applied by a carpenter over the old walls with J-M Decorative Ceiling Panels over the old ceiling. The interesting paneled effect on the walls was obtained by additional surface mouldings to supplement the usual joint mouldings.

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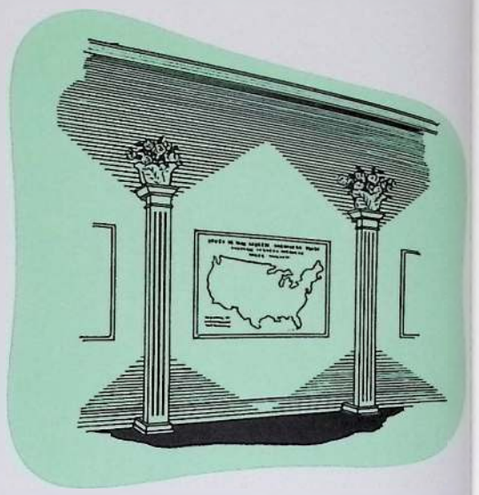


Whether it's FLOWERS, FURNITURE or AUTOMOBILES

Smart Interiors ATTRACT CUSTOMERS

IN many types of business it is often desirable to have an unobtrusive wall treatment in order to give greatest prominence to the articles on display. Products such as flowers, furniture and automobiles are of themselves attractive and colorful, and should be displayed in surroundings which allow for a full play of their natural beauty, and do not distract the customer's attention.

For these special purposes, decorators often recommend warm, buff-colored walls with a pleasing design to avoid the monotony of large, uninterrupted areas. One of the most suitable materials for this use is Johns-Manville Insulating Board Bevel Plank which is illustrated in the flower shop, the automobile showroom, and the furniture salon shown on the opposite page. In the automobile show room, large sheets of Insulating Board form the wainscot. Variety was achieved in the furniture salon by combining a wainscot of Decorative Asbestos Flexboard with the Bevel Plank on the upper walls.



Above:—Long wall areas can be pleasingly divided with wooden pilasters behind which electric lights are concealed. The side illumination will prove very effective for maps, charts or pictures mounted flat against the wall.



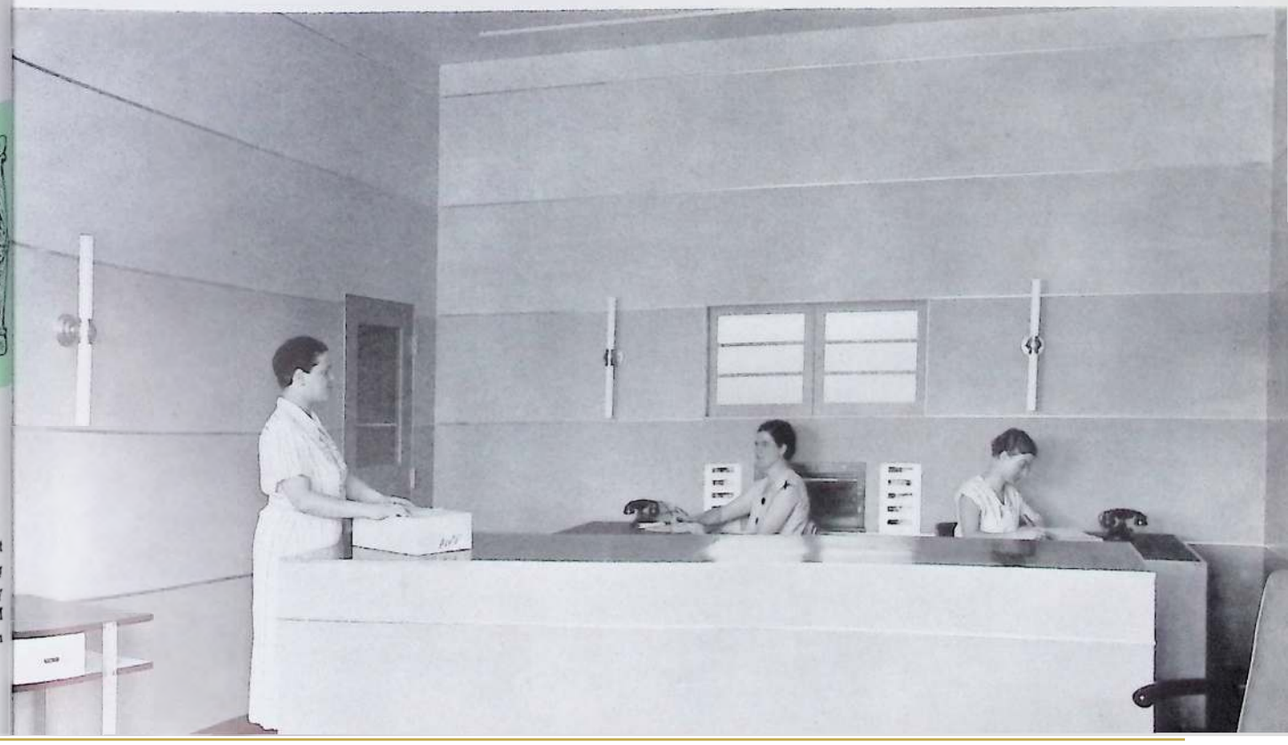
At right:—Recessed openings in the walls of a flower shop permit individual bouquets to be displayed in shadow-box fashion. The addition of a traditional picture frame gives all the effect of a painting of a brilliantly illuminated subject.

The inviting display rooms at the left are built of decorative units of Johns-Manville Insulating Board. No exposed nails can mar its lovely smooth Glazecoat surface thanks to the J-M Lightning Joint described and illustrated on page 4.



An alcove for confidential chats or for the signing of contracts is a necessity in businesses which are conducted in large rooms.

In addition to covering the entire walls and ceiling of this service room, J-M Standard Asbestos Flexboard was also used in the construction of the counter. Each band on the walls is painted a tone of blue, graduating from medium in the bottom panel to a sky-blue at the ceiling.



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The sanitary and modern appearance of the three stores on this page has been accomplished by the effective use of J-M Asbestos Wall Materials.





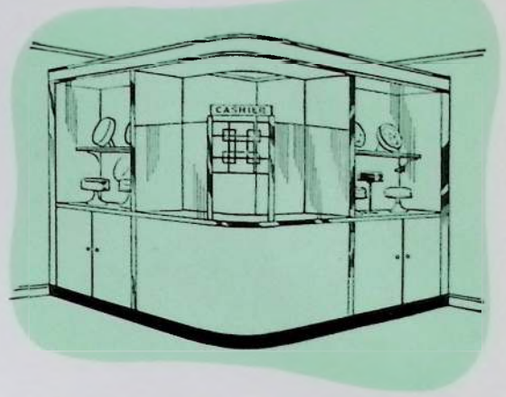
Many shop owners make better use of the cashier's spare time by having her sell small, ready-packaged articles. By placing the cash register on an island near the doorway, the cashier can readily attend to both tasks, and thus become a revenue-producing employee.



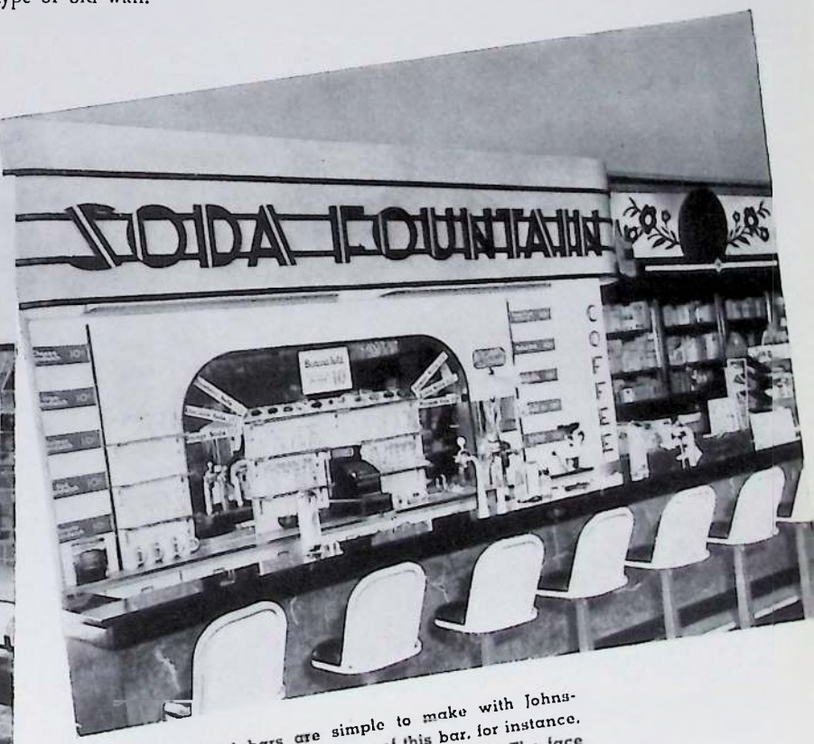
SANITARY *Smart Interiors* for FOOD SHOPS

ESPECIALLY adapted for use in general food stores, meat markets, pastry shops, candy and drug stores, and similar retail businesses, Johns-Manville Decorative Asbestos Flexboard provides a surface which is sanitary, easy-to-clean, and free from the need of painting. Because its surface is hard and smooth, it resists dust and dirt and requires only a wiping with a dry or damp cloth to keep it fresh and sparkling.

Decorative Asbestos Flexboard is furnished in Buff, Rose, Green, Gray and Slate, in keeping with the modern trend toward color. As the photographs show, this material can be had in the familiar scored or "tile" design, as well as in plain sheets of permanent color. Like all other J-M wall materials it can be applied over almost any type of old wall.



By taking advantage of the area around the cashier's cage for the display of merchandise, this hitherto unused space can be a source of sales promotion. This is especially true with new items or "specials" which it is profitable and desirable to push. With a little ingenuity, an attractive yet practical design can be developed. The customers cannot fail to see the display as all must visit this part of the store.



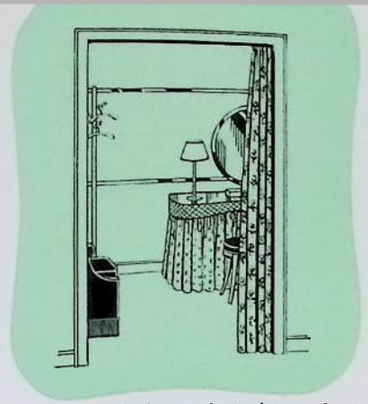
Attractive back-bars are simple to make with Johns-Manville materials. The canopy of this bar, for instance, is of painted Hard Board, curved at the ends. The face of the wall is also of Hard Board. Mouldings and letters are appliqued.

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Smart Interiors FOR BUSINESS AND PROFESSIONAL OFFICES

IS your office ceiling full of unsightly cracks? Are the walls beginni to look shabby, too? No need to tear down old plaster or spend young fortune on the re-decorating job!

Your Johns-Manville Building Material Dealer offers an effecti first-aid treatment for just such cases. Using only dry materials, such J-M Flexboard, Hard Board or Insulating Board, a "down-at-the-heel office can be quickly transformed into one that is modern and attracti Regardless of the present wall and ceiling construction—whether it plaster, wood or metal, painted or papered—sheets of these pre-fabricated materials can usually be applied over the old surfaces in less tim and with far less inconvenience than most other forms of re-finishing. Numerous interesting effects may be worked out with J-M wall an ceiling materials, without further finishing after they are applied.



A dressing nook in a doctor's or dentist's office will be greatly appreciated by patients. It can be small, yet decorative and practical.



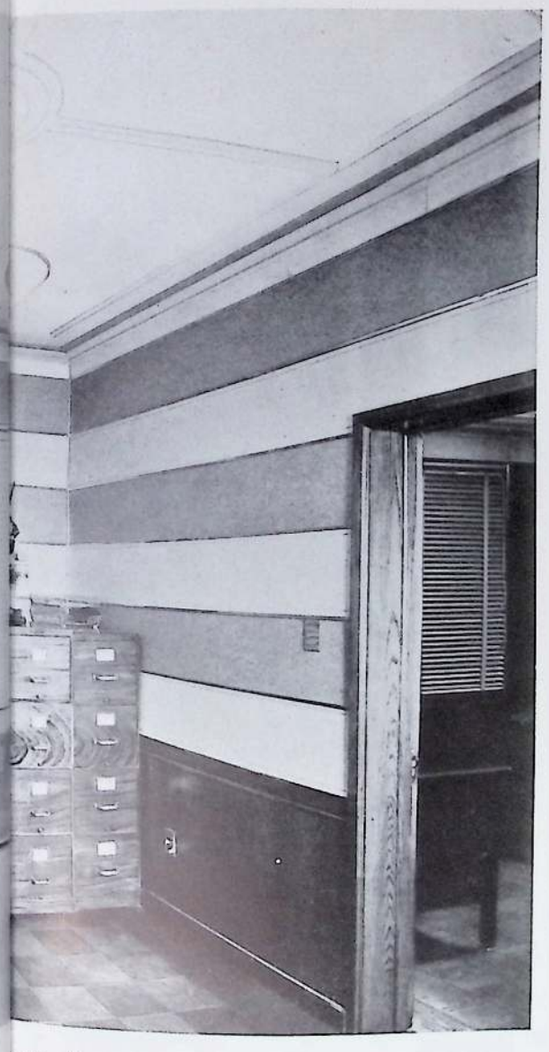
In covering his old walls with J-M Asbestos Flexboard, this dentist combined the familiar tile design with the modern plain sheets to create a sanitary wall of interesting variety.



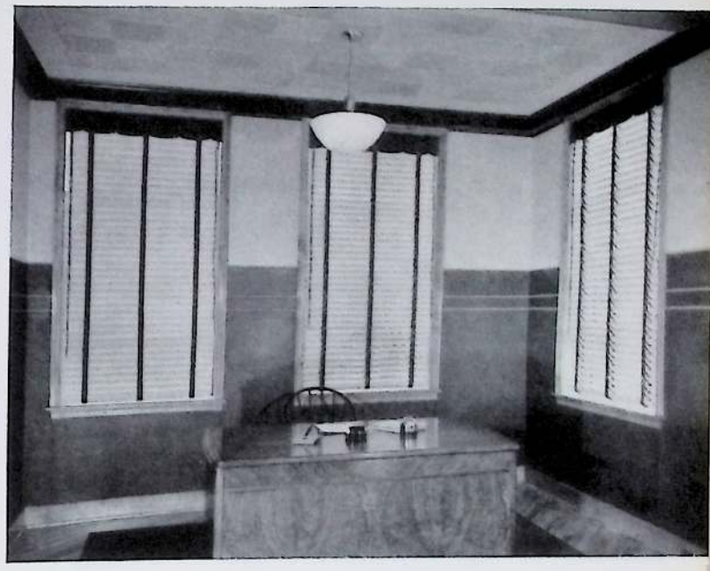




Above left:—In addition to providing crack proof walls and ceilings, J-M Standard Asbestos Flexboard offers an excellent surface for painting. Lower left:—A reception room decorated in Asbestos Flexboard. The paneling was obtained by applying squares of the Flexboard over wide strips of the same material.



ove:—Much of the interest in this office results from the ernating panels of Hard Board and Insulating Board on walls, above the wainscot. The burled finish and rich, own color of the Hard Board suggested its use in the construction of the desk also.



Above:—Two features of this private office are the unusually high wainscot of richly toned Hard Board and the Bevel Panel ceiling in variegated colors. Below:—A real estate office with Hard Board, Bevel Plank and Decorative Ceiling Panels.



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Above:—Located in a prominent New York City hotel, this efficiently arranged barber shop owes much of its distinctiveness to the panels of Breche Rose Asbestos Wainscoting. Reflected in the mirror are partitions faced with Asbestos Flexboard to separate the barber shop from an adjacent beauty parlor.

BARBER shops and beauty parlors offer intimate services to customers. Attendants are selected for their courtesy as well as their skill so that repeat business will result, but the sales problem does not end there. The surroundings, too, should create a favorable reaction on the part of patrons.

Whatever materials are chosen should also meet the requirements for sanitary surfaces and be able to withstand the effects of steam and hot water, especially around the basins.

J-M Asbestos Wainscoting so thoroughly meets all these requirements that it has found wide acceptance in this field. For elaborate shops, the marbleized design is ideal. Its authentic reproduction of Verde Antique, Black & Gold, Breche Rose and Jaune Fleuri marbles permits the creation of atmospheres of distinction.

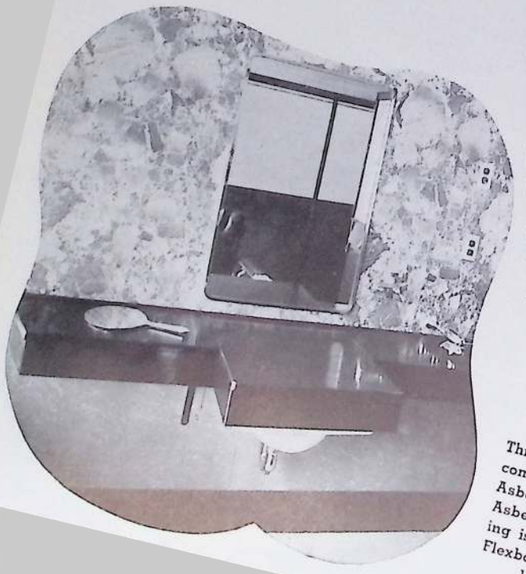
Where a more sophisticated effect is desired, or for conservative treatments, plain sheets of Blue, Ivory, Green and White Asbestos Wainscoting can be employed. Sheets can be held in place with polished metal mouldings over the joints, or fastened with decorative chromium screws, without mouldings.

Although made of asbestos and cement, the large sheets can readily be sawed by the contractor to fit around plumbing, fixtures, windows, mirrors and doorways. Like all other J-M wall materials, Asbestos Wainscoting can be applied quickly and economically over existing wall surfaces.

Smart Interiors for BEAUTY PARLORS and BARBER SHOPS

The separation of the waiting room from the work shop in a beauty parlor has always been a problem. Here it has been effectively accomplished. Both rooms however, have been identically decorated with J-M Asbestos Flexboard and polished aluminum mouldings to cover the joints.





This attractive beauty parlor booth combines Johns-Manville Breche Rose Asbestos Wainscoting and Rose Asbestos Flexboard. The Wainscoting is on the upper wall, while the Flexboard is used below the novel basin and dressing table.

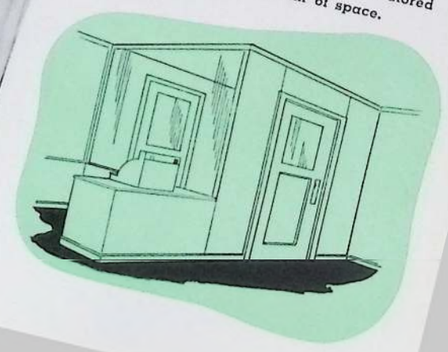


By placing the cashier behind the cosmetic counter and cutting a window through the Hard Board partition to the barber shop, this owner has skillfully solved the problem of centralized sales and collection.

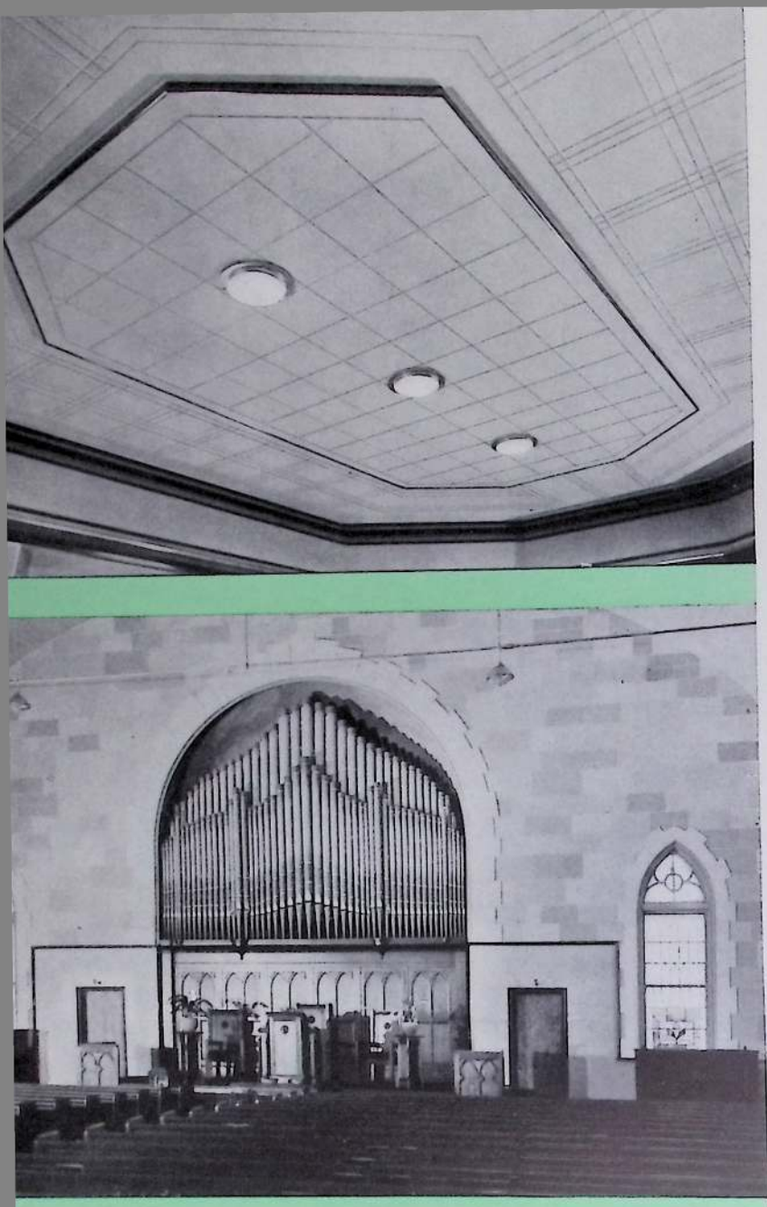


The booths in this beauty parlor have walls of J-M Hard Board stippled with light gray paint, while behind the basin is a J-M Color Panel—a sheet of Asbestos Wainscoting with a plain, polished surface; highly resistant to steam and hot water.

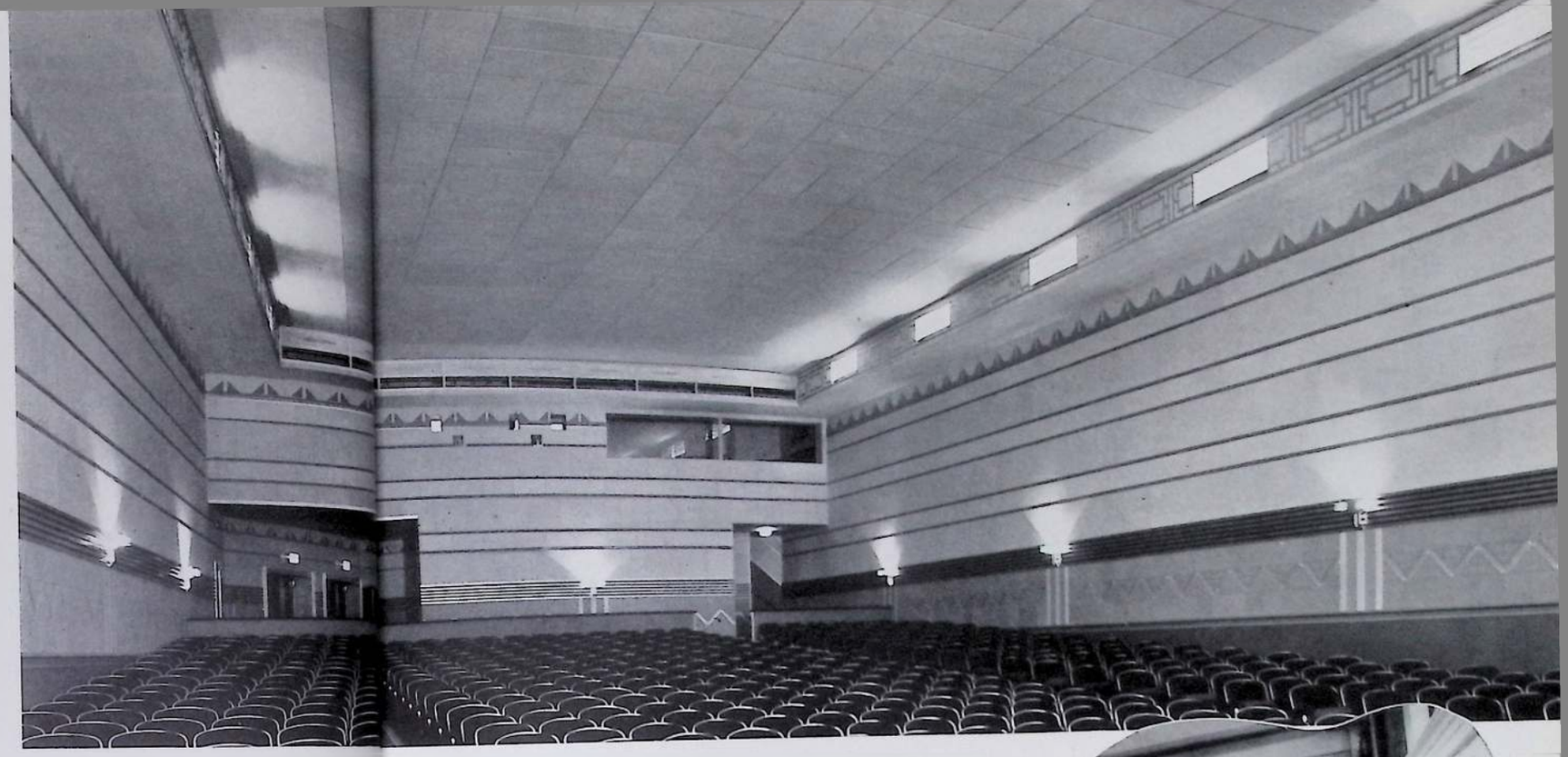
Below:—For comfort and protection from drafts, a winter vestibule like this will prove a valuable investment. Built of J-M Hard Board, it is light in weight, easy to assemble and attractive in appearance. It can be stored in a minimum of space.



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. . . and for CHURCHEATRE, HOSPITAL and SCHOOL

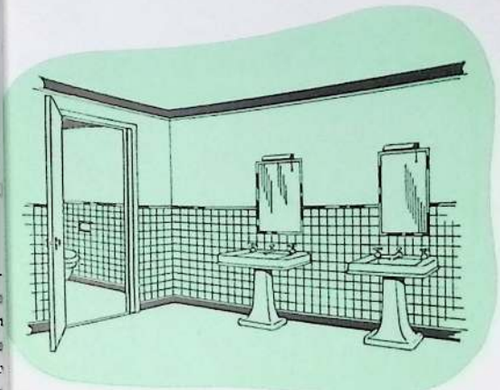
Above:—One of the most effective ways to maintain attendance at a motion picture theater is to keep the interior appearance in step with the times. Here is how one owner solved the problem within a moderate budget, by covering the old walls and ceiling with J-M Insulating Board Bevel Panels.

Top left:—Ceilings are often an important part of the room decoration, as in this lozenge-shaped display room. As a background for the lighting fixtures, 16" x 16" J-M Insulating Board Bevel Panels were applied as a drop ceiling, with a border repeating the contour of the room. The remainder of the ceiling was covered with J-M Decorative Ceiling Panels and Bevel Panels.

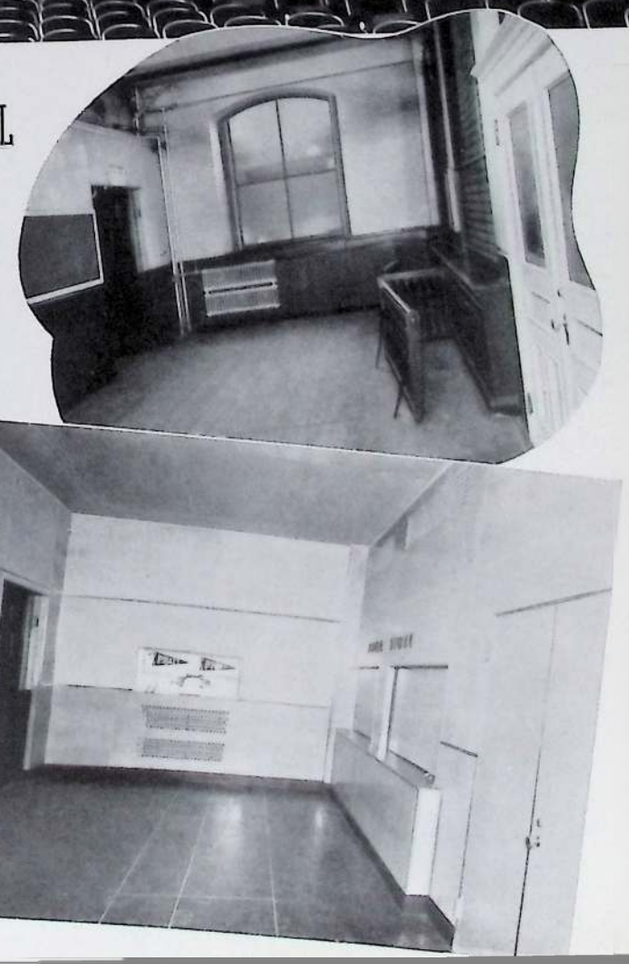
Center:—When this church was being modernized, it was felt that the effect of stone would be desirable. A satisfactory answer was found in J-M Bevel Panels in Variegated colors for the upper walls. Gray Asbestos Flexboard gave the appearance of polished granite around the doors.

Left:—In medical clinics, individual booths are essential for privacy. Since space is at a premium, the divisions must occupy a minimum of floor area. For this purpose, J-M Asbestos Wainscoting can be applied to 2" x 4" studs. This makes a sturdy wall with two sanitary surfaces.

Right:—A "before and after" of a school hallway. By removing or concealing unsightly equipment and by covering the walls and ceiling with J-M Decorative Flexboard, this old-fashioned interior has been made modern in appearance and less expensive to maintain.



There are many "plus" services that do not directly affect sales, but which nevertheless enhance the customer-appeal of a business establishment. Among these is the rest room. Practically any existing rest room with unsightly walls and fixtures can be modernized at low cost with the help of colorful sheets of J-M Asbestos Wainscoting applied right over the old plaster.



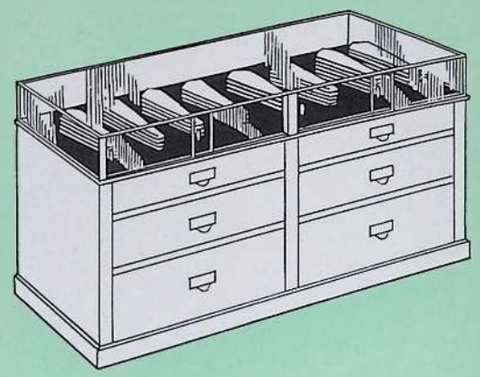
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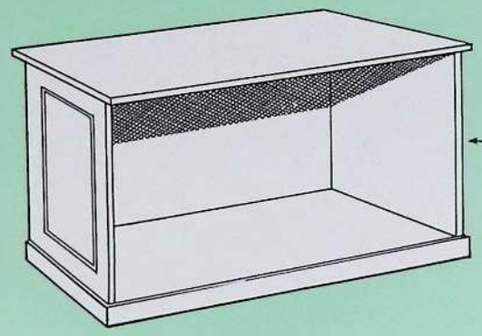
PRACTICAL DISPLAY SUGGESTIONS

Second in importance only to the walls and ceilings are the display facilities of a place of business. Many times these can be planned so as to make unproductive space profitable, and at the same time improve the general appearance. It is also very often possible to modernize existing equipment at little cost. The sketches on these pages illustrate several suggestions along these lines. In nearly every case the work can be done very economically with Johns-Manville Building Materials.

OLD WOOD COUNTER MADE INTO MODERN CASE

Only three steps are necessary to accomplish the interesting change shown in these illustrations. (1) Remove the top and all mouldings. (2) Cover the front and sides with J-M Hard Board or Asbestos Flexboard, and install a glass counter top. (3) Install drawers to hold reserve stock, leaving a suitable space under the glass for display of merchandise.



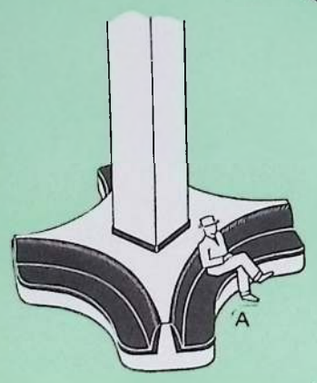


←REAR VIEWS

SPACE-SAVING DISPLAY PANELS

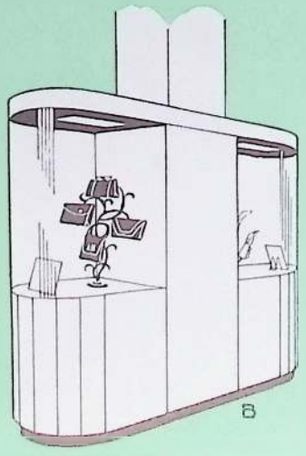
Below:—Among the articles for which this type of space-saving, swinging display is suitable are wall paper, rug samples, small kitchen articles, picture frames, mirrors, oil cloth and window shades. Individual sections can be removed and new articles applied without disturbing the rest of the display. The curved canopy and base can be made economically with J-M Hard Board.





UTILIZING SPACE AROUND LARGE COLUMNS

If space permits, building seats around the base of a column [see sketch (A)] will improve its appearance and furnish additional seating accommodations. Such an arrangement is ideal for basement sales rooms or shoe shops. Another suggestion is to flank the columns with display cases as shown in sketch (B).





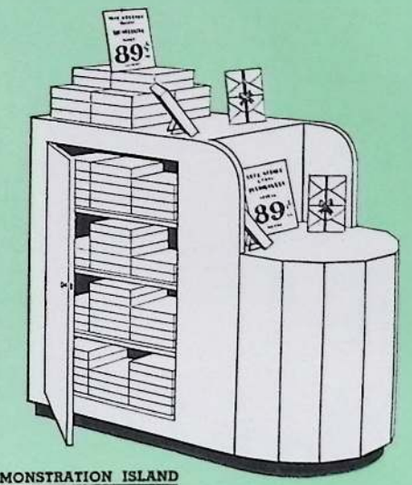
DEPARTMENT IDENTIFICATION

When cabinets behind counters do not go all the way to the ceiling, the tops can be used to identify departments or to feature special brands or merchandise. All that is necessary is to install a slot of suitable size along the edge of the cabinet and cut letters out of J-M Hard Board, leaving enough base to set into the slot with concealed lighting behind letters as shown in the sketch.



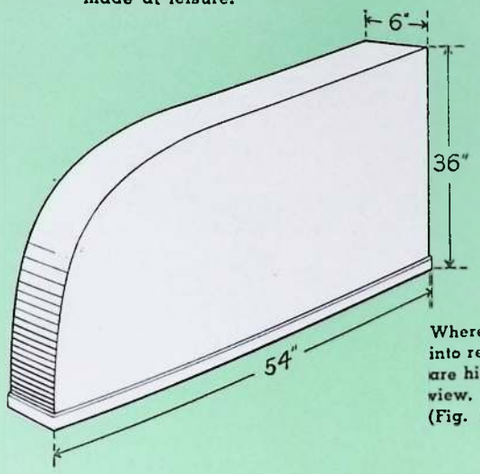
COMFORTABLE COUNTER

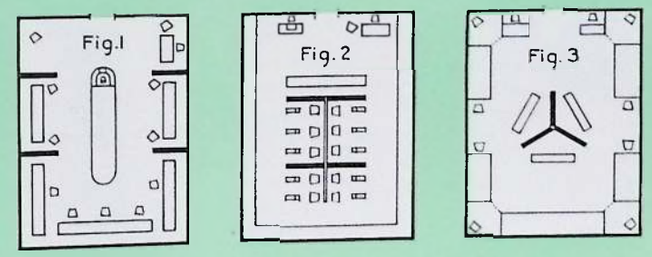
An overhanging counter like this is as comfortable to sit at as a table. It is especially adaptable for use in hosiery, glove or jewelry departments, where selections are made at leisure.



DEMONSTRATION ISLAND

When it is necessary to sell an article by demonstration, a small island such as is shown here will serve admirably.



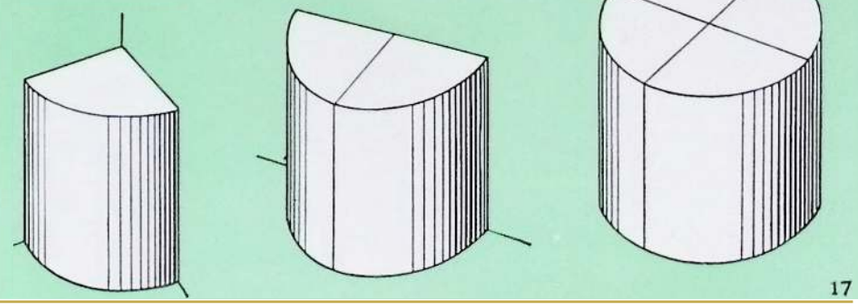


PORTABLE SPACERS

Where items are displayed over a large floor area, it is advisable to separate them into related groups. This can be done effectively by the use of portable spacers, which are high enough to provide the necessary division without interfering with the general view. The sketches above show how these spacers may be used along the wall (Fig. 1) or in the center (Figs. 2 and 3). Spacers are indicated by heavy lines.

SECTIONAL DISPLAY STANDS

A sectional stand such as this is often a most desirable display feature for use in aisles or at aisle intersections. Smaller stands for use in corners or against walls can be obtained merely by removing sections.



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J-M DECORATIVE INTERIOR WALL MATERIALS

INSULATING BOARD AND HARD BOARD



INSULATING BOARD IN LARGE SHEETS

Large sheets of fitted and inter-laced wood fibre. Sizes from 4' x 7' to 4' x 12'. Thickness, 1/2". Cover large areas quickly and economically. For decorative effects, designs can be cut in the surface. Standard Sheets of J-M Insulating Board have the new improved Glazecoat finish. They come in a soft ivory color, which has high light reflection values. They may be painted without priming when desired.

INSULATING BOARD BEADED BEVEL PLANK

A most popular style which gives the effect of paneling. Made in lengths of 8, 9, 10 and 12 feet, and in random widths of 10, 12, 14 and 16 inches. Edges are beveled and beaded. They are furnished with the exclusive J-M Lightning Joint which conceals nailing. Bevel Planks come in Ivory, White, Rose Tan or Gray-tone color shades which may be used separately or combined, depending on the effect desired. Their smooth Glazecoat surface has high light reflecting qualities.



INSULATING BOARD BEVEL PANELS

Made of Insulating Board, 1/2" thick, and furnished in sizes from 12" x 12" squares to 24" x 48" units. Edges are beveled and furnished with the exclusive J-M Lightning Joint which conceals all nailing (see below). Bevel Panels come in 4 soft color tones, White, Ivory, Rose Tan and Graytone. All have the smooth durable J-M Glazecoat finish. Colors may be used separately or blended as desired.

MULTIPLE BEVEL PANELS

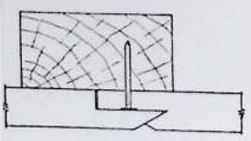
Large units scored to give the effect of smaller units. Sizes range from 16" x 32" grooved to 8" x 8", up to 24" x 48" grooved to 24" x 24". With these large pieces, the contractor can cover broad areas rapidly. An economical choice for covering old ceilings at low cost. Furnished in Ivory only and equipped with J-M Lightning Joint.

DECORATIVE CEILING PANELS

(not illustrated)

To easily achieve a variety of pleasing ceiling patterns J-M also furnishes 4 predesigned units, 16" x 16" in Ivory Color. Ask for details.



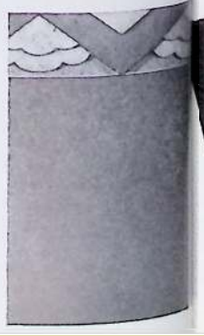


J-M LIGHTNING JOINT

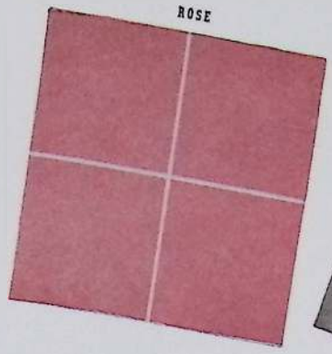
All J-M Insulating Board Decorative Units are furnished with the J-M Lightning Joint which conceals nail heads and speeds up application. This exclusive J-M feature costs you no more yet it adds materially to the appearance of your walls and ceilings!

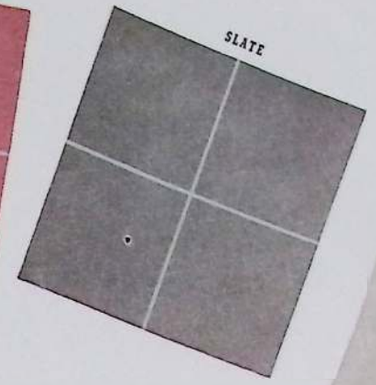
HARD BOARD PRODUCTS

A hard, smooth board with a rich brown color and a burled finish. Can be painted, stained, varnished, lacquered, enameled or waxed. Illustration shows decorative effect achieved with Standard and Tempered Hard Board. Furnished in sheets from 4' x 1' to 4' x 12'. Thicknesses from 1/8" to 5/16". For temporary construction, 1/4" Standard or De Luxe Panlboard may be used.









The four colors shown at the top of this page — Green, Rose, Slate and Light Gray, as well as an attractive Buff (not illustrated), represent the colors of Decorative Asbestos Flexboard. All furnished with or without scoring.



JOHNS-MANVILLE ASBESTOS WALL MATERIALS







J-M ASBESTOS FLEXBOARD

Decorative Flexboard is an integrally-colored asbestos-cement sheet, with a factory-polished, sanitary surface. Can be curved to a considerable degree. Easily cleaned with a dry or damp cloth. Sizes in Plain design: 48" x 96" x 1/8". Also in scored design: 48" x 48" x 1/8" (scored on 4" centers).

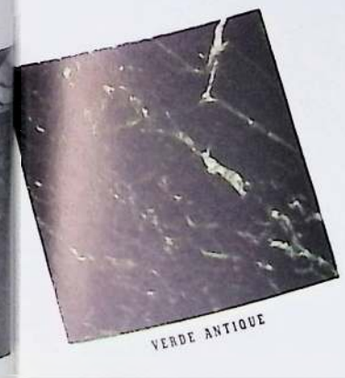
Standard Flexboard . . . The same as Decorative Flexboard, except that it is not polished and is available only in Gray.

J-M ASBESTOS WAINSCOTING

Plain or scored design. A rigid, asbestos-cement sheet for installation over old plaster walls or to construct new walls. "Baked on" surface will not spot or stain and can be cleaned with a dry or damp cloth. Sizes: 48" x 48" x 1/4". Plain design also available on order in 48" x 96" x 1/4".

MARBLEIZED ASBESTOS WAINSCOTING

Authentic reproductions of perfect marble specimens. The lustrous "baked on" surface resists dirt and can be easily cleaned by wiping or washing. Recommended for use wherever the effect of marble is desired, as in foyers, banks, smart shops, beauty parlors and sales rooms. Size, 32" x 48" x 1/4".







The three beautiful designs on the left, are Marbleized Asbestos Wainscoting. This material also comes in Black and Gold Marbleized as well as in four attractive colors (either plain or scored)—White, Light Green, Light Blue and Ivory. The last two are shown above.

Western Asbestos Co.: Architectural Manual (1946)
ACL Doc 21301 · Page 182 of 276
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THE JOHNS-MANVILLE DEALER OFFERS YOU A COMPLETE REMODELING SERVICE

MODERNIZE NOW • PAY LATER • FHA TERMS

If, as a business or professional man, you are putting off making essential improvements or repairs, you need hesitate no longer. Your Johns-Manville Building Material Dealer is equipped to offer a complete remodeling service — not merely to furnish the necessary material, but to assist and advise with regard to the services of an architect, contractor, electrician, etc., as well as to offer a financing arrangement that makes it easy to pay for the improvements out of monthly revenue.

Talk over your plans with him. He will be able to give you valuable advice and assistance and will estimate the cost of doing the job as a "complete package". He can also tell you how little it will really cost to make the desired improvements under the famous Johns-Manville Deferred Payment plan, operating in cooperation with the new Federal Housing Act. In many cases, the increased business and patronage that you gain as a result of improving the appearance of your place of business, might easily pay the small monthly installments to cover the cost of the complete remodeling job.

CELOTEX

The word Celotex is the brand name, identifying a group of products manufactured by The Celotex Corporation and is protected as a trade mark shown above.

INTERIOR FINISH
TILE BOARD WITH TYPE "E" JOINT FOR CONCEALED NAILING

INDEX No. 19-F OF A.I.A. FILE
File Under Carpentry & Millwork
Issued Sept., 1942

THE CELOTEX CORPORATION — 120 S. LA SALLE STREET — CHICAGO, ILLINOIS

For information on all Celotex Products see file index of Sweet's Catalog, 1942.

For Finish Plank and Wainscoting see Specification Sheet No. 2094.

A. CELOTEX STRUCTURAL INSULATION

CELOTEX STRUCTURAL INSULATION is a rigid cane fiber product made from bagasse, the tough vegetable fiber of sugar cane, after the sugar has been extracted. The individual fibers are long, tough, strong, and resilient, and by a process of felting and weaving are manufactured into strong efficient boards.

CELOTEX CANE FIBER TILE BOARD—With Type "E" Concealed Nailing Joint—in principle an interlocking tongue and groove joint. Fabricated into square and rectangular units, designed for easy application to walls and ceilings. The sizes, thickness, finish and joint detail are listed below.

B. PHYSICAL PROPERTIES

(1) Thermal Conductivity—The insulating value of Celotex insulation has been established by many nationally known laboratories (National Bureau of Standards, Armour Institute of Technology, and others). Tests show the average thermal conductivity to be 0.33 Btu. per hour per square foot per degree F. per inch thickness.

(2) Tensile Strength—The minimum tensile strength based on The Celotex Corporation product specifications, is 250 lbs. per square inch.

(3) Transverse Strength—The Celotex Corporation product specifications for ½" board call for a minimum transverse strength of 90 lbs., based on a specimen 4" wide placed between 3" supports.

(4) Nail Holding Strength (Lateral)—The minimum force required to move a 6-penny common wire nail to the edge of ½" thick Celotex Building Board from a position ½" from the edge is 55 lbs.

(5) Moisture Resistance—In the manufacture of Celotex cane fiber products the fibers are chemically treated so that the entire board throughout its thickness is water resistant.

(6) Expansion and Contraction—Linear expansion and contraction of Celotex cane fiber products due to temperature changes is practically nil.

(7) Rodent and Vermin Resistance—Celotex cane fiber products contain no food for squirrels, rats, mice or other rodents or vermin. They are sterile products.

(8) Ferox Process—Celotex Interior Finish Products are manufactured under the Ferox Process (patented) and therefore effectively resist damage by fungus growth, dry rot and termites. The Ferox Process is an integral treatment, not a surface treatment.

(9) Fire Retardant—Celotex cane fiber products are slow burning. Due to their high insulating value and freedom from rosin and pitch, they retard the spread of fire.

(10) Durability—Permanence and durability of Celotex Interior Finish Products is insured by the famous Celotex Ten-point Life of the Building Guarantee.

(11) Light Reflection—The smooth Ivory finish, No. 84, has high light reflection value (above 70 per cent).

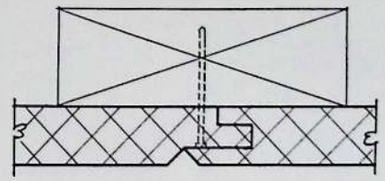
C. SIZES, THICKNESS, FINISH

Sizes—Small: 12"x12", 12"x24"*, 16"x16". Large: 16"x32".

Thickness—½" only.

Finish: Standard Finishes—Ripple Blend (a harmonious blend of four brown tones), Linen Finish No. 76; Smooth Finish in Ivory No. 84, Buff No. 85, and Green No. 86.

*This size furnished on special order only.



TYPE E JOINT (Furnished in ½" only)—All edges of top face beveled. An interlocking type of joint essentially Tongue and Groove in principle, but "offset" in such manner that head nails driven through the tongue are subsequently covered by interlocking member providing "concealed" or "blind" nailing. NOT REVERSIBLE. Suitable for Square, Diamond, and Ashlar patterns. For Herringbone, and Basket Weave patterns, specify one-half each left and right-hand rectangular tile. (Left-hand Tile is standard—Right-hand is available on special order only.)

D. USES

Used as complete interior treatment combining decoration and heat insulation. The variety of convenient sizes permit many interesting patterns and designs. Available in an attractive choice of colors. Suitable for new work or complete remodelling in stores, theatres, restaurants, schools, churches, bowling alleys and all residence work.

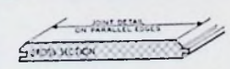
E. ADVANTAGES

Celotex Tile Board with Type "E" Concealed Nailing Joint permits easy and rapid application of tile units by ordinary workmen and provides an interlocking, tight-fitting, dustproof joint with all nails hidden from view. Tile Board may be combined with Celotex Finish Plank, Building Board, Wainscoting and other Celotex Interior Finish Products in a variety of patterns and color combinations to provide an attractive background for any decorative scheme. On large areas the use of starter strips speeds up work, as material can be applied in four quadrants, simultaneously.

F. NON-STANDARD TILE BOARD JOINT

(Available in Ivory No. 84 Finish only)

See application specifications on reverse side.

TYPE OF JOINT AND DESCRIPTION	DETAIL
D—Tongue groove joint all edges on one face beveled. Suitable for square, Diamond, Ashlar and Basket Weave patterns. (For Herringbone specify one-half each left and right joints.) Available on 1" Tile only, on special order.	

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SPECIFICATIONS

CELOTEX TILE BOARD WITH TYPE "E" JOINT

DETAILED FORM

NOTE: *The application of Celotex Finish Plank, Building Board and Key Joint Units is covered in other Specifications. Where more than one Celotex Interior Finish Product is being used, the application may be covered in one consolidated specification. For best results, detailed elevations of walls and plans of ceilings showing type, finish, size and thickness of units, including ornamental tile and mouldings, should be included and referred to in this specification.*

NOTE: *Notes are explanatory or advisory only and should not be included in the specifications. Select only those clauses which apply to the particular work.*

1. SCOPE OF WORK AND MATERIALS

The Carpenter Contractor shall provide and install Celotex Tile Board with Type "E" Concealed Nailing Joint and/or Celotex Mouldings and Ornaments to the following (wall) and (ceiling) areas.

NOTE: *Here list and locate definitely the wall and ceiling areas to be covered. Size of units, pattern desired and colors shall be included in drawings and referred to here.*

2. BASE

NOTE: *Select base best adapted to design and construction.*

(2a) FRAMING—Framing members shall be of sound seasoned lumber, straight and true, spaced to conform to the size of units to be used but not to exceed 16" on center. Joists and studs shall be set in alignment to provide a uniform base for application of the Tile Board. (For ceiling application with 16" Tile Board, cross stripping on 8" centers is advisable.)

(2b) FURRING STRIPS—Provide (1"x3"), (1"x4"), (2"x2"), (2"x4") furring strips spaced (12") or (16") on centers.

(2c) SOLID WOOD BASE
Cover framing with 4", 6" or 8" wide, matched 25/32" thick, lumber to form a continuous level nailing base.

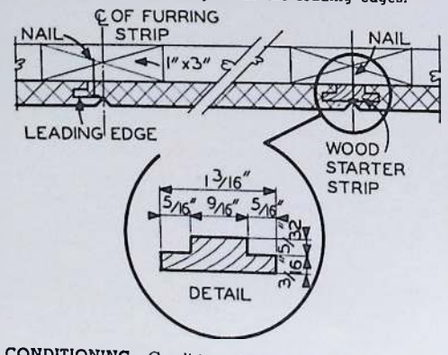
(2d) PLYWOOD BASE—Cover framing with plywood (preferably ⅜" thick) to form a continuous level nailing base.

(2e) PLASTER BASE—Shall be tested level and solid. Painted surfaces to be washed and scratched before application with adhesive and nails.

NOTE: *Concrete construction plastered or un-plastered should be furred as in (2b) above.*

3. APPLICATION

NOTE: *Celotex Tile Board with Type "E" Concealed Nailing Joint may be applied by nailing over wood or other nail holding bases or by cementing and supplementary nailing through tongues over sound plaster. The use of adhesive for intermediate fastening avoids the necessity of face nailing large units. It is recommended that the application begin at the center of the area and continue outward towards the boundaries so that the pattern will automatically work out symmetrical about the center. For center point application, wood "starter strips" (see detail below) must be used to join the two grooved edges of the Tile Board along the center lines of the area so that the tongue edges will always be the leading edges permitting concealed nailing through the tongues. Wood "starter strips" are distributed by The Celotex Corporation through lumber dealers. If wood "starter strips" are not used, the application must begin along the one boundary and proceed by courses to the opposite boundary with the tongues as the leading edges.*



(3a) CONDITIONING—Condition all Tile Board by opening packages and allowing to stand 24 hours for adjustment to atmospheric conditions before erection.

(3b) GENERAL—(1) Celotex Tile Board (and Celotex Moulding and Ornaments) shall be applied in exact accordance with the detailed drawings. [Begin application of Tile Board at center of area using wood starter strips and continue towards boundaries.] or [Begin application of Tile Board along one boundary of area to be covered and proceed by courses to the opposite boundary.]

(3c) SPACING—Bring units to a moderate contact. Do not force.

(3d) NAILS
For nailing through tongue, and face nailing concealed by mouldings use 1¼" common flat head nails.

For exposed face nailing (on rectangular Tile Board), use 1¼" No. 17 flat head cadmium plated needle point nails or 1¼" No. 16 or No. 17 brads or finish nails. (Where high humidities exist, use cadmium plated or zinc coated nails.)

(3e) NAILING OVER WOOD
(Rectangular Tile shall be applied with long dimension across the furring strips.) Nail the tongue on the leading edge of the Tile to the furring strip. Space nails approximately 4" on center. Drive nails through thickest portion of tongue and as close to bevel as possible with heads flush. (Where possible, drive an additional nail at far corner of other tongue.)

NOTE: *If Celotex Adhesive is not used on intermediate bearing, face nail with 1 to 4 nails depending on size of Tile Board. If finish nails are used drive at an angle and set flush or just below the surface.*

(3f) ADHESIVE—For cementing and nailing Tile Board to plaster, use Celotex (Plastic Heavy Body) (Light Body) Adhesive or other approved adhesives.

NOTE: *Include above when adhesive is required. Celotex Plastic Heavy Body Adhesive is used for applying Celotex Cane Fiber Board to rough or smooth surfaces, such as new dry plaster, old plaster surfaces which are clean and from which calcimine or casein paint has been removed, and continuous wood surfaces. Celotex Alcohol Base Light Body Adhesive is used for applying Celotex Cane Fiber Board to smooth surfaces similar to those mentioned above. Supplementary nailing must always be used with either adhesive for applying Celotex Tile Board with Type "E" Joint. (Where the sub-surface is not a suitable nailing base, wood furring strips must be provided.)*

(3g) CEMENTING AND NAILING OVER PLASTER

NOTE: *For better class of work but only where the plaster is sound*

On Tile Board apply spots of adhesive 3" or 4" in diameter to the back surface near each corner with additional spots approximately 8" to 10" apart over the area of large tile. Exercise care to prevent adhesive from appearing on the exposed finished side. Slide unit into position, level and true, and nail in position through tongue with additional face nailing as required for large units.

4. SUPPLEMENTARY

NOTE: *On new work, window and door frames shall be adjusted to compensate for thickness of Celotex Tile Board. On old work Celotex Tile shall be brought in close contact with trim and finished with a beveled butt joint or all trim shall be removed and replaced over Celotex Tile with finished wood filler strips installed at all jambs to compensate for thickness of wall finish.*

NOTE: *Celotex Mouldings and Ornaments are shown in color in 1942 Sweet's Catalog, 10-17. They are used for cornice decoration, batten strips to cover nail heads and joints, or to carry out the design. Celotex Wainscoting with leather brown, toughened and textured surface is used for wainscoting or other wall treatment where an exceptional wear-resisting surface is required.*

SHORT FORM—TYPE "E" JOINT

All wall and ceiling areas listed or noted on drawings shall be treated with ½" Celotex Cane Fiber Tile Board Type E Concealed Nailing Joint in the design selected and applied in strict accordance with manufacturers' current specifications. (Specify: Sizes, finish and colors, and other Celotex Interior Finish Products to be used, below.)

APPLICATION OF SPECIAL TILE BOARD—TYPE D JOINT

Cementing and Nailing Over Plaster—On Tile Board apply spots of adhesive 3" or 4" in diameter to the back surface near each corner with additional spots approximately 8" or 10" apart over the area of large tile. Slide unit into position level and true and nail in position with one or two nails at each corner and additional nails as required for large units. Set heads neatly below the surface, nailing at angle into bevels.

Nails—Galvanized finishing nails, No. 17 flat head cadmium needle point brads or No. 16 brads. [(Use 1¼" for ½" Tile Board.) (Use 1¾" for 1" Tile Board.)]

Nailing Over Wood—Use one nail at each corner and additional nails 6" apart along and close to edges, and center line resting on framing. Drive nails at an angle and set flush or just below the surface of bevels.

SHORT FORM SPECIFICATION FOR THE ABOVE

All wall and ceiling areas listed or noted on drawings shall be treated with Celotex Cane Fiber Tile Board Type [D] in the design selected and applied by [nailing] or [cementing and nailing] in strict accordance with manufacturer's current specifications. (Specify: Size, finish, and color and other Celotex Interior Finish Products below.)

CELOTEX

The word Celotex is the brand name, identifying a group of products manufactured by The Celotex Corporation and is protected as a trade mark shown above.

INSULATING LATH

REGULAR AND VAPOR-SEAL

INDEX No. 20-B
OF A.I.A. FILE
File Under
Furring & Lath
Issued February, 1942

THE CELOTEX CORPORATION — CHICAGO, ILLINOIS

For information on all Celotex Products see File Index of Sweet's Catalog, 1942

A. CELOTEX STRUCTURAL INSULATION

CELOTEX STRUCTURAL INSULATION is a rigid cane fiber product made from bagasse, the tough vegetable fiber of sugar cane, after the sugar has been extracted. The individual fibers are long, tough, strong, and resilient, and by a process of felting and weaving are manufactured into strong, efficient boards.

CELOTEX CANE FIBER INSULATING LATH is a patented insulating plaster base. The beveled edges and shiplapped joints provide greater plaster reinforcement at the joints where needed. The continuous unbroken surface eliminates wood lath marks and minimizes plaster cracking.

REGULAR—Has the natural, rough textured surface on the front and back.

VAPOR-SEAL—½" thick, is provided with a surface coating of asphalt, on the back surface to act as a vapor barrier. The 1" thickness is provided with an asphalt vapor barrier in the middle, ½" from each surface.

B. PHYSICAL PROPERTIES

(1) Thermal Conductivity—The insulating value of Celotex cane fiber board has been established by many nationally known laboratories (National Bureau of Standards, Armour Institute of Technology, and others). Tests show the average thermal conductivity to be 0.33 Btu. per hour per square foot per degree F. per inch thickness.

(2) Tensile Strength—The minimum tensile strength of Celotex cane fiber insulation based on The Celotex Corporation product specifications, is 250 lbs. per square inch.

(3) Plaster Bonding Strength—Laboratory tests show that a direct perpendicular pull of 700 to 1,160 pounds per square foot is required to break plaster loose from Celotex Cane Fiber Insulating Lath. As the plaster load of a ceiling equals only about 5 pounds per square foot, the use of this product as a plaster base provides a factor of safety of about 150. This is greatly in excess of the strength of bond of plaster to wood lath.

(4) Transverse Strength—The Celotex Corporation product specifications for ½" cane fiber board call for a minimum transverse strength of 90 lbs., based on a specimen 4" wide and placed between 3" supports. Transverse strength increases with the square of the thickness, which means the ¾" thickness is 2.25 times as strong as the ½" thickness, and similarly the 1" thickness is 4 times as strong as the ½" thickness transversely.

(5) Moisture Resistance—In the manufacture of Celotex cane fiber board the fibers are chemically treated so that the entire board throughout its thickness is water resistant.

(6) Rodent and Vermin Resistance—Celotex Cane Fiber Products contain no food for squirrels, rats, mice or other rodents or vermin. They are sterile products.

(7) Ferox Process—Celotex Brand Insulating Lath is manufactured under the Ferox Process (patented) and therefore effectively resists damage by fungus growth, dry rot and termites. The Ferox Process is an integral treatment, not a surface treatment, and presents no hazards to humans or domestic animals.

(8) Expansion and Contraction—The linear expansion and contraction of Celotex cane fiber products due to temperature changes is practically nil.

(9) Fire Resistance—Celotex Cane Fiber Products are slow burning. Due to their high insulating value, freedom from rosin and pitch, and low density, they retard the spread of fire.

(10) Government Standards—Celotex Cane Fiber Lath surpasses the requirements of Commercial Standards CS 42-35 of the U. S. Department of Commerce, and U. S. Federal Specifications LLL-F-321a.

(11) Durability—Permanence and durability of Celotex Cane Fiber Lath is insured by the famous Celotex Ten-point Life of the Building Guarantee.

(12) Branding—Regular Insulating Lath is branded on the back face (this side to studs). Vapor-seal Insulating Lath is branded with the name on the exposed plaster face to insure proper placement identification and protection against substitution.

C. SIZE AND THICKNESS

All CELOTEX CANE FIBER INSULATING LATH is made in one size only—18"x48", surface measure. REGULAR AND VAPOR-SEAL INSULATING LATH is available in ½" and 1" thickness.

D. USES

For heat insulation of exterior walls (frame and masonry) and top floor ceilings. For sound insulation of dividing walls, interior partitions and intermediate floors (ceilings).

E. ADVANTAGES

CELOTEX CANE FIBER INSULATING LATH is a continuous, solid plaster-base material. Sixteen years experience has proven the practicability and service of this sheet lath. It is manufactured under moisture control conditions to minimize expansion and prevent bucklings. Plaster will not work through the joints or board itself to wet the back surface.

The beveled and shiplapped joints provide the necessary reinforcement along the edges. It provides the necessary diagonal reinforcing allowing a longer and gradual change in the bending surface to resist tension due to structural changes. Due to the extra thickness of plaster at the joints, cracking tendency caused by the inelastic properties of plaster is avoided. As the plaster dries the resiliency of the fibers and internal strength of the board resists any subsequent deformation. As the scratch and brown coats dry a continuous homogeneous surfacing with additional bracing strength is provided to eliminate line cracks.

As moisture cannot pass through the lath, ventilation is imperative. Vapor passage is resisted by the barrier of Vapor-seal Lath.

PREVENTION OF CONDENSATION: For use on exterior walls and top floor ceilings in presence of high humidity or in cold climates where air conditioning or humidifiers are used, VAPOR-SEAL INSULATING LATH is recommended. The application specifications are identical to REGULAR INSULATING LATH.

Vapor barriers should be located as near as possible to the warm side of the wall because the temperatures at such barriers must be high enough to prevent condensation.

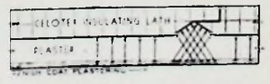
VAPOR-SEAL INSULATING LATH ½" thick was developed and is recommended exclusively for use with VAPOR-SEAL SHEATHING or other insulation used as a fill or sheathing. When used as recommended the temperatures at the vapor barrier on the back of ½" VAPOR-SEAL LATH are sufficiently high to prevent condensation.

VAPOR-SEAL INSULATING LATH 1" thick is generally recommended for use independent of other insulation. Even though the temperature on the back of the 1" VAPOR-SEAL LATH may become quite low under certain conditions, the temperature at the vapor barrier line remains well above the dewpoint temperature under such conditions.

Both ½" VAPOR-SEAL LATH and 1" VAPOR-SEAL LATH, due to the proper placement of the vapor barriers allow the retention of the breathing space in wall and ceiling construction. This breathing space is extremely important under circumstances where moisture even in small quantities may reach the interstud or joist space. The vapor barrier does not prevent the proper setting of the plaster.



Left: The efficient insulating qualities of Celotex Cane Fiber Lath are not affected by the application of plaster. The beveled edges provide added plaster reinforcement at the joints where needed.



5—2-42—1501

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SPECIFICATIONS

CELOTEX CANE FIBER INSULATING LATH

DETAILED FORM

NOTE: *Notes are explanatory or advisory only and should not be included in the specifications.*

NOTE: *Select and include only those clauses which apply to the particular work. Words in bracketed bold face type are selective.*

1. SCOPE OF WORK

The Plastering Contractor shall provide and have the Lather install CELOTEX CANE FIBER LATH to following **[wall]** and **[ceiling]** areas.

NOTE: *Here list and locate. For outside walls and top story ceilings, specify Vapor-Seal Lath. For other wall or ceiling surfaces, specify regular Celotex Cane Fiber Lath. If more than one kind or thickness is used, list separately and the respective areas covered.*

2. FRAMING

All framing shall be 12" or 16" on center. (Special framing is not required for CELOTEX CANE FIBER LATH.)

NOTE: *The proper adjustment in dimensioning window and door jambs should be made to compensate for CANE FIBER LATH. If stock frames are used suitable mention should be included in the millwork portion of the carpentry specification to allow for such variation.*

3. MATERIAL

Plaster base shall be **[Celotex Cane Fiber Lath]** [½"] [1"] thick or **[Celotex Cane Fiber Vapor-seal Lath]** [½"] [1"] thick, 18" wide **x** 48" long, delivered to the building site in the original manufacturer's packages.

4. APPLICATION

(4a) GENERAL. Do not moisten lath units before application. Apply lath with beveled edges out with the length at right angles to the framing (or furring) members. End joints shall be staggered and centered over framing members.

Where piecing out is necessary, use only strips of lath. Accurately cut and fit lath around all electric outlet boxes, piping, etc.

(4b) SPACING. Bring edges together in moderate contact.

(4c) NAILS. Use 1⅛" long, special blued plasterboard nails with $\frac{7}{16}$" heads for ½" thick lath.

Use 1¾" special blued plasterboard nails with $\frac{5}{16}$" heads for 1" thick lath.

(4d) NAILING. Nail lath units securely to each framing (or furring) member with 5 nails spaced uniformly approximately 3" apart (20 nails to each unit).

On curved surfaces, first nail at center to intermediate supports and spring to the contour of the framing.

(4e) ANGLE REINFORCEMENT. All corners shall be reinforced with metal corner beads. All re-entrant angles shall be reinforced with expanded metal lath angle strips. Reinforcement shall be securely stapled over lath. Use 6" strips of expanded metal lath at juncture of frame and masonry constructions.

5. PLASTERING

(5a) CAUTION. Do not wet Celotex Cane Fiber Lath before applying plaster.

(5b) INSPECTION. Inspect nailing and notify lather of any portions of lathing not adequately secured in accordance with the manufacturer's specifications. See that all corners and angles are reinforced with metal corner beads accurately set to line with grounds and that all re-entrant angles are reinforced with expanded metal lath angle strips.

(5c) PLASTER. Use standard gypsum cement plaster or gypsum wood fiber plaster for scratch and brown coats mixed accurately in accordance with the manufacturer's specifications. Both scratch and brown coats shall be mixed to a wet consistency to allow for application with light trowel pressure and to facilitate darbying. Use any standard plaster finish over the brown coat, such as gypsum, lime, or lime gauged with gypsum, mixed in accordance with the manufacturer's specifications.

NOTE: *Lime plaster, lime gauged with gypsum, or gypsum plaster containing more than ten per cent of lime should not be used for scratch or brown coats.*

(5d) APPLICATION. Apply in three (3) coats to full ½" thickness in accordance with the plaster manufacturer's specifications. Surfaces shall be rodded to a true plane. All corners and angles shall be plumb and true. Wherever necessary, and particularly on ceilings, provide plaster screeds to insure an even, uniform ½" plaster thickness.

In applying the scratch coat of plaster, it shall be carefully pressed into all beveled edges and joints to provide plaster reinforcement at these vital points.

If the brown coat becomes stiff and sets during darbying, wet down the surface to allow for darbying without undue pressure against the plaster surface.

Darby strokes shall be in the direction of framing members with the darby spanning two studs or joists.

(5e) VENTILATION. Provide adequate ventilation for the proper drying of the plaster.

NOTE: *Due to the moistureproof characteristics of Celotex Cane Fiber Lath, all plaster moisture must be carried off by the air in contact with the exposed plaster surface.*

(5f) HEAT. Provide adequate heat to prevent injury to fresh plaster by frost.

6. SPECIFICATIONS INSTRUCTIONS FOR OTHER TRADES

(6a) CONSTRUCTION. Follow the standard recommendations of the Building Code Committee of the U. S. Department of Commerce for all wood framing.

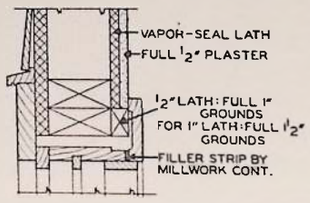
(6b) FURRING. Fur all exterior masonry walls to receive Celotex Cane Fiber Lath with 1"x2" furring strips set 12" or 16" on centers accurately shimmed to a true, level plane. Secure substantially to masonry.

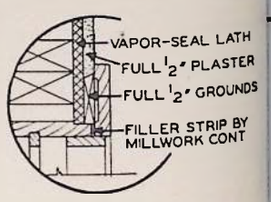
(6c) GROUNDS. Furnish and erect, substantially secured to framing members, wood grounds of sufficient thickness to provide a full ½" of plaster on the lath. (See details.)

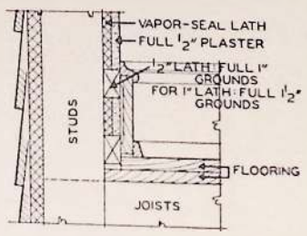
When 1" lath is used, the grounds shall be compensated equally for the increase in thickness.

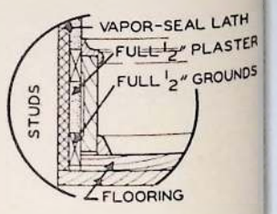
On ceilings it is desirable to provide small metal lath plaster screeds to insure uniform full plaster thickness.

(6d) ELECTRIC OUTLETS. Where 1" thick lath units are used, set electric outlet boxes to accommodate a full 1½" thickness from face of stud or joists to face of plaster.









SHORT FORM

All wall and ceiling areas herein listed or noted on drawings shall be insulated with [CELOTEX CANE FIBER LATH] and/or [CELOTEX CANE FIBER VAPOR-SEAL INSULATING LATH] applied in strict accordance with manufacturer's current specifications. Lath should be [½"], or [1"] thickness for the respective areas specified.

CELOTEX

The word Celotex is the brand name, identifying a group of products marketed by The Celotex Corporation and is protected as a trade mark shown above.

ROOF INSULATION

(VAPOR-SEAL)

OVER WOOD DECKS

SPECIFICATION No. 200-A AND B

INDEX No. 12-B
OF A. I. A. FILE
or Insulation 37A1
File Under Roofing
Issued January, 1945

THE CELOTEX CORPORATION — 120 SOUTH LA SALLE STREET — CHICAGO 3, ILLINOIS

When specifying Celotex Regular Roof Insulation over Wood Decks use Specification No. 100-A and B

See Roofing Section, Sweet's Catalog, 1945

For general information on coefficients of heat transmission, fuel and radiation savings, and the solution of condensation problems under roofs, write The Celotex Corporation.

A. CELOTEX VAPOR-SEAL ROOF INSULATION

CELOTEX VAPOR-SEAL ROOF INSULATION is an improved rigid type, water resistant, cane board roof insulation that is integrally treated to resist dry rot and termites, and coated on all edges and surfaces with high grade asphalt. It is provided with offsets on four edges and when applied, a network of channels next to the roof deck is formed which provides a means of equalizing the air pressure therein.

B. PHYSICAL PROPERTIES

(1) HEAT TRANSMISSION—The conductance of Celotex Vapor-Seal Roof Insulation is 0.30 Btu. per inch thickness as furnished and in proportion for other thicknesses.

(2) FEROX PROCESS—Celotex Vapor-seal Roof Insulation is manufactured under the Ferox Process (patented) and therefore effectively resists damage by fungus growth, dry rot, and termites. The Ferox Process is an integral treatment, not a surface treatment.

(3) MOISTURE RESISTANCE—In the manufacture of Celotex cane fibre board, the fibres are chemically treated so that the entire board throughout its thickness is water resistant.

(4) ASPHALT COATING—All edges and surfaces of Celotex Vapor-seal Roof Insulation are coated with high grade asphalt, providing protection against the passage of moisture. This provides a highly desirable surface for mopping with either asphalt or pitch and perfect bond is obtained with composition roofing.

(5) EXPANSION AND CONTRACTION—The linear expansion and contraction of Celotex cane fibre products due to temperature changes is practically nil.

(6) FIRE RESISTANCE—Any roofing approved by Underwriter's Laboratories, Inc., can be used over Celotex Vapor-seal Roof Insulation without change in rating.

C. SIZE AND THICKNESS

CELOTEX VAPOR-SEAL ROOF INSULATION is manufactured in one size only 23" x 47", and in thicknesses of 1", 1½", and 2". Square cut offsets ½ inch wide by ½ inch deep are provided on the underside of each thickness of board.

D. USES

For roof insulation over any solid type of roof deck, such as wood, concrete, gypsum, unit tile or steel. It is particularly recommended for buildings where high humidities due to manufacturing processes are maintained or where air conditioning is used. It is adapted to all other types of structures where long life and most efficient type of roof insulation is desirable.

E. ADVANTAGES

(1) CELOTEX VAPOR-SEAL ROOF INSULATION has greater insulating value than ordinary rigid fibre board roof insulation products. The thermal conductivity of ordinary roof insulation board varies from 0.33 to 0.36 Btu.. per inch thickness.

(2) Celotex Vapor-seal Roof Insulation is a pressure resisting rigid board form of insulation of proper density particularly adapted to use under built-up, smooth surfaced, or pitch and gravel roofing.

(3) Composition roofing applied with either asphalt or pitch will bond perfectly to the asphalt surface and it requires no greater quantity of hot bitumen per square than used in bonding roofing felts together.

(4) Celotex Vapor-seal Roof Insulation is highly moisture resistant. Each fibre is coated with a sheath of alum and resin to waterproof it during manufacture. It is integrally treated with the Ferox Process to prevent destruction by termites, fungus, or other cellulose destroying organisms. As further protection, the asphalt coating on all edges and surfaces of Celotex Vapor-seal Roof Insulation greatly reduces the danger of serious damage to the material due to sudden showers on the job, leaks in the composition roofing, and moisture condensation within the insulation.

(5) Half inch offsets on all edges of the underside of the insulation blocks form channels which equalize air pressure within the roof construction, preventing blisters caused by expansion of entrapped air or of air within the insulation.

(6) It is light and easily handled and protected during shipment or job storage by heavy kraft paper wrappings.

(7) Celotex Vapor-seal Roof Insulation effectively retards the flow of heat through the roof structure. This results in a substantial saving in fuel and radiation and for more comfortable working or living conditions during hot weather. When properly installed, it prevents ceiling condensation in buildings with excessive humidity conditions and the deterioration of wood roof structures in mill buildings, thus saving frequent and costly replacements.

SPECIFICATIONS—Short Form 200-A (Normal Conditions) Application by Nailing

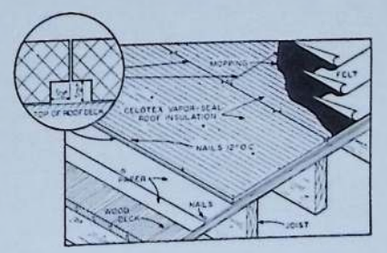
All roof decks throughout the building as indicated shall be insulated with [specify thickness] Ferox Treated Celotex Vapor-seal Roof Insulation in one layer, applied in strict accordance with manufacturer's current specifications, 200-A.

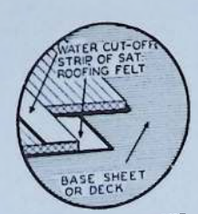
SPECIFICATIONS — Short Form 200-B (High Humidities) Application by Mopping

All roof decks throughout the building as indicated shall be insulated with [specify thickness] Ferox Treated Celotex Vapor-seal Roof Insulation in one layer, applied in strict accordance with manufacturer's current specifications, 200-B. Prior to the installation of roof insulation the entire roof area shall be covered with a Vaporproofing Course. (Use either method 1 or 2.)

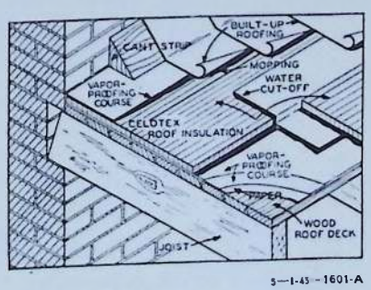
1. Over the wood roof deck first lay a layer of rosin sized sheathing paper lapped 2" at joints and nailed sufficiently to hold in position. Over the building paper lay two (2) plies (lapped half) of 15 lb. saturated [tarred] [asphalt] roofing felt. Nail the back edge of each sheet with tin-capped, galvanized, barbed roofing nails spaced 12" o.c. All laps shall be mopped back 17" with hot [coal tar pitch] [asphalt]. Do not mop over this membrane until just prior to the laying of insulation.

2. Over the wood roof deck lay two (2) plies (lapped half) of 34 lbs. per square prepared asphalt roofing having one side coated. Lay coated side down. Nail the back edge of each sheet with tin-capped, galvanized, barbed roofing nails spaced 12" o.c. All laps shall be mopped back 17" with hot asphalt. Do not mop over this membrane until just prior to the laying of insulation.





DETAIL OF WATER CUT OFF SEPARATING ADJOINING AREAS OF INSULATION



S—1-45—1601-A

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SPECIFICATIONS

CELOTEX VAPOR-SEAL ROOF INSULATION OVER WOOD ROOF DECKS

DETAILED FORM

1. SCOPE OF WORK

The Roofing Contractor shall provide and install roof insulation direct to all areas indicated.

NOTE: *Here list and locate definitely the roof areas to be covered. If more than one thickness is used, list and locate each work area separately. Bold face bracketed words are selective.*

2. MATERIAL

Insulation shall be **[specify thickness]** Ferox Treated Celotex Vapor-seal Roof Insulation laid in one layer.

3. ROOF DECK

The surface of the roof deck shall be broomed clean, free from dirt, loose material and thoroughly dry. All loose and springy boards shall be properly nailed before insulation is laid.

4. GENERAL

All Celotex Vapor-seal Roof Insulation shall be kept dry before, during, and after application. Only as much Celotex Vapor-seal Roof Insulation shall be laid over roof areas as can be covered by finished roofing in any one day. Apply with channels or off-sets on the underside next to the deck. (Not shiplapped.) Adjoining edges shall be brought to a moderate contact but shall not be forced into place. Where the roof meets vertical surfaces, such as parapets, penthouses, etc., boards shall be cut in a neat, workmanlike manner to insure proper joining without forcing. Boards shall be laid in parallel courses with end joints in each course breaking with those of adjoining courses.

NOTE: *Refer to General Information and Improved Application Suggestions.*

5. APPLICATION

200-A—NORMAL CONDITIONS

NOTE: *This specification applies to insulation against heat loss and to protect against top story excessive summer heat. Where prevention of condensation is required, use Application 200-B.*

(5a1) The entire roof area shall be covered with two (2) plies (lapped half) rosin-sized sheathing paper or asphalt saturated and coated paper. Fasten with barbed roofing nails until insulation is laid.

(5a2) Nails shall be of sufficient length to pass through the insulation and penetrate the wood roof deck, at least ¾".

(5a3) Space nails 12" o.c. Boards shall be held in place by nailing along each edge and staggered along the center line.

200-B—HIGH HUMIDITIES (Vaporproofing Course)

NOTE: *This specification applies where high humidities are maintained and prevention of condensation is necessary. Where this condition does not exist use Application 200-A.*

NOTE: *Include over entire roof area in conjuction with roof insulation on wood roof decks over rooms carrying high manufactured or incidental humidities. Select one of the two types specified below — select also, dependent on the type of finished roofing specified, pitch or asphalt.*

(5b1) Over the wood roof deck first lay a layer of rosin sized building paper lapped 2" at joints and nailed sufficiently to hold in position. Over the building paper lay two (2) plies (lapped half) of 15 lb. saturated **[tarred] [asphalt]** roofing felt. Nail the back edge of each sheet with tin-capped, galvanized, barbed roofing nails spaced 12" o.c. Laps shall be mopped back 17" with hot **[coal tar pitch] [asphalt].** Do not mop over this membrane until just prior to the laying of insulation.

(5b2) Over the wood roof deck lay two (2) plies (lapped half) of 34 lbs. per square prepared asphalt roofing having one side coated. Lay coated side down. Nail the back edge of each sheet with tin-capped, galvanized, barbed roofing nails spaced 12" o.c. All laps shall be mopped back 17" with hot asphalt. Do not mop over this membrane until just prior to the laying of insulation.

(5b3) Wrap the vaporproofing course around edge and mop back 6" on top of insulation at walls, skylight curbs, and under monitor skylight sash.

(5b4) Mop the exposed vaporproofing course felt liberally with hot **[coal tar pitch] [asphalt].** Mop only sufficient area to embed one insulating board at a time. Embed each board firmly. (For inclines exceeding 3" per foot use steep roofing pitch or steep roofing asphalt and supplementary nailing.)

