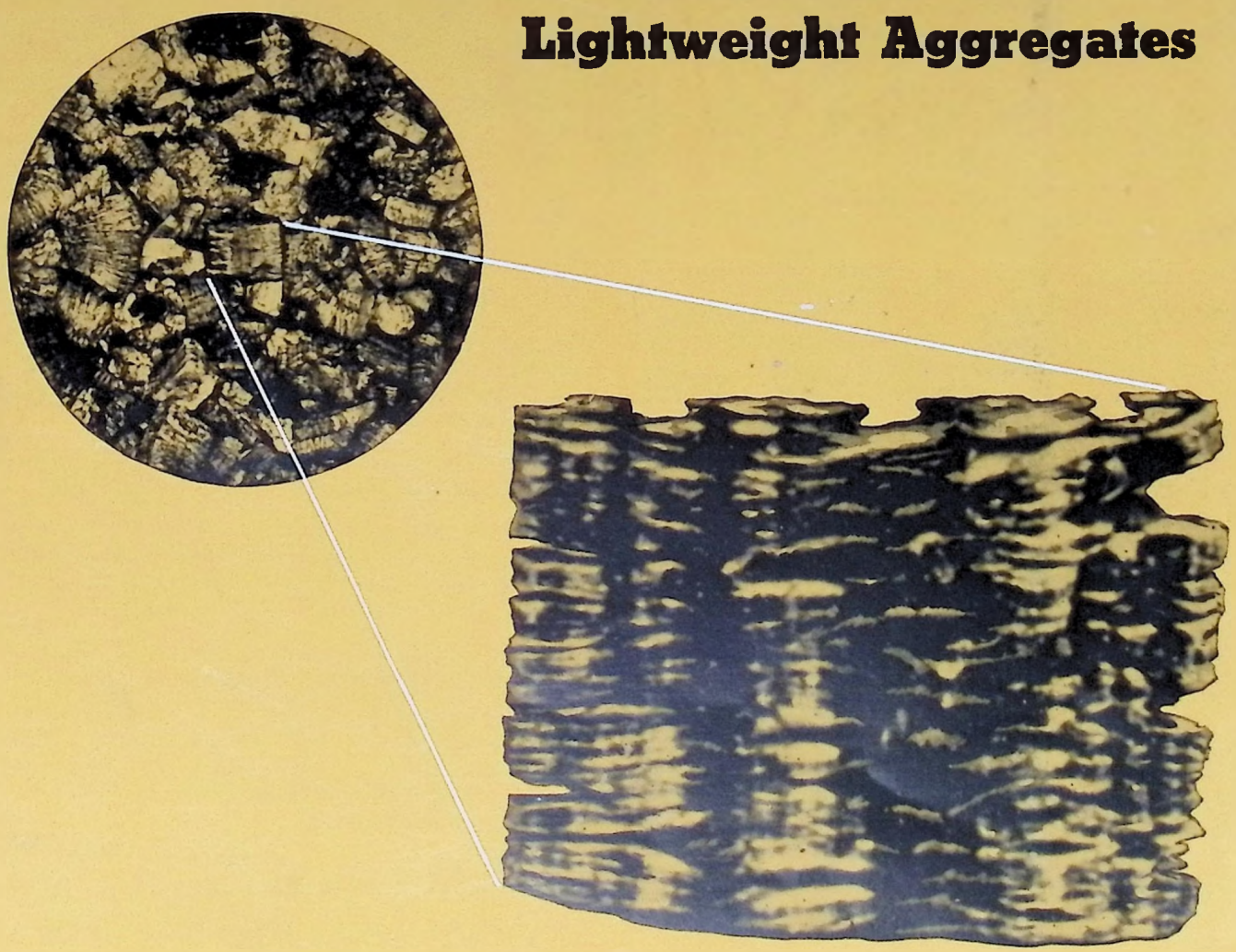
ZONOLITE

TRADE MARK REG. U. S. PAT. OFF.

