ASBESTOS

TEXTILES AND TEXTILE PRODUCTS



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ASBESTOS TEXTILES AND TEXTILE PRODUCTS

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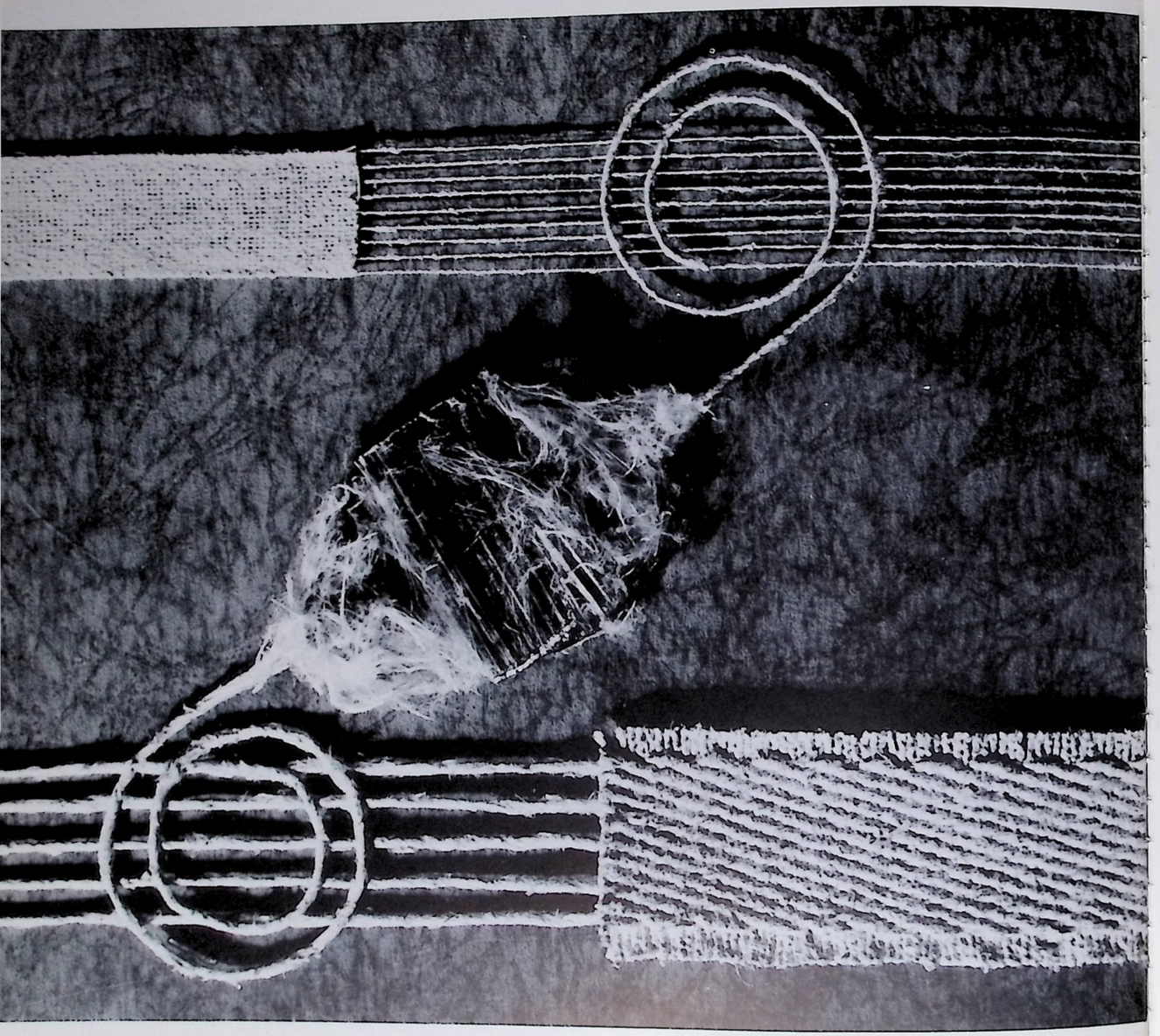
ASBESTOS

TEXTILES AND TEXTILE PRODUCTS

By
JESSE M. WEAVER

RAYBESTOS-MANHATTAN, INC.
INDUSTRIAL SALES DIVISION
MANHEIM, PENNA. NORTH CHARLESTON, S. C.
Branch Offices: CHICAGO: 1732 S. Michigan Ave. NEW YORK: 120 Broadway

EVERYTHING IN ASBESTOS TEXTILES



FROM CRUDE ASBESTOS TO FINISHED PRODUCT

FOREWORD

RAYBESTOS-MANHATTAN, INC. presents in this book authentic statistical and descriptive information on asbestos textiles and textile products. The faithful factual presentation of this material will make the book a valuable reference work and trustworthy guide. It gives the user of asbestos textiles easily understood information on grades, design, use and performance. The photographic illustrations are faithful reproductions of products taken from general stock.

This book is presented as the most complete and authoritative work on asbestos textiles ever produced. As such it will serve as both a text-book and a buyers' manual.

Progressive ideals, exceptional facilities for research and development, long experience in manufacturing and large plant capacity place Raybestos-Manhattan, Inc. in a leading position in the asbestos textile industry. Many of the asbestos products in common industrial use today were originated by this company.

Raybestos-Manhattan, Inc. offers the services of its technical staff on any question concerning the use of asbestos textiles.

ASBESTOS

ASBESTOS—a natural mineral material—has contributed immensely to the advancement of man's welfare and to the attainment of higher standards of living. Its remarkable properties have made it a necessity in many industries, in transportation and in the building trades. The development of the electrical industry is due in great measure to the physical properties of asbestos. Without asbestos to control the energy of motor vehicles it is quite unlikely that millions of people would have a livelihood dependent on the automotive industry; that a marvelous system of highways would be a reality in the United States; that our everyday life would have been so greatly changed by the use of automobiles. Asbestos safeguards mankind, adds to his enjoyment, promotes his health and serves him in many hidden ways, for asbestos does its work unseen as a vital part of innumerable articles.

The word *asbestos* denotes a group of minerals, fibrous in physical similarity and having in common a high degree of immunity to heat, but differing in appearance, chemical composition and intrinsic value.

Six varieties are recognized by mineralogists. Three of them are commercially important, and one of the three, *chrysotile*, is predominant in occurrence, production and usefulness.

Chrysotile is green, pearl-grey or light yellow in the vein, but white when fibreized and so slender that individual fibres are microscopic in diameter. *Crocidolite* is grey-blue as fibre and in cloth, somewhat rough and not so fine in comparison with chrysotile. *Amosite* occurs as shaggy grey or brown fibre, unfit for spinning but excellent as heat insulation.

Nature combined hydrogen and oxygen as water of crystallization, with silica, magnesia, iron, alumina, sometimes soda, and occasionally lime, to make the different kinds of asbestos. Every species contains most of these constituents, but they occur in quite different amounts, although each one adheres somewhat closely to a narrow variation in percentage.

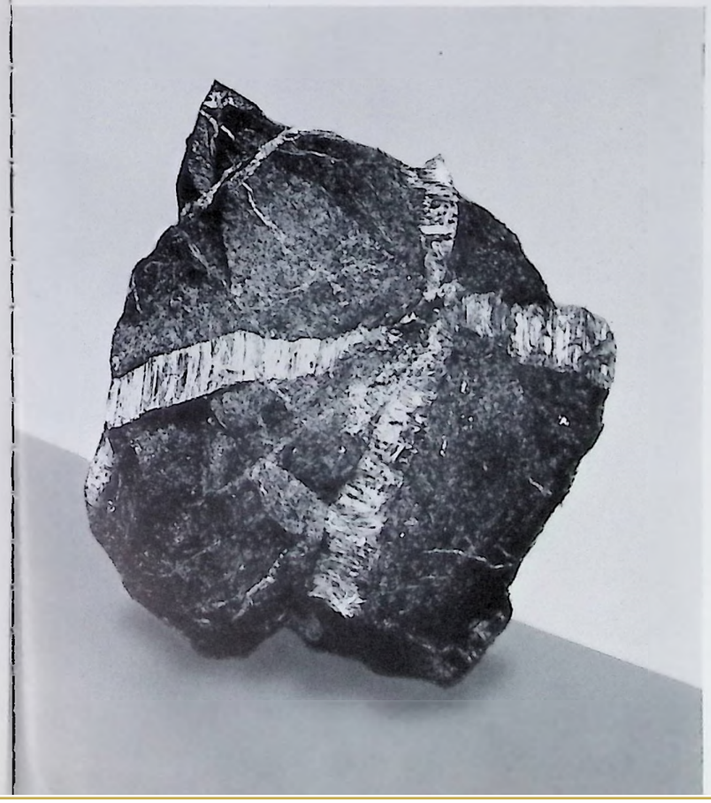
The variations in percentage of the different elements, though not very wide, are significant. They affect the quality of the fibre (regardless of its *grade*). Much experience and knowledge, as exemplified in the time-trained personnel of Raybestos-Manhattan factories, are necessary in selecting and blending asbestos to produce inherent quality in asbestos textiles. Consumers should be aware that *grade*, which is a percentage classification, is not the only measure of worth in asbestos textiles—but that there is also an intangible factor of quality which time and service disclose. *Grade* in fibre means only length of fibre; *grade* in textiles means percentage of asbestos. The *quality* of the fibre—regardless of length and percentage—determines, together with intelligent and skillful manufacturing, the genuine worth of every Raybestos-Manhattan textile and textile product.

TYPICAL ANALYSES OF ASBESTOS

	CHRYSOTILE				CROCIDOLITE	AMOSITE
	Arizona	*Canadian*	*Rhodesian*	*Russian*	*African Blue*	
	a	b	c	c	d	e
MgO	42.05	41.41	39.9	38.8	2.64	3.96
SiO_2	41.56	40.49	40.9	39.4	51.64	50.24
H_2O	14.31	14.06	13.9	14.4	4.01	3.00
Fe_2O_3 and FeO*	.64	2.53	2.4	6.5	34.38	39.80
Al_2O_3	1.27	1.27	1.5	0.9		
CaO			0.2	0.3	.05	tr.
Na_2O					7.11	2.12
	99.83	99.70	98.8	100.3	99.83	99.12

a Analyst, R. E. Zimmerman, Cited in Bulletin 118 Ariz. Bureau of Mines.
b Average of 11 analyses from F. Cirkel.
c Henry Joseph, Mellon Institute Fellowship.
d Dana, System of Mineralogy, 6th Ed.
e C. Gardthausen.