NOTE: *Built-up roofing shall be applied in strict accordance with manufacturer's specifications selected by the architect. For Celotex Built-up Roofs see Celotex Roofing Products section in Sweet's Catalog.*

GENERAL INFORMATION AND IMPROVED APPLICATION SUGGESTIONS

SHEET METAL WORK—Roof insulation warrants the installation of the very best type of flashing construction. It is important that insulation be protected from the elements. A condensation drip pan of metal should be installed under the sill of sash frames at skylight, monitor, and saw-tooth curbs to prevent moisture that may form on window glass from entering roofing and the underlying roof insulation by infiltration at these points. At exposed eaves, roofing and insulation should be protected by metal eave strips. Therefore, we recommend that you insert the following in the sheet metal specifications:

Drip Pans—A condensation drip pan flashing of metal shall be provided under the sills of sash frames at skylight, monitor, and saw-tooth curbs.

Eave Strips—At exposed eaves, metal eave strips, with drip, and extended down over edges of roof deck shall be provided as a stop for the insulation and securely fastened in place.

Gutters—Hanging gutters shall be furnished in a complete unit provided with roof flange, [(gravel stop) (if roof surface is of gravel or slag)] and the entire girth of the gutter formed in one continuous sheet of metal properly hung with roof brackets.

Vent Flashing—Vents, outlets, drains, scuppers, etc., shall be properly flashed and installed in a workmanlike manner. (Large or heavy ventilators, standpipes or louvers shall be securely anchored to the underlying roof deck.)

CARPENTRY—Wherever cant strips are provided, insert the following in the carpentry specifications:

Cant Strips—Cant strips shall be provided at all intersections of the roof surfaces and vertical walls, parapets, and curbs. Wood cant strips shall be set on top of roof insulation and securely fastened in place by nailing through insulation into the roof deck or nailing strips.

Where sheet metal flashing aprons and flanges of any nature are used, insert the following in the carpentry specifications:

Wood Nailing Strips—Wood nailing strips of sufficient thickness to finish flush with the top surface of the insulation and 1" wider than metal flashing aprons and flanges shall be provided for such aprons and flanges. Nailing strips shall be rigidly secured to the roof deck with (nails) (lag bolts) (expansion bolts).

SEAL COURSE—A seal course laid prior to the application of the roof insulation permits sealing the roof deck shortly after it has been completed, thus protecting the interior of the building from the weather. The seal course makes it possible for the roofing contractor to await weather most favorable to the roofing work and the roofing may be applied to the deck after the work of the other trades has been completed, thereby preventing possible damage to the roofing. If a seal course is desired, insert the following in the built-up roofing specification:

Seal Course—Prior to the installation of the roof insulation, entire roof area shall be covered with a seal course consisting of one layer of 15 lb saturated felt. Apply felt lapped half, laid dry, over building paper and nail 1" from upper edge sufficiently to hold in place. Mop between layers to within 1" of upper edge. Mop the entire surface of this felt with a uniform coating of bitumen.

WATER CUT OFFS—Water cut offs consist of strips of saturated roofing felt stuck in bitumen to the base sheet carried over the edge of the insulation and stuck to the top surface of the insulation. Water cut offs are used to divide the roof area into rectangular sections approximately 30' square so that each such area of roof insulation is isolated from adjoining areas. If water cut offs are desired, insert the following in the built-up roofing specification:

Water Cut Offs—Strips of saturated roofing felt 8" to 10" wide shall be stuck in bitumen to the base sheet, carried over the edge of the insulation, and stuck to the top surface of the insulation. Install these water cut offs approximately 24" from and parallel to all vertical walls and divide the roof area into rectangular areas approximately 30' square. In installing water cut offs between such areas. At the end of each day's work, similar cut off shall be applied and mopped solidly over the exposed edges of insulation.

TWO LAYER INSULATION—This specification contemplates the use of single layer application which is the accepted practice on most roofs today. The nature of this material, its size, and its square edges make the heat loss through joints practically nil. When two layer application is desired, insert the following in this specification:

Two Layer Insulation—Apply the boards of the second layer parallel to those of the first layer so that the joints of the second layer break with those of the first layer and with the offset edges of the second layer facing downward against the first layer. [(Select one of the following clauses, depending upon either normal conditions or high humidities.) (Apply the two layers of insulation by nailing through the two layers at one time.) (Embed the second layer in a hot mopping of bitumen to the first layer.)]

CELOTEX

The word Celotex is the brand name, identifying a group of products manufactured by The Celotex Corporation and is protected as a trade mark shown above.

CELOTEX CEMESTO

INDEX No. 37-A OF A.I.A. FILE
File Under Structural Insulation Fabricated
Issued February, 1945

THE CELOTEX CORPORATION — 120 South La Salle Street — CHICAGO, ILLINOIS

For Information on All Celotex Products see File Index of Sweet's Catalog

A. DESCRIPTION

CELOTEX CEMESTO BOARD is a structural insulating material consisting of genuine Ferox-treated Celotex cane fibre insulation board surfaced on both sides with ⅛-inch asbestos-cement board, light grey in color. A moisture-proof, highly-resistant bituminous adhesive bonds the asbestos-cement to the Celotex core. Cemesto Board, therefore, combines the high insulating efficiency of Celotex and the special benefits of the asbestos-cement surface. The patented Ferox Process protects the Celotex core against damage by dry rot, fungus growth, and termite attack. Cemesto Board was first introduced by The Celotex Corporation in 1930 and is now produced at the Metuchen, New Jersey, plant.



B. PHYSICAL PROPERTIES

(1) Insulating Value—The high insulating value of the Celotex core is retained in Cemesto Board. Its conductivity has been established by tests to be 0.33 B.t.u. per hour per square foot per degree F. per inch thickness. When Cemesto Board is applied to studding, joists or rafters alone or in combination with other materials, the coefficient will be practically the same as it is for the corresponding thickness of plain Celotex board used in the same manner.

(2) Strength and Stiffness—Laboratory tests together with actual experience over 12 years in practice testify to the strength of Cemesto Board. The asbestos-cement surfacing adds strength making Cemesto Board particularly useful in wood frame or steel construction. Cemesto Board is not recommended as a load bearing material for walls or partitions.

(3) Water and Vapor Resistance—Asbestos-cement board itself is reasonably waterproof, and therefore affords considerable protection to the underlying Celotex core. For greater protection, Cemesto Board is provided with a waterproofing and bonding course of special asphalt between the asbestos-cement and the Celotex core. Cemesto Board has been used in various types of air conditioning and humidity rooms over a number of years without deterioration. For unusually severe conditions, the surface is painted as an added precaution.

(4) Expansion and Contraction—Expansion and contraction of Celotex Cemesto Board due to temperature changes is practically nil. The restraining effect of the two asbestos-cement surfaces minimizes such dimensional changes.

(5) Fire Resistance—Asbestos-cement itself is fireproof. In combination with Celotex board, it provides an excellent flame-proof surface treatment; and therefore Celotex Cemesto Board is fire retardant to a satisfactory degree. Cemesto Board, however, is not a high temperature insulation and is not recommended where the temperature is constantly in excess of 200° F.

(6) Bond Strength—The bond between the asbestos-cement and the Celotex core is in excess of 1,000 lbs. per square foot. The material shows no sign of fracture when subjected to severe vibration nor will it delaminate under severe climatic conditions when the application conditions are right.

(7) Permanence—The Celotex core is manufactured under the Ferox Process (patented), and therefore effectively resists damage by fungus growth, dry rot, and termites. The hard surfaced coating of asbestos-cement will withstand exposure to severe climatic changes without the asbestos-cement facing flaking, chipping, spalling or becoming loose from the Celotex core. The surface will not discolor or streak. If necessary, the surface can be washed to maintain a clean wall finish.

C. SIZES, THICKNESSES AND WEIGHT

Standard Cemesto Board is made surfaced two sides only in thicknesses of 1⅛", 1$\frac{9}{16}$", and 2" all 4'-0" wide. Standard lengths are 4', 6', 8', 10', and 12'.

Special rectangular sizes or other special shapes are furnished, but a charge is made for waste as well as for cutting costs. One or more edges may be shiplapped or grooved for spline, and edges may be sealed with a waterproof compound. Essential data in condensed form is shown in the table below:

Overall Thickness	1⅛"	1$\frac{9}{16}$"	2"
Celotex Core Thickness	⅞"	1$\frac{5}{16}$"	1¾"
Conductance of Celotex Core	0.38	0.27	0.19
Cemesto Wall Coefficients Air to Air ("U" Value):			
Inside Walls or Partitions	0.239	0.181	0.146
Outside Walls	0.267	0.197	0.156
Cemesto Surface to Surface Coefficients (Conductance)	0.337	0.233	0.179
Approximate Weight per Sq. Ft. (lbs.)	4.0	4.8	5.3
Approx. Wgt. per Sq. Ft. CRATED (lbs.)	4.4	5.3	5.8
Minimum Carlots—Sq. Ft. (Bulk)	21,000	17,500	15,000

D. USES

On factory buildings or industrial buildings, shops or assembly buildings, airplane plants, airplane hangars, ordnance plants, etc., Cemesto Board may be used for the exterior as a curtain wall replacing corrugated metal, rolled sheet metal, asbestos protected metal, corrugated asbestos siding or masonry. It may be used for an inside lining material in light factory construction in conjunction with steel or other surfacing material. Details illustrating special methods for supporting or attaching Cemesto for walls or roof decks will be furnished on request.

In general building construction, such as permanent or temporary housing, portable structures, temporary schools, exhibition buildings, filling stations, tourist camps, frame buildings or other wood frame structures, Cemesto Board is applied by nailing to wood members such as studs, joists or rafters. It is used as exterior sheathing providing insulation, bracing, and finish in one material. It may be used for walls, ceilings or partitions as interior treatment.

Certain processing industries, such as candy, baking, textile, tobacco, and dry kiln manufacture, require special treatment rooms to maintain fixed temperatures, humidities or drying conditions. In such rooms Cemesto Board can be applied either to metal or to wood framing.

(CONTINUED ON REVERSE SIDE)

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CELOTEX CEMESTO

(CONTINUED)

E. ADVANTAGES

The merits of the material, stated briefly, are:

(1) Hard, durable, smooth, washable surface.

(2) Fire-proof surface.

(3) Surface is not damaged by sulphur dioxide or ordinary acid fumes.

(4) A light grey-white surface of high light reflection.

(5) A pleasing finish, unaffected by the elements, for either exterior or interior work.

(6) It is readily workable with ordinary carpenter tools. It may be sawed, drilled, and nailed. It may be applied with nails, screws or bolts and clips. Nailing will not fracture the surface when reasonable care in driving is used.

(7) Celotex core provides a degree of resiliency to prevent shattering or fracture.

(8) A suitable vapor barrier provided by the bituminous laminating agent.

F. APPLICATIONS OF CEMESTO

(1) Exterior Walls With Wood Framing:

(a) Single Wall—Mill Construction—Single wall construction (so-called curtain wall construction) using large panels of Cemesto in standard wood mill buildings. Horizontal wood girts approximately 4'-0" apart are framed between wood columns. Nailing members are framed between girts at vertical Cemesto joints thus allowing these joints to occur independently of column spacing. Panels are attached to wall framing members by nailing. Vertical joints are covered with caulking tape and wood battens. Horizontal joints are sealed by laying caulking tape between joints as panels are set up. Wood industrial sash may be easily installed at any desired location in the wall. Suitable for 1⅛", $1\frac{9}{16}$" or 2" Cemesto.

NOTE: *For illustrations, specifications, and application instructions, write for Detail Sheet W-1.*

(b) Single Wall—Ordinary Wood-Framed Structures—Wall framing consists of studs and horizontal nailing headers set in between studs. Studs are located 4'-0" on centers to utilize standard widths of Cemesto. Horizontal headers are spaced so as to center on horizontal Cemesto joints. Panels are attached to wall framing members by nailing. Horizontal wall joints are sealed with caulking tape. Vertical joints are sealed with waterproof wood spline and caulking tape. Suitable for 1⅛", $1\frac{9}{16}$" or 2" Cemesto.

NOTE: *For illustrations, specifications, and application instructions, write for Detail Sheet W-2.*

(c) Alternate Single Wall—Exterior Construction. A simple method consists of wood framing made up of T-shaped studs spaced approximately 4'-2" on centers built up of a 2" x 4" to which is attached a 2" wood member of the same thickness as the Cemesto Board used, forming a T-shaped stud. A suitable top plate or girder of 2" x 4", 2" x 6" or 2" x 8" shall be used to distribute the loads to the Tee studs. Cemesto is inserted between the 2" members set in caulking compound and nailed to the flat side of the 2" x 4". The inside exposed joints are covered with a 4" wide wood batten nailed through to the opposite side of the 2" x 4". Suitable only for $1\frac{9}{16}$" or 2" Cemesto.

(d) Double Wall Construction—Exterior or Interior—Wood framing shall consist of 2" x 4" studs spaced 24" or 48" on center with 2" x 4" headers behind all horizontal joints or cut edges to which Cemesto is attached. Suitable for 1⅛", $1\frac{9}{16}$" or 2" Cemesto.

(2) Exterior Walls With Steel Framing—Two special methods have been developed for the application of Cemesto as an exterior "curtain" wall on structural steel industrial buildings. This curtain wall construction provides insulation, exterior weather resistance, and a neat interior surface in one application. The Cemesto is attached by means of clips and bolts to light steel intermediate members adapted to the structural design and column spacing used.

Cemesto also may be applied by nailing to nail-holding metal members using the same spacing as recommended for wood framing.

NOTE: *For illustrations, specifications, and application instructions, write for Detail Sheets S-1, S-2, and S-3.*

(3) Interior Partition Walls—Three types of partitions either ceiling high or free standing. Limited to a height of 12'-0". The constructions described below permit the partition to be taken down and reassembled with ease.

(a) Load-Bearing Single-Wall Partition—A Cemesto panel is framed between studs consisting of 2" x 4"s or 4" x 4"s set approximately 4'-2" on center and held in place with wood quarter-rounds or stops nailed to the studs around all edges on both sides of the Cemesto. For load-bearing partitions the studs are tied together by a suitable top plate of proper size to carry required loading. Suitable for 1⅛", $1\frac{9}{16}$" or 2" Cemesto; 4'-0" widths.

(b) Splined Non-Bearing Single-Wall Partition—A studless, non-load bearing partition wall may be built with Cemesto grooved on edges to receive spline. The spline method of construction eliminates the need of framing members or battens at the joints. The spline consists of ⅜" wood inserted in a slot having a depth of at least ¾ of an inch in each Cemesto panel. The partition should be anchored top and bottom with rabbeted plates or base and cove mouldings. Suitable for $1\frac{9}{16}$" or 2" Cemesto; 4'-0" widths. For partitions to remain in place permanently, the spline should be glued in place using either chip glue or Celotex Light Bodied Adhesive.

(c) Battened Non-Bearing Single-Wall Partition—Similar to No. 3-b except the spline is omitted and 1" x 3" or heavier wood battens are placed on opposite sides of all vertical joints and fastened together by nailing through the batten on one side and through the Cemesto into the batten on the other side. The top and bottom plates are rabbeted to receive the Cemesto and the battens stop at the plates. Suitable for 1⅛", $1\frac{9}{16}$" or 2" Cemesto; 4'-0" widths.

NOTE: *For illustrations, specifications, and application instructions, write for Detail Sheets WP-1 and WP-2.*

(4) Cemesto Roof Decks on Wood Framing—Cemesto may be used as a roof deck on flat or sloping roofs. Wood purlins or rafters of sufficient strength to support the loads shall be spaced 4'-0⅛" on centers. Apply 4'-0" wide Cemesto parallel to framing with 2" x 4" wood headers under end joints or apply "special size" 2' x 8' Cemesto at right angles to framing using wood spline for joining long edges. End joints to rest on bearing allowing ⅛" between slabs. Nail Cemesto to framing, spacing nails 6" to 8" o.c. along edges. Use large-headed 12d nails with $1\frac{9}{16}$" Cemesto and 16d nails with 2" Cemesto. All joints shall be filled flush with caulking compound and then covered with 6" wide strips of sheathing paper lightly nailed or cemented to the board. Finished roofing shall be applied in accordance with roofing manufacturer's specifications.

NOTE: *For illustrations and application instructions, write for Specification Sheet Form 4519.*

(5) Nailing—Cemesto is applied to wood framing by nails or screws. Nails shall be spaced approximately 4" to 6" on centers along edges and 8" to 12" on centers on intermediate bearing. Nails shall be ⅜" to ¾" in from edge with heads flush with facing. Nails shall be approximately twice as long as the thickness of Cemesto used. Use common nails for ordinary construction and galvanized or cement-coated nails for high humidities. For application to steel, bolts, screws or clips may be used.

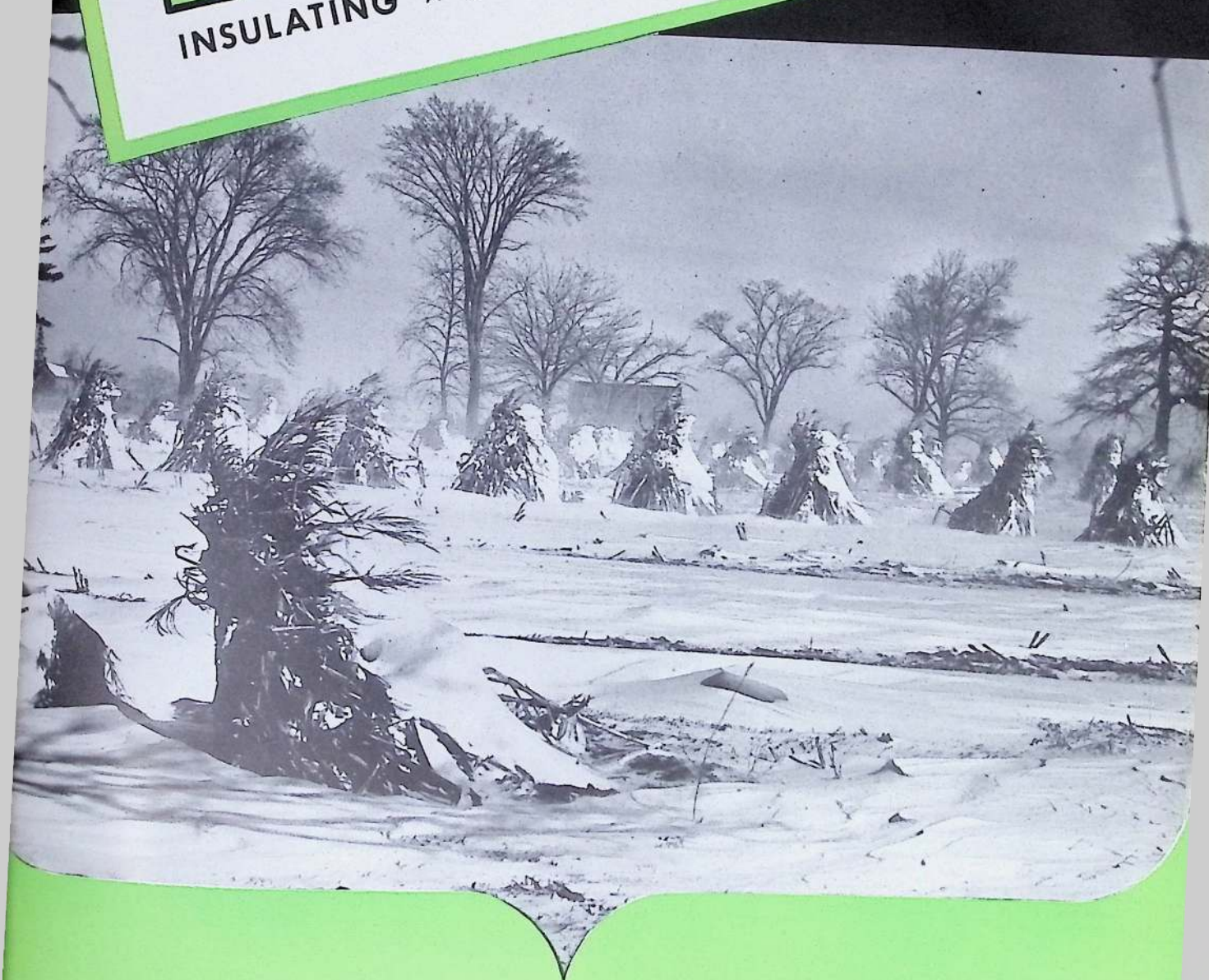
(6) Joint Treatment—Generally Cemesto joints are covered with strips of asbestos-cement, wood or metal. If desired, joints may be left plain—slightly beveling or rounding the edge of the face with an emery stone, file, plane or sandpaper. Shiplapped or splined joints are also possible. For exterior joints and for interior joints in rooms where high humidities prevail, use a gasket of roofing felt or asbestos felt under the batten or caulk joint and batten with caulking compound applied with caulking gun.

(7) Finishing—It is not necessary to paint Cemesto when used as exterior finish. Water emulsion paints for interior use may be applied directly to Cemesto. The asbestos-cement surface of Cemesto demands special precautions with some paints. When oil base paints are used on the interior, it is necessary to prime the surface with a specially prepared primer or a zinc sulphate wash in order to neutralize the lime. Lead and oil paints for exterior surface demand special preparatory application. Paint suitable for application over Portland cement may also be applied direct. For unusual conditions of acid fumes, special acid-resistant paint should be used. The Celotex Corporation will assist in any paint problem.

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CELO-SIDING

INSULATING ★ STRUCTURAL ★ EXTERIOR FINISH



for FARM UTILITY BUILDINGS

A superior, multiple-function material especially adapted to farm building construction where insulation, structural strength, speedy application and economy in first cost and maintenance are required.

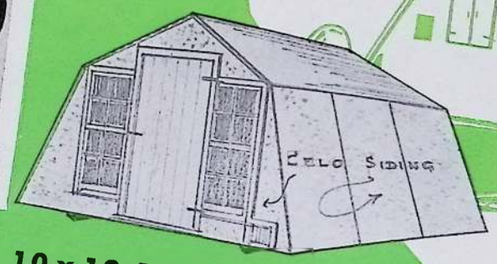
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SMOOTH ROLL ROOFING

Especially recommended for use on roofs of Celo-Siding farm buildings are the high quality Celotex smooth roll roofings. Waterproof, weather-proof, made of the finest felts, these roll roofings will give years of service and lasting protection under all weather conditions. Easily applied.

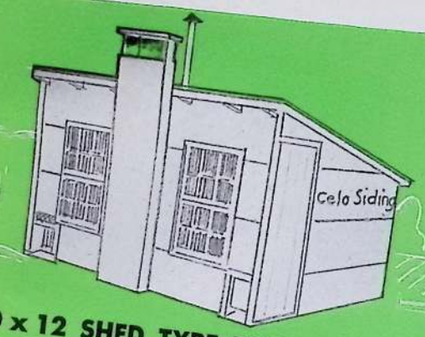


TRIPLE-SEALED for YOUR PROTECTION



10 x 12 BROODER HOUSE

Brooder Houses are the starting homes of baby chicks. Built to provide controlled temperature conditions, these houses should be well insulated and ventilated. *Celo-Siding* provides insulation.

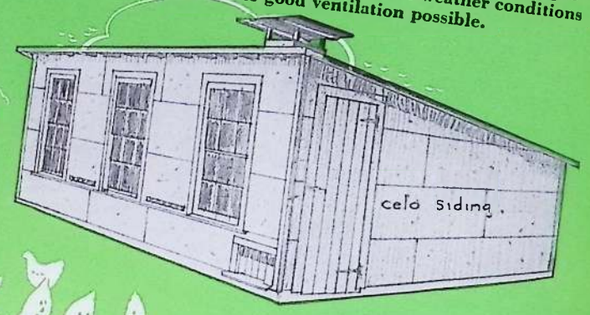


10 x 12 SHED TYPE BROODER

A sturdy structure that will stand many years service and racking strain of moving to clean new ground locations. *Celo-Siding* improves temperature and ventilation control.

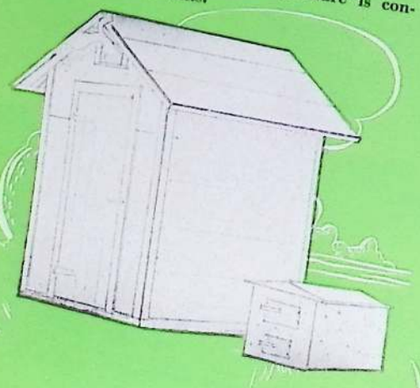
POULTRY LAYING HOUSE

Standard 20′ x 20′ poultry laying house with ventilating system. *Celo-Siding* insulation protects against extreme outside weather conditions and makes good ventilation possible.



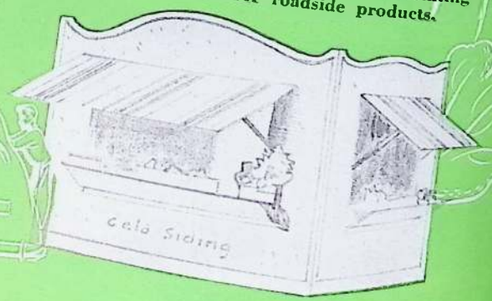
SMOKE HOUSE

With an outside firebox, frame construction may be used with little fire hazard. Tight construction is necessary as temperature is controlled by gable vents.



ROADSIDE MARKET

Smart, colorful *Celo-Siding* attracts attention and establishes confidence of buyers, resulting in more patronage for roadside products.



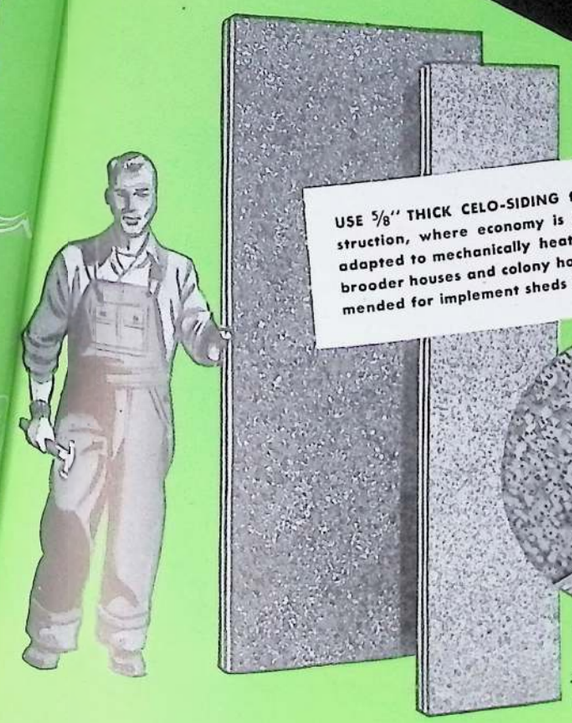
TENANT HOUSES • SMALL GENERAL PURPOSE BARNS • O

CELO-SIDING

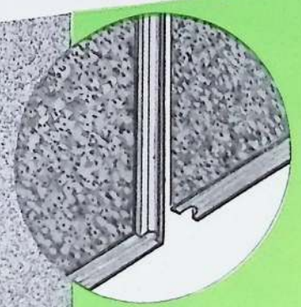
TRADE MARK

AVAILABLE *Now* . . . WITHOUT PRIORITIES

To help American Farmers in the real job they are doing of producing food for the world at large.



USE 5/8" THICK CELO-SIDING for lighter type construction, where economy is important. Especially adapted to mechanically heated structures such as brooder houses and colony hog houses. Also recommended for implement sheds and lining milk houses.



This detail shows T&G Joint on 2′ x 8′ size in 7/8" thickness only.

COMES IN SIZES:

5/8"—4′ x 8′
with Square Edges

7/8"—2′ x 8′
with T & G Joints on long edges

4′ x 8′ and 4′ x 10′
with square edges

•

...IN 2 GOOD-LOOKING COLORS

•

EASY TO HANDLE

EASY TO APPLY

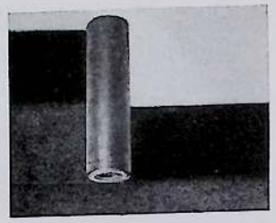
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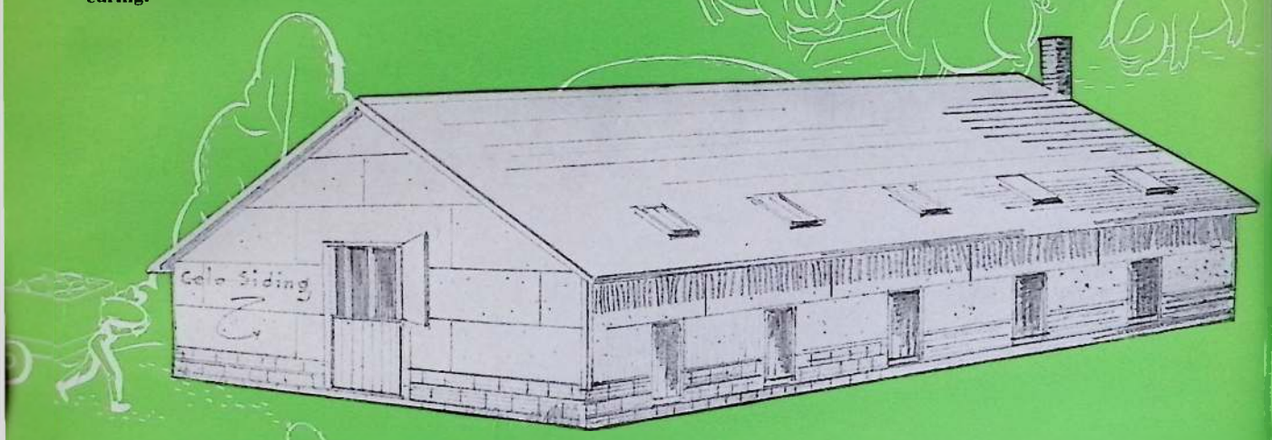
TOBACCO CURING BARN
Dry, even temperature provided by *Celo-Siding* protects storage and aids in tobacco curing.

19/UP ROLL ROOFING



For lasting economy and assured protection Celotex 19/Up mineral surfaced roll roofing is recommended where Celo-Siding farm buildings demand the best in roofing. A 19" selvage provides double coverage, blind nailing assures a smooth appearance and finest mineral granules in several attractive colors afford a measure of fire safety.

TRIPLE-SEALED for YOUR PROTECTION



HOG COLONY HOUSE
Celo-Siding walls make draft proof interiors, insure a comfortable start in hog colony houses to raise litters for market.

LET'S RAISE *Pigs!*

Celo-Siding is ideal for hog houses because it keeps interiors in the right condition both summer and winter. "Only 60% of pigs farrowed each year live to market age," says Dr. Robert Graham of the University of Illinois, "and about 30% of the loss occurs in the first 60 days after birth." Cold, drafty houses, lack of ventilation, and unclean ground location for litters, invites these results. It costs just as much to house a sow with only half a litter as it does to raise all her young pigs, and think of the profits lost.

Select a good location for the hog house, provide warm, dry interiors by facing side and ends with Celotex *Celo-Siding*. Adopt a proper feed program. That's the answer to raising more pigs more profitably.

CELO-SIDING
TRADE MARK

. . . A War Developed and Tested Exterior Siding

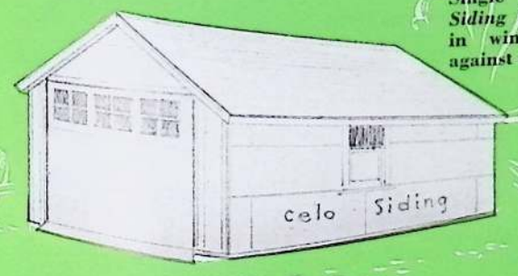
An economical granule-coated siding that gives long lasting service, ideal for remodeling or on new construction. Possesses structural strength and good insulating qualities. Will withstand beating, slashing rains, snow, sleet, ice, and hot summer sun. *Celo-Siding* is available in bufftone or green colors and in two thicknesses 5/8" and 7/8". Sizes 5/8"—4' x 8' with square edges; 7/8"—2' x 8' with T&G joints on long edges, 4' x 8' and 4' x 10' with square edges. Use 7/8" for greater strength and insulation value; 5/8" for lighter, lower cost construction. Easy to handle and apply—modernizes and weather proofs any utility building at low first cost with little, if any, maintenance expense.

ADVANTAGES OF CELO-SIDING

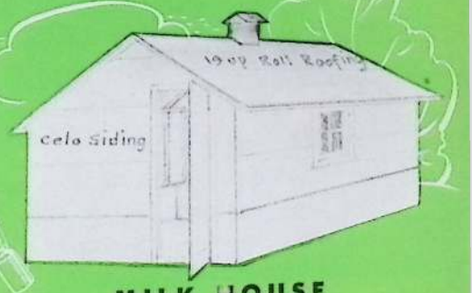
In this period of material shortages and building restrictions, farmers will appreciate such a high-grade, easy-to-apply siding for utility buildings. No special tools are necessary to apply *Celo-Siding*. Anyone, even without experience, can erect it. *Celo-Siding* comes in boards in sizes convenient to handle and apply by one man. The durability of Celo-Siding insures full protection of isolated buildings lacking natural protection. The trim appearance that *Celo-Siding* gives to scattered buildings blends them into a pleasing farm scene that adds to farm values. *Celo-Siding* gives added protection against loss by fire from flying sparks.



GARAGE—IMPLEMENT SHED—WORKSHOP
This utility building will fit the needs of dirt farmers for storage of motor driven equipment. *Celo-Siding* makes the building a comfortable place to work in during the winter months when there is time to repair equipment at the built-in work bench.



10' x 20' SINGLE GARAGE
Single garage 10' x 20', with *Celo-Siding* provides tight-walled interiors in winter months and protection against direct rays of hot summer sun.



MILK HOUSE
Celo-Siding installed above the concrete wall of this milk processing room will make a good-looking, sanitary milk house, 8' x 10'.

ND STORAGE • GENERAL WAREHOUSES • SMOKE HOUSE ORY BARNS • CATTLE FEEDING SHEDS • SWEET POTATO CURING

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CELO-SIDING

TRADE MARK

Read carefully. **If you intend to erect new buildings, consider *Celo-Siding* sizes in planning spacings of studs, wall heights, and general over-all dimensions.**

APPLICATION INSTRUCTIONS

Celo-Siding, applied to wood framing provides bracing strength, insulation, and a weather-resistant exterior surface finish. *Celo-Siding* is furnished in two colors—bufftone and green; 5/8" and 7/8" thick and in the following sizes:

Celo-Siding 7/8" (center matched), size 2' x 8'—tongue and groove long edges, short edges square. *Celo-Siding* (big board); 5/8"—4' x 8' with square edges; 7/8"—4' x 8' and 4' x 10' with square edges.

FRAMING—*Celo-Siding* should be applied to studs of the following spacings: 16" or 24" o.c.—for horizontal applications of center matched boards. 24" spacing—for vertical applications of center matched boards.

Headers should be provided behind end joints in vertical application of *Celo-Siding* (center matched) and vertical and horizontal applications of *Celo-Siding* (big board).

CELO-SIDING (CENTER MATCHED): Horizontal Application—To ensure alignment of *Celo-Siding*, strike a chalk line across framing for the first course.

Start application at the base and center of a wall with tongues of boards *up*.

From center, nail *Celo-Siding*, caulk joints (see caulking instructions), and proceed with application right and left to opposite corners of wall, allowing a space not to exceed 1/8" between short edges of boards.

Cut boards at corners, allowing them to extend beyond edge of rough framing so that the surface of *Celo-Siding* on adjoining walls will be flush with the cut edges of boards.

Begin application of second course staggering or off-setting vertical joints with respect to those in the first course.

The vertical and horizontal joints of *Celo-Siding* (center matched) shall be left exposed. Horizontal butt joints in vertical application requiring two or more courses may be covered with batten strips backed up with caulking cement.

CORNER TREATMENT—At exterior corners, apply wood corner strips backed up with caulking cement over the ends of *Celo-Siding*.

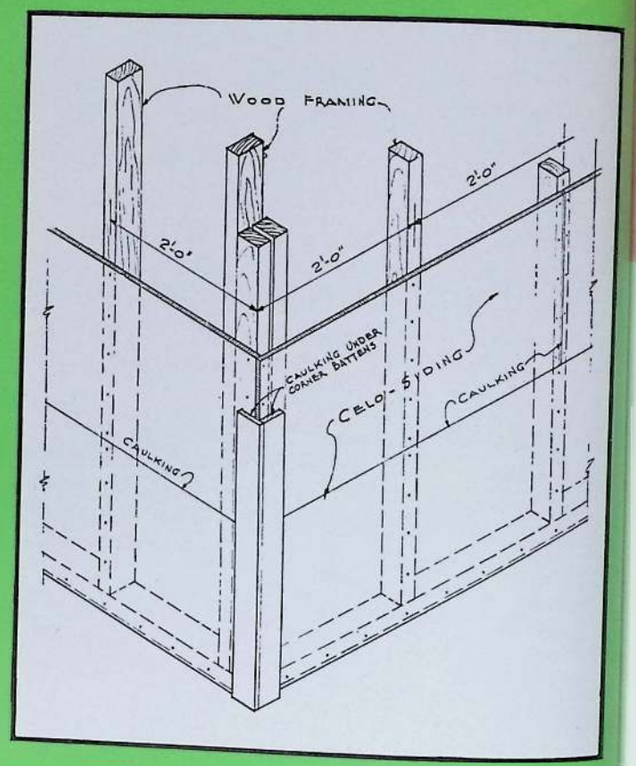
Bring board in close contact with framed openings. (Drip caps should be set before application of *Celo-Siding*.) The juncture between window and door casings and *Celo-Siding* should be thoroughly caulked.

The accompanying drawing illustrates use.

CUTTING—Cut through granule and asphalt layers with a roofing knife. Complete cut with a coarse-tooth, wide-set saw.

NAILS AND NAILING—The following nails are recommended: 2 3/8"—8d cement-coated nails (sinkers) or equal.

All nails shall be 3/8" in from edges of *Celo-Siding*. Nails shall be spaced 4 1/2" o.c. at intermediate and edge supports for *Celo-Siding* (center-matched).



The heads of the nails shall be flush with the granule surface of *Celo-Siding*.

CAULKING INSTRUCTIONS—Use a gun consistency caulking cement to caulk joints between *Celo-Siding*.

Use a small nozzle caulking gun, applying a generous ribbon of caulking cement to the back edges of the tongues of *Celo-Siding* (center-matched)—horizontal applications—scraping off any extrusion of cement if the reverse side is to be exposed to the interior.

All *Celo-Siding butt joints* should be caulked by first nailing a board in place and applying a ribbon of caulking cement at the intersection of the edge of the *Celo-Siding* and the surface of the framing.

THE CELOTEX CORPORATION • CHICAGO

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50—8-44—7223A



SONOTHERM

STRUCTURAL INSULATING BOARD

Sonotherm Insulating Board is the combination of long, tough wood fibers, chemically impregnated and completely coated with special, fire-resistive cement and molded into strong slabs of predetermined thicknesses. The exceptional strength of Sonotherm combined with the important heat-insulating and sound-absorption properties make it an ideal building material. It is used as structural roof decking, fire-resistive siding for stucco base, sound insulating partitions, ceiling and wall lining laid in forms, exposed or plastered suspended ceilings. Sonotherm can be easily sawed, chamfered, glued and nailed . . . can be applied on wood studding or on steel frame angle iron.

FIRE-RESISTANT! The wood fibers of Sonotherm are chemically impregnated and completely coated with fire-resistant cement. Fire Department tests have found Sonotherm to possess satisfactory fire-resistive qualities.

HIGH INSULATING EFFICIENCY! The thermal conductivity of Sonotherm as determined by the Engineering Materials Laboratory, University of California, establishes it as having high insulating value. Its insulating properties also prevent condensation.

HIGH SOUND ABSORPTION VALUE! The open, porous surface of Sonotherm allows the absorption of sound, making it an ideal material for correcting acoustical deficiencies and for reduction of noisy conditions. It may be painted without impairing its acoustical efficiency.

STRONG! DURABLE! TERMITE-PROOF! Tests have proven Sonotherm to possess exceptional and lasting strength. The mineralized wood fibers do not attract insects or rodents, are termite-proof and resist attack by fungus growth. There is no detrimental corrosive effect when Sonotherm comes in contact with steel and it also resists water.

IDEAL PLASTER OR STUCCO BASE! Sonotherm does not require additional lath, it is itself a strong stucco and plaster base, many times stronger than required by Government minimum specifications.

DECORATIVE SURFACE! Painted Sonotherm presents a pleasing texture and fits into any desired decorative scheme. The color of unfinished Sonotherm is a light, neutral gray that does not require excessive covering, even if painted white. Painting does not destroy its sound-absorbing efficiency.

Manufactured by

SONOTHERM MANUFACTURING COMPANY, INC.

MAIN OFFICE: MERCHANTS EXCHANGE BUILDING, SAN FRANCISCO, CALIFORNIA

Plant: ADDISON AND THIRD STREETS, BERKELEY, CALIFORNIA

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SONOTHERM STRUCTURAL INSULATING BOARD

THERMAL CONDUCTANCE OF SONOTHERM

Established by Engineering Materials Laboratory
University of California

One Inch Sonotherm	.399 B.t.u.
Two Inch Sonotherm	.199 B.t.u.

B.t.u. values are per hour, per sq. ft., per degree Fahrenheit.

SOUND ABSORPTION COEFFICIENTS OF SONOTHERM

Standing Wave Method, Bureau of Standards

Thickness	*Noise Reduction Coefficient*	*Coefficients at Frequencies Shown* 256	512	1024	2048
One Inch Sonotherm	.55	.38	.71	.61	.52
Two Inch Sonotherm	.70	.56	.56	.91	.78

TRANSVERSE STRENGTH OF SONOTHERM

Established by Engineering Materials Laboratory
University of California

WITHOUT CEMENT TOPPING

Thickness	*Span Between Supports*	*Transverse Strength*
2 Inch Sonotherm	16 inches	732 lbs. per sq. ft.
2 Inch Sonotherm	24 inches	336 lbs. per sq. ft.
2 Inch Sonotherm	32 inches	188 lbs. per sq. ft.
3 Inch Sonotherm	24 inches	905 lbs. per sq. ft.

WITH CEMENT TOPPING

2 Inch Sonotherm	24 inches	794 lbs. per sq. ft.
3 Inch Sonotherm	24 inches	1,650 lbs. per sq. ft.

SONOTHERM AS WALL SHEATHING WITH CEMENT PLASTER

Established by Engineering Materials Laboratory
University of California

Thickness	*Span Between 2"x 4" Studs*	*Transverse Strength*
One Inch Sonotherm with ¼ inch Cement Plaster	16 inches	600 lbs. per sq. ft.

BONDING STRENGTH OF PLASTERS ON SONOTHERM

Established by Engineering Materials Laboratory
University of California

Cement	1,022 lbs. per sq. ft.
Gypsum	605 lbs. per sq. ft.

SPECIFICATIONS OF SONOTHERM

Standard Thicknesses	*Standard Size*	*Approximate Weight*
1"	32" x 96"	2 lbs. per sq. ft.
2"	32" x 96"	4 lbs. per sq. ft.
3"	32" x 96"	6 lbs. per sq. ft.

SONOTHERM
THE FLAMEPROOF STRUCTURAL INSULATING BOARD

SONOTHERM MANUFACTURING COMPANY, INC.
MAIN OFFICE: MERCHANTS EXCHANGE BUILDING, SAN FRANCISCO, CALIFORNIA
Plant: ADDISON AND THIRD STREETS, BERKELEY, CALIFORNIA

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J-M Asbestos Flexboard



Horizontal and 12" x 12" scored DeLuxe Flexboard in combination with a wainscot of the plain material create this attractive bathroom

For many years, Johns-Manville Flexboard has successfully fulfilled the demand for a cement-asbestos board product which, in addition to possessing stone-like durability and being easily workable, creates attractive interiors. Millions of square feet of natural gray Standard Flexboard and integrally-colored Decorative Flexboard have been utilized with excellent effect in homes, offices, stores and public buildings.

The latest addition to this line, De Luxe Asbestos Flexboard, has a high glossy baked-on finish. The sheets are furnished in eight attractive colors to match any decorative scheme.

Standard Asbestos Flexboard is used for both interior and exterior surfaces; Decorative and De Luxe Asbestos Flexboard are for interior use only.

Advantages of Flexboard

All three of the Flexboard materials are made of asbestos fibre and portland cement formed under great pressure into dense, monolithic sheets. Consequently, they are fire-resisting, rot-proof and as permanent as stone. Yet Flexboard is readily workable. It is made in large size sheets to secure economical application. It may be cut with a carpenter's saw and nailed close to the edge without cracking. An added advantage, its flexibility, enables the sheets to be bent over curved surfaces. Flexboard can be installed with equal ease during the construction of a new building or over existing walls or ceilings.

DeLuxe Flexboard for Interiors

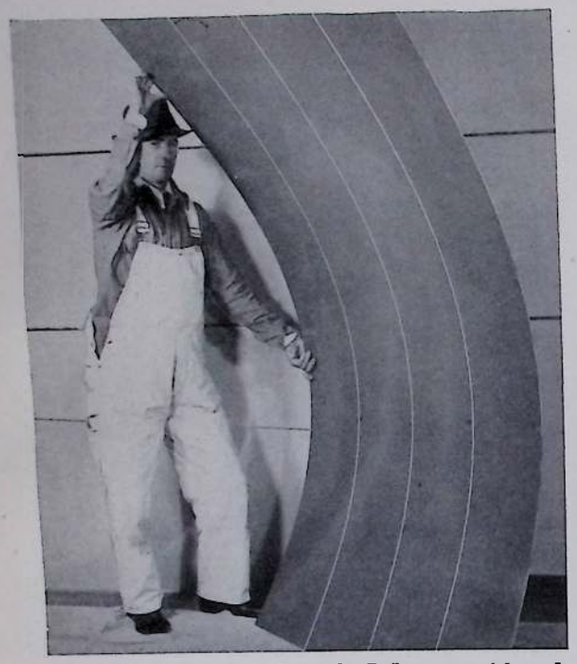
This material—a pre-finished asbestos sheet—was developed to meet the need for an inexpensive structural wall finish of mineral composition which has a colorful, high gloss surface. It was the work of the J-M research and factory men that made this product superior to similar materials: first because of its sturdy base; second, because of the care taken in manufacture and the modern equipment used in applying the finish; third, because rather than imitate, DeLuxe Flexboard sets a style of its own. As a result, this product is ideal for use in kitchens, bathrooms, theatre lobbies, stores, beauty parlors, office building corridors, barber shops and other interior locations.

The cement-asbestos base of DeLuxe Flexboard is specially waterproofed. This prevents moisture from penetrating through the back and edges of the sheet and causing swells or blisters in the surface.

J-M ASBESTOS FLEXBOARD
September, 1942 (Cancelling sheet dated August, 1941)

Printed in U. S. A.

Western Asbestos Co.: Architectural Manual (1946)
ACL Doc 21301 · Page 193 of 276
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Like other Flexboard products, the DeLuxe material can be applied to curved surfaces. This facilitates building semi-circular counters, lunch bars and similar structures

The durability and uniformity of the DeLuxe Flexboard mirror-like surface are caused not only by specially-developed lacquers but also are the result of air-conditioned spray rooms and up-to-date ovens from which the glossy finish comes out free from blemishes.

DeLuxe Flexboard maintains its distinctiveness by coupling its durability and beauty with scoring that is strikingly different. Horizontally scored sheets (12″ apart) produce a modern, streamlined effect. Sheets are also scored in 12″ x 12″ squares, a complete departure from the regular tile design.

In addition to withstanding wear, DeLuxe Flexboard is also highly resistant to steam and hot water. When it is installed according to specification, DeLuxe Flexboard may be used in shower stalls and bathrooms. Moreover, the high gloss surface is remarkably resistant to stains which might be caused by materials found in bathrooms and kitchens. The glass-like surface may be cleaned merely by wiping it with a dry cloth.

Colors, Sizes and Accessories:

DeLuxe Flexboard, ⅛″ thick, is furnished in eight colors: ivory, blue, green, peach, yellow, red, black and white. All these colors are available in the plain and horizontally scored sheets which are furnished in size 4 ft. x 8 ft.; and also in sheets with 12″ x 12″, box-like scoring, supplied in size 4 ft. x 4 ft. Scoring on the white sheets is gray; on all other colors, white.

Packaging: The 4 ft. x 8 ft. sheets are packed 4 per crate, and the 4 ft. x 4 ft. sheets, 6 per crate. Standard crates contain only one color, but assorted colors will be shipped in crate or less-than-crate lots for a nominal charge. Each sheet is wrapped in paper.

J-M Joint Cement: This material is used to fill the joints between sheets where scoring meets. It is furnished in colors gray and white to match the scoring of DeLuxe Flexboard and is available in 2-oz. cans; 24 cans, one color to a carton.

Touch-up Lacquer: Supplied in 1-oz. cans in the same colors as DeLuxe Flexboard; packed 24 cans, one or assorted colors to a carton.

Cleaning and Maintenance:

At the completion of a job, the surface of the DeLuxe sheets should be thoroughly cleaned with a soft cloth to remove grit and dust particles. Then the finish should be polished with a liquid wax automobile polish according to the manufacturer's directions. Areas unusually soiled during application may require repeated cleaning.

To remove penetrating stains which might be formed by some common medicines, antiseptics or fruit juices, such polishing cleaners as Duco No. 2 Paste Polishing Compound, McAleer's Rubbing Compound or Kennite Paste may be used sparingly.

Caution: Never use abrasive cleaners for periodic cleaning or soap containing strong alkali or caustic.



Interiors of DeLuxe Flexboard can be kept clean merely by wiping the high-gloss surface with a dry cloth

Decorative Flexboard for Interiors

Decorative Flexboard is an attractive wall finishing material for interiors combining the qualities of cement-asbestos board with soft, mottled coloring. The colors available are an integral part of the sheets which are sanded and given a fine lustrous finish.

Under ordinary conditions, the lustrous finish of Decorative Flexboard will last indefinitely. Where excessive water, scouring powder, grease or steam is liable to affect the finish, periodic coatings of a good quality paste wax is recommended.

Decorative Flexboard is supplied in both plain and scored sheets in five colors: rose, green, gray, slate and buff, ⅛″ thickness only. The plain sheets are supplied 4 ft. x 8 ft. in packages containing 4 sheets (128 sq. ft.) and weighing about 160 lb., crated.

Scored Decorative Flexboard, except in gray color, is grooved with gray lines in 4″ squares, to simulate tile; gray sheets are grooved in white. The material is supplied 4 ft. x 4 ft., in packages containing 6 sheets (96 sq. ft.) and weighing approximately 115 lb., crated. Packages contain one type, one color only.

Decorative Flexboard Battens are available in the five colors, to match the Decorative Flexboard. They are supplied 4 ft. long in three widths, 1¼″, 2″ and 4″. Black battens are also available for special decorative effects. Battens are shipped 10 per package.



Decorative Flexboard provides a durable modern wall treatment which is attractive and economical

Standard Asbestos Flexboard

Standard Flexboard is furnished in unpolished sheets of a natural gray color. It is not recommended for decorative purposes as there is variation in shade in individual sheets and from one sheet to another. The combination of durability and workability makes it the economical and highly practical material for structural wall-board uses, while its fire-resisting quality places it far ahead of any wood-fibre board. The rot and weather-resisting qualities of Standard Flexboard make it highly serviceable for exterior surfaces as well as for interior walls. It is ideal for many interior uses such as wall and ceiling finishes in laundries, storage rooms, furnace rooms, or wherever any possibility of fire hazard exists. Unpainted, it is used to line interiors of barns, milk houses, pasteurizing plants and grain bins.

Poultry men use Standard Flexboard as the exterior side walls on brooder and small laying houses and as roofs on range shelters.

Standard Flexboard is furnished ⅛″ and 3/16″ thick, in sheets 4 ft. x 8 ft., with a smooth plain finish. Sheets are wrapped for shipping unless specifically ordered loose or crated. Packages are as follows:

Thickness, inches	No. of sheets per package	Sq. ft. per package	Approx. wt., lb. taped	Approx. wt., lb. crated
⅛	2	64	79	171
3/16	2	64	112	180

Standard Flexboard is also available grooved in 4″ squares. Scored Standard Flexboard lends itself to varied decorative treatments. The tile-design squares may be painted in one or more colors and the grooves, in gray or a contrasting color. Scored sheets are supplied 4 ft. x 4 ft. x ⅛″. Packages contain 6 sheets (96 sq. ft.) and weigh about 125 lb. crated.

Painting: Standard Flexboard is primarily a sheet material for wall finishing where durability, fire resistance and easy workability are important. However, where a decorative effect is required, it may be painted as readily as plaster. The surface should be clean and dry before painting is started. For interior use, the primer coat should be applied in accordance with the primer manufacturer's directions and followed by one or more coats of a good grade interior paint.

For exteriors and for interiors where severe moisture conditions prevail, a chlorinated rubber enamel (tornesit type) applied in accordance with manufacturer's directions may be used. Another method of painting is with a heavy coat of boiled linseed oil and three coats of a good exterior paint. Complete directions for painting cement-asbestos products appear on a separate data sheet.

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Methods of Applying Flexboard

The recommended method of applying Flexboard products is by mechanical fastening. However, they may be applied with Flexboard Cement, supplemented by mechanical fasteners. Detailed application directions, supplementing those below, are on other data sheets.

Mechanical Fastening:

The large sheets of Asbestos Flexboard can be easily and quickly applied. The 3/16″ thickness may be nailed directly to studding or joists spaced on not greater than 16″ centers. For the 1/8″ thickness a solid backing of 3/8″ plywood or wood sheathing should be erected before applying the Flexboard. If application is over existing plaster, the plaster may be chased to receive nailing grounds.

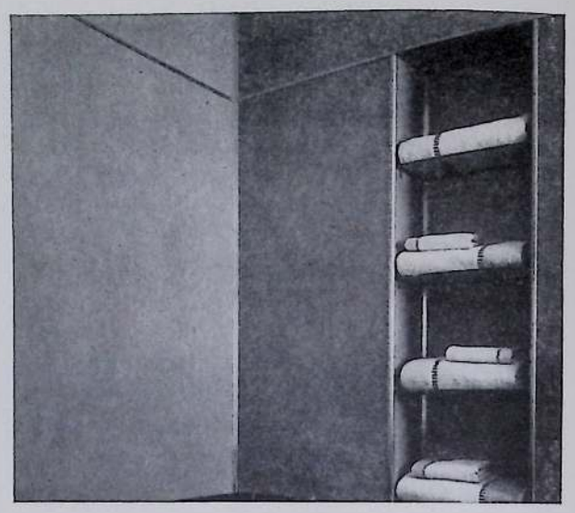
Asbestos Flexboard can be applied to curved surfaces with the following limitations (applies to unscored sheets only):

Thickness of sheets	Longitudinal radius	Transverse radius
1/8″	30″	36″
3/16″	36″	54″

If joints between sheets are to be left uncovered, cuts must be carefully made and the sheets snugly fitted before being secured. Decorative and Standard Flexboard edges may be beveled. It is recommended that the sheets be unpacked and permitted to stand separated at the job for 24 hours prior to being applied, so that the material may become acclimated.



An attractive treatment of a kitchen, using Decorative Flexboard and black battens



Useful built-in fixtures are easily constructed with J-M Asbestos Flexboard

If Flexboard is used on walls around shower stalls, bath tubs, etc., a 15-lb. asphalt-saturated asbestos felt should be applied over the entire area which is to receive the sheets. When Flexboard is applied with mechanical fasteners over old plaster walls which have an irregular surface, drumming may occur. In such cases Flexboard cement, properly applied, may be used to prevent this condition.

Nailing Sheets: For Standard, Decorative and DeLuxe Flexboard sheets 1/8″ thick, No. 1 x 1″ drive-screw nails; for 3/16″-thick Standard sheets, No. 2 x 1¼″ drive-screw nails; and No. 4 x 1½″ drive-screw nails where battens make two thicknesses of Flexboard. All sheets are nailed on not over 16″ centers, vertically and horizontally; edges on no greater than 8″ centers. Nailing is begun at the starting edge of sheets and continued toward opposite edges to "wipe" sheets in place. In scored materials, nails are placed in the scoring where possible. Battens of Decorative Flexboard are secured with fasteners adjacent to each edge, spaced on no greater than 6″ centers.

Use of Adhesive with Mechanical Fasteners:

DeLuxe, Decorative and Standard Flexboard can be applied using J-M Flexboard Cement supplemented by mechanical fasteners such as nails, mouldings or other form of overlapping device.

J-M Flexboard Cement: This cement, a special type of adhesive, is supplied in 1-gal. containers. The cement weighs 12 lb. per gal.

J-M Asbestoboard

J-M Asbestoboard is a large-size sheet building material which is manufactured by subjecting a mix of portland cement and asbestos fibre to hydraulic pressure. This material, an attractive gray in color, provides a pleasing, inexpensive and easily erected wall lining for interior and exterior use. In strength, durability and fireproof qualities this flat, rigid, mineral product is preferable to wood, plaster, or sheet metal.

For use as a fire-stop partition between domestic garages and dwellings, as an unburnable lining for detached garages, for ceiling and walls, sorting table tops, bath house walls and similar applications, Johns-Manville Asbestoboard will satisfactorily meet all requirements.

It will not rot or rust and does not chip, buckle or deteriorate. Because it lasts indefinitely, Asbestoboard is used extensively for industrial construction and public buildings.

Extremes of temperatures from the hottest to the coldest weather will not affect the strength of Asbestoboard. The passage of time hardens and toughens it. Its weight, as compared to heavier and bulkier materials, is much in its favor. The supporting framework can be lighter, resulting in greater interior space and lower cost.



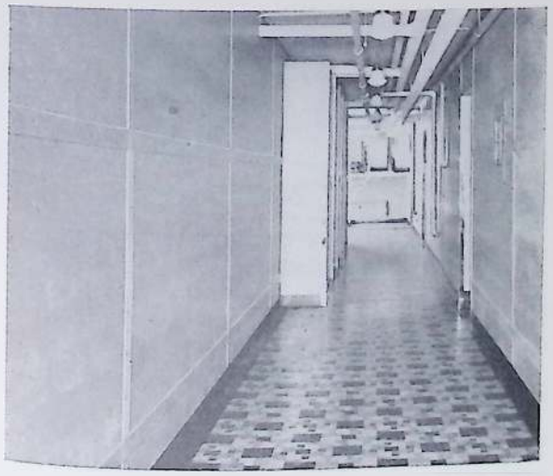
J-M Asbestoboard affords a neat, fireproof and easily erected inside finish for garages

In its natural color, Asbestoboard is well adapted to the construction of interior or exterior walls, ceilings, partitions, cabinets, baseboards, and other trim. When used for these or similar purposes, the material does not require a protective coating to preserve its surface, thus minimizing the cost of maintenance. For decorative effects, however, Asbestoboard can be painted. Complete directions for painting cement-asbestos products appear on a separate data sheet.

The sheets can be drilled with twist drills, punched, fastened with nails or screws and sawed with a hand saw, though a portable power saw with a carborundum wheel should be used if much sawing is to be done.

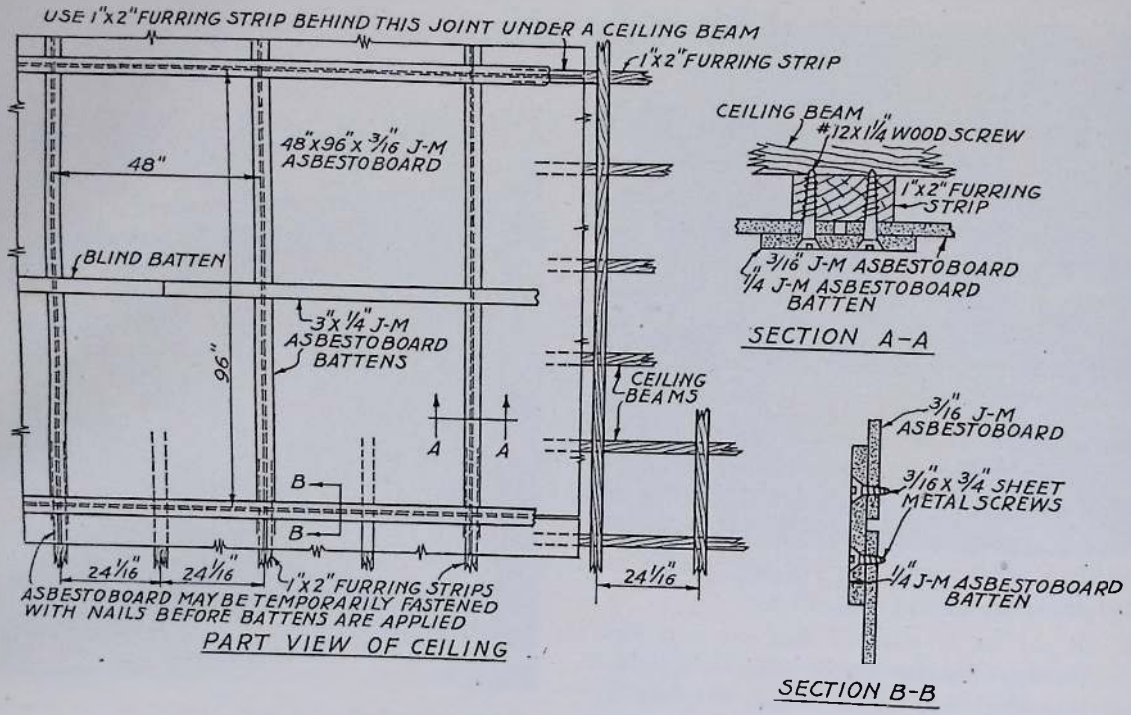
Asbestoboard is furnished in flat sheets, 48″ x 96″ (± 1/32″), and in 3/16″ and 1/4″ thickness (± 1/32″). Battens 2″, 3″ and 4″ wide by 4 or 8 ft. long are also available 3/16″ thick. Weights for this material per sq. ft. are 1.8 lb. for 3/16″ thickness and 2.3 lb. for 1/4″ thickness, uncrated.

The sheets of Asbestoboard are packed as follows: 3/16″ thickness, 10 sheets, and 1/4″ thickness 8 sheets.

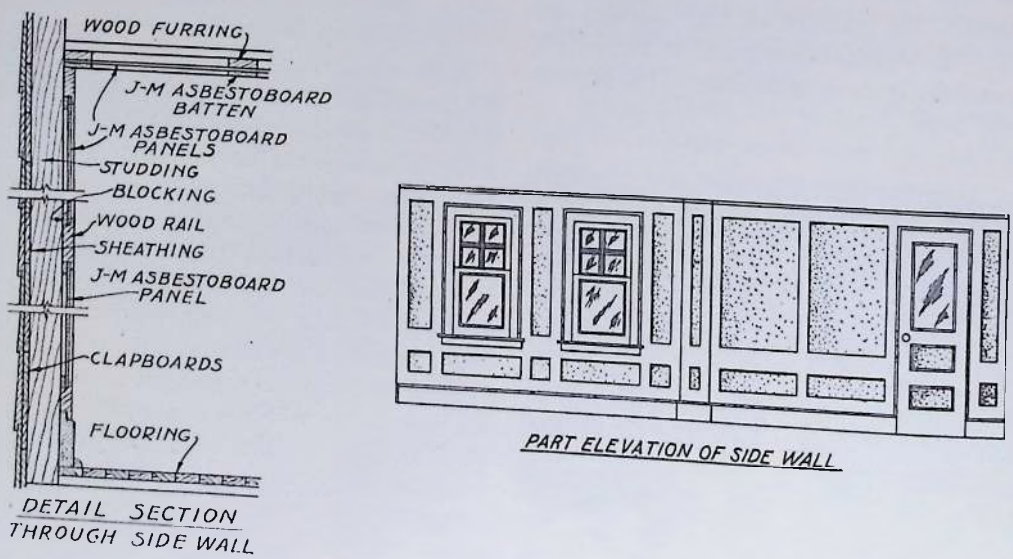


Battens of J-M Asbestoboard lend a decorative effect to this hospital corridor which is lined with the same material in sheet form

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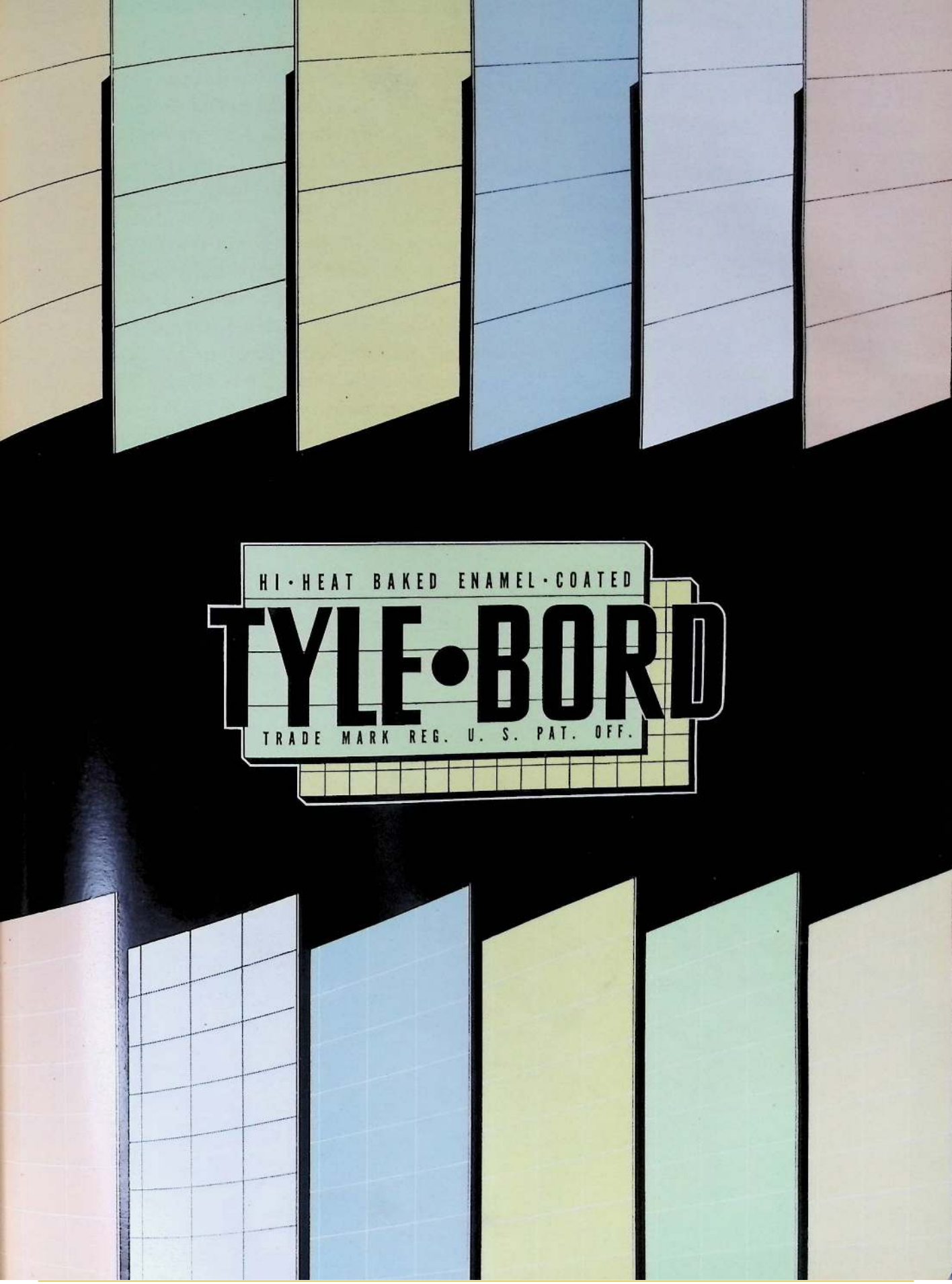


Under-size ceiling construction details for J-M Asbestoboard



One type of side-wall interior using J-M Asbestoboard

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TYLE•BORD will give you longer lasting satisfaction than many more expensive wall coverings when properly installed. To get all the benefits of TYLE•BORD it is necessary to apply it carefully, according to direction. Hit-and-miss cutting will leave you with unhappy results. Most important is the use of the correct molding for the function intended as well as the right accessories.

TYLE•BORD Mastic Cement is not like any cement or mastic made for any other purpose. Other cements will not meet the requirements of TYLE•BORD application. Don't use linoleum paste or asphalt cements. TYLE•BORD Mastic Cement is designed and made so it will NOT DRY BRITTLE. It remains a little rubbery for years. This gives it better adhesion, and allows for expansion and contraction. All walls expand and contract. Every edge of TYLE•BORD should be protected with one of the moldings shown below. The panel of TYLE•BORD should not be forced tightly into the molding channel. One-eighth inch play will allow for settling as well as expansion. TYLE•BORD Walls have years and years of new-looking beauty because, thus engineered and installed, they do not crack. That, together with the bonded baked-hard surface makes it unnecessary to patch, paint or redecorate during their entire lifetime. Ordinarily bathroom and kitchen walls have to be fixed up every two or three years. That is why TYLE•BORD walls are *economical.*

There are other prefinished Wallboards on the market. Some of them are very good. But if you want to be *sure,* get GENUINE TYLE•BORD with this trade-mark. There is no other name. Used with the accessories shown below, applied as directed, you are buying complete satisfaction and freedom from concern for the longest period of time.

All the accessories required to do a complete and workmanlike job are shown below.



GENUINELY ECONOMICAL . . . POSITIVELY PRACTICAL . . . INCIDENTALLY BEAUTIFUL . . .

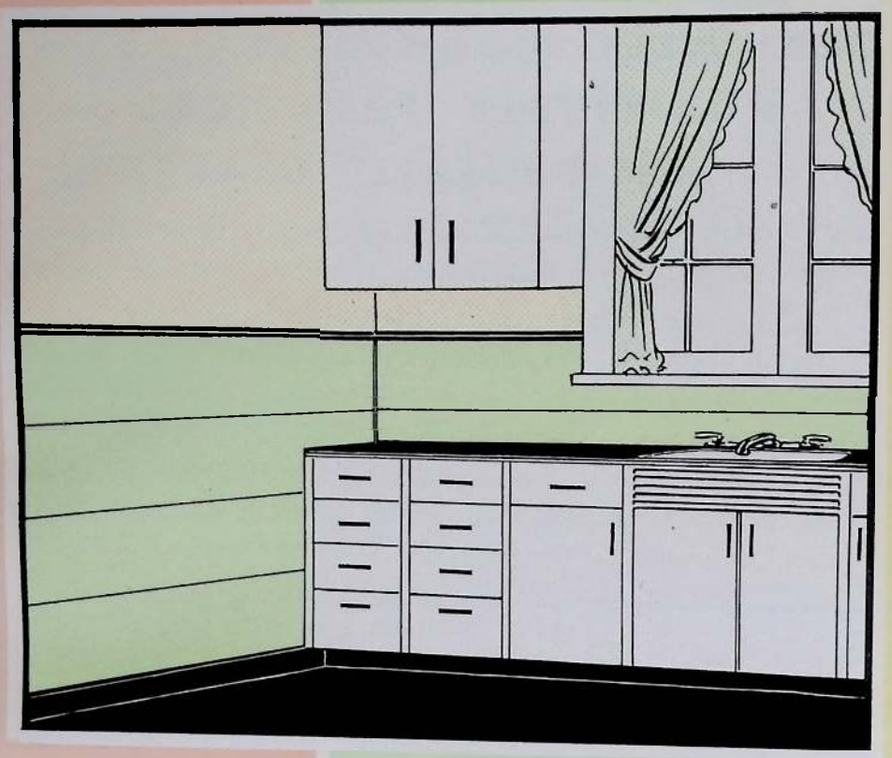
and so easy to keep clean! TYLE•BORD wainscot or full-wall application is shown in these illustrations. There are scores of other uses, too.

For years we have marked time. Now is the time to act! TYLE•BORD on the walls, and as counter-facing, is one of the dreams that is most practical. Many years of lustrous, colorful, sanitary beauty, without re-decorating . . . and cleansing time cut to practically nothing.

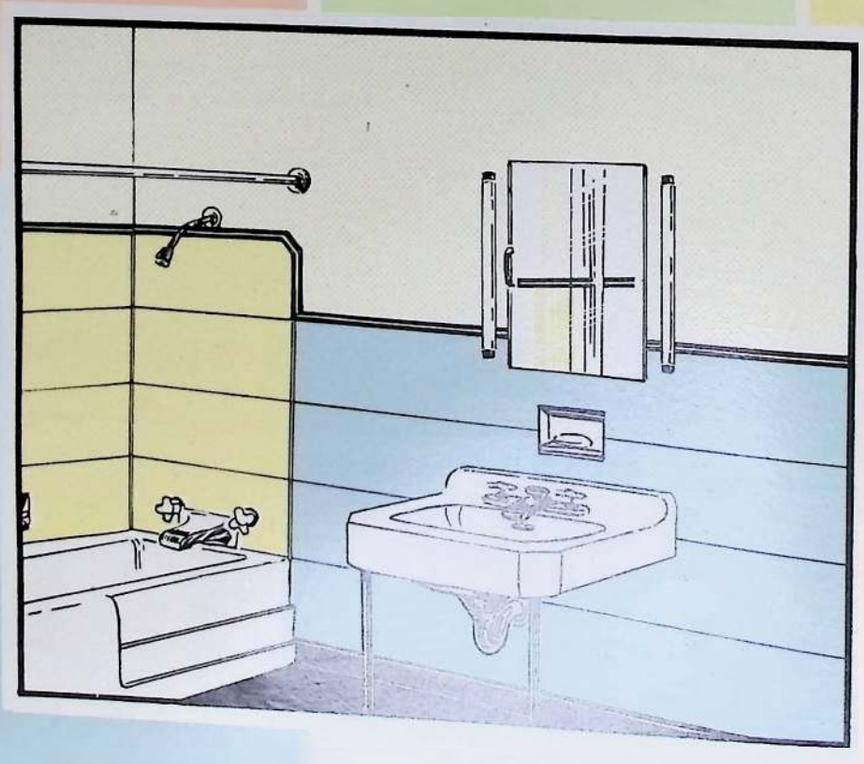
TYLE•BORD is now available in any quantity, 6 colors, 2 patterns: modern streamline and block, as shown on the front of this folder.



TYLE•BORD *is beautiful!*



KITCHEN WALLS shoul be, and can be wit TYLE • BORD, as easy t keep clean as the porcela finish of your refrigerat or stove. Wiped only wit a damp cloth, splash an dirt are easily remove The surface is baked hard Six inviting pastel color are shown by the back ground swatches on th page — Apricot, Green Ivory, Blue, White, Yello



YOUR BATHROOM r veals your housekeepin more than any other par of your home! Therefor the small cost of installin TYLE•BORD over part o all of your bathroom walls is an investment that pay double dividends: it is s much easier to keep the hard-used room clean an shining; patching an painting every 2 or 3 year are eliminated. TYLE• BORD is always fresh an lustrous.

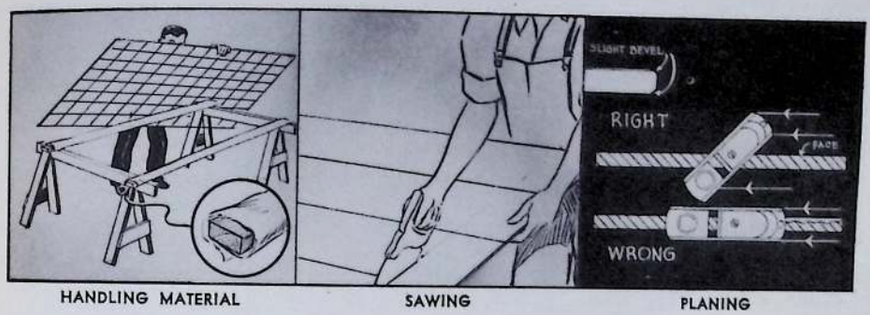
T-115

POINTERS *for handling* TYLE-BORD

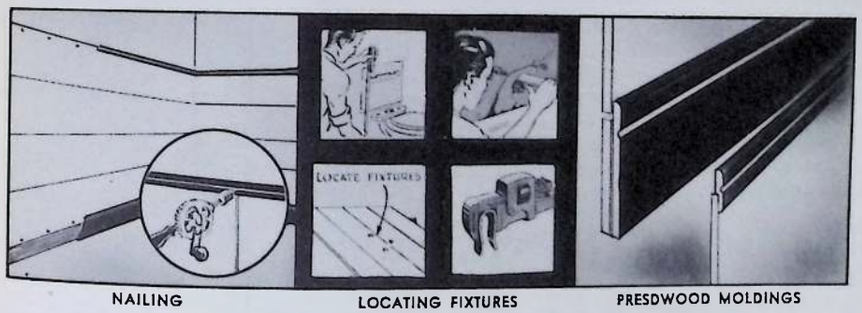
(Trade Mark Reg. U. S. Pat. Off.)



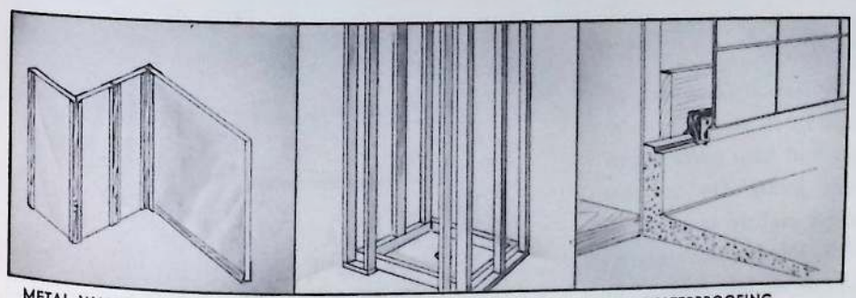
PLANNING BACKING HOW TO BEGIN



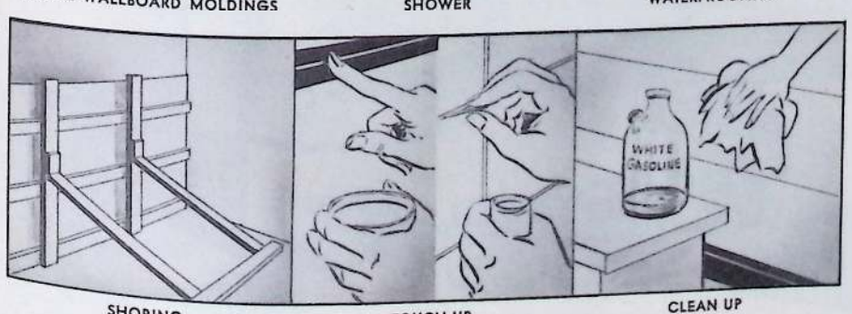
HANDLING MATERIAL SAWING PLANING



NAILING LOCATING FIXTURES PRESDWOOD MOLDINGS



METAL WALLBOARD MOLDINGS SHOWER WATERPROOFING



SHORING TOUCH-UP CLEAN UP

1. **PLANNING:** Double check measurements, examine walls, plan job completely before beginning work. See that all materials and all tools are on hand.
2. **BACKING:** If plaster is soft or broken, knock it out and replace with wooden strips nailed to studding. Backing should be solid.
3. **HOW TO BEGIN:** Seldom is a wall square or plumb. Determine low corner of room for wall applications. Measure 4 feet up from low corner and strike level line around all walls of room. Work from this level line; not from the floor.
4. **HANDLING MATERIAL:** It is best to pad sawhorses, or stringers between sawhorses, with newspaper or soft felt to prevent scratching or marring the beautiful surface of Tyle-Bord.
5. **SAWING:** Finished surface of Tyle-Bord should always be face up across horses or stringers for sawing. Pencil marks can be taken off with White gasoline and cloth.



APPLYING MASTIC

APPLYING MASTIC: Tyle-Bord mastic must be applied as shown using square toothed spreader made of Masonite. Ridges formed provide even drying by allowing for escape of air.

6. **PLANING:** Hold plane at an angle, not parallel with edge of board. Plane against the surfaced side.
7. **LOCATING FIXTURES:** Locate measurements on Tyle-Bord panel after it is cut to fit but before cement is applied to back. Drill from surface side.
8. **NAILING:** Nail at edge where molding will cover nail heads. Nail sparingly in scoreline. Barely puncture surface with drill before nailing in scoreline to prevent bulging at nail head. Never nail in plain surface areas.
9. **PRESDWOOD MOLDINGS:** Top edge of base mold should be parallel to level line. Scribe and cut at bottom to conform to floor. Apply mastic on back, drill and nail in scorelines. Top edge of cap molding should fit along level line. Drill and nail only in scoreline using ribbon of mastic on back.
10. **METAL WALLBOARD MOLDINGS:** There are five wallboard moldings, one for each purpose . . . inside corner, outside corner, division, edge, and cove. Edges of panels should always be protected by a molding. Panels should not be seated snugly in channel—allow some space for expansion of board.
11. **SHOWER:** Simple framing around shower base with Tyle-Bord sheets to be applied inside and outside, shown in the illustration above.
12. **WATERPROOFING:** Cutaway detail showing application of mastic in edge mold where sheets join shower base to make watertight seal at base.
13. **SHORING:** Some form of bracing against opposite wall, or temporary structure as shown above, for overnight drying assures a better installation.
14. **TOUCH-UP:** Nail heads should be countersunk in scoreline. Nail head holes should be filled with Tyle-Bord plastic filler whic hdoes not shsink or pucker in drying. Touch-up color to match scoreline, applied with paper match, will completely mask out nail hole.
15. **CLEAN UP:** If mastic is smeared on board, wipe off with cloth dampened with White gasoline. Do this as the job progresses and it is easier. Fingerprints and grime will come off with a damp cloth. Tyle-Bord is cleaned with a damp cloth. Stuborn dirt or oil burner film may be removed with silver polish.