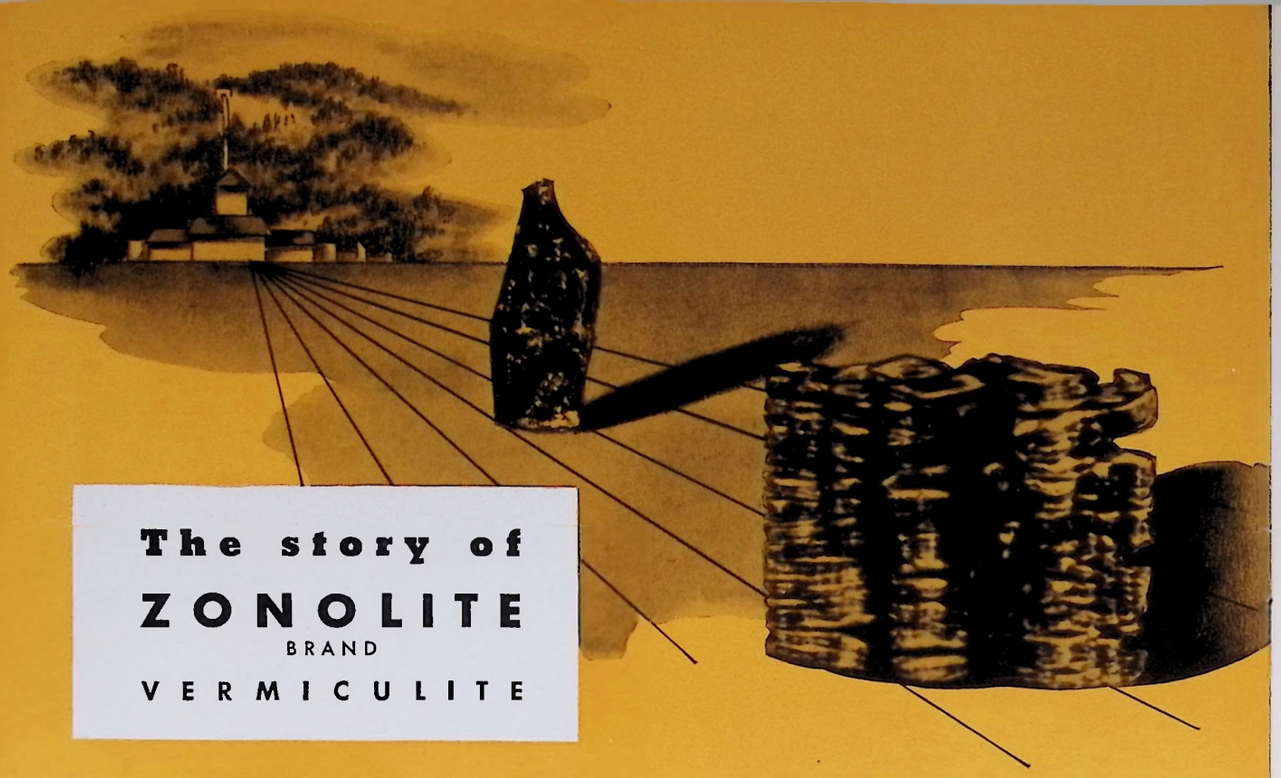
BRAND

VERMICULITE

Insulation and Lightweight Aggregates



Published by AsbestosClaims.Law
asbestosclaims.law/library/21302/1



The story of ZONOLITE BRAND VERMICULITE

The Story of Zonolite is the story of a new concept in building that affords architects and builders new freedom in design and construction. Two of the age old problems in building have been excessive weight and fire hazards. An amazing mineral discovered during World War I — Zonolite brand vermiculite — has been developed into a new industry that is on the threshold of revolutionizing building by greatly minimizing these problems.

A featherweight mineral that can be used either alone, or mixed as an aggregate with gypsum or portland cement, Zonolite brand vermiculite makes possible the reduction by millions of pounds the dead load in buildings, and at the same time greatly increases the fire safety. It is desirable for use in any type structure, whether for fireproofing steel columns in a giant skyscraper, or as a warm, dry, insulating concrete floor in an Iowa poultry house. Zonolite cannot possibly be burned. It is processed at 2000 degrees.

Zonolite brand vermiculite is a member of the mica family, but, unlike ordinary mica, it will expand when heated. It is the ability to expand when heated that makes Zonolite unique. The expanded material weighs from 5 to 8 pounds per cubic foot, and contains millions of tiny dead air cells that are natural insulators against the passage of heat. The raw material is mined principally at a huge vermiculite mine in Montana and from a somewhat smaller one in South Carolina. At the mines the crude ore is refined, cleaned and graded; then shipped to Zonolite factories in various parts of the United States and foreign countries, where it is processed.

Zonolite is graded to different sizes for specific uses. The standard grades include: Insulating Fill, Concrete Aggregate, and Plaster Aggregate. The physical characteristics of all grades are exactly the same—they combine light weight, fire safety, permanence and versatility.