* Although it is customary to report iron as ferric and ferrous oxides, it occurs combined in the silicate and as free magnetite, Fe_3O_4.



CHRYSOTILE ASBESTOS is found as veins in serpentine rock. Veins are seldom parallel. Note the many directions of large and small veins in this photograph from Canada, courtesy Asbestos Corporation, Ltd.

Much rock is blasted, crushed and screened to free the veins of asbestos. Then the asbestos is crushed and otherwise manipulated to "open" and separate the fibres, to make them fine and fit for spinning.

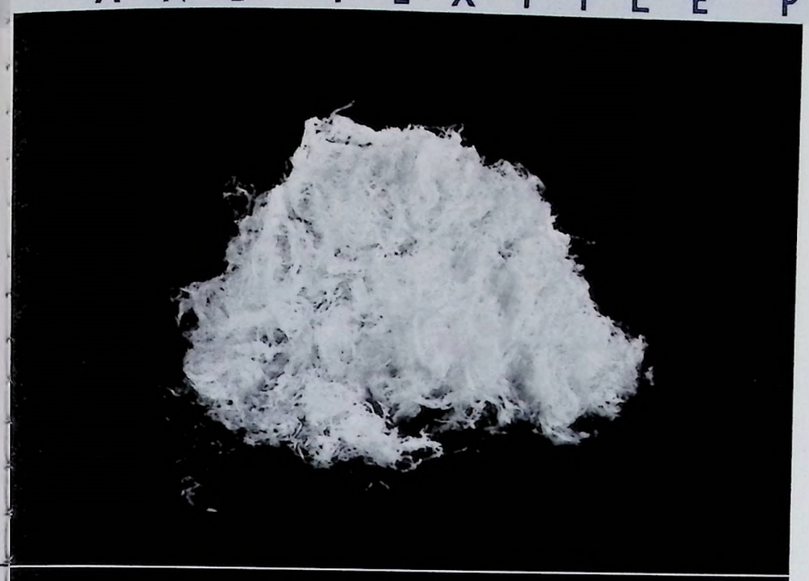
CARDED AND PROCESSED FIBRES

CARDED ASBESTOS FIBRE is pure 100% asbestos produced by working fibreized "crude" asbestos into finer division by separating, screening, combing and carding operations. The thoroughness and extent to which these operations are carried out determine the fineness of the finished product while the type and length of the crude stock establish the various grades.

Raybestos-Manhattan carded asbestos fibres are supreme in finish and in choice of types to meet every requirement in filter clarification of liquids, such as beer, wine, oil and acids. Carded fibre mixed with oil and graphite is a convenient packing for stuffing boxes.

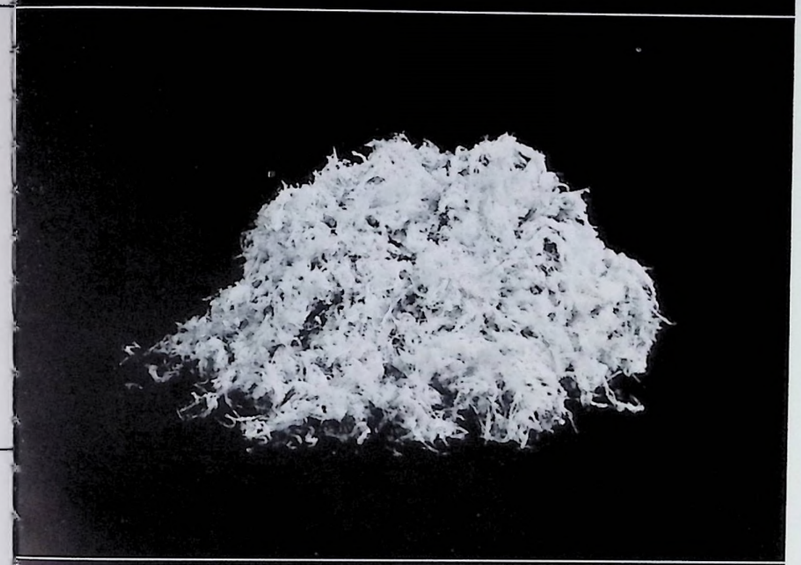
It adds to the effectiveness and appearance of radiating gas grates and heaters. It is a safe "snow" for holiday decoration.

STYLE NO.	TYPE AND GRADE
329 Carded	Canadian No. 1 Crude
321 "	Shabanie No. 1 Crude
320 "	Canadian 50/50 Nos. 1 and 2 Crude
330 "	Canadian No. 2 Crude
316 "	Shabanie No. 2 Crude
319 "	Canadian 50/50 Mill Fibre and No. 2 Crude
18333 Combed	A blend of long spinning fibres processed through opening, screening, separating and combing operations for wire-wiping pads. A superior blend that mats firmly and wipes without scratching.



CARDED ASBESTOS FIBRE

For filtering and clarifying liquids, packing, "snow," etc.



COMBED ASBESTOS FIBRE

For Wire-Wiping Pads.

ASBESTOS FILTER FIBRE

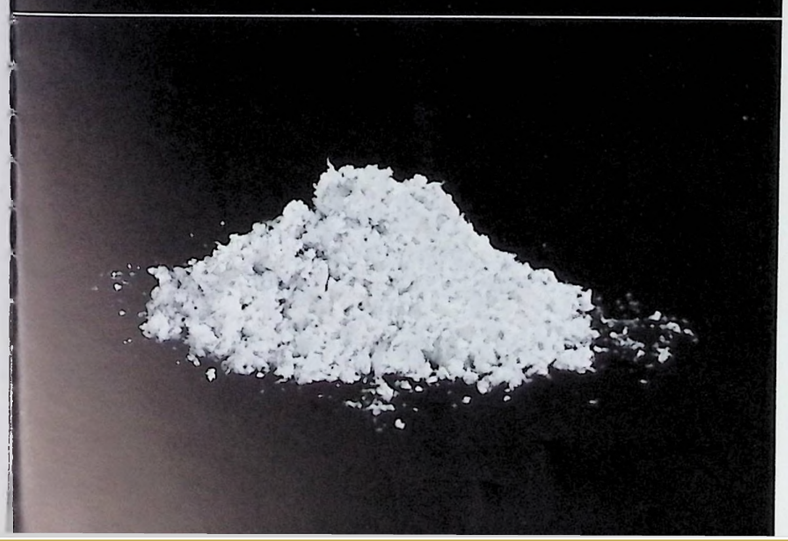
This is a distinctive type of chemically treated asbestos prepared as a filter bed for clarifying spirits, wines, beers and other beverages. It is superior to vegetable filter fibres in its immunity from bacterial attack. Exceedingly fine and most effective for perfect filtration of thin fluids. Also used in Gooch Crucibles.

BLUE ASBESTOS FIBRE

This type of asbestos, a silicate of iron and sodium, is more resistant than other types to acid action and is especially well adapted for filtering hydrochloric, sulphuric and nitric acid solutions.

SHIPPING PACKAGES

CARDED FIBRE: ¼, ½ and 1 lb. boxes; 10 and 25 lb. cartons; 50 lb. bbls.
FILTER FIBRE: 5, 10 and 25 lb. cartons.
COMBED FIBRE: 100 lb. bags.
BLUE FIBRE: 100 lb. bags.



ASBESTOS FILTER FIBRE

Purified, chemically-treated asbestos which makes a bed having high filter value with adequate permeability. Especially prepared for quantitative analyses of precipitates by the Gooch Crucible method.

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STANDARD GRADES

The word *grade* in the asbestos textile industry indicates a system of classification based on percentages of asbestos in the finished product.

STANDARD GRADES*	ASBESTOS CONTENT BY WEIGHT
Commercial	75% up to but not including 80%
Underwriters	80% " " " " " 85%
Grade A	85% " " " " " 90%
Grade AA	90% " " " " " 95%
Grade AAA	95% " " " " " 99%
Grade AAAA	99% to 100% inclusive

The grade most satisfactory for a given purpose depends on a number of service conditions:

1. Maximum temperature.
2. Whether high temperature is continuous or intermittent.
3. Electrical requirements, if any.
4. Tensile requirements, if any.
5. Acid conditions.
6. Caustic conditions.

In general the temperature limits for the grades in degrees Fahrenheit are as follows:

Commercial	up to 400° F.
Underwriters	" " 500° F.
A	" " 550° F.
AA	" " 600° F.
AAA (Plain)	" " 800° F.
AAAA (Plain)	" " 900° F.
AAA (Wire Inserted)	" " 1000° F.
AAAA (Monel or nichrome wire ins.)	" " 1750° F.

Strength decreases rapidly above 800° F. in grades below AAAA.

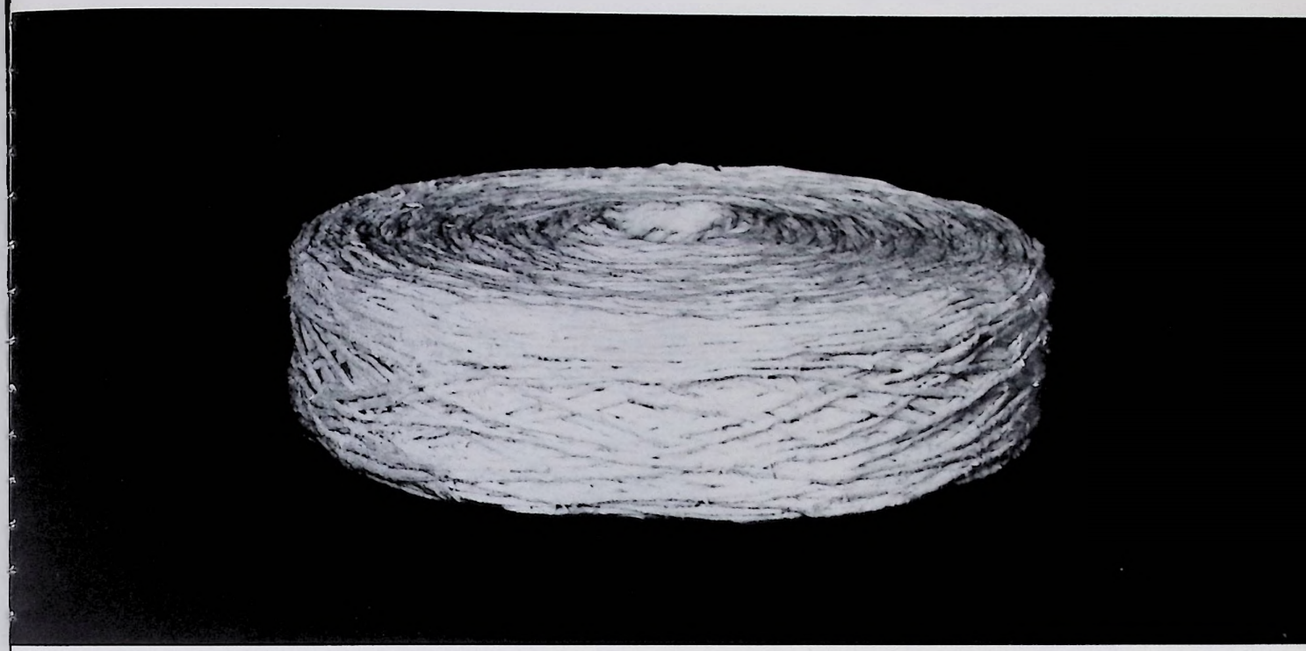
Caustic and acid conditions require Grade AAAA.