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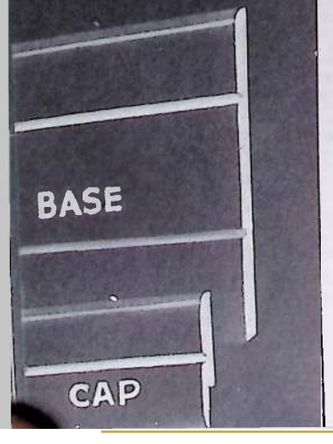












THE *RIGHT* ACCESSORIES

Using the correct accessories is important if you want all the values, beauty and durability of TYLE-BORD.

The molding shapes, shown at the left of this page, are especially designed for every practical use of this highly finished, durable wallboard. The first five shapes are made either of plastic or metal. Every edge of TYLE-BORD should be protected with a molding. The shapes are self-explanatory when you study them. Cove molding is used at the upper wall edge, adjoining ceiling, or at edges abutting door or window casings, or medicine cabinets. Tub-edge, you will note, allows for a ribbon of cement within the channel as well as between the molding and tub, for water sealing.

Base and Cap moldings, made of presdwood, should be cemented with mastic and nailed in scorelines.

All nail holes in panels (along scoring) and moldings should be filled with special filler, applied like putty—wiped flush with surface—but so made that it will not shrink when it dries out. After filler is applied, touch-up color applied with a paper match, the same color as scoring, will make a neat job.

At the right are shown the two patterns of TYLE-BORD: 6-inch block pattern and 12-inch streamline. Both patterns are made in six soft pastel colors: Blue, Green, White, Yellow, Ivory and Apricot.

Shown below is the Mastic Cement especially designed to remain a little rubbery to allow for movement in settling or expansion and contraction due to changes of temperature. Also is shown the specially designed spreader, so designed that the mastic cement can be applied in ridges, allowing for the escape of air and solvent, and even, firm adhesion.

THE TYLE-BORD COMPANY, INC.
700 MERCER ST. · SEATTLE 9, WASHINGTON

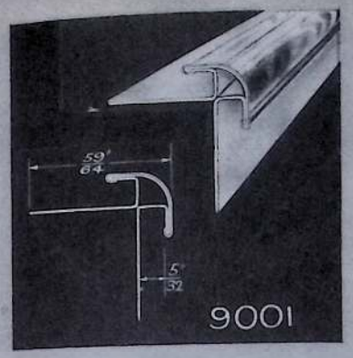
A ribbon of mastic cement in all molding channels will help make watertight joints. Do not seat panels tightly in channels of molding — leave a fraction of an inch to take up expansion.



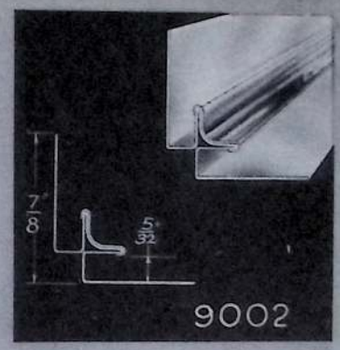
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MOLDINGS FOR 1/8" WALLBOARD

STAINLESS STEEL



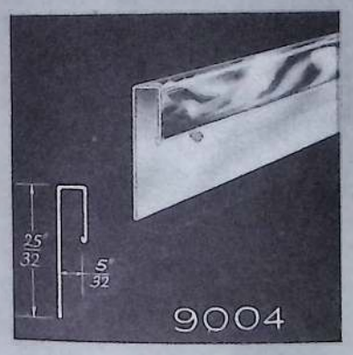
Outside Corner 1/8"
9001 8 Ft. Length, per ft.....$ .22



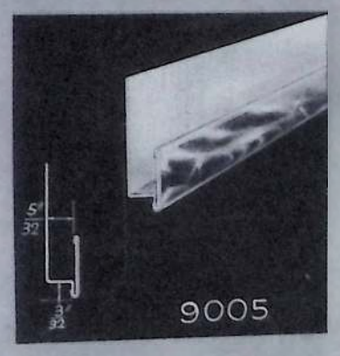
Inside Corner 1/8"
9002 8 Ft Length, per ft.....$ .20



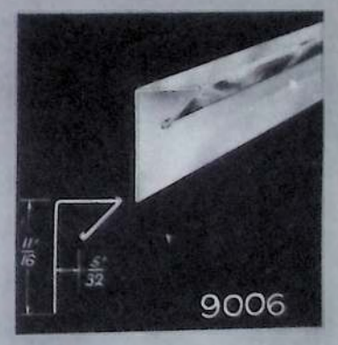
Division 1/8"
9003 8 Ft. Length, per ft.....$ .20



Edge or Cap 1/8"
9004 8 Ft. Length, per ft.....$ .20



Tub-Edge 1/8"
9005 6 Ft. Length, per ft.....$ .20



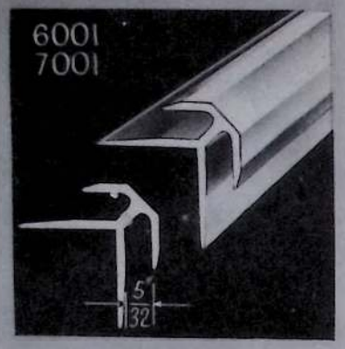
Ceiling Cove 1/8"
9006 8 Ft. Length, per ft.....$ .20

TRADE COLOTRYM MARK MOLDINGS
STAINLESS STEEL ALUMINUM PLASTIC
·· THE WESTERN SOURCE FOR METAL MOLDINGS ··

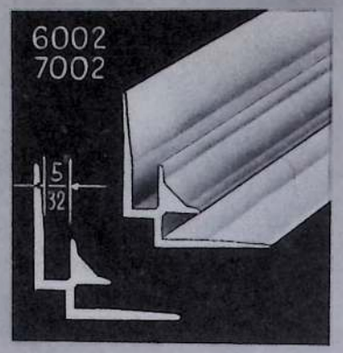
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MOLDINGS FOR 1/8" WALLBOARD

ALUMINUM



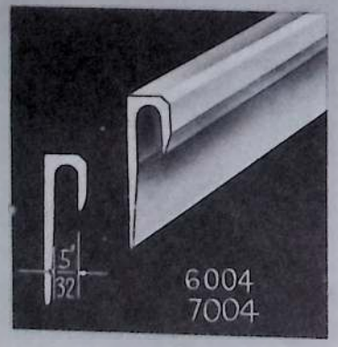
Outside Corner 12' Length
6001 Bright Polished, per ft.....$ .20
7001 Alumilited, per ft..... .27



Inside Corner 12' Length
6002 Bright Polished, per ft.....$ .20
7002 Alumilited, per ft..... .27



Division 12' Length
6003 Bright Polished, per ft.....$ .16
7003 Alumilited, per ft..... .23



Edge 12' Length
6004 Bright Polished, per ft.....$ .14
7004 Alumilited, per ft..... .21



Tub Edge 10' Length
6005 Bright Polished, per ft.....$ .16
7005 Alumilited, per ft..... .23

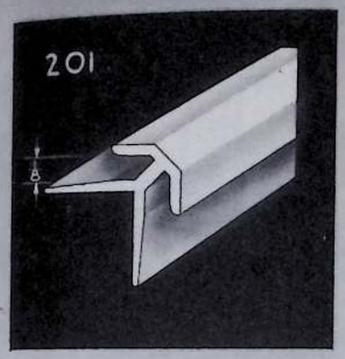


Ceiling Cove 12' Length
6006 Bright Polished, per ft.....$ .16
7006 Alumilited, per ft..... .23

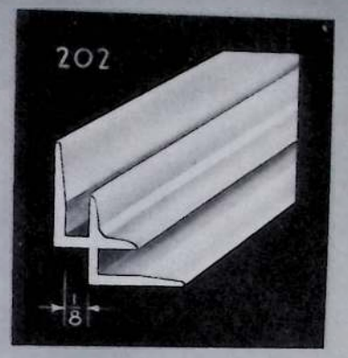
COLOTRYM TRADE MARK MOLDINGS
STAINLESS STEEL ALUMINUM PLASTIC
THE WESTERN SOURCE FOR METAL MOLDINGS

MOLDINGS FOR 1/8" WALLBOARD

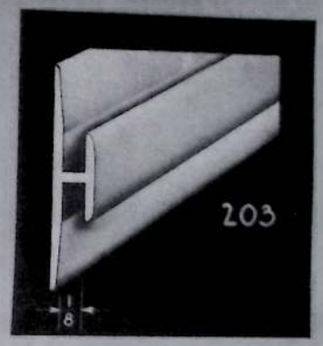
PLASTIC



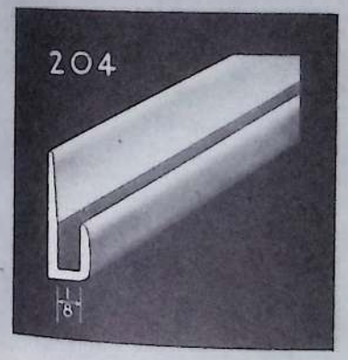
Outside Corner 8' Length
201 per ft.....$ .18



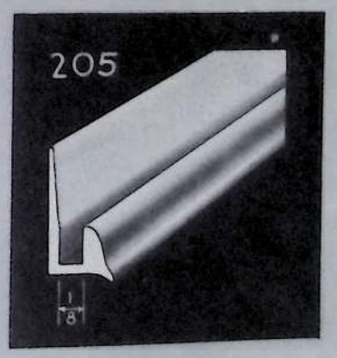
Inside Corner 8' Length
202 per ft.....$ .18



Division 8' Length
203 per ft.....$ .18



Edge or Cap 8' Length
204 per ft.....$ .16

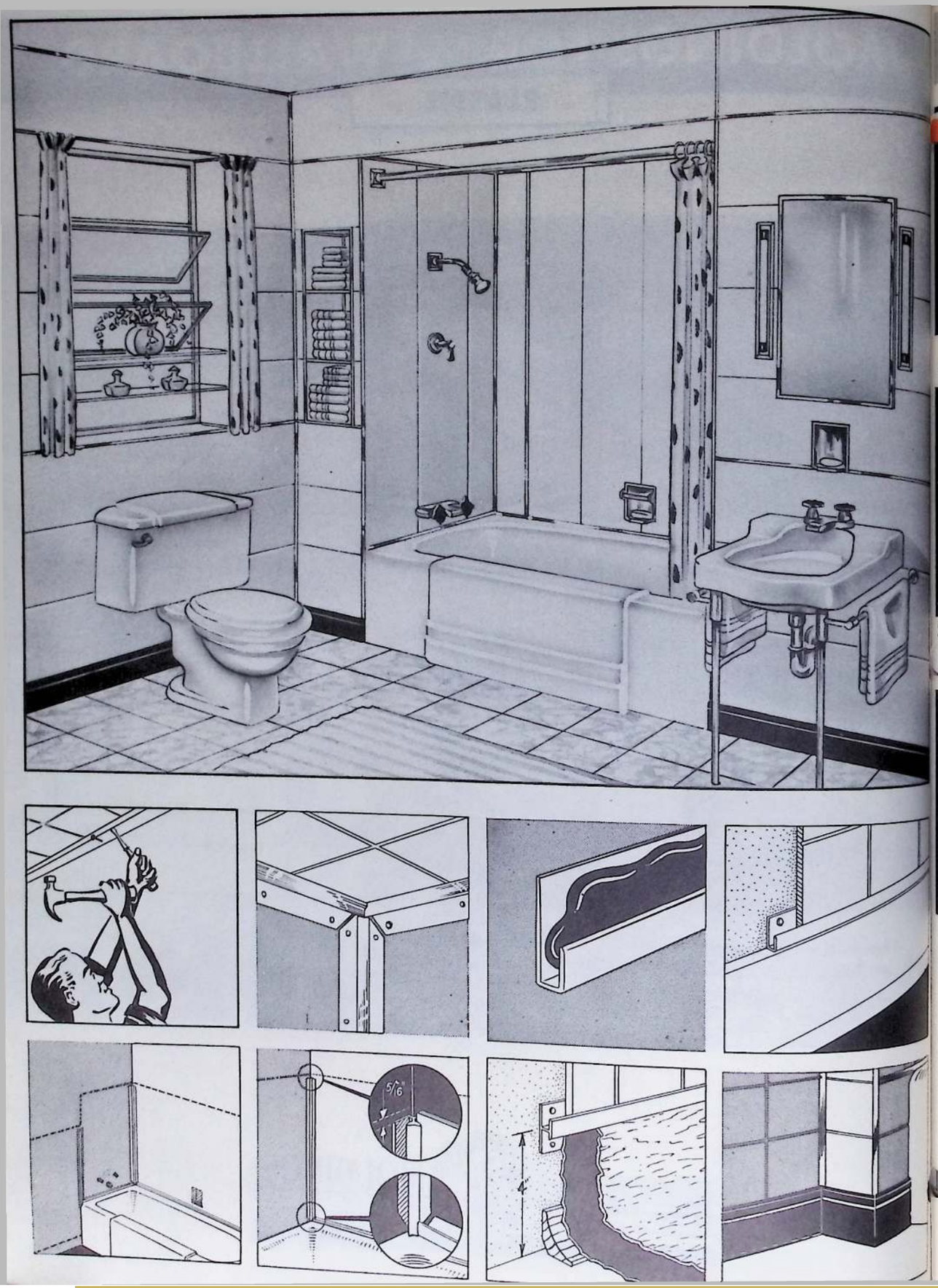


Tub Edge 6' Length
205 per ft.....$ .16

Plastic Moldings may not remain stable dimensionally. We recommend use of metal moldings where practicable.

COLOTRYM TRADE MARK MOLDINGS
STAINLESS STEEL ALUMINUM PLASTIC
THE WESTERN SOURCE FOR METAL MOLDINGS

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STAINLESS STEEL

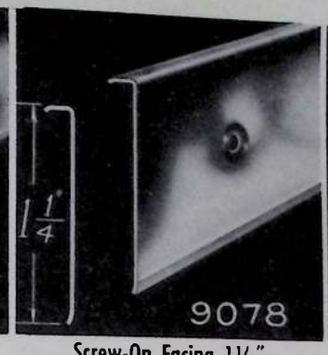
Linoleum Moldings



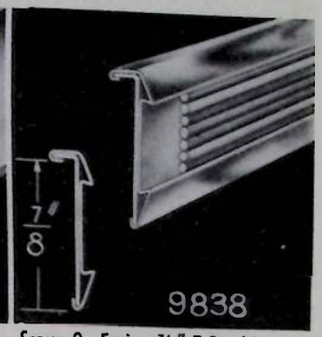
Screw-On Facing 3/4"
9028 12 Ft. Length



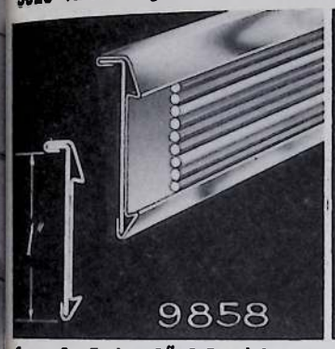
Screw-On Facing 1"
9048 12 Ft. Length



Screw-On Facing 1 1/4"
9078 12 Ft. Length



Screw-On Facing 7/8" 7-Bead Insert
9838 12 Ft. Length



Screw-On Facing 1" 9-Bead Insert
9858 12 Ft. Length



Round Corner 7/8" 7-Bead Insert
9830 for No. 9838

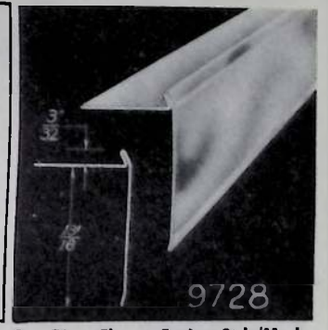
Insert Beading

100-FT. ROLLS

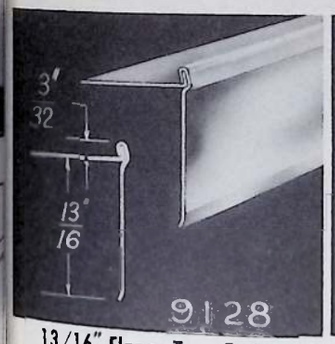
7-Bead for No. 9838
and No. 9830 Corners

9-Bead for No. 9858

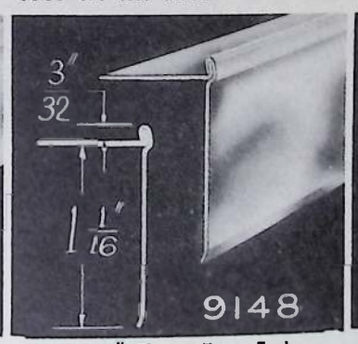
STANDARD COLORS
RED & WHITE BLACK & WHITE
BLUE & WHITE



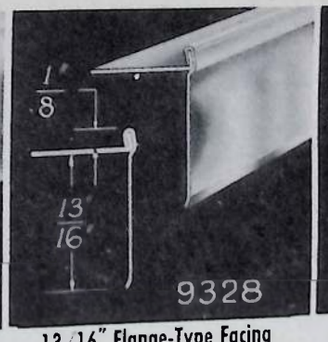
One Piece Flange Facing Std./Med.
9728 12 Ft. Length



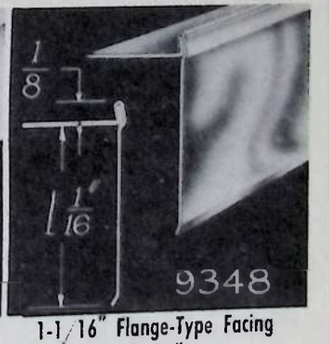
13/16" Flange-Type Facing
Std./Med.
9128 12 Ft. Length
Also 8½ Ft. Length



1-1/16" Flange-Type Facing
Std./Med.
9148 12 Ft. Length



13/16" Flange-Type Facing
for 1/8"
9328 12 Ft. Length



1-1/16" Flange-Type Facing
for 1/8"
9348 12 Ft. Length

TRADE COLOTRYM MAKE MOLDINGS
STAINLESS STEEL ALUMINUM PLASTIC
·· THE WESTERN SOURCE FOR METAL MOLDINGS ··

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STAINLESS STEEL

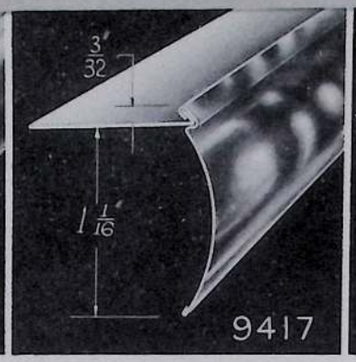
Linoleum Moldings



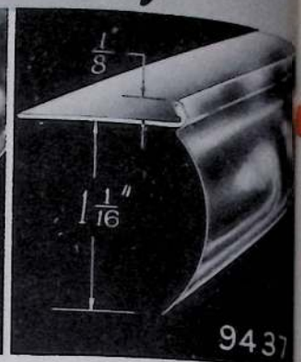
Stair-Nosing Overlap—Light
9017 12 Ft. Length



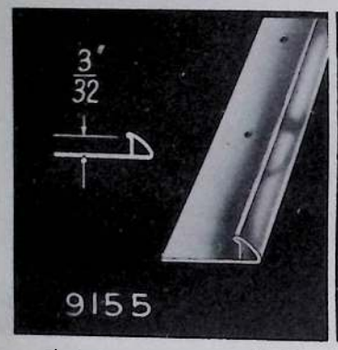
Stair-Nosing Overlap—Heavy
9037 12 Ft. Length



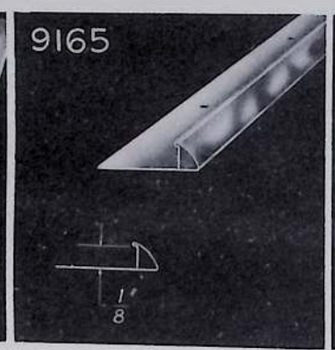
Stair-Nosing with flange Std./Med.
9417 12 Ft. Length



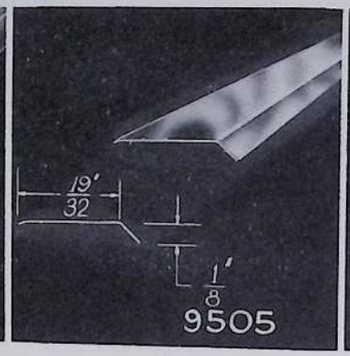
Stair-Nosing with Flange, for 1/8"
9437 12 Ft. Length



Flush Door Edging Std./Med.
9155 12 Ft. Length



Flush Door Edging for 1/8"
9165 12 Ft. Length



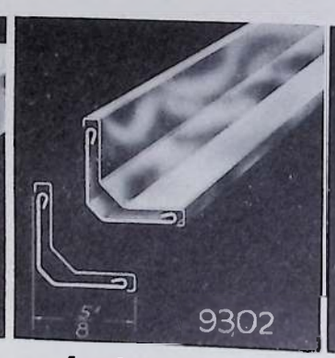
Carpet Edge 5/8" Light
9505 3 Ft. Length



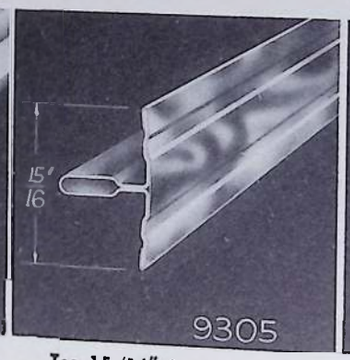
Carpet Edge 5/8" Heavy
9515 3 Ft. Length



Snap-On Outside Corner
9301 12 Ft. Length



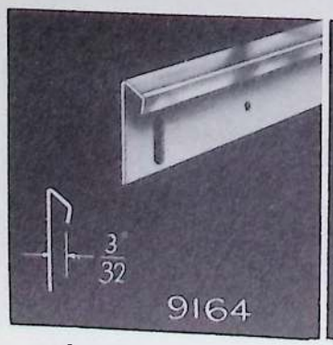
Snap-On Inside Corner
9302 12 Ft. Length



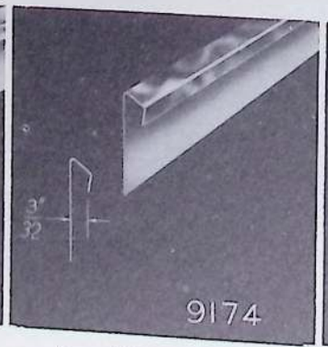
Tee 15/16" Scored Facing
9305 12 Ft. Length



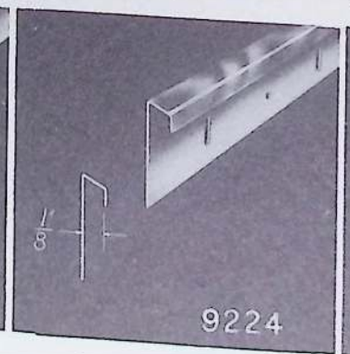
Tee 1¼" Scored Facing
9315 12 Ft. Length



Cap—Heavy Std./Med.
9164 12 Ft. Length



Cap—Light Std./Med.
9174 6 Ft. Length



Cap—Heavy For 1/8"
9224 12 Ft. Length



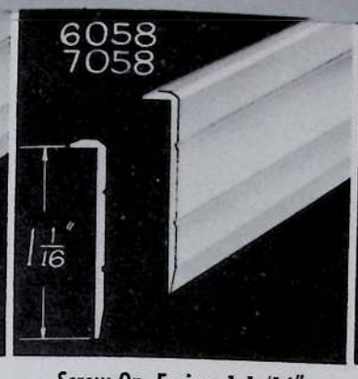
Cove, Std./Med.
9106 12 Ft. Length

ALUMINUM

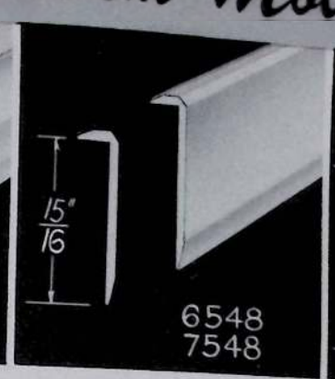
Linoleum Moldings



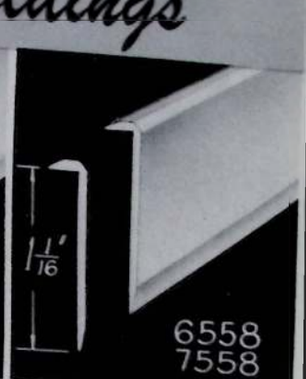
Screw-On Facing 15/16"
12' Length
6048 Bright Polished
7048 Alumilited



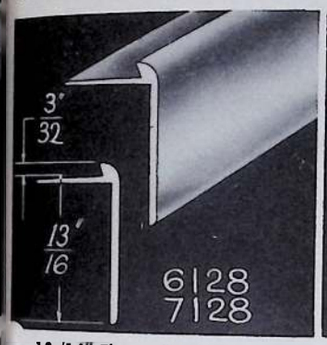
Screw-On Facing 1-1/16"
12' Length
6058 Bright Polished
7058 Alumilited



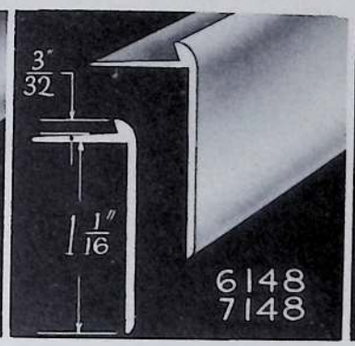
Screw-On Facing 15/16"
12' Length
6548 Bright Polished
7548 Alumilited



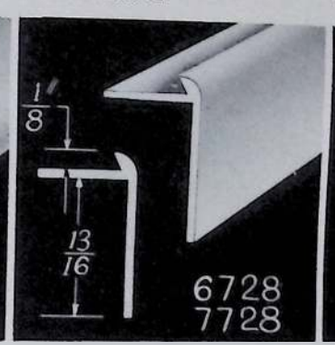
Screw-On Facing 1-1/16"
12' Length
6558 Bright Polished
7558 Alumilited



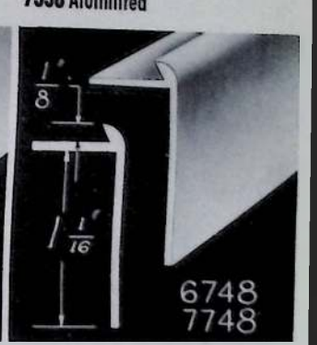
13/16" Flange-Type Facing
S/M 12' Length
6128 Bright Polished
7128 Alumilited



1-1/16" Flange-Type Facing
S/M 12' Length
6148 Bright Polished
7148 Alumilited



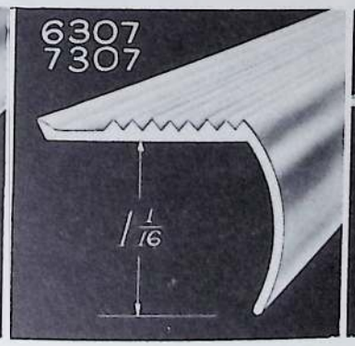
13/16" Flange-Type Facing
⅛" 12' Length
6728 Bright Polished
7728 Alumilited



1-1/16" Flange-Type Facing
⅛" 12' Length
6748 Bright Polished
7748 Alumilited



13/16" Flange-Type Facing
⅛" 12' Length
6328 Bright Polished
7328 Alumilited



Stair Nosing ⅛" 12' Length
6307 Bright Polished
7307 Alumilited



Stair Nosing ⅛" 12' Length
6537 Bright Polished
7537 Alumilited



Stair-Nosing Std./Med. 12' Length
6417 Bright Polished
7417 Alumilited

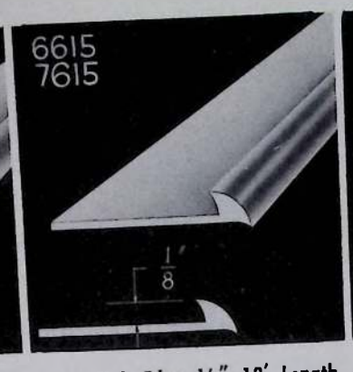
TRADE COLOTRYM MARK MOLDINGS
STAINLESS STEEL ALUMINUM PLASTIC
·· THE WESTERN SOURCE FOR METAL MOLDINGS ··

Linoleum Moldings

ALUMINUM



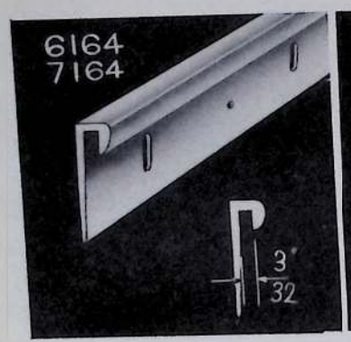
Flush Sink Edge S/M 12' Length
6105 Bright Polished
7105 Alumilited



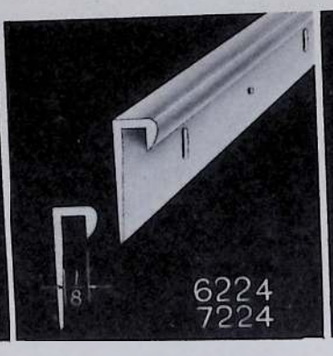
Flush Sink Edge 1/8" 12' Length
6615 Bright Polished
7615 Alumilited



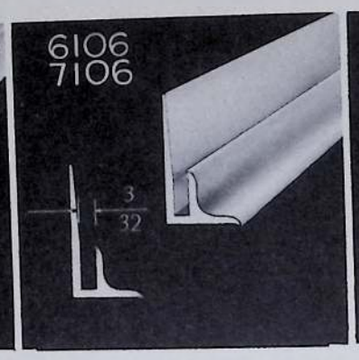
Flush Door Edge S/M 12' Length
6155 Bright Polished
7155 Alumilited



Cap Std./Med. 12' Length
6164 Bright Polished
7164 Alumilited



Cap 1/8" 12' Length
6224 Bright Polished
7224 Alumilited



Cove Std./Med. 12' Length
6106 Bright Polished
7106 Alumilited



Butt Carpet Edging S/M 12' Lg
6405 Bright Polished
7405 Alumilited

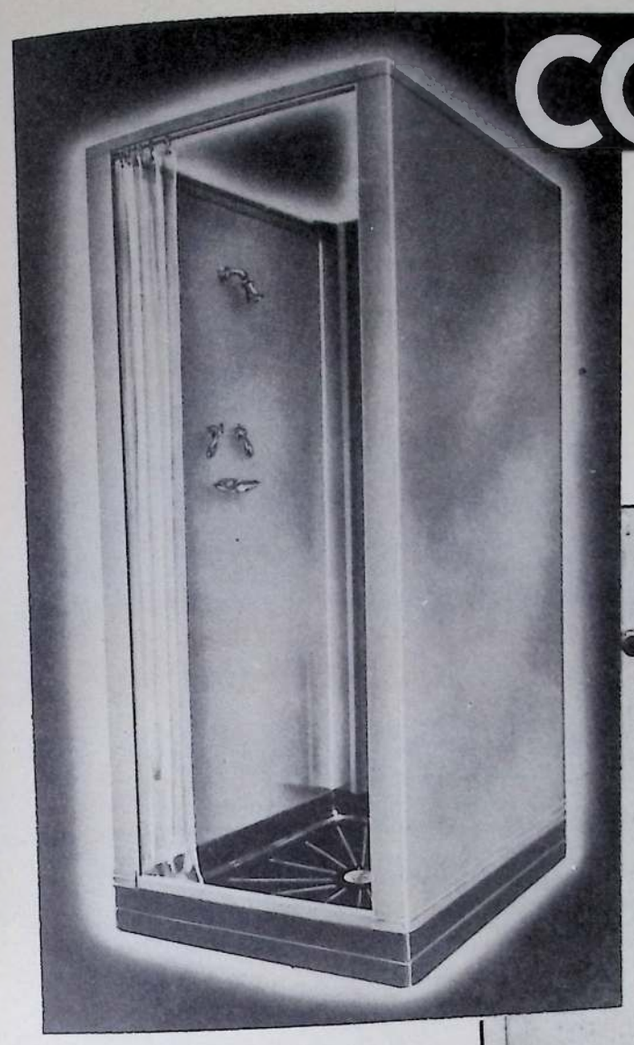
As metals become available in greater quantity, additional shapes and sizes of mold will be added to the Colotrym line. Catalog sheets, similar to this one will be issued f time to time, and when the supply of metals is assured, a permanent catalog, indexed loose-leaf binder will be issued to replace all Catalog Sheets. Meantime, please sheets for reference.

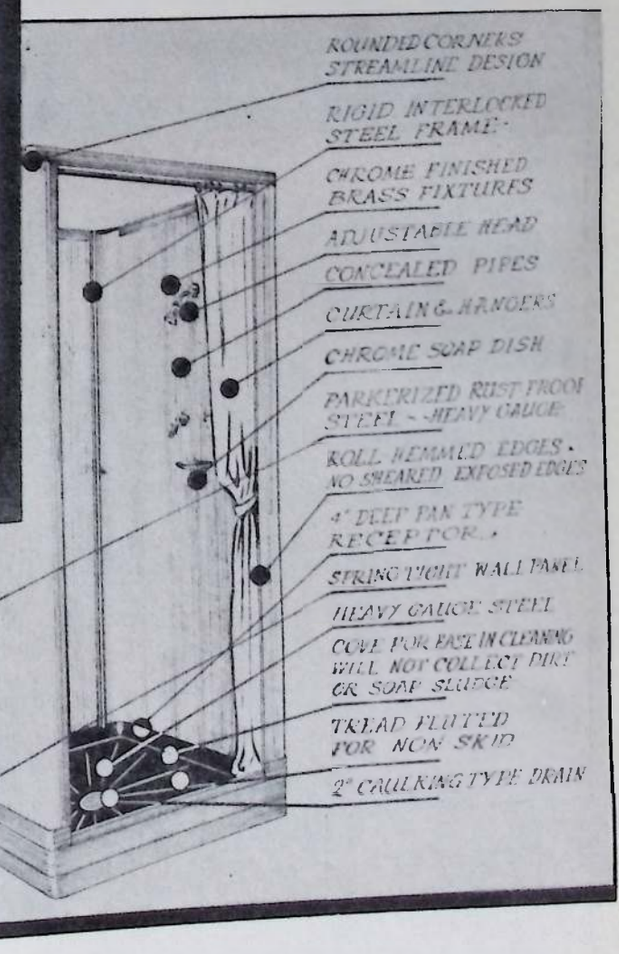
COLOTYLE

Alsteel

Standard Shower Cabinet

S-56





You will find all the features you desire in a home shower cabinet in this NEW beautiful Shower by Colotyle. It is sturdy in construction. Its cost is low.

The Colotyle Alsteel Standard Shower Cabinet is finished in WHITE, with black receptor, all baked enamel; chrome finish brass adjustable shower head, valve handles; soap tray. Curtain and fasteners also. 72" high: 32"x32". 2 carton pack. Quick Assembly.

Manufactured by **COLOTYLE CORPORATION,**
700 MERCER AT AURORA SEATTLE 9, WASHINGTON

Published by AsbestosClaims.Law
asbestosclaims.law/library/21301/204

VIMLITE* SUPER-STRONG PLASTIC GLAZING

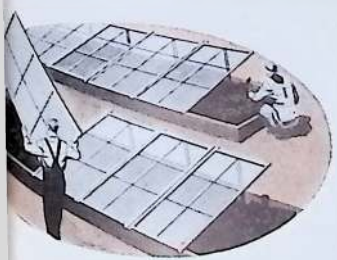
A Celanese Plastic Product*

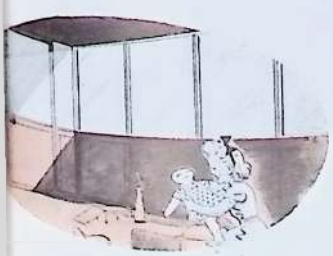


TWO TYPES . . . WIRE MESH . . . PLASTIC MESH

VIMLITE is lightweight, super-strong, flexible plastic glazing—produced with two types of reinforcing: plastic mesh or wire mesh. Bursting strength is 200 lbs. per square inch for the wire type and 165 lbs. per square inch for the plastic type. Vimlite has excellent weathering characteristics. It is impervious to rain, hail, sleet and snow.

VIMLITE is translucent — (diffused light transmission 61% to 73%) — gives privacy without blocking light sources. Vimlite offers health benefits, because it transmits ultra-violet light from sunshine. Insulating value is high. Transmitted radiant heat is dissipated slowly—an important factor in maintaining overnight high temperatures in cold frames and poultry buildings.





INSTALLATION

VIMLITE is easy to install . . . simply cut to size with shears, and tack in place using wood strips or moldings. Once installed, Vimlite stays put.

For special decorative effects, Vimlite can be sprayed with lacquer colors, formed, bent and otherwise fabricated. Plastic mesh Vimlite can be produced on special order in many beautiful colors and color combinations for display and decorative applications.

*Reg. U. S. Pat. Off.

VIMLITE HAS MANY USES

GLAZING Poultry and farm buildings, Cold frames, Greenhouses, Sun rooms, Storm sash, Window shades, Porch enclosures, Cellar windows, Skylights, Warehouse windows, Camp buildings, Children's playhouses, Tool sheds.

WALLS, PARTITIONS Stockrooms, Office, Factory, Garage, Shelf backing, Draft screens, Air conditioning enclosures, Enclosures to guard against dust and vapors, Folding screens.

SAFETY GUARDS For Moving Belts, Conveyors, Band saws, Spraying rooms, Shafting, Flywheels and other moving equipment.

MISCELLANEOUS Store decorations, Theatrical scenery, Lampshades, Electric signs, Insulation, Ceilings, Photographer's props.

SPECIFICATIONS

Each roll is contained in a safety-shipping carton—no additional packing required for reshipment.

WIRE MESH TYPE

Width 28"

Roll length	25 ft.	50 ft.	100 ft.
Approx. Ship. Wt.	10 lbs.	17 lbs.	34 lbs.
Price			

Width 36"

Roll length	25 ft.	50 ft.	100 ft.
Approx. Ship. Wt.	12 lbs.	21 lbs.	45 lbs.
Price			

PLASTIC MESH TYPE

Width 36"

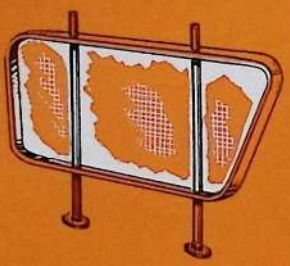
Roll length	25 ft.	50 ft.	100 ft.
Approx. Ship. Wt.	5 lbs.	10 lbs.	20 lbs.
Price			

VIMLITE* *A Celanese* Plastic Glazing*

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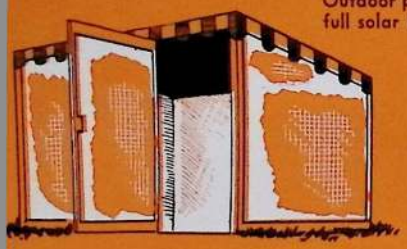


FOLDING SCREEN
Offers draft protection with maximum light transmission.



DECORATIVE PANEL
Plastic Mesh Vimlite adapts itself to contemporary design.

PORTABLE ENCLOSURE
Outdoor playhouses with full solar benefits.





Plastic Mesh VIMLITE

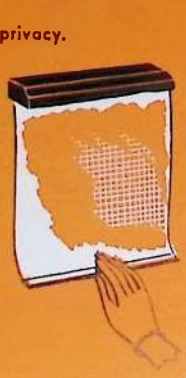
OFFERS SHATTERPROOF SAFETY . . . PRIVACY . . . INSULATION . . . EASY INSTALLATI

Now for the first time you can offer your customers an *all plastic reinforced* glazing material. This new type Vimlite is available for the same applications as wire reinforced Vimlite . . . but, in addition, Plastic Mesh Vimlite can be used in dozens of new and interesting ways. Look at the illustrations on this page . . . they represent only a few of the things Plastic Mesh Vimlite can do.

Plastic Mesh Vimlite offers approximately 20% greater light transmission—the reinforcing is made of transparent filaments. It has improved outdoor weathering acteristics . . . is lightweight and tough.

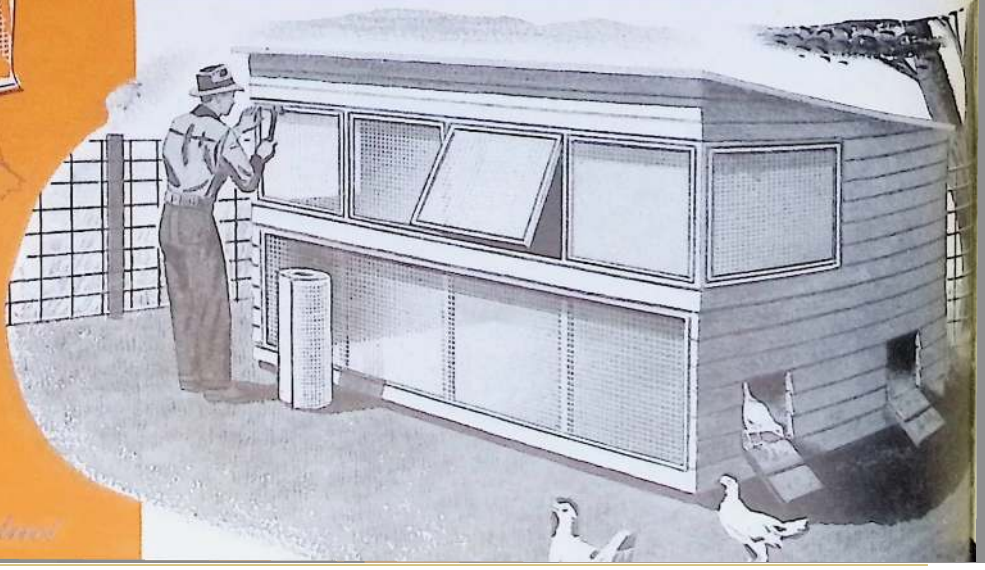
Recommend this new Celanese p whenever you have the opportunity slightly higher price is more than m by increased customer satisfaction. Mesh Vimlite promises you greater sales and higher profits.

ROLL SHADE
Flexible . . . light with privacy.



DISPLAY BACKGROUNDS
Ideal for back-lighting of merchandise.

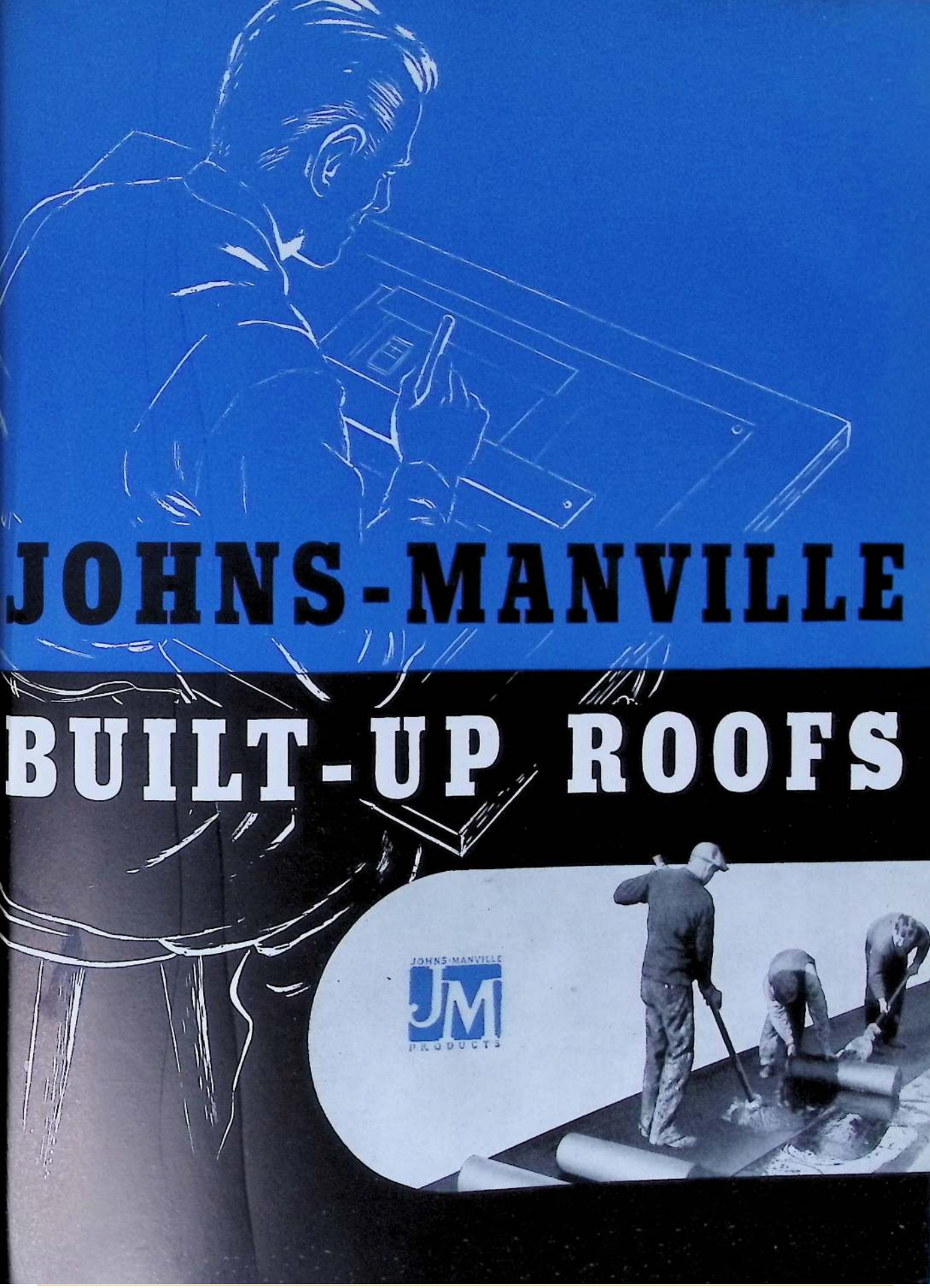




A Celanese Plastic Product*

*Reg. U. S. Pat. Off.

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IN this manual, Johns-Manville offers to architects and engineers, complete and comprehensive built-up roofing specifications covering the usual types of roof deck construction. These specifications are based on years of experience. They derive their authority from proven performances over long periods of time and under every weather condition. Johns-Manville—with the background of 88 years in the roofing industry—offers a definite specification for every roofing requirement. As the charts below show, Johns-Manville recommends Asbestos Smooth-Surfaced Flexstone Roofs on all inclines from ½" to 6".

We have listed specifications for certain special type roofs but if you have an extraordinary condition not covered in this manual, please consult the nearest Johns-Manville office.

FLEXSTONE ROOFS section 1

ASPHALT & GRAVEL ROOFS section 2

SPECIAL ROOFS section 3

FLASHINGS section 4

ROOF INSULATION section 5

ANALYSIS CHART FOR JOHNS-MANVILLE FLEXSTONE BUILT-UP ROOFS

ON INCLINES ½" TO 6" PER FOOT

TYPE OF ROOF DECK	ROOFING	PAGE	BASE FELTS			FINISHING FELTS (ALL MOPPED)		LBS. OF ASPHALT PER SQUARE
			55 lb. Asphalt Saturated Asbestos Felt	No. 45 Asphalt Saturated Asbestos Felt	No. 30 or No. 40 Asphalt Sat. Rag Felt	No. 15 Asphalt Saturated Rag Felt	15 lb. Asphalt Saturated Asbestos Felt	
Over Wood Decks	Flexstone "Super A"	5	*1 (Nail)				3	90
	Flexstone "Standard"	5	*1 (Nail)				2	60
	Flexstone "Service"	5			1 (Nail)		2	60
Over Non-Combustible Decks (Including Nailable Types but Excluding Steel†)	Flexstone "Super A"	6	1 (Mop)				2	80
	Flexstone "Standard"	6		1 (Mop)			2	80
	Flexstone "Service"	6			1 (Mop)		2	80
Over Approved Roof Insulation	Flexstone "Super A"	7					4	130
	Flexstone "Standard"	7				1	3	100
	Flexstone "Service"	7					2	100

*If desired, J-M No. 45 Asphalt Saturated Asbestos Base Felt may be used instead of J-M 55 lb. Asphalt Saturated Asbestos Felt.
†On steel decks, roof insulation must first be installed.

ANALYSIS CHART FOR JOHNS-MANVILLE ASPHALT AND GRAVEL (SLAG) BUILT-UP ROOFS

ON INCLINES NOT LESS THAN ½" NOR MORE THAN 2" PER FOOT

TYPE OF ROOF DECK	ROOFING	PAGE	ROSIN SIZED SHEATHING PAPER	PLIES OF NO. 15 ASPHALT SATURATED RAG FELT (Nail)	(Mop)	LBS. OF ASPHALT PER SQUARE
Over Wood Decks (Or Other Nailable Type Decks)	5 ply Asphalt and Gravel	8	1	2	3	150
	4 ply Asphalt and Gravel	8	1	2	2	125
Over Non-Combustible Decks (Excluding Steel†) or Over Approved Roof Insulation	4 ply Asphalt and Gravel	9			4	200
	3 ply Asphalt and Gravel	9			3	175

†On steel decks, roof insulation must first be installed.

JOHNS-MANVILLE **FLEXSTONE** BUILT-UP ROOFS

Smooth-Surfaced • Asbestos

ON INCLINES ½" TO 6" PER FT.



Advantages of Flexstone Roofs

Won't dry out from the sun • Made of fireproof and rotproof asbestos • Need no periodic coating • Upkeep expense minimized • No extra weight from slag • No clogging of drains or gutters • Actual roof can be seen • Easy to find and repair leaks • Built for long years of service

FLEXSTONE roofs combine the best in roofing materials, engineering practice and application methods to achieve a smooth-surfaced asbestos built-up roof which has no superior. Eighty-eight years of experience in the manufacture of roofing materials, and all the lessons Johns-Manville has learned over that period about the effects of time and weather on roofing, have gone into the making and building of this roof.

Today Flexstone roofs are protecting buildings all over this country and Canada. In many cases, they are still giving satisfactory service after 20, 25 and even 35 years.

Since Flexstone roofs are made of asbestos felts, they have all the advantages of that ageless mineral. The result is literally *a flexible covering of stone*, which effectively resists the drying out action of the sun . . . will not support combustion . . . and is rotproof, long-lived and easy to maintain It's economical in cost, too.

To insure proper and skilled application, Flexstone roofs are applied only by Johns-Manville Approved Roofers—roofers who have been carefully selected on the basis of experience, integrity and financial stability.

Designed to give full and lasting protection to the building and its contents, we believe that a smooth-surfaced, asbestos J-M Flexstone roof is the finest built-up roof that can be specified.

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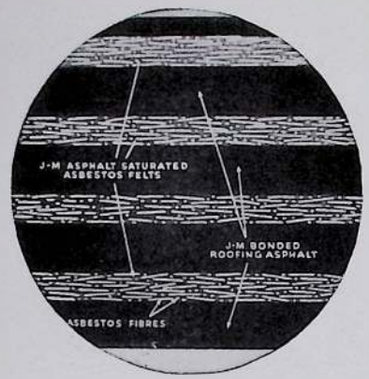


Fig. 1—Magnified Section of J-M Flexstone Roof.

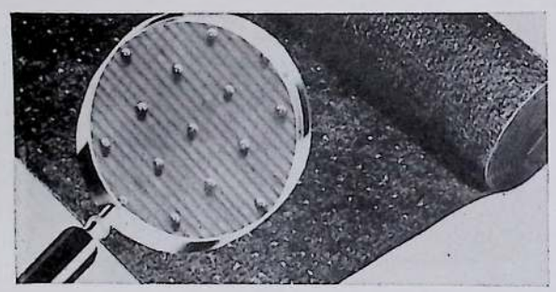


Fig. 2—Flexstone Felts are Perforated with Numerous Small Holes.

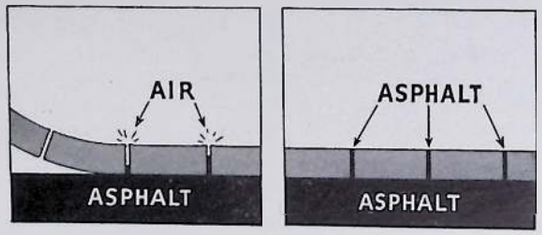
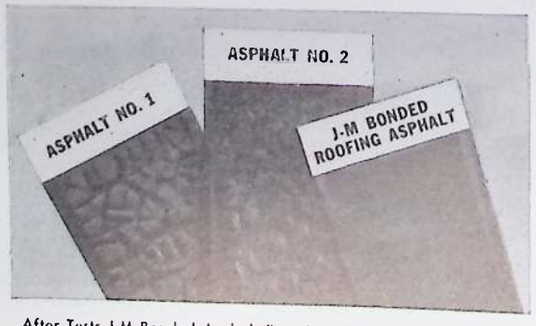


Diagram Shows How Perforations Allow Air to Escape.



After Tests J-M Bonded Asphalt Remained Practically Unchanged.

Why Asbestos Roofs Resist the Drying Out Action of the Sun

Fibres in ordinary roofing felts are hollow. Hence, they act as "wicks" which permit the sun to draw off the asphalt so essential to the life of the roofing felt. But, on the other hand, asbestos fibres are solid—no capillary action is possible and the fibres cannot act as a wick through which the asphalt may be drawn off. Note in illustration (figure one), which is a magnified section of a J-M Asbestos Flexstone roof, how the network of solid asbestos fibres in each ply protects the impregnated asphalt within the felt and at the same time, blankets the layer of asphalt below it.

Asbestos Felts Are Perforated to Make Application Easier and to Eliminate Blisters

As illustrated (figure two) J-M Asbestos Felt is made with millions of tiny perforations. This latest improvement in the manufacture of asbestos felt makes the felt more flexible. As a result, it lays smoother and conforms better to the irregularities of the roof deck. Each perforation serves as a check valve that opens upward. When the felt is laid in hot asphalt, these valves allow trapped air to escape. No air bubbles remain underneath—bubbles which might later develop into troublesome blisters. The hot asphalt "wells up" through the perforations, completely sealing them from below. The subsequent layer of asphalt then seals them from above.

Johns-Manville Uses a Specially Selected Grade of Asphalt

J-M Bonded Roofing Asphalt has proved to be superior to ordinary asphalts. Tested in the most modern types of weathering machines, Bonded Asphalt remained in virtually its original condition after being subjected to alternate cycles of heat, rain and freezing cold equivalent to ten years of actual service.

Grades of Flexstone Roofs

There are three grades of Flexstone roofs. The best, most durable and longest lived is the "Flexstone Super A". Where a less permanent roof will be satisfactory, or where budget restrictions exist, the "Flexstone Standard" or "Flexstone Service" are designed to give adequate protection.

THE SMOOTH-SURFACED ASBESTOS BUILT-UP ROOF

FOR APPLICATION OVER WOOD DECKS

ON INCLINES ½" TO 6" PER FT.

The Flexstone SUPER A Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Super A* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and vertical surfaces.

Application of Roofing

First: Lay one thickness of Johns-Manville 55 lb. Asphalt Saturated Asbestos* Felt, lapping the sheets 2" and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 10" apart, the nails to be staggered.

Second: Over the base felt, lay three plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 22" over the preceding one, mopping the full width under each with 30 lbs. of Johns-Manville Bonded Asphalt per ply, per square, and nailing at 9" centers adjacent to the back edge.

Third: Coat entire surface uniformly with Johns-Manville Regal Roof Coating (1 gal. per square) or Bonded Asphalt (20 lbs. per square).

**Johns-Manville No. 45 Asphalt Saturated Asbestos Felt may be used instead of Johns-Manville 55 lb. Asbestos Felt.*

The Flexstone STANDARD Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Standard* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the *Super A* except change paragraph "Second' under "Application of Roofing" to read:

Second: Over the base felt, lay two plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 17" over the preceding one, mopping the full width under each with 30 lbs. of Johns-Manville Bonded Asphalt per ply, per square, and nailing at 9" centers adjacent to the back edge.

The Flexstone SERVICE Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Service* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

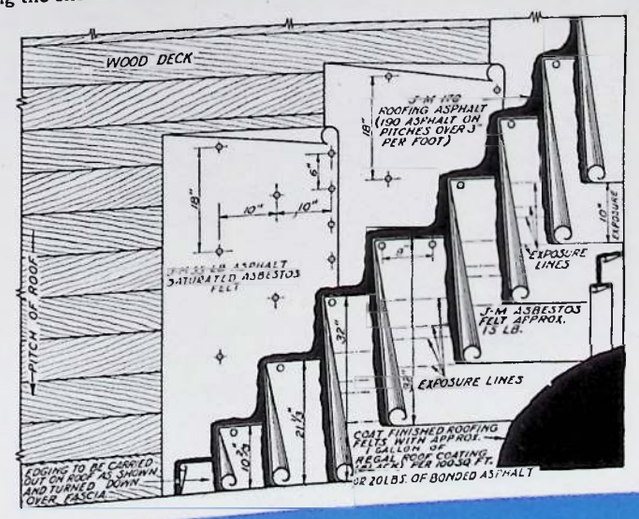
COMPLETE SPECIFICATION

Exactly the same as the *Super A* except for the following changes: Change paragraph "First" under "Application of Roofing" to read:

First: Lay one thickness of Johns-Manville No. 30 or No. 40 Asphalt Saturated Rag Felt, lapping the sheets 2", and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 11" apart, nails to be staggered.

Change paragraph "Second" to read:

Second: Over the base felt, lay two plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 17" over the preceding one, mopping the full width under each with 30 lbs. of Johns-Manville Bonded Asphalt per ply, per square, and nailing at 9" centers adjacent to the back edge.



Drawing showing how a Johns-Manville Flexstone "Super A" Roof is applied over a wood deck.

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FOR APPLICATION OVER NON-COMBUSTIBLE DECKS
(Including Nailable Types But Excluding Steel*)

ON INCLINES ½" TO 6" PER FT.

The Flexstone SUPER A Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Super A* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and vertical surfaces.

Application of Roofing

First: Coat the entire surface with Johns-Manville Concrete Primer. On gypsum, where necessary, apply two coats, allowing each to dry. If deck is of pre-cast units, omit the primer 4" each side of all joints.

Second: Lay one thickness of Johns-Manville 55 lb. Asphalt Saturated Asbestos Felt, lapping the sheets 2", spot mopping under each with 20 lbs. of Johns-Manville Bonded Asphalt per square.

Third: If roof construction permits, nail at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 10" apart, the nails to be staggered. If deck is of precast units, the asphalt shall be omitted 4" each side of all joints.

Fourth: Over the base felt, lay two plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 17" over the preceding one, mopping the full width under each with 30 lbs. of Johns-Manville Bonded Asphalt per ply, per square, and if roof construction permits, nailing at 9" centers adjacent to the back edge. With nailing strips provided, nail each sheet of the base felt at 6" centers at each nailing strip. Nail each sheet of the finishing felt at each nailing strip ¾" from the back edge.

Fifth: Coat entire surface uniformly with Johns-Manville Regal Roof Coating (1 gal. per square) or Bonded Asphalt, (20 lbs. per square).

The Flexstone STANDARD Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Standard* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the *Super A* except change paragraph "Second" under "Application of Roofing" to read:

Second: Lay one thickness of Johns-Manville No. 45 Asphalt Saturated Asbestos Base Felt, lapping the sheets 2", spot mopping under each with 20 lbs. of Johns-Manville Bonded Asphalt per square.

The Flexstone SERVICE Roof

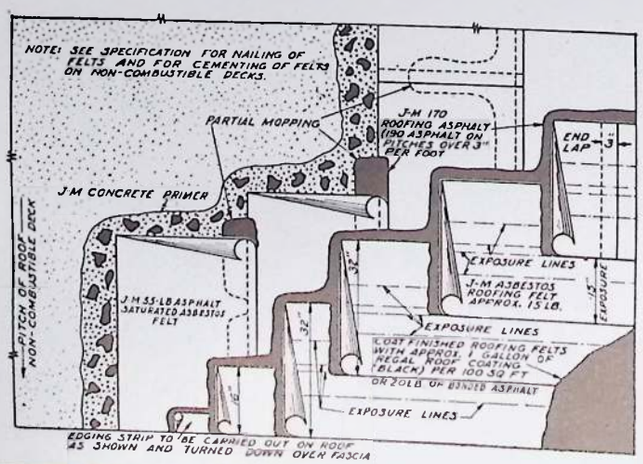
CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Service* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the *Super A* except change paragraph "Second" under "Application of Roofing" to read:

Second: Lay one thickness of Johns-Manville No. 30 or No. 40 Asphalt Saturated Rag Felt, lapping the sheets 2", spot mopping under each with 20 lbs. of Johns-Manville Bonded Asphalt per square.



*On steel decks, roof insulation must first be installed.

Drawing showing how a Johns-Manville Flexstone "Super A" Roof is applied over a non-combustible (concrete) deck.

FOR APPLICATION OVER APPROVED ROOF INSULATION

ON INCLINES ½" TO 6" PER FT.

The Flexstone SUPER A Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Super A* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Insulation on deck shall be properly applied to manufacturer's specifications, and be dry and clean. Cants shall be installed in the angles formed by the deck and vertical surfaces.

Application of Roofing

First: Lay four plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 24½" over the preceding one and mopping the full width under each with Johns-Manville Bonded Asphalt. Use 40 lbs. asphalt per square for mopping directly onto insulation, and 30 lbs. per ply, per square for subsequent moppings.

Second: If pitch of roof exceeds 3" to the foot and roof construction permits, nail each sheet of the felt at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet of the felt at each nailing strip, all nails to be placed so as to be covered by not less than two plies of felt.

Third: Coat entire surface uniformly with Johns-Manville Regal Roof Coating (1 gal. per square), or Bonded Asphalt (20 lbs. per square).

The Flexstone STANDARD Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Flexstone *Standard* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the *Super A* except change paragraph "First" under "Application of Roofing" to read:

First: Lay three plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts, lapping each sheet 22" over the preceding one and mopping the full width under each with Johns-Manville Bonded Asphalt. Use 40 lbs. asphalt per square for mopping directly onto insulation, and 30 lbs. per ply, per square for subsequent moppings.

The Flexstone SERVICE Roof

CONDENSED SPECIFICATION

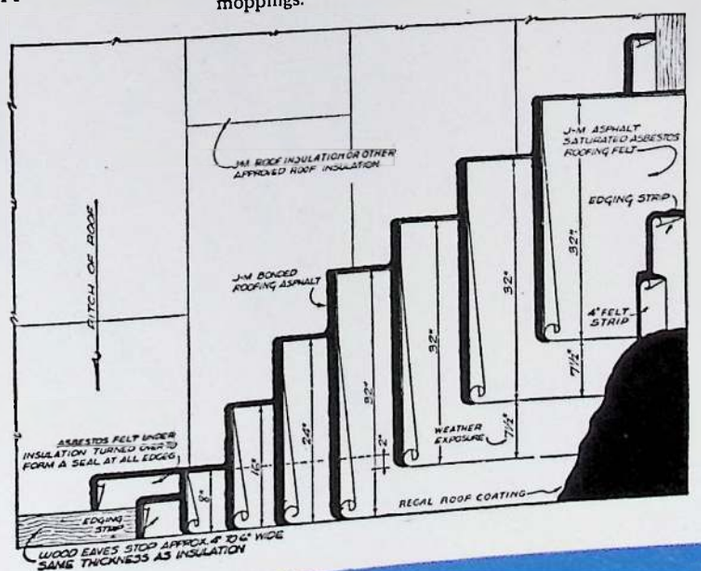
Roofing: Shall be a Johns-Manville Flexstone *Service* Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the *Super A* Specification except change paragraph "First" under "Application of Roofing" to read:

First: Lay one ply of Johns-Manville No. 15 Asphalt Saturated Rag Felt lapping the sheets 2", mopping the full width under each with asphalt. Over the rag felt lay two plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felts lapping each sheet 17" over the preceding one and mopping the full width under each with Johns-Manville Bonded Asphalt. Use 40 lbs. asphalt per square for mopping directly onto insulation, and 30 lbs. per ply, per square for subsequent moppings.

NOTE: Johns-Manville roof insulation may be applied to any type roof deck. For specifications see Section 5 of this manual.



Drawing showing how a Johns-Manville Flexstone "Super A" Roof is applied over Johns-Manville or other approved roof insulation

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FOR APPLICATION OVER WOOD (Or Other Nailable Type) DECKS

FOR INCLINES NOT EXCEEDING 2" PER FT.

The 5 Ply Asphalt and Gravel Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville 5 Ply Asphalt and Gravel Roof applied in accordance with the manufacturer's specifications, and all work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and adjoining vertical surfaces.

Application of Roofing

First: If over wood sheathing, lay one thickness of Johns-Manville (25 lb. to 500 sq. ft.) Rosin Sized Sheathing Paper, lapping the sheets not less than 1".

Second: Lay two plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place.

Third: Over these felts lay three additional plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 22" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt and nailing at 24" centers adjacent to the back edge.

Fourth: Over the entire surface pour a uniform coating of Johns-Manville Bonded Asphalt and imbed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 square feet of surface.

General: Not less than 150 lbs. of asphalt should be used for constructing each 100 square feet of completed roof.

The 4 Ply Asphalt and Gravel Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville 4 Ply Asphalt and Gravel Roof applied in accordance with the manufacturer's specifications, and all work shall be done by a roofing contractor approved by the manufacturer.

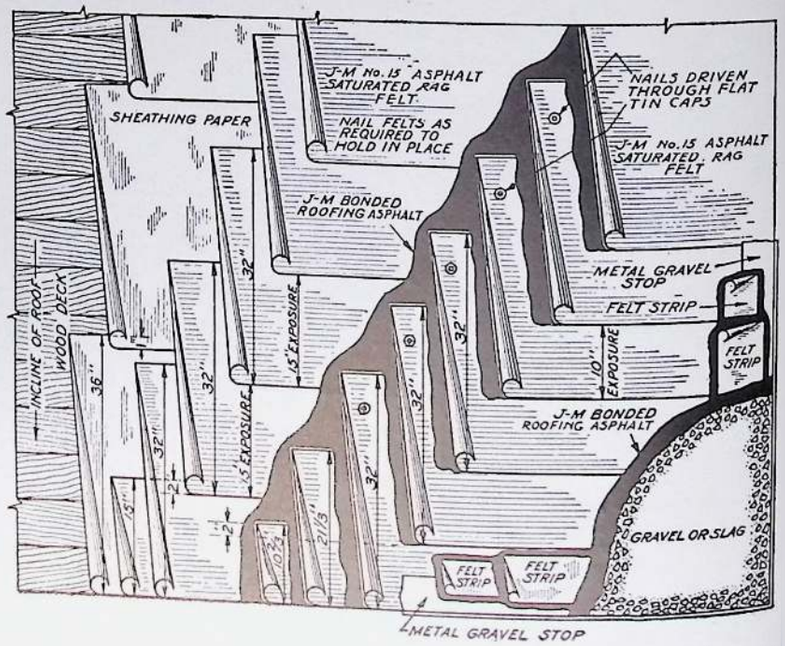
COMPLETE SPECIFICATION

Exactly the same as the 5 Ply Asphalt and Gravel Roof except for the following changes:

Paragraph "Third" under "Application of Roofing" should read:

Third: Over these felts, lay two additional plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 17" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt and nailing at 24" centers adjacent to the back edge.

Under General: Change "150 lbs. of asphalt" to "125 lbs. of asphalt."



Drawing showing how a Johns-Manville 5-Ply Asphalt and Gravel Roof is applied over a wood or other nailable type deck.

FOR APPLICATION OVER NON-COMBUSTIBLE (Except Steel*) DECKS OR OVER APPROVED ROOF INSULATION

FOR INCLINES NOT EXCEEDING 2" PER FT.

The 4 Ply Asphalt and Gravel Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville 4 Ply Asphalt and Gravel Roof applied in accordance with the manufacturer's specifications, and all work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and adjoining vertical surfaces. If over roof insulation, insulation shall be properly applied to manufacturer's specifications, and be dry and clean.

Application of Roofing

First: Lay four plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 24½" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt. If roof construction is of precast units, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the units. If incline exceeds 1" per ft., the felt shall be nailed adjacent to upper edge so that all nails shall be covered by not less than three layers of felt.

Second: Over the entire surface, pour a uniform coating of Johns-Manville Bonded Asphalt, and imbed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag for each 100 ft. of roof surface.

General: Not less than 200 lbs. of asphalt should be used for constructing each 100 square feet of completed roof.

The 3 Ply Asphalt and Gravel Roof

CONDENSED SPECIFICATION

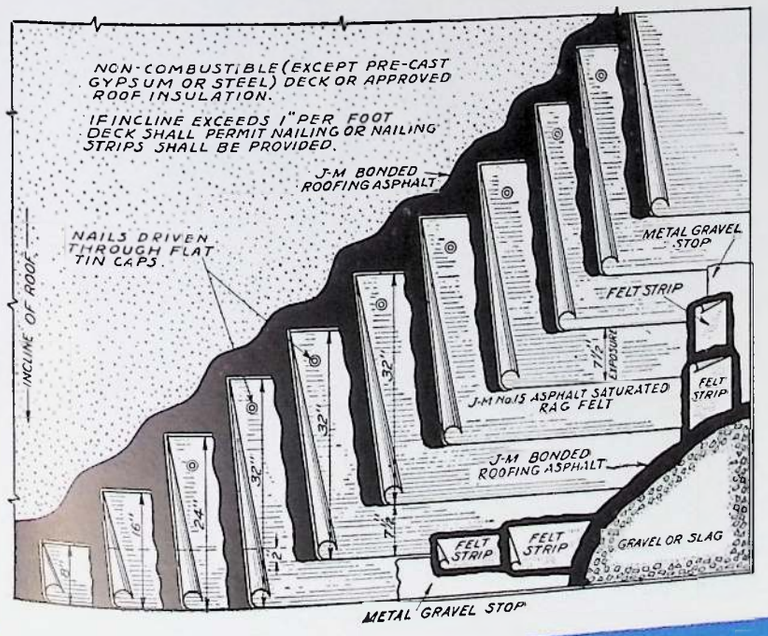
Roofing: Shall be a Johns-Manville 3 Ply Asphalt and Gravel Roof applied in accordance with the manufacturer's specifications, and all work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Exactly the same as the 4 Ply Asphalt and Gravel Roof except for the following changes: Paragraph "First" under "Application of Roofing" should read:

First: Lay three plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 22" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt. If roof construction is of precast units, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the units. If incline exceeds 1" per ft. the felt shall be nailed adjacent to upper edge so that all nails shall be covered by not less than two layers of felt.

Under General: Change "200 lbs. of asphalt" to "175 lbs. of asphalt."



*On steel decks, roof insulation must be installed.

Drawing showing how a Johns-Manville 4-Ply Asphalt and Gravel Roof is applied over a non-combustible (except steel) deck or over approved roof insulation.

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Many times it is desirable, for the sake of appearance, to have color in a built-up roof. In the following Specifications, Johns-Manville Split Sheet Slatekote Roofing is specified for the finishing felts. Since Split Sheet Slatekote is surfaced with red, green or black mineral granules, it presents an attractive, colorful appearance. The mineral granules also serve to protect the felts against the drying out action of the sun.

FOR APPLICATION OVER WOOD DECKS

ON INCLINES 1" to 4" PER FT.**

The Split Sheet Slatekote Built-Up Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Split Sheet Slatekote Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

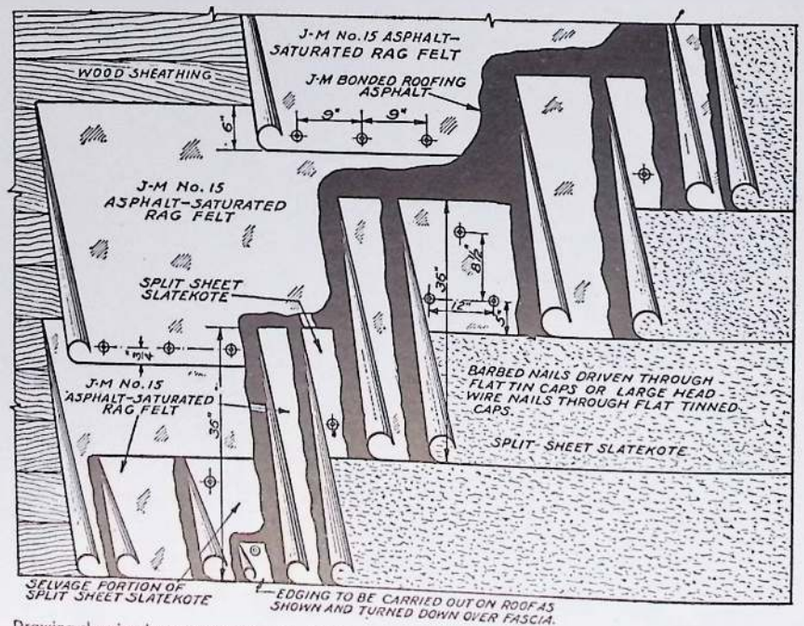
Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and adjoining vertical surfaces.

Application of Roofing

First: Lay one ply of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping the sheets 6" and nailing at 9" centers through the laps.

Second: Over this felt lay two plies of Johns-Manville Split Sheet Slatekote Roofing and two plies of the Johns-Manville No. 15 rag felt, alternating one ply of the Slatekote and one ply of the No. 15 rag felt as follows: Lay one sheet of the Slatekote, mopping the full width under it with Johns-Manville Bonded Asphalt and nailing through the unsurfaced portion in two lines spaced 8½" apart, the first line to be 5" from the edge of the slate surfacing, the nails to be spaced at 12" centers and staggered. Lay one sheet of the No. 15 rag felt to lap the unsurfaced portion of the Slatekote and extend over the No. 15 rag felt first laid, mopping the full width under it with the asphalt. Then lay a second sheet of the Slatekote to completely cover the No. 15 rag felt just laid, mopped and nailed in the same manner as the first sheet of the Slatekote, followed by a sheet of the No. 15 rag felt to lap the unsurfaced portion as previously specified. Lap the ends of the Slatekote sheets 6". Scrape the slate surfacing from the overlapped portion of the underlying sheet, nail at 6" centers, 2" from the edge, and mop the full width of the lap with the asphalt.

***Where pitch exceeds 4" ask nearest J-M office for a modified form of this specification.*



Drawing showing how a Johns-Manville Split Sheet Slatekote Built-Up Roof is applied over a wood deck.

FOR APPLICATION OVER NON-COMBUSTIBLE DECKS (Including Nailable Types But Excluding Steel*)

ON INCLINES 1" to 4" PER FT.**

The Split Sheet Slatekote Built-Up Roof

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Split Sheet Slatekote Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. Cants shall be installed in the angles formed by the deck and adjoining vertical surfaces.

Application of Roofing

First: Coat all surfaces which are to receive the roofing with Johns-Manville Concrete Primer and allow to dry. If deck is of precast units, the primer shall be omitted 4" each side of all joints.

Second: Lay one ply of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping the sheets 6", spot mopping under each with Johns-Manville Bonded Asphalt and, if roof construction permits, nailing at 12" centers through the laps. If deck is of precast units, the asphalt shall be omitted 4" each side of all joints.

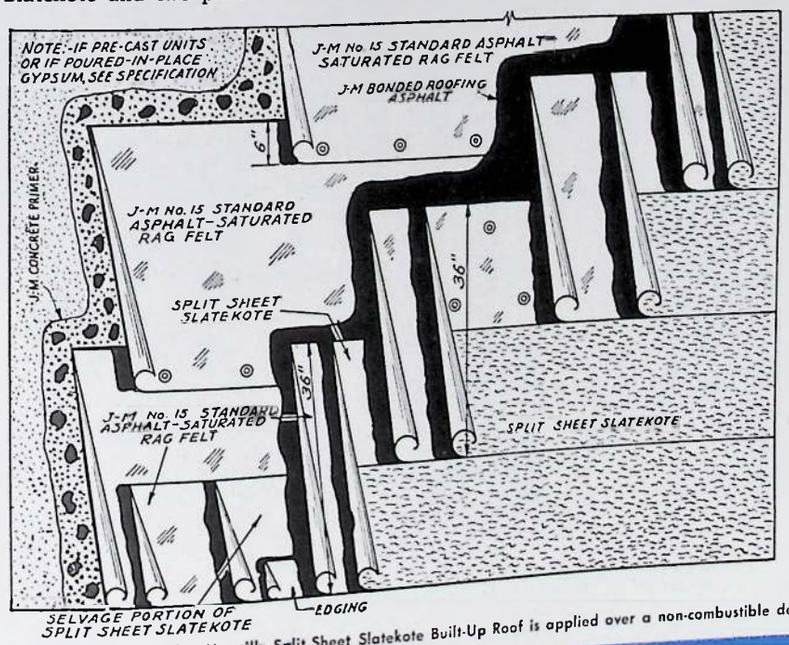
Third: Over this felt lay two plies of Johns-Manville Split Sheet Slatekote and two plies of the No. 15 felt, alternating one ply of the Slatekote and one ply of the No. 15 felt as follows:

Lay one sheet of the Slatekote, mopping the full width under it with the asphalt and, if roof construction permits, nail through the unsurfaced portion in two lines spaced 8½" apart, the first line to be 5" from the edge of the slate surfacing, the nails to be spaced at 12" centers and staggered. Lay one sheet of the No. 15 felt to lap the unsurfaced portion of the Slatekote and extend over the No. 15 felt first laid, mopping the full width under it with asphalt. Then lay a second sheet of the Slatekote to completely cover the No. 15 felt just laid, mopped and nailed in the same manner as the first sheet of the Slatekote, followed by a sheet of the No. 15 felt to lap the unsurfaced portion as previously specified. Lap the ends of the Slatekote sheets 6". Scrape the slate surfacing from the overlapped portion of the underlying sheet, nail at 6" centers, 2" from the edge, and mop the full width of the lap with asphalt.

With nailing strips provided as required, nail each sheet of the No. 15 felt at 9" centers at each nailing strip. Nail each sheet of the Slatekote through the unsurfaced portion with two nails at each nailing strip, spaced at 8½" centers, the first to be 5" from the edge of the slate surfacing.

** On steel decks, roof insulation must first be installed.*

***Where pitch exceeds 4" ask nearest J-M office for a modified form of this specification.*



Drawing showing how a Johns-Manville Split Sheet Slatekote Built-Up Roof is applied over a non-combustible deck.

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FOR UNDER PROMENADE TILE

FOR APPLICATION OVER CONCRETE DECKS TO BE OVERLAID WITH PROMENADE SURFACING

ON INCLINES NOT EXCEEDING 1" PER FT.

CONDENSED SPECIFICATION

Roofing: Shall be a Johns-Manville Built-Up Roof applied in accordance with the manufacturer's specifications, and the work shall be done by a roofing contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean and properly graded to outlets.

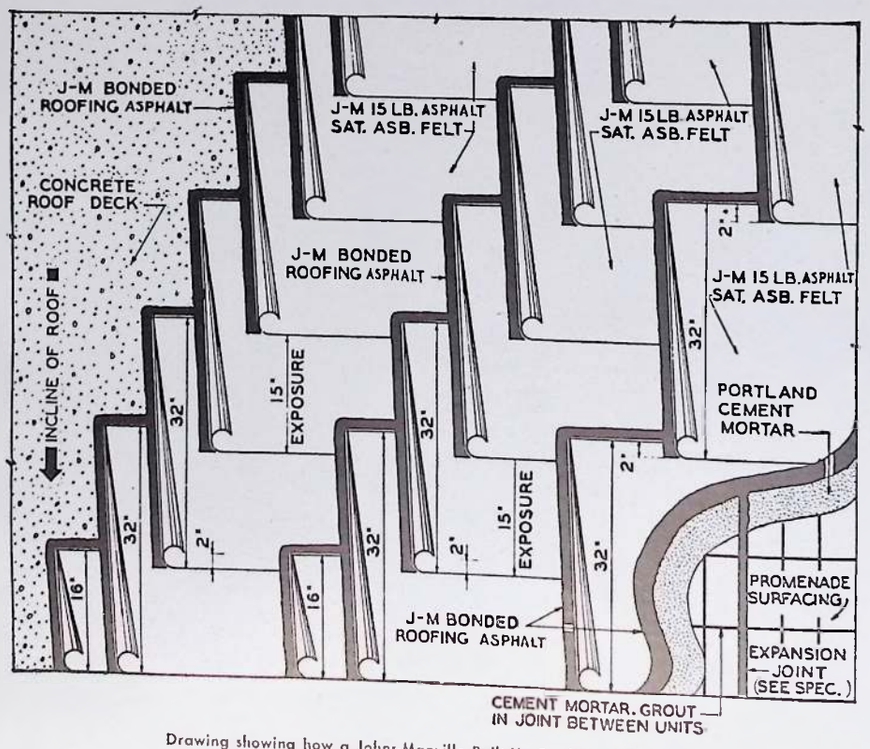
Application of Roofing

First: Lay two plies of Johns-Manville 15 lb. Asphalt Saturated Asbestos Felt, lapping each sheet 17" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt. Then apply two additional layers of the felt, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt.

Immediately preceding the laying of the promenade tile or other surfacing material, thoroughly clean the roof surface and lay one additional ply of Johns-Manville Asphalt Saturated Asbestos Felt, lapping each sheet 2" over the preceding one, mopping the full width under each with Johns-Manville Bonded Asphalt. Then coat the entire surface with the asphalt. No more of the roof surface shall be covered with the last ply of felt and asphalt than can be immediately covered with the surfacing material.