Fill Type Insulation

A free-flowing, easy to apply, loose-fill insulation, Zonolite brand vermiculite is ideal for homes, commercial and industrial buildings, and cold storage plants. See Page 3 for further information.

Insulating Concrete Aggregate

Properly graded and treated, Zonolite concrete aggregate is mixed with portland cement to make a remarkably light and highly efficient insulating concrete. Some of the applications of this material are shown on Pages 4 and 5.

Insulating Plaster Aggregate

Weighing only 216 pounds per cubic yard, as compared to 2700 pounds for sand, Zonolite Plaster Aggregate mixed with gypsum is widely used for conventional plastering or fireproofing. Crack resistance and ease of application are added advantages. See Pages 6 and 7.

Zonolite Acoustical Plastic

Is a ready-mixed, fire safe acoustical plaster, combining incombustibility and high sound absorbing qualities at low cost. See Page 6.



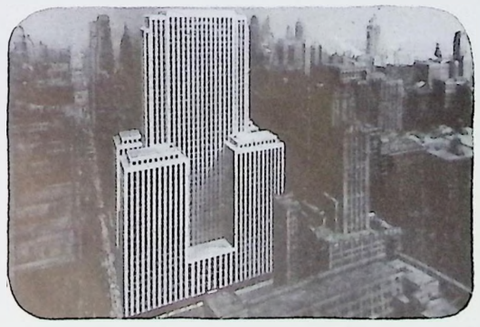
Zonolite insulation in attic of home. Lightweight — easy for worker to handle bag.



Pouring Zonolite Fill in loft of huge cold storage plant. Free flowing — rapidly installed.



Above plant—completing installation. See how Zonolite insulation fits snugly against joists.



Field Building, Chicago. Insulated with thousands of bags of Zonolite Insulating Fill.

ZONOLITE

Zonolite insulation · fill type

General — Zonolite Granular Fill Insulation is a lightweight, free-flowing material. It is usually installed in the attic right above the ceiling and in the side walls. Every space is uniformly filled, without seam or joint, to the proper density. Each granule consists of laminations containing millions of tiny dead air cells that resist passage of heat. Golden color reflects heat. Weighs about five pounds per cubic foot.

Easy Installation — Simply pour from bag and level off to even thickness. No special equipment or masks required. Will not harm or irritate skin. So simple to install anybody can do it.

Fireproof — Rotproof — Odorless — 100% fireproof. Not treated. Can't possibly burn. Absolutely rotproof, vermin proof and a non-conductor of electricity. Virtually unaffected by moisture. In case of high humidities or unusual moisture conditions, material will not be harmed or lose original characteristics.

Efficient — Because space in attics or sidewalls is uniformly filled, there are no voids, seams or breaks to cause "heat leaks". In attics it fits tight around joists. Highly desirable for residential, industrial and cold storage installations.

Twin Houses Prove Efficiency — Albert Kahn, prominent architect, designed two houses as a "proving ground" for Zonolite Insulating Fill. The houses, identical in every detail except that Twin A was not insulated and Twin B was completely insulated in ceiling and sidewalls with Zonolite Insulating Fill, were constructed side by side in Detroit.

Not only was Twin B far more comfortable to live in, but it actually accomplished fuel savings of $66.52 in a single heating season. (Present day fuel costs considerably higher — savings proportionately greater.) The cost of the Zonolite was $210.45. The following table shows the amazing annual return on that $210.45 investment:

	Gallons of Oil Used	Oil Cost @ 7½c Per Gallon
Twin A (Uninsulated)	2536	$190.20
Twin B (Insulated with Zonolite)	1649	123.67
Annual Fuel Savings	....	66.53
Cost of Zonolite*	....	210.45
Annual Return on Investment in Zonolite	....	31.6%

* Zonolite paid for itself in fuel savings in 3 years and 2 months.

The chart below shows the approximate area covered by one bag of Zonolite Granular Fill Insulation when installed at various thicknesses.

Thickness	2"	3"	3⅝"	4"	5"	5⅝"
Coverage per bag in sq. ft.	26	17	14	13	10½	9

Published by AsbestosClaims.Law
asbestosclaims.law/library/21302/2

Zonolite insulating concrete

General Characteristics

Zonolite Insulating Concrete is made by mixing Zonolite Stabilized Concrete Aggregate, a special grade of vermiculite, with portland cement and water. It is mixed in the same manner as ordinary concrete. The aggregate is treated chemically at time of manufacture to improve workability, bulk and lightness of the concrete, and at the same time impart a considerable degree of water repellency to the product.