Underwriters grade serves most electrical requirements.

Grades A and AA are indicated for superior electrical insulation under heat conditions.

* Grades established by the American Society for Testing Materials. See A.S.T.M. specification D-299 for test methods to determine grades.

ASBESTOS ROVING



CHEESE

Roving is regularly supplied in

2 TYPES	Plain and Reinforced
3 GRADES	Underwriters, A and AA
2 VARIETIES	Ferrous and Non-Ferrous
STANDARD CUTS	5-cut to 14-cut *
HALF CUTS	*e. g.*, 4½ and 6½ cut are available subject to tolerances of nearest standard cut.
COLORS	Standard in natural "white" but available in grey, blue, green, red, yellow, etc.

Packages are wrapped individually in tissue paper.

Cases contain approximately 250 pounds.

For further information see pages 12 and 13.

* The word *cut* denotes a 100-yard unit in designating asbestos roving numbers. For example, 7-*cut* roving measures 700 yards per pound avoirdupois, subject to the tolerance on page 13.

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ASBESTOS ROVING

Asbestos roving is a textile product designed for insulating electrical conductors such as heater cord, heat-resisting fixture wire and electric cable for ship wiring. It is an assemblage of carded fibres rubbed into a single strand without twist. Raybestos-Manhattan roving is composed of selected asbestos which has unequalled qualities for the purpose in its low content of impurities such as iron, lime and soda. Thorough mixing, carding and rubbing produce a uniform strand of maximum strength for ease of application.

Types *Asbestos Roving* is composed of a mixture of chrysotile asbestos and cotton or other fibre.

Reinforced Asbestos Roving is composed of a core of cotton or other yarn covered with a mixture of asbestos and other fibre.

Form Roving varies in fluffy or smooth appearance according to degree of rubbing.

Grades Three grades, Underwriters, A and AA, meet practically all specification requirements. Grades AAA and AAAA can be supplied in the heavier cuts.

Varieties The varieties are *ferrous* and *non-ferrous*. The amount of iron tolerated in the two varieties in standard specifications is as follows:

	TOTAL IRON CONTENT MAXIMUM %	MAGNETIC IRON CONTENT MAXIMUM %
Ferrous Roving	6.00	2.00
Non-Ferrous, Underwriters Grade	1.75	0.75
Non-Ferrous, higher grades *	2.00	1.00

* As the asbestos content increases, so too does the probability of iron. Due to the advantage Raybestos-Manhattan maintains in obtaining supplies of asbestos for roving from mines known to produce fibre with the smallest percentage of impurities, R-M roving is well under the standard stipulation regarding iron.

Colors Roving is naturally a very slight shade off pure white. It is available in colors: grey, blue, green, red, yellow, etc.

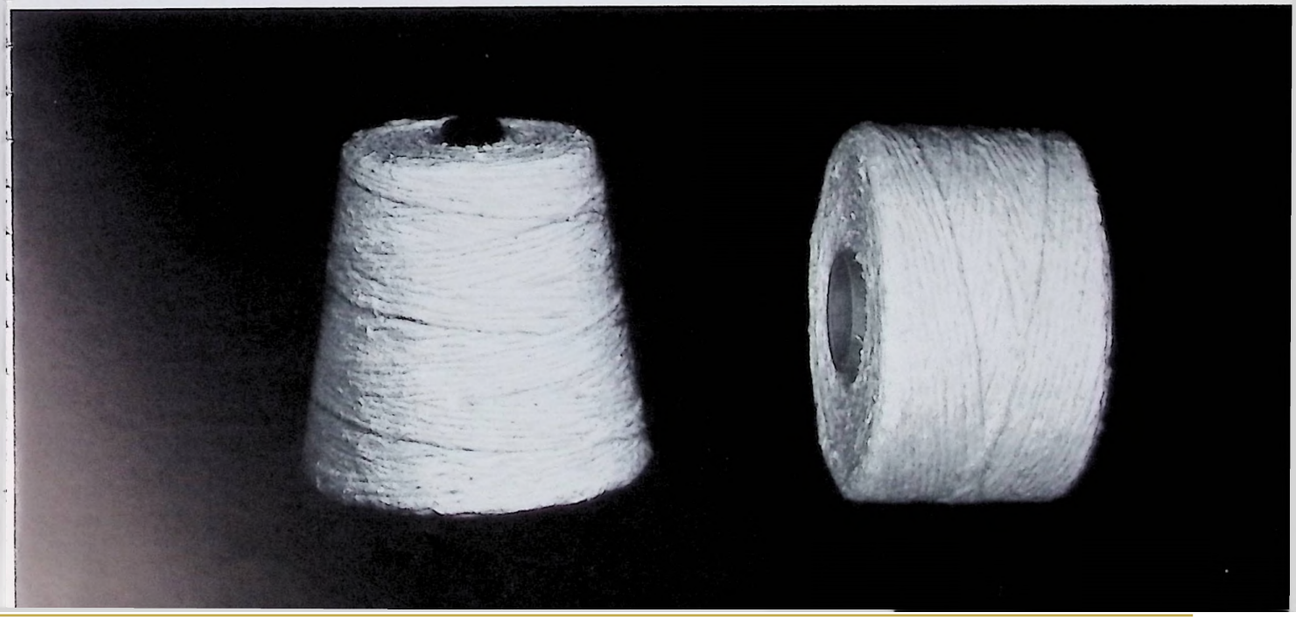
Packages Roving comes from the card as a "cheese." The general demand is for cones, wound to outside diameter of 4¼" at the base, 2⅞" at the top, with a traverse of 4¼" on a 4⅜" long paper cone. Also it is supplied wound on paper tubes, in sizes required by purchaser's wrapping machines. When ordering roving the kind and size of package, with directions for winding, should be specified.

Sizes The sizes established by practice as standard for roving are:

CUT DESIGNATION	NOMINAL YARDAGE PER POUND	A.S.T.M. STANDARD TOLERANCES IN YARDAGE PER POUND
5-cut	500	450 to 549
6-cut	600	550 to 649
7-cut	700	650 to 749
8-cut	800	750 to 849
9-cut	900	850 to 949
10-cut	1000	950 to 1049
12-cut	1200	1150 to 1249
14-cut	1400	1300 to 1499

Test methods for grade, yardage and iron, approved as standard, will be found in specifications D-375-37 issued by the American Society for Testing Materials. Raybestos-Manhattan roving meets all the stipulations in those specifications.

CONE TUBE



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ASBESTOS YARNS

RAYBESTOS-MANHATTAN yarns cover a range in sizes running beyond the general practice of the industry. Manufacturing technique and skill of many years' experience, applied to the processing of the world's finest output of asbestos fibre, have resulted in adding 40-cut, 50-cut and 60-cut to the list of fine asbestos yarns. Raybestos-Manhattan produces asbestos yarn for every known purpose and invites inquiries whether the requirement is for a single case or for carloads.

Asbestos yarn is a strand of twisted fibres. Asbestos fibres only are used for Grade **AAAA** yarn. Asbestos and cotton are used for other grades. Various types comprise:

Single-ply yarn.

Multi-ply yarn: 2-ply, 3-ply, etc.

Plain, or

Non-Metallic: Yarn without reinforcement.

Reinforced: Yarn with an insert of cotton or other yarn or wire.

Asbestos-Metallic: Plain yarn plied or twisted with wire. "Metallic yarn" and "wire-inserted yarn" are synonymous with "asbestos-metallic" yarn.

Asbestos-Metallic yarn is *regular* when made with brass or copper wire insertion. It is special when made with zinc, monel, nichrome, stainless steel, nickel-manganese, or other fine wire. The general practice is to use .008" wire, with a tolerance of .001" in diameter.

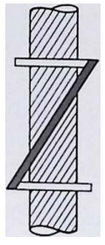
Sized yarn has a coating of sizing, for which there are a number of starches and gums that may be used.

Endless yarn is spliced, without knots, and is produced only in plain, plied construction, with or without sizing, as ordered.

Cord Construction yarn is made by a process which produces a more uniform strand at the expense of slower production.



S TWIST



Z TWIST

"A yarn or cord has S twist if, when held in a vertical position, the spirals conform in slope to the central portion of the letter S, and Z twist if the spirals conform in slope to the central portion of the letter Z."—A.S.T.M. designation.

The word *cut* preceded by a number indicates the number of single-ply asbestos yarn, in units of 100 yards per pound. Thus, 10-cut single yarn measures ten hundred yards per pound, subject to a plus or minus tolerance. See table, page 15.

YARN NUMBERS

The system used by Raybestos-Manhattan to designate the cut-number of asbestos yarn also indicates its formation, *i.e.*, whether single or multi-ply and whether plain or wire-inserted. The cut is designated by the first figure in three-figure numbers, and by the first two figures in four-figure numbers. The next figure gives the number of plies, and the last figure shows whether the yarn is plain (indicated by a cipher), or asbestos-metallic, the number of strands of wire being indicated. Examples:

No. 810 is 8-cut, single-ply, plain yarn.