Second: Lay the promenade surfacing in a bedding of Portland cement mortar not less than 1" thick, with expansion joints in both directions on not greater than 20 ft. centers, and also at all walls, curbs and other vertical surfaces. Expansion joints shall be not less than 1" wide and shall extend from the top of the surfacing through the mortar bed to the roofing, filled with Johns-Manville Expansion Joint Filler. All joints between the surfacing, other than expansion joints, shall be grouted with Portland cement mortar.

General: All flashing shall be of sheet metal.



Drawing showing how a Johns-Manville Built-Up Roof is applied over a concrete deck which is to be overlaid with a promenade surfacing.

The Johns-Manville Asbestile System of Flashing . . . Insures Proper Treatment of All Critical Areas

More than any other place on the roof a leak is apt to develop at the junction formed by the roof deck and a vertical surface. To give the required degree of protection at such points, Johns-Manville has developed the Asbestile System of Flashing. Asbestile is a heavy-bodied plastic cement designed to give thorough water tightness where used in conjunction with asbestos flashing felts. As Asbestile sets, it becomes hard and forms an integral part of the wall itself. Johns-Manville offers two methods of Asbestile Flashing:

1. The Johns-Manville *Super A* Asbestile Flashing System
2. The Johns-Manville *Standard* Asbestile Flashing System

THE SUPER A ASBESTILE FLASHING SYSTEM

THIS IS OUR NUMBER ONE RECOMMENDATION AND SHOULD BE USED WHEREVER POSSIBLE

CONDENSED SPECIFICATION

All flashings shall be applied in accordance with the Johns-Manville Super A Asbestile Flashing System, and shall be installed by a contractor approved by the manufacturer. Cap flashing shall be extended (architect to specify "through the wall" or "up and over the parapet wall").

COMPLETE SPECIFICATION

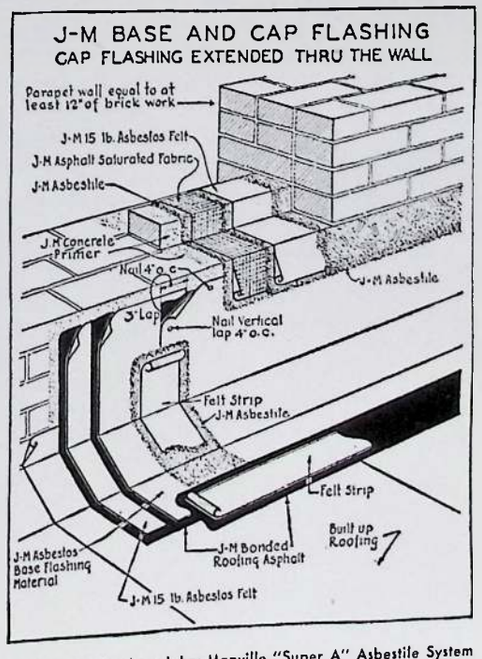
Base Flashing

First: Strike a chalk line 3" above top of base flashing and prime the wall to this line. Allow the primer to dry.

Second: Lay one thickness of the Johns-Manville 15 lb. Asphalt Saturated Asbestos Felt to extend not less than 6" high on the vertical surface to be flashed, and not less than 4" on the roof, lapping the sheets 3", mopping the full width under each with Johns-Manville Bonded Asphalt.

Third: Johns-Manville Asbestos Base Flashing shall then be mopped with asphalt and pressed immediately into place directly over and entirely covering the 15 lb. asbestos felt. Nail the top edge into brick joints or wood nailing strips, at not to exceed 4" centers horizontally. The base flashing shall be applied to extend not less than 6" high on the vertical surfaces and not less than 4" on the roof. Such dimensions shall be measured from the top and bottom edges, respectively, of cants, coves or fillets.

The ends of the sheets shall be lapped not less than 3", nailing not to exceed 4" centers vertically, cemented and covered with ⅛" course of Johns-Manville Asbestile with a 4" wide strip of the Johns-Manville 15 lb. Asbestos Felt imbedded therein and finished with a second course of Asbestile troweled on. The edges of the base flashing on roof shall be covered with a 4" wide Johns-Manville 15 lb. Asbestos Felt strip, imbedded in and coated over with asphalt but shall not be nailed to the deck.



Drawing showing how Johns-Manville "Super A" Asbestile System of Flashing (base and cap) is applied when extended through the wall.

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Super A Asbestile Flashing System (Cont.)

Cap Flashing Extending Through the Wall
(For New Work)

Mop the top of the wall with Johns-Manville Bonded Asphalt or trowel a ⅛" thickness of Johns-Manville Asbestile to within 2" of outside face of wall and imbed one ply of Johns-Manville Waterproofing Fabric. Provide sufficient fabric so that same will overhang wall and later overlap base flashing at least 4". Then, over the fabric, apply another mopping of asphalt or troweling of Asbestile, into which imbed one ply of Johns-Manville 15 lb. Asbestos Felt. The felt shall be of sufficient width to cover top of wall to within 2" of outside face and to overhang inside face of wall to later overlap base flashing at least 4". Over this felt on top of wall, apply a finished mopping of asphalt or a ⅛" troweling of Asbestile.

After the parapet is completed, the overhanging fabric and felt shall be brought down over the base flashing in the following manner:

First, coat vertical wall with ⅛" troweling of Asbestile to extend down over base flashing at least 4". Then imbed the overhanging fabric into this troweling of Asbestile. Apply over the fabric a second troweling of Asbestile, into which imbed the overhanging felt. Trowel over the felt a final coating of Asbestile, bringing it to a feather edge over the base flashing and to a straight line at the top edge of the projecting felt.

The face of base and cap flashing shall be coated with Johns-Manville Regal Roof Coating to extend from the roof surface to the top edge of the projecting felt.

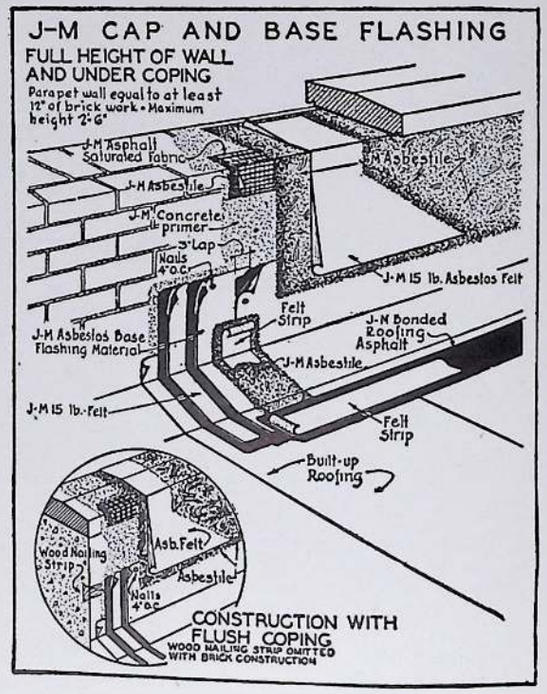
Cap Flashing Extending Up and Over Masonry Parapet Wall (For Existing Work)

At the inner top corner of parapet, imbed in Johns-Manville Asbestile an 8" wide strip of Johns-Manville Waterproofing Fabric so that same extends 4" on top of the wall and 4" on face of wall.

A layer of Asbestile, ⅛" thick, shall then be troweled over the inside face of the wall, extending down to a point 4" below the top edge of base flashing and continued over the top of wall to within 2" of outside face. A ply of Johns-Manville 15 lb. Asbestos Felt shall be imbedded therein, with sheets lapped 3" and sealed with a layer of Asbestile.

Over this felt, apply a second ⅛" layer of Asbestile, troweled over and finished to a feather edge and to a straight line at lower edge, extending below top of base flashing at least 4".

The face of the base and cap flashing shall be coated with Johns-Manville Regal Roof Coating to extend from the roof surface to the under side of the coping.



Drawing showing how Johns-Manville "Super A" Asbestile System of Flashing (base and cap) is applied when extended up the parapet and over or under the coping.

THE STANDARD ASBESTILE FLASHING SYSTEM

THIS FLASHING METHOD IS SECOND ONLY TO THE SUPER A AND CAN BE USED FOR BOTH OLD AND EXISTING WORK. IT IS DESIGNED FOR USE WHERE CONDITIONS DO NOT WARRANT THE APPLICATION OF THE *SUPER A* FLASHING SYSTEM

CONDENSED SPECIFICATION

All flashings shall be applied in accordance with the Johns-Manville Standard Asbestile Flashing System and shall be installed by a contractor approved by the manufacturer.

COMPLETE SPECIFICATION

Base Flashing

First: Strike a chalk line 3" above top of base flashing and prime the wall to this line. Allow the primer to dry.

The surface of the roof and adjoining surfaces which are to receive the base flashing shall be mopped with Johns-Manville Bonded Asphalt which is not to extend above top of base flashing.

Second: Johns-Manville Asbestos Base Flashing shall then be mopped with asphalt and pressed immediately into place, nailing the top edge into brick joints or wood nailing strips, at not to exceed 4" centers horizontally. The base flashing shall be applied to extend not less than 6" high on the vertical surfaces and not less than 4" on the roof. Such dimensions shall be measured from the top and bottom edges, respectively, of cants, coves or fillets.

The ends of the sheets shall be lapped not less than 3", nailing not to exceed 4" centers vertically, cemented and covered with ⅛" Course of Johns-Manville Asbestile with a 4" wide strip of Johns-Manville 15 lb. Perforated Asbestos Felt imbedded therein and finished with a second course of Asbestile troweled on. The edge of the base flashing on roof shall be covered with a 4" wide Johns-Manville 15 lb. Perforated Asbestos Felt strip, imbedded in and coated over with asphalt but shall not be nailed to the deck.

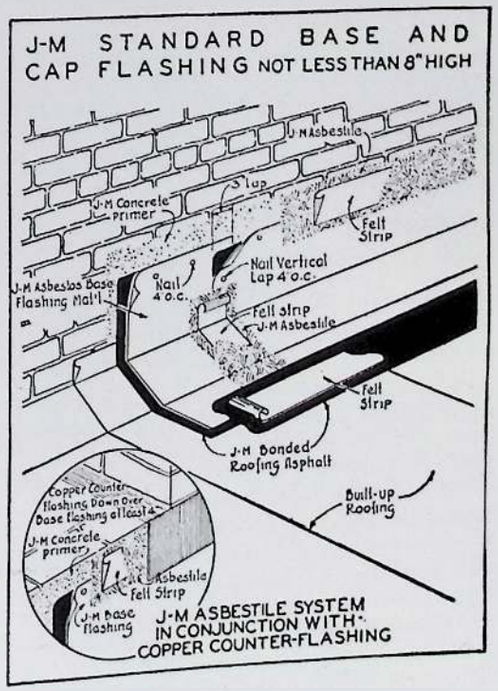
Cap Flashing

Combined cap and base flashing should be not less than 8" high.

Trowel on a layer of Johns-Manville Asbestile 5" wide and ⅛" thick, to cover completely the nails on top of the Johns-Manville Base Flashing. Into this imbed a 4" wide strip of Johns-Manville 15 lb. Asbestos Felt, over which apply another ⅛" troweling of Asbestile.

Bring the Asbestile to a feather edge and finish it neatly in a straight line.

The face of the flashing shall be coated with Johns-Manville Regal Roof Coating to extend from the roof surface to the top of the cap flashing.



Drawing showing how Johns-Manville "Standard" Asbestile System of Flashing (base and cap) is applied.

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Johns-Manville Roof Insulation Pays for Itself

TODAY, these five advantages of roof insulation are well recognized by architects and engineers.

1—Roof insulation retards the passage of heat through the roof; this saves fuel and cuts air-conditioning costs.

2—Insulation helps insure comfortable, uniform working conditions and hence increases production.

3—Insulation helps protect the roof deck against deterioration and rot which may eventually result in the costly necessity of building a completely new roof deck.

4—An insulated roof prevents condensation and roof drip which may ruin finished ceilings and walls, and even damage equipment and stocks of merchandise.

5—Insulation provides protection to the roofing felts. It acts as a "cushion" separating the roofing from the deck and therefore helps prevent the felts from cracking due to the cycles of alternate expansion and contraction in the deck.

It can be readily perceived that these various savings in operating costs, increased efficiency, protection of the building structure and of the roofing felts, will in a short time offset the initial cost of the roof insulation and then continue to pay substantial dividends during the entire life of the roof.

Johns-Manville Furnishes Two Types of Roofing Insulation

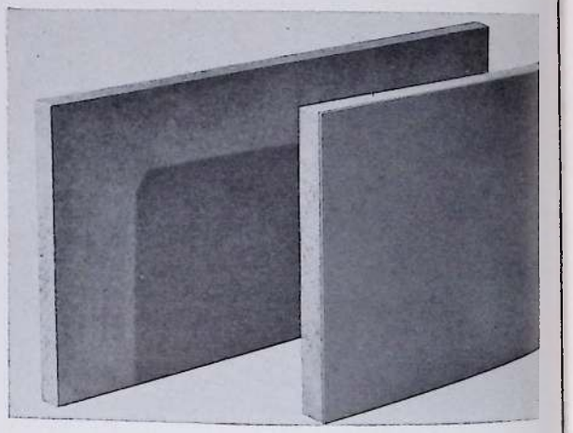
JOHNS-MANVILLE ROCK CORK INSULATION which is basically a mineral insulation that cannot rot or decay. It is exceptionally efficient and moisture resistant.

JOHNS-MANVILLE ROOFINSUL, a rigid and structurally strong insulation, made of saturated pine fibre, interlaced, felted and rolled into boards of practical size. It provides a light weight, efficient, low cost roof insulation for all types of roof decks.

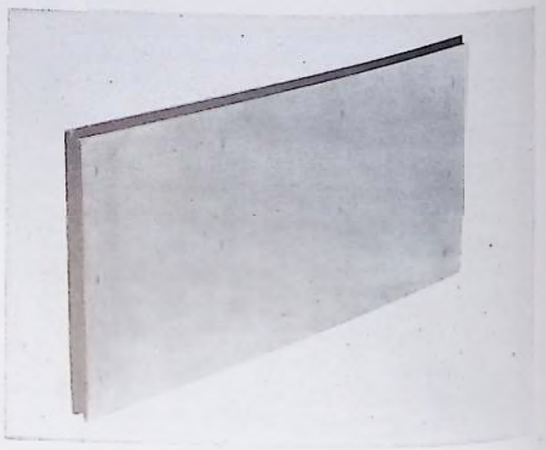
Johns-Manville specifications for the application of roof insulation have been carefully drawn to insure that it will retain its initial efficiency throughout the lifetime of the roof. Specifications call for the insulation to be sealed below and above from moisture that would cause loss of efficiency. In addition, it is isolated into small areas by a system of "path stripping" to restrict leak damage to a minimum.



Here Johns-Manville Roofinsul is Being Applied.



Johns-Manville Rock Cork Cannot Rot or Decay.



Johns-Manville Roofinsul is Rigid and Structurally Strong.

Note: In these specifications where Johns-Manville Flexstone Roofs are to be applied over the insulation, Johns-Manville *Asphalt* Saturated Asbestos Felts and Johns-Manville Bonded Asphalt should be used for felts and for a cementing agent respectively.

Where Johns-Manville Asphalt and Gravel Roofs are to be applied over the insulation, Johns-Manville *Asphalt* Saturated Rag Felts and Johns-Manville Bonded Asphalt should be used for felts and for a cementing agent.

FOR APPLICATION OF JOHNS-MANVILLE ROOF INSULATION OVER WOOD DECKS

ON INCLINES UP TO 6" PER FT.

CONDENSED SPECIFICATION

Insulation shall be Johns-Manville Roof Insulation (state type and thickness), applied in accordance with the manufacturer's specification.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets.

Application of Roof Insulation

First: A wood strip of the same thickness as the insulation by approximately 4" wide shall be provided, secured to the roof deck adjoining all eaves, to act as a stop for the insulation.

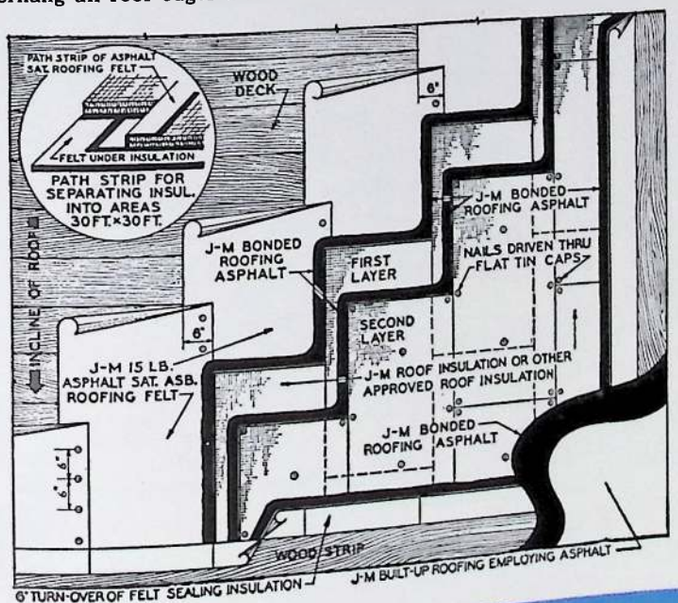
Second: Under insulation lay one ply of Johns-Manville 15 lb. Felt, lapping each sheet 6" over the preceding one and nailing sufficiently to hold in place. If an asphalt and gravel roof is to be applied over the insulation on a wood deck, under the insulation lay one thickness of Johns-Manville (25 lbs. to 500 sq. ft.) Rosin Sized Sheathing Paper. Then lay two plies of Johns-Manville No. 15 Asphalt Saturated Rag Felt, lapping each sheet 17" over the preceding one, nailing sufficiently to hold in place. The felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation, and shall overhang all roof edges a similar amount.

Third: Lay Johns-Manville Roof Insulation with the long-dimension joints continuous and at right angles to the sheathing, and with short-dimension joints broken, mopping the full width under each sheet. The edges of the sheets at the joints shall be thoroughly sealed. The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the felt, mopped the full width, to extend not less than 4" over the edge of the insulation in place, and not less than 4" under the adjoining insulation to be laid. Nail each sheet of the insulation at 24" centers adjacent to the longitudinal edges and staggered through the longitudinal center.

If to be applied in more than 1 layer, succeeding layers shall be applied in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer, with all nailing done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

General: Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.



Drawing showing how Johns-Manville Roof Insulation is applied over a wood deck.

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FOR APPLICATION OF JOHNS-MANVILLE ROOF INSULATION OVER NON-COMBUSTIBLE DECKS (Including Nailable Types But Excluding Steel)

ON INCLINES UP TO 6" PER FT.

CONDENSED SPECIFICATION

Insulation shall be Johns-Manville Roof Insulation (state type and thickness), applied in accordance with the manufacturer's specifications.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets.

Application of Roof Insulation

First: A wood strip of the same thickness as the insulation by approximately 4" wide shall be provided, secured to the roof deck adjoining all eaves, to act as a stop for the insulation.

If incline exceeds 3" per foot, roof deck shall permit nailing or wood nailing strips shall be provided.

If asphalt is used as cementing agent, coat the entire surface with Johns-Manville Concrete Primer. On gypsum, where necessary, apply two coats, allowing each to dry. If deck is of precast units, the primer shall be omitted 4" each side of all joints.

Second: Under insulation lay one ply of Johns-Manville 15 lb. Felt, lapping each sheet 6" over the preceding one, mopping the full width under each.

The felt applied under the insulation shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

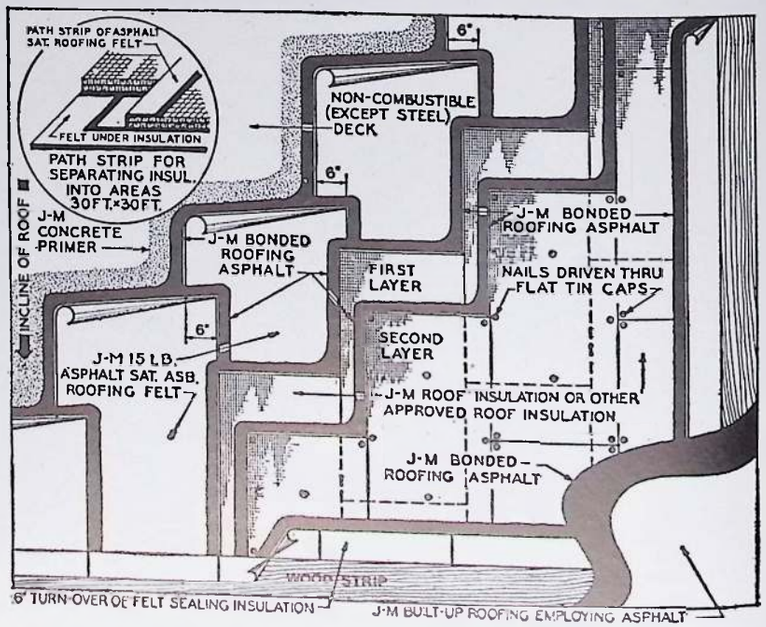
If roof construction is of precast units, the cement applied to the roof surface shall be omitted for a width of 4" each side of all joints between the units. If poured-gypsum deck, the cementing agent shall be applied by "spot-mopping."

Third: Mop solid Johns-Manville Roof Insulation with all end joints broken. The edges of the sheets at the joints shall be thoroughly sealed. The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the felt, mopped the full width, to extend not less than 4" over the edge of the insulation in place, and not less than 4" under the adjoining insulation to be laid. If roof construction permits, nail each sheet of the insulation at 24" centers adjacent to the longitudinal edges and staggered through the longitudinal center. With wood nailing strips, provided as required, nail each sheet of the insulation at each nailing strip at 12" centers.

If to be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer with all nailing done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

General: Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.



Drawing showing how Johns-Manville Roof Insulation is applied over a non-combustible deck (including nailable types but excluding steel)

FOR APPLICATION OF JOHNS-MANVILLE ROOF INSULATION OVER STEEL DECKS

ON INCLINES UP TO 6" PER FT.

CONDENSED SPECIFICATION

Insulation shall be Johns-Manville Roof Insulation (state type and thickness), applied in accordance with the manufacturer's specifications.

COMPLETE SPECIFICATION

Preparation of Deck

Roof deck shall be firm, dry and clean, and properly graded to outlets. If steel deck has not been shop primecoated or if coating is incomplete or damaged, the entire deck or uncoated areas shall be painted with Johns-Manville Concrete Primer and allowed to dry.

Application of Roof Insulation

First: A wood strip of the same thickness as the insulation by approximately 4" wide shall be provided, secured to the roof deck adjoining all eaves, to act as a stop for the insulation.

Second: Under insulation lay one ply of Johns-Manville 15 lb. Felt, lapping each sheet 6" over the preceding one, mopping the full width under each. The felt applied under the insulation shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

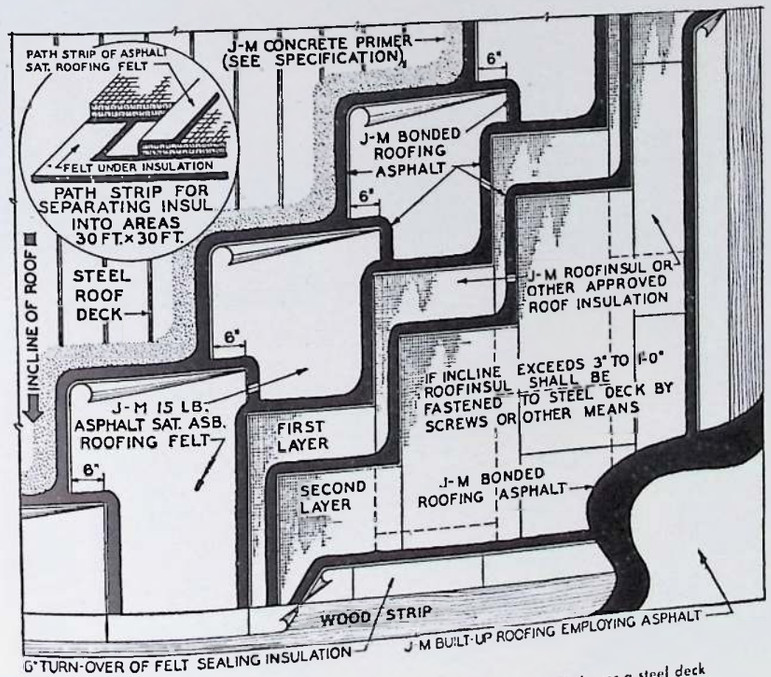
If use of felt is impractical, apply hot asphalt to underside of insulation before laying.

Third: Mop solid Johns-Manville Roof Insulation with all end joints broken, using expanding nails, self tapping screws or other approved fastening devices. The edges of the sheets at the joints shall be thoroughly sealed. The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the felt, mopped the full width with the asphalt, to extend not less than 4" over the edge of the insulation in place, and not less than 4" under the adjoining insulation to be laid. If incline exceeds 3" per foot, secure each sheet of the insulation with not less than five fasteners per sheet.

If to be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer, with all fastening done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

General: Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.



Drawing showing how Johns-Manville Roof Insulation is applied over a steel deck

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JOHNS-MANVILLE

BUILT-UP ROOFS

EXECUTIVE OFFICES

22 East 40th Street ○ New York 16, N. Y.

DISTRICT OFFICES

ATLANTA, 101 Marietta St.
BOSTON, 49 Federal St.
CHICAGO, 222 North Bank Dr.
CINCINNATI, Central Parkway at Walnut St.
CLEVELAND, 45 Prospect Ave., N. W.
DENVER, 1755 Glenarm Place
LOS ANGELES, 816 West 5th St.
MILWAUKEE, 757 N. Broadway
NEW ORLEANS, 200 Carondelet St.
NEW YORK, 22 East 40th St.
PHILADELPHIA, 1617 Pennsylvania Blvd.
ST. LOUIS, 1000 Market St.
SAN FRANCISCO, 116 New Montgomery St.
SEATTLE, 777 Thomas St.

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J-M Asphalt Shingles



J-M Asphalt Shingles provide long years of service at moderate cost

To meet the need for roof and side wall protection where low initial investment is a necessary limitation, Johns-Manville has developed a comprehensive line of asphalt shingles. J-M Asphalt Shingles provide long years of service at moderate cost. The shingles are made from a base of high-grade rag felt which is saturated with asphalt and then given a further coating of harder asphalt, into which is imbedded colorful mineral granules.

The durable color of the surface granules eliminates the expense of periodic painting. The mineral granules also make the shingles highly fire retardant. J-M Asphalt Shingles carry the Underwriters' Class C label when they are applied as roofing. Rating does not cover sidewall applications.

The various styles are available in a wide range of colors and blends which produce pleasing variegated effects without too sharply contrasting hues and shades. The variety makes possible the choice of the most effective color harmony between the house and the surrounding landscape.

If desired, J-M Asphalt Shingles can be applied directly over the old wood shingles with a minimum amount of preparation, eliminating the cost and trouble caused by removing the old shingles. The more important details of construction are summarized on the reverse of this sheet.

J-M Asphalt Shingles are made in several styles among which are square-butt and hexagonal strips.

J-M Thick-Butt Asphalt Shingles, made with square butts, are designed to give greater protection because of an extra thickness of asphalt and granules on the tabs. This extra facing protects the saturant from the drying-out action of the sun. Because of their design, however, these shingles weigh but little more than ordinary asphalt shingles.

Details of application and accessories are outlined on the reverse of this sheet.



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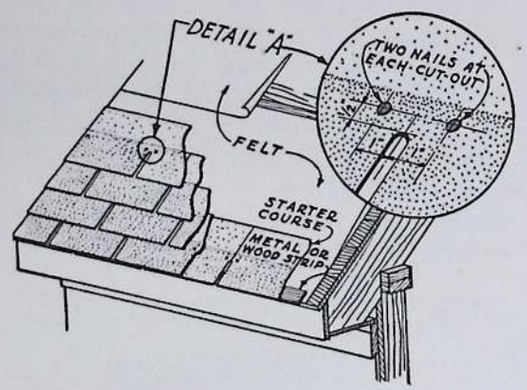
J-M Hexagonal Asphalt Shingles

Application of J-M Asphalt Shingles

Complete directions for the application of J-M Asphalt Shingles, including flashings, and treatment of valleys, hips and ridges, appear on other data sheets. The following directions summarize the important details for proper application.

Roofing Application:

J-M Asphalt Shingles can be used on roofs where the pitch is 4″ (5″ for certain types) to the foot, or



more. When used over wood sheathing, one layer of Standard Asphalt-Saturated Rag Felt, not less than 15-lb. weight, lapped at least 2″ at all joints, should be applied before the shingles are laid.

When application is to be made over old wood shingles, all decayed and missing shingles should be replaced and all loose and curled shingles securely nailed down to make the surface as smooth as possible. It may be necessary to smooth out the old roof deck by nailing on beveled wood strips with the thick edges against the butts of the wood shingles.

Sidewall Application: Asphalt shingles, when applied on sidewalls, are primarily used to re-cover the walls of buildings already constructed. When application is to be made over existing wood shingles or clapboards, a layer of Standard Asphalt-Saturated Rag Felt, not less than 15-lb. weight, is applied directly over the old wall, after loose, curled and decayed siding or shingles have been fastened or replaced, and after horizontal filler strips have been nailed against the butt edges of the siding or shingles.

As previously mentioned, Underwriters' classification does not apply when the asphalt shingles are used for sidewall application.

Asphalt Shingle Accessories:

J-M Standard Asphalt-Saturated Rag Felt: This felt is primarily used as a liner under the shingles. It is furnished in 36″-wide rolls as shown below:

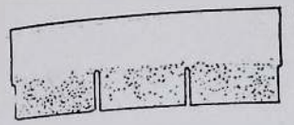
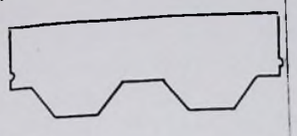
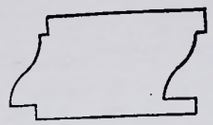
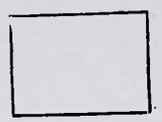
Style No.	Area of roll, sq. ft.	Total weight per roll, lb.
30	216	60
15	432	60

Slatekote Starting Strips: Slatekote Starting Strips are cut from standard Slatekote Roofing for use with J-M Asphalt Shingles, as starters. These strips are also used to line valleys and cover hips and ridges. The strips are furnished, in several colors, in rolls 36 ft. long in three widths: 9″, 12″ and 18″, weighing 21, 28 and 42 lb. per roll respectively.



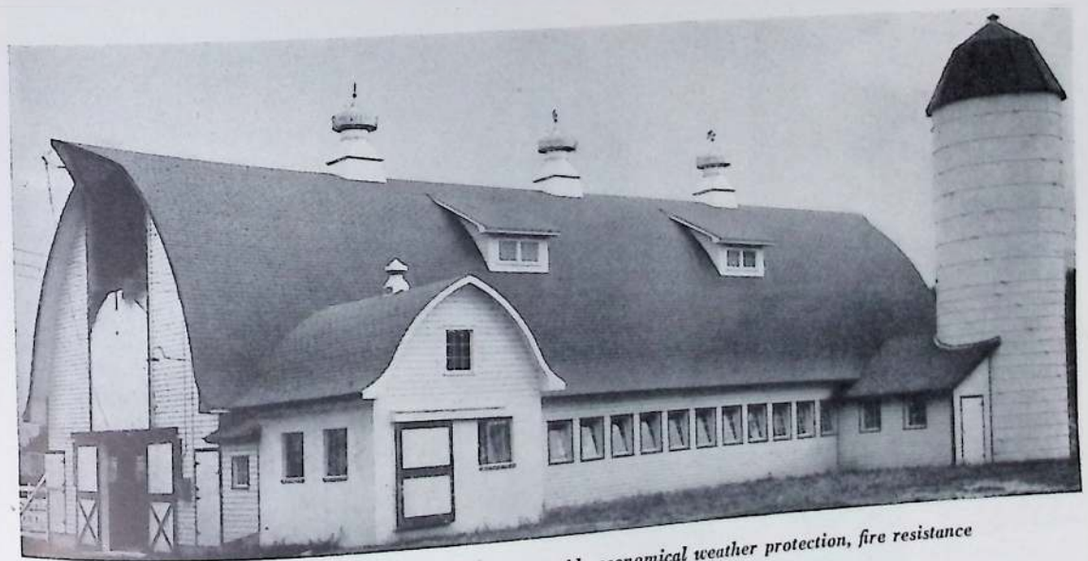
J-M Thick-Butt Asphalt Shingles

J-M Asphalt Shingles Available from Pittsburg and Los Angeles

Shape	Names and colors	Size, in.	Exposure, in.	Head lap, in.	Shingles per sq.	Approx. wt. lb., per sq.
	**12″ Thick Butt Strip Shingles** Sunset red Black Victory green Silver gray Natural green**	36x12	5	2	81	210
	**11⅓″ Standard Hexagonal Shingles** Black Victory green Sunset red Silver gray Natural green**	36x11⅓	4⅜	2	86	168
	**Latch Thatch Shingles** Sunset red Victory green Black Silver gray Natural green**	18x12	8¼	3¾	116	150
	**Dutch Lap Shingles*** Victory green Sunset red Black Silver gray	16x12	13x10	2	112	130

* Dutch Lap Shingles (Pittsburg only) also used for hips and ridges. ** Los Angeles only.

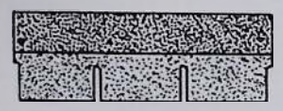
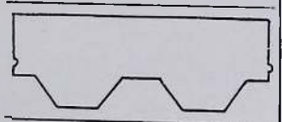
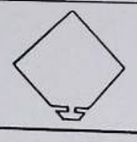
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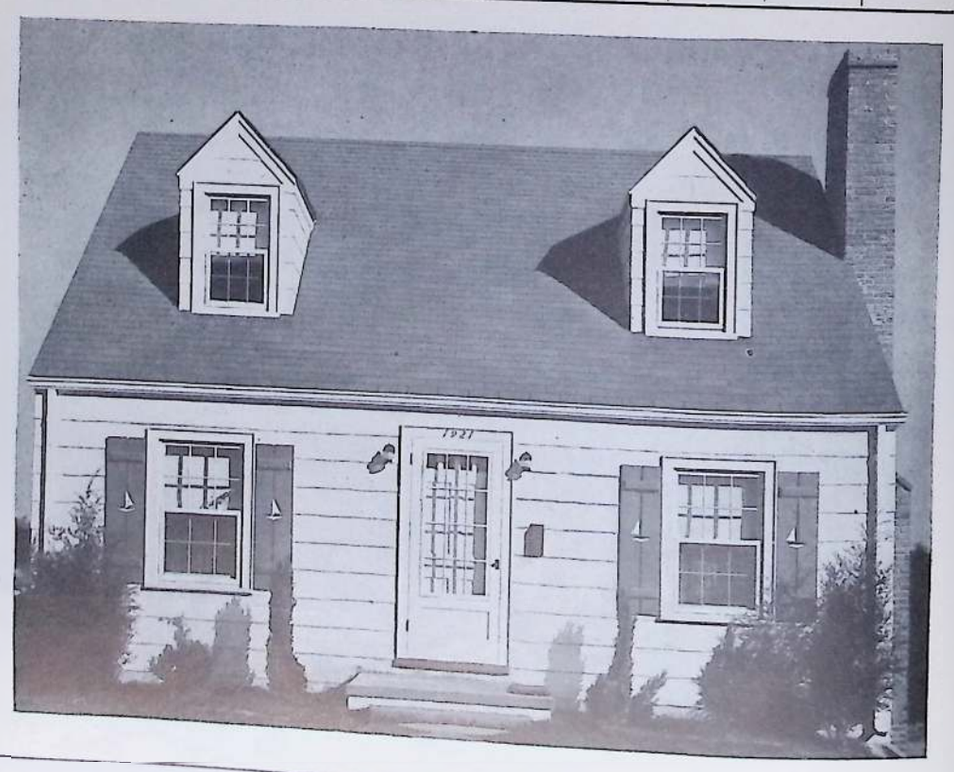


For farm buildings, J-M Asphalt Shingles provide economical weather protection, fire resistance and attractive appearance

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J-M Asphalt Shingles Available from Asbestos Factory

Shape	Names and colors	Size, in.	Exposure, in.	Head lap, in.	Shingles per sq.	Approx. wt. lb., per sq.
	**Flexstone Thick-Butt Shingles** Standard blue-black Killarney green Tile red Montrose red Standard green Autumn brown Heather blue	36x12	5	2	80	210
	Slatekote Thick-Butt Shingles Standard blue-black Killarney green Tile red Montrose red Standard green Autumn brown Heather blue	36x12	5	2	80	210
	**Slatekote Hexagonal Shingles** Tile red Montrose red Standard green Killarney green	36x11⅓	4⅔	2	86	165
	**Slatekote Locnotch Individual Shingles** Standard green Tile red Standard blue-black Killarney green	16x16	14x14	2	80	125



J-M Asphalt Shingles combine fire resistance and durability with attractive appearance and economy

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J-M Ready-to-Lay Roofings

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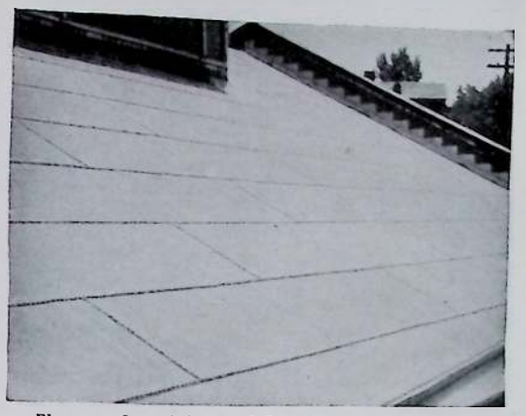
Asbestos Ready-to-Lay Roofings

J-M Asbestos Ready-to-Lay Roofings, made of asbestos felt thoroughly impregnated with asphalt, are rot-proof, weather-proof and highly fire-resisting. They are particularly adapted to pitched roofs of factories, many types of industrial buildings, garages, service stations, houses, barns, sheds, etc. The roofings are manufactured in three general types: smooth black top, smooth white top, and mineral surfaced. They are packed with galvanized nails, lap cement and butt-lap strips. If specified, they are supplied without nails and cement. The weights given are approximate.

Flexstone Smooth-Surfaced Roofing: This roofing consists of three or four plies of asphalt-impregnated asbestos felt, cemented together with asphalt into heavy, strong sheets. The sheets are furnished with a smooth surface, 32″ x 80″, six sheets per sq. Three-ply material, designated "Heavy," is packed 5 sq. per crate containing sufficient material for 500 sq. ft. of roof surface. The shipping weights are 80 lb. per sq. crated, and 66 lb. uncrated. Four-ply material, "Extra-Heavy," is packed 4 sq. per crate containing sufficient material for 400 sq. ft. Weights for shipment are 98 lb. per sq. crated, and 83 lb. per sq. uncrated. The Heavy material carries Underwriters' Class B label; Extra Heavy, Class A.

Flexstone Slate-Surfaced Roofing: A heavy asphalt-impregnated asbestos felt, surfaced on one side with red, green, or blue-black mineral granules, especially designed for steep-roofed buildings where color is desired in the finished roof. The material is furnished in 1-sq. rolls, 32″ wide, with 2″ selvage, shipping weight 85 lb. and carries the Underwriters' Class B label.

J-M White Top Roofing: This roofing is made of plies of asphalt-impregnated asbestos felts cemented together with asphalt, with a white (unimpregnated) asbestos felt on top. It has been used on many industrial buildings on the back of saw-tooth construction because of its clean, attractive, light-reflecting surface and its fire and weather-resisting properties. White Top Roofing is supplied in three weights: Standard, Heavy and Extra Heavy, each with 2″ sanded selvage edge for laps. Standard (3-ply) is furnished in 1-sq. rolls, 32″ wide, weighing 55 lb. per sq. and Heavy (3-ply) in 1-sq. rolls, 32″ wide, weighing 60 lb. per sq. Rolls are cut into pieces 13 ft. 6″ long. Extra Heavy (4-ply) is furnished six flat 32″ x 80″ sheets per sq., 4 sq. per crate, weighing 98 lb. per sq. crated and 83 lb. per sq. uncrated. Heavy carries the Class B and Extra Heavy the Class A Underwriters' label.



Flexstone Smooth-Surfaced Roofing assures an attractive and economical roof

Asphalt Ready-to-Lay Roofings

Johns-Manville manufactures several types of asphalt roll roofings, with an asphalt-saturated rag felt base, at a somewhat lower cost than the more enduring asbestos roofings. Since the life of rag felt roofing is largely dependent upon the type and quantity of saturant and coating, Johns-Manville uses only those asphalts that best resist the action of sun and weather in order to provide maximum service and durability. Asphalt ready-to-lay roofings are furnished smooth- and mineral-surfaced. The weights given are approximate and accessories are shipped as described unless otherwise specified.

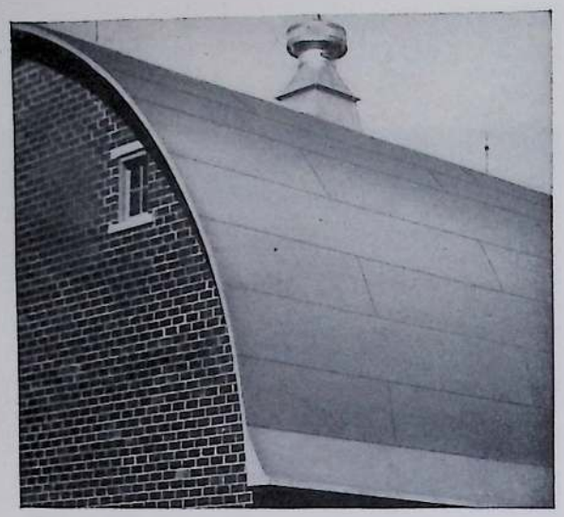
Smooth-Surfaced Asphalt Roofings:

Pilot-Roofing: This material, one of the highest quality smooth-surfaced asphalt roofings, is finished with a smooth mica surface on one side and a veined talc surface on the other. It is recommended for

All colors are not available in all locations; therefore, consult a J-M office before selection.

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J-M Ready-to-Lay Roofings are particularly adapted to steep-roofed buildings

steep-roofed buildings. The roofing is furnished in 1-sq. rolls (108 sq. ft.), 36″ wide, with lap cement and galvanized nails. Pilot is furnished in Heavy and Extra Heavy weights, 55 and 65 lb. per sq. respectively. Both weights carry the Underwriters' Class C label.

Service Roofing: This is a medium grade asphalt roofing with a veined talc surface on both sides and furnished in 1-sq. rolls (108 sq. ft.) 36″ wide. It is available in Medium weight, 45 lb. per sq., with bright nails and lap cement.

Mineral-Surfaced Asphalt Roofings:

Mineral-Surfaced roofings are especially adapted where color is desired in the finished roof. They are manufactured from rag felts heavily saturated and coated with asphalt, with colored mineral granules securely embedded in the asphalt on the upper surface. In the following descriptions, all weights given for the asphalt roofings are approximate.

Slatekote Roofing: The standard type of Slatekote is furnished in 1-sq. rolls (108 sq. ft.), 36″ wide, with or without 2″ selvage edge for lap. Lap cement and galvanized nails are included. The roofing, weighing 90 lb. per sq. and carrying the Underwriters' Class C label, is supplied in Standard Red, Victory Green, Black, Tile Red, Spruce Green and Standard Green.

Slatekote Starting Strips, for starting shingles, lining valleys and covering hips and ridges, are furnished in rolls, 36 ft. long in three widths, 9″, 12″ and 18″, weighing 21, 28 and 42 lb. per roll, respectively. Starting strips are available in Victory Green, Black, Tile Red, Spruce Green, Blue Blend Mix and Brown Blend Mix.

Modernedge Slatekote Roofing: This variety of Slatekote has a split through the center of the roll in a pyramid pattern to effect thatch-like roof lines. Furnished in 32″-wide rolls to cover 100 sq. ft. roof area, in colors: Mossfield, Killarney Blendfield, Azure Blue Blend, Green Blend, Red Blend, Blue-green Blend and Blue Blend. Packed without nails or cement, Modernedge Slatekote Roofing weighs 105 lb. per sq. and carries the Underwriters' Class C label.

Duplex Slatekote Roofing: This style of Slatekote is made 36″ wide, with 17″ slate surfacing and 19″ selvage for cementing, for use where a superior longer-lasting roof is desired and on pitches as low as ½″ to the foot where built-up roofing is not available. It is furnished with necessary galvanized nails and Duplex Slatekote Cement which does not require heating. The roofing weighs 61 lb. per roll plus 10 lb. for nails and cement which are shipped separately. Colors are Victory Green and Black. Duplex Slatekote carries the Underwriters' Class C label.

All colors are not available in all locations; therefore, consult a J-M office before selection.

Application of J-M Ready-to-Lay Roofings

Roof Pitches:

Ready-to-lay roofings are not suitable for use on flat surfaces, nor should they be used on roofs surrounded by parapet walls or other vertical surfaces where stoppage of leader outlets would result in water backing up and lying on the roof. In other words, these roofings should not be used on any surface that cannot be depended upon to drain water freely.

Roof Surfaces:

Ready-to-lay roofing is usually applied directly over wood sheathing, which should be composed of well-seasoned roof boards, closely laid, preferably tongue and groove, and secured with at least two nails to each rafter. Any boards that warp or curl should be drawn down by re-nailing. Any loose nails should be re-driven, knot holes or cracks covered with tin and the roof cleared of all obstructions and swept clean. This should provide a sound, smooth nailing surface.

In the case of an existing roof of old shingles, it is advisable to remove the shingles and provide close sheathing to receive the new roofing.

On old tin roofs, if the roof boards are laid close and in good condition, it is better to remove the tin. Application can be made over the tin, however, provided all standing seams and sharp edges are flattened down and nailed before the roofing is applied.

The application is as important as the materials in determining the satisfactory service to be obtained where this type of roof covering is adaptable. Particular attention should therefore be paid to detailed directions for use. See drawings on other side of page.

Laps:

Roofing is always laid so that water runs over the laps, never against exposed edges. Horizontal laps should be sealed with lap cement (except on Modernedge) and nailed about ¾″ from edge. On asbestos roofing, vertical end laps are butted, and under all vertical butted end joints, 6″ wide strips of roofing felt (included with shipments) are applied, centered under the joint. These strips are coated with lap cement, into which the ends of the roofing felts are firmly embedded and nailed. On asphalt roofing, vertical laps are formed by lapping over the roofing felts and cementing and nailing as required.

Laps, minimum roof pitches, type of nailing, etc., are summarized in the table below.

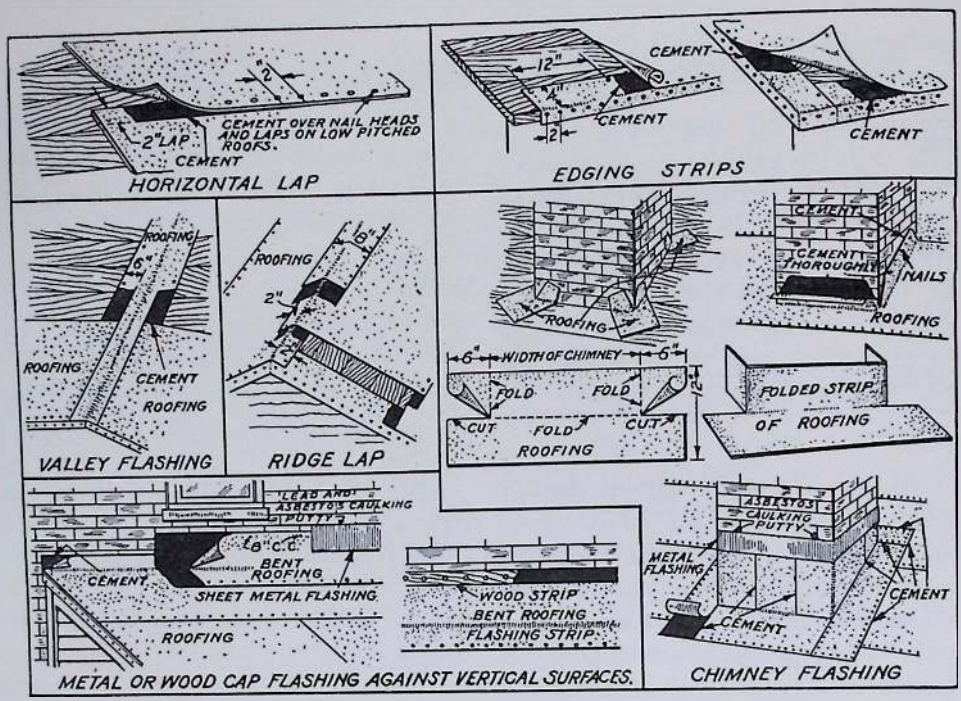
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Application Data on J-M Ready-to-Lay Roofing

Style	Min. roof pitch per ft.	Horizontal lap	Vertical lap	Type of nailing	Laps cemented	Nailing centers for horizontal laps	Nailing centers for vertical laps
Flexstone Smooth-Surfaced	2″	2″	Butted	Exposed	Yes	2″	2″
Flexstone Slate-Surfaced	3″	2″	Butted	Exposed	Yes	2″	2″
White Top	3″	2″	Butted	Exposed	Yes	2″	2″
Pilot-Roofing	2″	2″	4″	Exposed	Yes	2″	1″
Service	2″	2″	4″	Exposed	Yes	2″	1″
Slatekote	3″	2″	4″	Exposed	Yes	2″	1″
Duplex Slatekote	½″	19″	6″	Concealed	Yes	12″ staggered	2″
Modernedge Slatekote	4″	2″	Point over Point	Exposed	No	Top: Nail over each point Bottom: Nail in center of each point and recession.	2″
				Concealed	Yes	3″	2″

Complete application directions for J-M Ready-to-Lay Roofings appear on other data sheets

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Details for Ready-to-Lay Roofings with exposed nailing and cemented laps

J-M Roofing Cements, Coatings and Putties

J-M Asbestos Fibrous Roof Coating: A high-grade black roof coating made of asbestos fibre and asphalt in the right consistency for brush application, with asbestos fibre ground for a smooth coating, or unground for use where the roof is in bad condition, such as rusted metal roofs. Covering capacity, 75 to 150 sq. ft. per gal., depending on condition of roof, and whether coating is ground or unground. Shipped in 1, 5. 15-30 and 50-55-gal. containers.

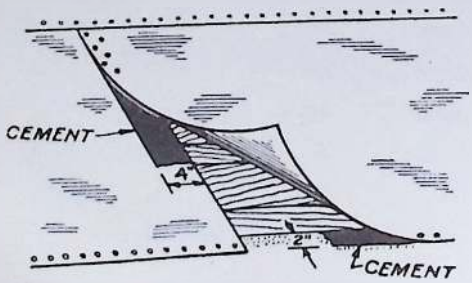
J-M Asbestos Roof Putty: A high-grade plastic roof putty, made of asbestos fibre and asphalt, used for patching leaky roofs, setting flashing flanges around vent pipes and other purposes. The putty remains waterproof and plastic, expanding and contracting with the underlying surface. It adheres tightly to metal, felt, wood or glass. Furnished in red, in 1, 5, 10, 25, 50 and 150-lb. containers; in gray, in 1, 5, 10, 35, 60 and 175-lb. containers; and in black, in 1, 2½, 5, 10, 25, 45, 135, 275, 470 and 500-lb. containers. The 1-lb. and 2½-lb. cans of Asbestos Roof Putty are shipped 24 per carton; 5-lb. cans, 12 per carton; and 10-lb. cans, 6 per carton.

J-M Lap Cement: This material is similar to the cement packed in each roll of ready-to-lay roofing but is shipped in 1, 5, 25-30 and 50-55-gal. containers for use where roofing is shipped without accessories. The 1-gal. cans are packed 6 per carton. Also packed in pint cans, 36 per carton.

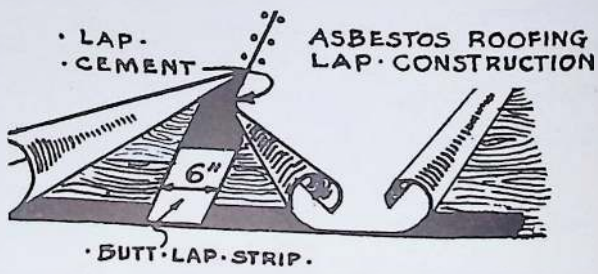
J-M Regal Roof Coating: A black, high-grade asphaltic roof coating, applied cold as a surface finish on smooth-surfaced roofs. One gal. (approx. 8 lb.) is required per 100 sq. ft. Furnished in 1, 5, 25-30 and 50-55-gal. containers. The 1-gal. cans are packed 6 per carton.

J-M Roofing Tape: A waterproofing fabric for use with roof coatings and putties for mending or bridging large cracks or holes. Furnished in rolls of 36 linear ft. 3" wide, and shipped in cartons containing 4 rolls.

Other Materials: J-M Ready-Mixed Asbestile, Special A.R. Roof Putty, Bonded Roofing Asphalts and Bonded Roofing Pitch are described under Bonded Built-up Roofs; Asbestos Caulking Putty in the section covering "Building Materials"; and Concrete Primer and Standard Asphalt Waterproofing Cement in the "Waterproofing and Miscellaneous Asphalt Products" Section.

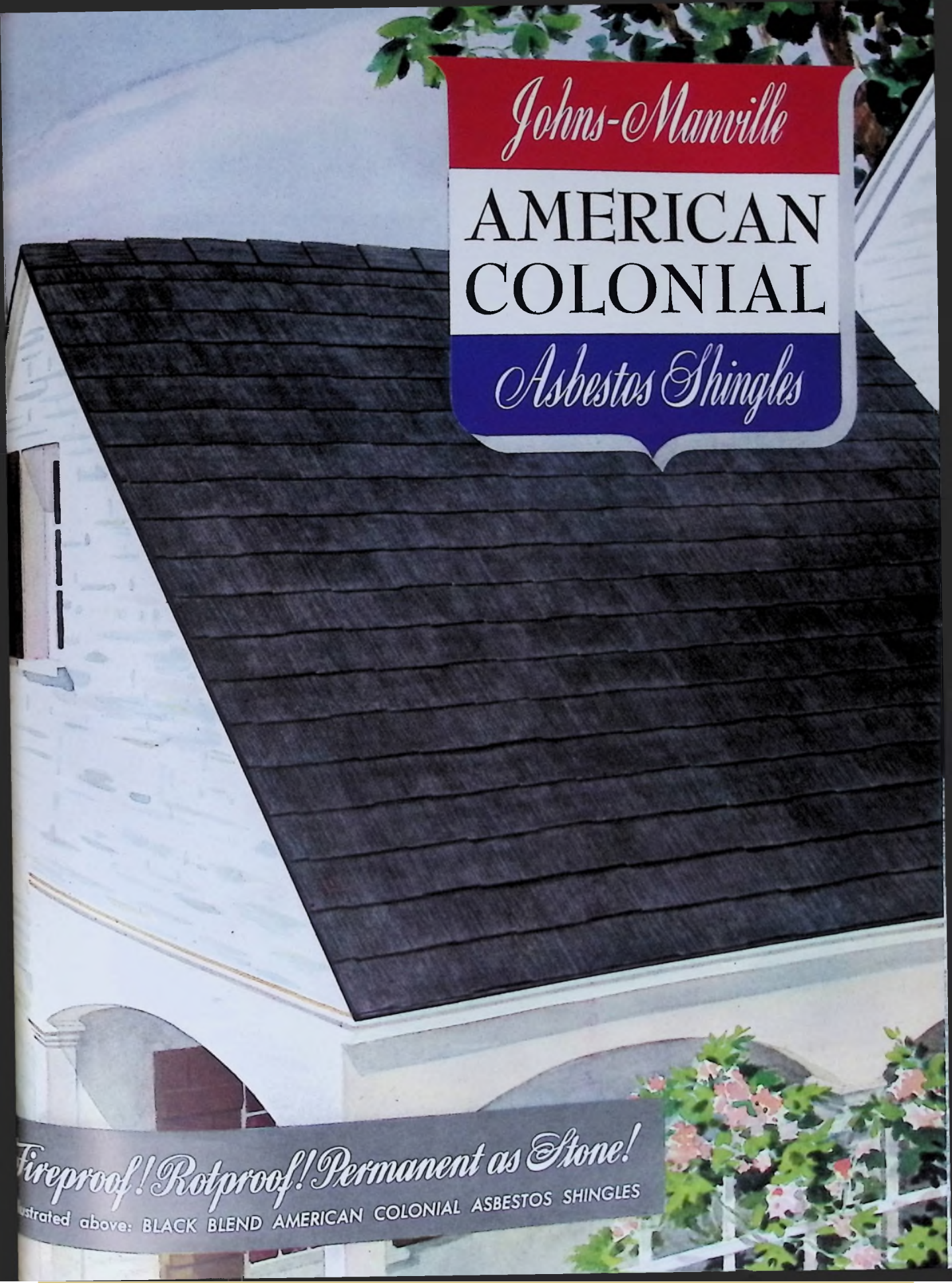


Vertical lap on asphalt roofings with exposed nailing and cemented laps

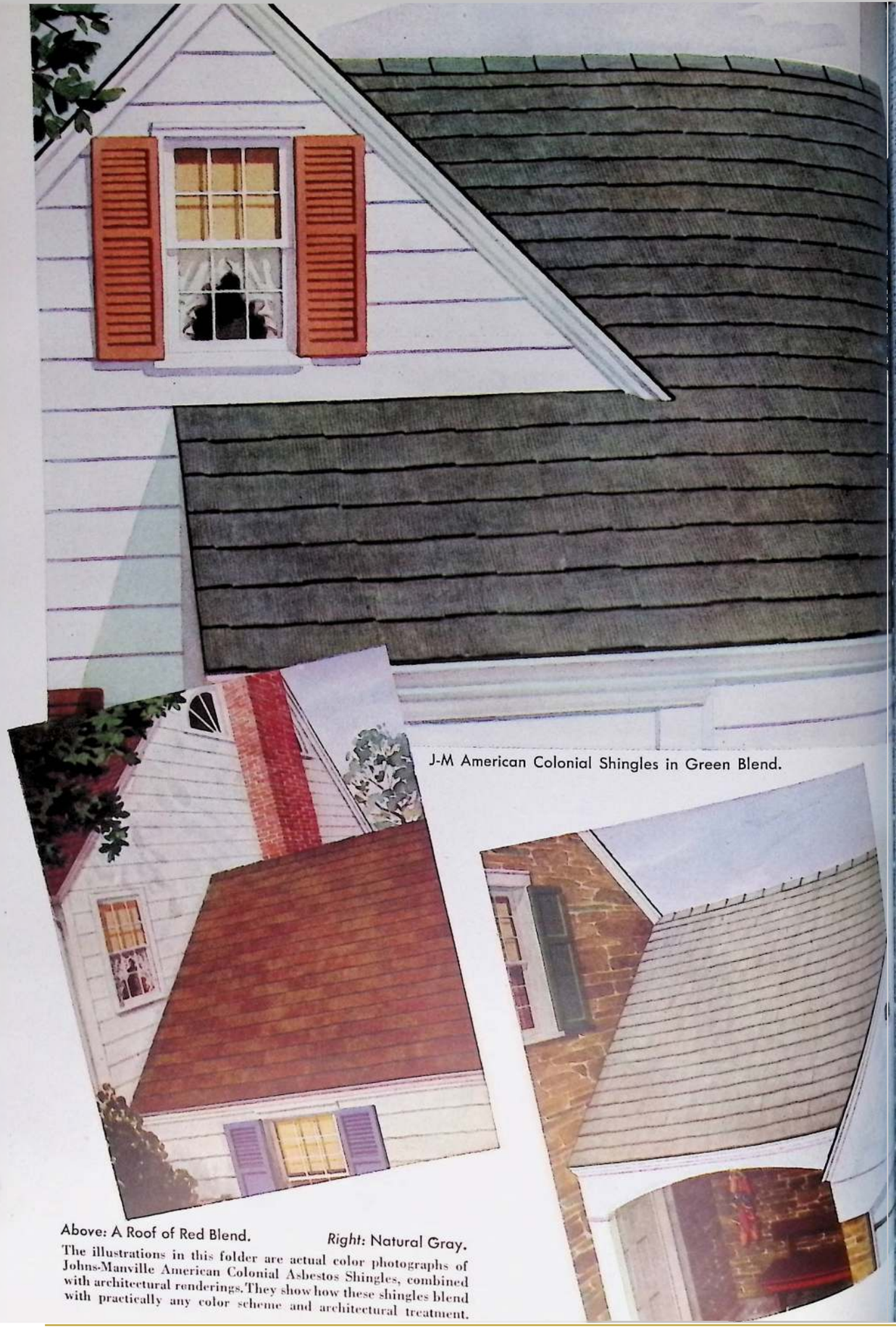


Vertical lap on asbestos roofings with exposed nailing and cemented laps

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J-M American Colonial Shingles in Green Blend.

Above: A Roof of Red Blend. *Right:* Natural Gray.

The illustrations in this folder are actual color photographs of Johns-Manville American Colonial Asbestos Shingles, combined with architectural renderings. They show how these shingles blend with practically any color scheme and architectural treatment.

Based on over 80 years of manufacturing experience in roofing materials, we recommend the new J-M American Colonial Asbestos Shingle as the most satisfactory and economical shingle over a period of years any home owner can buy. We believe it is one of the finest roofing products we have ever manufactured and at its new low price we recommend its selection.

Johns-Manville



Left: White is a favored color for the roofs of southern homes. Note how perfectly these white American Colonial Shingles blend with the architecture of this charming home.

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Shown above are a few typical examples of the use of J-M American Colonial Asbestos Shingles by leading builders of fine homes. On existing homes, for re-roofing, they are easily applied right over the old shingles.

NOW! A ROOF OF FIREPROOF, ROTPROOF TEXTURED ASBESTOS SHINGLES *at the lowest price in Johns-Manville history!*

It's true! A roof of genuine Johns-Manville Asbestos Shingles at the lowest price you have ever had to pay. And what a shingle! Combining new beauty of color and texture with the tried and time-tested advantages of asbestos, it represents the most outstanding value in J-M's more than 80 years experience in the manufacture of roofing materials.

Beauty Here is beauty such as you would never have thought possible in a fabricated shingle! The texture and graining of fine old weathered wood. The clean-cut shadow lines that make for interest and charm in a roof. The simplicity and dignity of line that are invariably associated with the word "Colonial." Truly, it is difficult to believe that a shingle so lovely in appearance can also possess the permanence of stone.

Color But the stylists of this new Johns-Manville American Colonial Shingle were not content with beauty of design alone. They sought — and found — outstanding new beauty of color, too. There is a soft green blend, for example, that seems to harmonize perfectly with any surroundings. A blend of rich, warm reds that gives a distinctive touch to any home. A black blend that makes one of the most strikingly handsome roofs you have ever seen. And there is a natural gray and a white, too — colors which are particularly suitable for southern homes.

Fireproof Like all Johns-Manville Asbestos Shingles, these new American Colonial Shingles are fireproof — not just fire-resistant. Even the white heat of a blow torch cannot burn them! Against that ever-present menace which destroys millions of dollars in property each year — the roof-communicated fire — they give your home effective protection. This advantage alone may some day mean the difference between security and disaster should sparks or brands from a nearby fire happen to fall on your roof.

Rotproof and Weatherproof Made of asbestos and cement, two practically imperishable materials, J-M American Colonial Shingles are immune to rot or decay. They are unaffected by ice or snow — unharmed by exposure to salt air. Built to defy the ravages of time and weather, a roof of these durable shingles needs no periodic upkeep — no expensive repairs. Applied on your new home or over the old shingles on your present home, it is an investment in protection that will endure as long as your house stands.

NEW FAST-LAYING DESIGN CUTS APPLICATION COSTS!

The development of the American Colonial Shingle is the result of years of study and research to produce a fabricated asbestos-cement shingle that would cut application costs to the bone. The answer has been found in a strip type shingle which, when applied on the roof, covers in one simple operation as much area as 5 ordinary shingles!

In actual application tests, conducted with the help of an experienced roofing contractor, the new American Colonial Shingle required less time to apply than any other Johns-Manville Asbestos Roofing Shingle and only slightly more time than the fastest-laying asphalt strip shingle.

Home-owners, builders and architects everywhere have been so enthusiastic in their response to this new shingle that J-M has been able to take full advantage of modern mass production economies in its manufacture. As a result of these economies, plus its low application cost, you can now provide your home with the protection of a textured asbestos shingle roof at the lowest price in Johns-Manville history!

LASTING, LOW-COST PROTECTION AGAINST THE 3 WORST ENEMIES OF YOUR ROOF:



TIME! In 1910, a Johns-Manville Asbestos Shingle roof was applied on this Greenwich, Conn., residence (above). Today the same shingles are still on the job, none the worse after more than 36 years of exposure to the weather. Rain . . . snow . . . sleet . . . ice . . . sun . . . even time itself has not harmed them.



FIRE! The photograph above dramatically illustrates the fireproof qualities of J-M Asbestos Shingles. Even when subjected to the extreme heat of a blow torch they do not burn! What better protection could you give your home against the hazards of the roof-communicated fire than a roof of these fireproof shingles?

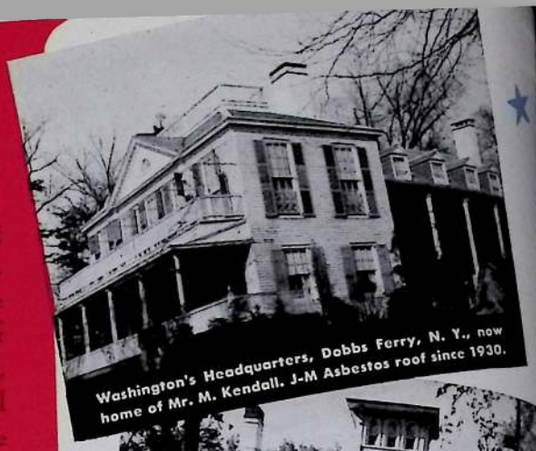


WEATHER! When you buy a roof you naturally expect full protection from the weather. But few roofs are called upon to meet the test passed by the one shown above. This New England home was directly in the path of the hurricane of September, 1938. Yet its J-M Asbestos Shingle roof came through intact — without the loss of even one shingle!

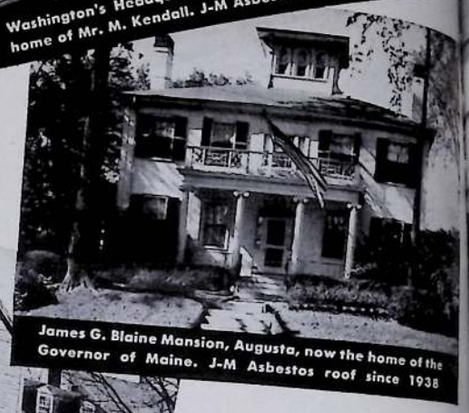
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J-M ASBESTOS SHINGLES SAFEGUARD AMERICA'S HISTORIC HOMES

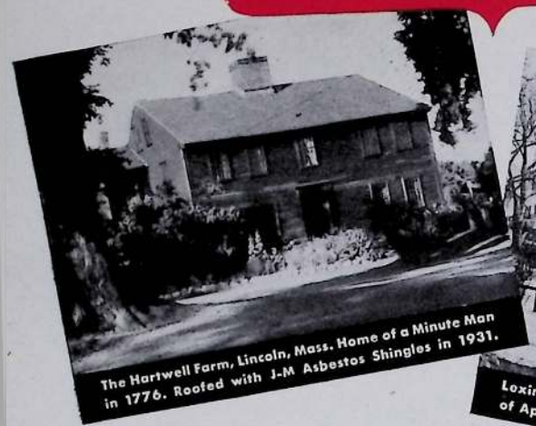
Because they combine beauty with lasting protection against fire and weather, Johns-Manville Asbestos Shingles have been selected for re-roofing many of our country's historical buildings. Today, a roof of the new American Colonial Shingles offers your home these same advantages — at surprisingly low cost!



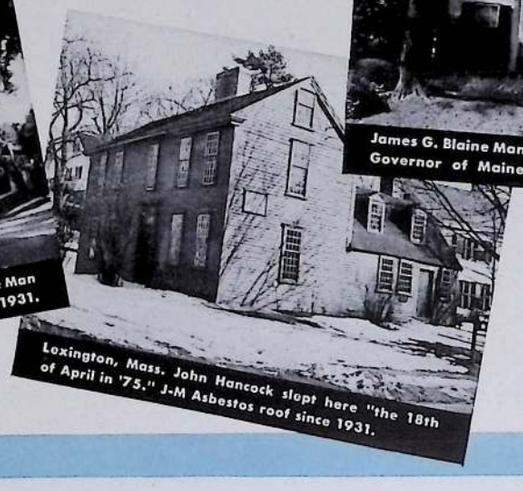
Washington's Headquarters, Dobbs Ferry, N. Y., now home of Mr. M. Kendall. J-M Asbestos roof since 1930.



James G. Blaine Mansion, Augusta, now the home of the Governor of Maine. J-M Asbestos roof since 1938



The Hartwell Farm, Lincoln, Mass. Home of a Minute Man in 1776. Roofed with J-M Asbestos Shingles in 1931.

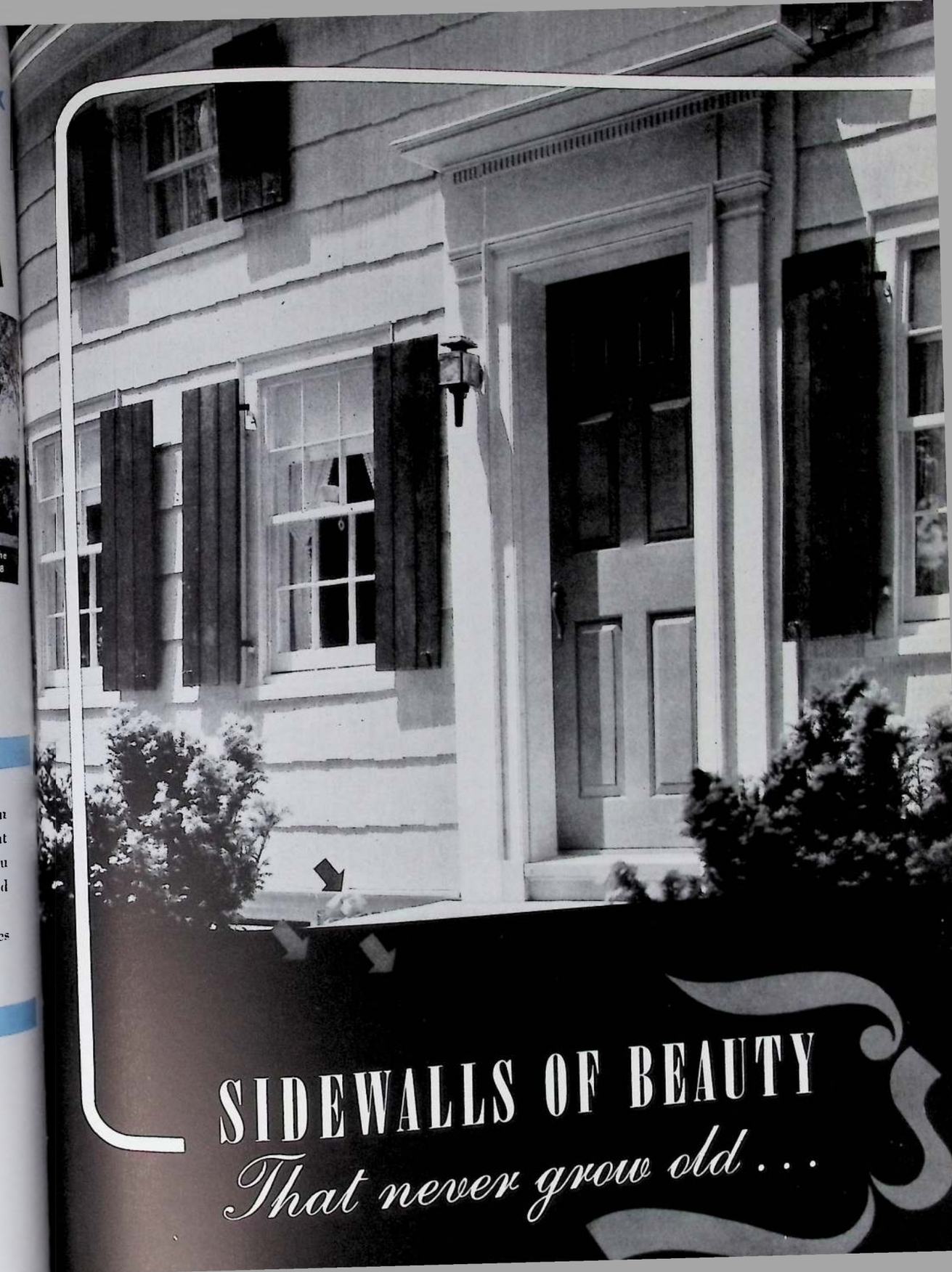


Loxington, Mass. John Hancock slept here "the 18th of April in '75." J-M Asbestos roof since 1931.

RE-ROOF FOR THE LAST TIME

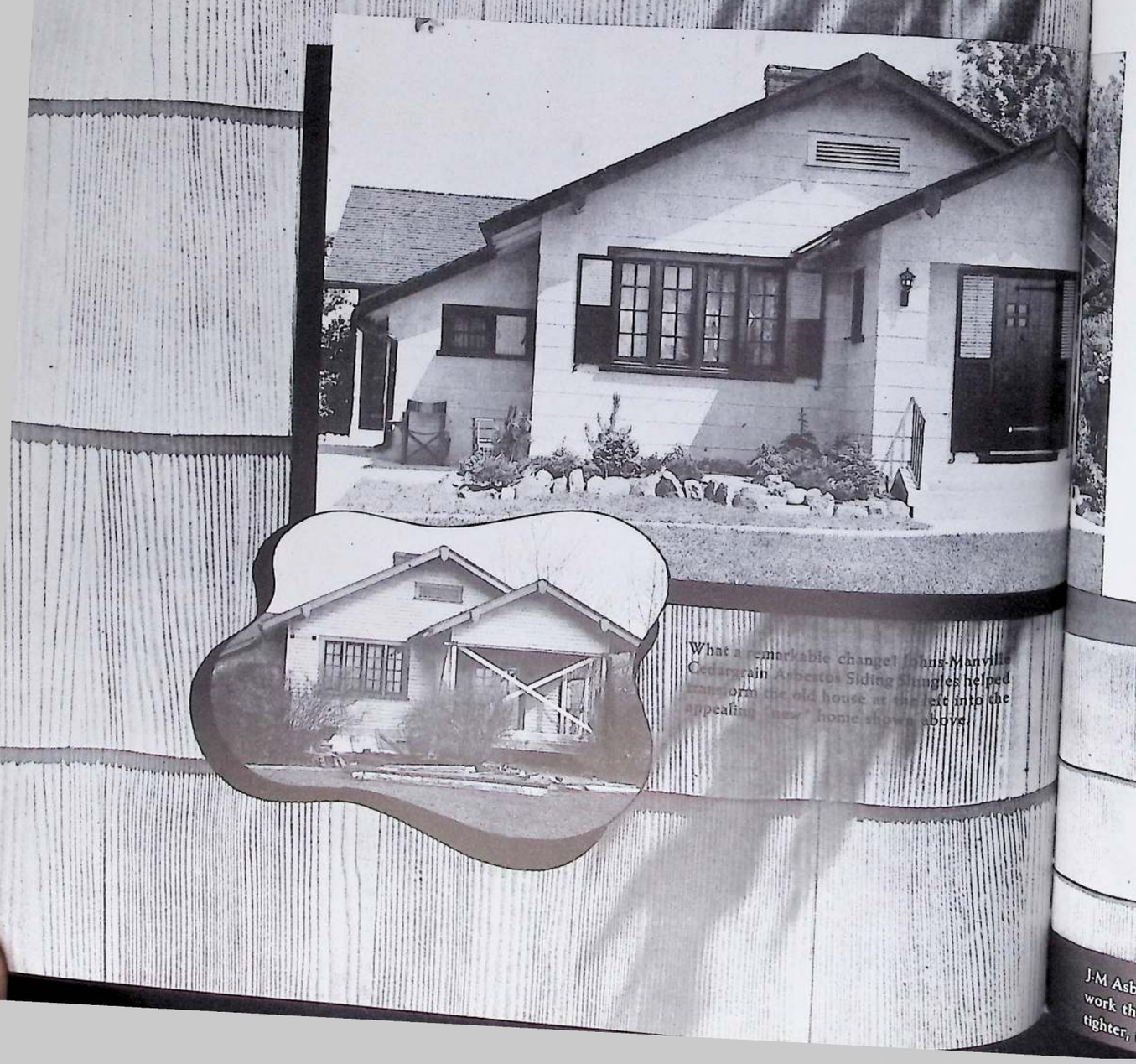
Thousands of the very earliest Johns-Manville Asbestos Shingles have been in service for over 30 years. Examination shows they are still in excellent condition — will probably last another 30 years and even more. When you put them on your house you not only gain protection against fire and weather — you gain protection against future roofing expense!

Ask your Johns-Manville Dealer to show you these 30 year *plus* shingles and tell you how little they cost. There is no obligation.



Fortify your home against fire, weather, wear

JOHNS-MANVILLE ASBESTOS SID



What a remarkable change! Johns-Manville Cedargrain Asbestos Siding Shingles helped transform the old house at the left into the appealing "new" home shown above.

● Presented here are some of the Johns-Manville Asbestos Siding Shingles... modern building materials developed by scientific research. They provide beauty, security and low upkeep cost for the outside walls of your home, and they are surprisingly inexpensive.

Johns-Manville Asbestos Sidings authentically reproduce all of the character and texture of fine weathered wood. Their beauty is lasting, too... because they are made of two enduring materials, asbestos and cement. They cannot burn, won't rot, and never need preservative treatment.

FOR USE ON NEW OR OLD HOUSES

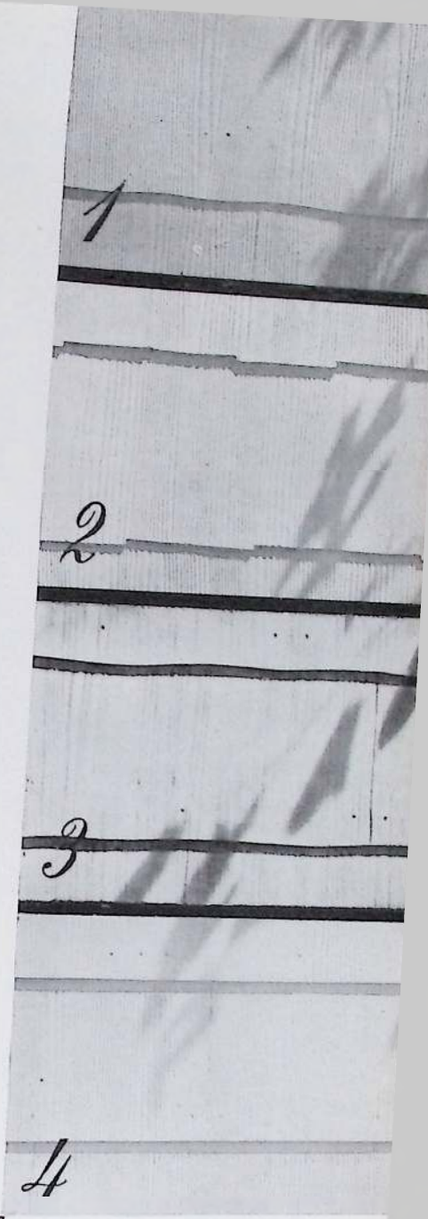
On new houses, J-M Asbestos Sidings are easily applied over the sheathing in the usual manner. To modernize old dwellings, they are nailed right *over* the existing shingles or clapboards which do not have to be removed. This saves time and money. No matter how old or shabby a house may be, J-M Asbestos Sidings give it the distinctive charm and appearance of a "new" home. Look at the remarkable transformations shown in the illustrations in this folder!

One of the most popular styles of J-M Asbestos Siding Shingles has the *Cedargrain Texture*, as shown on the background of the opposite page. Note the pleasing wood graining and clean cut shadow lines. You can choose between Blended Gray and a pleasing shade of White, and both colors are available with either staggered, or wavy edges. For owners who prefer the horizontal effect of clapboards, a straight edge style is also available. They have a wide exposure and their *Cedargrain Texture* makes them decidedly superior in appearance to smooth wood siding.

Whether you plan to build a new home or are considering "fixing up" your present house, specify Johns-Manville Asbestos Siding for the outside walls. They will fortify your home against fire, weather and wear!



J-M Asbestos Siding Shingles are applied quickly and economically. On re-siding work they are nailed right over the old walls. They make the house snugger, tighter, reduce upkeep expense to a minimum.



These close-up views show the variety of interesting and distinctive wall treatments now possible with J-M Asbestos Sidings.

1. J-M No. 105-U uniform thickness shingles with wavy butts (10½" exposure). Available in Blended Gray (illustrated) and a pleasing shade of White with Cedargrain texture, which reproduces the beauty of sawed wood shingles.