Advantages

High Insulating Value—Zonolite Insulating Concrete has a high insulating value, one inch having a rate of heat transfer equal to 20 inches of ordinary concrete. It has sufficient crushing strength (from 5 to 20 tons per sq. ft., depending on the mix) to withstand all but the most unusual load conditions.

Lightweight—Zonolite Insulating Concrete weighs 1/7 as much as ordinary concrete or less than 2 pounds per square foot 1 inch thick.

Incombustible—Zonolite Concrete Aggregate is processed at 2000°. It cannot burn. Tests by the Underwriters' Laboratory on a floor construction incorporating Zonolite Insulating Concrete is given a four hour fire rating. This effectively protects against passage of heat and flame in case of fire.

Economical—The first cost, which is comparable to other insulating materials, is the last cost because Zonolite Insulating Concrete is permanent.

Time Tested—Over 250 million board feet of Zonolite Insulating Concrete are giving satisfactory service throughout the world.

Rot Proof—Moisture has no effect whatsoever on the life of Zonolite Insulating Concrete. If, for any reason, it should become wet, it will dry out without warping or buckling, retaining its original high insulating efficiency.

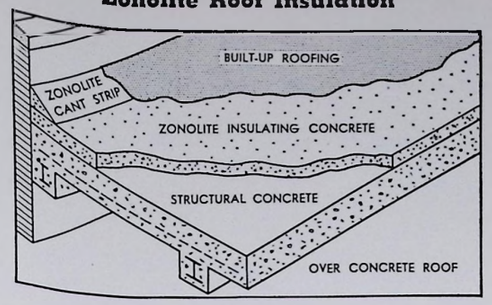
Vermin Proof—Zonolite Insulating Concrete provides no food or nesting material for vermin or termites, nor can they gnaw their way through it.

Permanent—Zonolite Insulating Concrete consists entirely of mineral or inorganic materials. It is not affected by destructive agents that limit its life or usefulness. Therefore, it need not be replaced during the life of the building.

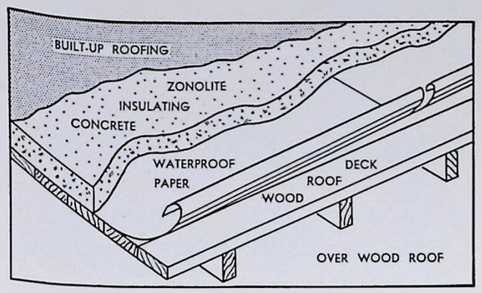
Physical Properties

Mix		(1-4)	(1-6)	(1-8)
Proportions:	Portland Cement (bags)	1	1	1
	Zonolite Stabilized Concrete Aggregate (bags) (1 bag contains approx. 4 cu.ft.)	1	1½	2
	Water (gallons)	13	19½	26
Density (lb. per cubic foot)		34	24	20
K (70°) (BTU/hr./sq. ft./inch)		0.79	0.65	0.60
Crushing Strength (lb./sq. inch)		240	115	70
Crushing Strength (lb./sq. foot)		35,000	16,500	10,000

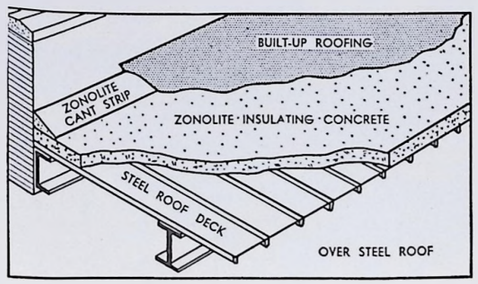
Zonolite Roof Insulation



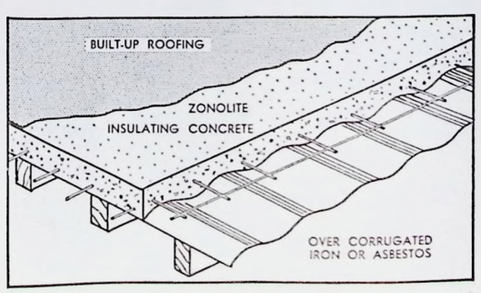
Zonolite Insulating Concrete over Concrete Roof