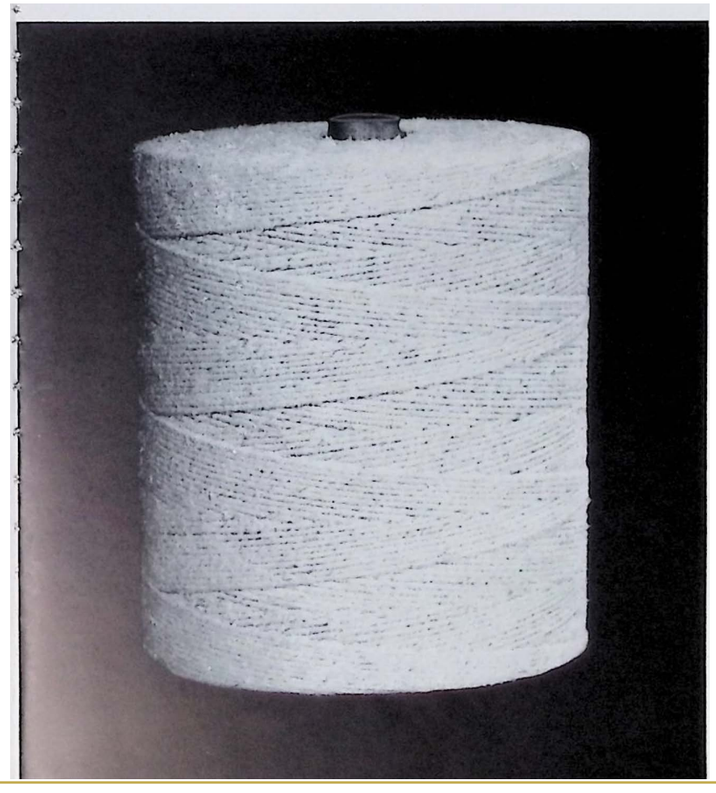
No. 811 is 8-cut, single-ply, 1-wire metallic yarn.

No. 1022 is 10-cut, 2-ply, 2-wire yarn.

No. 1420-20s/2 cotton—designates a 1420 yarn reinforced with 2-ply cotton yarn of count 20.

TABLE OF STANDARD SIZE ASBESTOS YARNS

CUT DESIGNATION	NOMINAL YARDAGE PER POUND	PERMISSIBLE RANGE OF VARIATION IN YARDAGE	CUT DESIGNATION	NOMINAL YARDAGE PER POUND	PERMISSIBLE RANGE OF VARIATION IN YARDAGE
5-cut	500	450 to 549	20-cut	2000	1900 to 2099
6-cut	600	550 to 649	22-cut	2200	2100 to 2299
7-cut	700	650 to 749	24-cut	2400	2300 to 2499
8-cut	800	750 to 849	26-cut	2600	2500 to 2699
9-cut	900	850 to 949	28-cut	2800	2700 to 2899
10-cut	1000	950 to 1049	30-cut	3000	2900 to 3099
12-cut	1200	1150 to 1249	35-cut	3500	3300 to 3699
14-cut	1400	1300 to 1499	40-cut	4000	3800 to 4199
16-cut	1600	1500 to 1699	50-cut	5000	4750 to 5250
18-cut	1800	1700 to 1899	60-cut	6000	5750 to 6250



*"Note: Example:—The permissible variation for the average of twelve skeins of 10-cut is 950 to 1049 yds. per lb. The permissible variation for individual skeins of 10-cut shall not be greater than 900 to 1099 yds. per lb.

"The yardage per pound of plied plain asbestos yarn shall be the single-ply yardage (subject to the permissible variation) divided by the number of plies, and then corrected by deducting the contraction caused by twisting.

"The yardage per pound of metallic asbestos yarn is less than that of plain yarn of the same cut in proportion to the weight of the inserted wire.

"The yardage per pound of sized yarns, single or plied, shall be subject to a tolerance of minus 2 per cent in comparison with the corresponding untreated yarn."

*Quoted from A.S.T.M. Specification D-299.

Yarn is put up on paper tubes with Universal or Foster winding, as ordered. Tubes of various sizes are supplied to meet customers' requirements, and wound with traverse and diameter called for.

Shipped in strong cardboard cases, metal strapped.

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ASBESTOS THREAD—MANTLE YARN

Raybestos-Manhattan asbestos thread, known also as mantle yarn, is designed for hand and machine sewing and for tying mantles. Strength, smoothness, uniformity and finish are paramount in R-M threads. Machine thread has Z twist.

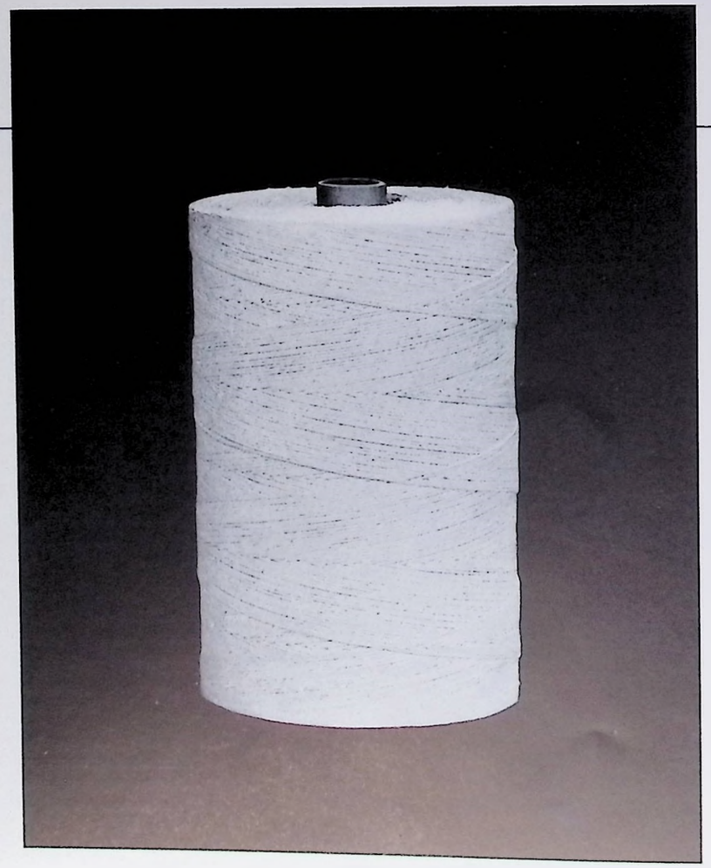
Two types, plain and reinforced with wire, are standard. The wire insertion customarily used is monel, nichrome or nickel-manganese.

Asbestos thread is immune to loss of strength from mildew, weathering and aging.

Thread for mantle manufacturers is wound on tubes in 1 lb., 2 lb. or 5 lb. packages. For sewing it is wound on tubes or cones as ordered. Orders should specify the type and size of package.

STYLE NO.	YDS. PER LB.	TENSILE STRENGTH
216	750	6 lbs.
218	900	5 "
316	500	10 "
324	760	8 "
330	900	6 "
635	550	12 "
1621 Nichrome	580	7½ "
3031 Monel	600	9 "
3561 Monel	400	15 "

Tolerances are 10% plus or minus.



ASBESTOS CORD

Raybestos-Manhattan asbestos cords are made to specifications formulated by our laboratories to meet the special requirements of various industries. Glass factory cord has a durable finish that prolongs its "life" and avoids injury to the finest glassware. Cord for the electrical industry is tenacious, will not untwist, is even in diameter and sustains high temperatures with the minimum change in character. Asbestos-Metallic cords having brass, copper, monel, stainless steel or other fine wire are available for severest service conditions. See page 18 for wire-wiping cord.

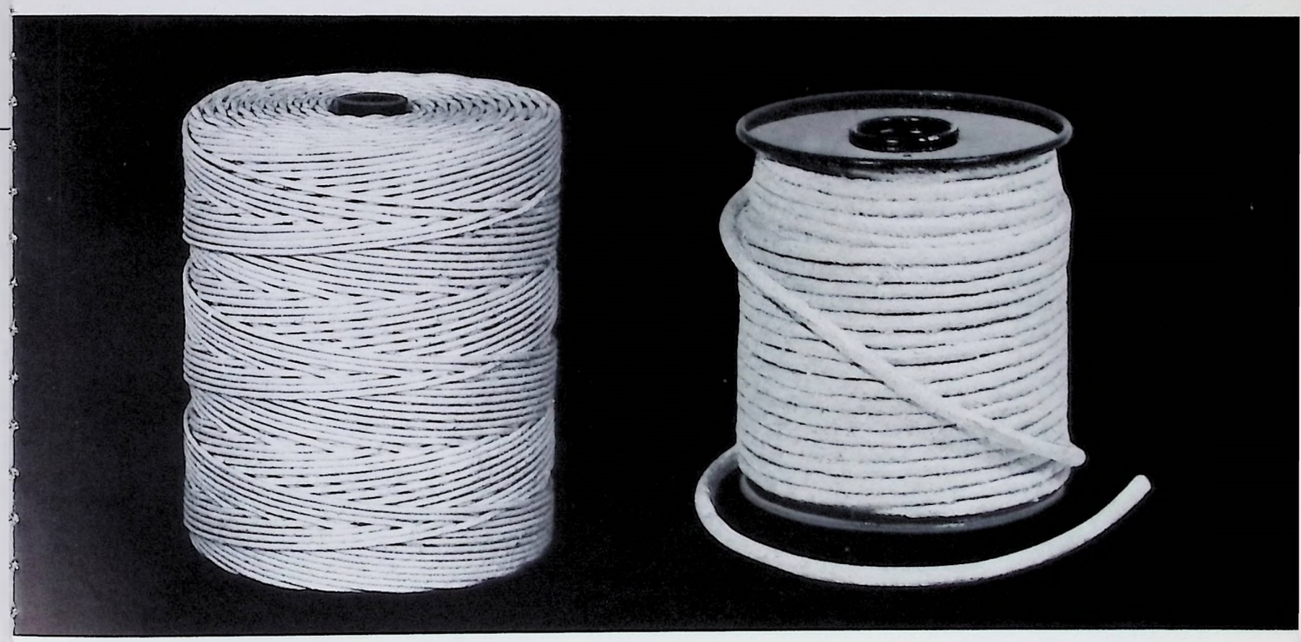
Asbestos cord is a twist of either single or plied yarns, or a braid over a yarn core, with braid over braid for the larger diameters. Twisted cord is supplied unless braided is specified.

Endless cord, a strand without knots, is a hand-spliced twisted cord of uniform diameter.