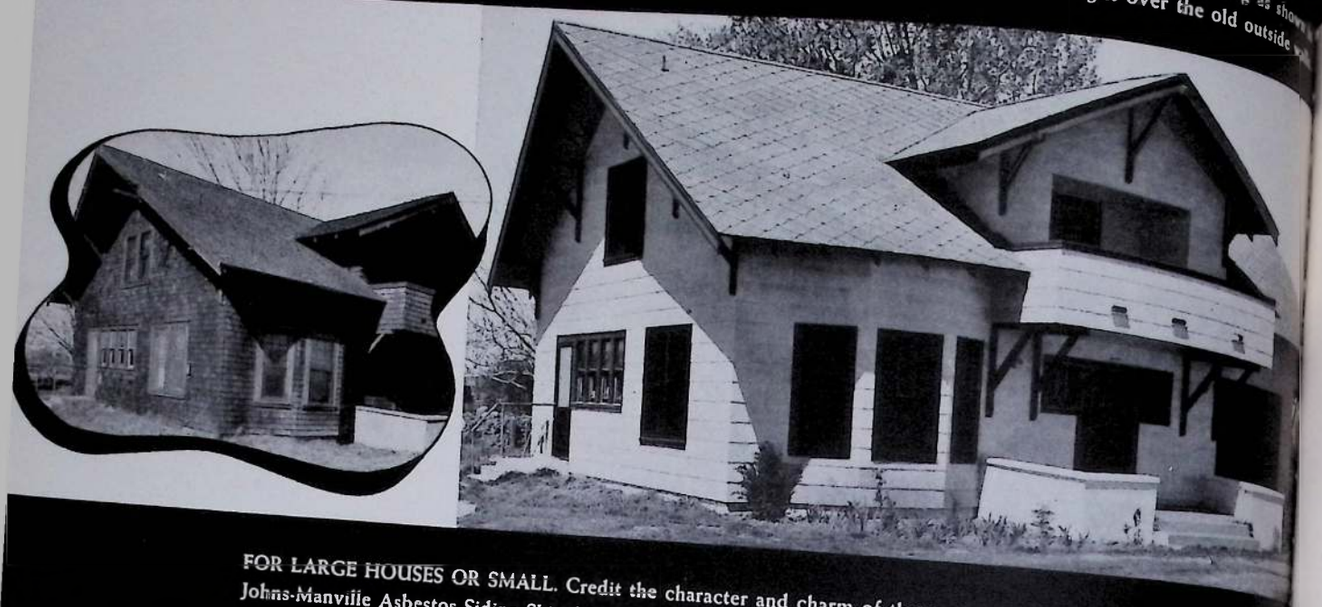
2. J-M No. 107-U uniform thickness shingles have staggered butts which give pleasing shadow lines. Available in Blended Gray and a pleasing shade of White (illustrated) with the Cedargrain texture.

3. J-M Shake Texture shingles impart the charming ruggedness of old hand-split wood shingles. Shown here in No. 105, uniform thickness.

4. J-M 109-U uniform thickness Asbestos Shingles, with their delicate Cedargrain texture, give the horizontal effect of Clapboards, with a wide exposure, in a durable siding material.

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NOW, THE CHARM OF A NEW HOME. It is hard to believe that this lovely cottage was once the shabby worn-out dwelling as shown inset. Johns-Manville Asbestos Siding Shingles brought about the change. They were inexpensively applied right over the old outside walls.



FOR LARGE HOUSES OR SMALL. Credit the character and charm of these new residences to Johns-Manville Asbestos Siding Shingles! They are used everywhere on large houses and small.





ASK ABOUT JOHNS-MANVILLE PERMATONE
ASBESTOS SIDING SHINGLES WHICH COME IN LOVELY COLORS

• If you prefer colorful exterior walls instead of white or gray, you will be especially interested in Johns-Manville Permatone Asbestos Siding Shingles. Available in attractive colors which will harmonize with almost any surroundings, they have the same rotproof, fireproof and permanent characteristics as the shingles described in this folder. Once you have them applied over your present siding, expenses for sidewall repairs and upkeep are a thing of the past. They have the permanence of stone, and they never require preservative treatment. Ask your Johns-Manville dealer for full details.

JOHNS-MANVILLE PRODUCTS

AS 50-A—8-44

J-M Rigid Asbestos Shingles

The modern demand is for roof and side wall protection which is not only fireproof and durable but also distinctive in appearance. Because J-M Rigid Asbestos Shingles so fully meet these requirements they are constantly becoming more popular. Made of asbestos fibre and cement formed under great pressure, these shingles cannot burn or decay and exterior maintenance expense is reduced to a minimum.

Recognizing the trend toward colorful roofs, Johns-Manville has sought to provide a wide choice and to produce pleasing variations of tone without too sharply contrasting hues and shades.

In side walls, the modern tendency is toward distinctive textures and shadow effects. In some locations, however, J-M Siding Shingles are also available in attractive colors.

For both roofing and siding, J-M Asbestos Shingles make possible the most effective harmony between the house and the surrounding landscape.

Detailed information including styles, sizes, colors, weights, etc., is given on separate data sheets.



Each strip shingle on the roof covers as much area as the five ordinary strip shingles it appears to be

Asbestos Roofing Shingles

J-M American Colonial Asbestos Shingles provide a roof which is not only durable and attractive but extremely economical. Each strip shingle on the roof covers as much area as the five ordinary strip shingles it appears to be. Yet it can be applied in one operation, self-aligned.

American Colonial Shingles are offered in colors which harmonize with any natural surroundings, and their clean-cut shadow lines make for interest in a roof.



J-M American Colonial Asbestos Shingles are durable, attractive and economical

Asbestos Siding Shingles

For side wall protection which is comparable to the roofing shingles in fire resistance and attractiveness, Johns-Manville has produced asbestos siding shingles. These shingles are divided into two groups: the universally popular textured white or gray asbestos shingles with grained surface accurately reproducing wood textures, and others which have colorful mineral granules pressed into their surface.

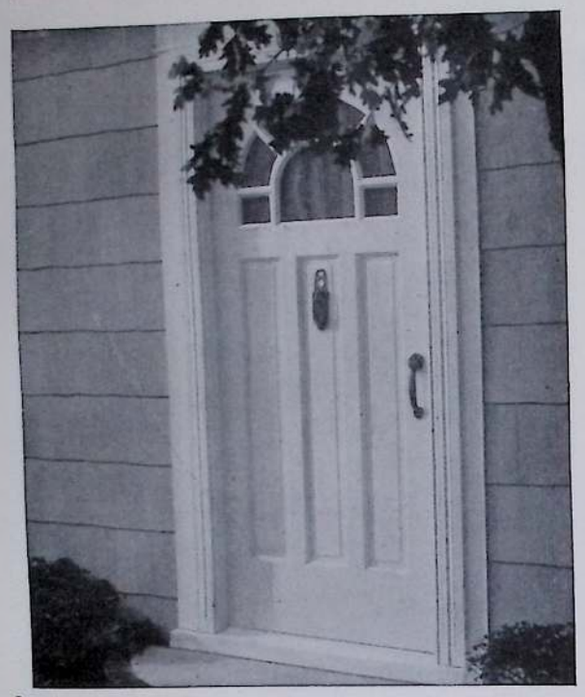
Application Directions

Complete directions for the application of J-M Rigid Asbestos Shingles, including flashings, and treatment of valleys, hips and ridges, appear on other data sheets. The following directions summarize the important details for proper application.

Roofing Shingles: The shingles should not be applied over a wet or damp roof deck. When a job is left partially complete, felt should be laid over the topmost applied courses to prevent rain from running down underneath the shingles.

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Charm and variety found in textured wood are an inherent part of J-M Asbestos Siding Shingles

The minimum roof pitch for American Colonial shingles is 5″ per foot. When the roofing shingles are used over sheathing, one layer of J-M Asbestos Slaters Felt is applied horizontally before the asbestos shingles are laid.

Boards on new roofs should be dry, well seasoned, of narrow width and uniform thickness, laid close (tongue and grooved preferred), and nailed with at least two nails to each rafter.

Satisfactory results can be secured applying asbestos shingles over old wood shingles; with the provision, however, that missing shingles are replaced, loose and curled shingles firmly nailed. After the surface is made as uniform as possible, J-M Asbestos Slaters Felt should be applied before the new shingles are laid.

Siding Shingles: When application is to be made over existing wood shingles or clapboards, loose and curled siding must be firmly nailed, decayed siding replaced and horizontal filler strips nailed against the butt edges of the existing siding or shingles. In some instances it may be more economical to remove existing siding down to the wood sheathing.

Work then proceeds in the same manner as over new sheathing using J-M Asbestos Slaters Felt applied over the side wall. A cant strip is placed along the bottom of the side wall before the first course is applied.

J-M Asbestos Shingle Accessories:

American Colonial Flashing System: For flashing J-M Asbestos Shingle Roofs. Materials used are American Colonial Felt and Roof Cement, and Concrete Primer.

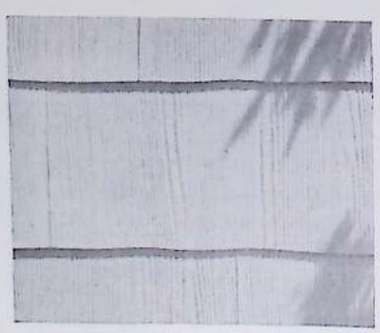
Asbestos Slaters Felt: For use as a liner under asbestos shingles. The asphalt-saturated felt is furnished in 3-sq. rolls 32″ wide, weighing 45 lb. per roll; tar-saturated, in 4-sq. rolls, 32″ wide, weighing 60 lb. per roll.

Galvanized Needle-Point Nails: For applying J-M Asbestos Shingles. Approximately 230 of 1¼″, 195 of 1½″ and 150 of 2″ nails per lb.

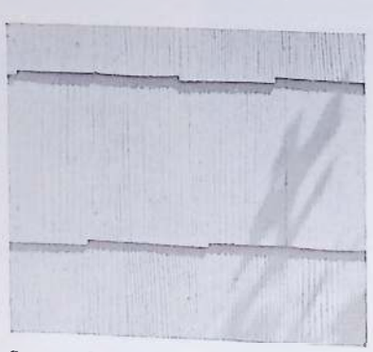
Siding Shingle Cleaner: A liquid for cleaning certain types of J-M Asbestos Siding Shingles in accordance with instructions. Furnished in 1-qt. bottles or in cartons containing 4 one-quart bottles.

How Asbestos Shingles Are Sold

Asbestos shingles are sold by the square, which means sufficient shingles to cover 100 sq. ft. of surface when applied in accordance with manufacturer's directions. Eave starters and ridge and hip shingles, required by the various shingles, may be purchased separately.



Cedargrain texture on uniform-thick shingles which have wavy butts



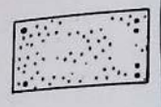
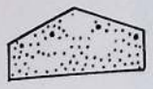
Staggered butt shingles, uniform-thickness. They have Cedargrain texture



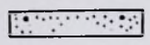
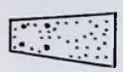
Asbestos Shingles with Cedargrain Texture and a straight butt line

J-M Asbestos Shingles Available from Pittsburg and Los Angeles

Asbestos Roofing Shingles

Shape	Catalog No.–Style	Size	Type	Colors	Approx. wt. lb. per sq.	Weather exposure	Shingles per sq.	Starters and Ridge Shingles
	No. 80 Dutch Lap method	12″ x 24″	Uniform thickness	Black blend Red blend Green blend Copper blend Silver white	255	4″ side lap 9″ x 20″	80	No. 81 eaves starter and No. 597 hip and ridge shingle
	No. 559 American Colonial Cedar-grain (American method)	13″ x 25″	Uniform thickness	Black blend Red blend Green blend Copper blend Silver white	300	5½″	102	No. 536 starter, No. 597 hip and ridge shingle

Starters and Ridge Shingles

Shape	Catalog number and style	Size	Type	Colors	Pieces per 100 linear ft.	Approx. wt. lb. 100 linear ft.
	No. 81 eaves starter—Used with No. 80 shingle	3″ x 24″	Uniform thickness	Mixed	50	40
	No. 536 starter—Used with No. 559 Cedargrain shingle	7″ x 25″	Uniform thickness	Mixed	48	60
	No. 597 hip and ridge shingle—Used with No. 559 and No. 80 shingles	4¾″ to 5 11/32″ by 12″ long	Uniform thickness	Same as No. 559 Cedargrain shingle	480	330

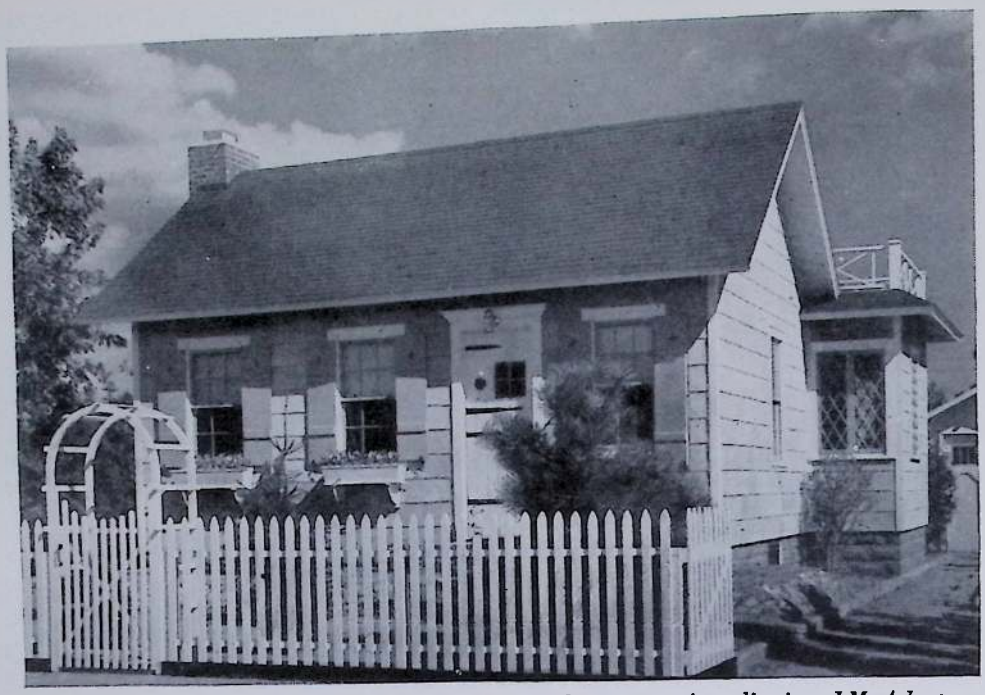
Asbestos Siding Shingles

Shape	Catalog Number	Size	Type	Color	Texture	Approx. wt. lb. per sq.	Exposure	Shingles per sq.
	105-U*	24″ x 12″	Uniform thickness	Blended gray Oyster white	Cedargrain Cedargrain	185	24″ x 10½″	57
	107-U*	24″ x 12″	Uniform thickness	Blended gray Oyster white	Cedargrain Cedargrain	185	24″ x 10½″	57
	109-U*	24″ x 12″	Uniform thickness	Blended gray Oyster white	Cedargrain Cedargrain	185	24″ x 10½″	57

* Pittsburg only

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Because of their fire-resistance, beautiful textures, and economy of application, J-M Asbestos Siding Shingles are widely used for side wall protection



Constructed of J-M Asbestos Roofing and Siding Shingles, the exterior of this cottage is fireproof and will not deteriorate or require periodic painting

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JOHNS-MANVILLE

Products



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FOREWORD . . .

There is probably no other single factor in the building industry that contributes so much toward comfort, safety and sanitation as the plumbing and heating industry. Yet too often, the service it renders is taken for granted. The American home-owner becomes conscious of its importance only at those times when, because of inferior materials or workmanship, he is temporarily deprived of plumbing or heating conveniences.

Fully realizing that the plumbing and heating contractor holds the key to better standards of living, Johns-Manville has for 70 years, conscientiously endeavored to equip the plumbing and heating industry with the finest insulation materials available to meet the wide variety of demands. Johns-Manville has long recognized that the combination of quality materials and quality workmanship will bring about a deeper appreciation of this vital industry in the minds of the home owners of America.

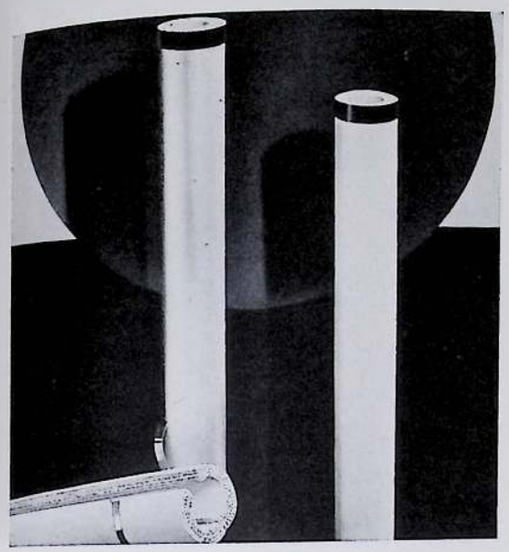
In the distribution of low pressure insulation materials, Johns-Manville has selected a nation-wide, quality group of Recognized Supply Houses—wholesalers who not only stock J-M materials but render an efficient and valuable service to the individual contractor.

This book has been designed to assist you in offering better materials, expertly applied. That is the surest foundation upon which to build customer good-will for the plumbing and heating industry.

PIPE COVERING

PRE-SHRUNK ASBESTOCEL FOR RESIDENTIAL HEATING SYSTEMS

For temperatures to 300 deg. F.



Pre-Shrunk Asbestocel Pipe Coverings retain their efficiency in service



Non-canvas finishes need no pasting and save 1/3 in application time

J-M Pre-Shrunk Asbestocel Pipe Insulation is the outstanding cellular type of insulation for low pressure steam and hot water heating lines. It is made of moisture-resistant asbestos paper which offers positive assurance against shrinkage troubles. An improved type of corrugation affords greater strength and gives the covering a more uniform appearance.

Old style cellular pipe insulation readily absorbs moisture while in stock or in handling, and when heat is applied the insulation dries and shrinks causing the sections to pull apart at the joints.

Pre-Shrunk Asbestocel fits the pipe perfectly, retains its original size indefinitely and assumes a permanently efficient, neat appearing job.

Colors and Finishes

Supplied with regular canvas or asbestos paper finish. The non-canvas finish does away with the necessity of pasting, saves one-third in application labor and is neat and attractive in appearance.

Sizes and Thicknesses

Furnished in 3 ft. sections in thicknesses from two to eight 1/4" plies.

Can also be supplied to fit straight runs of copper pipe or tubing of outside diameters from 3/8" up.

Fine Corrugated Pre-Shrunk Asbestocel having 6 plies to the inch and affording greater strength and efficiency can also be supplied with regular canvas finish. Standard thicknesses are four, six and nine plies. Other plies can be furnished on order.

PRE-SHRUNK ASBESTOCEL PIPE COVERING (Canvas, Non-Canvas Jackets)
Carton Contents and Approximate Shipping Weights

Nominal Pipe Size Inches	2 PLY Lineal Ft. of Insul.	2 PLY No. of 3 Ft. Sec.	2 PLY Approx. Wgt. Lbs. Canvas	2 PLY Approx. Wgt. Lbs. Non Canvas	2 PLY List Price Per Carton Table O	3 PLY Lineal Ft. of Insul.	3 PLY No. of 3 Ft. Sec.	3 PLY Approx. Wgt. Lbs. Canvas	3 PLY Approx. Wgt. Lbs. Non Canvas	3 PLY List Price Per Carton Table O	4 PLY Lineal Ft. of Insul.	4 PLY No. of 3 Ft. Sec.	4 PLY Approx. Wgt. Lbs. Canvas	4 PLY Approx. Wgt. Lbs. Non Canvas	4 PLY List Price Per Carton Table O
1/2"	180	60	54	68	$39.60	120	40	50	62	$26.40	84	28	51	62	$18.48
3/4"	150	50	53	62	36.00	105	35	49	57	25.20	72	24	49	56	17.28
1"	120	40	48	58	32.40	84	28	44	52	22.68	60	20	44	49	16.20
1 1/4"	90	30	41	50	27.00	69	23	41	49	20.70	51	17	41	46	15.30
1 1/2"	84	28	41	51	27.72	60	20	38	44	19.80	45	15	41	43	14.85
2"	60	20	34	41	21.60	45	15	34	40	16.20	36	12	36	40	12.96
2 1/2"	45	15	32	37	18.00	36	12	32	37	14.40	33	11	37	39	13.20
3"	36	12	30	35	16.20	27	9	28	31	12.15	21	7	28	33	9.45
3 1/2"	24	8	24	28	12.00	21	7	25	30	10.50	18	6	27	32	9.00
4"	33	11	30	33	19.80	27	9	34	40	16.20	21	7	35	42	12.60
4 1/2"	30	10	32	31	19.50	21	7	30	35	13.65	18	6	32	40	11.70
5"	21	7	25	32	14.70	18	6	28	33	12.60	15	5	30	35	10.50
6"	18	6	28	32	14.40	15	5	27	33	12.00	12	4	29	31	9.60

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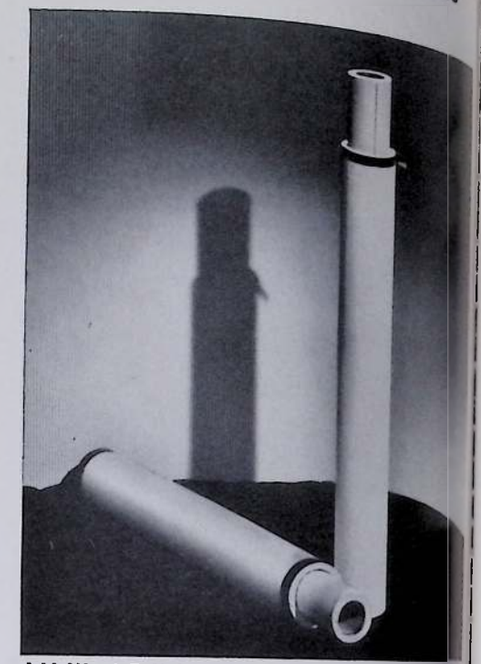
PIPE COVERING

PRE-SHRUNK WOOL FELT FOR HOT AND COLD WATER SERVICE LINES

For temperatures below 225 deg. F.

J-M PRE-SHRUNK WOOL FELT PIPE INSULATION is made of specially indented wool felt and provided with a dual service liner for use on both hot and cold water service lines. The indenting process reduces its conductivity 25% compared with ordinary wool felt making it a much more efficient insulator. It is also 16% to 20% lighter. Like Pre-Shrunk Asbestocel it is moisture resistant which eliminates objectionable shrinkage.

Insulation of hot and cold water service lines promotes quicker delivery of water of the desired temperature at the faucet and prevents sweating of the cold water lines. It has long been recognized as an essential in hotels, apartment houses, etc. Although the insulation of residential service water lines has not been generally practiced, the convenience and economy which it assures is now being demanded by an increasing number of home owners.



J-M Wool Felt is equally efficient on hot and cold water service lines

Finish, Sizes and Thicknesses

Furnished in 3 ft. sections in thicknesses ½", ¾", 1", double ½" and double ¾" with canvas finish to fit all pipe sizes. The double layer construction permits breaking of all through joints. An integral waterproof jacket is supplied with the wool felt when so ordered.

Can also be supplied to fit straight runs of copper pipe or tubing of outside diameters from ⅜" up.

STANDARD HAIR FELT FOR COLD WATER PIPE FITTINGS

J-M STANDARD HAIR FELT is made from selected cattle hair by an improved felting process. It is used for the insulation of fittings on cold water service pipes.

Furnished in rolls 9', 6', 4½' and 3' wide by 50' long; also 3' wide by 100' long in thicknesses from ¼" to 2".

STANDARD HAIR FELT
List prices and approximate weights

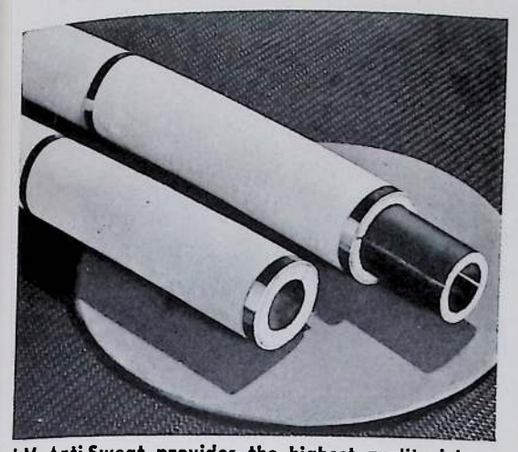
Thickness, inches	List price, per sq. ft.	Weight per bale of 300 sq. ft., pounds
¼	$.08	75
½	.12	120
¾	.17	160
1	.20	210
1¼	.25	255
1½	.30	300
2	.40	395

J-M PRE-SHRUNK WOOL FELT PIPE INSULATION
Carton Contents and Approximate Shipping Weights

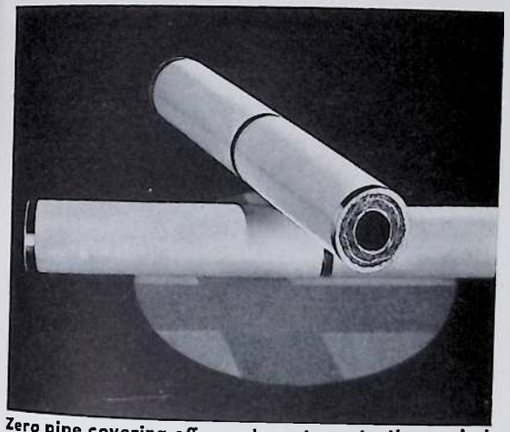
Cartons 14"x20½"x36¾" OD Nominal pipe size, inches	½" thick (percarton) Feet	Sections	Approx. gross weight, lb.	List Price per Carton Table O	¾" thick (percarton) Feet	Sections	Approx. gross weight, lb.	List Price per Carton Table O	1" thick and Double ½" thick* (percarton) Feet	Sections	Approx. gross weight, lb.	List Price per Carton Table O
½"	180	60	74	$39.60	120	40	80	$26.40	84	28	86	$18.48
¾"	135	45	71	32.40	108	36	82	25.92	72	24	80	17.28
1"	123	41	64	33.21	84	28	71	22.68	60	20	73	16.20
1¼"	96	32	56	28.80	72	24	72	21.60	51	17	70	15.30
1½"	84	28	60	27.72	60	20	65	19.80	45	15	71	14.85
2"	63	21	49	22.68	45	15	56	16.20	36	12	63	12.96
2½"	45	15	43	18.00	36	12	58	14.40	30	10	61	12.00
3"	36	12	40	16.20	27	9	46	12.15	24	8	55	10.80
3½"	Made to order only				21	7	42	10.50	18	6	50	9.00
4"					18	6	40	10.80	18	6	58	10.80
5"					12	4	33	8.40	9	3	40	6.30

*Also available in Double ¾" thickness on order. Double ¾" thickness is shipped in crates.

PIPE COVERING



J-M Anti-Sweat provides the highest quality job on cold water lines to prevent condensation or sweating



Zero pipe covering offers adequate protection against freezing under normal conditions of service

ANTI-SWEAT FOR COLD WATER SERVICE LINES SUBJECT TO SEVERE DRIPPING

A SUPERIOR INSULATION consisting of a combination of insulating and moisture resisting felts for use on cold water lines to keep pipes cold and prevent condensation and damage from dripping. It costs less to keep water cold than to re-cool it.

Furnished with canvas finish in 3 ft. sections in thicknesses of ½" and ¾" solid construction and in 1", 1½" and 2" broken joint construction to fit standard pipe sizes.

Also furnished in sections to fit straight runs of copper pipe or tubing of outside diameters from ⅜" up.

ZERO — TO PREVENT FREEZING UNDER ORDINARY CONDITIONS

ZERO pipe insulation is used to prevent cold water pipes from freezing under *ordinary* conditions. It is composed of layers of hair felt with a layer of asphalt saturated wool felt inside. Hair felt, one of the best of insulating materials, greatly retards the flow of heat from the water in the pipe to the colder surrounding air. Consult Johns-Manville for the correct specification wherever conditions are unusually severe.

Finish, Sizes and Thicknesses

Furnished 1¼" thick with canvas finish in 3 ft. sections for pipe sizes from ½" up.

Also supplied for straight runs of copper pipe or tubing of outside diameters from ⅜" up.

J-M ANTI-SWEAT PIPE INSULATION
Carton Contents and Approximate Shipping Weights

Cartons, 14" x 20½" x 36¾" O.D. Nominal pipe size	½" thick Feet	No. of sections	Approx. gross wgt. lb.	List prices, per carton Table O	¾" thick Feet	No. of sections	Approx. gross wgt. lb.	List prices, per carton Table O	1" thick Feet	No. of sections	Approx. gross wgt. lb.	List prices, per carton Table O
½ inch	162	54	93	$35.64	108	36	101	$23.76	72	24	108	$15.84
¾ inch	135	45	86	32.40	99	33	92	23.76	66	22	96	15.84
1 inch	108	36	83	29.16	84	28	94	22.68	60	20	98	16.20
1¼ inches	84	28	76	25.20	66	22	84	19.80	48	16	92	14.40
1½ inches	75	25	71	24.75	60	20	79	19.80	45	15	88	14.85
2 inches	54	18	72	19.44	45	15	73	16.20	36	12	89	12.96
2½ inches	39	13	57	15.60	36	12	72	14.40	27	9	79	10.80
3 inches	33	11	53	14.85	27	9	60	12.15	21	7	70	9.45
4 inches					18	6	56	10.80	18	6	72	10.80

ZERO PIPE INSULATION
Carton Contents and Approximate Shipping Weights

Per carton	Nominal pipe sizes, inches ½	¾	1	1¼	1½	2	2½	3	4
Feet	60	54	45	39	36	30	21	18	12
Sections	20	18	15	13	12	10	7	6	4
Approx. gross wt. lb	78	85	65	71	71	69	61	50	41
List price, per carton (Table O)	$13.20	$12.96	$12.15	$11.70	$11.88	$10.80	$8.40	$8.10	$7.20

Carton size: 14" x 20½" x 36¾"

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PIPE COVERING

85% MAGNESIA *FOR THE BETTER RESIDENTIAL HEATING SYSTEMS*

For temperatures to 600 deg. F.

J-M 85% MAGNESIA is the most durable and efficient insulation of the moulded type. The J-M manufacturing process produces an 85% Magnesia with the maximum number of minute dead-air cells which increase its natural resistance to heat transmission and reduce its weight.

It is the quality insulation in its field, slightly higher in price than cellular pipe covering but also higher in insulating efficiency. Figures compiled by Johns-Manville on a nine room, three bath house showed that it saved its cost in less than one heating season.

Sizes and Thicknesses

Moulded in 3 ft. lengths in the following thicknesses —Standard (⅞" to 1½"), 1½", 2", 2½", Double Standard and 3" (double layer) to fit standard pipe sizes.

For smaller pipe sizes furnished in sectional form packed in crates or cartons with canvas jacket and metal bands.

For larger pipe sizes furnished in segmental form without canvas or bands.

INSULATION FOR COPPER PIPES AND BRASS TUBING

THE PIPE INSULATION MATERIALS listed below can be supplied in sections to fit straight runs of copper pipe or brass tubing with the following outside diameters—⅜", ½", ⅝", ¾", 1⅛", 1⅜", 1⅝", 2⅛", 2⅝", 3⅛", 3⅝", 4⅛", 5⅛" and 6⅛".

PRE-SHRUNK ASBESTOCEL	ANTI-SWEAT
PRE-SHRUNK WOOL FELT	ZERO
85% MAGNESIA	

The advantages and savings to be obtained from the use of insulation on copper pipe and brass tubing are recognized by leading manufacturers of these products.

When ordering this special size covering specify the *outside* diameter of the pipe or tubing to be insulated.



J-M 85% magnesia affords maximum mechanical strength consistent with high insulating efficiency

SAVINGS OBTAINABLE THROUGH INSULATION OF DOMESTIC HEATING PIPING

Pre-Shrunk Asbestocel or Standard Thick 85% Magnesia

EXAMPLE

Heat Losses

Insulation	Season Heat Loss Btu.	Coal Loss* Per Season	Cost of Coal Loss Per Season
Bare	76,000,000	11,265 lbs.	$67.50
3 Ply Asbestocel	21,810,000	3,239 lbs.	19.40
85% Magnesia	16,354,000	2,422 lbs.	14.42

* Divide by 13 to translate pounds of coal loss into gallons of fuel oil.

Heat Savings

Insulation	Approx. Cost of Insulation Applied	Annual Saving With Insulation
3 Ply Asbestocel	$40.00	$48.10
85% Magnesia	50.00	53.08

Assumed Conditions: 100 feet of 2" pipe; coal at $12 per ton; providing 13,500 Btu. per lb. boiler efficiency 50%; heating season 3,400 hrs. Pipe temperature 150° above surrounding air.

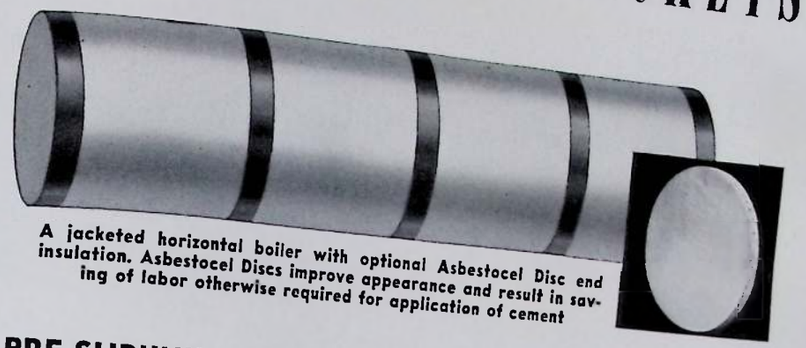
85% MAGNESIA PIPE COVERING

Approximate Weight in Pounds per Standard 3-foot Section, Uncrated

Thickness, inches	Nominal pipe sizes, inches: ½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Std.	1.62	1.85	2.02	2.39	2.74	3.77	4.30	5.0	5.57	6.83	7.42	8.05	9.35
1½	3.77	4.12	4.59	5.10	5.52	6.27	7.16	8.1	8.88	9.70	10.50	11.40	13.10
Dbl. Std.	4.86	5.31	5.80	6.42	7.23	9.82	10.90	12.3	13.40	16.40	17.60	19.00	21.50
2	6.11	6.75	7.30	7.89	8.40	9.42	10.60	11.9	12.90	14.00	15.20	16.40	18.60
2½	8.95	9.80	10.50	11.25	11.90	13.20	14.50	16.1	17.40	18.80	20.00	21.55	24.50
3	12.40	13.20	14.00	15.20	16.00	17.40	19.10	21.1	22.60	24.20	25.90	27.70	31.10

For gross (crated) weights add approximately 20% to the above.

RANGE BOILER JACKETS



A jacketed horizontal boiler with optional Asbestocel Disc end insulation. Asbestocel Discs improve appearance and result in saving of labor otherwise required for application of cement



(Above) Asbestocel Jacket on vertical boiler

(Below) Applying top section of Jacket



PRE-SHRUNK ASBESTOCEL

THE J-M PRE-SHRUNK ASBESTOCEL JACKET for range boilers is highly effective in keeping hot water *hot*. It is made of the same moisture-resistant asbestos felts as used in J-M Pre-Shrunk Asbestocel pipe covering and furnished in two full-round sections slit longitudinally. The standard jacket is 3 ply but can be supplied on special order up to 10 ply 2½" thick. End insulation may be either cement or 1" Asbestocel Discs. Jackets fit both vertical aud horizontal boilers and are of extra length when discs are used (see table below).

Finish and Sizes

A clean asbestos paper finish, which may be painted if desired. See below for standard sizes. Other sizes on order.

Asbestocel discs or cement for end insulation furnished with each jacket plus three 2" bands for vertical boilers and 5 bands for the horizontal type including 8 aluminum staples.

Rapid application is one of its special features. Full directions with every unit.

ECONOMY RANGE BOILER COVERS

RECOMMENDED for use under conditions requiring maximum heat economy or when water is heated by electricity. Constructed with either 1, 2 or 3 one inch layers of Hair Felt each covered with muslin and quilted. A finish cover of heavy canvas is supplied with brass eyelets and cord for lacing. Furnished to fit all standard size boilers.

PRE-SHRUNK ASBESTOCEL RANGE BOILER JACKETS

Sizes Regularly Stocked

Gallons	Dia. x Length inches	Extra Length for Discs (inches)	Gross Weight
30	12x60	1½	21
40	14x60	1¾	23
52	16x60	2	25
66	18x60	2⅝	27
82	20x60	2¾	30
100	22x60	3¾	33

Carton Sizes: 30-60 gal. incl. 21½"x 7½"x32¼"
82-100 gal. 20¼"x13½"x32¼"

HEAT SAVINGS OBTAINABLE BY USE OF A J-M ASBESTOCEL RANGE BOILER JACKET

Heat Losses

Insulation	Annual Heat Loss Btu.	Coal Loss* Per Year	Cost of Coal Loss Per Year
Bare	33,800,000	5,020 lbs.	$30.08
3 Ply Jacket	8,510,000	1,262 lbs.	7.57

* Divide by 13 to translate pounds of coal loss into gallons of fuel oil.

Heat Savings

	Approx. Cost of Jacket Applied	Annual Saving With Jacket	Duration of Service Which Pays for Jacket
3 Ply Jacket	$7.50	$22.51	4 months

The above example is given for coal. If other fuel is used the actual savings would vary according to its cost.

Assumed Conditions: 30 gal. standard range boiler heated from coal-fired heating boiler. Water temperature 170 deg. F. Surrounding air temperature 70 deg. F. Coal at $12 per ton providing 13,500 Btu. per lb.—Boiler efficiency 50%. Heat cost 89c per million Btu. Heating Season 8,760 hours.

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WARM AIR DUCT INSULATION

ASBESTOCEL IN FLEXIBLE ROLL FORM (CORRUGATED ASBESTOS PAPER) FOR TEMPERATURES TO 300 DEG. F.

ASBESTOCEL IN FLEXIBLE ROLL FORM is particularly adapted to insulation of warm air heater casings and furnace ducts. It is made by fastening together a plain and a corrugated asbestos felt into a single sheet approximately 1/4" thick.

It is applied by wrapping it two or more times around the duct to be insulated and fastened by wire wound around it spirally. Additional fastening should be provided by wire rings placed about every 18". To provide a neater finish, Asbestos Paper may be pasted over the surface of the Asbestocel.

Furnished in rolls 37" wide, containing approximately 250 sq. ft. Shipping weight, in cartons about 50 lbs. Also furnished fine corrugated 1/6" thick in 250 sq. ft. rolls.



It pays to insulate warm air ducts with J-M Asbestocel

J-M ASBESTOS PAPER & ROLL BOARD

J-M ASBESTOS PAPER AND ROLL BOARD are used when an insulating material of minimum thickness is required.

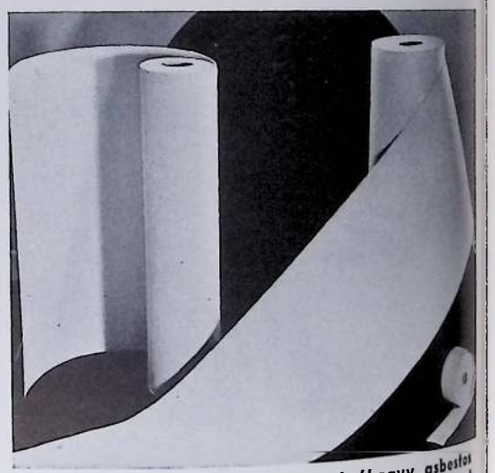
Asbestos Paper is used principally in the manufacture of corrugated insulation in various forms. It is occasionally employed as a wrapping for furnace and heater pipes in one or several wraps but this is of no value as an insulation. Where little room is available it is used as a protection against heat and as a fire retardent between walls, floors and ceilings.

Furnished in 50 and 100 lb. rolls in widths 18", 24" and 36" to 37 1/2" in thickness .015" to 1/16".

A 12 lb. Paper Tape is available in rolls 84 ft. long 2" and 3" wide.

Asbestos Roll Board is similar to Asbestos Paper but is used where a heavier material is required.

Furnished 3/32" and 1/8" thick in rolls 18" and 36" wide weighing 100 lbs.



Asbestos Paper and Roll Board (heavy asbestos paper) can be supplied in special widths or in cut sheets on order

SAVINGS OBTAINABLE THROUGH INSULATION OF WARM AIR FURNACE DUCTS
EXAMPLE

Heat Losses

Insulation	Season Heat Loss Btu.	Coal Loss* Per Season	Cost of Coal Loss Per Season
Bare	32,400,000	4,800 lbs.	$28.80
2 Ply Asbestocel in Flexible Roll Form	14,880,000	2,204 lbs.	13.22

* Divide by 13 to translate pounds of coal loss into gallons of fuel oil.

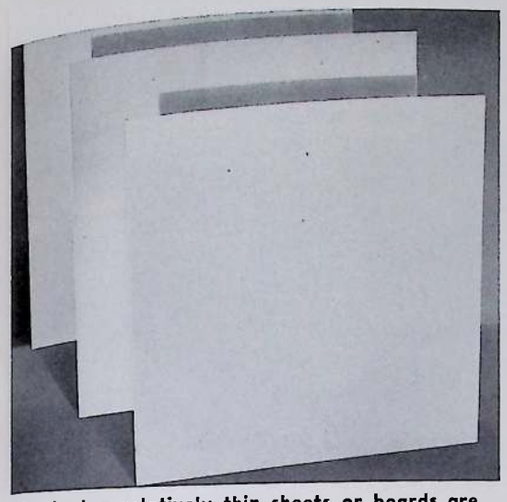
Heat Savings

	Approximate Cost of Insulation Applied	Annual Saving With Insulation
2 Ply Asbestocel	$28.00	$15.58
Return on Investment—55% annually.		

Assumed Conditions: 200 square feet of galvanized iron or other metal, coal at $12 per ton providing 13,500 Btu. per lb.; boiler efficiency 50%; heating season five months; temperature difference 100 deg. F.

MISCELLANEOUS INSULATIONS

ASBESTOS SHEET MILLBOARD FOR PROTECTION AGAINST FIRE



Used when relatively thin sheets or boards are needed for protection

J-M ASBESTOS SHEET MILLBOARD is recommended for general uses requiring sheet or board for protection against fire, heat and acid fumes. It is frequently used as a fireproof lining for ranges, stoves, grates, gasbacks, etc. It can be cut with shears to any size desired and fastened with nails or screws.

It is made in a number of grades of varying densities, resiliency and fire-resisting properties with various temperature limits from 400 deg. F. to 1,000 deg. F.

No. 106 Millboard is the grade most commonly used because it is low in price and will take care of the majority of conditions where Millboard is required. It will withstand temperatures up to about 800 deg. F. but is not generally recommended for use at temperatures above 400 deg. F.

The size of the standard sheet is 42" x 48" available in thicknesses from 1/32" to 3/4". The material is also furnished in cut pieces.



Banroc (loose) is adaptable for many conditions requiring an economical loose insulation

BANROC (LOOSE ROCK WOOL) FOR TEMPERATURES TO 1,000 DEG. F.

LOOSE ROCK WOOL FIBRE is produced from fused high silica minerals blown into fibres by means of steam jets. Unlike products from unblended rock or slag it has a high degree of stability. Being non-combustible, it is an effective fire retardent. It is used as an insulating filler in hollow oven walls, fireless cookers, electric ranges and for other purposes where a loose bulk insulation is required. It may be packed to varying densities but usually 12 lb. per cu. ft. is recommended. Furnished in 50 lb. burlap bags or 35 lb. paper bags.

ASBESTOS SHEET MILLBOARD
Average Uncrated Weights

Thickness, inches	Per sheet, 42"x48", pounds	Per sq. ft., ounces	Thickness, inches	Per sheet, 42"x48", pounds	Per sq. ft., ounces
1/32	2.5	2.9	3/16	13.3	15.2
3/64	3.5	4.0	1/4	17.6	20.1
1/16	4.6	5.3	5/16	21.4	24.4
5/64	6.0	6.9	3/8	25.2	28.8
3/32	7.0	8.0	1/2	31.5	36.0
1/8	9.0	10.3	5/8	42.9	49.0
5/32	11.3	12.9	3/4	46.6	53.3

Actual weights and thicknesses may vary plus or minus 10 percent

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SHEETS AND BLOCKS

J-M 85% MAGNESIA BLOCKS

For temperatures to 600 deg. F.

J-M 85% MAGNESIA BLOCKS are used for insulating flat, curved or irregular surfaces.

They are composed of carbonate of magnesia bonded with asbestos fibre, moulded and machined into block form and are especially light and highly efficient.

These blocks provide the ideal insulation for boilers, heaters and hot water tanks when maximum insulating efficiency is required. They have the same high insulating efficiency as the pipe covering, and give the same lasting satisfaction to the home owner.

For Domestic Heating Boilers

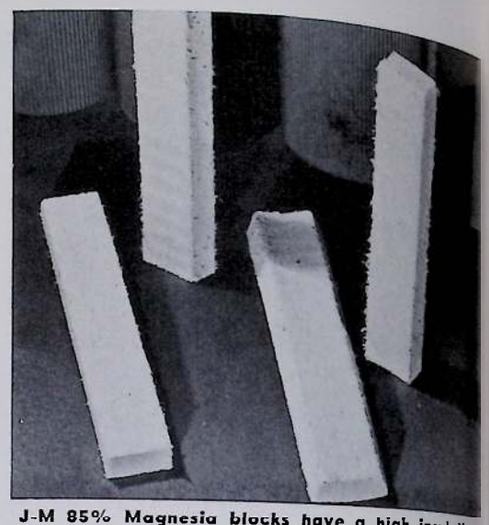
Many boilers on domestic heating systems will be found to be insulated with but a skim coat of asbestos cement, a covering which is entirely inadequate for providing any degree of insulating efficiency.

All boilers other than the jacketed type which are insulated by the boiler manufacturer should be insulated with at least 1½" thickness of good insulating material preferably with 1" J-M 85% Magnesia blocks finished with ½" of J-M No. 352 Cement. A less effective but lower cost specification is a 1" coating of No. 352 Cement only.

Sizes and Thicknesses

J-M 85% Magnesia blocks are furnished in standard sizes 3" x 18" and 6" x 36", flat or curved, from ½" to 4" in thickness. Other sizes furnished on special order.

Weight about 1.4 lbs. per sq. ft. per inch thick.



J-M 85% Magnesia blocks have a high insulating value, are light in weight and easily cut and fitted



J-M 85% Magnesia and cement provide the ideal insulation for domestic heating boilers

85% MAGNESIA BLOCKS

Number of 85% Magnesia Blocks per Carton*

Thickness	Flat or Curved blocks 6" x 36"	12" x 36"
1"	36*	
1¼"	28	
1⅜"	26	
1½"	24	12
1¾"	20	10
2"	18	9
2¼"	16	8
2½"	14	7
2¾"	12	6
3"	12	6
4"	9	4

* Flat only

The gross weight of a standard carton of 85% Magnesia blocks and lagging is approximately 75 lb. Standard cartons are 18⅜" x 12¾" or 13" x 36¼". For small or odd lots the carton size is 12⅜" x 6¾" x 36¼".

SAVINGS OBTAINABLE THROUGH INSULATION OF DOMESTIC HEATING BOILERS

EXAMPLE

Determine the compartive heat savings when insulating with (A) only ½" Cement (commonly used) and (B) 85% J-M Magnesia Blocks (1") plus ½" Cement.

Heat Losses

Insulation	Season Heat Loss Btu.	Coal Loss* per Season	Cost of Coal Loss per Season
Bare	36,720,000	5,449 lbs.	$32.60
Cement	16,310,000	2,418 lbs.	14.48
Mag. & Cement	5,050,000	748 lbs.	4.48

* Divide by 13 to translate pounds of coal loss into gallons of fuel oil.

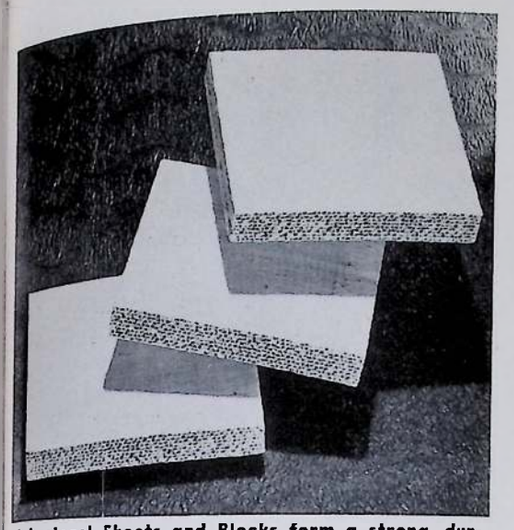
Heat Savings

Insulation	Approx. Cost of Insulation Applied	Annual Saving With Insulation
Cement	$6.00	$18.12
Mag. & Cement	19.00	28.12

Comparison (Cement alone vs. Mag. and Cement)
Extra cost of Mag. and Cement $13.00 spent but once
Extra saving with Mag. and Cement $10.00 EVERY YEAR
Return on added investment 77% annually.

Assumed Conditions: A boiler with 30 sq. ft. of bare surface using coal as fuel at $12 per ton providing 13,500 Btu. per lb.; boiler efficiency 50% —heating season 3,400 hours—temp. difference 150 deg. F.

SHEETS AND BLOCKS



Asbestocel Sheets and Blocks form a strong, durable and efficient insulation within the temperature limits indicated



ASBESTOCEL SHEETS AND BLOCKS

For temperatures to 300 deg. F.

ASBESTOCEL SHEETS AND BLOCKS are used for insulating medium or low pressure boilers, feed-water heaters, dry rooms, warm air ducts and other surfaces whose temperatures are not extreme.

Asbestocel sheets and blocks are made of alternate plain and corrugated asbestos felts, built up in layers to the proper thickness.

Asbestocel is furnished standard in 4 plies per inch of thickness in sizes 6", 9", 12", 18" and 36" wide by 36" and 72" long, from ½" to 4" in thickness. Weight of 4 ply material approximately 1 lb. per sq. ft. per inch of thickness.

This material can also be furnished fine corrugated in 6 plies per inch of thickness.

J-M INSULATING CEMENTS

J-M INSULATING CEMENTS are well known for their excellent coverage, good finish and insulating properties. There is a cement for every purpose.

J-M No. 352 is a general utility short fibre quality cement used in large quantities by the plumbing and steamfitting trade for insulating heating boilers and pipe fittings.

J-M No. 302 is made of asbestos fibre and binding materials. It is a high grade insulating as well as finishing cement.

J-M No. 0352 is a factory made inexpensive quality cement suitable for many of the requirements of the plumbing and steamfitting trade.

J-M No. 400 is a smooth finishing cement of good insulating value.

J-M No. 450 is a high grade insulating cement for applying in thicknesses equal to block insulation where the latter cannot be used. It adheres readily to hot or cold surfaces but is not a finishing cement.

J-M 85% Magnesia Cement. This material is similar to J-M 85% Magnesia sectional and block insulation except that it is in powdered cement form. Compared with other cements its insulating efficiency is high but it is not ordinarily recommended as a finishing cement.

DATA ON J-M INSULATING CEMENTS

Cement	Temperature Limit Deg. F.	Size of Containers (lbs.)	Covering Capacity Applied and Dried in Sq. Ft. 1" Thick per 100 lbs.
No. 352 & 0352	1,000	100*	19
No. 302	1,000	100	25
No. 400	700	100	25
No. 450	1200-1500	50	50
85% Magnesia	600	60	58

*No. 352 is also available in 50 lb. paper bags.

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TRANSITE FLUE PIPE

TRANSITE FLUE PIPE is used for venting gas-burning appliances. Tested by the Underwriters' Laboratories for compliance with the Building Code of the National Board of Fire Underwriters, it has passed all requirements and is listed for use with domestic gas-burning equipment.

Composed of asbestos and cement — two materials which have long been noted for their natural durability and fire resistance — Transite Flue Pipe cannot rust or warp. The product possesses unusual toughness and strength, imparted by the method of manufacture. Bonded together under tremendous hydraulic pressure when formed, the pipe is of dense, homogeneous structure.

Since Transite is of attractive gray-white appearance it need not be painted, altho decorative effects may be easily and readily applied if desired.

Thousands of installations in all parts of the country, many of them in use over a long period of years, have proved the economy and efficiency of Transite Flue Pipe.

Rapidly, Economically Installed

Transite Flue Pipe is furnished in both round and oval form, and in a large variety of sizes. It is relatively light in weight and is easily cut to special sizes with an ordinary hand saw. The availability of a complete line of fittings further simplifies installation on the job.

I.W. TRANSITE FLUE PIPE, especially designed for venting coal and oil burning domestic heating equipment. A non-metallic, asbestos and cement product that is both durable and fire-resistant. Available in a wide range of sizes and shapes.



Made of asbestos fiber and cement, Transite Flue Pipe is of pleasing appearance, cannot rust, and is economical and efficient in service



The ease and speed of assembly of Transite Flue Pipe and the complete line of fittings available simplifies installation on every gas-venting job

SIZES OF TRANSITE FLUE PIPE

Round Pipe is furnished in sizes from 2" to 5" in standard lengths of 5'0"; and in sizes 6" to 12" in standard lengths of 6'6". These sizes represent inside diameters.

Oval pipe is supplied in the following sizes: 2¼" x 4¼", 2¼" x 6⅝", 2¼" x 9¾" and 2¼" x 11¼". The outside narrow dimension of all four sizes is 2¾". The outside narrow dimension of all oval couplings is 3⅝".

The round pipe fits any standard outlet and a simple adaptor is employed when oval pipe is used. Standard fittings are available to accommodate any unusual structural arrangement.

PACKINGS

MORE THAN SIXTY YEARS of manufacturing and field experience stand back of every J-M Packing. This experience and the high quality of the asbestos fibres and other materials used, as well as the great care exercised during production are directly responsible for their long life and efficient service.

SERVICE SHEET *(STYLE No. 60)* Asbestos-Fibre Sheet Packing for steam, gas, oil, air, water, ammonia and some acids, alkalies and other chemicals. Made of selected long-fibre asbestos and special heat-resisting compounds and graphited on one side only. Service Sheet can be used in thicknesses one half as great as rubber. Furnished in various sizes, and in thicknesses of 1/32", 1/16" and ⅛". Also furnished in cut gaskets for standard and extra heavy flanges.

LIBERTY RED RUBBER SHEET *(STYLE No. 107)* For medium or low-pressure steam and hydraulic service. Made from a heat-resisting rubber compound, is light in weight and will not deteriorate rapidly.

HYDRAULIC SHEET PACKING *(STYLE No. 109)* A cloth inserted rubber sheet for low pressure cold water service.

LEAD JOINT RUNNERS Real time and money savers for use in pouring good leak-proof joints without spilling lead. Furnished in sizes for all requirements.

TWISTED MOGUL PACKING *(STYLE No. 193)* Made of long fibre asbestos yarn, lubricated and graphited for use on valve stems, reciprocating rods with small packing spaces, and centrifugal pumps. Furnished in coil form only, in sizes 1/16" and up. By untwisting the strands, any desired size may be obtained.

ASBESTOS WICK *(STYLE No. 4195)* This is a single twisted strand of commercially pure asbestos roving. Can be used for a great variety of purposes.

ASBESTOS ROPE *(STYLE No. 4196)* Made by twisting tightly together a number of strands of commercially pure asbestos roving, the center strands being bonded with a heat-resisting compound. Suitable for the many services where an asbestos rope is required.



Service Sheet (Style No. 60)



Liberty Red Rubber Sheet (Style No. 107)



Lead Joint Runner



Twisted Mogul Packing (Style No. 193)



Asbestos Wick (Style No. 4195)



Asbestos Rope (Style No. 4196)

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REFRACTORY AND INSULATING REFRACTORY PRODUCTS

For over forty years Johns-Manville has been supplying the plumbing and heating industry with refractory products to meet every service requirement.

Scientific research, backed by a highly successful record of performance in service, prove the efficiency of these materials. Those most adaptable for plumbing and heating uses are listed below.

INSULATING FIRE BRICK FOR DOMESTIC OIL BURNERS

Here are two light weight insulating refractories for lining combustion chambers of domestic oil burners. Low heat capacity and high insulating value help bring the chamber to efficient operating temperature quicker, saving fuel and retarding soot formation, smoke and odors. Sound deadening qualities provide quieter operation.

JM-20 Insulating Fire Brick for use to 2000°F. Weight per brick 2.1 lbs. JM-26 Insulating Fire Brick for use to 2600°F. Weight per brick 2.8 lbs. Both are easily cut with a hack saw to form any shape of chamber. Furnished in convenient cartons of 20 bricks each.

JM-1626 CEMENT *FOR BONDING*

A special air-setting cement for laying Insulating Fire Brick; comes ready-mixed in 5, 10, 20, 200 and 400 lb. containers.

J-M DOBFILL

A light weight asbestos material for filling in. Won't corrode the furnace or expand under heat. Furnished in 50 lb. bags. Density approximately 20 lbs. per cu. ft.

J-M FIREITE ASBESTOS FURNACE CEMENT *FOR SEALING*

A ready-mixed, economical cement for sealing and repairing joints in stoves, heaters, ranges, boiler furnaces, etc. Used also for sealing cleanout doors, flue pipes and other furnace parts. It is odorless, and adheres firmly to castings, sheet metal or any other clean surface. Fireite is quickly applied and sets without heat. Furnished in 5, 10, 25, 50 and 100-lb. containers.

J-M STANDARD FIRECRETE

A dry, hydraulic setting refractory that is handled like ordinary concrete. Recommended for constructing combustion chambers of stoker installations and hearths of rotary oil burners.

Furnished in 100-lb. bags.



Lining combustion chambers of domestic oil burners, regardless of their shape, is a quick, easy job with JM-20 Insulating Fire Brick

Firm, tight joints. Bonding presents no problem with JM-20 Insulating Fire Brick . . . just use JM-1626 Bonding Cement and rub into place

SPECIFICATIONS

STANDARD HEATING AND PLUMBING INSULATION SPECIFICATIONS FOR RESIDENCES

HEATING EQUIPMENT *STEAM AND HOT WATER*

Boiler—The boiler shall be insulated with 1" thick Johns-Manville 85% Magnesia Blocks, finished with ½" J-M No. 352 Cement reinforced with 2" hexagonal mesh galvanized wire. The cement shall be applied in two coats to a total thickness of ½".

Alternate Specification: The boiler shall be insulated with two coats of J-M No. 352 Cement to a total thickness of 1", reinforced with 2" hexagonal mesh galvanized wire netting.

Steam or Hot Water Piping—All piping of the heating system shall be insulated with J-M 3 ply Pre-Shrunk Asbestocel insulation with (state type) finish on exposed piping and with (state whether asbestos or canvas) finish on concealed piping.

Alternate (for maximum efficiency): All piping of the heating system shall be insulated with Standard Thick J-M 85% Magnesia insulation.

Fittings and Valves—Fittings and valves shall be insulated with J-M No. 352 Cement, applied to a thickness equal to that of the adjacent pipe insulation.

HEATING EQUIPMENT *WARM AIR*

Warm Air Heater—Shall be insulated in the same manner as the heating boiler.

Warm Air Ducts—All warm air ducts shall be insulated with not less than two layers of 1 ply J-M Asbestocel in Flexible Roll Form.

The Asbestocel shall be cut to fit the ducts snugly at all bends and shall be applied with all circumferential and horizontal joints broken. The first layer of Asbestocel shall be securely wired in place and the second layer shall be held in place, and all joints covered, with strips of Asbestos paper not less than 3" wide and securely pasted in place.

Alternate (for maximum efficiency): All warm air ducts shall be insulated with three layers of 1 ply J-M Asbestocel in Flexible Roll Form, applied in accordance with the above specification.

HOT AND COLD WATER SERVICE SYSTEM

Hot Water Heater—The hot water heater, where external to the storage tank, shall be insulated in the same manner as the heating boiler.

Hot Water Storage Tank—The hot water storage tank shall be insulated with a J-M Pre-Shrunk Asbestocel Range Boiler Jacket (see note). The range boiler cover shall be applied in a neat and workmanlike manner in accordance with directions accompanying each jacket.

Note: Where hot water is heated indirectly, or directly by means of a coal-fired heater or gas heater, an Asbestocel Jacket should be specified. Where water is heated by electricity a J-M Economy Range Boiler Cover should be specified.

Hot and Cold Water Service Piping—All hot and cold water service piping, except exposed fixture branches, shall be insulated with 1" thick (single layer) J-M Pre-Shrunk Wool Felt Pipe Insulation with Dual-Service Liner.

Fittings and Valves—Hot Water Service Lines: All fittings and valves on hot water service lines shall be insulated with J-M No. 352 Cement, applied to a thickness equal to that of the adjacent sectional pipe insulation.

Cold Water Service Lines: All fittings and valves on cold water service lines shall be insulated with ¾" thick J-M Standard Hair Felt, followed by ¼" coat of J-M No. 352 Cement.

Water Pipes Exposed to Freezing—All cold water, soil or waste piping, where exposed to freezing and so designated by the architect, shall be insulated with Johns-Manville 3 layer Built-Up Hair Felt Insulation, applied according to the manufacturer's detailed specification.

Note: Above specification will be furnished on request.

PAINTING

The insulation on (boiler, heater and/or hot water storage tank) shall be painted with one coat of glue sizing and two coats of oil paint of color selected.

The insulation on piping, fittings and valves shall be painted where required.

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JOHNS-MANVILLE

JM

PRODUCTS

JOHNS-MANVILLE

EXECUTIVE OFFICES: 22 EAST FORTIETH STREET, NEW YORK 16, N. Y.

Cable Address: "JOHNMANVIL," NEW YORK

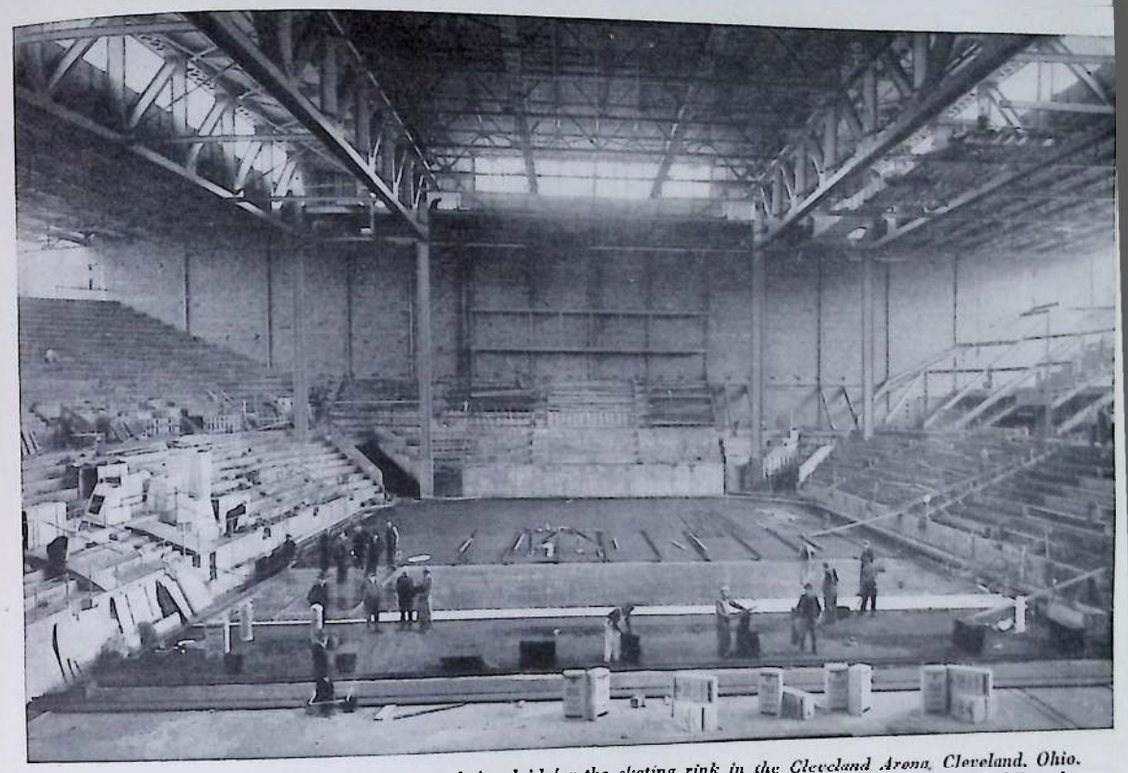
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CANADIAN JOHNS-MANVILLE CO., LIMITED

MONTREAL · TORONTO · VANCOUVER · WINNIPEG

J-M Rock Cork



A double layer of 2" Rock Cork sheets being laid for the skating rink in the Cleveland Arena, Cleveland, Ohio. In addition to resisting the strains set up by massed formations in hockey, this floor is capable of holding the dead weight of heavy exhibits. M. R. Carpenter, Consulting Engineer

J-M Rock Cork is a low-temperature insulating material manufactured from Banroc, a mineral wool, combined in production with a waterproof binder, moulded into sheet form and baked. Its recommended range of use covers all refrigeration applications and other low temperature work. For duct insulation, when Rock Cork is used with a suitable adhesive and securely fastened, the temperature limit is 150 deg. F.

The exceptional success of Rock Cork, used since 1908 as an insulation for all kinds of cold-storage construction, is largely due to:

1. Retention of low conductivity at low service temperatures.
2. Non-absorption of moisture and odor.
3. Possibility of thorough sealing against penetration of air.
4. Immunity to termites, vermin and mold.
5. Structural strength to permit handling and applying without breakage.
6. Ease of sawing and working on the job.

It is the above qualities which are responsible for the continued wide use of Rock Cork in industry.

Characteristics of Rock Cork

The conductivity of J-M Rock Cork is less than 0.33 B.t.u. per sq. ft., per deg. F. temperature difference per inch thick, per hour at mean temperatures below 100 deg. F. Due to the natural interlacing of the fibres, innumerable minute dead-air cells are formed, which are responsible for the high insulating value.

The resistance to moisture, which is a marked characteristic of Rock Cork, is an important factor in maintaining its original low conductivity in service. Examination of a number of installations with an average of 17 years in use showed a moisture pick-up of 1.1 percent average, with no instance of more than 2 percent. This low moisture absorption adds to the longevity of the construction and thus increases the economy effected by the use of Rock Cork.

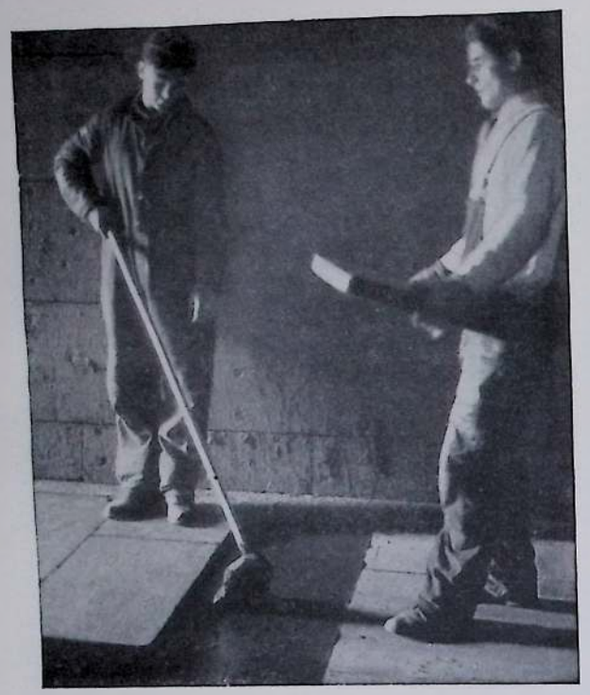
Owing to the nature of its waterproof binder, Rock Cork furnishes an ideal base for an asphaltic adhesive or finish, assuring an air and moisture-resistant seal.

IN-80

ROCK CORK
October, 1941 (Cancelling sheet dated March, 1941)

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Hot-mopping Rock Cork sheets over a concrete floor

The binding material with which Banroc is combined, in the manufacture of J-M Rock Cork, gives the material a firm structure which permits ready handling and installing in any type of construction. It has, however, sufficient compressibility to follow slight irregularities of the surface to be insulated, eliminating voids between the insulation and the wall.

All materials used in the manufacture of Rock Cork are odorless, and the most sensitive food products will not absorb offensive odors from this material. It will not harbor rats, insects or vermin of any kind. nor is it subject to attack by termites. Extensive tests have demonstrated that Rock Cork will not, under any conditions, support the growth of bacteria or mold.

The fibrous nature of Rock Cork permits absolutely tight joints, not possible with the granular edges of other material.

Sizes and Types of Rock Cork

J-M Rock Cork sheets are furnished in the following standard sizes and thicknesses: 18″ x 36″, in thicknesses of 1″, 1½″, 2″, 3″ and 4″. Other sizes, within these limitations, and intermediate thicknesses can be furnished on special order.

The sheets weigh about 1.25 lb. per sq. ft. per inch of thickness, uncartoned. Cartoned, the weight is about 1.3 lb. per sq. ft. per inch of thickness.

The sheets, according to thickness, are packed in cartons containing the following: 1″, 54 sq. ft.; 1½″, 36 sq. ft.; 2″, 27 sq. ft.; 3″, 18 sq. ft.; and 4″, 13½ sq. ft.

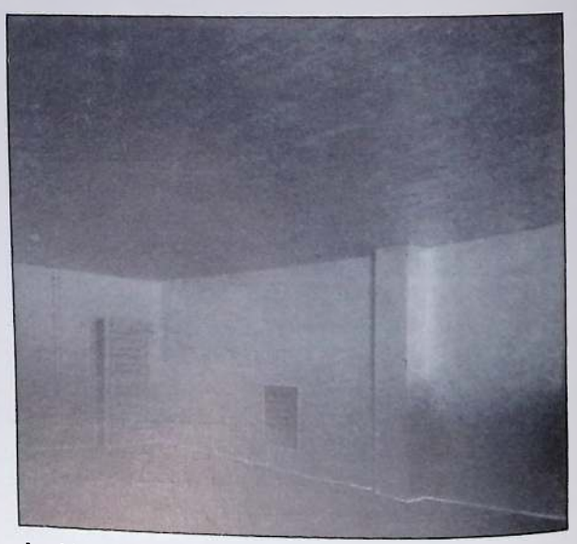
Rock Cork in lagging form for curved surfaces such as columns is made to accommodate diameters from 18″ to 20 ft., and is supplied 18″ long (or 36″ on special order) in thicknesses of 1½″, 2″, 3″ and 4″, and from 2″ to 6″ wide, depending on the diameter.

Flat discs are furnished in 1½″, 2″, 3″ and 4″ thicknesses in one piece up to 18″ diameter; and in two pieces for larger diameters up to 36″.

Rock Cork is also manufactured in granular form for use where an insulation which can be poured into place is desired. Granulated Rock Cork should be packed to a density of 12 to 14 lb. per cu. ft. Furnished in 35-lb. paper bags and in burlap bags of random weights.

Where hand packing, rather than pouring, is required to fill irregular spaces, Zerofil is recommended. It is an asphalt-treated loose mineral wool which is especially convenient for packing around ice-making tanks, etc. Zerofil should be packed to a density of approximately 10 lb. per cu. ft. Shipped in 35-lb. paper bags and in random-weight burlap bags.

Rock Cork Pipe Insulation and Zerotex Fitting Insulation, for pipe lines carrying refrigerated fluids, are described on other data sheets.



In this milk room the solid Rock Cork partitions at the right were built of two layers of sheets with a ½″ core of portland cement mortar, the first layer being erected over temporary studding. The finish used over the insulation was portland cement plaster

Uses for J-M Rock Cork

J-M Rock Cork in sheet and lagging form is used as a standard cold insulation for any form of cold storage construction or refrigerating equipment. Rock Cork has a record of successful service in meat freezers and coolers, quick freeze rooms and equipment, ice cream hardening rooms, ice storage rooms and ice manufacturing tanks, fruit and vegetable storages, air conditioning equipment, rooms and equipment for the dewaxing of lubricating oils, brine coolers, indoor and outdoor cold tanks including much specialized equipment such as gas purifier boxes. Careful inspection of jobs insulated with J-M Rock Cork as far back as 1908, show the material to be in perfect condition after these many years of service.

Applying J-M Rock Cork

The application of low-temperature insulation of any type involves more care than is common with insulation against heated surfaces. With low temperatures, the insulation must not only be permanently waterproofed but must also be sealed against the infiltration of moist air which in time would condense and destroy its insulating value. While portland cement may be used for adhesion of Rock Cork, asphalt has the distinct advantage of providing waterproof construction, a most important feature in applying any low temperature insulation. Asphalt also sets much quicker than portland cement plaster, making possible more rapid application. J-M Rock Cork Asphalt is prepared especially for this work.



Rock Cork sheets provide an ideal base for asphaltic adhesives and finishes, helping to assure an airtight, waterproof seal



Rock Cork sheets make ideal partitions where it is desired to divide refrigerated rooms. The temporary studs are removed after erection and a finish of portland cement plaster is applied

The finish over Rock Cork depends upon the type of construction used and expected service: When Rock Cork is applied against wood framing or constructed as a self-supporting partition, the finish should be portland cement plaster; when applied in asphalt against concrete or good, solid brickwork, the finish may be either portland cement plaster, Insulkote or Zerokote* —the plaster where abrasion or rubbing against the walls may be expected, and Insulkote or Zerokote if the room is to be frequently hosed and washed. Regardless of the finish used, the Rock Cork sheets should first receive a coat of J-M Rock Cork Primer.* *

* Zerokote is a job-mixed finish consisting of 35 percent (or lb.) Zerokote Emulsion, 45 percent (or lb.) plasterer's sand, 20 percent (or lb.) of J-M No. 302 Cement and about 4 gals. (33 lb.) of Water. The sand and cement are mixed dry and then mixed with the Zerokote Emulsion to which 2½ gal. of water has been added. More of the water is added slowly until a good troweling consistency is obtained. Too much water should be avoided.

Note: Different formula for Zerokote Emulsion used in Pacific Coast territory.

Zerokote should not be used when the temperature is likely to exceed 100 deg. F. nor for a finish on insulation exposed to direct action of the weather.

* * J-M Rock Cork Primer is used for priming Rock Cork sheets only. It has a covering capacity of about 150 sq. ft. per gal.

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J-M Rock Cork is applied in accordance with the specifications which have been developed and found sound during many years of experience with this material on all kinds of refrigeration work. The application of Rock Cork by J-M Insulation Service Units is made in accordance with these specifications.

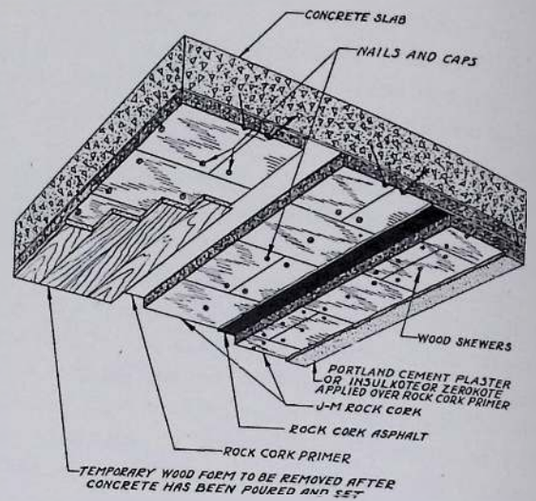
Thicknesses Recommended

While many factors, such as the cost of refrigeration, and local atmospheric and temperature conditions, may govern the amount of insulation which should be used, the thicknesses of sheets or lagging given in the following table are recommended for general requirements:

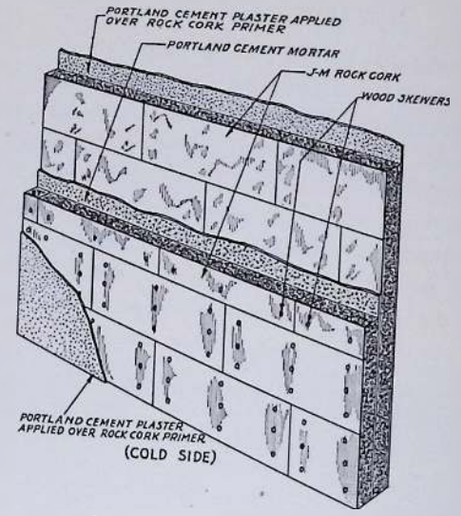
Temperature range, deg. F.	Thickness
—60 to—40	12"—Three layers
—40 to—25	10"—Three layers
—25 to—15	8"—Two layers
—15 to 0	7"—Two layers
0 to 15	6"—Two layers
15 to 25	5"—Two layers
25 to 35	4"—One or two layers
35 to 45*	3" or 2"—Single layer

* Suitable thickness of insulation at this higher temperature range generally depends on other factors more than temperature difference. Among these factors are cost of refrigeration, surface temperature and dew point.

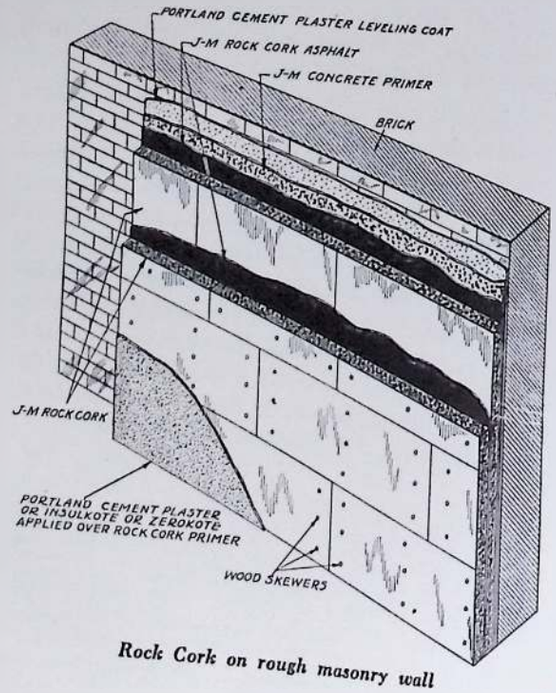
In the use of low-temperature insulation in loose or granular form, it is customary to employ twice the thickness recommended for sheets or lagging.