Zonolite Insulating Concrete over Wood Roof

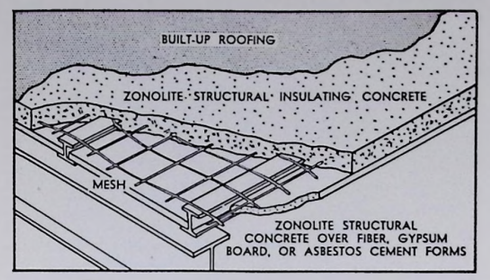


Zonolite Insulating Concrete over Steel Deck

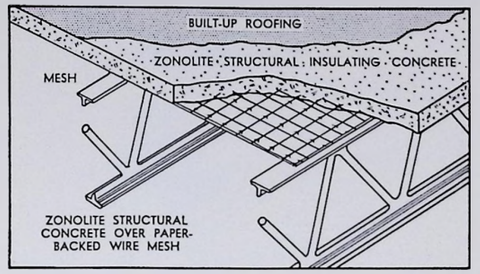


Zonolite Insulating Concrete over Corrugated Roof

Zonolite Short Span Structural Roof Deck

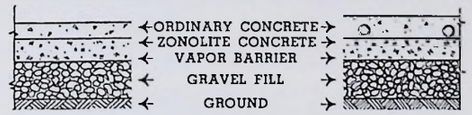


Zonolite Concrete over Gypsum Board Forms



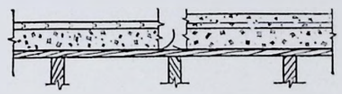
Zonolite Concrete over Paper-backed Wire Mesh

Zonolite Floor Insulation



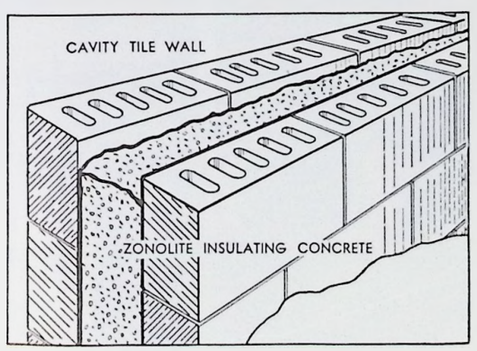
Zonolite Insulating Concrete Floor on Ground

Radiant Heat Pipes in Floor



Zonolite Insulating Concrete over Wood Floor

Zonolite Cavity Wall Insulation



Insulating Cavity Wall with Zonolite Concrete

ZONOLITE

Zonolite insulating concrete

Structural Roof Decks—Zonolite Insulating Concrete is widely used in Short Span Structural Roof Decks, in which the functions of insulation and structural strength are combined. Reinforcing steel, usually in the form of a welded wire mesh, is embedded in the insulating concrete. Illustrated are two common types of construction, one using a paper-backed lath called "Steeltex," and the other with welded mesh and supporting board forms of gypsum, asbestos cement or fiber. Hi-rib lath is also frequently used for supporting the insulating concrete. For this application, the usual proportions are 1 bag (4 cubic feet) of Zonolite Stabilized Concrete Aggregate to 1 bag portland cement.* A BUILT-UP roofing is applied directly to top of Zonolite concrete.

*For further information and specifications, write for folder CA-5.

Roof Insulation—Zonolite Insulating Concrete—because of its lightness, insulating value and permanence—is the ideal material for roof insulation on structural decks of other materials such as concrete, wood, steel, gypsum, etc. It is simply poured to the required depth (never less than two inches) over the existing structural deck and when cured, a built-up roof or other roofing material is applied according to customary practice.

This permanent insulating material has sufficient strength to withstand normal traffic on roofs, combined with flexibility and resiliency to resist cracking due to temperature changes. The chemical pre-treatment of the aggregate imparts a considerable degree of water resistance to the concrete.

CANTS, CRICKETS and SADDLES may be poured monolithically with the roof insulation. By varying the thickness of the Zonolite Concrete, proper slopes for roof drainage can be easily obtained.

For details and specifications, write for folder CA-2.

Floor Insulation—Warm, dry, grade level floors (with or without radiant heat) result whenever Zonolite Insulating Concrete is used as a base for the wearing surface. Heat losses into the ground are reduced to a minimum, saving fuel costs and greatly increasing comfort. On hot, humid days, condensation on floor surfaces can usually be avoided because of the low heat capacity of Zonolite Insulating Concrete. A topping, or wearing surface, must be used over Zonolite Insulating Concrete floors to prevent damage from traffic or heavy loads.