Cord is *plain* when supplied without a sized finish. General practice is to supply sized cord unless plain is specified.

Raybestos-Manhattan has developed a specially treated cord to resist abrasion at high temperatures, as in the glass industry.

TWISTED CORD BRAIDED CORD



Style No.

310-P	Twisted Cord of plain yarn, not sized.
310-S	Twisted Cord of plain yarn, sized.
310-BT	Twisted Cord of plain yarn, heat treatment.
310-M	Twisted Cord of metallic yarn, not sized.
310-MS	Twisted Cord of metallic yarn, sized.
315-P	Braided Cord of plain yarn, not sized.
315-S	Braided Cord of plain yarn, sized.

Sizes: 1/16", 3/32", 1/8", 3/16", 1/4", 3/8".

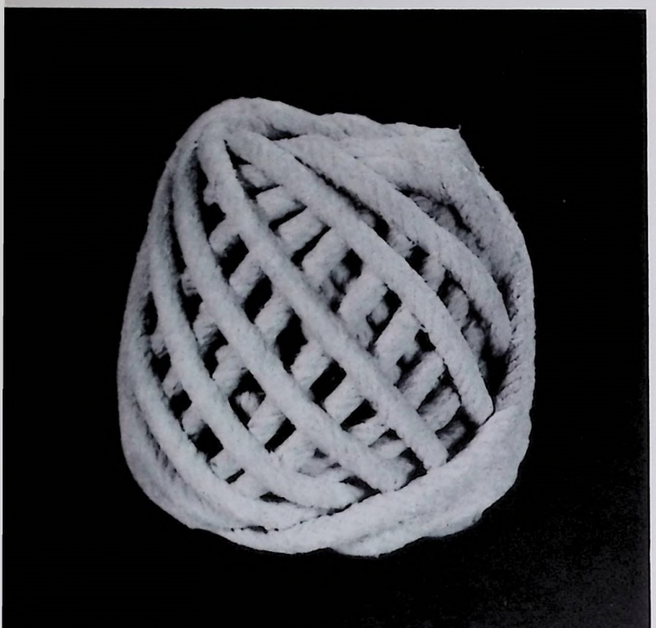
Packages: 5 and 10 pound tubes; 10, 25 and 50 pound reels.

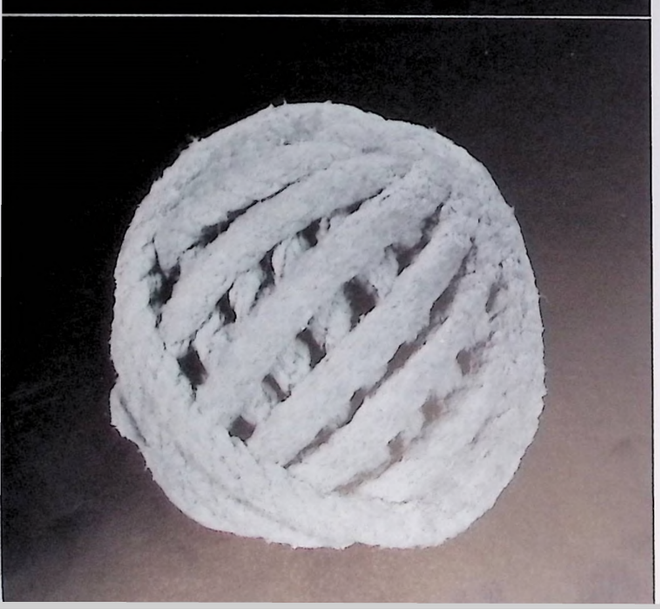
Orders for asbestos-metallic cord should specify the kind of wire required or explain the service conditions.

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WIRE-WIPING CORD AND WICK

The removal of excess spelter or other metallic plating by an asbestos wipe requires a variety of cords and wicks for different kinds of wire. The Raybestos-Manhattan list includes firm, medium and soft-twist wicks; soft-twist and hard-twist cords. Special care is taken in selecting and preparing the fibre for wire wiping purposes. R-M cords and wicks leave the wire with an even, smooth coating free from scratches.





WIRE WIPING CORD

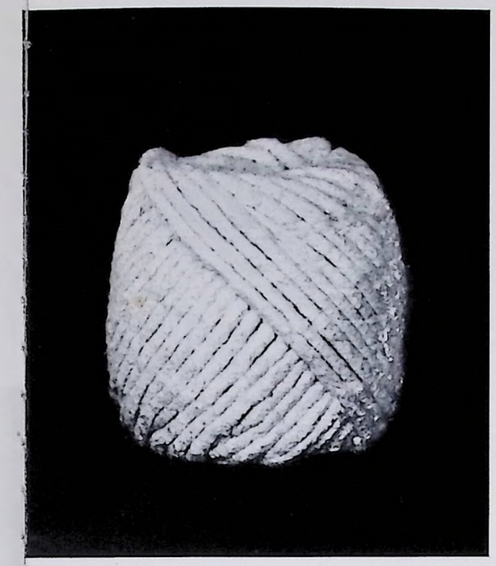
Styles: No. 884—¼" Hard Twist.
887—5/16" Hard Twist.
2104—⅛" Soft Twist.
8107—¼" Soft Twist

Packages: 25 and 50 lb. reels, each in a carton.

WIRE WIPING WICK

Styles: No. 484—¼" Soft Twist.
574—¼" Medium Twist.
577—5/16" Medium Twist.
784—¼" Firm Twist.
3001—¼" Firm wick with 1 yarn insertion.
3004—¼" Asbestos yarn insertion in each strand.
3187—⅜" Soft Twist fine roving wick reinforced with asbestos yarn.

Packages: 1 lb. balls in 25 or 50 lb. cartons, 25 and 50 lb. reels in cartons.



TWISTED ASBESTOS WICK

Asbestos wick is loosely-twisted strands of asbestos fibre, or ⅛" wick roving, plied to 3/16", ¼", 5/16", ⅜" and ½" diameters. The ¼" runs 90 feet per pound. This size is always supplied unless other diameters are ordered.

Commercial grade serves most purposes, but all grades, including AAAA, are available.

USES

Low pressure steam and hot water valve packing. When dipped in hot tallow or paraffin it is adaptable for cold water valves. A good emergency packing for pumps; as a seal in ovens and also for caulkings.

The ⅛", 3/16" and ¼" sizes are put up in ¼, ½ and 1 lb. balls and packed in 25 and 50 lb. cartons. These and all other sizes are put up also on 25 and 50 lb. reels, each in a carton.

See list of wire wiping wicks on page 18.

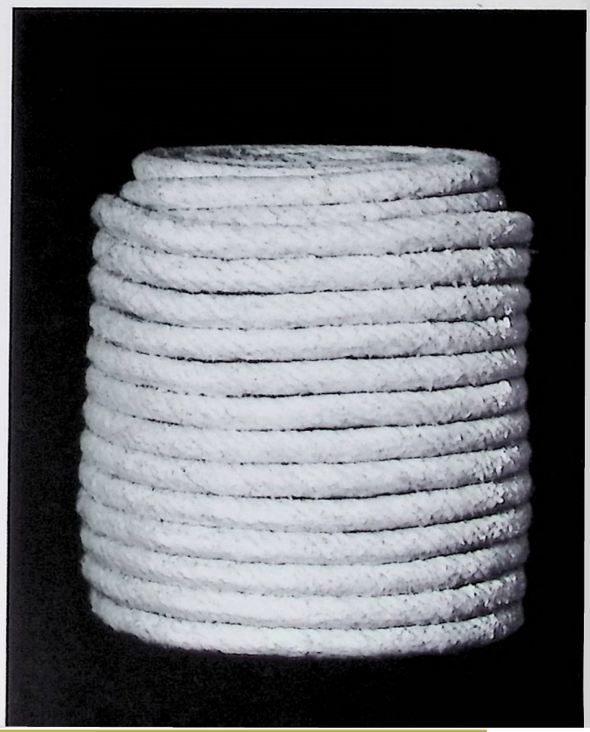
ASBESTOS TWISTED ROPE

Raybestos-Manhattan twisted rope, available in all grades, is made in Commercial Grade for general use; in Grade A for Navy Specifications and for expansion cushions; in Grade AA for expansion joints in plastic walls of boiler settings and as a seal between brickwork and boiler shells; in Grade AAA for covering the exhaust line of Diesel engines and in Grade AAAA for high temperature applications, acid conditions, etc. Grade AAAA wrapped on exhaust pipes of return tubular boilers provides effective protection when finished with high temperature cement. Rope effectively seals doors of gas generators. It is a dependable lagging for pipes. A superior product for this purpose is Raybestos-Manhattan Insulating Tape.

Asbestos twisted rope is put up in 25 and 50 lb. coils, each in a carton, in the following sizes, subject to 5% plus and minus tolerance in length:

DIAMETER	FEET PER POUND	DIAMETER	FEET PER POUND
⅜"	24	1"	3.5
½"	13	1⅛"	3.0
⅝"	10	1¼"	2.5
¾"	8	1½"	1.5
⅞"	4.5	2"	1.1

Braided Asbestos Rope will be found in the Raybestos-Manhattan Packing Catalog.



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ASBESTOS CLOTH

Asbestos cloths of Raybestos-Manhattan manufacture comprise the widest selection of styles, textures, grades, weights and thicknesses. There is a cloth suitable for every purpose known, and Raybestos-Manhattan specializes in developing fabrics for any new use that may arise.

Significant in Raybestos-Manhattan cloths is the attribute of quality—a characteristic apart from "grade." "Grade" denotes only the percentage of asbestos. Quality embraces workmanship, design, finish, durability and other characteristics needed for the particular service required of the fabric. A knowledge of asbestos in all its characteristics with respect to type, source, impurities, chemical and heat resistance and working qualities is essential to the proper selection for a particular cloth. Raybestos-Manhattan research and control laboratories govern all manufacturing processes, assuring the highest possible quality.