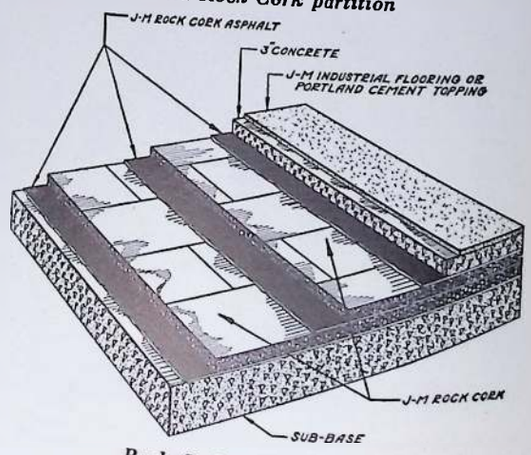
Rock Cork construction for ceiling insulation



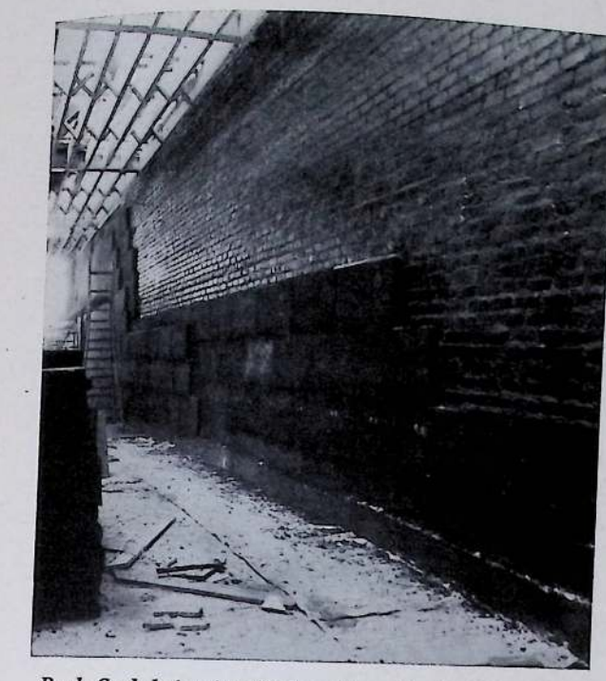
Solid Rock Cork partition



Rock Cork on rough masonry wall



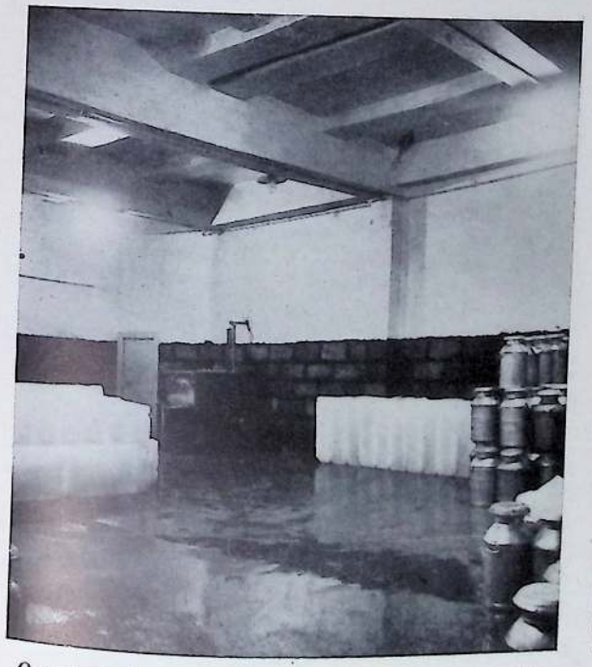
Rock Cork floor insulation



Rock Cork being installed on the walls of a fruit chilling room at the plant of the Mutual Citrus Association, Orange, California. Chilling the fruit before shipment saves the ice in the refrigerator cars on the long journey east



Rock Cork insulation on walls and ceilings, with a finish coat of cement, keeps the low temperature necessary in the lard storage room of the big packing plant of Kingan & Company at Indianapolis, Indiana



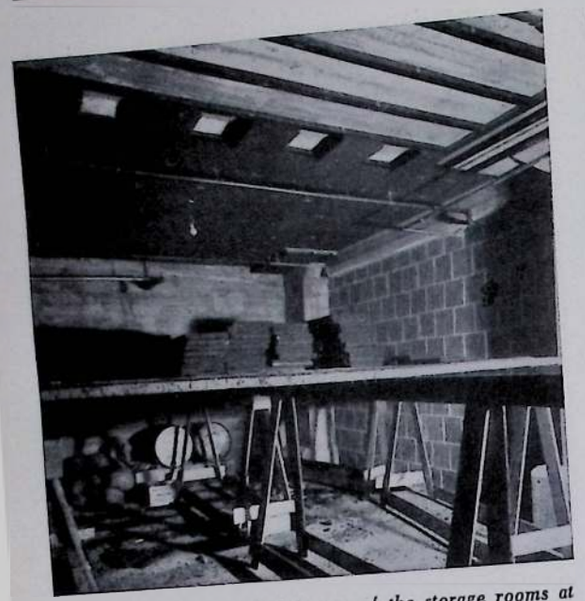
One of the 25 or more installations of Rock Cork in New York City plants of the Dairymen's League. In this icing room the Rock Cork on the wall is protected from damage by skidding milk cans with a dado of J-M Asphalt Plank. Aluminum paint was applied later, directly to the plank



The top of a pile of cakes of ice in the plant of the Southern New England Ice Co., at Bridgeport, Conn. Such a method of ice storage is possible only through the maintained service efficiency of the Rock Cork insulation applied to walls and ceilings

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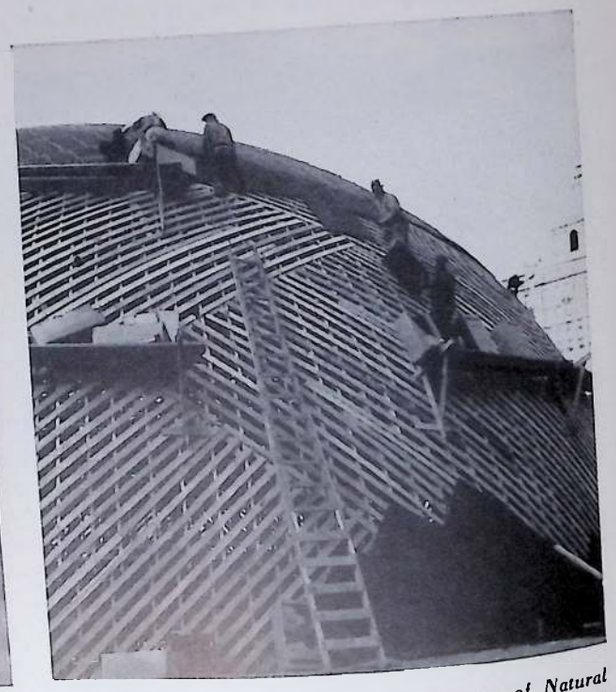
Rock Cork being installed in one of the storage rooms at the Union Pacific Terminal, Los Angeles, Cal., used by the Pacific Fruit Dispatch. The first layer of insulation was applied between nailing strips, the second attached to them



Rock Cork being applied to walls and ceiling in one of the cold storage rooms of the Great Lakes Terminal Warehouse at Detroit, Michigan. The customary coat of plaster was applied over the insulation as a finish



The air-conditioning ducts in the Tudor Theater, in New Orleans, La., were insulated with Rock Cork for the double purpose of avoiding condensation and maintaining the proper thermal conditions. The sheets were wired on, after application, and then the outer surface of the duct finished with a layer of portland cement



At the planetarium of the American Museum of Natural History, New York City, Rock Cork was used to prevent condensation under the concrete roof. The wood form held the sheets of Rock Cork in position until they could be attached, by hair-pin wires, to the steel reinforcement on which the concrete roof was spread by cement guns

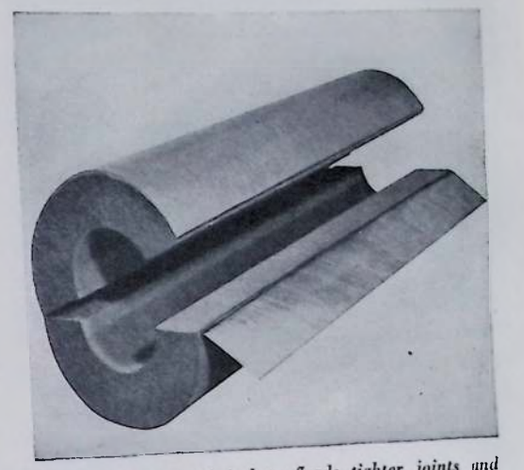
J-M Rock Cork Pipe Insulation

J-M Rock Cork Pipe Insulation and Zerotex Built-up Fitting Insulation are used on pipe lines carrying ice water, brine, ammonia and other refrigerated fluids. Highly efficient and durable, they combine all of the properties essential to an economical and permanent cold pipe insulation.

Rock Cork and Zerotex for the insulation of pipe lines embody all the desirable features of Rock Cork sheets which have been used with exceptional success in cold storage insulation for over 30 years.

Both the pipe and fitting insulation have a remarkably high resistance to moisture infiltration which causes most cold pipe insulation failures. The integral waterproof jacket provides thorough sealing, further assuring permanence under service conditions.

Rock Cork and Zerotex will not decay nor support the growth of bacteria or mold. The insulations are also odorless and vermin-proof.



The integral waterproof jacket affords tighter joints and facilitates the application of the insulation

Rock Cork Pipe Insulation

J-M Rock Cork Pipe Insulation is manufactured from Banroc, a mineral wool, which is bonded with a waterproof compound. Furthermore, it is furnished with a factory-applied integral waterproof jacket, in single layer sections, 3 ft. long, to fit standard pipe sizes.

The integral waterproof jacket of the sectional pipe insulation protects both longitudinal joints, eliminating dependence upon seam filling compounds. In addition, it increases considerably the speed of application as a complete section can be applied as a unit. When installed, Rock Cork Pipe Insulation provides an unbroken, seamless sheath which is highly efficient as a barrier to the flow of heat.

Rock Cork Lagging, used as an outer application over the sectional insulation for very low temperature work, is supplied 1½-ft. and 3-ft. long depending upon pipe size and thickness of the lagging. It is furnished 1½", 2", 3" and 4" thick. Lagging is also used on very large pipe, small tanks and cylinders.

On special order the insulation can be supplied to fit straight runs of ¼" to 4" brass and copper tubing. Outside diameter of tubing must be stated in the order.

A definite thickness of insulation is supplied for each size of pipe according to the individual service requirements, as indicated in the next column.

When other conditions prevail, recommendations should be secured from Johns-Manville.

Service Recommendations:

Ice Water thickness is used for water, liquid ammonia and other cold lines between 30 and 45 deg. F. It varies from 1.4" to 2" in thickness, according to pipe size. For pipe sizes of 12", 14" and 16", the insulation is furnished in half-sections, 3-ft. long.

Brine thickness is used for pipes conveying brine, ammonia and other cold lines operating between 0 to 30 deg. F. It varies in thickness from 1.91" to 3.19" according to pipe size. Furnished in half-sections, 3-ft. long, for 10", 12" and 14" pipe.

Heavy Brine thickness is used for pipes conveying brine, ammonia or other refrigerants operating at temperatures from 0 to –30 deg. F. The thickness varies from 2.82" to 4.18" increasing with the pipe size. The insulation is furnished in half-sections, 3-ft. long, for pipe sizes 8", 10" and 12".

Temperatures below –30 deg. F.: On pipe lines operating at temperatures below –30 deg. F., the choice of proper thickness depends upon such a number of varying factors that recommendations should be obtained from Johns-Manville.

However, under certain conditions, the following thicknesses of J-M Rock Cork Lagging over Heavy Brine thickness have been used: From –30 to –50 deg. F., 1½" lagging for pipe sizes 1¼" to 4" and 2" lagging for pipe sizes over 4". For service temperatures ranging from –50 to –70 deg. F., 2" lagging for pipe sizes from 1¼" to 4" and 3" lagging for pipe sizes over 4".

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Zerotex Built-up Fitting Insulation

All fittings are insulated with J-M Zerotex, a felted mineral wool, combined in production with a water-resistant binder. Zerotex is furnished in blankets 20″ wide by 48″ in length with a nominal thickness of 2″. During application the thickness is reduced somewhat as the material is secured in place. The blankets are supplied in cartons containing 40 sq. ft. and half cartons of 20 sq. ft.

To apply the felt to a fitting, a piece, slightly larger than the circumference of the fitting, should be cut from the sheet. The Zerotex should then be placed on the fitting and secured with jute twine. One to four layers may be required depending upon the thickness desired. Additional pieces of Zerotex should be cut and stuffed into low spots in the fitting to assure the proper thickness.

Each layer of the fitting insulation is covered with a double-wrapping of Zerotape, all pores of which are closed by a brushing of Zeroseal. Full details of application appear on other data sheets.

Zerotex Built-up Fitting Insulation has proved its worth under service conditions for an extended period of time. It offers decided advantages over rigid or pre-cast types of fitting insulation. The material can be readily adapted to any style of fitting with complete assurance of a tight, moisture-proof installation. Since all fittings are insulated with the same material, the necessity of maintaining expensive stocks of fitting jackets is eliminated.

Accessories

The following J-M materials are required in the application of Rock Cork Pipe Insulation:

Zeroseal: A special heavy-bodied plastic cement composed of asbestos fibre, asphalt and other mineral ingredients, designed to afford thorough water-tightness. It is used to seal all joints of the insulation and to close all pores in the sealing membrane of Zerotape which is applied over Zerotex on fittings. It is furnished in 10, 25, 50 and 150-lb. containers. One gal. weighs about 9 lb., net.

Zerotape: A high-grade waterproof fabric used as a sealing membrane over Zerotex on fittings and over end joints on pipe insulation. It is furnished in 1½″ and 3″-wide rolls, 40 ft. long.

Zerogloss: A moisture-resistant compound of ground asbestos fibre and asphalt which is used to give a bright black protective finish to the entire installation, both pipe and fittings. It is furnished in ½, 1 and 5-gal. cans and 30-gal. drums.

Sufficient Zeroseal, Zerotape and Zerogloss, as well as copperized staples and copper-covered annealed steel wire, are shipped with the pipe insulation for use in applying the material in accordance with application directions. If specified on the order, galvanized steel straps and seals will be furnished instead of wire at slight extra cost.

Zerotex and accessories for insulating fittings should be ordered separately.

List prices of Rock Cork Pipe Insulation per linear foot

Nominal size, pipe inches	O. D. pipe, inches	Ice Water Thickness			Brine Thickness			Heavy Brine Thickness		
		O. D. insulation, inches	Thickness of insulation, inches	List price per lin. ft.	O. D. insulation, inches	Thickness of insulation, inches	List price per lin. ft.	O. D. insulation, inches	Thickness of insulation, inches	List price per lin. ft.
¼	0.540	3.5	1.45	$1.00	4.5	1.98	$1.25	6.5	2.97	$2.10
⅜	0.675	3.5	1.40	1.00	4.5	1.91	1.25	6.5	2.90	2.10
½	0.840	4.0	1.58	1.00	5.0	2.08	1.25	6.5	2.82	2.10
¾	1.050	4.5	1.72	1.05	5.0	1.97	1.35	7.0	2.97	2.25
1	1.315	4.5	1.59	1.20	5.5	2.09	1.55	7.5	3.09	2.60
1¼	1.666	5.0	1.67	1.25	6.5	2.42	2.00	8.0	3.16	2.90
1½	1.900	5.0	1.52	1.40	7.0	2.55	2.25	8.5	3.30	3.00
2	2.375	5.5	1.55	1.55	7.5	2.56	2.35	9.0	3.31	3.50
2½	2.875	6.0	1.56	1.65	8.0	2.56	2.70	9.5	3.31	3.65
3	3.500	6.5	1.50	1.85	9.0	2.75	3.30	10.5	3.49	3.95
3½	4.000	7.0	1.50	2.25	10.0	3.00	3.65	11.0	3.50	5.30
4	4.500	8.0	1.75	2.55	10.5	2.97	3.95	12.0	3.75	5.50
5	5.563	9.0	1.72	2.95	11.5	2.99	4.80	13.5	3.97	6.35
6	6.625	10.0	1.68	4.20	13.0	3.19	5.50	14.5	3.92	7.80
8	8.625	12.5	1.94	5.50	15.0	3.19	6.80	17.00	4.18	10.00
10	10.750	14.5	1.87	7.00	17.0	3.125	9.00	19.00	4.12	12.00
12	12.750	16.5	1.875	8.00	19.0	3.125	10.50	20.75	4.00	14.10
14	14.000	18.0	2.000	9.05	20.0	3.000	12.00	—	—	—
16	16.000	20.0	2.000	10.30	—	—	—	—	—	—

Sizes below heavy black line are furnished in half-sections, 3 ft. in length; 7″ and 9″ sizes take list prices of 8″ and 10″ respectively.

Application of J-M Rock Cork Pipe Insulation

Proper application is equally as important as proper materials in the success of refrigerated pipe insulation. J-M Rock Cork Pipe Insulation, properly installed, will give satisfaction over a long period.



Rock Cork Pipe Insulation is easily and quickly applied

Spacing of the Lines:

Sufficient space must be allowed between pipes and adjacent surfaces to permit easy application of the full thickness of insulation. Dimensions required for the minimum spacing of pipe lines follow:

Insulation thickness	Space required between parallel pipes, inches	Space required between pipe and adjacent surfaces, inches
Ice Water Thickness		
Up to 6″ pipe—screwed fittings	7	5
Larger than 6″ pipe—screwed fittings	11	6
All pipe sizes—flanged fittings	12	8
Brine Thickness		
Up to 6″ pipe—screwed fittings	9	7
Larger than 6″ pipe—screwed fittings	15	9
All pipe sizes—flanged fittings	16	10
Heavy Brine Thickness		
Up to 3″ pipe—screwed fittings	11	9
Larger than 3″ pipe—screwed fittings	19	13
All pipe sizes—flanged fittings	20	14

Preparation of Lines:

Before any insulation is applied, pipe and fittings must be tested, made tight, cleaned of rust, scale or other foreign matter, freed of frost and made dry.

All pipe should be hung on metal saddles placed over the insulation. A sheet metal shield, at least as long as the outside diameter of the insulation and extending half way up on each side, should be snugly fitted under the line at each hanger-point.

Lines may be supported on wood blocks set in hangers until the insulation is ready to be applied.

Rates of heat transmission

The rates of heat transmission given below are expressed in B.t.u. per square foot (and also per linear foot), per hour, per degree temperature difference between fluid in the pipe and air surrounding the pipe. In the case of screwed fittings, where the proportion of fittings to pipe is not unusually high, no great error will be introduced by figuring small fittings, such as ells and tees, as one linear foot of pipe; and larger fittings, valves, crosses, etc., as one and one-half linear feet. Reference to a table of areas will be necessary in computing radiation equivalents for flanged fittings. Such a table appears on another data sheet.

Pipe size, inches	Ice Water Thickness			Brine Thickness			Heavy Brine Thickness		
	B.t.u. per lin. ft.	B.t.u. per sq. ft. pipe surface	B.t.u. per sq. ft. outer surface	B.t.u. per lin. ft.	B.t.u. per sq. ft. pipe surface	B.t.u. per sq. ft. outer surface	B.t.u. per lin. ft.	B.t.u. per sq. ft. pipe surface	B.t.u. per sq. ft. outer surface
½	.110	.502	.105	.098	.446	.075	.087	.394	.051
¾	.119	.431	.101	.111	.405	.085	.094	.340	.051
1	.139	.403	.118	.124	.352	.086	.104	.294	.053
1¼	.155	.357	.118	.131	.300	.077	.113	.260	.054
1½	.174	.351	.133	.134	.270	.073	.118	.238	.053
2	.200	.322	.139	.151	.244	.077	.134	.214	.057
2½	.228	.303	.145	.170	.226	.081	.147	.197	.059
3	.269	.293	.158	.186	.202	.079	.162	.176	.059
3½	.295	.282	.161	.191	.183	.073	.176	.167	.061
4	.294	.248	.140	.209	.176	.076	.182	.154	.058
5	.349	.239	.148	.241	.165	.080	.202	.138	.057
6	.404	.233	.154	.259	.150	.076	.228	.130	.060
8	.455	.201	.139	.318	.140	.081	.263	.116	.059
10	.559	.198	.147	.383	.135	.086	.309	.110	.062
12	.648	.194	.150	.438	.131	.088	.364	.108	.067
14	.670	.182	.142	.487	.132	.093	.392	.107	.068
16	.750	.179	.143	.542	.130	.094	.434	.104	.069
18	.833	.176	.145	.604	.127	.096	.476	.102	.070
20	.919	.175	.146	.661	.126	.097	.520	.100	.071

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Prevention of Freezing in Water Pipes

It is impossible for any type or thickness of insulation to prevent the freezing of water in pipes if there is no flow and surrounding temperatures remain low for a sufficient length of time, since no insulation will completely prevent heat flow. The following table is based upon the use of Rock Cork Pipe Insulation and indicates the proper insulation thickness to use where conditions are known or can be assumed with reasonable accuracy.

Data on Freezing of Water in Pipes*

Steel Pipe size, inches	Rock Cork, Insulation thickness	B.t.u. per deg. temp. diff., per hour per lin. ft.	Hours to cool from 42 to 32 deg. F. No flow	Lb. water flow per hr. per lin. ft. to prevent freezing
½	Ice Water	0.110	0.43	0.63
	Brine	0.098	0.52	0.56
	Heavy Brine	0.087	0.73	0.50
1	Ice Water	0.139	0.78	0.79
	Brine	0.124	0.90	0.71
	Heavy Brine	0.104	1.20	0.59
1½	Ice Water	0.174	1.27	0.98
	Brine	0.134	1.72	0.76
	Heavy Brine	0.118	2.04	0.67
2	Ice Water	0.200	1.69	1.14
	Brine	0.151	2.31	0.86
	Heavy Brine	0.134	2.71	0.76
3	Ice Water	0.269	2.73	1.53
	Brine	0.186	4.02	1.06
	Heavy Brine	0.162	4.68	0.93
4	Ice Water	0.294	4.08	1.68
	Brine	0.209	5.84	1.19
	Heavy Brine	0.182	6.77	1.04
6	Ice Water	0.404	6.45	2.30
	Brine	0.259	10.01	1.48
	Heavy Brine	0.228	11.61	1.30
8	Ice Water	0.455	9.75	2.60
	Brine	0.318	14.00	1.82
	Heavy Brine	0.263	17.00	1.50
10	Ice Water	0.559	12.22	3.20
	Brine	0.383	17.95	2.20
	Heavy Brine	0.309	22.32	1.76
12	Ice Water	0.648	14.80	3.70
	Brine	0.438	22.12	2.50
	Heavy Brine	0.364	26.80	2.08

* Figures are based on an air temperature of —20 deg. F. This is an approximate 60-deg. temperature difference. If air is to be taken at 0 deg. F., the time to cool 10 deg. will be approximately 45 percent greater. The last column shows minimum amount of water at 42 deg. F. to prevent freezing.

These rates of flow include no safety factor to provide for temporary reductions due to lower pressure, etc. Weights of water are per foot, so the minimum flow in a line 100-ft. long must be at least 100 times the tabular value.

Insulating the Pipe

Before Rock Cork insulation is applied, the pipe should be brushed with Zerogloss. The proper thickness of the insulation, according to the type of service, should then be applied to all the straight sections of the pipe line.

When the pipe is joined with flanged fittings, sections or segments should be applied about 1″ away from the flange to permit thorough packing of Zerotex between and around the bolts.



Rock Cork provides an economical and durable cold pipe insulation with a high resistance to moisture infiltration

When screwed fittings have been used, the insulation should be butted tightly against the fitting. On some fittings, such as ells and tees, in certain sizes of pipe, the butting edges of the insulation may require beveling to secure correct application of the sections. A small space should be allowed between these edges so that the Zerotex may be tied in place on the fitting. Insulation applied in this manner reduces to a minimum the amount of time and material necessary to insulate fittings.

Sectional Pipe Insulation:

Before each section of insulation is applied, both longitudinal joints and one of the end joints, should be coated with J-M Zeroseal. Then the section should be placed upon the pipe, closed and temporarily secured with from four to eight staples furnished for the purpose, the coated end being butted tightly against the uncoated end of the previously applied section. The sections should be so placed that longitudinal joints occur at top and bottom of the pipe.

The area to be covered by the waterproof lap should then be coated with Zeroseal and the lap pressed smoothly into it. The end joint should next be sealed with one width of 3″-wide Asbestos Felt embedded in a coat of Zeroseal.

The section should be permanently secured in place with six loops of copper-covered annealed steel wire or four ½″ x 0.015″ galvanized steel straps. The smaller sizes of insulation should be secured with three straps or with five loops of wire. Larger sizes need a sufficient number to insure a tight, permanent installation. If wire is used, it should be twisted tightly and the ends neatly clipped.

Segmental Pipe Insulation:

When the insulation is furnished in segmental form, each segment is provided with a factory-applied jacket the lap of which extends along one longitudinal edge. When applied, this lap should cover the flush-cut edge of the jacket on the following segment. One longitudinal joint of each segment should be coated with Zeroseal and applied to the uncoated joint of the adjoining segment. When the complete set of segments is assembled on the pipe each area to be covered by a waterproof lap should be coated with Zeroseal and the lap pressed into it. The set is then strapped or wired in place with from three to six straps or loops of wire in the same manner as the sectional insulation.

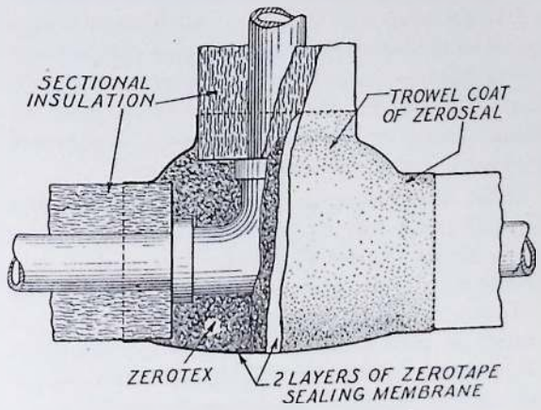
Lagging over Pipe Insulation:

When lagging is required over the insulation, a coat of Zeroseal should be applied and the lags embedded in it. They should then be secured with from three to six straps or loops of copper-annealed steel wire, the ends of wire being neatly clipped and bent down. See "Finishes" for final asbestos felt wrapping.

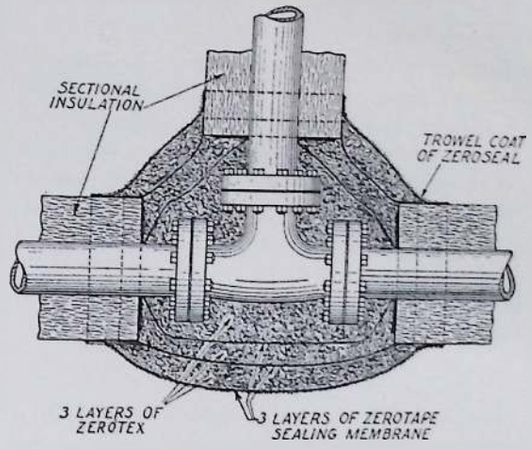
Insulating the Fittings

Before any fitting insulation is applied, care should be taken to see that the ends of the pipe insulation are coated with Zeroseal. The fitting should then be given a brush coat of Zerogloss.

All fittings are insulated with J-M Zerotex. Depending upon service requirements, from one to three built-up layers should be applied, each layer consisting of a sufficient number of plies to attain a compressed thickness of from 1½″ to 2″. As each ply is put on, it should be secured in place with several wraps of jute twine and the built-up layer covered with a double wrap of Zerotape. Before the application of each successive built-up layer, Zeroseal should be brushed into the Zerotape to close all pores and to facilitate the application of the next layer of Zerotex.



Fitting insulated for Ice Water thickness



Fitting insulated for Heavy Brine thickness

For Ice Water thickness, one layer of Zerotex, of slightly greater thickness than the pipe insulation, is required. The outer ply of Zerotex should be extended over the pipe insulation jacket about 1″.

Brine thickness requires two layers of Zerotex, the first of which should be built up to about one-half the thickness of the adjoining pipe insulation. When the second layer is applied, the total thickness should be slightly greater than the pipe insulation and the outer ply of Zerotex should extend about 1″ over it.

When Heavy Brine thickness is used, three layers of Zerotex are required. The first two should be applied as described for Brine thickness and the third layer applied over them. The third layer should extend about 2″ over the adjacent pipe insulation.

If lagging is used over Heavy Brine thickness, fittings should be insulated as described for Heavy Brine thickness, so that the total thickness of the fitting insulation exceeds that of the pipe insulation by at least 2″.

Each built-up layer of Zerotex should be evenly and symmetrically packed around the fitting and care exercised to see that flanges receive the full thickness.

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The sealing membrane covering each layer of Zerotex should consist of a wrap of Zerotape applied so that a double thickness of the tape covers the Zerotex at every point. Over each sealing membrane, Zeroseal should be applied, leaving no uncoated spots.

The ends of the Zerotape in each case should be sealed to the pipe insulation with Zeroseal.

For insulating small fittings, 1¼" and less, 1½"-wide Zerotape should be used. In these sizes, the 1½" tape handles better and less tape is wasted.

After the full thickness of the Zerotex has been applied and sealed, the entire surface of the fitting should be covered with a trowel coat of Zeroseal. A ¼" coat of hard-finish asbestos cement, consisting of 2 parts of asbestos cement and 1 part of portland cement, should then be troweled smoothly over the insulated fitting. On fittings in concealed locations and where appearance is unimportant, the cement coating may be omitted without loss of insulating value as it is applied only to provide a smooth finish.

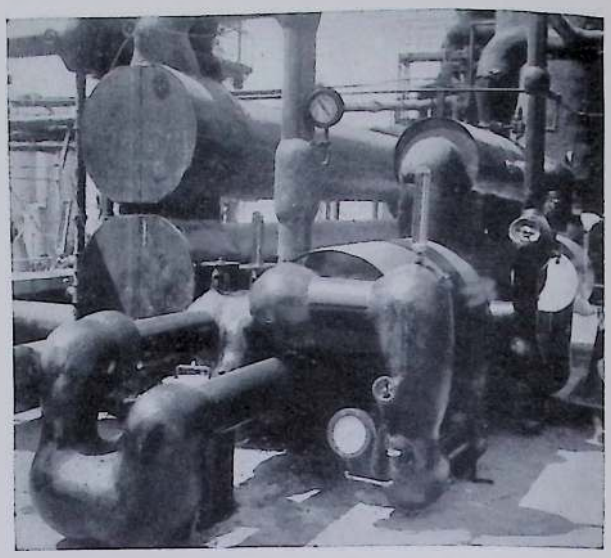
Finishes

For a bright, black finish, a brush coat of J-M Zerogloss is recommended over all pipe insulation and fittings. If an aluminum finish is desired, the following mixture is applied over the Zerogloss.

To 2 lb. of the Aluminum Company of America's Extra Brilliant Varnish Powder add one gallon of Du Pont Company's VO 129 Aluminum Mixing Varnish. The paint must be mixed immediately before using and in no case should more paint be made up than can be used in one day. Two coats should be applied, the first of which must be allowed to dry at least 24 hours before the second coat is applied. A brush may be used for application, but a spray will give a quicker and possibly slightly smoother job.



Applying the sealing membrane over Zerotex



The finished Rock Cork job, perfectly sealed to prevent frosting, offers a neat and workmanlike appearance

When lags are applied over the pipe insulation, their outside surface should be coated with J-M Zeroseal, and the line then wrapped with J-M No. 50 Waterproofing Felt. Where hot asphalt can be used economically, it should be used, instead of Zeroseal, to hot-mop the felt in place. The entire line is then finished with a brush coat of Zerogloss.

For weatherproofing, insulation on all outdoor lines should be further protected with an additional jacket of J-M Double Coated Flexstone which is furnished in rolls of 108 sq. ft., 32" wide, and weighing approximately 50 lb. All joints should be lapped at least 3" and sealed down with Zeroseal. All horizontal laps should be located on the side of the pipe with the laps turned downward in order to shed water from the surface. The jackets should be secured in place by means of rings of No. 16 B. & S. gauge Copperweld wire applied at not greater than 4" centers.

If fire hazard must be considered, a J-M Asbestos Firetard Jacket may be applied in the same manner as the Double Coated Flexstone. Furnished in rolls of 108 sq. ft., 32" wide, and weighing about 55 lb.

Zerotex Fitting Insulation, properly sealed and coated in accord with the application directions, should receive two coats of Zerogloss or two coats of an approved aluminum paint when the line is exposed to the weather.

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NATIONAL INSULATION...the economical insulation with highest insulating efficiency



- FLAME-PROOF
- VERMIN-PROOF
- WATER REPELLENT
- ODORLESS
- FLEXIBLE
- RESILIENT
- LIGHT WEIGHT
- SAFE AND EASY TO HANDLE

NATIONAL cotton INSULATION

NATIONAL INSULATION

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NATIONAL INSULATION HAS ALL THESE FEATURES

Highest Insulating Efficiency

National Insulation is foremost among the most efficient insulations, having the extremely low thermal conductivity of only 0.24 BTU per hour per sq. ft. per degree Fahrenheit per one inch of thickness.

Flame-Proof

National Insulation is specially treated to resist fire... meets Federal specifications.

Vermin-Proof

U. S. Department of Agriculture tests certify that this chemically treated insulation will not harbor vermin, rodents or insects.

Water-Repellent, Odorless

National Insulation repels water and has no odor.

Flexible, Resilient

Its resiliency allows for normal expansion and contraction without affecting the insulation... will not sag or settle, leaving bare unprotected areas.

Light Weight, Safe and Easy to Handle

National Insulation weighs about 85 hundredths of a pound per cubic foot as compared with other insulating materials which weigh from 1½ to more than 10 pounds per cubic foot. The clean fibres are non-irritating, making it safe and easy to handle.

Vapor-Proof Paper Backing

The specially treated backing of National Insulation meets the Paper and Pulp Industry specification T-448-M-41 for vapor barrier purposes. The flanged edges of the backing help to make it easy and economical to install.

Easy to Install

National Insulation is easily unrolled between attic floor joists, or tacked to rafters.

SCHEDULE OF SIZES AND WEIGHTS FOR SHIPPING PURPOSES

For Studs and Joists spaced on 16" centers... Overall width of paper backing 17". Net insulation width 14½". 1½" paper flanges.

Thickness	Lin. Ft. per roll	Sq. Ft. per roll	No. Rolls per carton	Sq. Ft. Insl. per carton	Wt. per M. Sq. Ft. incl. carton
1"	50	60	18	1088	106
1½"	50	60	12	725	113
2"	50	60	9	544	178
2½"	50	60	6	363	216
3"	25	30	9	272	258
3⅜"	25	30	9	272	297

For Studs and Joists spaced on 24" centers... Overall width of paper backing 26". Net insulation width 23". 1½" paper flanges.

Thickness	Lin. Ft. per roll	Sq. Ft. per roll	No. Rolls per carton	Sq. Ft. Insl. per carton	Wt. per M. Sq. Ft. incl. carton
1"	50	96	9	862	106
1½"	50	96	9	862	138
2"	50	96	6	575	174
2½"	50	96	6	575	205
3"	25	48	6	287	251
3⅜"	25	48	6	287	294

Paper Backing furnished meets Paper and Pulp Industry Specification T-448-M-41 for Vapor Barrier purposes

Form No. NC-101 10M

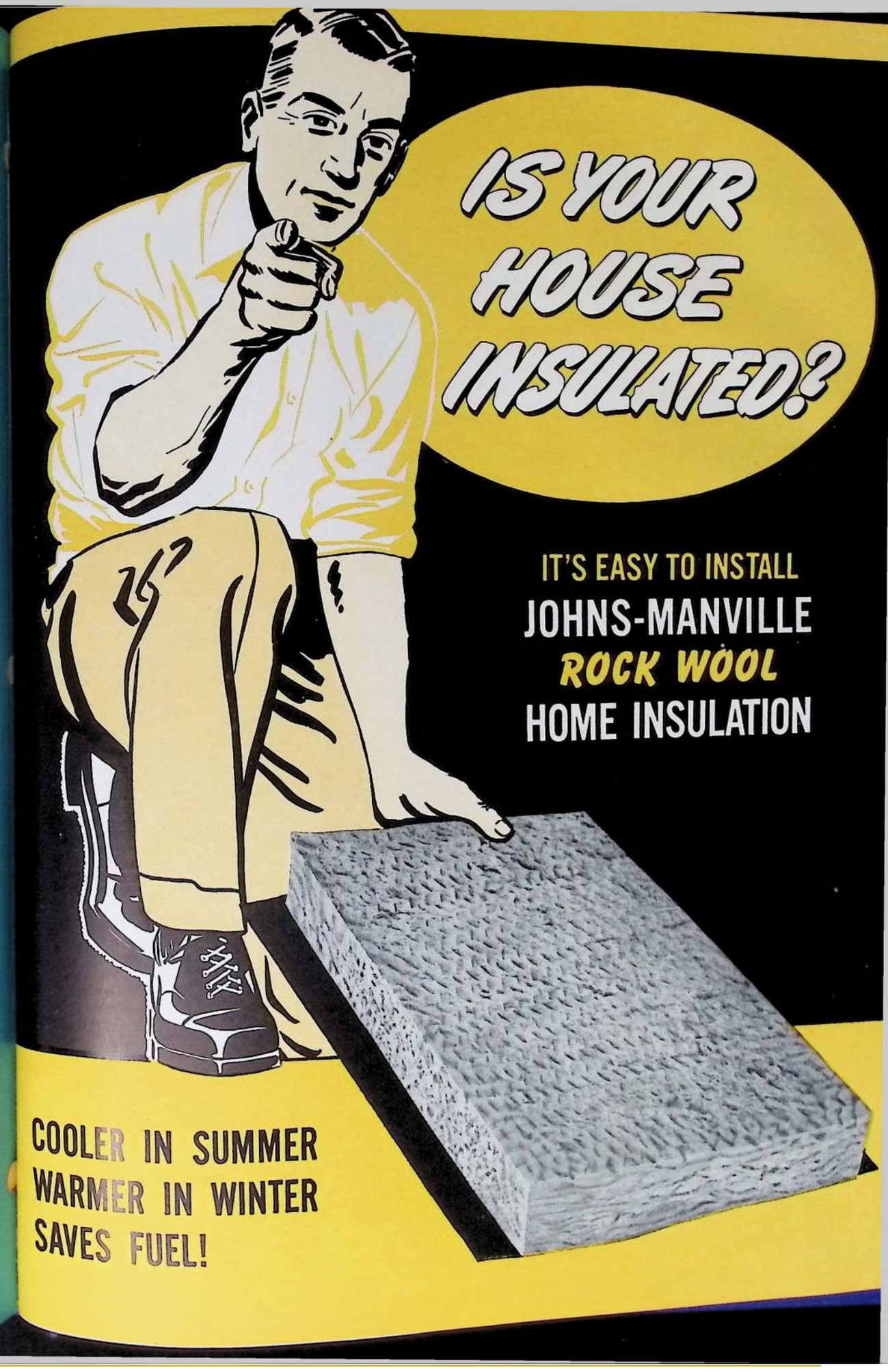
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Mr. and Mrs. Homeowner:

You are paying for Johns-Manville Rock Wool Home Insulation even though you don't have it!

. . . you pay in wasted fuel.
. . . you pay in cold, drafty rooms in winter.
. . . you pay in sleepless nights in hot weather.
. . . and you may pay in unnecessary fire loss!

Nearly a million homeowners know from experience that Johns-Manville Rock Wool Home Insulation provides refreshing comfort in hot summer weather, with rooms up to 15° cooler. They know, too, that in winter, it helps keep precious heat inside where it belongs. As a result they enjoy rooms that are warmer and less drafty. Best of all, they save up to 30% on their fuel bills and this makes their insulation pay for itself!

When you consider all these facts, can you afford *not* to have the year-round comfort and fire protection of Johns-Manville Rock Wool Insulation? Remember, it starts to pay for itself from the very moment it is installed.

JOHNS-MANVILLE HOME INSULATION
Comes in Big, Thick, Fireproof Super-Felt Batts Which Provide a Scientific Barrier to the Passage of Heat.

Widely used in new houses during construction, Johns-Manville Super-Felt Batts can also be applied in accessible roof and attic areas of existing homes.





If you have an open attic without a floor, J-M Super-Felt Batts can be installed between the joists so as to cover the ceiling of the rooms below.



If there is an attic floor, or if you plan to build a room in your attic later on, J-M Super-Felt Batts can be installed between the roof rafters.

Both Methods are Equally Efficient

Why t[he] J-M Super-Felt Batt assures you M[axi]mum Fuel Savings and Comfort



EASY TO INSTALL

Super-Felt Batts are quickly and e[asily] stalled. They are designed to fit [snug] between floor joists or attic rafte[rs]. can be sure J-M Super-Felt will [stay] place in your home rapidly and w[ith] tory-made efficiency.

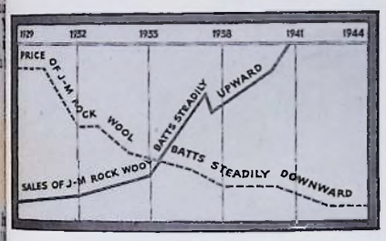
HANDLES WITHOUT "CODDLING"

Ordinary Rock Wool Batts must [be] dled with care to prevent their [fall]ing apart or becoming separated from [the] waterproof backing. Not so with J-M Super Felt! These well-made Batts [are] strong and tough. The "wool" is [held] — and for this reason can be [han]dled without "coddling." This means [that] time and money are saved during [the] cation. No going back to make [fill]s to obtain desired thickness. No [cut]ting thin spots.



RESISTS HEAT IN ALL 3 WAYS

Heat may be transferred from a region of high temperature to a region of low temperature in any or all of these three ways: (1) by actual contact, (2) by physical movement of air currents, (3) by direct radiant energy between two surfaces. Some insulating materials used in houses resist the passage of heat in only one of these three ways, and consequently are only relatively efficient. Because of its inherent structure (millions of minute, trapped air cells which resist the flow of heat), and because it effectively reduces the movement of air currents, J-M Super-Felt resists all three forms of heat transfer.



LOW COST

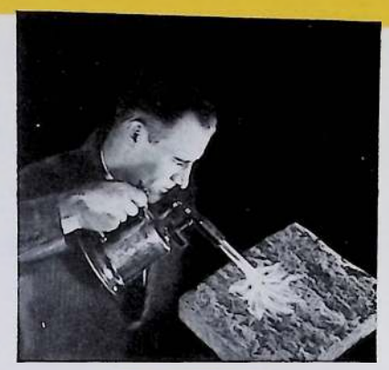
Ever since Johns-Manville pioneered the first Rock Wool Batt, J-M research laboratories have been busy improving the product and reducing its cost. Today, Super-Felt with its many exclusive advantages actually costs you one-third less than the best J-M Rock Wool Batt of equal thickness in 1934. And keep this in mind. It actually costs you nothing to insulate your house with J-M Super-Felt because it pays for itself in fuel savings.

MOISTURE PROOF

J-M Super-Felt has a moisture-proof membrane which forms a barrier to prevent moisture getting into the insulation from wet plaster walls. In addition, Super-Felt is treated against moisture so that any dampness which might penetrate through leaks from the outside will run off the insulation without ill effect.

DOESN'T ATTRACT VERMIN

There is nothing in the sterile mineral composition of J-M Rock Wool to attract vermin. This is not always true of insulations that are made from non-mineral substances.



FIREPROOF

J-M Super-Felt, being of mineral composition, is fireproof! It carries the approval of the Underwriters Laboratories. It will even withstand the fury of the blow torch. No insulating material of other than mineral composition (even if chemically treated to resist flame) can provide the permanent protection against fire made possible by Johns-Manville Rock Wool.

WILL NOT SETTLE

When you insulate your house, you want to be certain that the insulating material you use will always stay in place. Loosely fabricated materials in any form and many "chunky" bulk materials may have a tendency in time to "settle" when installed in vertical or sloping spaces, leaving thin spots and voids. Such materials will not give you the permanent protection you have a right to expect. Even a cursory examination of J-M Super-Felt will give you an idea of its firmness and compact felting. It is designed to "stay put", assuring you of a continuous heat barrier, free of voids and thin spots.



LOW CONDUCTIVITY

The effectiveness of any insulation material is measured by its thermal conductivity, (which is always computed on a basis of 1" thickness) and on its thickness as applied. It follows, therefore, that when two materials have the same thermal conductivity, if one material is 1" thick it will be by itself proportionately less efficient than one 3" thick.

Since J-M Super-Felt has a thermal conductivity comparable to any home insulating material on the market and is applied at full wall thickness, (approximately 3⅛"), it provides maximum protection against the passage of heat, and the greatest dollar and cents return.



IDENTIFIED FOR YOUR PROTECTION

Each J-M Super-Felt Batt is clearly identified with the Johns-Manville Trade-Mark on the waterproof membrane. This, combined with Johns-Manville's long experience in the field of insulations for industry and the home, is your assurance of quality. Look for this identification when you buy insulation. It will pay you extra dividends in year-round comfort and fuel savings.

PERMANENCE

You invest in insulation only once, and it is important to you to know that your insulation will be permanent. Materials that are not composed of mineral fibre must be treated with various kinds of chemicals to delay decay and rot. J-M Super-Felt, however, is of mineral composition — rock wool. Being mineral, it cannot rot or decay. It remains unchanged as long as your house stands.

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For That New Home You Are Planning Insist On Johns-Manville Super-Felt

(COMPARE ITS EFFICIENCY WITH OTHER INSULATIONS)

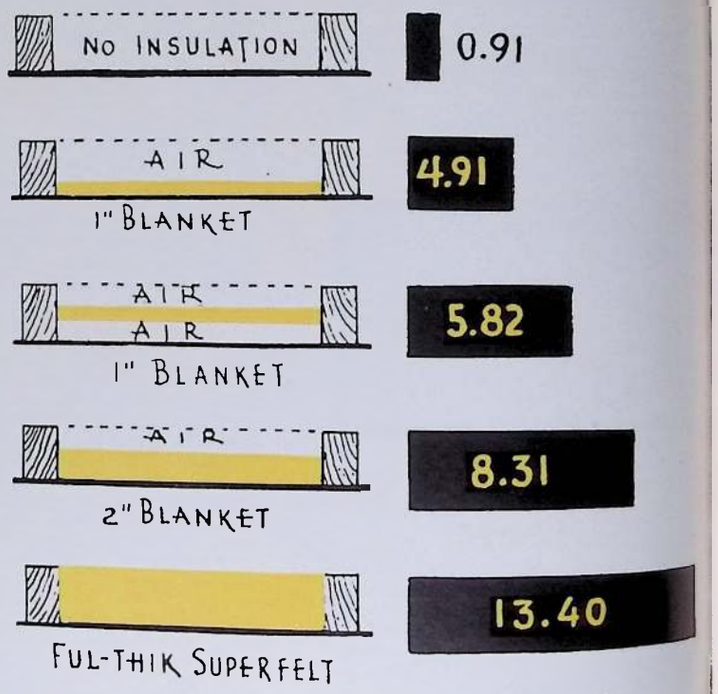
Naturally you'll want that new home of yours to be thoroughly modern. And that means above all, complete insulation — both sidewalls and ceilings. But just any insulating material will not do. Always keep in mind that as long as your house stands, your insulation will affect the comfort, health and safety of your family, as well as your annual heating cost. Don't take chances. Insist on Johns-Manville Super-Felt and be sure.

Why Full Thickness is so Important

In summer an attic becomes unbearably hot. This stored-up heat tries to pass through the barrier of insulation to the rooms below. The insulation may be likened to a dam holding back a body of water, the pressure of which is constantly increasing. Unless the dam is of sufficient thickness, there will be dangerous seepage. Similarly, unless the barrier of insulation is of adequate thickness, the accumulated heat will force its way through into the rooms. In winter, full-thick insulation is equally essential. Precious heat will leak through a thin material and quickly escape to the outdoors. This wastes fuel and makes your house harder to heat!

A Fire Stop — Not a Fire Hazard!

J-M Super-Felt is made of rock wool, a mineral. It cannot burn! When installed at full thickness in the hollow walls of a house, it effectively shuts off these "flue-like" spaces — prevents flames from spreading throughout the house. Hundreds of actual cases in our files testify to the fact that J-M rock wool has helped keep dangerous fires under control. *This kind of fire safety cannot be depended upon from an insulation made of organic fibres, even if treated to resist flame!* Insist on fireproof J-M Super-Felt.



NOTE: The length of each bar represents the total resistance to the passage of heat of the wall spaces in frame construction when insulated by various methods. (Authority: A.S. H. & VE. Guide). Notice that J-M Super-Felt is the most effective by a wide margin.

NOTE: There are two types of J-M Rock Wool Home Insulation: 1. J-M Super-Felt Batts described in this folder. These are specially fabricated for application in new houses during construction (when the walls and attic areas to be insulated are readily accessible), and in accessible roof and attic areas in existing homes. 2. J-M also manufactures nodulated Rock Wool which is pneumatically installed in closed wall spaces and in closed or open attic spaces of existing houses. Specially designed "blowing" equipment is used and the work is done only by approved contractors. The material is applied pneumatically at proper, uniform density and will not settle. Both types are equally efficient when properly installed.

FOR COMPLETE INFORMATION ABOUT JOHNS-MANVILLE SUPER-FELT HOME INSULATION, CALL

J-M Home Insulation

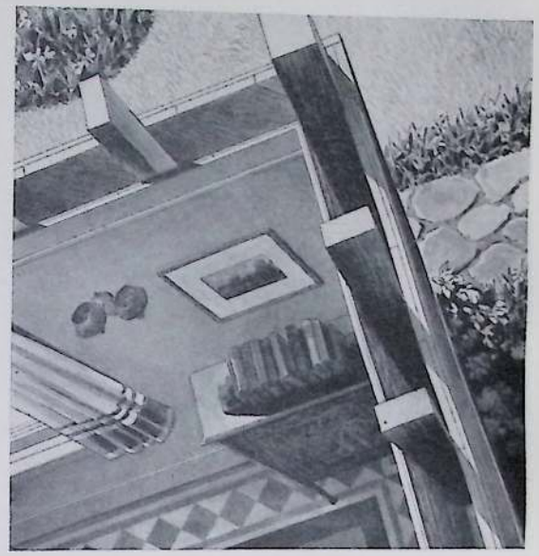
J-M Home Insulation consists of special grades of rock wool for retarding heat flow through walls, ceilings and floors of frame houses. Its purpose is to assist in keeping buildings warm in winter and cool in summer, thereby providing greater comfort with lower fuel bills. Home Insulation is lasting, fireproof, non-conductive of electricity, and does not nourish vermin. Moreover, the insulation will not attract moisture from the air. Its efficiency is maintained throughout the life of the building structure.

The Utility of Insulation

Heating systems vary in efficiency. One system may heat a house with less fuel cost than another system, under like conditions of service, but the gain or loss by the use of either system is but a small amount when compared with the saving or loss due to the type of house construction employed. This factor is often overlooked when heating systems are being planned.

A pound of coal contains from 12,000 to 14,500 B.t.u. When this is burned in the average domestic heating system, it has been estimated that about 50 percent is lost because of imperfect combustion, etc. The remaining 50 percent goes to heat the house and it is from this that the saving is made.

The term "dead air space" was formerly in common use as applying to the hollow space in building walls, and the popular impression was that this prevented heat transmission something like the space in the walls of a thermos bottle. It has been conclusively proved, however, that this notion was fallacious and that a material which contains a great number of small confined air spaces per unit volume is much more effective as an insulator than an empty space in which air currents may circulate.



These hollow walls offer little resistance to the flow of heat. During the summer, they allow outside heat to seep into the cooler interior; in cold weather, furnace warmth is wasted to the outdoors. Home Insulation, filling these hollow spaces, would present a barrier to this flow

It is obvious that the most practical method of home insulation is to fill the area in the walls of a house with a material containing these minute air spaces. Johns-Manville does just this with Home Insulation.

The roof or attic floor of any home can be insulated, as can also the walls of any frame house, whether of stucco, clapboard, shingles, brick or stone veneer. The form in which rock wool is applied depends on whether the house is already built or is being constructed.

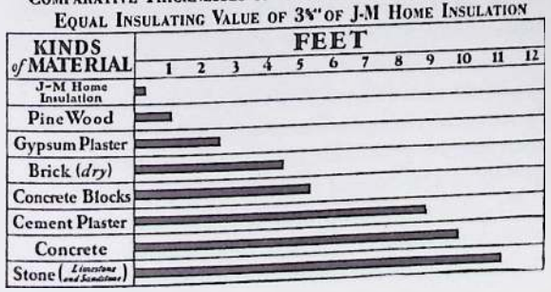
The Advantages of Insulation

Home Insulation is an investment which begins to pay dividends as soon as it is installed. The immediate benefits include the following:

Increase in Home Comfort
Addition to Property Value
Improvement of Health Conditions
Reduction in Decorating Costs
Reduction in Fuel Costs
Decrease in Furnace Operation
Aid in Fire Prevention

A more detailed description of these advantages is given in subsequent paragraphs on the following page.

COMPARATIVE THICKNESSES OF VARIOUS WALLS REQUIRED TO EQUAL INSULATING VALUE OF 3½" OF J-M HOME INSULATION



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Increases General Home Comfort:

(a) Warmer in winter. No rooms "hard to heat" are found where an adequate heating system is installed in a house which is insulated with rock wool.

(b) Cooler in summer. The upper floor rooms can be kept at a temperature close to that of the lower floors. Indoor temperatures will sometimes run as much as 15 deg. F. lower than the outside temperature during the heat of the day.

(c) Attic space, used for storage, can be made into extra bedrooms, play rooms, etc.



In summer, the sun often heats roofs up to 150 deg. F. The roof re-radiates this heat throughout the house unless home insulation prevents such action

Adds to Property Value:

House insulation has received wide publicity in the past few years through advertising, government reports, magazine articles, etc., and it is safe to predict that in the near future an uninsulated house will not be considered a good investment.

Improves Health Conditions:

(a) Frame walls, if uninsulated, usually permit air infiltration in large quantities, resulting in drafts. Heat exchange next to such walls also sets up air currents or drafts within the room.

(b) Ventilation is under more positive control in the case of the insulated house.

(c) Insulation aids in cutting down the number of air changes in a house and thus considerably reduces the evaporation required to moisten the indoor air properly, thereby helping to prevent coughs and colds.



Cold, north wind is frequently the cause for drafty and hard-to-heat rooms. Insulation between the walls will do much to correct these conditions

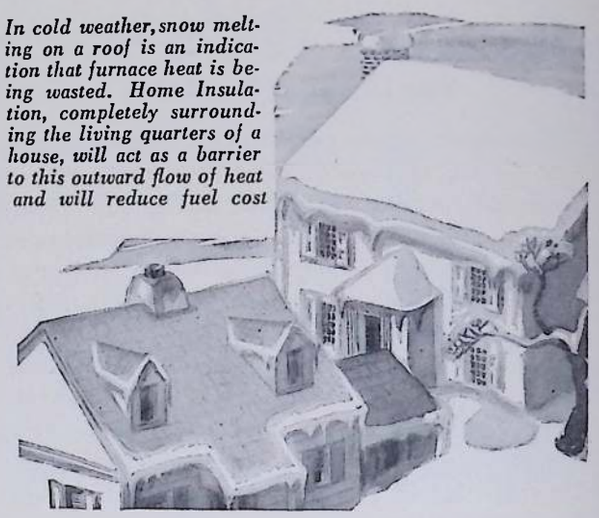
Reduces Decorating Costs:

In winter, insulation minimizes the discoloration of interiors by keeping ceilings and walls at or near room temperature, which prevents "sweating."

Reduces Fuel Costs:

A survey covering a large number of individual cases indicates that for an average insulated house of six to eight rooms, an annual saving of 20 to 30 percent of the fuel bill may be expected. These figures may safely be taken as a fair average, although numerous examples of greater savings have been recorded.

In cold weather, snow melting on a roof is an indication that furnace heat is being wasted. Home Insulation, completely surrounding the living quarters of a house, will act as a barrier to this outward flow of heat and will reduce fuel cost



Decreases Furnace Operations:

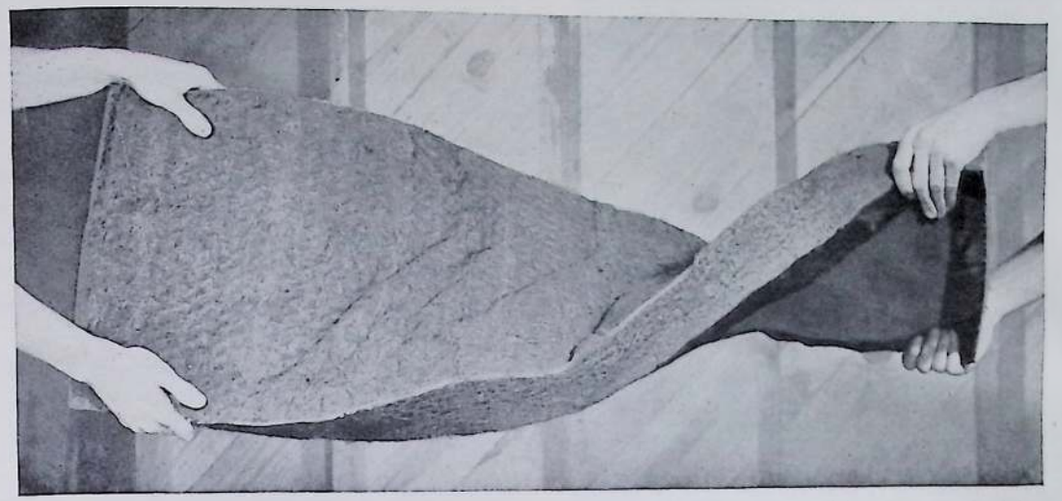
In an insulated house it is possible to reduce materially the usual period of furnace operation by the judicious use of fireplaces, cookstoves, and auxiliary heaters during the chilly days of spring and autumn. With reduced furnace operation there is a consequent saving of labor in the handling of fuel and ashes. In addition, the heating plant will require considerably less attention because of the ease of uniformly maintaining comfortable temperatures.

Aids in Preventing Fires:

The average frame house, due to its construction, is a fire hazard. Filling the walls and ceilings with a fireproof insulating material lessens the possibility of the house catching fire from overheated flues because furnace "forcing" then becomes unnecessary. Furthermore, as long as the insulation is in place, it will prevent the passage of flame between the walls.

As a matter of fact, J-M Home Insulation is regarded as such an excellent fire stop that its use has been approved as a fire retardant in multiple dwellings.

J-M Type B Home Insulation



When Super-Felt is used considerable saving is made in installation costs because of less time involved in cutting and handling the material. The felted structure does not break down even when twisted and bent

Super-Felt, the improved J-M Type B Home Insulation in the familiar batt form, is ideal for insulating new houses. The product is prefabricated to a scientifically determined thickness and density. In addition to this feature, the specially treated Rock Wool has added strength and unusual resiliency. These characteristics, which are retained indefinitely inside the walls and attic of a house, permit economical and rapid installation because:

Super-Felt Is Easier to Handle: The batts can be lifted from the containers without their breaking and they can be bent excessively without any damaging effect. Eliminating the requirement of careful handling reduces the time required for application.

Easily Cut: When batts must be fitted around pipe or into odd-shaped areas, a clean, even cut can be secured by merely using a reasonably sharp knife.

Patching Eliminated: Because Super-Felt springs into proper and uniform thickness immediately after being released from the containers, thin spots and heat-leaking voids in the insulation are eliminated. This ends time-consuming patching often necessary with insulation not as resilient as Super-Felt.

Storage Costs Reduced: The resiliency of Super-Felt enables the batts to be machine-compressed into the containers. Such a practice decreases, by more than 30 percent, the storage space formerly required. For example, it requires only fifty containers 15″ x 48″ x 16″ in depth (333 cu. ft.) to store 2000 sq. ft. of Super-Felt Batts.

Description and Sizes

Super-Felt, brown in color, is made of felted Rock Wool Fibre. Its superior strength is gained only as a result of the exclusive J-M manufacturing process. No "stiffener" which might detract from the insulating value of the material is used to obtain its rigidity.

Super-Felt batts are manufactured with a vapor seal paper adhered to one face, covering the entire surface and extending 1½″ on the long sides of the batt. These 1½″ laps, neatly folded against the membrane backing in manufacture, are turned out and tacked or stapled to the studs, rafters or joists in application. The paper backing helps to prevent the passage of vapor and resists the penetration of moisture from excess water in fresh plaster.

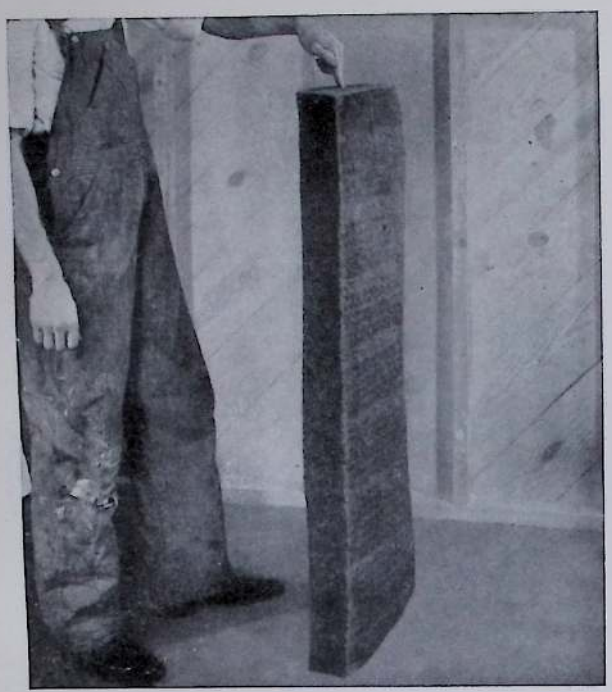
The improved structural strength of Super-Felt makes it difficult to pull the Rock Wool fibres apart. This fact provides assurance that the backing, which is securely fastened to the wool, will not tear off.

Type B batts are furnished Ful-Thik and Semi-Thik. Ful-Thik batts are manufactured in full wall-stud thickness and Semi-Thik batts with an average thickness of 2″. The installed area shown in the table is the overall measure of the surface covered with the batts applied between studs on 16″ centers.

Size in inches	Thickness designation	No. per container	Area, sq. ft. net	Area, sq. ft. installed
15 x 48	Ful-Thik	8	40.0	42.7
15 x 48	Semi-Thik	12	60.0	64.0
15 x 23	Ful-Thik	16	38.3	40.9
15 x 23	Semi-Thik	24	57.5	61.3

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The firmness and compact felting of Super-Felt assure a heat barrier free of voids and thin spots

The 15″ x 48″ size is especially suitable for attic floors and for sidewalls. The smaller, 15″ x 23″ batts are particularly adaptable for overhead work.

Application of Super-Felt Batts

Super-Felt forms a homogeneous mass of solid insulation which, when installed, should completely envelop the living quarters of a house. In general, if the attic is unfinished and not to be occupied, it is better to stop the heat flow at the attic floor line instead of at the roof. Super-Felt, therefore, is installed between studs from the foundation to the roof and between the top story ceiling joists.

When an attic floor makes the above procedure impractical, the batts should be installed between the rafters and between the studding at the gable ends. An attic containing a heated room is similarly insulated except that the batts are installed only to ceiling height of the room and between the ceiling joists.

When Super-Felt is applied between studs or rafters, the batts are installed with the unpapered side toward the sheathing or shingle lath. Where Ful-Thik batts are used between studding or rafters 4″ thick or less, the paper laps are tacked or stapled to the face of the studs or rafters. When the framing exceeds 4″, or when Semi-Thik batts are used with 4″ studding, the laps are turned out on the sides and fastened.

Super-Felt, when installed between ceiling joists, is laid on top of the lath or plaster base with the paper side down. If lathing is not in place, or if it is impossible to get above the ceiling joists, the batts can be placed from the underside with the paper lapping the underside of joists and tacked or stapled.

More complete application information is available on other data sheets.

Type L Home Insulation

Type L is loose rock wool, white in color, shipped in bulk in paper bags containing approximately 40 lb. This type of Home Insulation must be packed entirely by hand and cannot produce the same quality job possible with the other types discussed.



Super-Felt fits snugly between rafters, joists and studs

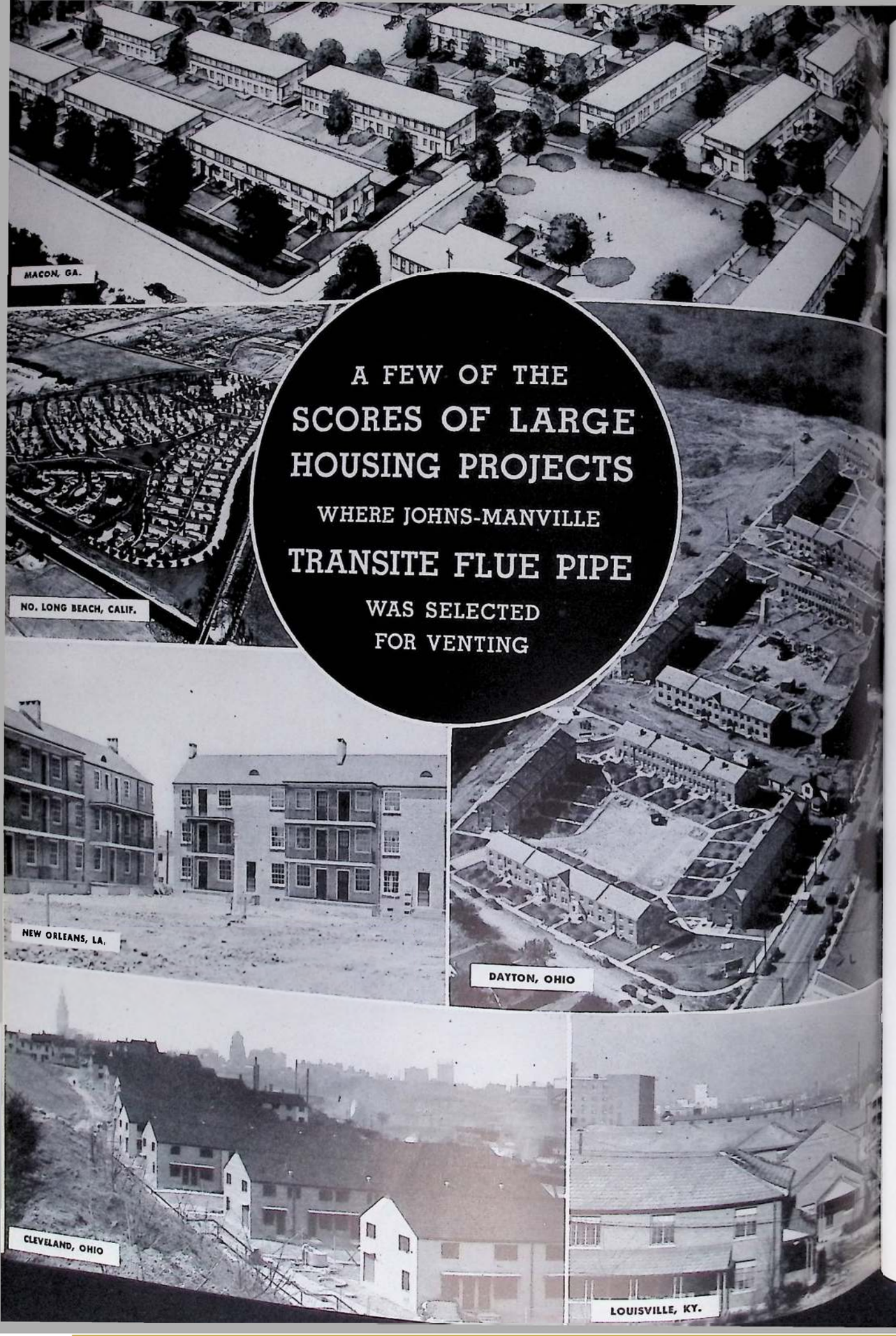
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Johns-Manville TRANSITE FLUE PIPE

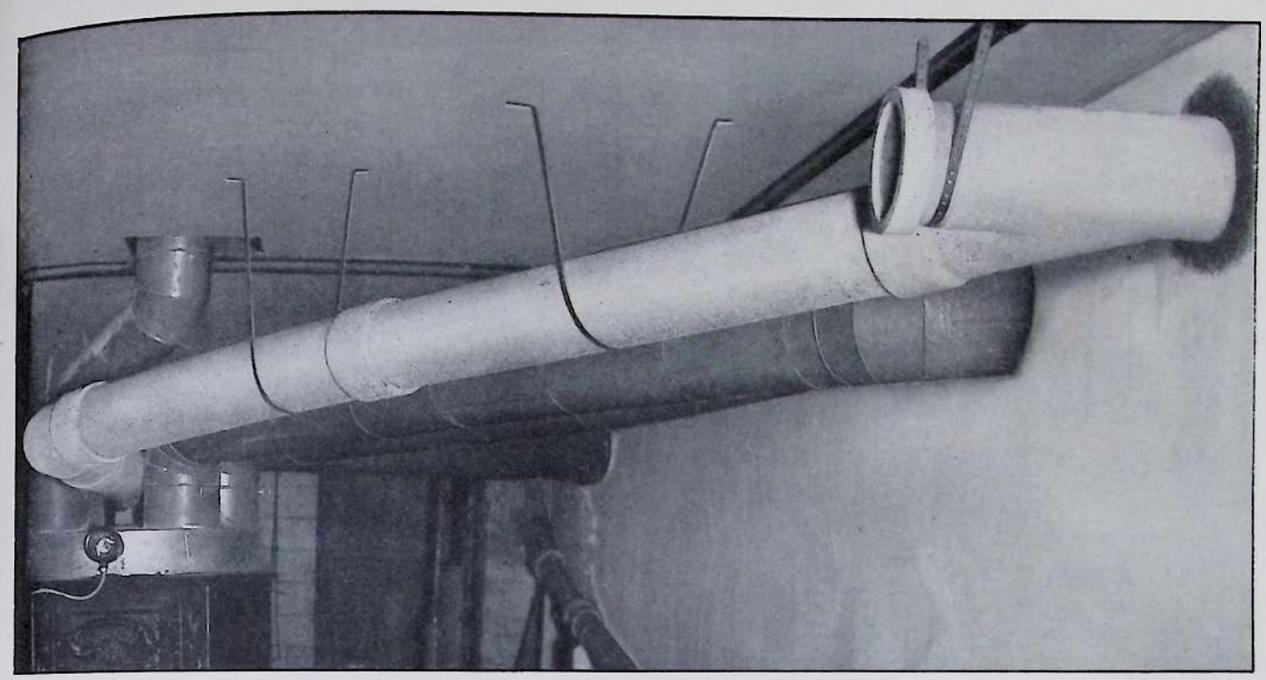
An Asbestos-Cement Product For Venting Domestic Gas Burning Appliances

JOHNS-MANVILLE JM PRODUCTS

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A FEW OF THE
SCORES OF LARGE
HOUSING PROJECTS
WHERE JOHNS-MANVILLE
TRANSITE FLUE PIPE
WAS SELECTED
FOR VENTING



JOHNS-MANVILLE TRANSITE FLUE PIPE

for venting domestic gas burning appliances . . .

FOR over ten years Johns-Manville Transite Flue Pipe has been used for venting gas burning appliances. Specially designed for this service, Transite Flue Pipe is made of asbestos and cement—two materials that have long been noted for their natural durability and fire-resistance.

The Underwriters' Laboratories of the National Board of Fire Underwriters tested Transite Flue Pipe, found that it successfully passed all requirements, and approved it for use with domestic gas burning appliances.

Sizes and Shapes

Transite Flue Pipe is furnished in round cross-section in sizes from 3″ to 12″, inside diameter. Sizes 3″ to 7″, inclusive, are furnished in standard lengths of 5′ 0″; and sizes 8″ and larger in standard lengths of 6′ 6″. Ten foot lengths are also available in sizes from 3″ to 7″ in diameter, and thirteen foot lengths in 8″ in diameter and larger. Round pipe and fittings are furnished with tapered couplings unattached.

Round Transite Flue Pipe is also available with socket joints for use in flues, an application often necessary when gas-burning appliances are to be vented through existing chimneys. No couplings are necessary with this type of pipe; thus the outside diameter of the pipe represents the maximum clearance required. The socket-joint flue pipe is available in sizes (inside diameters) of 3″ to 12″, in 13-ft. lengths.

Transite Flue Pipe is also furnished in oval cross-section for use where it is desired to run a flue through an interior partition or exterior wall constructed of 4″ studs. The interior cross-sections of Transite Oval Pipe are 2¼″ x 4¼″, 2¼″ x 6⅝″, 2¼″ x 9¾″ and 2¼″ x 11¼″. The outside narrow dimension of all four sizes is 2¾″. The corresponding dimension of all oval couplings is 3⅜″. All sizes of oval pipe are furnished in lengths of 5′ 0″. Each length of oval pipe and each fitting is furnished with couplings cemented on at the factory.

Fittings and Couplings

Round Transite Flue Pipe is tapered at both ends and all fittings are tapered on all legs so that any two pieces may be joined together by the use of a tapered coupling. In order to provide for field cutting of a pipe, a Duplex coupling is available with one tapered outlet and one bell to receive cut piece.

The ends of Oval Transite Pipe and Fittings are cut square. The joints are formed with an oval coupling, which provides a space of 3/16″ for cementing. For various types of fittings see pages 6, 7, 8 and 9.

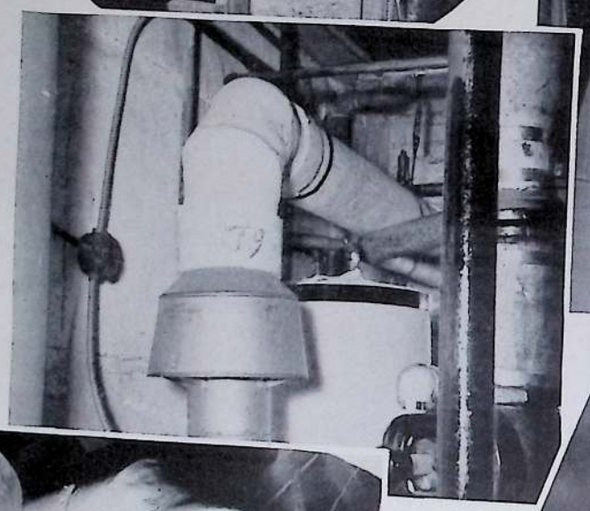
Joints

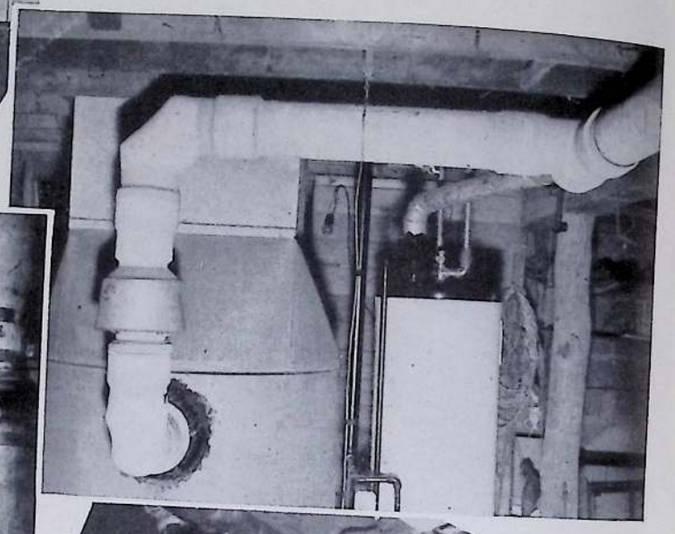
Transite Flue Pipe Cement is a ready-mixed material for use in all pipe joints and openings in brick and stonework through which pipe may pass. For tapered couplings enough water is added to provide a thick creamy consistency; for Duplex and oval couplings it is mixed to a paste. The pipe need not be wet before application. Transite Flue Pipe Cement air sets. Case hardening occurs in three to four hours; a ⅛″ joint reaches full strength in approximately 24 hours and a ¼″ joint, in approximately 2 to 3 days. The cement, after attaining full strength, will hold its bond under all atmospheric conditions and through the entire range of flue gas temperatures for which the pipe is recommended. It is furnished in 1, 5, 10, 25 and 50-lb. containers and must be ordered separately.

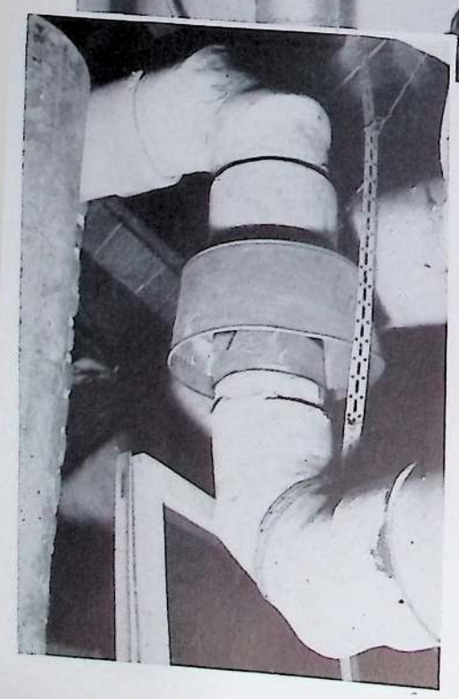
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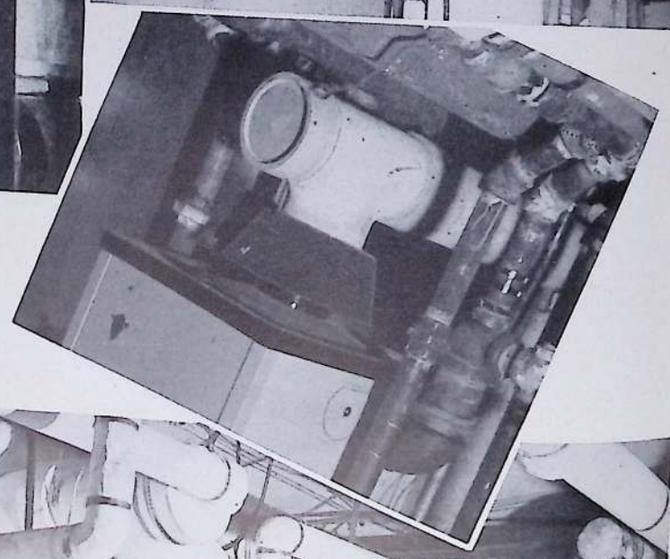
TYPICAL INSTALLATIONS OF JOHNS-MANVILLE TRANSITE FLUE PIPE







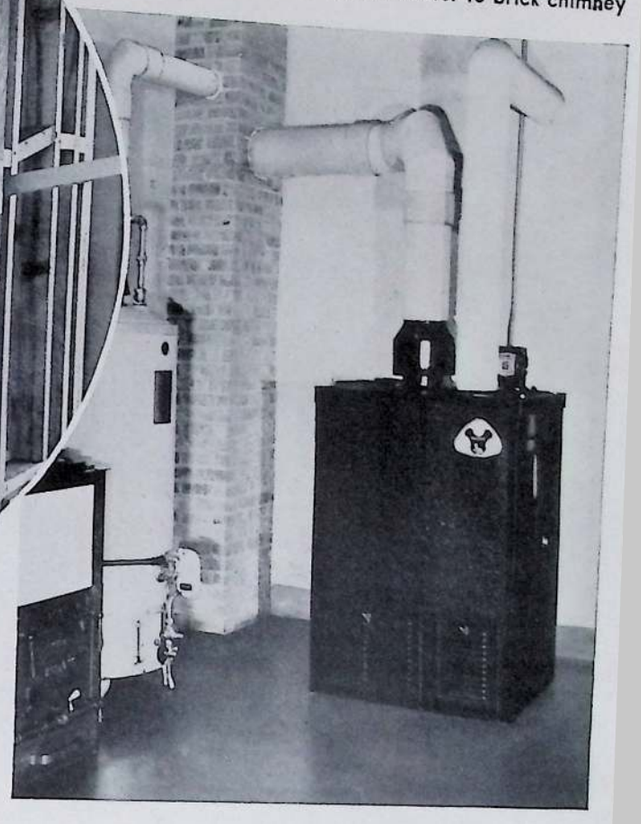








(Left) Here is shown the installing of round Transite Flue Pipe in a stud-framed enclosure during construction of a residence. Oval Transite Pipe is available for stud partitions of standard depth. (Below) Transite used to connect gas-fired boiler and hot water heater to brick chimney



Approximate Quantity of Transite Flue Pipe Cement Required Per 100 Joints

ROUND PIPE Pipe Size, Inches	Bell end of Duplex Coupling, lb. No. 1	Bell end of Duplex Coupling, lb. No. 2	One end of Tapered Coupling, lb.
3	53	64	9
4	76	91	13
5	92	109	15
6	105	127	18
7	152	183	27
8	172	205	30
10	210	252	37
12	300	350	49

OVAL PIPE Pipe No.	Inside dimensions, inches	One end of oval coupling, lb.
3	2¼ x 4¼	32
4	2¼ x 6⅝	42
5	2¼ x 9¾	72
6	2¼ x 11¼	82

Installation of Transite Pipe

Transite Pipe can be cut with a coarse tooth carpenter's saw. Field cuts should be square and Duplex Couplings should be used. No special tools are required for any part of the assembly. In some instances field tapering has been resorted to, and for such purposes a portable tapering tool is available.

Transite Flue Pipe is readily installed. The round pipe fits over all standard round outlets of gas heaters; an adapter is used if the outlet is oval. The light weight of the material makes it easy to handle and support. The sections can be suspended with standard pipe hangers, when running horizontally, and by the usual type of brackets when running vertically.

A drip tee should be installed at the bottom of vertical runs of pipe by cementing a drip cap to one branch of a tee. When oval pipe passes through the top of a partition or exterior wall, an adapter can be used to convert the remainder of the line to round Transite Pipe capped with a hood. The portion of the vent from the appliance to the point at which the pipe enters the stud framing is frequently round pipe, with an adapter used from the round to the oval pipe.

When oval pipe is run between studs, metal lath should be used for the plaster base over the space, and all combustible materials should be cut back at least 1″ from the outside surface of the pipe.

Transition from oval pipe to round pipe is readily accomplished by using a standard adapter at the point where the space between studs is adequate or where the pipe is exposed in open rooms or attics.

DETAIL DRAWINGS

To assure ease and economy of installation on every Transite Flue Pipe job, Johns-Manville makes available, beginning on page 10, complete detail drawings covering every phase of the installing of the material in various types of construction and under a wide range of structural conditions.