The diagrams illustrate how Zonolite Concrete is used in ordinary grade-level floors, and where radiant heat pipes are placed in the floor. Also shown are typical examples of how Zonolite can be used to insulate above-grade floors.

For details and specifications, write for folder CA-4.

Cavity Wall Insulation—Zonolite Insulating Concrete is finding increasing application as an insulating material in cavity walls constructed of brick, clay, tile or concrete block. Very lean mixes, having the maximum insulating value, are generally used.

*The physical properties of this mix are shown at the bottom of Page 4.

Zonolite Company: Zonolite Insulation and Lightweight Aggregates (c. 1947)
ACL Doc 21302 · Page 3 of 5
Published by AsbestosClaims.Law
asbestosclaims.law/library/21302/3

Zonolite insulating plaster

Zonolite Plaster Aggregate—weighing only 8 pounds per cubic foot, as compared to 100 pounds for sand—is rapidly replacing sand in gypsum plaster. It is graded to the standard sizes specified for sand aggregates and is included in the Standard Specifications for Gypsum Plastering, which specifications were sponsored by the American Society for Testing Materials and the American Institute of Architects. It is used in the same manner and proportions (volume) as sand. No special precautions are necessary. Ease of handling and elimination of dead load usually makes Zonolite Plaster cost less.

All three: architect—plasterer—owner—benefit when Zonolite Plaster is specified. Architects prefer Zonolite Plaster because of the weight reduction and fire protection it offers. (See Page 7). The plasterers like it because it is light in weight and easy to mix and apply. It comes in clean paper bags, eliminating contamination, and the trouble of frozen sand in the winter. Can be mixed indoors. Simplifies cleaning up after the job is finished. And the owner prefers it because of its crack resistance and the additional insulation afforded by its use. Zonolite Plaster has nearly four times the insulating value of sand plaster. Because the weight of the building is reduced, settlement cracks are frequently eliminated.

For details, send for Plaster literature.

Zonolite acoustical plastic

Zonolite Acoustical Plastic is a factory mixed material, requiring only the addition of water before being applied by ordinary plastering procedures. Filling a long felt need for an incombustible, low cost, sound deadening material, it is widely used in churches, restaurants, theatres, offices, bowling alleys, class rooms, homes—wherever quiet is particularly desired. It will stick to any clean, firm, water resistant surface. "When applied to combustible surfaces it will reduce the flame spread, contribution of fuel and production of smoke."*

The high sound absorption characteristics of Zonolite Acoustical Plastic, even after several coats of water-base paint, are shown in the table below. (For specifications for mixing and applying write for folder PA-5.)

*Underwriters' Laboratory Retardant 2850, April 30, 1946, Page 18.

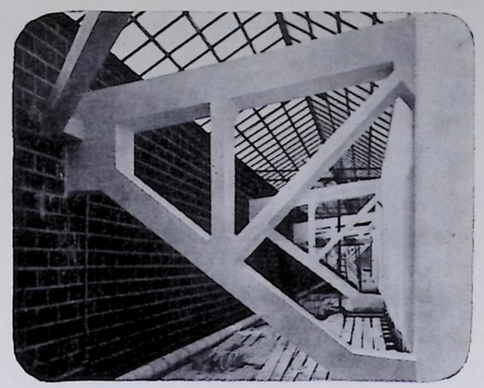
Sound Absorption Test

Coefficient of sound absorption recorded for Zonolite Acoustical Plastic ½" thick after being painted with 2 and 4 coats of Kem-Tone.

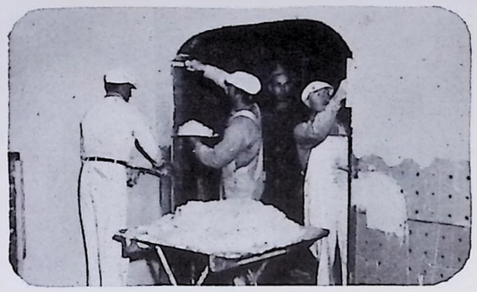
FREQUENCY (cycles per second)	COEFFICIENTS* 2 coats	COEFFICIENTS* 4 coats
128	.31	.30
256	.32	.37
512	.52	.59
1024	.81	.84
2048	.88	.74
4096	.84	.65
Noise Reduction Coefficient	.65	.65

*As determined by a Nationally known laboratory.

Meets Federal Specifications SS-A-111, Acoustic Materials, Type II, Classes I and FF.