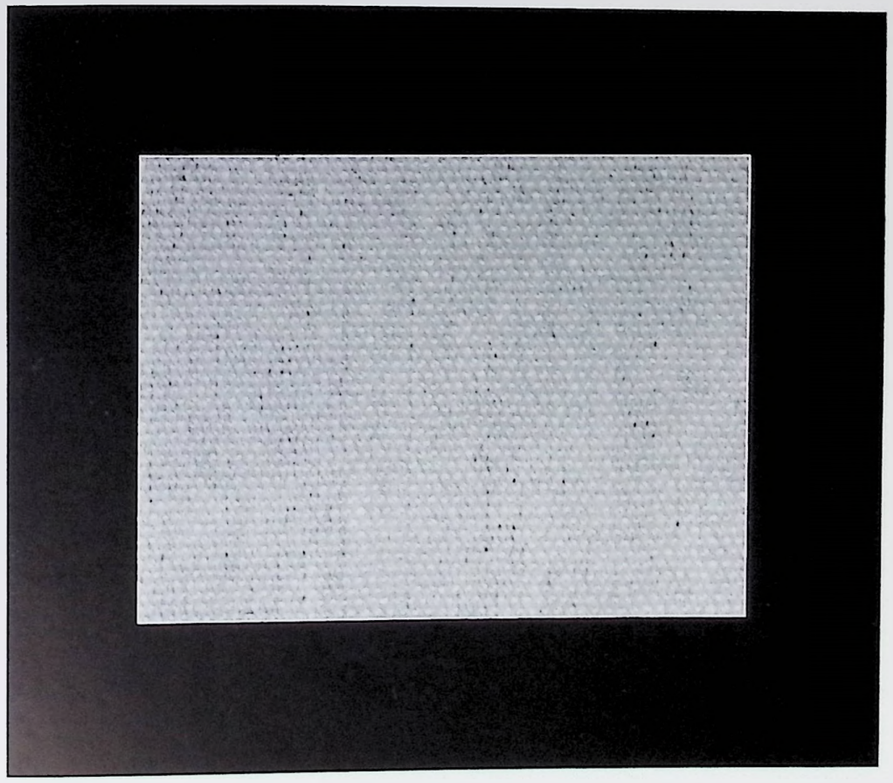
Thickness	Raybestos-Manhattan asbestos cloths are woven from .015″ up to 1″ thick. Single ply cloths run up to 3/32″; 2-ply construction produces 3/32″, ⅛″ and 5/32″, according to the size of the yarn. Multi-ply, interlocking weave makes flexible cloth up to ½″ thick. Heavier fabrics, up to one inch, are woven usually with asbestos-metallic yarn and are made as a base in the production of friction material.
Widths	Standard widths are 36″ and 40″. Special widths below 36″ and over 40″—up to 124″—are woven to order. Stocks generally are in the 40″ width.
Texture	The range in texture of Raybestos-Manhattan cloths is from "light proof" to open mesh. The weaves are in plain, herringbone, twill and broken twill.
Weight—Plain Cloth	R-M asbestos cloths are foremost in the wide selection of textures and weights. Weights per square yard begin at 8 ounces and go up to several pounds.
Asbestos-Metallic	Asbestos-Metallic or, briefly, Metallic cloths are woven with asbestos yarn having one or two strands of wire insertion. The Raybestos-Manhattan standard is .008″ brass wire. Lighter or heavier wire may be used. Copper, zinc, monel, nichrome, stainless steel or other fine wire can be used in cloth designed for special purposes. Weights run from 1.34 lbs. to several pounds per square yard.
Grades	Each style of cloth listed on page 24 is generally woven in but one grade, as determined by the use for which it was designed. Any style, however, may be woven to order in more than one grade, and all fabrics, excepting the very light ones, are available in all standard grades shown on page 10.

Where the service encounters abrasion or where very high tensile strength is a requirement, asbestos metallic cloth of a grade to withstand the temperature is recommended. See page 10.

GLASS FILTER CLOTH

Raybestos-Manhattan glass cloths are woven with 100% glass yarn, inert to all acids excepting hydrofluoric and immune to bacterial deterioration. They are suitable for filter press diaphragms in solutions up to 500° F. The initially high tensile strength is maintained for long service periods by treatment at the rim of flexure in diaphragms. Glass fabrics designed and woven by Raybestos-Manhattan will carry an effective bed of asbestos filter cake material. Suitable for filtering hot or cold acids and for clarifying beer, wine, spirits and other fluids.

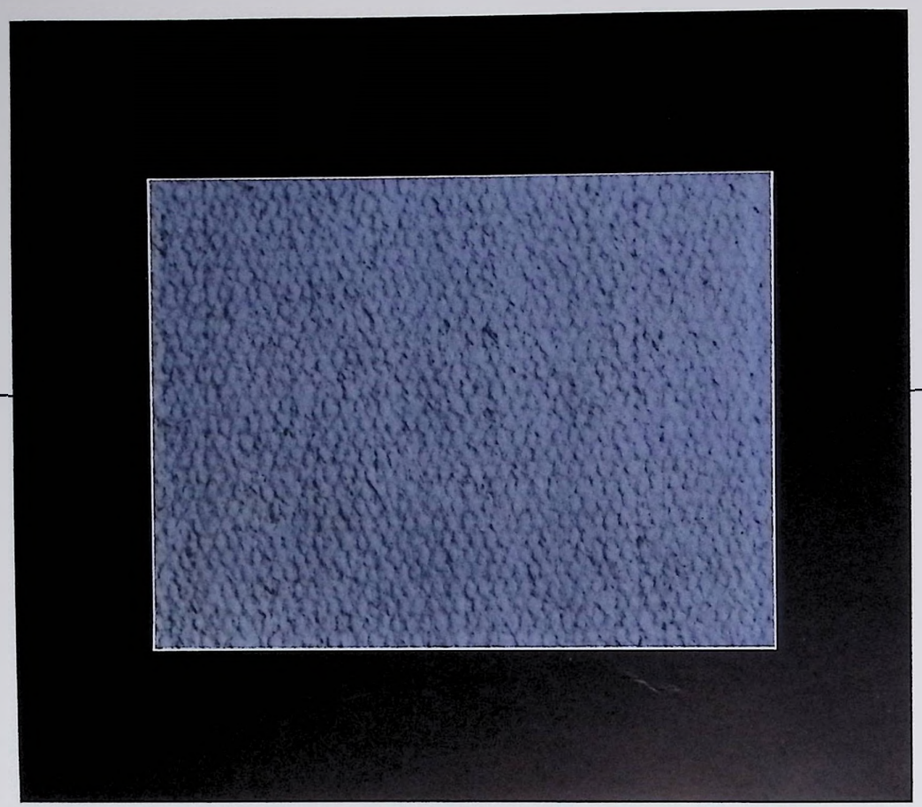
STYLE 12GH165



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BLUE ASBESTOS CLOTH

(Crocidolite Asbestos)



STYLE NO.: 546—Grade AAAA.
WEIGHT: 2.32 lbs. sq. yd.
WIDTH: 40 inches.

THE HIGHEST RESISTANCE to acids among the various types of asbestos is found in blue asbestos, a silicate of iron and sodium in which the percentage of chemically combined water is small.

Blue asbestos cloth is recommended for service in the filtration of acid solutions, or wherever acid conditions are encountered.

RHINOBESTOS CLOTH

RHINOBESTOS CLOTH is an exceedingly tough, brown sheet asbestos developed for resistance to heat and abrasion. It has set new records of endurance and economy in replacement as a covering for paddles, for lining pans and as conveyor mats in glass manufacturing.

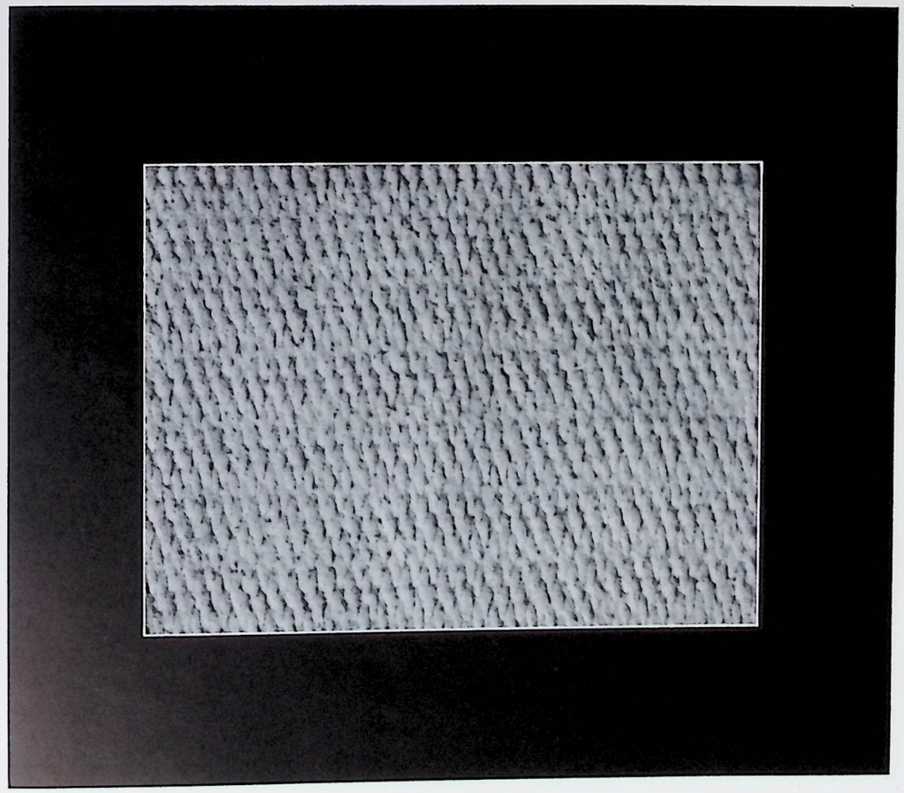
Rhinobestos makes excellent mats for use on laboratory burners; surpassing in satisfaction and durability.

Rhinobestos is the strongest, highly-fire-resistant sheet asbestos obtainable for any purpose.

Standard thickness 1/8". Widths 15", 18", 21", 24", 26", 36" and 40", in rolls of 10 and 25 yards. Sheets 36" x 36" and 40" x 40".

The Rhinobestos treatment is available also in 3/16" and 1/4" thick fabrics, either plain or asbestos metallic.

Made only by Raybestos-Manhattan.