Round Transite Flue Pipe, Fittings and Couplings

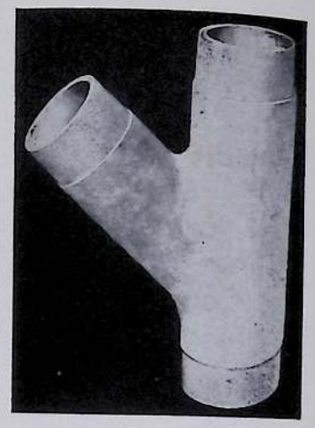
For approximate weights of round Transite Flue Pipe and fittings see page 14



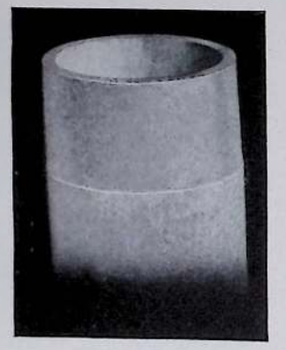
Short-leg Tee



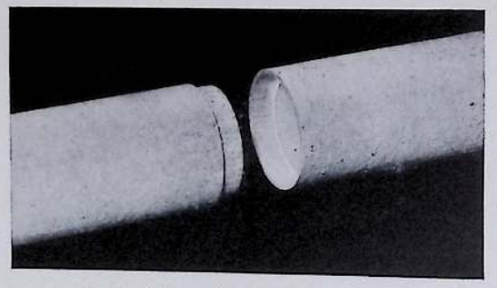
Long-leg Tee



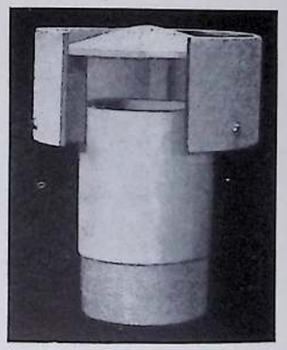
Lateral



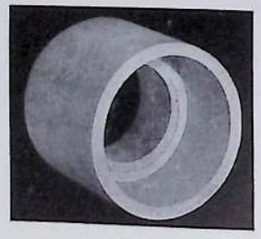
Tapered Flue Pipe



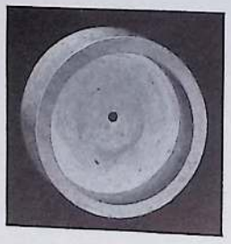
Socket Joint Pipe for chimney liner



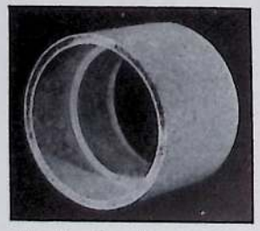
Ventilator Top



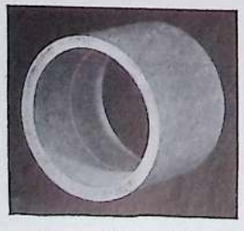
Reducer



Drip Cap



Duplex Coupling for joining field-cut pipe



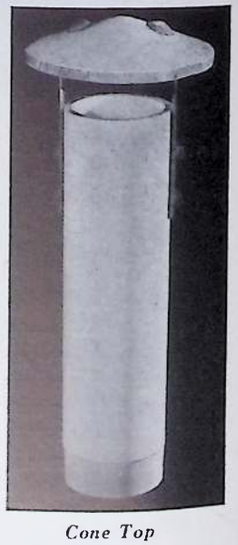
Tapered Coupling



90 deg. Elbow



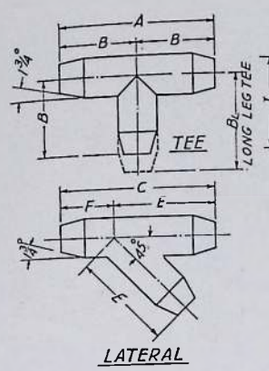
45 deg. Elbow

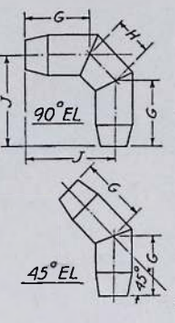


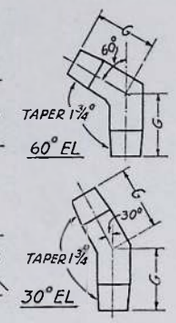
Cone Top

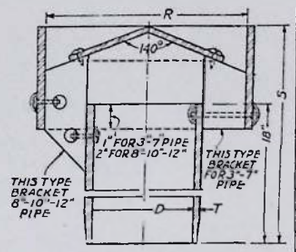
Round Transite Flue Pipe, Fittings and Couplings

For approximate weights of round Transite Flue Pipe and fittings see page 14



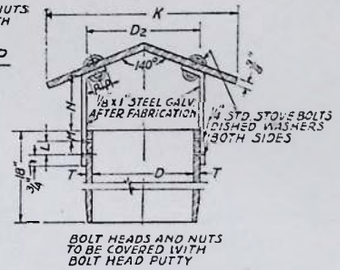






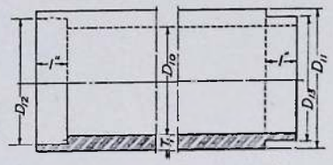
DIMENSIONS - CONE AND VENTILATOR TOPS

PIPE SIZE	K	L	M	N	P	R	S
INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.
3	6.0	2.0	1.25	2.00	.75	6	20.0
4	8.0	2.0	2.00	2.67	1.00	8	21.0
5	10.0	3.0	2.00	3.33	1.00	10	22.0
6	12.0	3.0	2.00	4.00	1.00	12	23.0
7	14.0	4.0	2.00	4.67	1.00	14	23.0
8	16.0	4.0	2.00	5.33	1.00	16	24.0
10	20.0	5.0	2.00	6.70	1.00	20	24.75
12	20.0	6.0	2.00	5.50	1.00	24	26.25



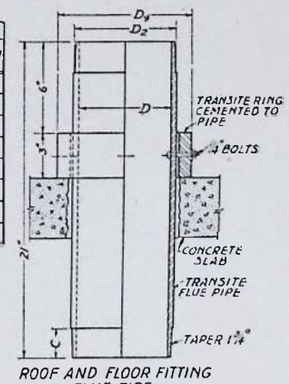
DIMENSIONS - LATERALS, TEES AND ELBOWS

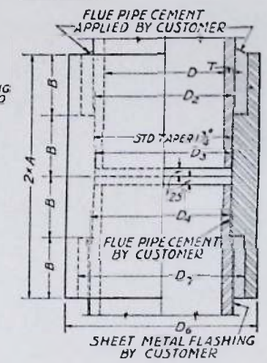
PIPE SIZE	A	B	BL	C	E	F	G	H	J
INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.
3	11	5.5	16.50	14.75	10.0	4.75	4.50	3.0	6.62
4	13	6.5	17.00	17.00	12.0	5.00	5.00	4.0	7.83
5	15	7.5	17.50	19.00	13.5	5.50	5.00	5.0	8.50
6	16	8.0	18.00	20.00	14.5	5.50	5.25	6.0	9.49
7	17	8.5	18.50	23.00	16.5	6.50	6.50	7.0	11.45
8	18	9.0	19.00	24.50	17.5	7.00	6.75	8.0	12.41
10	22	11.0	20.00	28.00	20.5	7.50	7.25	10.0	14.32
12	24	12.0	21.00	33.00	24.5	8.50	8.50	12.0	16.99

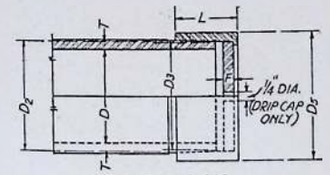


DIMENSIONS - SOCKET JOINT FLUE PIPE

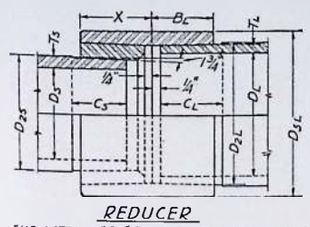
D10	D11	D12	D13	T1	FULL LENGTH
INS.	INS.	INS.	INS.	INS.	
3.00	3.88	3.48	3.40	.44	13'-0"
3.95	4.85	4.44	4.36	.45	13'-0"
5.00	6.02	5.55	5.47	.51	13'-0"
5.85	6.95	6.44	6.36	.55	13'-0"
7.00	8.22	7.65	7.57	.61	13'-0"
7.85	9.15	8.54	8.46	.65	13'-0"
10.00	11.70	10.89	10.81	.85	13'-0"
12.00	13.96	13.02	12.94	.98	13'-0"



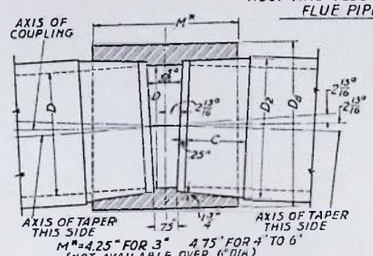


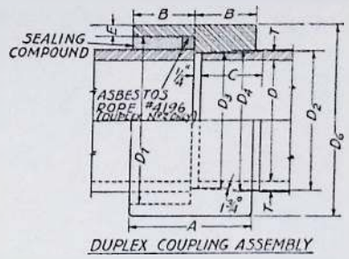


"F"=¼" FOR 3" TO 6" SIZES; ⅜" FOR 7" TO 10" SIZES; ½" FOR 12" SIZE.



SUB-LETTERS "L" & "S" DESIGNATE LARGER AND SMALLER DIA. PIPE. EXAMPLE: 4"x3" REDUCER COUPLING DL (LARGE END) = 4" DS (SMALL END) = 3"

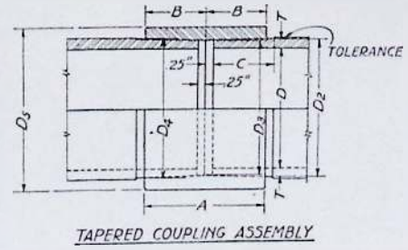




DIMENSIONS: COUPLINGS, DUPLEX Nº2, REDUCER, FITTING, DRIP AND END CAP — DUPLEX Nº1

PIPE SIZE D	T	D2	D3	D4	D5	D6	D7	D8	D9	L	A	B	C	E	X		D6	D7	E
INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.
3	.32	3.64	3.53	3.62	4.40	5.30	4.50	4.42	5.70	2.50	3.50	1.75	1.75	.40	2.32		4.69	4.02	.34
4	.32	4.64	4.52	4.62	5.42	6.30	5.50	5.42	6.70	2.75	4.00	2.00	2.00	.40	2.32	2.82	5.69	5.01	.34
5	.35	5.70	5.58	5.68	6.56	7.44	6.56	6.46	7.80	2.75	4.00	2.00	2.00	.44	2.60	2.85	6.83	6.07	.38
6	.35	6.70	6.58	6.68	7.56	8.44	7.56	7.48	8.80	2.75	4.00	2.00	2.00	.44	2.60	3.10	7.83	7.07	.38
7	.40	7.80	7.65	7.78	8.78	9.66	8.66		9.82	3.25	5.00	2.50	2.50	.50	2.65	3.15	9.05	8.17	.44
8	.40	8.80	8.65	8.78	9.78	10.66	9.66		10.80	3.25	5.00	2.50	2.50	.50	3.15	3.15	10.05	9.17	.44
10	.40	10.80	10.65	10.78	11.78	12.66	11.66		12.70	3.25	5.00	2.50	2.50	.50		3.65	12.05	11.17	.44
12	.45	12.90	12.72	12.86	14.01	14.88	13.76		15.04	3.75	6.00	3.00	3.00	.56		3.70	14.27	13.27	.50

NOTE: Above table includes pipe dimensions.



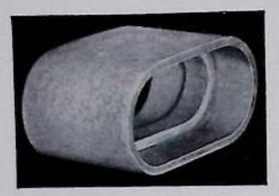
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Oval Transite Flue Pipe, Fittings and Couplings

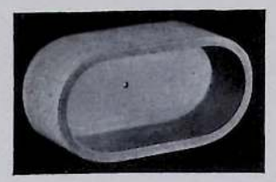
For approximate weights of oval Flue Pipe and fittings see page 14



Pipe & Coupling



Ribbed Coupling



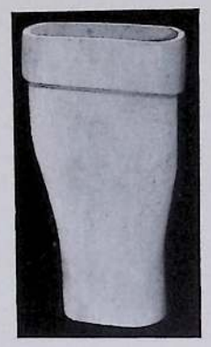
Drip Cap



Adaptor



Tee—Oval Outlet



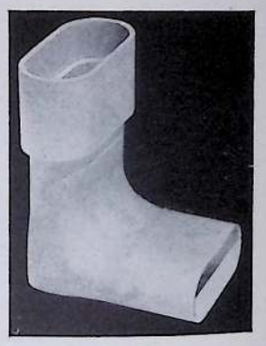
Reducer



Tee—Round Outlet



45 deg. Elbow



90 deg. Elbow



Flat Oval Tee

45 deg. Elbow (Flat Oval)



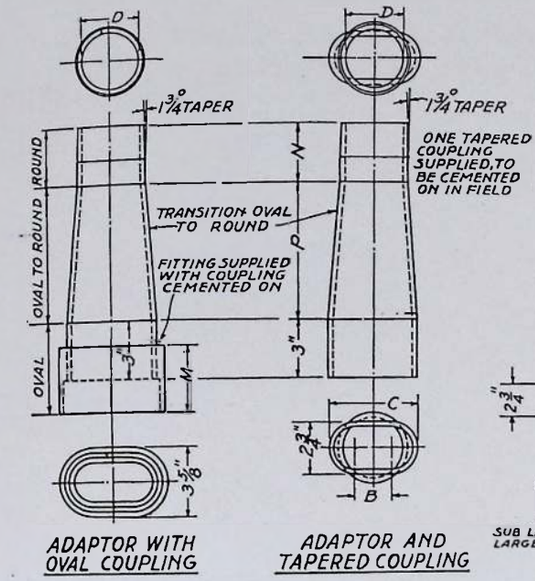
90 deg. Elbow (Flat Oval)

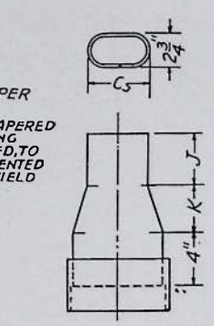
Flat Oval Lateral

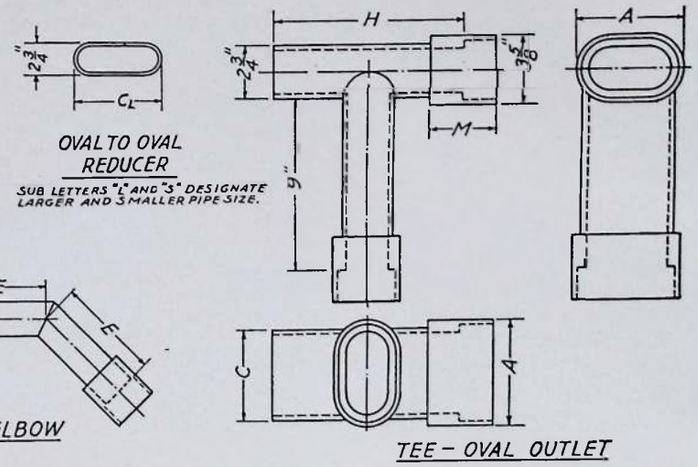
The two illustrations directly above, and at the sides, are Flat Oval Fittings. They allow change of direction in the same plane

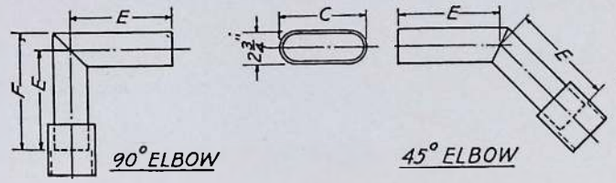
Oval Transite Flue Pipe, Fittings and Couplings

For approximate weights of oval Flue Pipe and fittings see page 14



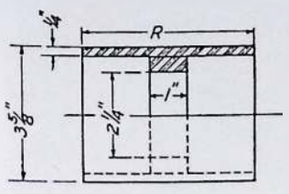


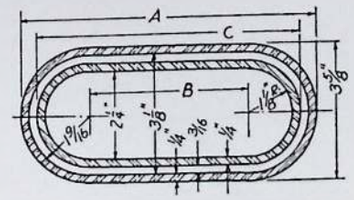


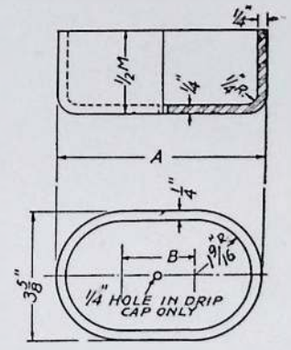


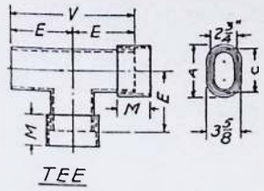
DIMENSIONS — OVAL FITTINGS AND COUPLINGS

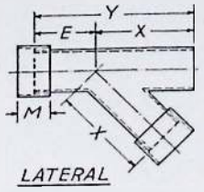
PIPE NO.	INSIDE DIM.	A	B	C	D	E	F	G	H	J	K	L	M	P	N	R
	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.	INS.
3	2¼x4¼	5.6	1.96	4.7	3.0	6.5	7.87	5.0	10.0	–	–	10.0	3.5	7.0	3.0	4.5
4	2¼x6⅜	7.9	4.31	7.1	4.0	8.0	9.37	5.0	12.0	3.5	3.51	12.0	3.5	9.0	3.0	4.5
5	2¼x9¾	11.1	7.46	10.2	5.0	9.0	10.37	5.0	14.0	4.00	4.74	14.0	4.5	10.5	3.5	5.5
6	2¼x11¼	12.6	9.01	11.8	6.0	10.0	11.37	5.0	16.0	4.00	2.31	16.0	4.5	12.0	4.0	5.5





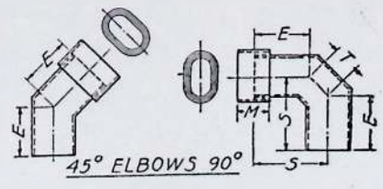






ADDITIONAL DIMENSIONS FLAT OVAL FITTINGS

PIPE SIZE	S	T	V	X	Y
INS	INS	INS	INS	INS	INS
3	8.62	3	13	12	18.5
4	11.83	4	16	16	24.0
5	12.50	5	18	20	29.0
6	14.24	6	20	24	34.0

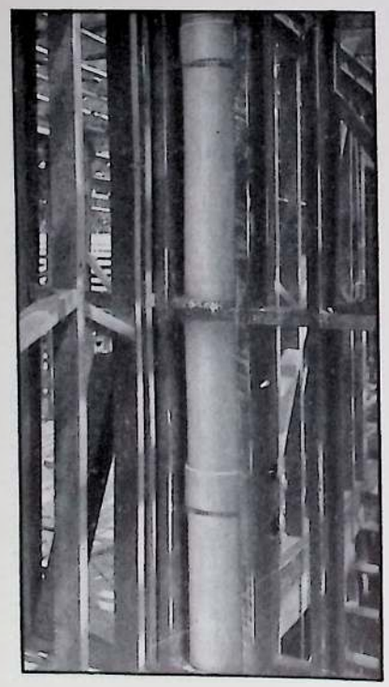


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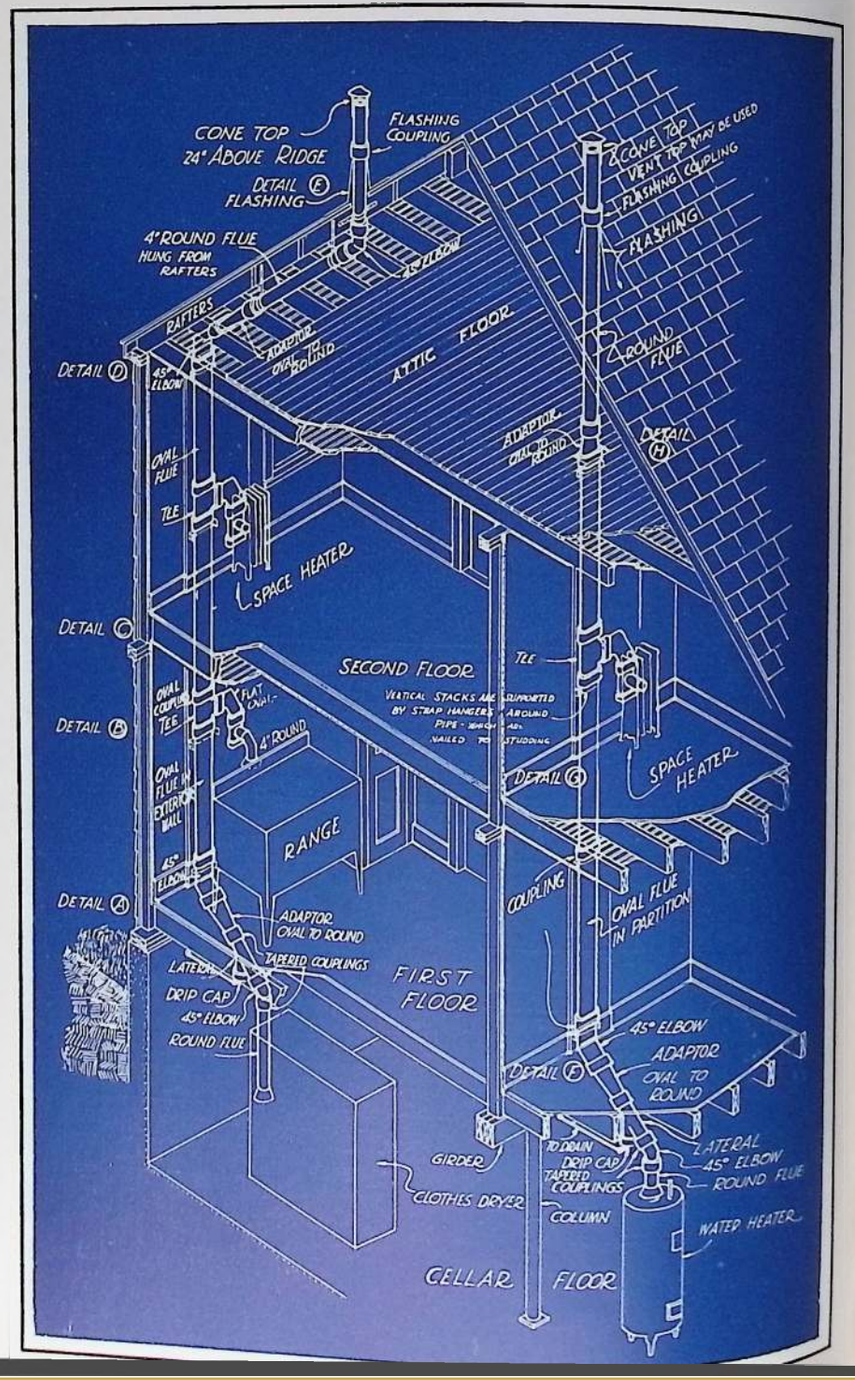
How to install J-M Transite Flue Pipe in exterior and interior frame walls

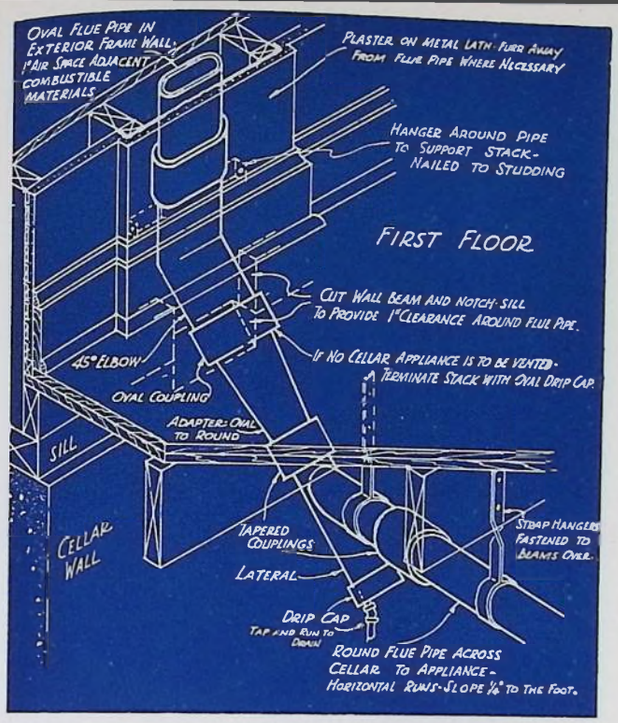
This first master drawing and the series of details which follow illustrate the installation of Transite Flue Pipe in exterior and interior frame walls. Complete information is given on its application under various conditions.





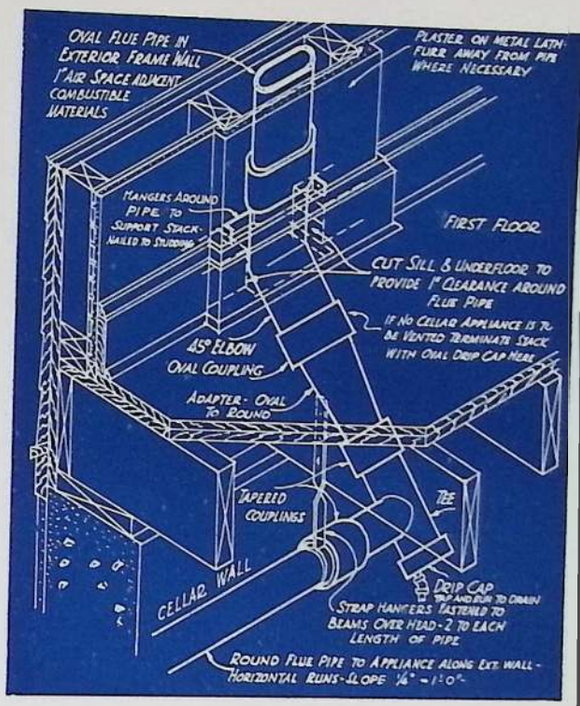






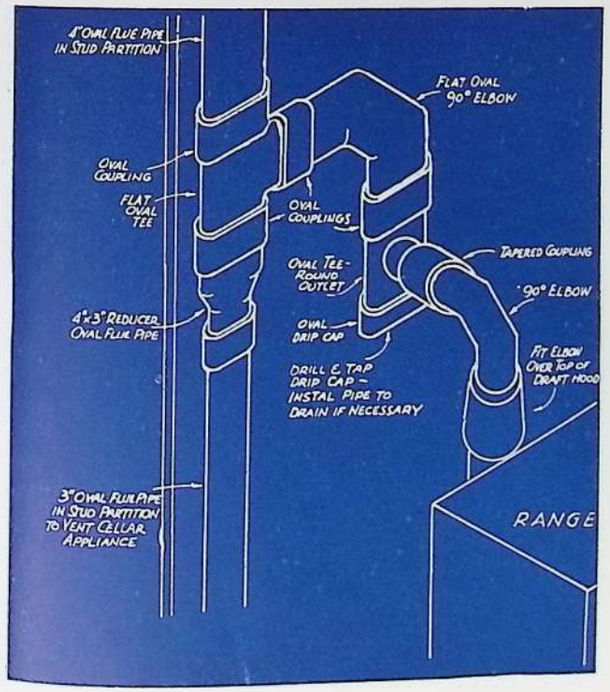
Detail A

BUILDING CONSTRUCTION . . . First floor joists parallel to exterior wood frame wall.
PIPING LAYOUT . . . Round pipe hung from cellar ceiling transformed to oval vertical pipe built in side wall. Interior drip cap to be tapped and run to drain.



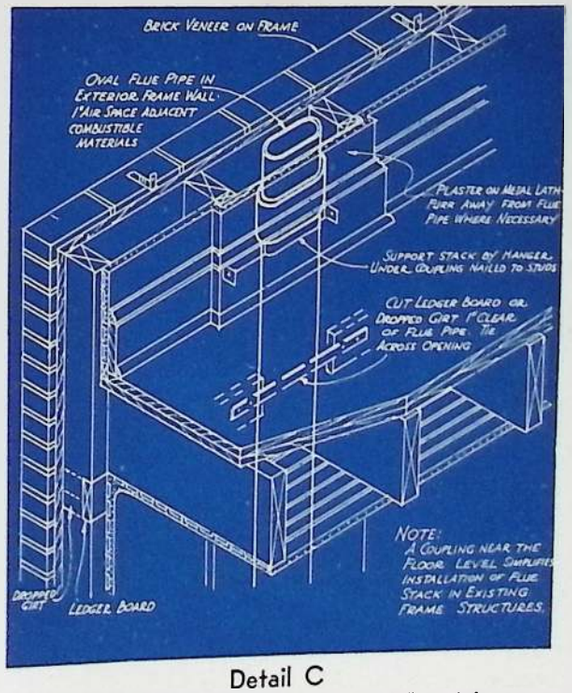
Detail A-1

BUILDING CONSTRUCTION . . . First floor joists perpendicular to exterior walls.
PIPING LAYOUT. . . Round pipe hung from cellar ceiling transformed to oval vertical pipe built in side wall. Interior drip cap to be tapped and run to drain.



Detail B

BUILDING CONSTRUCTION . . . Exterior frame wall.
PIPING LAYOUT . . . Vertical oval pipe from cellar appliance increased to larger size and provided with fitting to receive round pipe venting kitchen range.

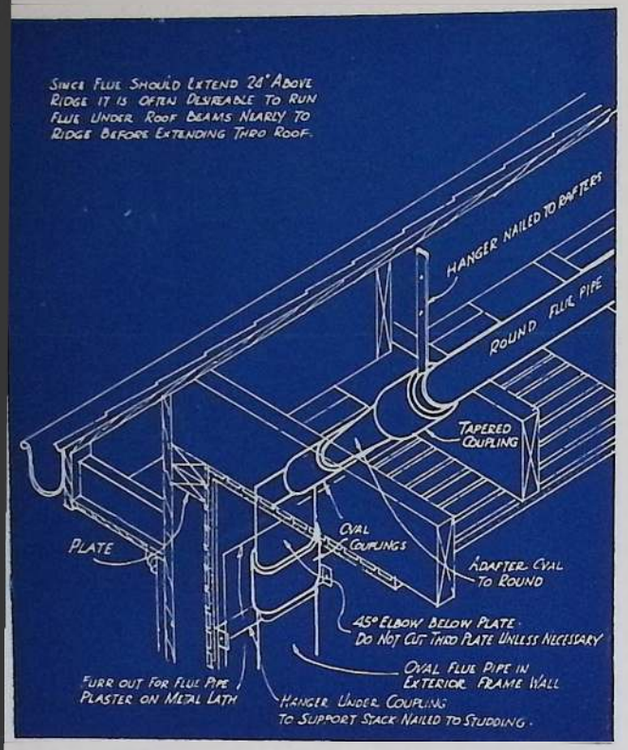


Detail C

BUILDING CONSTRUCTION . . . Second floor joists perpendicular to exterior brick veneer frame wall.
PIPING LAYOUT . . . Oval pipe passing second floor joists showing ledger board cut and pipe supported.

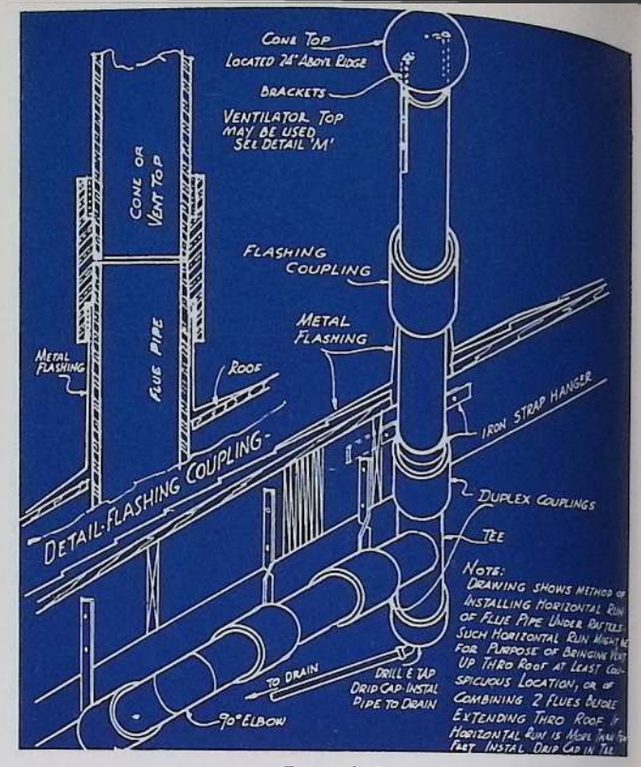
[Above details apply to Transite Flue Pipe master drawing on Page 10]

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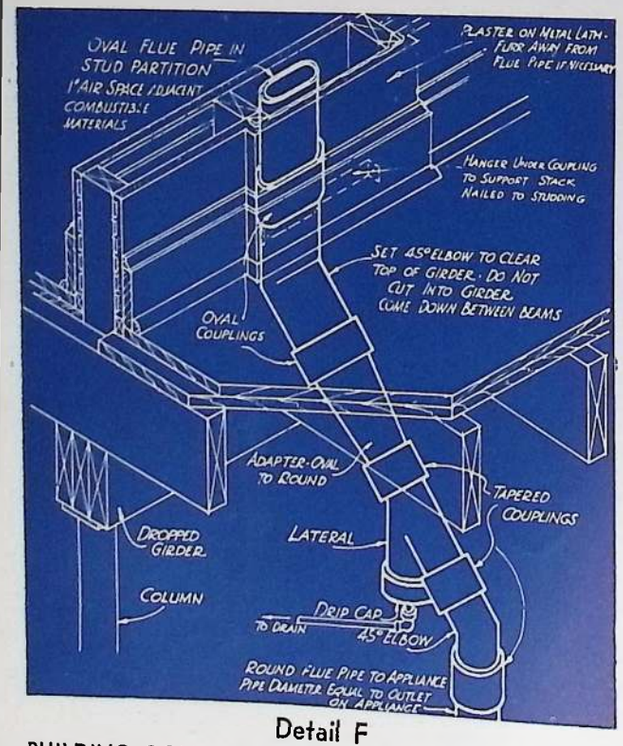
Detail D

BUILDING CONSTRUCTION . . . Wood frame roof, ceiling joists and rafters vertical to side wall.
PIPING LAYOUT . . . Oval pipe in wall transformed to round, running parallel to rafters.



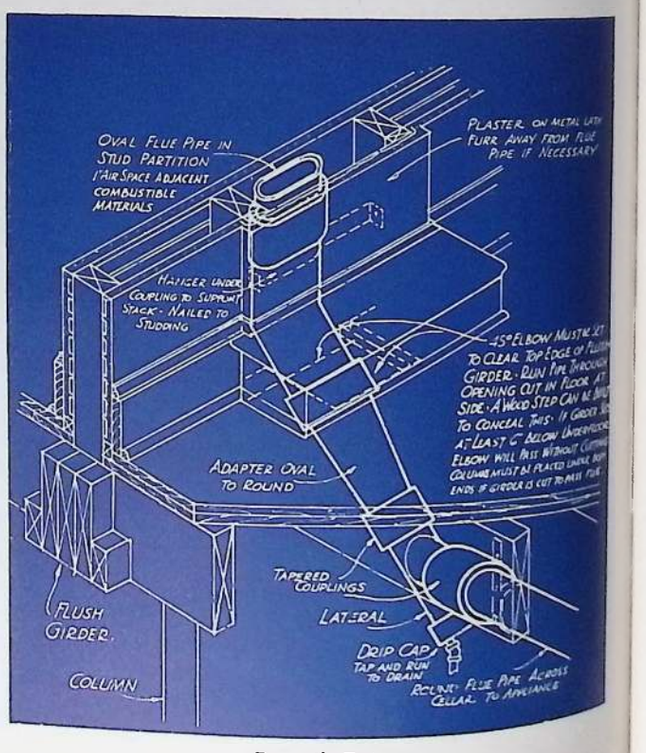
Detail E

BUILDING CONSTRUCTION . . . Frame roof with wood rafters and sheathing.
PIPING LAYOUT . . . Pipe hung from rafters and extended through roof. Note cone top and coupling for flashing.



Detail F

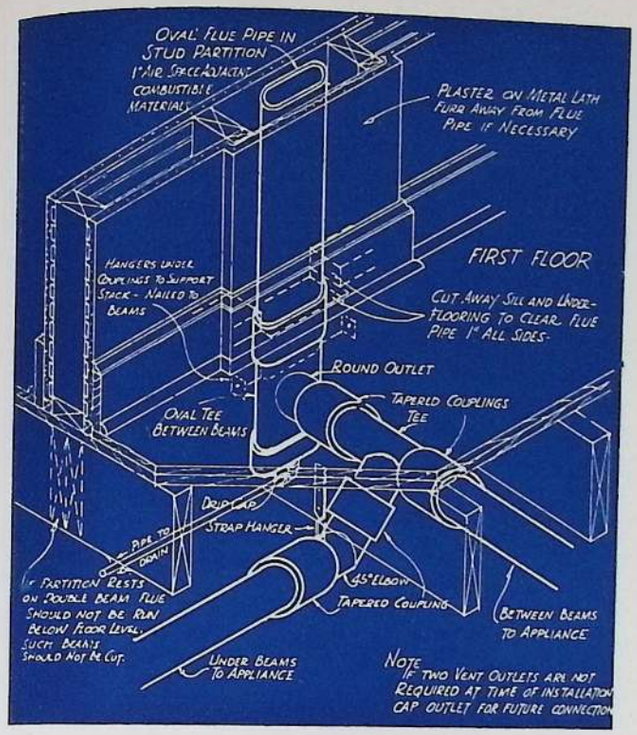
BUILDING CONSTRUCTION . . . Interior partition resting on drop girder perpendicular to joists.
PIPING LAYOUT . . . Round pipe from cellar transformed to oval of equal area built in partition. Drip cap in cellar.



Detail F-1

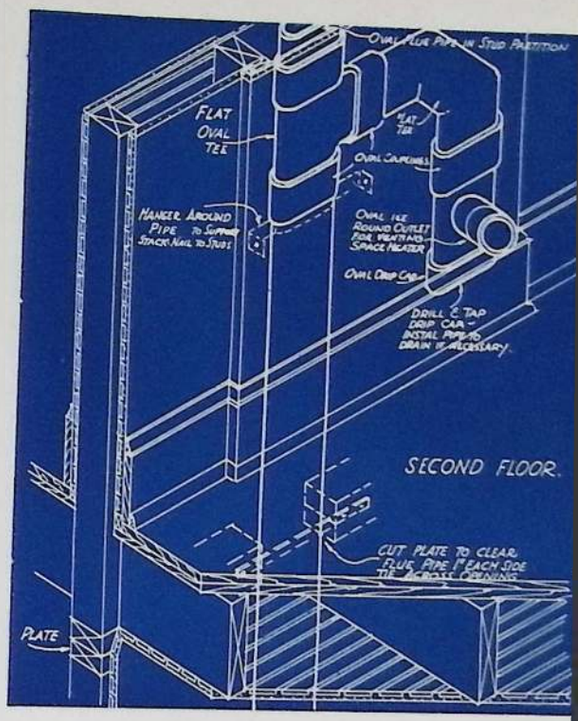
BUILDING CONSTRUCTION . . . Interior partition resting on flush girder, joists framed in.
PIPING LAYOUT . . . Round pipe from cellar transformed to oval of equal area built in partition. Drip cap in cellar.

[Above details apply to Transite Flue Pipe master drawing on Page 10]



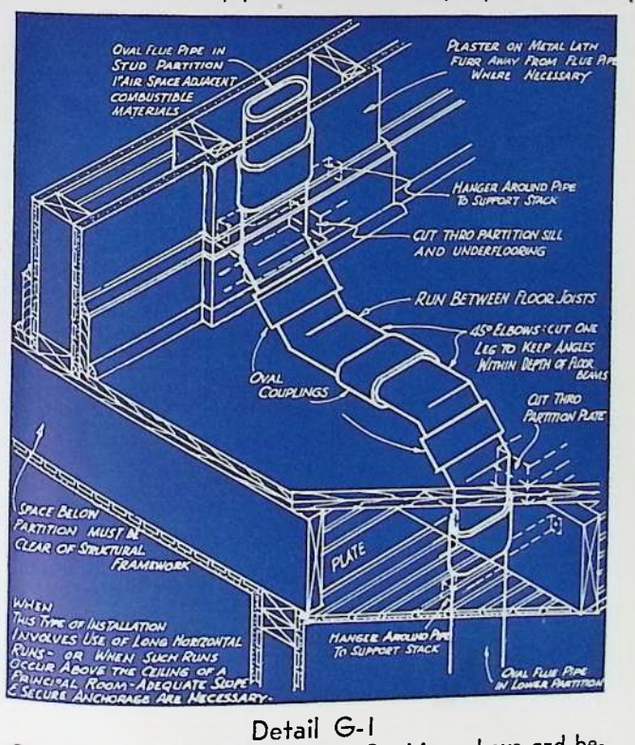
Detail F-2

BUILDING CONSTRUCTION . . . Partition resting on and crossing first floor joists at 90 degs.
PIPING LAYOUT . . . Round pipe fastened in basement transformed to oval pipe built in wall. Drip cap in basement.



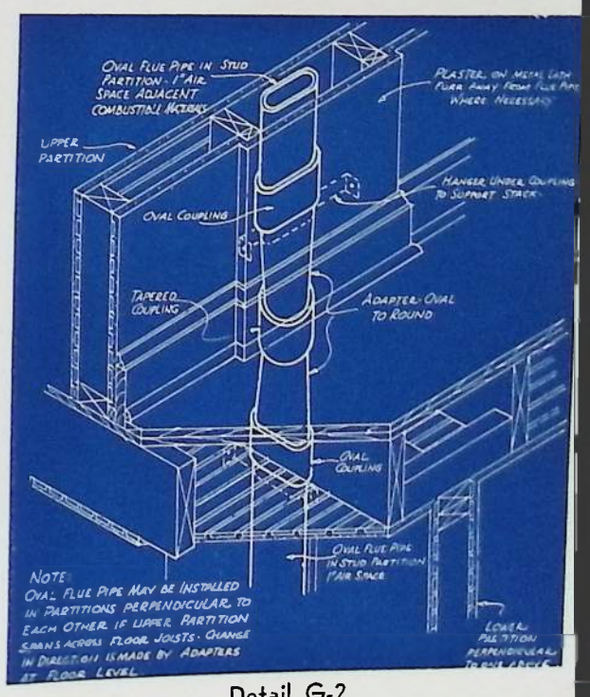
Detail G

BUILDING CONSTRUCTION . . . Interior bearing partitio supporting ends of joists at second floor.
PIPING LAYOUT . . . Oval fitting in wall to receive round pipe from space heater. Partition plate cut and rejoined



Detail G-1

BUILDING CONSTRUCTION . . . Partitions above and below second floor joists, but not over each other. Joists crossing them at right angles.
PIPING LAYOUT . . . Vertical oval pipe in lower partition crosses between joists and built-in upper partition.

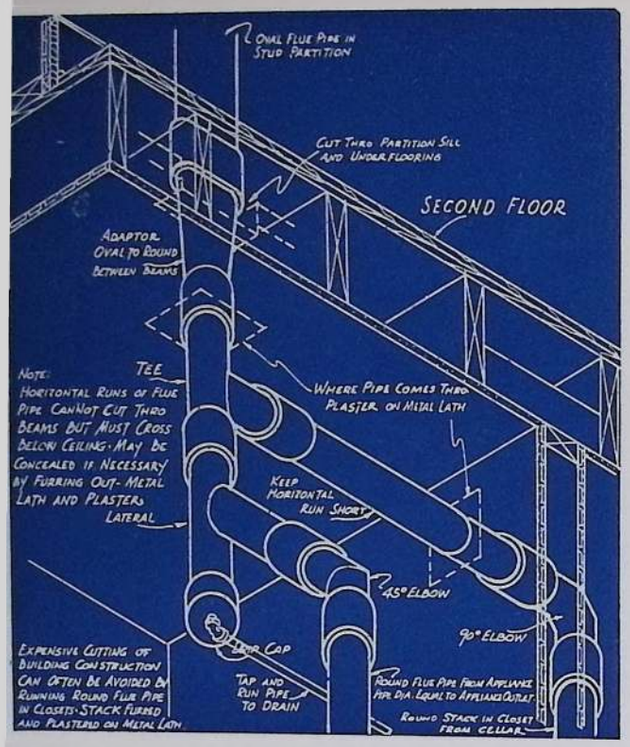


Detail G-2

BUILDING CONSTRUCTION . . . Partitions above and below second floor joists, crossing each other at right angles.
PIPING LAYOUT . . . Oval pipe in lower partition transformed to oval pipe in opposite direction in upper partition through use of two adapters.

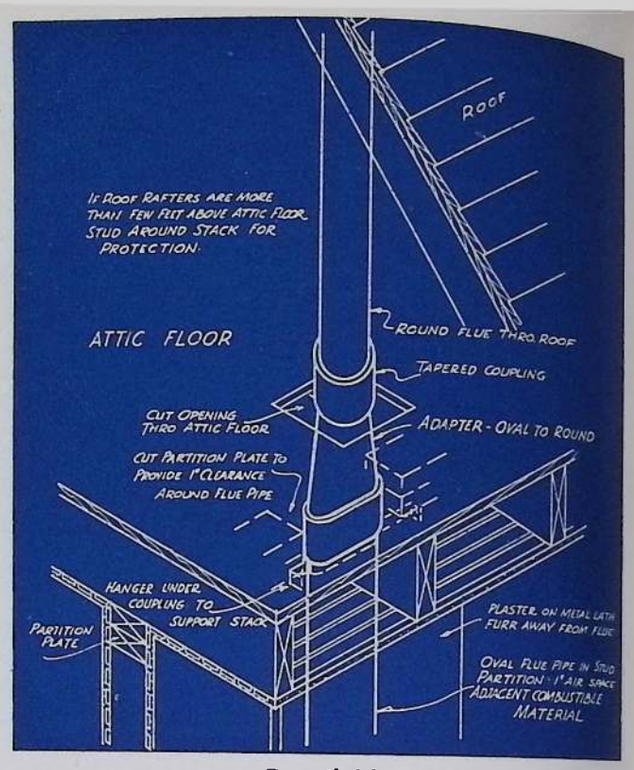
[Above details apply to Transite Flue Pipe master drawing on Page 10]

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Detail G-3

BUILDING CONSTRUCTION . . . Partitions above and below second floor joists, crossing each other at right angles.
PIPING LAYOUT . . . Oval pipe transformed to round and exposed to avoid cutting building construction.



Detail H

BUILDING CONSTRUCTION . . . Attic floored, partition under, roof construction above.
PIPING LAYOUT . . . Oval pipe in partition transformed to round for going through attic.

[Above details apply to Transite Flue Pipe master drawing on Page 10]

*Approximate Weights of Round Transite Flue Pipe and Fittings**

Standard Lengths: 3" to 7" pipe, 5 ft.; 8" to 12" pipe, 6½ ft. (With Socket Joint: 3" to 12" pipe, 13 ft.)

Pipe Size, In.	Pipe, Including 1 Coupling Weight, lb./ft.	30°, 45°, 60° El., Including 1 Coupling Weight, lb.	90° Elbows, Including 1 Coupling Weight, lb.	Short-leg Tees, Including 2 Coupl'gs Weight, lb.	Long-leg Tees, Including 2 Coupl'gs Weight, lb.	Laterals, Including 2 Coupl'gs Weight, lb.	Tapered Coupl'gs Weight, lb.	Flashing Coupl'gs Weight, lb.	Deflection Coupl'gs Weight, lb.	Duplex Couplings Weight, lb. No. 1	Duplex Couplings Weight, lb. No. 2	End and Drip Caps Weight, lb.	Ventilator Top Weight, lb.	Cone † Tops Weight, lb.	Pipe with Socket Joint Weight, lb./ft.	Roof and Floor Fittings Weight, lb./ft.
3	3.8	3.85	4.60	6.70	8.10	10.45	1.35	5.7	1.9	1.75	2.10	1.00	7.6	6.1	4.6	9.0
4	5.0	4.95	7.20	10.40	11.90	12.65	1.95	7.3	2.6	2.10	2.50	1.35	11.8	8.1	6.0	11.0
5	6.6	6.45	10.45	15.65	17.60	17.40	2.95	9.3	3.7	3.15	3.70	2.50	17.0	11.5	8.6	14.4
6	8.0	8.25	13.00	18.50	20.80	23.25	3.00	10.6	4.0	3.40	4.20	3.00	24.0	15.5	10.7	16.8
7	9.6	11.75	15.00	21.00	24.10	31.50	4.00	18.8	.....	5.30	7.60	3.30	30.0	19.2	14.1	22.6
8	10.7	17.10	20.35	27.70	31.20	45.95	6.60	21.0	.....	7.80	8.40	4.20	42.0	22.4	16.8	25.3
10	13.4	22.45	32.20	43.40	46.70	63.90	8.20	25.2	.....	9.50	10.20	5.40	59.0	28.5	28.0	29.9
12	18.4	36.00	57.00	70.00	74.60	95.50	12.00	38.2	.....	12.20	16.20	6.70	86.0	38.5	38.6	40.8

Weight of Reducers: Approximately 0.5 lb. per inch of large diameter, e.g., 6" to 4" weighs 3 lb.
*The weights given are for individual fittings, including couplings where specified.
†Shipped knocked down.

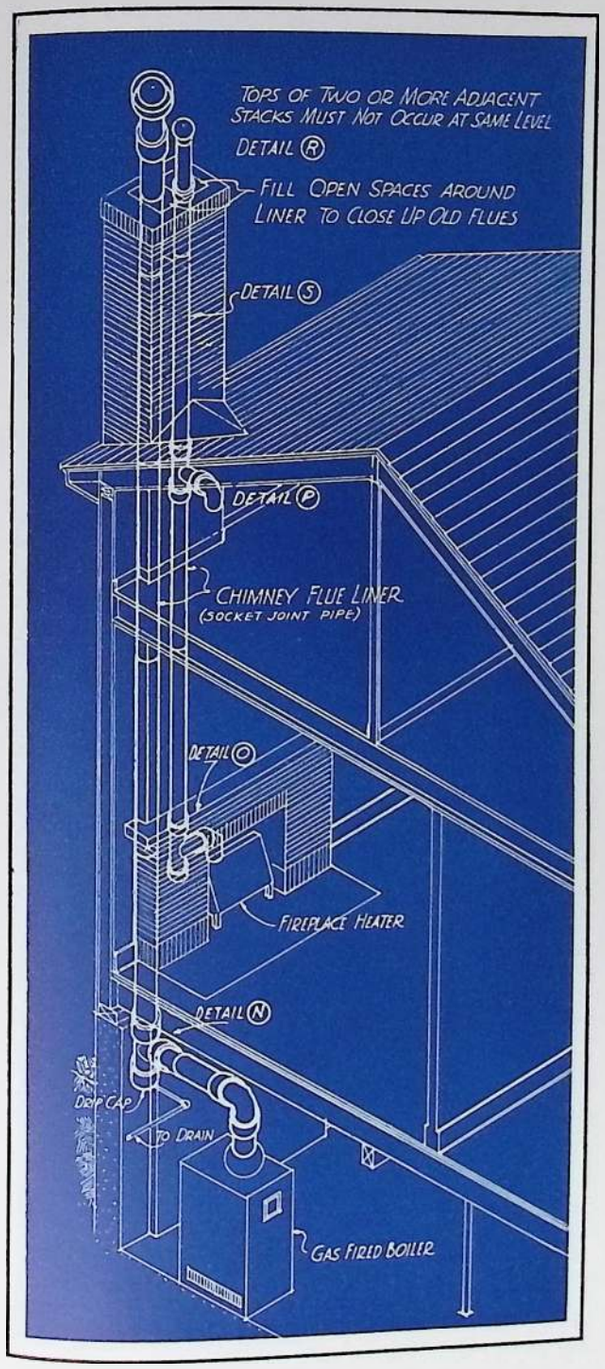
Approximate Weights of Oval Transite Flue Pipe and Fittings

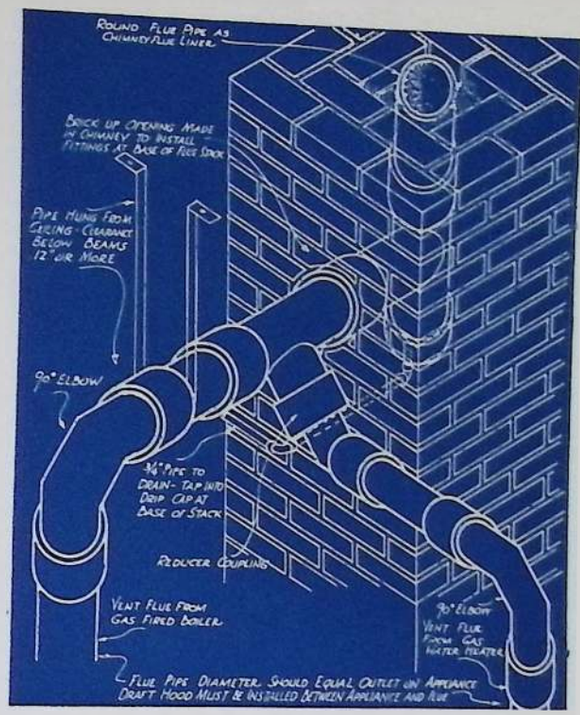
Pipe No.	Inside dimensions, Inches	Pipe, Including 1 Coupling Std. L. ft.	Pipe, Including 1 Coupling Wt. lb./ft.	Ribbed Couplings Weight, lb.	45° Elbows,† Including 1 Coupling Weight, lb.	90° Elbows,† Including 1 Coupling Weight, lb.	Tees,† Including 2 Couplings Weight, lb.	End and Drip Caps Weight, lb.	Lateral,† Including 2 Couplings Weight, lb.	Reducer, Including 1 Coupling Weight, lb.	Adaptor,‡ Including 1 Coupling Weight, lb.
3	2¼ x 4¼	5	2.5	1.1	3.5	3.5	4.5	1.2	5.8	3.5	3.5
4	2¼ x 6⅝	5	3.4	2.2	5.8	5.8	7.5	1.6	9.6	5.2	5.2
5	2¼ x 9¾	5	4.2	3.0	9.3	9.3	13.4	2.2	19.6	8.6	8.6
6	2¼ x 11¼	5	5.1	3.6	10.6	10.6	18.0	2.5	28.0	10.0	10.0

†Elbows and tees are supplied as either standard or flat fittings; laterals flat only. Standard tees are supplied with either oval or round branch outlet.
‡Adaptors are supplied with oval or tapered couplings.

How to install Transite Flue Pipe in connection with brick chimneys

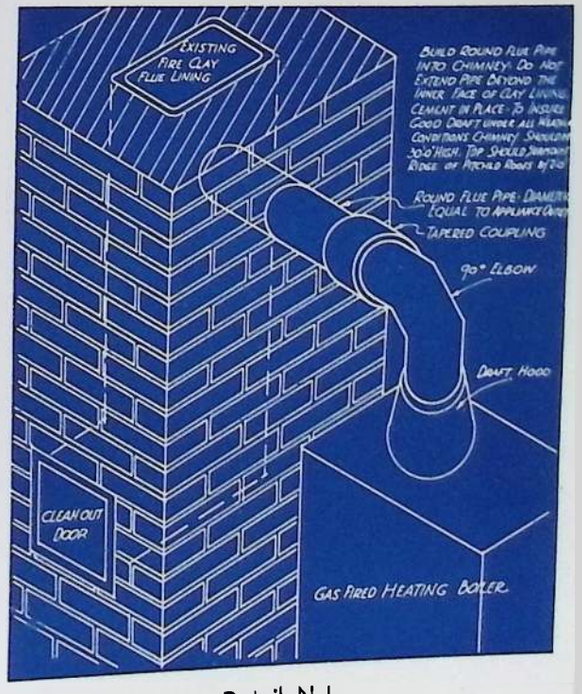
The master drawing below and details which follow illustrate approved methods of running round Transite Flue Pipe into brick chimneys and installing it as chimney liners.





Detail N

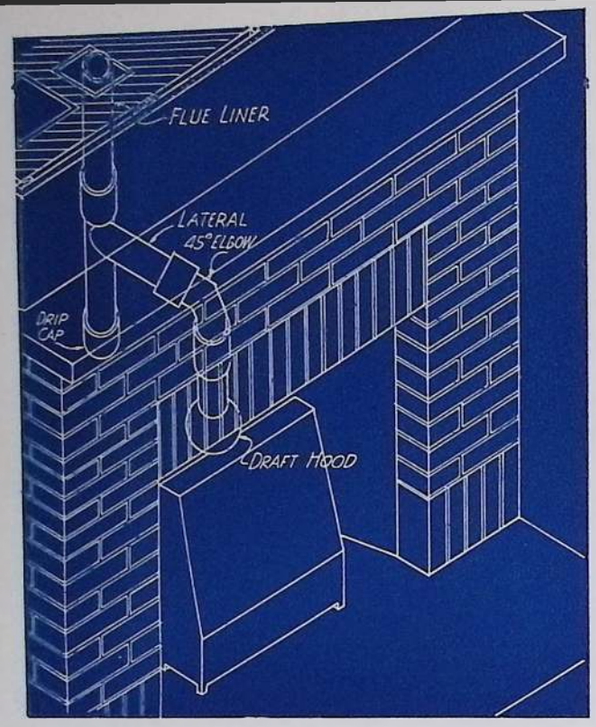
BUILDING CONSTRUCTION . . . Brick chimney.
PIPING LAYOUT . . . Round Transite liner. Flue pipes from two pieces of apparatus connected together and then one connection made to chimney.



Detail N-1

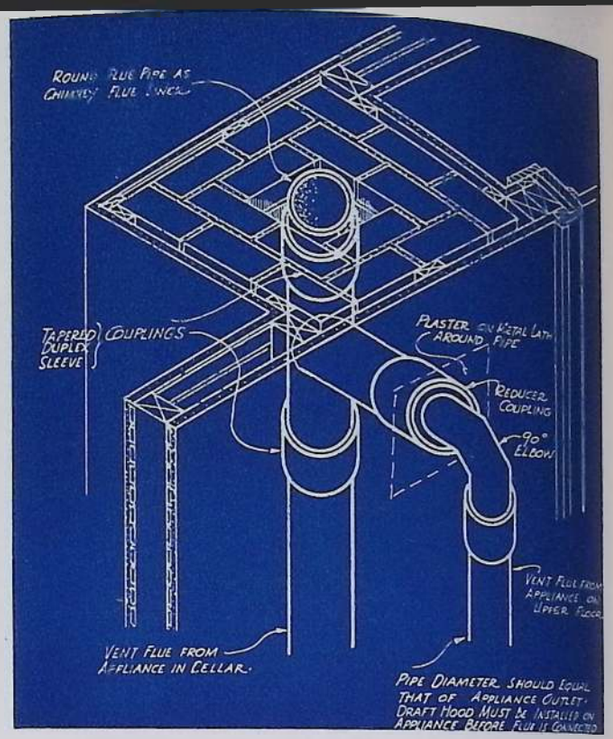
BUILDING CONSTRUCTION . . . Lined brick chimney.
PIPING LAYOUT . . . Round pipe from boiler vents into chimney by going through brick work and tile liner.

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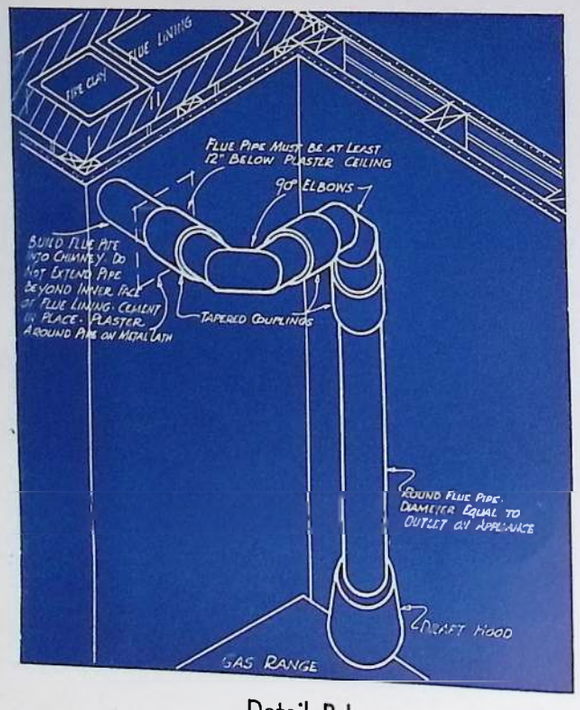
Detail O

BUILDING CONSTRUCTION . . . Brick fireplace with tile lined flues.
PIPING LAYOUT . . . Flues lined with round Transite pipe. Space heater connected to flue. Drip cap provided.



Detail P

BUILDING CONSTRUCTION . . . Unlined brick chimney.
PIPING LAYOUT . . . Chimney lined with round pipe large enough to vent apparatus on upper floor. Connection provided with reducer for smaller pipe entering chimney.



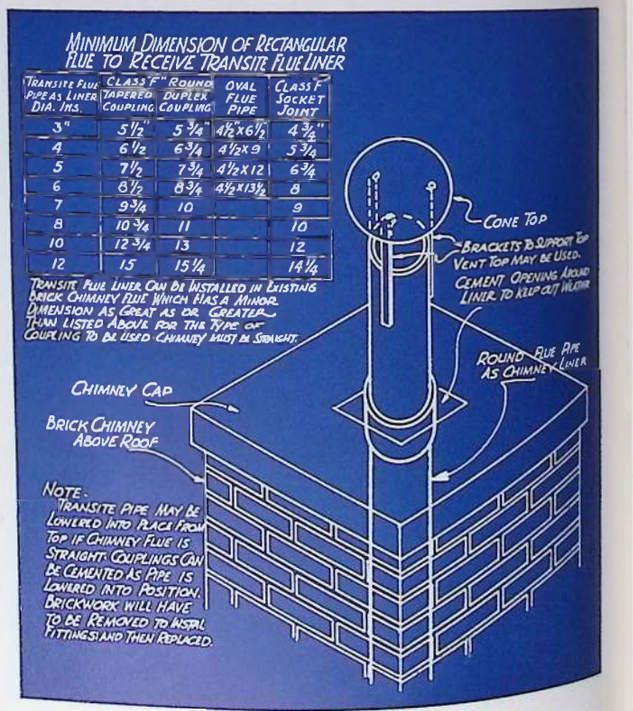
Detail P-1

BUILDING CONSTRUCTION . . . Lined brick chimney.
PIPING LAYOUT . . . Outlet on apparatus not in line with chimney. Necessary connections indicated.

MINIMUM DIMENSION OF RECTANGULAR FLUE TO RECEIVE TRANSITE FLUE LINER

TRANSITE FLUE PIPE AS LINER DIA. INS.	CLASS "F" TAPERED COUPLING	ROUND DUPLEX COUPLING	OVAL FLUE PIPE	CLASS F SOCKET JOINT
3"	5 1/2"	5 3/4"	4 1/2 x 6 1/2	4 3/4"
4	6 1/2	6 3/4	4 1/2 x 9	5 3/4
5	7 1/2	7 3/4	4 1/2 x 12	6 3/4
6	8 1/2	8 3/4	4 1/2 x 13 1/2	8
7	9 3/4	10		9
8	10 3/4	11		10
10	12 3/4	13		12
12	15	15 1/4		14 1/4

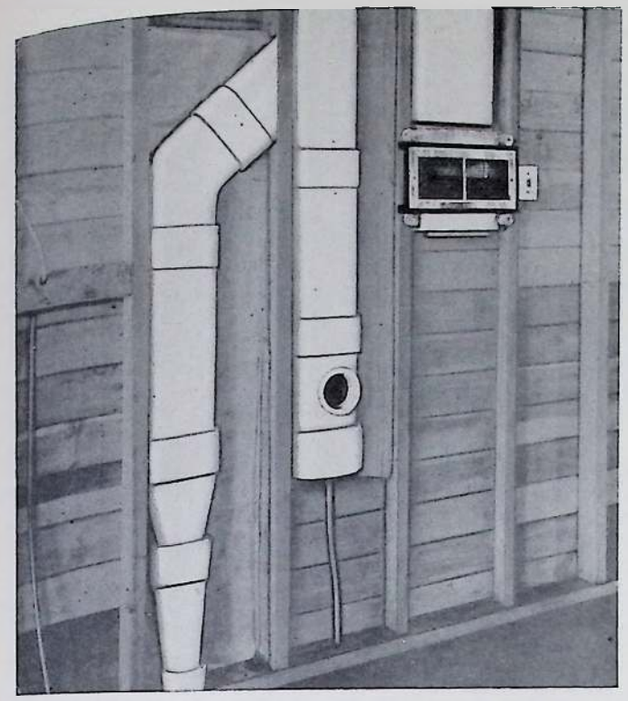
TRANSITE FLUE LINER CAN BE INSTALLED IN EXISTING BRICK CHIMNEY FLUE WHICH HAS A MINOR DIMENSION AS GREAT AS OR GREATER THAN LISTED ABOVE FOR THE TYPE OF COUPLING TO BE USED. CHIMNEY MUST BE STRAIGHT.



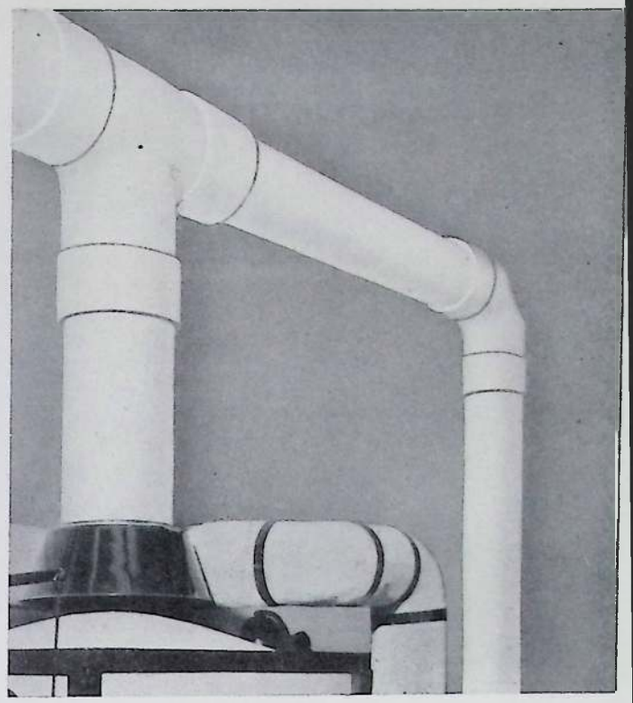
Detail R

BUILDING CONSTRUCTION . . . Brick chimney capped.
PIPING LAYOUT . . . Round Transite chimney liner brought above chimney cap and finished off with cone top.

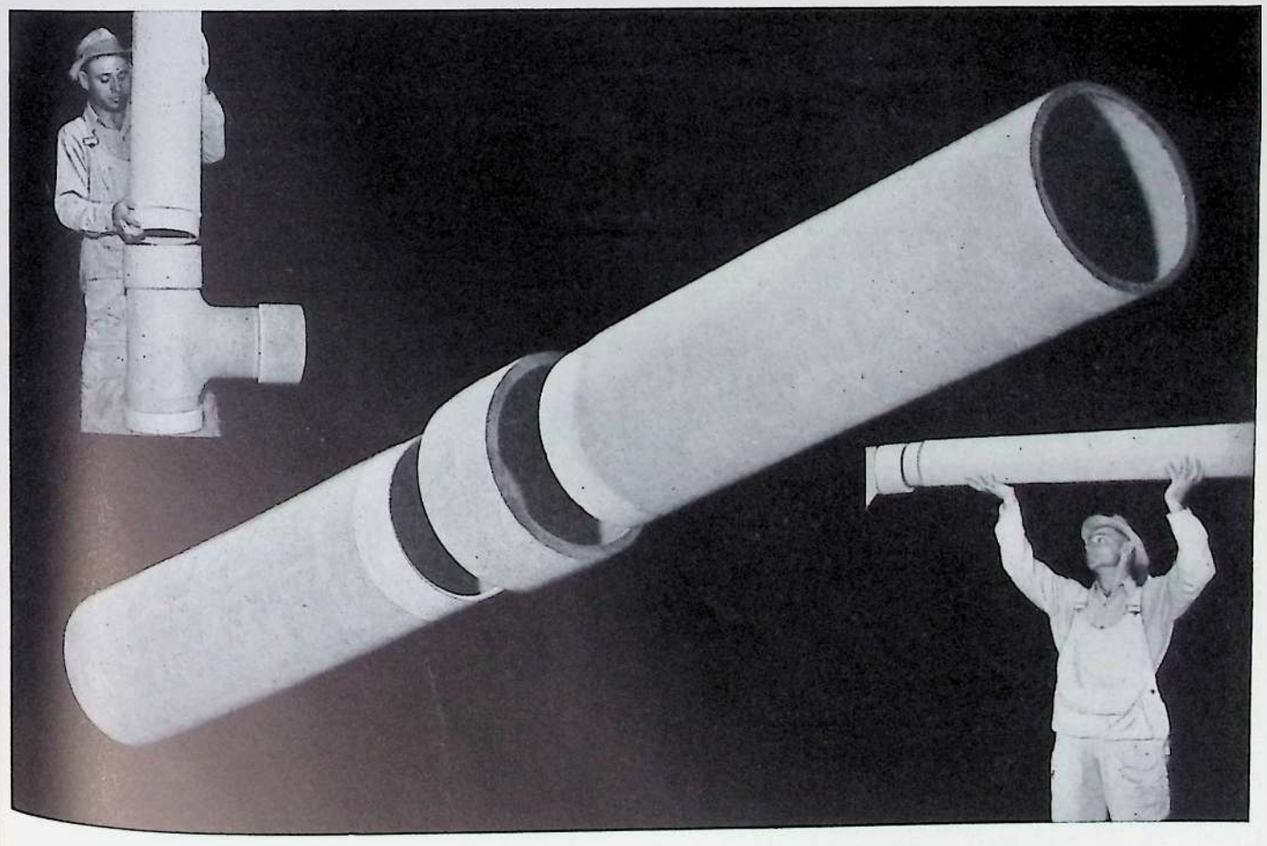
[Above details apply to Transite Flue Pipe master drawing on Page 15]



Oval Transite Flue Pipe is designed to fit between wall studs where a concealed venting system is desired.



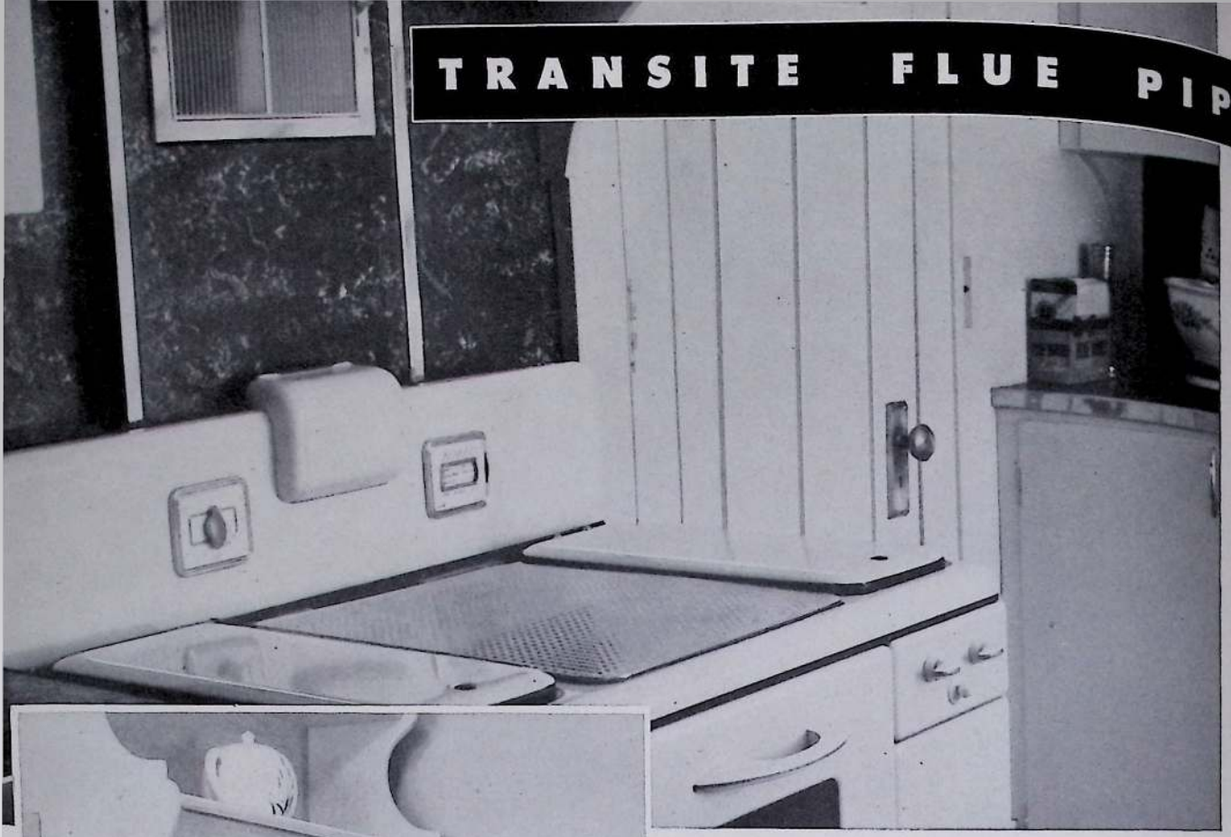
In addition to its practical advantages, Transite Flue Pipe makes a neat, attractive appearance on any venting job.



Transite Flue Pipe is quickly and easily joined with tapered couplings.

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TRANSITE FLUE PIPE



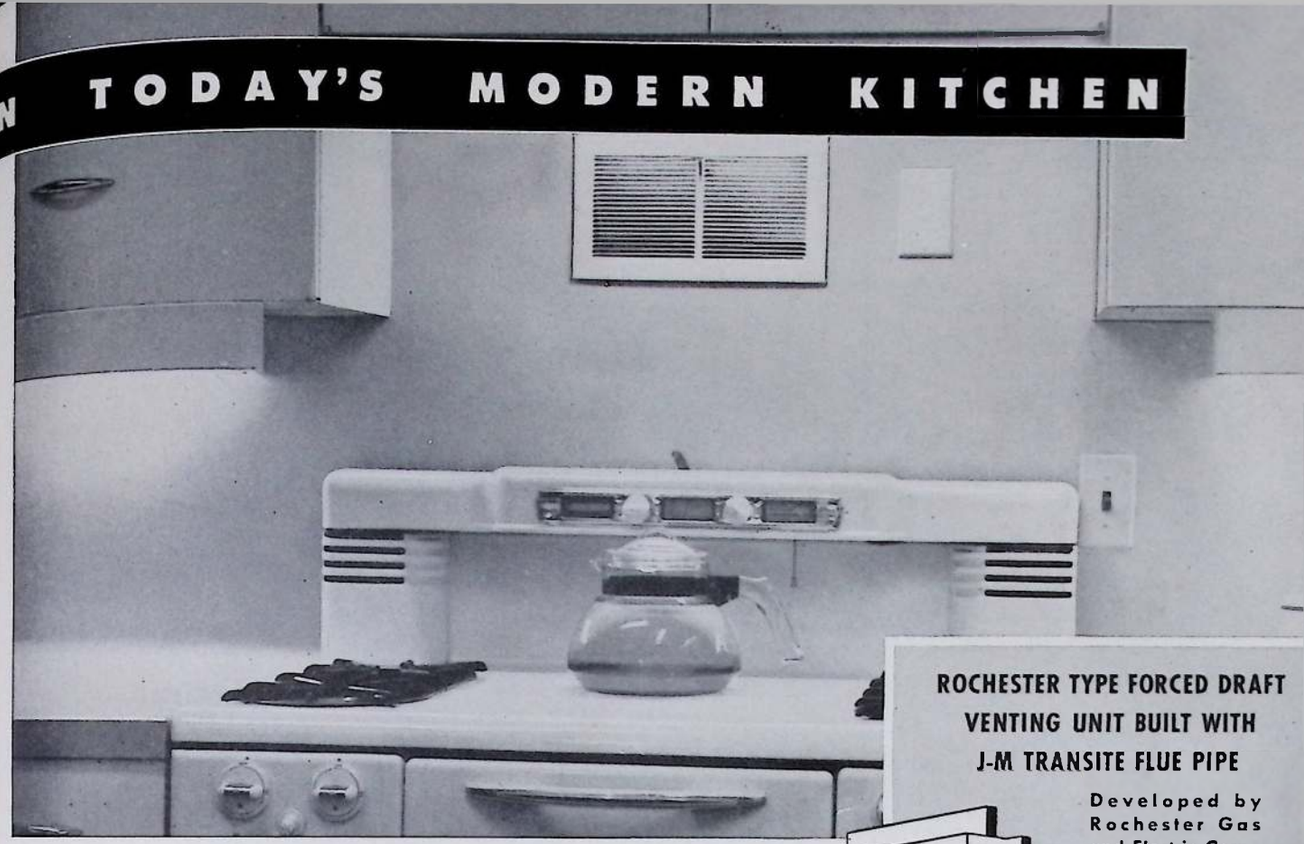


Transite Flue Pipe helps make modern kitchen ventilating systems practical for both new and existing homes. At left is a simple ventilating assembly unit with concealed oval flue pipe installed against an existing kitchen wall.



At right is the blower unit and Transite Flue Pipe exhaust duct viewed from the basement. The round flue pipe exhausts to the outside through the basement wall.

TODAY'S MODERN KITCHEN



ROCHESTER TYPE FORCED DRAFT VENTING UNIT BUILT WITH J-M TRANSITE FLUE PIPE

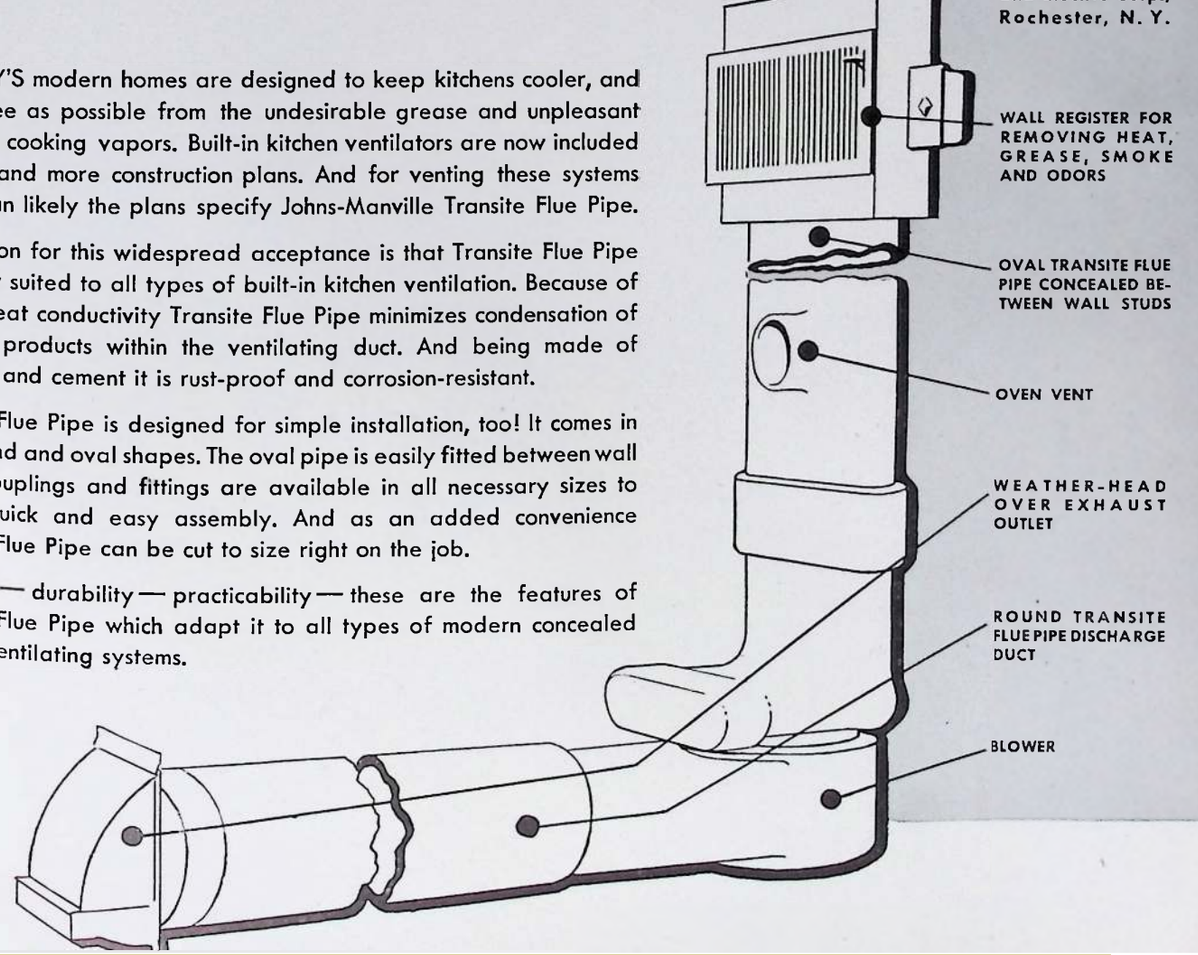
Developed by Rochester Gas and Electric Corp., Rochester, N. Y.

TODAY'S modern homes are designed to keep kitchens cooler, and as free as possible from the undesirable grease and unpleasant odors of cooking vapors. Built-in kitchen ventilators are now included in more and more construction plans. And for venting these systems more than likely the plans specify Johns-Manville Transite Flue Pipe.

The reason for this widespread acceptance is that Transite Flue Pipe is ideally suited to all types of built-in kitchen ventilation. Because of its low heat conductivity Transite Flue Pipe minimizes condensation of the flue products within the ventilating duct. And being made of asbestos and cement it is rust-proof and corrosion-resistant.

Transite Flue Pipe is designed for simple installation, too! It comes in both round and oval shapes. The oval pipe is easily fitted between wall studs. Couplings and fittings are available in all necessary sizes to assure quick and easy assembly. And as an added convenience Transite Flue Pipe can be cut to size right on the job.

Economy — durability — practicability — these are the features of Transite Flue Pipe which adapt it to all types of modern concealed kitchen ventilating systems.



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FLEXCELL REG. U.S. PAT. OFF.

Trade Mark identifying a premoulded expansion fibre joint consisting of cane fibre and asphalt compound.

FLEXCELL

REG. U.S. PAT. OFF.

Premoulded Bituminous Fibre Expansion Joint Filler

INDEX No. 4-E-11
OF A. I. A. FILE

Condensed specification data for Architects and Engineers
Issued September, 1944

THE CELOTEX CORPORATION — 120 SOUTH LA SALLE STREET — CHICAGO, ILLINOIS

See also, Sweets Architectural or Engineering Files

A. DESCRIPTION

FLEXCELL EXPANSION JOINT is a premoulded fibre joint of cellular nature, impregnated throughout with a durable asphaltic compound. It is used between slabs of concrete in highways, runways, floors, or any other large area where normal expansion and contraction must be compensated. It is made by scientifically treating genuine Celotex Cane Fibre Board with selected asphalt. The asphalt is carefully applied so as to coat each springy fibre without overloading the tiny air cells within the fibres. Thus Flexcell is in effect a pneumatic cushion. These characteristics give Flexcell its compressibility, which enables it to compensate for the expansion of the concrete slabs without extruding. It also provides the necessary resiliency to spring back and fill the joint when the concrete contracts.

B. PHYSICAL PROPERTIES

(1) FIBRE—Like all Celotex cane fibre products, the base of Flexcell is manufactured under the Ferox Process (patented). This is an integral treatment which effectively protects the material against destruction by dry rot, fungus growth, and termites.

(2) IMPREGNATION—From 35 to 50 per cent by weight of asphalt is introduced into the fibres by the Flexcell process.

(3) COMPRESSIBILITY—The material is compressible to 50 per cent of its original thickness under a pressure not exceeding 750 lbs. per square inch.