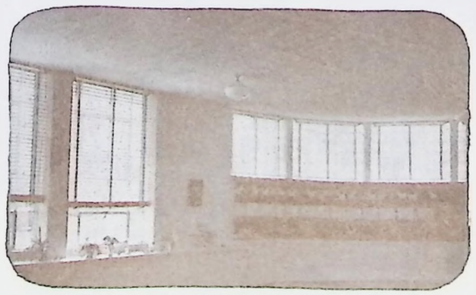
Trusses fireproofed with Zonolite plaster. Tons of dead load eliminated by this method.



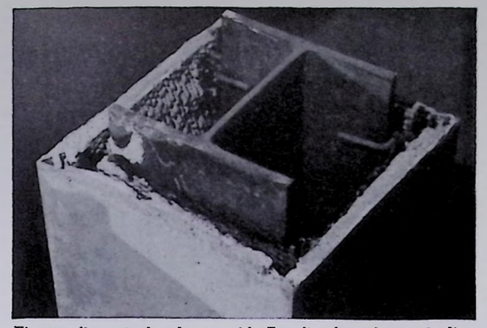
Plastering team at work on interior of home. Easy workability and light weight of Zonolite Plaster decreases fatigue and increases efficiency.



Picture nails will not chip or crack Zonolite plaster. Cracking virtually eliminated.

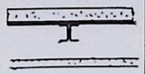
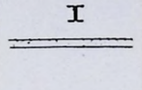
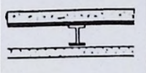
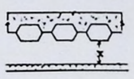
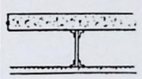
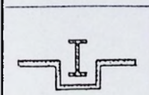
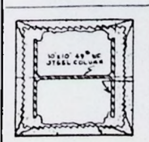
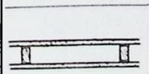


Schoolroom sound conditioned with 100% fireproof—"fire-safe"—Zonolite Acoustical Plastic.



Fireproofing steel column with Zonolite brand vermiculite plaster aggregate and gypsum.

Summary of Fire Tests

Construction	Description	Rating	Authority
	**Steel Plate Floor Assembly.** 2" vermiculite concrete topping. Suspended ceiling 1" vermiculite plaster on metal lath.	4 hrs.	Underwriters' Lab. Rel. No. 2773—9/12/44
	**Steel Plate Floor.** Suspended ceiling of 1" vermiculite plaster, on metal lath as protection for steel construction. Incombustible construction above ceiling.	4 hrs.	Underwriters' Lab. Rel. No. 2773—1/20/47
	**Steel Plate Floor.** 2½" sand concrete topping. Ceiling of 1" vermiculite plaster on metal lath.	4 hrs.	U.S. Bureau of Standards BMS92 Table 44
	As above, except ¾" vermiculite plaster.	3 hrs.	
	**Cellular Steel Floor.** Minimum of 2" cinder concrete fill. Suspended ceiling of ⅞" vermiculite plaster on metal lath for protection of cellular steel.	4 hrs.	Underwriters' Lab. Rel. No. 2689-12/18/39
	**Steel Joist Floor.** 2½" sand concrete fill 1" vermiculite plaster on metal lath.	4 hrs.	U.S. Bureau of Standards BMS92 Table 43
	Steel Joist Floor. 2½" sand concrete fill ¾" vermiculite plaster on metal lath.	3 hrs.	
	**Steel "I" Beam Protection.** Suspended protection of 1" vermiculite plaster on metal lath. Incombustible construction above ceiling.	4 hrs.	Underwriters' Lab. Rel. No. 2773—1/20/47
	**Steel column protected with 1" vermiculite plaster on metal lath.** Lath spaced 1¼" from column flange. Space behind lath on flange faces filled with plaster as shown.	3 hrs.	Underwriters' Lab. Rel. No. 2851—1.7.47
	**Load-bearing wood stud partition.** Metal lath with ¾" vermiculite plaster both sides.	1 hr.	Underwriters' Lab. Rel. No. 2773—8/31/44

*1-4 Enc. Steel Plate Floors.

Fireproofing structural steel

With Zonolite Plaster

General

The outstanding property of Zonolite Insulating Plaster is its ability to stop the passage of heat and flame. Like many other materials of construction, Zonolite Plaster will not burn. However, due to its unusually high insulating value, heat passes through Zonolite Plaster very slowly—so slowly, in fact, that one inch of this lightweight material is given a four hour rating for the protection of structural members.

See typical fire ratings for various applications at the left.