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STYLES OF ASBESTOS CLOTHS

PLAIN NON-METALLIC CLOTHS

STYLE NO.	WT. LBS. SQ. YD.*	THICKNESS INCHES*	CONSTRUCTION WARP FILLER
28P047	0.47	.015	21 x 16
26P073	0.73	.026	17.5 x 14.5
40P100	1.00	.030	26 x 24
18P105	1.05	.030	15 x 13
28P105	1.05	.030	16 x 15
18P125	1.25	.040	22 x 11
28P125	1.25	.030	26 x 15
14P130	1.30	.035	16 x 10
18P145	1.45	.050	21 x 14
10P150	1.50	.070	9 x 9
14P150	1.50	.050	12 x 15
15P163	1.63	.050	20 x 10
14P165	1.65	.050	14 x 14
12P175	1.75	.065	22 x 11
14P175	1.75	.068	20 x 10
18P175	1.75	.063	28 x 13
12P200	2.00	.062	18 x 9
10P210	2.10	.062	18 x 8
10P215	2.15	.075	19 x 8
12P215	2.15	.062	20 x 10
10P225	2.25	.065	18 x 9
10P250	2.50	.065	20 x 10
12P280	2.80	.078	18 x 8
10P300	3.00	.093	18 x 9.5
12P475	4.75	.125	45 x 17
10P525	5.25	.135	40 x 14

HERRINGBONE

10H250	2.50	.062	20 x 10
10H266	2.66	.078	20 x 12
14H225	2.25	.62	28 x 14
14H250	2.50	.62	28 x 14
14H251	2.50	.62	32 x 13
14H260	2.60	.62	28 x 14
18H225	2.25	.62	40 x 14
18H230	2.30	.62	36 x 18
18H250	2.50	.68	40 x 14
18H275	2.75	.74	40 x 14

TWILL CLOTHS

STYLE NO.	WT. LBS. SQ. YD.*	THICKNESS INCHES*	CONSTRUCTION WARP FILLER
35BT115	1.15	.035	30 x 22
12T270	2.70	.075	30 x 11
12T290	2.90	.080	32 x 12
12T370	3.70	.090	40 x 14
10T425	4.25	.095	40 x 14
10BT450	4.50	.120	32 x 9

BLUE ASBESTOS CLOTH

546	2.32	.085	16.3 x 6.3

STANDARD METALLIC CLOTHS

14M185	1.85	.043	12 x 14
14M190	1.90	.032	20 x 10
14M195	1.95	.055	14 x 13
12M200	2.00	.040	19 x 9
10M225	2.25	.070	18 x 8
12M250	2.50	.062	18 x 8.5
10M267	2.67	.070	18 x 8.5
9M275	2.75	.062	17 x 8
10M275	2.75	.062	18 x 9
12M280	2.80	.066	20 x 10
12M285	2.85	.065	18 x 9
10M300	3.00	.065	18 x 8
8M312	3.12	.072	17 x 9
10M335	3.35	.065	20 x 8
10M350 (Monel)	3.50	.070	18 x 9
12M356	3.56	.081	22 x 10
10M425	4.25	.093	16 x 8
12M625	6.25	.125	45 x 15

* Tolerance in weight plus 5%; in thickness, plus .005".

The foregoing lists comprise the fabrics most commonly called for. Other styles are available as special cloths. Most styles are woven regularly in 40" width, but are made to order in the 36" standard width, and in special widths up to 124". The standard rolls are 50 yards and 100 yards. Larger rolls can be supplied. Put up with paper and burlap wrapping, heads well protected.

ASBESTOS CLOTH UTILITY INDEX

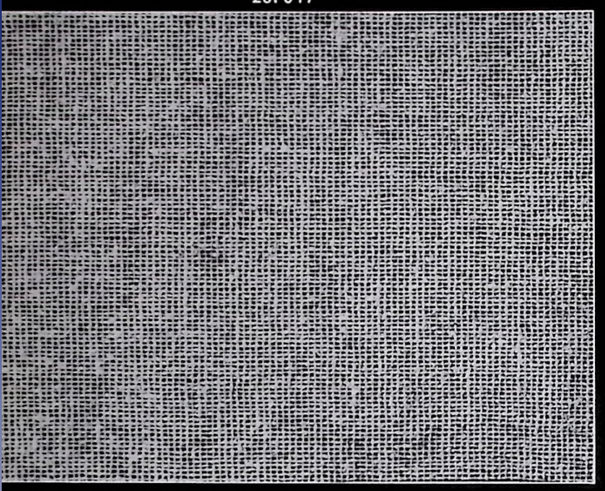
SERVICE	SUITABLE STYLES			GRADE RECOMMENDED
Awnings	18P175	14P172	24T170	Underwriters.
Blankets				
For smothering fires	15P163	18P175	12P175	All grades are suitable. Grade AAAA is almost indestructible.
	12P215	10P225		
Welding Blankets	10P300	10T370		AAAA—Heavy, pure cloth.
Belts				
Blue Print Machines	18P175	12P215		AA
Stereotype Mat Dryers	10M325			AAA for endurance. Lower grades can be used.
Conveyor Belt Facing	10P250			AA
Conveyor Rolls on Sheet Glass Machines	10P250			AAAA—Write for information.
Clothing	All herringbone cloths and special styles.			Write for information.
Curtains				
Lehr	10P250			Commercial and AA.
Theatre and School Auditoriums	10M300			AAA—This weight and grade is obligatory in a number of states as the result of tests made by the Bureau of Standards.
Theatre and School Auditoriums	10M275			Some communities permit lower grade and lighter cloth designed for other purposes. We urge adherence to the higher standard.
Welding Booths	10P225			Commercial.
Diaphragms				
Electrolytic	10P370	10T425		AAAA only for electrolytic cells.
Dust Collection				
From hot gases; grinding dust, etc.	Special cloths.			See page 28.
Filter Press				
Acid filtration	Blue asbestos and glass cloths. Style depends on filtering requirements.			Recommendations will be made on receipt of service information.
Glass Factory Uses	Rhinobestos Cloth.			See page 23.

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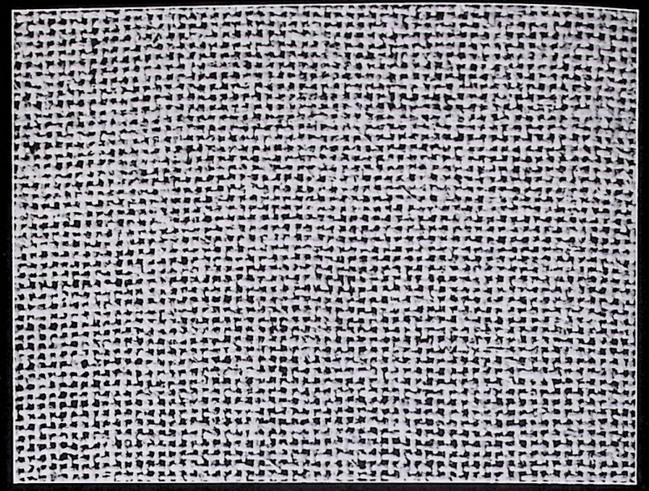
ASBESTOS CLOTH

TEXTURES REPRODUCED IN FULL SIZE

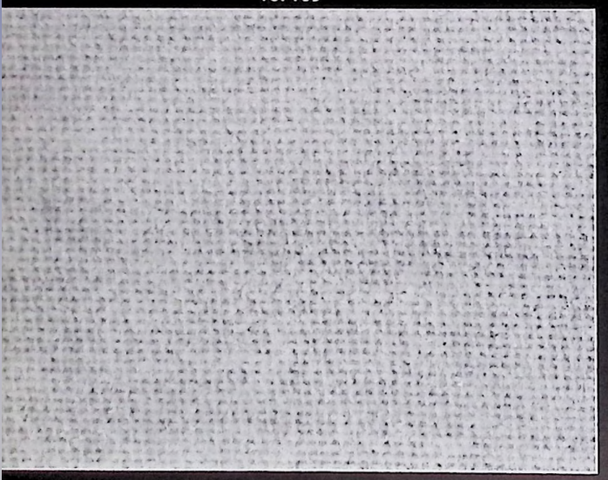
28P047



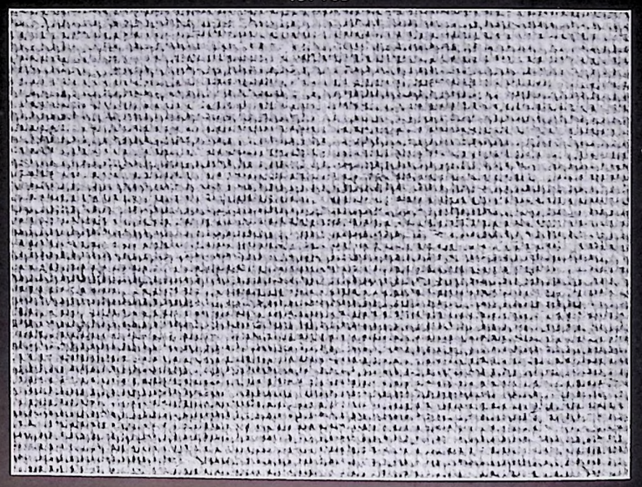
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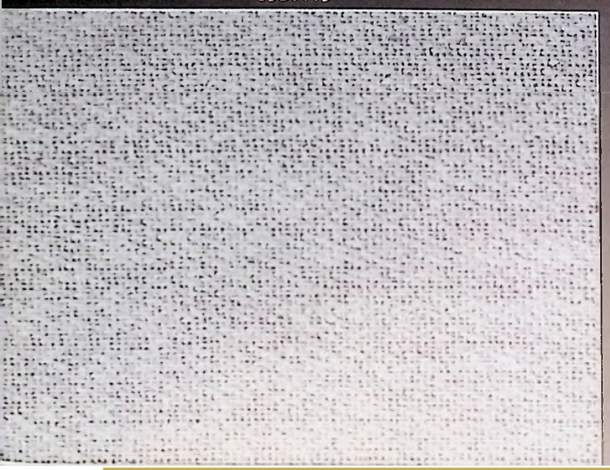
18P105