(4) RESILIENCY—This is the property of re-expanding after the load or compressing force is removed. Tests show that Flexcell, after compression to 50 per cent, returns to 70 per cent or more of its original thickness. This factor of 70 per cent is usually included in basic specifications; whereas for the actual thickness of joint selected in proper construction, the recovery is between 92 and 99 per cent.

(5) NON-EXTRUSION—Flexcell is non-extruding because the air chambers retained within the board permit it to be compressed without being displaced. When compressed to half its original thickness, the extrusion will be less than 1/8 inch.

(6) BONDING PROPERTIES—The rough surface of Flexcell permits the concrete to grip and hold firmly to the Flexcell filler, thus providing a tight joint and anchoring it in position.

(7) EASE OF HANDLING—Flexcell is light in weight, easily handled at all temperatures. It does not become hard or brittle in cold weather, nor soft and sticky in hot weather. It is readily stored and holds its shape indefinitely.

(8) DURABILITY—Flexcell in use over a period of 12 years has shown that it will not disintegrate and that light, heat, moisture, freezing, and thawing have no harmful effects.

C. SIZES, THICKNESSES, WEIGHT AND JOINT SPACING

FLEXCELL is available in two forms:

(1) Standard size sheets 36 in. wide by 10 ft. long in thicknesses of 1/4", 3/8", 1/2", 3/4", and 1". Necessary size of joint is cut from this sheet to fit job conditions. Other sheet sizes are available on special order.

(2) Rectangular Strips ready for use. These strips are 10 ft. long varying in width from 2" to 12" by 1/2 inch intervals and in each respective thickness stated above. Specially fabricated strips of extra length, odd shapes, bored for dowel openings or other job conditions made on order.

APPROXIMATE SHIPPING WEIGHTS
(In Pounds)

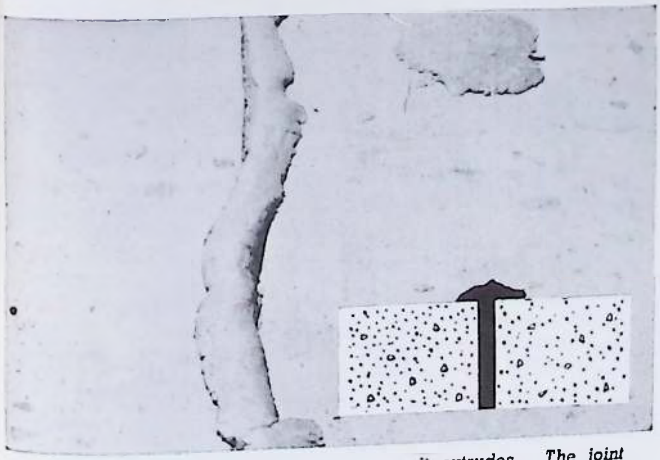
Thickness	1/4"	3/8"	1/2"	3/4"	1"
Per 100 Square Feet	70	95	120	190	260

Table 1, following, shows the estimated expansion of concrete for various lengths of slabs.

TABLE 1
ESTIMATED EXPANSION OF CONCRETE

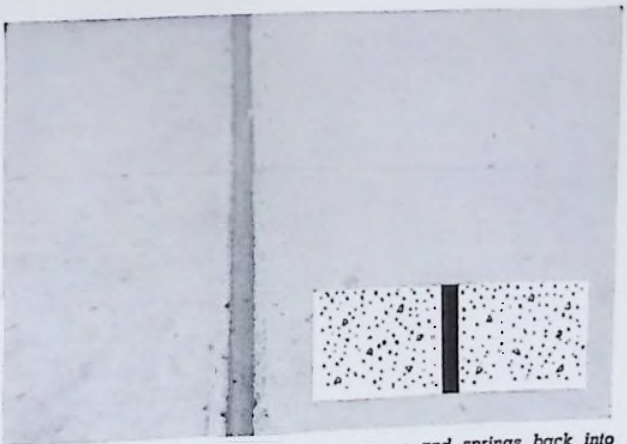
When slab length or width in feet is:	15'	20'	25'	30'	33'	40'	50'	60'	75'	90'	100'
Estimated expansion in inches when approximate temperature rise above setting temperature is 60° F.:	.05"	.07"	.09"	.11"	.12"	.14"	.18"	.22"	.27"	.32"	.36"

ORDINARY JOINT IN CONCRETE



When ordinary joint yields to pressure, it extrudes. The joint bulges, making an unsightly and annoying bump in the pavement.

FLEXCELL JOINT IN CONCRETE



Flexcell Expansion Joint gives under pressure and springs back into position when the pressure is relaxed. It never extrudes.

10-9-44-7046-B

(OVER FOR SPECIFICATIONS)

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Table 2 is a guide to the suggested thickness of Flexcell to use depending on joint spacing. In general, the thickness of Flexcell should be twice and preferably three times the estimated expansion; and when properly selected and located, relieves the restraint and greatly minimizes the development of cracks.

TABLE 2
SUGGESTED SPACING AND THICKNESSES OF FLEXCELL

When expansion joints are placed at approximate intervals of	10′ to 20′	20′ to 30′	30′ to 50′	50′ to 70′	70′ to 100′
Suggested thickness of joint filler should be	¼″	⅜″	½″	¾″	1″

D. USES

The normal uses for Flexcell are divided into two classes:

1. Concrete slabs in paving work such as highways, streets, curbs, and gutters, airport runways, service stations, drive-in markets, swimming pools, tennis courts, etc.

2. Structures such as retaining walls, abutments, bridge piers, viaducts, loading platforms, machine bases, reinforced concrete buildings and similar uses where the need for expansion joint is dictated by the nature of the construction.

E. SPECIFICATIONS

DETAILED FORM

1. SCOPE OF WORK

The contractor shall provide and install expansion joint fillers where shown on the plans or herein specified.

2. MATERIAL

Expansion joints shall be ___ inches thick and in lengths of ___ feet.

NOTE: *If more than one thickness and length are used, describe and locate. If special fabrication is required, show in separate detail drawing.*

Expansion joint filler shall be a premoulded bituminous fibre joint such as Flexcell. This material shall meet the requirements stated below:

(a) **Fibres** — The structure of material shall consist of long spring-like cane or similar fibres of cellular nature.

(b) **Asphaltic Content** — The fibres shall be uniformly impregnated throughout with at least 35% and not over 50% by weight, with durable asphaltic compound.

(c) **Grade of Asphalt** — The extracted asphaltic compound after evaporating the volatile carbon tetrachloride by heating to 400° F. shall have a penetration at 70 degrees F.—100 grams—5 seconds of not more than 50.

(d) **Resiliency** — A specimen 4″ x 5″ in size shall be compressed at the rate of 1/10″ per minute to 50% of its original thickness, then the load released, this compression being repeated 3 times; and after the 3rd compression, the specimen shall return to at least 70% of its original thickness within one hour after being released from last compression.

(e) **Extrusion** — A specimen 4″ x 5″ confined on three sides when compressed to half its original thickness shall not extrude more than ⅛″.

(f) **Loss of Asphaltic Compound** — A specimen when compressed under Clause "d" for Resiliency shall not lose more of the asphaltic compound than 2% by weight of the original weight of the specimen tested.

(g) **Compressibility** — A specimen when tested under Clause "d" for Resiliency shall not require a pressure in excess of 750 lbs. per sq. in.

SHORT FORM SPECIFICATION

JOINT FILLER: Flexcell premoulded cane fibre uniformly impregnated with between 35% and 50% durable asphaltic compound by weight. Sample when compressed to 50% of original thickness at rate of 1/10″ per minute and released, shall show at least 70% recovery within one hour, shall not require more than 750 lbs. per sq. in. compression load, and extrusion of not more than ⅛″.

F. FLEXCELL COMPLIES WITH:

American Association of State Highway Officials Standard Specification M 59-42.

Federal Specification HH-F-334.

American Society for Testing Materials Tentative Revisions of Standard Specifications for Preformed Expansion Joint Filler D 544-41.

War Dept., U. S. Engineer's Office Spec. No. 3276.

Navy Dept., Bureau of Yards and Docks Spec. 4Yd, Item 1-10, II.

U. S. Veteran's Administration.

State Highway Department Specifications for Bituminous Fiber Expansion Joint for Use on State and Federal Aid Projects.

G. APPLICATION SUGGESTIONS

Flexcell is readily used in any of the conventional methods of installing expansion joint. The sketches in Fig. 1 to 5 indicate typical uses of expansion joints.

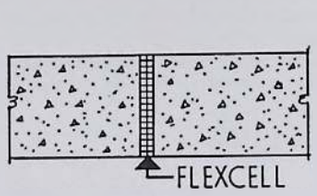


Fig. 1

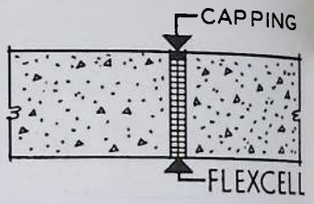


Fig. 2

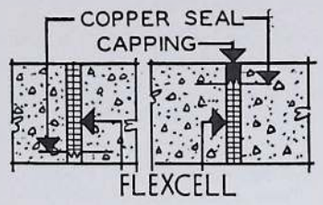


Fig. 3

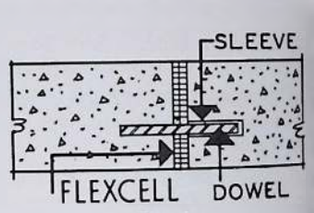


Fig. 4

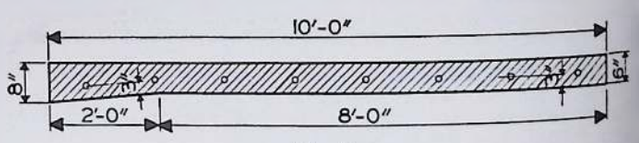


Fig. 5

Fig. 1—In this type of joint, the joint filler is brought flush with the surface of the slab.

Fig. 2—In this type, the joint material is held down approximately ¾″ or 1″ below the surface of the slab and the opening above the joint is filled with poured asphalt, or other suitable compounds.

Fig. 3 shows a typical method of installing Flexcell with a copper seal straight or crimped near the top or at the bottom of the slab. This provides a water-tight joint against a pressure head of water.

Fig. 4 shows a typical dowel bar extending from one slab to the next through Flexcell joint. This method is used to transmit the loads on the surface from one slab to another and to prevent adjoining slabs from moving up or down in respect to each other.

Fig. 5 shows a thickened joint with holes for dowel bars. Used where the slab is thicker at the edges or shoulder than at the center.

H. ADVANTAGES

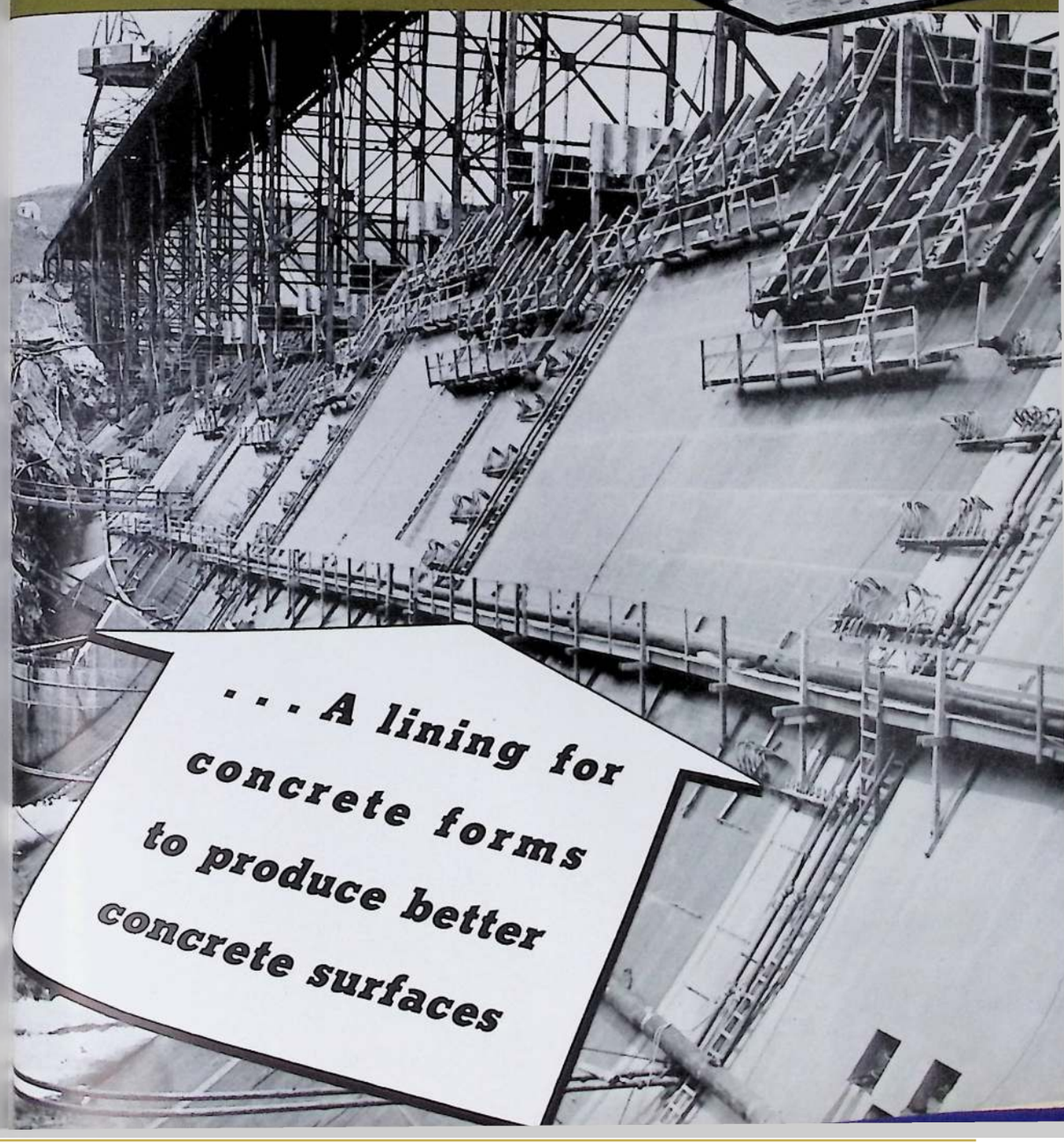
Flexcell has these definite advantages:

(1) It will not extrude when under normal compression.
(2) Its cellular structure permits proper and uniform compression.
(3) It is resilient and re-expands when released from compression.
(4) It provides a neat finished joint that does not require re-trimming.
(5) It retains its original shape while being installed and may be stored indefinitely.
(6) It is protected against moisture and against destruction by termites, dry rot, alternate freezing and thawings.

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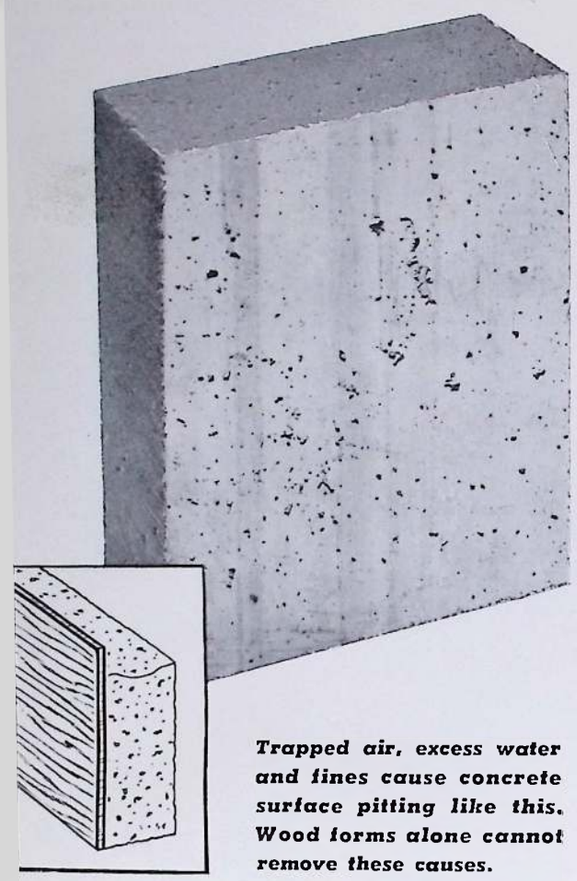
ABSORPTIVE FORM LINER



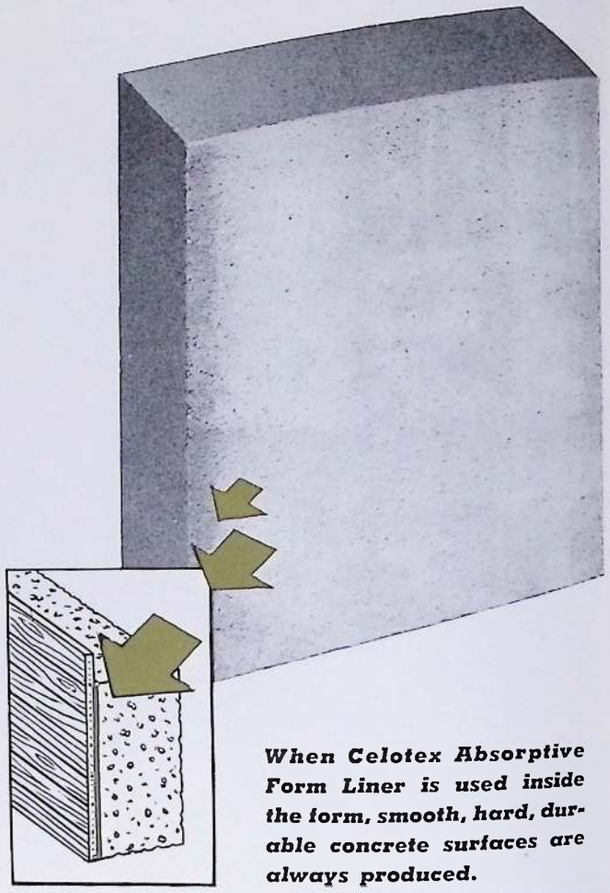


HANDSOME, DURABLE, WEAR-RESISTANT CONCRETE SURFACES

WITH CELOTEX ABSORPTIVE FORM LINER



Trapped air, excess water and fines cause concrete surface pitting like this. Wood forms alone cannot remove these causes.



When Celotex Absorptive Form Liner is used inside the form, smooth, hard, durable concrete surfaces are always produced.

STRUCTURAL and architectural concrete surfaces that are comparatively free of voids and pits yet that have greater wear-resistance and better appearance are now easily and readily produced by means of Celotex Absorptive Form Liner.

Normally, when concrete is placed against conventional wood forms and vibrated to insure a dense mix, air bubbles and excess water are driven to the sides of the form in an effort to escape. But, because wood forms are non-porous, these free agents become entrapped just at or below the form surface and cause undesirable pits and "sand streaks" to appear on the finished surface.

Celotex Absorptive Form Liner overcomes this common fault by eliminating the air and excess water in the concrete through absorption. This porous form lining material is a Celotex cane fibre board felted to a predetermined density and then surface-impregnated with a specially prepared compound that controls the rate of air and water absorption. As its name implies, Celotex Absorptive Form Liner is a lining material only and is not a substitute for structural forming material. Conventional tongue and groove board or plywood forms are built according to the project requirements and are then lined with Celotex Absorptive Form Liner. No oil or other treatment of the form is required. After the concrete placing is completed, the forms are stripped (within 24 to 36 hours) and the liner is peeled off and discarded.

Actual field operations in all types of mass concrete structures have proved the value of Celotex Absorptive Form Liner in providing uniformly smooth surfaces as well as hard and extremely durable surfaces. The physical change that takes place in mass concrete placed against Celotex Absorptive Form Liner extends to a depth of approximately one and one-half inches from the face. The water-cement ratio is lowest at the point of contact with the form, therefore the strength and density of the concrete is greatest at the surface. As the water-cement ratio increases with the distance from the face, the concrete near the surface blends with the balance of the mass so gradually that no plane of cleavage exists between the hard outer layer and the less dense interior mass.

Concrete engineers agree that Celotex Absorptive Form Liner is at last the practical solution to the age-old problem of producing a relatively pit-free concrete surface that also possesses hardness and durability.

What CELOTEX Absorptive Form Liner does for Structural Concrete

1 NO PITS OR SURFACE VOIDS

Trapped air, the major cause of concrete surface pitting is absorbed by Celotex Form Liner. This absorption at the surface allows concrete to fill the space ordinarily taken up by air bubbles.

2 CONCRETE MADE STRONGER

Celotex Absorptive Form Liner removes excess water and air from the concrete, thereby producing a smooth, dense, hard, outer layer which extends to a depth of about 1½ inches from the face.

3 BETTER APPEARANCE

Concrete cast against Celotex Absorptive Form Liner produces a surface with a uniform overall texture having no grain or definite bold pattern. Therefore, little or no supplementary finishing is required.

4 MORE DURABLE CONCRETE

In an alternate freezing and thawing test, concrete blocks cast in wood forms lost 37% in weight in 60 cycles of the test, but blocks cast against Celotex Absorptive Form Liner showed no loss.

5 SURFACE CRAZING ELIMINATED

Concrete blocks cast against Celotex Absorptive Form Liner showed practically no surface crazing after a lengthy test of exposure to direct sun and periodical dousing with ice-water.

6 GREATER ABRASION RESISTANCE

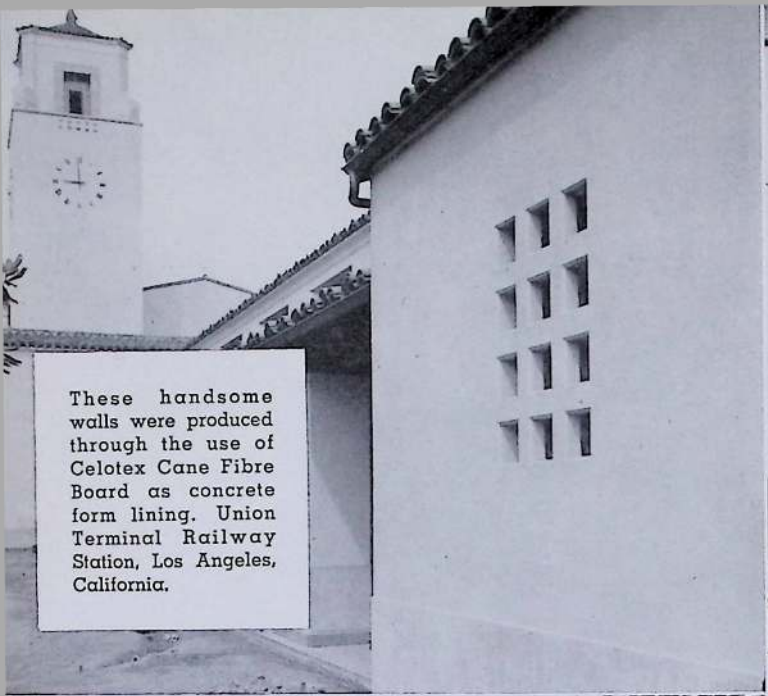
The surface of a concrete block cast against Celotex Absorptive Form Liner withstood the abrasive ball test to a far greater degree than a similar block cast in an ordinary wood form.

"Case Hardening" for Structural Concrete

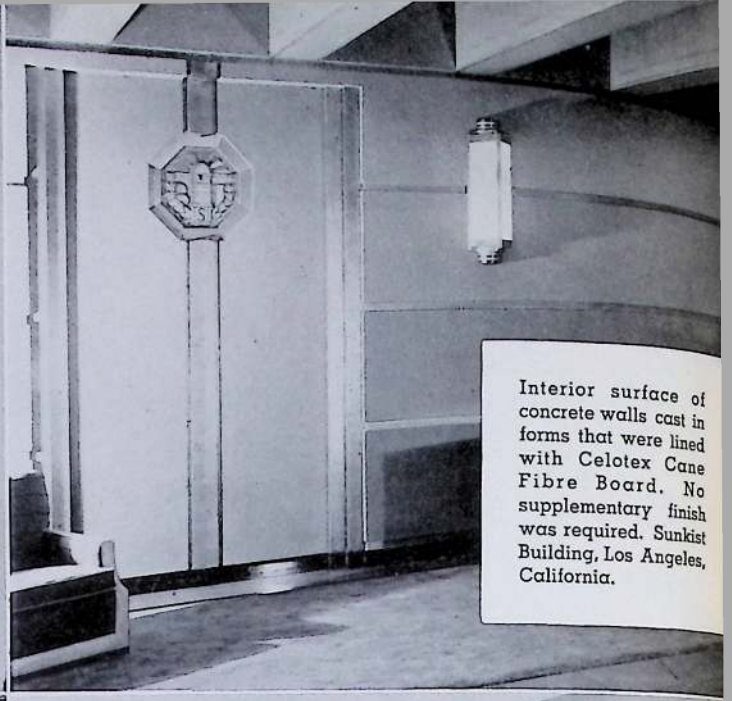
The change produced by Celotex Absorptive Form Liner in concrete is, in effect, the same as that produced in steel by the case hardening process. For years concrete engineers have been trying to develop a method whereby a smooth, pit-free surface could be developed that also had sufficient hardness to resist the attriting action of water in dam and spillway construction and to withstand the weathering to which all concrete structures are exposed. Such surfaces (vertical or sloping only) are now being successfully produced because Celotex Absorptive Form Liner eliminates the cause of pitted surfaces and weak concrete—excess water, air bubbles and excess fines.



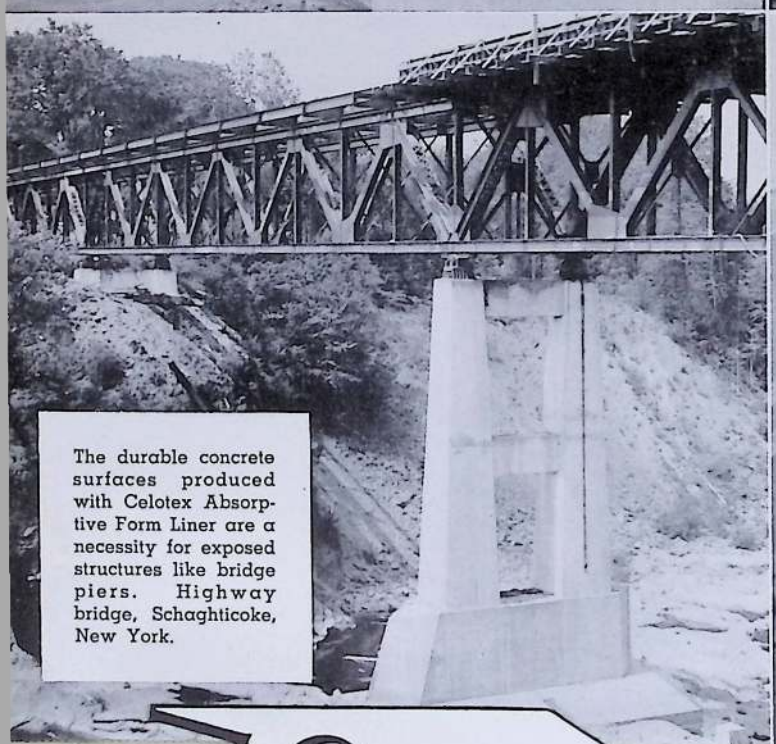
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These handsome walls were produced through the use of Celotex Cane Fibre Board as concrete form lining. Union Terminal Railway Station, Los Angeles, California.



Interior surface of concrete walls cast in forms that were lined with Celotex Cane Fibre Board. No supplementary finish was required. Sunkist Building, Los Angeles, California.



The durable concrete surfaces produced with Celotex Absorptive Form Liner are a necessity for exposed structures like bridge piers. Highway bridge, Schaghticoke, New York.



Here is shown the use of Celotex Absorptive Form Liner in vertical wall construction with conventional wood sheathed concrete forms. Florence Hotel, Missoula, Montana.

CELOTEX
REG. U. S. PAT. OFF.

ABSORPTIVE FORM LINER

Improves all Types of Structural Concrete

Used successfully on concrete Dams, Aqueducts, Viaducts, Grade Separations, Bridge Piers, Abutments, Retaining Walls, Docks, Stadia, as well as many types of residential and industrial concrete construction.

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★ build
★ modernize
★ maintain

Sonneborn

wood preservation and finishing a

paints and enamels b
(Featuring "Productive Coloration")

rust preventive coatings c

Building Products Division

L. SONNEBORN SONS, INC.

NEW YORK 16, N. Y.

NOTE: For information on Concrete Floor Treatments, Waterproofing, Dampproofing and Caulking, see Section $\frac{3h}{13}$ of Sweet's Engineering Catalog.

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LIGNOPHOL *The One Application Preservative and Finish for Wood Floors, Trim, Doors and Paneling*

LIGNOPHOL Penetrates and Protects

The essential difference between Lignophol and the usual surface finishes for floors and trim is its ability to penetrate into the wood, depositing toughening resins and life-imparting oils which resist moisture, molds, fungi, and wood-destroying organisms, and also retard splintering, warping and common wood floor wearing problems.

Protection Is Long Lasting

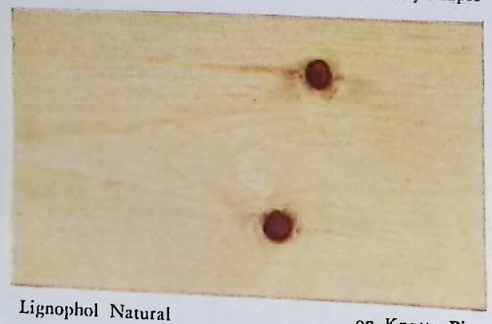
A single application of Lignophol gives a long lasting finish. With proper care in maintaining the treated areas, many years of service are added to the floors and woodwork. Lignophol has been in use for more than 25 years. Its ability to withstand the hardest sort of usage is reflected in the number of schools, factories and armories which have standardized on Lignophol for floors in gymnasiums, classrooms, drill rooms, and production and office areas. Its beauty and lasting protection also make it the ideal wood finish for residences.

LIGNOPHOL Highlights Beauty of Grain

Lignophol does not cover up the natural beauty of the wood. It actually highlights the subtle design of the grain itself, increasing the attractive appearance of the wood. As shown in the table on the next page, Lignophol is suitable for many kinds of woods used for various purposes. Preparation of the surface does not differ essentially from ordinary surface finishes, but the final effect is an enhancement of the beauty of the grain—and, of course, added protection.



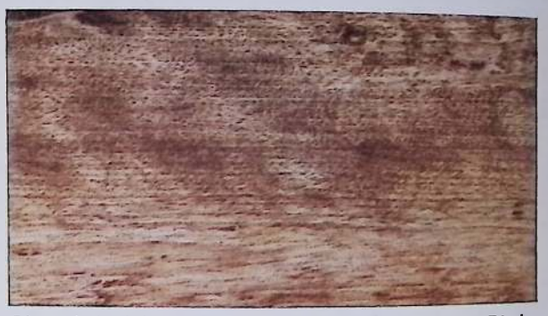
Lignophol Natural on Curly Maple



Lignophol Natural on Knotty Pine



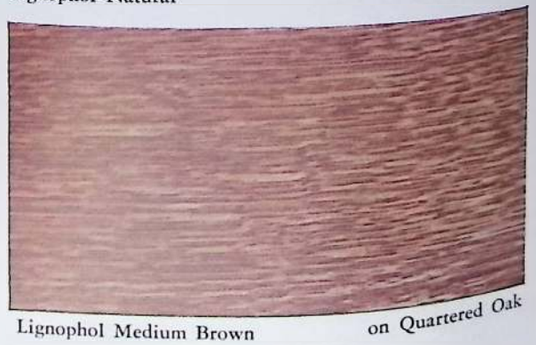
Lignophol Medium Brown on Knotty Pine



Lignophol Light Brown on Birch



Lignophol Natural on Oak



Lignophol Medium Brown on Quartered Oak

SONNEBORN wood preservation and finishing



Simplex Time Recorder Co., Gardner, Mass. Stanley G. Kendall, Architect and Contractor. (Lignophol used on wood paneling.)



Executive Offices of Northwest Airlines, St. Paul, Minn. (Lignophol used in connection with renovation of building.)

Flooring Associations Recommend LIGNOPHOL

Lignophol is recommended by the Maple Flooring Manufacturers' Association, the Western Pine Association, and the National Oak Flooring Manufacturers' Association, as well as by architects and decorators.

Types and Colors

Lignophol is furnished in both Penetrating and Wax Finish. Colors are Natural, Light Brown, Medium Brown and Dark Brown. Coverage per gallon is 700 sq. ft. on hard woods; 600 sq. ft. on soft woods.

Specifications for Preserving and Finishing Wood with Lignophol

Wood Floors

SPECIFICATION No. 1: Flat Finish

(a) After sanding or scraping, all wood surfaces shall be given one application of Lignophol Penetrating Finish, manufactured by L. Sonneborn Sons, Inc., New York, (color to be selected by architect). Application to be made in accordance with the directions of the manufacturer. Brush thoroughly into the wood, using 1 gal. to 700 sq. ft. of surface, one coat, on hard woods; and 1 gal. to 600 sq. ft. on soft woods.

(b) Within two hours after application, surface shall be rubbed down thoroughly with clean dry cloths or mops. (For oak floors, Use Lignophol Wax Finish, Specification No. 3 or 4.)

SPECIFICATION No. 2: Satin Finish (Use Specification No. 1 and add the following). After rubbing down the entire floor, permit it to dry thoroughly (at least overnight), making sure no trace of tackiness exists. Then buff with polishing machine, using No. 2 steel wool.

Optional: (Where floors are not to be used immediately, add following paragraph to Specifications 1 and 2.) All floors, except oak, not to be used immediately after polishing or which may be subject to any traffic by workmen, are to be covered with finely ground cornmeal, using 1 lb. per sq. ft.; cornmeal is to be left on floors until workmen leave building or until floors are ready for use. On oak flooring use plain building paper.

SPECIFICATION No. 3: Medium Gloss Wax Finish

(a) After sanding or scraping, all floors shall be given one application of Lignophol Wax Finish, manufactured by L. Sonneborn Sons, Inc., New York, (color to be selected by architect). Application to be made in accordance with the directions of the manufacturer. Brush thoroughly into the wood, using 1 gal. to 700 sq. ft. of floor surface on hard woods; and 1 gal. to 600 sq. ft. on soft woods.

(b) Within one hour after application, surfaces shall be rubbed down thoroughly with clean, dry cloths or mop; after rubbing down, buff with an electric polishing machine, with No. 2 steel wool.

SPECIFICATION No. 4: High Gloss Wax Finish

(Use Specification No. 3 and add the following). Allow this surface to harden, then apply one coat of Sonneborn's Paste Wax. To determine whether the surface is dry enough to permit waxing, try waxing a small area and see whether a satisfactory polish is obtained. If not, wait a few days longer and repeat the test. It is suggested that after the application of Lignophol at least a week elapse before waxing.

SPECIFICATION No. 5: Porch Floors — Apply Lignophol Penetrating Finish, Natural, liberally on all ends, tongues and grooves of porch flooring before laying. If under side of floor is subject to dampness or moisture, apply one coat of Lignophol Penetrating Finish, Natural, to bottom and sides of flooring, and pile uniformly with air spaces between to allow uniform drying for two or three hours, before laying.

Western Asbestos Co.: Architectural Manual (1946)
ACL Doc 21301 · Page 268 of 276
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LIGNOPHOL SPECIFICATIONS (Cont.)

Trim, Doors, Panels, Cabinets, Shelves

SPECIFICATION No. 6: Flat Finish—Use Specification No. 1 (a) and (b) and add the following:

Doors—When treating doors they shall be fitted after Lignophol has been applied. Care must be taken to apply Lignophol to edges, tops and bottoms of doors. After all wood is in place, treat nail-holes and other defects with putty or filler colored to match the surface color. Sand filler and putty spots when thoroughly hard.

(For Interior Oak Woodwork, use Lignophol Wax Finish Specification No. 3 or No. 4.)

SPECIFICATION No. 7: Satin Finish—Use Specification No. 1 (a) and (b) and add the following: After rubbing down entire surface, permit it to dry thoroughly (at least overnight), making sure no trace of tackiness exists. Then buff, using fine steel wool or soft cloths.

SPECIFICATION No. 8: Medium Gloss Wax Finish—Use Specification No. 3 (a) and add the following: Within one hour after application, surface shall be rubbed down with clean dry cloth. Immediately after rubbing down, buff with soft cloth. Treat all nail-holes and defects with putty or filler colored to match surface and sand these spots when thoroughly dry.

SPECIFICATION No. 9: High Gloss Wax Finish—Use Specification No. 8 and add the following: Allow this surface to harden, then apply one coat of Sonneborn's Paste Wax. To determine whether the surface is dry enough to permit waxing, try waxing a small area and see whether a satisfactory polish is obtained. If not, wait a few days longer and repeat the test. It is suggested that after the application of Lignophol at least a week elapse before waxing.

SPECIFICATION No. 10: Miscellaneous—Tempered Masonite, Tempered Board and Hard Board—Wherever these boards are used for flooring, walls, ceilings, wainscots, etc. use one coat of Lignophol Penetrating Finish, Natural, or Wax Finish, applied according to manufacturer's directions.

GENERAL INFORMATION

Both types of Lignophol penetrate the wood effectively. Select the Wax type where a gloss finish is important. The Penetrating type (with a satin non-slip finish) is highly recommended as the ideal treatment for gymnasium and other floors that receive hard usage.

FILLERS: Fillers interfere with the penetration of Lignophol. However if a filler is to be used on open-grained wood, apply after the application of Lignophol, as in printed directions; then wax.

APPLICATION: Preparation of the surface does not differ essentially from ordinary surface finishes. The important advantages are the saving of time and labor through a single application. Full directions for application are furnished with each package.

SPECIAL COLOR SCHEMES: It is possible to harmonize the use of Lignophol with a special color scheme. Complete recommendations, depending upon your plans, are furnished upon request.

Recommendations for Use of LIGNOPHOL

Type of Building	Finish	Specification No.
Armory Floors	Satin Finish—Non-slip	2
Bakery Floors	(Please Inquire)	
Churches	Satin Finish	2
Dance Floors	Wax Finish—High Gloss	4
Department Stores	Satin Finish—Non-Slip	2
Exterior Floors	Flat Finish	1
Floors laid in Mastic	(Please Inquire)	
Gymnasium Floors	Satin Finish—Non-Slip	2
Industrial Buildings	Flat Finish	1
Masonite	Flat Finish	10
Office Buildings	Satin Finish	2
Piers	Flat Finish	1
Residences	Wax Finish—Medium Gloss	3
Residences	Wax Finish—High Gloss	4
Schools and Institutions	Satin Finish—Non-Slip	2
Siding	Flat Finish	6
Trim, Doors, Paneling, etc.	Flat Finish	6
Trim, Doors, Paneling, etc.	Satin Finish	7
Trim, Doors, Paneling, etc.	Wax Finish—Medium Gloss	8
Trim, Doors, Paneling, etc.	Wax Finish—High Gloss	9

Type of Wood	Kind of Lignophol	Specification No.
Beech Flooring	Penetrating Finish	2
	or Wax Finish	4
Birch Flooring	Penetrating Finish	2
	or Wax Finish	4
Chestnut Flooring	Wax Finish	4
Chestnut Trim	Wax Finish	9
Cherry Flooring	Wax Finish	4
Cherry Trim	Wax Finish	9
Flexwood	Wax Finish	9
Gum Flooring	Penetrating Finish	2
	or Wax Finish	4
Knotty Pine Paneling	Wax Finish	9
Mahogany Flooring	Wax Finish	4
Mahogany Trim	Wax Finish	9
Maple Flooring	Natural Penetrating	2
	or Wax Finish	4
Masonite Presdwood	Penetrating Finish	10
	or Wax Finish	10
Oak Flooring	Wax Finish	4
Oak Trim	Wax Finish	9
Pine Flooring	Wax Finish	4
Plywood	Wax Finish	9

FLOORLIFE No. 69

For Sealing and Finishing Wood Floors

Floorlife No. 69 is a clear, synthetic resin base coating which produces an unusually wear resistant, glossy finish.

FILLING: While ordinarily it is not necessary to use a filler when applying two coats of Floorlife No. 69, it is possible to use a wood filler before proceeding with the application, as in the finishing of oak floors.

COVERING CAPACITY: A gallon of Floorlife No. 69 covers about 500 sq. ft., one coat. When two coats are used, the second coat will cover about 600 sq. ft. per gal.

Productive Coloration
by
SONNEBORN

Productive Coloration is a new and original system of utilizing the colors and reflective properties of paint to increase efficiency, output and safety in industry. Years of research and development by the Sonneborn Research Staff, working in close cooperation with Cecil I. Cady, a member of the Society of Illuminating Engineers, preceded the introduction of Productive Coloration to the architectural and engineering professions, as well as to industrial production and maintenance executives.

From a practical standpoint, the desirability of simplifying and condensing the tremendous amount of modern literature on illumination and color technology into every-day language is obvious. In a new full-color brochure on Productive Coloration we have been able to accomplish that end. Equally important, we have also translated scientific data into definite, step-by-step recommendations by means of which Productive Coloration can be achieved with speed and economy. By means of progress photographs, this brochure shows how improved light reflectance and better working conditions are secured, first by brightening the area adjoining the plant machinery, and then by painting the machinery parts in especially keyed colors to improve operator efficiency.

A chart in the brochure presents a series of color combinations, scientifically planned not only for color balance but to provide maximum reflectance values, which enables the reader to visualize how and to what degree, by the proper color treatment of walls, ceiling, dado, floor, machinery areas and machine parts, increased plant illumination can be obtained.

How former drab surfaces and shadows can be converted into a bright, cheerful working environment, resulting in improved worker morale, reduced accident rates and increased production efficiency in plants, mills, factories and similar buildings, is clearly brought out in this copyrighted publication which bears the title of the new system, "Productive Coloration."

Productive Coloration can be applied to an entire plant, or it may be done on a step-by-step basis—department by department—or building by building—as a means of obtaining the advantages of this important scientific development.

More than four decades of specialized experience in the manufacture of paint and its application by industry qualifies the Sonneborn organization to act as your counsel in the specification of Sonneborn paints applied in accordance with the principles of Productive Coloration for increased efficiency, safety and output in your clients' plants.

In any event, the Sonneborn organization will gladly work with you to assure maximum satisfaction with the ultimate result. Write our main office outlining your problem. We will arrange to have a Sonneborn technical service man give you the benefit of our experience. And a copy of the brochure "Productive Coloration" will also go forward to you promptly.

CEMCOAT INTERIOR

For Increased Light Reflectance and Easier Maintenance

Cemcoat Interior is an oil paint formulated with the most modern tested pigments and a specially treated vehicle. Designed for use on practically any type of interior surface, it is particularly suited for masonry.

Cemcoat Interior is furnished in flat, eggshell, semi-gloss and gloss finish. Available in white and a variety of colors.

For more than 25 years, Cemcoat Interior has enjoyed wide acceptance among factories, food plants, textile mills, schools, laundries and office buildings, where light reflection and the ability to withstand frequent washings are necessary qualities for economical maintenance.

SPECIFICATION: For various types of surfaces.

THREE-COAT WORK: Concrete, Brick and Plaster.
- 1st Coat: Hide-N-Seal (pigmented primer and sealer)
- 2nd Coat: Hide-N-Seal
- 3rd Coat: Cemcoat Interior Finish (Specify finish desired)

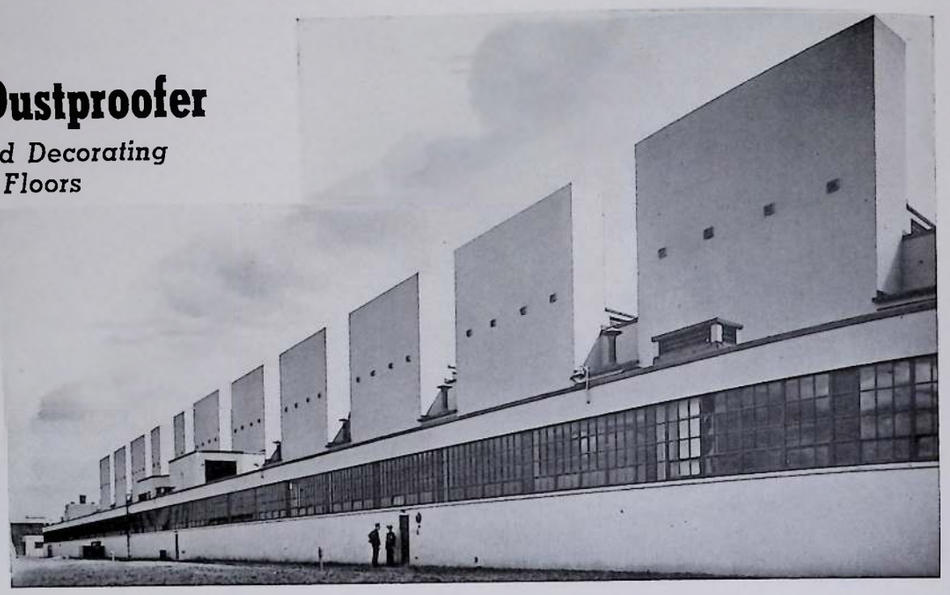
THREE-COAT WORK: Woodwork and Wallboard.
- 1st Coat: Hide-N-Seal
- 2nd Coat: Hide-N-Seal
- 3rd Coat: Cemcoat Interior Finish

TWO-COAT WORK: All surfaces.
- 1st Coat: Hide-N-Seal
- 2nd Coat: Cemcoat Interior Finish

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CEMCOAT
Filler and Dustproofer

For Protecting and Decorating Cement or Wood Floors



Large airplane engine plant in Middle West. Albert Kahn, Associated, Architects and Engineers. George Fuller Co., Contractors. (Cemcoat Filler and Dustproofer, Hydrocide Waterproofing Paste, Lapidolith Liquid, Cemcure and S.R.P. No. 75 used.)

Cemcoat Filler and Dustproofer is a tough, resilient combination of treated gums, varnishes and oils which drys to a hard film, providing a smooth, dustless and highly decorative, lasting finish for cement or wood floors.

Ordinary paint films do not supply that extra toughness essential for the severe service floor paints must withstand, particularly in industrial plants, schools, and similar buildings subject to heavy floor traffic. They are not formulated for penetration, therefore the film is easily broken. Cemcoat Filler and Dustproofer is especially formulated for cement floors and is unaffected by water or by transient contact with acids, oils or solvents.

Cemcoat Filler and Dustproofer is recommended where dustproofing action is desired on concrete floors in addition to a colored, decorative effect. Available in eight colors, white, and transparent.

NOTE: Newly laid concrete floors and basement floors should not be painted until the concrete is thoroughly dry. However, where such floors are laid directly on the ground soil, it must be expected that in the majority of cases the concrete will absorb moisture from the ground. In such cases, we suggest priming the concrete floor with Cemcoat No. 273 Concrete Sealer, an alkali resistant primer, followed by a coat of Cemcoat Filler and Dustproofer. Write for detailed specifications.

COVERAGE: One gallon will cover 300 to 350 sq. ft. one coat, or 200 sq. ft. two coats.

SPECIFICATION:

FIRST COAT: Cemcoat Filler and Dustproofer reduced with about 20% turpentine.

SECOND COAT: Cemcoat Filler and Dustproofer.

NOTE: We will inspect concrete floors before painting and, where necessary, provide special directions.

CEMCOAT FUME RESISTANT EGGSHELL WHITE

Cemcoat Fume Resistant Eggshell White is especially recommended for protecting interior surfaces in industrial plants where fumes, gases and heat are present. Covers 350-400 sq. ft. per gallon, one coat.

SPECIFICATION: On new surfaces.

FIRST COAT: Sonneborn's Hide-N-Seal, applied as received.

SECOND COAT: Cemcoat Fume Resistant Eggshell White, applied as received.

MACHINERY AND EQUIPMENT ENAMEL

Sonneborn's Machinery and Equipment Enamel is a high gloss enamel of extreme durability, composed of active pigments ground in a tough, waterproof, elastic varnish.

Designed for interior or exterior use on metal equipment such as machinery, motors, engines, pipe lines, meters, fire alarm boxes, fire hydrants, etc.

For new work, two coats are recommended. Where necessary, new equipment should receive a coat of metal filler. Then apply one good flow coat of Sonneborn's Machinery and Equipment Enamel and follow with a second coat for uniform color and finish.

COVERING CAPACITY: About 250-300 sq. ft. per gallon, two coats, or 400-500 sq. ft. per gallon one coat.

SONNEBORN paints and enamels

CEMCOAT EXTERIOR FLAT

For Cement, Brick and Stucco

The ideal exterior paint for masonry is one formulated on the basis of Cemcoat specifications. Cemcoat Exterior is manufactured of the best grade of finely ground pigments (a more expensive method of securing opacity) and selected treated oils, balanced and prepared to give maximum exposure service. It acts as a dependable waterproof, decorative coating and is generally unaffected by the lime present in stucco, cement or brick.

Covers 150-200 sq. ft. per gallon, two coats, on masonry.

SPECIFICATION: On cement, brick and stucco.

First Coat: Cemcoat Exterior Flat reduced 20% with Cemcoat Reducer.

Second Coat: Cemcoat Exterior Flat. (Color as selected).

Third Coat: (If required)—Cemcoat Exterior Flat.

Cinder Block

Cemcoat Exterior Flat is suitable for cinder block, Haydite and similar porous blocks.

COVERING CAPACITY: Coverage varies with porosity of the blocks. First coat should cover 100 to 200 sq. ft. per gallon, the second coat about 125 to 225 sq. ft. per gallon.

P. & D. 2-COAT SYSTEM

Primer and Finish for Exterior Wood Surfaces

This system was designed because of economic conditions, changes in construction, and to provide a system of house painting that will permit a satisfactory two coat job, taking into consideration the wider use of woods of greater variety.

One of the distinct advantages of the P & D 2-coat System is that the priming coat has sufficient penetration to establish necessary adhesion to old paint and to new wood. This is accomplished by stabilizing absorption or penetration of the important oils so that the first or prime coat produces a sound foundation for the finish coat. Heretofore, because of the variable degree of absorption of oil in the first coat, safety demanded a second coat before the final coat to seal the surface sufficiently to protect and assure the durability of the job.

Our 2-coat system, using the special P & D Primer as the foundation coat on new or weather-worn surfaces, makes for speed and economy. Coverage of both primer and finish averages 750 sq. ft. per gallon per coat.

P & D 2-Coat System Primer is furnished in white. For the Finish Coat, P & D House Paint is manufactured in white and in a variety of attractive colors.

SPECIFICATION:

Priming Coat: P & D 2-Coat System Primer.

Finish Coat: P & D House Paint.

SONOLASTIC ALUMINUM PAINT

Ready-Mixed— for Exterior and Interior Use

Sonolastic Aluminum Ready-Mixed is so formulated as to utilize the leafing and covering capacity of metallic aluminum powder to the fullest extent. The synthetic vehicle employed contains polymerized, chemically inert hydrocarbons, and the combination is highly resistant to industrial vapors, fumes and gases.

Sonolastic Aluminum Ready-Mixed is superior to ordinary aluminum paints in protective efficiency, penetration into the sub-surface, absence of porosity, and retention of brilliance.

SPECIFICATION: Surfaces shall be thoroughly clean, dry and free from grease, rust, loose paint, etc.

New Work, Interior and Exterior: Cement, Brick, Plaster Wood, Wall Board:

1st Coat: Sonolastic Aluminum Ready-Mixed

2nd Coat: Sonolastic Aluminum Ready-Mixed.

Metal Surfaces, New and Old: Thoroughly remove mill scale or grease from new metal. Old rusty metal shall be thoroughly wire brushed.

1st Coat: S.R.P. No. 75 Red Primer

2nd Coat: Sonolastic Aluminum Ready-Mixed.

Sonolastic Aluminum Ready-Mixed may be applied to interior or exterior surfaces exposed to heat, provided the temperature does not exceed 200° F. When an aluminum finish is desired on surfaces previously painted and in good condition, one coat of Sonolastic Aluminum Ready-Mixed may be applied.

COVERING CAPACITY: On painted smooth non-porous surfaces, one gallon of Sonolastic Aluminum Ready-Mixed covers about 500 to 600 sq. ft., one coat.

On painted porous surfaces, such as cement, plaster, brick, one gallon covers from 300 to 400 sq. ft., one coat.

For priming new unpainted cement, brick or plaster, one gallon covers from 150 to 200 sq. ft., one coat.

ULTRA Heat-Resisting Aluminum Paint for Interior Metal Surfaces

Ultra Heat-Resisting Aluminum Paint is furnished in the form of separately contained aluminum paste pigment and the requisite amount of vehicle, to be mixed on the job, immediately before application.

The vehicle employed in Ultra Heat-Resisting Aluminum Paint enables the aluminum to adhere to metallic surfaces at temperatures up to 750° F.

COVERING CAPACITY: Approximately 500-600 sq. ft. per gallon, one coat.

Detailed instructions for the application of Ultra Heat-Resisting Aluminum Paint, including preparation of the surface, mixing of the paint and precautions which should be observed to insure a successful job, will be furnished upon request.

Western Asbestos Co.: Architectural Manual (1946)
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SONNEBORN rust preventive coatings

S. R. P.

Rust Preventive Coating for All Metal Surfaces

Every year rust and corrosion do more than $200,000,000 worth of damage to machine parts, buildings—everything made of iron, steel and many other metals. For this relentless and costly sabotage, oxygen aided by moisture is chiefly responsible. Industrial engineers and chemists know that oxygen in the air gets in its most destructive work if metal is exposed to the atmosphere alone. The presence of gases, acids, and alkalies speeds up the rate of damage by fortifying and adding to the activity of oxygen.

Why S.R.P. Means Protection—Inside or Outside—Sonneborn's S.R.P. has been developed specifically to meet the exacting needs of rust prevention. Its formula includes an active corrosion inhibitor of the chromate type, and an inert micronized, flaky iron ore (micaceous hematite) dispersed in a treated oil vehicle.

Penetrating—Tenacious—Alloys with Rust—Laboratory tests show that Sonneborn's S.R.P. actually penetrates through and combines with the rust to make a firm and lasting bond with clean metal beneath. It puts an end to further formation of rust that has already started, and forms a non-porous and impermeable coating which is highly resistant to corrosion. Its elasticity prevents the formation of pinholes and resists the damaging action of expansion and contraction or mechanical injury.

Easily Applied—No Expensive Preparation Needed—Simply wire-brush to remove loose scale or layers of foreign matter. Firm rust need not be removed. S.R.P. is applied with either brush or spray in the same manner as paint.

S.R.P. No. 75 for Priming—S.R.P. No. 75 is the perfect priming coat. Its especially micronized pigment is suspended in a treated oil vehicle. Dries in about 18 hours. Available in reddish shade only. Covering capacity between 500-600 sq. ft. per gallon one coat.

S.R.P. No. 87 Finish Coat—S.R.P. No. 87 contains the same pigment as S.R.P. No. 75 in a varnish vehicle. Especially recommended as a finish coat over S.R.P. No. 75. S.R.P. No. 87 is available in red or black. Covering capacity between 500-600 sq. ft. per gallon one coat. However any suitable metal finish coat can be applied over S.R.P. No. 75.

SPECIFICATION: Priming Coat: One coat S.R.P. No. 75 Red Primer. For priming metal surfaces, where maximum protection against rust and weather conditions is of the utmost importance. May also be used as a finishing coat on interior metal surfaces.

FINISH COAT: S.R.P. No. 87 Finish, red or black. If finishing coat is desired in some other color, Sonneborn's other metal paints may be used.

SERVICE AND DISTRIBUTION

The Technical Division at our home office, as well as our trained field representatives, will at all times be glad to assist in the solution of construction or maintenance problems involving:

- Wood Preservation and Finishing
- Paints and Enamels
- Rust Preventive Coatings
- Concrete Floor Treatment
- Waterproofing and Dampproofing
- Caulking

Literature descriptive of any Sonneborn Product is available upon request.
Prompt delivery and service is assured through conveniently located Sonneborn Distributors.

BUILDING PRODUCTS DIVISION

L. SONNEBORN SONS, INC.

88 LEXINGTON AVENUE NEW YORK 16, N. Y.

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★ build
★ modernize
★ maintain

Sonneborn

concrete floor treatment a
waterproofing b
dampproofing c
caulking d

Building Products Division
L. SONNEBORN SONS, INC.
NEW YORK 16, N. Y.

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LAPIDOLITH LIQUID (Patented)

For Wearproofing and Hardening Concrete Floors

The principle of wearproofing and dustproofing finished concrete floors through the application of a chemical hardener was pioneered in the United States by Sonneborn in the early 1900's. Ever since, the effectiveness of this method has been demonstrated on literally millions of square feet of concrete floors in buildings of every description under varying conditions of service.

The Liquid Concrete Hardener That Cannot Be Copied

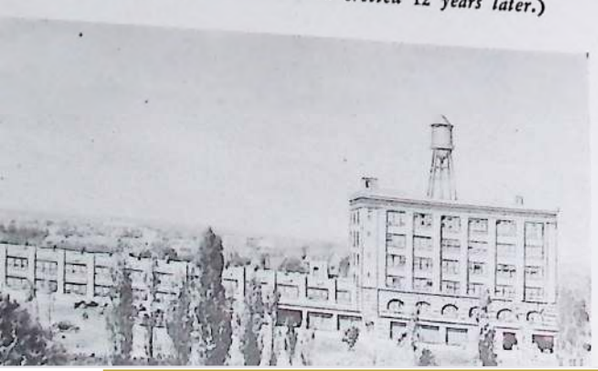
Consistent with the Sonneborn policy of constant research directed toward product betterment, our laboratories have developed a radical improvement in Lapidolith Liquid which increases notably the extent to which it penetrates into the structure of the concrete and assures even greater hardening action than has ever before been possible. This improvement is so basic, in fact, that Lapidolith Liquid is now protected by both U. S. and British patents.

Improved Wetting Action and Penetration

Two outstanding properties make Lapidolith Liquid unique:

1. Lapidolith Liquid has 100% lower surface tension than concrete floor hardening solutions of the fluosilicate type of the same concentration. This means deeper penetration—more thorough hardening.
2. The low surface tension assures a more effective reaction with the hydration products of cement because Lapidolith Liquid reaches into the tiny voids and capillaries which ordinary hardeners cannot penetrate. This *effective* penetration overcomes the "blocking off" caused by surface reactions to which ordinary hardeners are subject.

Southern Biscuit Co., Richmond, Va. Francisco & Jacobus, Architects. Wise Contracting Co., Contractors. (Lapidolith Liquid used in original building (right) and, again, in large addition erected 12 years later.)



These Photomicrographs Show How Lapidolith Liquid Hardens Concrete



Untreated Concrete
Enlarged 50 times
Note the large voids (black areas) and the extreme porosity of the surface.



Lapidolized Concrete
Enlarged 50 times
Note that the porosity is being overcome. The voids are beginning to fill with dense crystalline masses.



Lapidolized Concrete
Enlarged 120 times
Note that the cement matrix is completely filled and homogeneous. A continuous network of crystalline reaction products has eliminated all surface porosity.

Easy to Apply—No Wait, No Delay In Production

Concrete floors can be hardened and dustproofed with Lapidolith Liquid with no more effort than is required for a simple washing of the floor. *The floor can be used during the application.* It should be dry, clean and free from dust, oil or paint. New floors must be thoroughly set and dry before applying Lapidolith Liquid.

Concrete of average density requires about one gallon for each 100 sq. ft. of surface for the three applications. If floors are made of colored cement or terrazzo, send for special directions. Full instructions on how to apply Lapidolith Liquid simply and quickly are furnished with every shipment.

For White Cement Floors

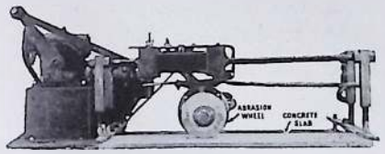
Lapidolith Liquid, applied to white cement floors, will insure a hard, dustproof and easily maintained surface; moreover, the use of Lapidolith Liquid protects the greater light reflectivity of the white cement.

SONNEBORN concrete floor treatment

MANY TESTS PROVE SUPERIORITY OF LAPIDOLITH LIQUID

TEST *for Hardness on Heavy Duty Floors*

The degree of hardness imparted to concrete by Lapidolith Liquid is confirmed by the following scientific evaluations*: Taking the abrasion index of untreated 1:2 concrete as 100, scientific tests, conducted by independent laboratories, of the effectiveness of Lapidolith Liquid in hardening concrete have shown that the treatment raises the abrasion index of the concrete to 225, or more than twice the value for the untreated surface. By comparison, a hardening treatment based on the use of surface aggregates raised the abrasion index to 167, or only two-thirds above the value of the untreated concrete.



**Obtained with modified Dorry Abrasion Testing Machine, illustrated at left.*

TEST *for Protection Against Oils*

This photograph shows a concrete block which was immersed in Oleic Acid for 10 weeks.

The left part of the concrete block was treated with Lapidolith Liquid and shows no change. The right part was left untreated and shows the destructive action of Oleic Acid.



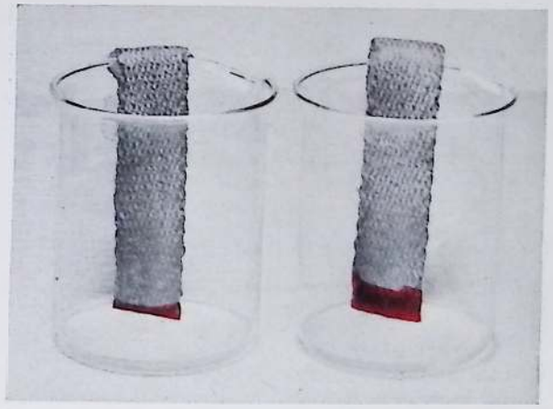
It is recommended that wherever concrete is exposed to oils it be treated with Lapidolith Liquid for protection. This includes surfaces in oil refineries, warehouses, garages, machine shops, engine rooms, packing plants, soap factories, creameries, etc. The range of uses for concrete floors and tanks is thus extended, since heretofore their susceptibility to destruction by animal, vegetable and mineral oils limited their use.

TEST *for Penetration*

Graphic proof of the more effective penetration of Sonneborn's patented Lapidolith Liquid is shown by the following test which was made by the Foster D. Snell, Inc., Laboratories:

The glass beaker shown at the right below contains Lapidolith Liquid to a depth of 1/10 inch, the one on the left 20° Baume Solution of commercial silicofluoride in the same amount.

Duplicate cotton wicks, previously treated with blue litmus solution and dried, were placed as shown in a vertical position. Since both solutions are acid in reaction to litmus, the wicks turn red at the line of contact.



But patented Lapidolith Liquid, due to its superior wetting action, rose in the wick to nearly 3/8 inch within a half hour while the solution of the commercial silicofluoride barely rose beyond the line of contact.

Here's what the Snell Laboratories say:

"The accompanying photograph is a clear and accurate record of the results obtained. . . It demonstrates clearly that Lapidolith Liquid has a much greater wetting power than an ordinary aqueous solution of commercial magnesium silicofluoride of approximately the same density."

TEST *for Dustproofness*

Concrete cubes, two weeks old, some treated with Lapidolith Liquid and some untreated, showed the following comparison after 200 revolutions of an abrasive disc.

	Grams
Untreated sample weighed before test	750
After the test	429
Loss in weight 41% or	321
Lapidolized sample weighed before test	770
After the test	742
Loss of only 3½% or	28

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The above tests confirm more than a quarter of a century of experience in the treatment of millions of square feet of concrete. Lapidolized concrete attains a degree of hardness which, when subjected to traffic, virtually makes it immune to dusting.

TEST *for Permeability*

Extensive tests were made and water forced under 30 lbs. pressure through pipes filled with untreated concrete and Lapidolized concrete. These tests showed that Lapidolized concrete permitted the passage of only one-tenth as much water as untreated concrete. The figures below represent cu. cm. of water which permeated the concrete in a given time:

TIME	UNTREATED	LAPIDOLIZED
1st min.	1.132 cu. cm.	0.135 cu. cm.
30th min.	0.186 cu. cm.	0.074 cu. cm.
60th min.	0.174 cu. cm.	0.048 cu. cm.

Because Lapidolith Liquid reduces the permeability of concrete, it reduces the risk of damage from freezing.

STANDARD SPECIFICATIONS:

LAPIDOLITH LIQUID

Specification No. 1:

Cement Finished Floors — Harden and dustproof all cement finished floors with Lapidolith Liquid chemical concrete hardener, manufactured by L. Sonneborn Sons, Inc., New York, N. Y.; applied in three applications, in accordance with manufacturer's printed directions.

Concrete floors should be allowed to age and cure for 10 to 14 days. All surfaces must be thoroughly clean.

Specification No. 2:

Cement Finished Floors — Harden and dustproof all cement finished floors with Lapidolith Liquid chemical concrete hardener, manufactured by L. Sonneborn Sons, Inc., New York, N. Y.; to be applied by the manufacturer's own Service Division and subject to a guarantee for the completed installation acceptable to the architect.

Specification No. 3:

Cement Finished Floors, Integrally Colored—Harden and dustproof all cement finished floors, integrally colored, with Lapidolith Liquid for Colored Floors, manufactured by L. Sonneborn Sons, Inc., New York, N. Y.; in strict accordance with the directions for applying Lapidolith Liquid to colored floors, to be furnished by the manufacturer.

Specification No. 4:

Terrazzo Floors—Harden and dustproof all Terrazzo finished floors, during the process of installation, with Lapidolith Liquid, manufactured by L. Sonneborn Sons, Inc., New York, N. Y.; as per manufacturer's printed directions.

NOTE: For decorating and protecting concrete floors, use Sonneborn's Cemcoat Filler and Dustproofer, described in Sweet's Catalog 14.

FERROLITH "H"

For Integrally Coloring and Hardening Concrete

Ferrolith "H" colored,* is an all-ferrous metallic concrete hardener and dustproofer containing a cement dispersing agent and pigments. The dispersing agent insures a denser, better hydrated mix and also serves to distribute the oxide pigments more evenly. The pigments incorporated in Ferrolith "H" have the greatest tinctorial value in addition to being fast, sunproof and alkali-resistant.

Colors—Standard** (no pigment added), Tile Red, Green, Brown, Gray and Maroon.

Quantity Required

For light duty floors .....30 lbs. per 100 square feet
For heavy duty floors .....40 lbs. per 100 square feet
For extra heavy duty floors....50 lbs. per 100 square feet

Specification—Ferrolith "H" (specify standard or colored) manufactured by L. Sonneborn Sons, Inc., New York, N. Y., shall be used in (*color selected by the architect*) and applied in accordance with the manufacturer's printed instructions.

*Formerly called "Harcol"
**Formerly regular Metallic Hardener.

CEMCURE

For Curing Concrete

Cemcure is a marked improvement over customary methods employed to maintain the water ratio of Portland cement concrete at proper levels during the cure, so as to assure greatest ultimate strength. Cemcure is a ready-to-use solution of synthetic waterproof components in a volatile diluent. It forms a membrane which seals in the gauging water needed to assure hydration and the development of full compressive strength.

The use of Cemcure eliminates the need for such coverings as straw, sawdust, wet burlap, etc. Cemcure is simply sprayed over the surface of the freshly poured concrete.

Cemcure has been widely and successfully used on major construction projects with uniformly satisfactory results.

Specification—Immediately after final troweling, or when concrete has reached its final set, or after the forms are removed, all (*mention areas, etc.*) are to be cured with Cemcure, manufactured by L. Sonneborn Sons, Inc., New York, N. Y., in accordance with the manufacturer's directions.

AIR-ENTRAINING ADMIXTURES AVAILABLE

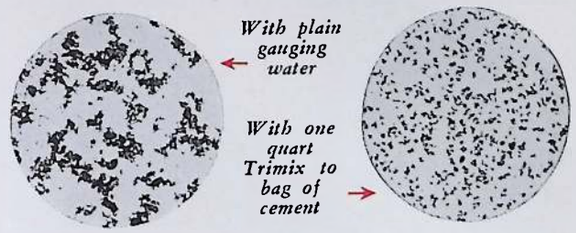
One of the most notable of recent advances in concrete technology is embodied in the discovery that air-entraining cements or admixtures produce concrete having remarkable resistance to the damaging effects of thawing and freezing. Sonneborn Research Laboratories have taken an active part in furthering this development. However, extensive tests for evaluation of the ability of our admixtures to impart such resistance were not completed in time for publication in these pages. When the data are available they will be released to architects, engineers and the construction field in general.

TRIMIX LIQUID

Admixture for Improving Quality and Workability of Concrete and Mortar

The importance of water cement ratio and early strength in concrete construction, whether below or above grade, is universally recognized in modern building practice. Diffusion of cement particles is a vital contribution to this end.

In the improved Trimix Liquid, diffusion of cement particles is achieved by the use of a patented surface active agent. Trimix, therefore, justifies itself due not only to its early strength-imparting efficiency, but because it effectively wets and scatters the cement particles *without in any way interfering with the hydration of the Portland cement.*



The photomicrographs reproduced above illustrate the degree of diffusion secured when Portland cement is gauged with plain water as compared with the diffusion obtained when Portland cement is gauged in water to which has been added one quart of Trimix per bag of cement.

The use of Trimix has many other advantages, briefly summarized as follows:

(A) 20% of the normal volume of gauging water may be omitted.
(B) Greater workability is secured, as measured by slump increase; with Trimix added to the gauging water, the slump ranges from six to seven inches, as compared to 2½ inches with the same amount of plain gauging water.
(C) Higher strength is obtained, due to the fact that the use of Trimix imprisons the gauging water used, and this lowers the evaporation, resulting in more thorough curing.
(D) A greater homogeneity of the mix is obtained with the addition of Trimix, because it tends to eliminate the tendency of water to segregate from the cement and aggregate particles.
(E) Trimix accelerates the attainment of early strength, produces concrete and mortar of greater water tightness and durability, and reduces shrinkage.
(F) Trimix also has *air-entraining properties* and therefore falls into the class of concrete admixtures capable of imparting resistance to the damaging effects of thawing and freezing.

Specification—Trimix Liquid, as manufactured by L. Sonneborn Sons, Inc., New York, N. Y., shall be used in proportions as recommended in the manufacturer's printed directions.

HYDROCIDE MORTAR ADMIXTURE

For Increased Workability, Bonding Strength, Reduced Mortar Shrinkage

Hydrocide Mortar Admixture is a powder composed of natural pozzuolana of superior lime reactive capacity and metallic soaps, designed to produce mortar of improved workability, more efficient bonding strength and reduced shrinkage.

The New York Testing Laboratories, after conducting tests using 1:3 mortar with and without the use of Hydrocide Mortar Admixture, report the following comparative results:

Characteristic (7 day)	With Hydrocide	Without Hydrocide	Change (per cent)
Strength, Bonding	20.5 lb. per sq. in.	15.7 lb. per sq. in.	30% increase
Strength, Compressive	1793 lb. per sq. in.	1426 lb. per sq. in.	25% increase
Shrinkage, per ft.	.0354 in.	.0510 in.	30% decrease

Specification—Integral Mortar Admixture shall be Hydrocide Mortar Admixture as manufactured by L. Sonneborn Sons, Inc., and used as per their printed directions.

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HYDROCIDE PASTE

For Integrally Waterproofing Portland Cement Concrete

A colloidal paste having the color of Portland cement, containing stearates and pozzuolanic materials miscible with water in all proportions.

Factors Governing Recommendation:

(1) Hydrocide Paste in general is recommended for use where normal water pressures are encountered.

(2) In the construction of concrete floors in cellars, basements and in general, directly upon underlying soil, the use of Hydrocide Paste is recommended since the action of the pozzuolanic ingredients reduces the free lime, permitting subsequent painting if specified.

Quantities Required—See table below.

Specification—Integral admixture shall be Hydrocide Paste or Powder as manufactured by L. Sonneborn Sons, Inc. and used in accordance with their printed directions.

HYDROCIDE POWDER

For Integrally Waterproofing Portland Cement Concrete

A fine powder having the color of Portland cement. Consists predominantly of a natural pozzuolana, plus metallic stearates.

Factors Governing Recommendation: Same as for Hydrocide Paste.

Quantities Required—See table below.

Specification—Same as for Hydrocide Paste.

HYDROCIDE PASTE No. 30

For Integrally Waterproofing Portland Cement Concrete

A colloidal paste containing stearates in the highest possible concentration consistent with easy dispersibility.



Farmers & Mechanics Savings Bank, Minneapolis, Minn. McEnary & Krafft, Architects. (Hydrocide Colorless used on outside stonework.)

Factors Governing Recommendation:

Hydrocide Paste No. 30 is recommended where unusual water pressures are encountered.

The high content of available waterproofing ingredients permits a substantial decrease in the amount necessary per bag of cement, as shown in the table below.

Specification—Integral admixture shall be Hydrocide Paste No. 30, as manufactured by L. Sonneborn Sons, Inc., used in the proportion of 6/10th lb. per bag of cement in accordance with printed directions.

HYDROCIDE EXTERIOR COLORLESS

For Exterior Masonry Walls Above Grade

A colorless liquid for exterior waterproofing of masonry walls, composed of a water-repellent colloid incorporated in special penetrating solvents, permanently stable in form, which when applied will not discolor or mar the original appearance of the masonry. Hydrocide Colorless is manufactured in two formulae, "G" and "D". Hydrocide "G" is for surfaces of low or medium porosity and Hydrocide "D" for surfaces of high porosity.

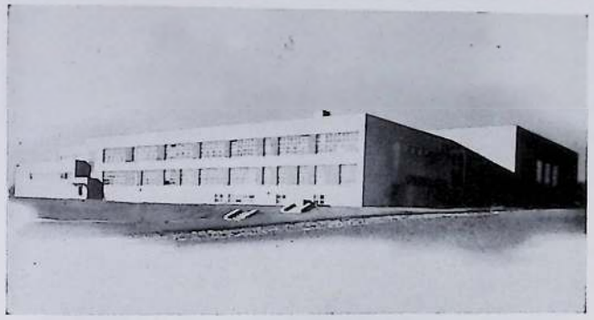
Table for Estimating Quantities of Hydrocide Paste, Powder and Hydrocide Paste No. 30 for Various Types of Work

	100 sq. ft. 1 in. thick			One Cubic Yd.			100 Cubic Ft.		
	Powder or Paste	Paste #30	Bags of Cement	Powder or Paste	Paste #30	Bags of Cement	Powder or Paste	Paste #30	Bags of Cement
1:2:3 Concrete	2 lbs.	1¼	2	7 lbs.	4¼	7	26 lbs.	15½	26
1:2:4 Concrete	2 lbs.	1¼	1¾	6 lbs.	3½	6	22 lbs.	13¼	22
1:2 Floor Finish	4 lbs.	2½	4	12 lbs.	7¼	12½	46 lbs.	27½	46
1:3 Brick Mortar	3 lbs.	1¾	3	9 lbs.	5½	9½	35 lbs.	21	35
1:2 Plaster Coat	4 lbs.	2½	4	12 lbs.	7¼	12½	46 lbs.	27½	46
1:3 Stucco	3 lbs.	1¾	3	9 lbs.	5½	9½	35 lbs.	21	35

Preparation of Surface—In the successful use of Hydrocide Colorless too much emphasis cannot be placed on the proper preparation of the surface. For instance, open cracks and defective joints should be repointed with a cement waterproofed with Sonneborn's Hydrocide Mortar Admixture. For work involving the use of a caulking compound, Sonneborn's Caulking Compound can be economically employed.

All defective joints and cracks should be repointed. Windows and door frames should be tightly caulked. Parapet walls should be thoroughly sealed with Hydrocide Mastic or other suitable compound of similar type.

Covering Capacity:—The covering capacity of Hydrocide Colorless will vary with the texture of the surface —80 to 100 sq. ft. per gal. for first coat; 150 to 200 sq. ft. per gal. for second coat.



Harrison Junior-Senior High School, Harrison, N. Y. Robert P. Vignoia, Architect. John A. Johnson Contracting Corporation, Contractors. (Hydrocide Mastic, Hydrocide No. 648, Hydrocide Powder and Sonneborn Caulking Compound used.)

HYDROCIDE MASTIC

For Structural Dampproofing Below Grade

(Trowel Application)

Hydrocide Mastic is a bituminous compound of plastic consistency, reinforced with high-grade asbestos fibre.

Covering Capacity:—From 15 to 20 square feet per gallon.

HYDROCIDE SEMI-MASTIC

For Structural Dampproofing Above and Below Grade

(Brush Application)

Hydrocide Semi-Mastic is essentially the same compound as the Mastic but has a consistency which permits application by brush or with suitable spray equipment.

(NOTE: May also be used as a plasterbond except for Portland cement mixtures.)

Covering Capacity:—From 30 to 35 square feet per gallon.

HYDROCIDE No. 648

For Exterior Dampproofing Below Grade, and for Stone Backing

A bituminous compound free from coal tar, applicable by brush or spray.

Covering Capacity:—From 65 to 85 sq. ft. per gal., first coat; approximately 125 sq. ft. per gal., second coat, depending upon porosity of surface.

HYDROCIDE No. 633

For Structural Dampproofing Above Grade, and as Plasterbond

A bituminous compound of heavy paint consistency, applicable by brush or spray. May be used either in lieu of furring or in combination with furring as an added factor of safety. Remains tacky for an exceptionally long period. Plastering may safely proceed in two days but not beyond 28 days after application.

(NOTE: Hydrocide No. 633 is not recommended as a bonding coat for Portland cement plasters. When using this product as a plasterbond on extremely smooth surfaces, the latter should first be mechanically roughened.)

Covering Capacity:—From 65 to 85 sq. ft. per gal., depending on porosity of surface.

Where, if used as a plasterbond, dampproofing is of equal importance, use two coats. Covering capacity for the second coat is approximately 100 sq. ft. per gal.

HYDROCIDE No. 600

For General Structural Dampproofing and Plasterbonding

(Brush or Spray on Dry or Damp Surfaces.)

A heavy-bodied bituminous emulsion containing not less than 55% asphalt.

Covering Capacity:—From 75 to 100 sq. ft. per gal., depending on character and condition of surface. Particularly useful where surfaces to be treated are so moist as to interfere with the application of solvent-type dampproofings.

Specification—The surfaces (enumerated) shall be treated with (specify product) as manufactured by L. Sonneborn Sons, Inc., in accordance with the manufacturer's printed instructions.

See next page for details on Sonneborn's Caulking Compound

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CAULKING COMPOUND

For Caulking, Pointing Up, Sealing, Glazing, etc.

Sonneborn has been identified with the manufacture of caulking compounds for many years. Sonneborn Caulking Compounds are synonymous with uniformly dependable products and the highest standard of service.

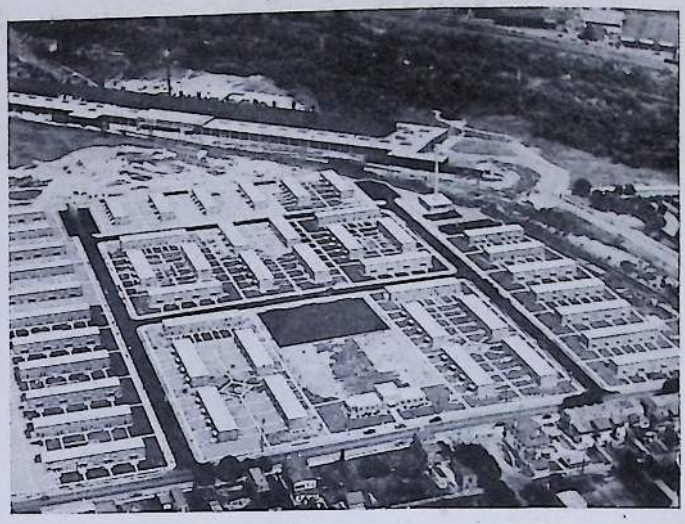
They are airproof, non-shrinking, waterproof and plastic. They cure to a tough film on the surface, but remain pliable and elastic underneath. They expand and contract with changes in temperature and do not sag or run out of vertical joints.

Sonneborn Caulking Compounds meet U. S. Bureau of Standards tests and are used extensively on federal projects as well as private projects in practically every section of the country under a wide range of climatic conditions.

They are available in two consistencies: knife and gun grade. The knife grade is easily applied with a putty knife or hand tool. The gun grade is lighter in consistency and is applied with a caulking gun.

Colors—White, Natural, Light Gray, Black.

Coverage—One gallon is sufficient to caulk approximately 150 linear feet, depending upon the depth and conditions of the job. Ordinarily, one gallon will caulk approximately nine windows, 4 x 7 feet, or will fill a joint ½ x ½ inch, for about 75 linear feet.



Glenside Homes Project, Reading, Pa. Harry Maurer, Architect. James E. Mast, Chairman, Housing Authority. John A. Johnson Contracting Corp., Contractors. (Sonneborn Caulking Compound used.)

In Cartridge Tubes—Sonneborn Caulking Compounds in Light Gray and White also in cartridges.

Specification—Caulking material shall be ..... grade, color ....., as manufactured by L. Sonneborn Sons, Inc., New York, N. Y., delivered to the project in sealed containers or in cartridges, and applied in accordance with manufacturer's printed directions

SERVICE AND DISTRIBUTION

The Technical Division at our home office, as well as our trained field representatives, will at all times be glad to assist in the solution of construction or maintenance problems involving:

- Wood Preservation and Finishing
- Paints and Enamels
- Rust Preventive Coatings
- Concrete Floor Treatment
- Waterproofing and Dampproofing
- Caulking

Literature descriptive of any Sonneborn Product is available upon request.
Prompt delivery and service is assured through conveniently located Sonneborn Distributors.

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L. SONNEBORN SONS, INC.

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