Weight Reduction

The possibilities of weight reduction offered by Zonolite Plaster, when used for fireproofing in the place of concrete and allied materials, are unusual. When stone concrete is used to obtain a four hour rating as protection for structural steel beams, the concrete weighs approximately 190 pounds per linear foot for a 15" I beam. This same beam may be protected with one inch of Zonolite Plaster on metal lath, in which case the plaster and lath will weigh about 19 pounds, giving a 90 percent reduction in weight for the protection material.

In one large 35-story office building recently constructed, the weight of concrete fireproofing for the steel frame had initially been estimated at 15 million pounds. Redesigning for Zonolite Plaster on metal lath, the total weight of plaster required was 855,000 pounds, or a reduction of over 14 million pounds (94 percent).

This saving, coupled with an equally large saving in weight due to the use of Zonolite protection for the cellular steel floor system, resulted in a saving of 1880 tons of structural steel in the entire building, or a 30 percent reduction in the amount of steel originally called for.

Additional Savings

Zonolite fireproofing plaster provides both the finished surface, as well as the needed fire protection. Ordinarily, where appearance is important, a plaster finish is necessary on concrete protected construction. The very substantial saving possible with Zonolite is self-evident. The total cost, materials and labor for fireproofing by this method about equal the cost of forming alone for poured concrete. Fireproofing with Zonolite Plaster eliminates the cost of the concrete, reinforcing, labor of placing, dismantling forms and providing an additional plaster finish.

In the adjoining column, a summary of fire tests is shown. Complete reports are available for any of these tests.

Zonolite Company: Zonolite Insulation and Lightweight Aggregates (c. 1947)
ACL Doc 21302 · Page 4 of 5
Published by AsbestosClaims.Law
asbestosclaims.law/library/21302/4



Comparing volume of Zonolite brand vermiculite to sand at equal weights. Zonolite vermiculite weighs 4 to 8 lbs. per cu. ft. depending on grade—sand 100 lbs. per cu. ft.

Fire-proofing

Steel columns and floor fireproofed with Zonolite brand vermiculite. Dead load reduced 15,634 tons. Mercantile Bank, Dallas, Texas.



Acoustical

Luggage Store, Rochester, N. Y.



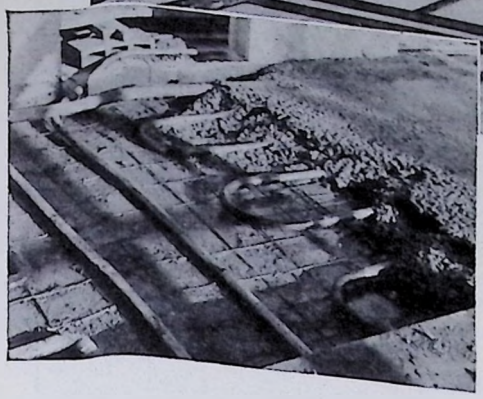
Zonolite Acoustical Plastic sound conditioning Esquire Theater, Sacramento

Floors

Radiant heat pipes being installed over Zonolite insulating concrete. Arella Photo Studios, Dearborn, Mich.



Covering radiant heat pipes with ordinary concrete — pipes resting on Zonolite insulating concrete. Bowling Green State University, Bowling Green, Ohio.

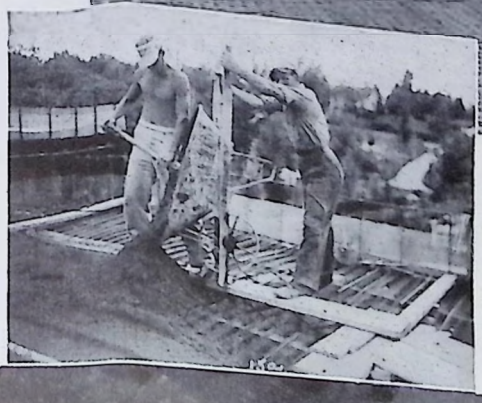


Roofs

Zonolite insulating concrete poured over paper-backed wire mesh to form structural roof deck. Omaha, Neb.



Installing structural roof deck — pouring Zonolite insulating concrete over reinforced metal lath. Atlanta, Ga.



Zonolite insulating concrete over steel deck—4 acres of roof area. Lily Tulip Cup Co., Augusta, Ga.



ZONOLITE IS THE REGISTERED TRADE MARK OF ZONOLITE COMPANY, 135 S. LA SALLE ST. CHICAGO 3, ILLINOIS

FORM G-24
PRINTED IN U.S.A.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21302/5