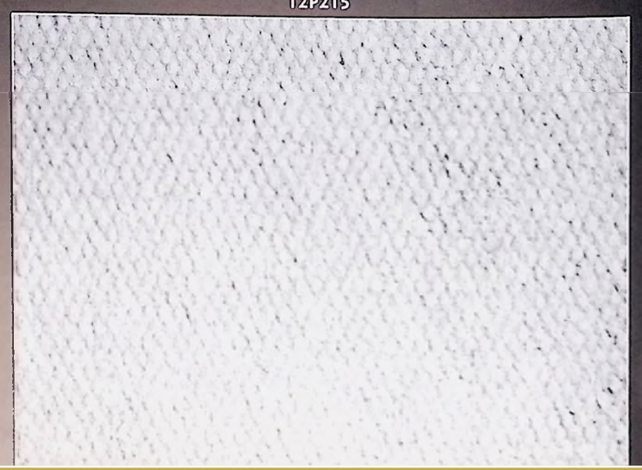
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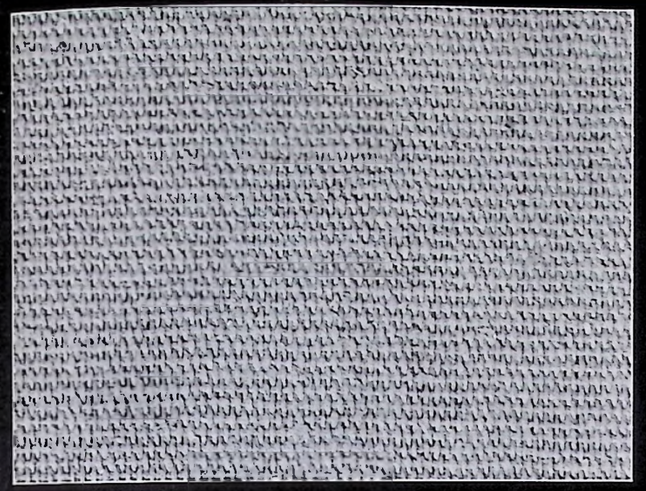
35BT115



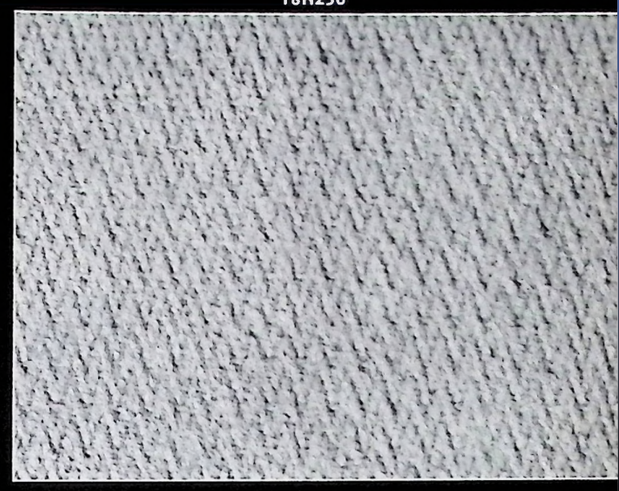
12P215



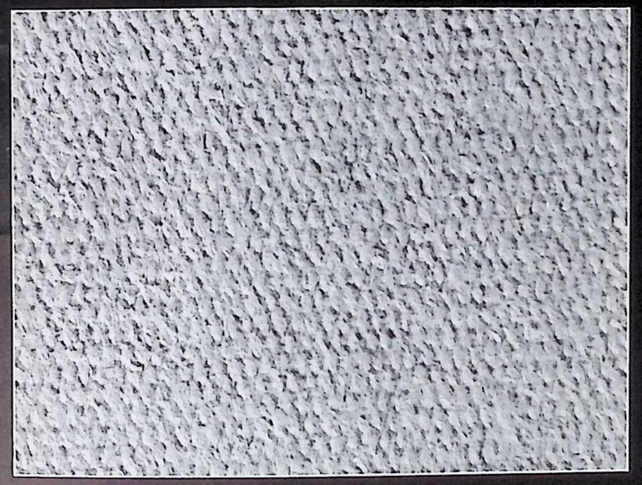
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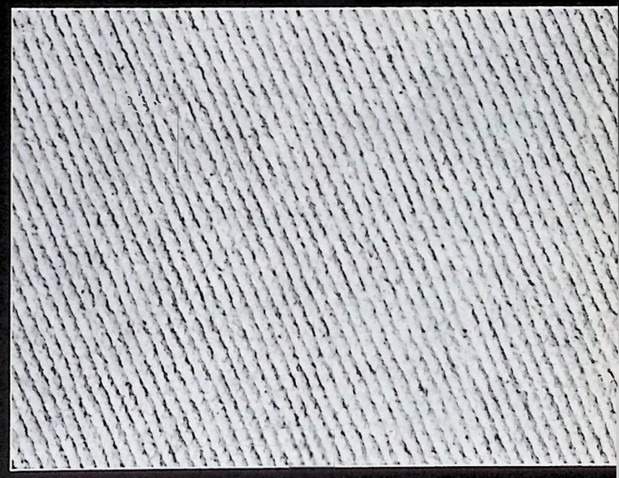
18H250



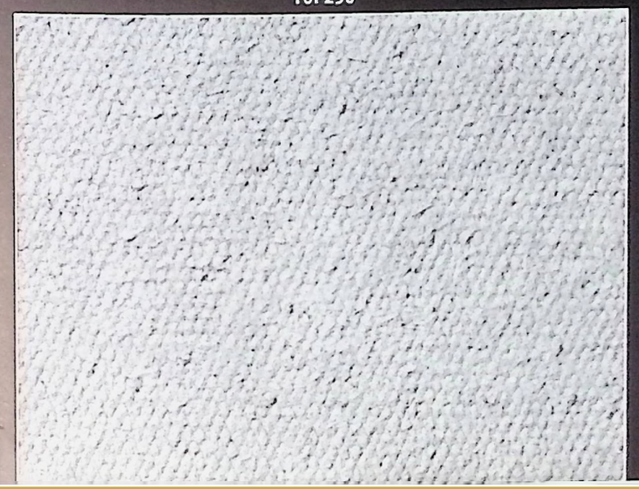
10P225



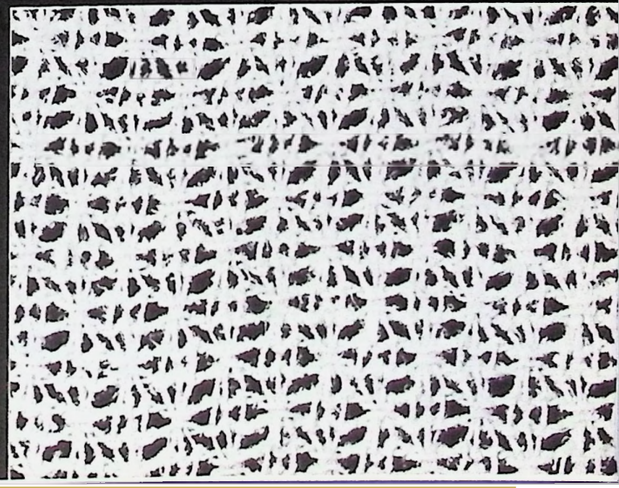
12T370



10P250



28L125



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ASBESTOS BAGS FOR DUST COLLECTION

BAGS FOR USE in mechanical dust collectors are fabricated by Raybestos-Manhattan to specifications of the manufacturer of the equipment. Also, woven tubing for bag house use is made seamless in diameters of 18", 20" and 22¼".

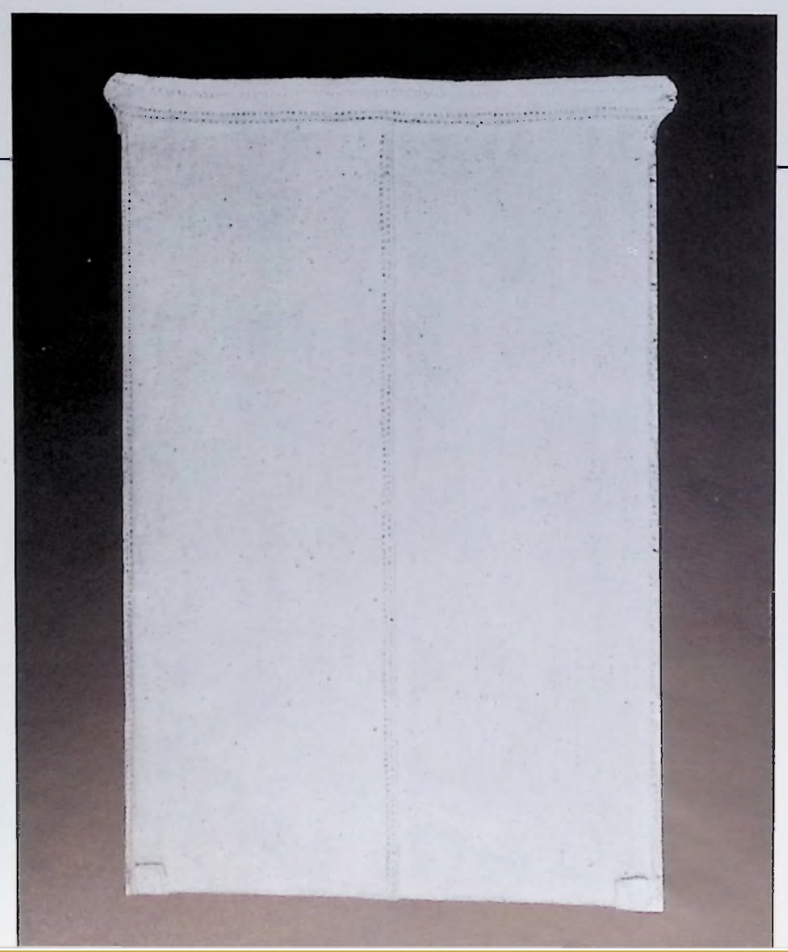
Raybestos-Manhattan weaves fabrics specially designed for each type of collecting.

This is a specialized field of service in which problems require study with regard to the nature of dust, gas, temperature, moisture and acid conditions, volume of gas with percentage of solids, and other factors. Raybestos-Manhattan fabrics have the proper texture for maximum collection with free permeability for the gas stream.

Raybestos-Manhattan asbestos bags are recommended where conditions of temperature and incandescent particles create a fire hazard. Asbestos permits operations at higher temperatures and eliminates the expense of pre-cooling systems.

Asbestos bags are durable, the service period extending generally in terms of years-per-bag as compared with months for combustible fabrics.

The Raybestos-Manhattan research laboratory and staff of engineers, experienced in dust collecting practices, are available as free service in the study of dust recovery, dust-nuisance abatement and the elimination of fire and explosion hazards.



ASBESTOS FIRE BLANKETS

A BLANKET OF asbestos cloth provides at small expense an article of great utility in smothering fires. Loss of life may be avoided by its timely use to wrap about a person whose clothing is on fire. Especially efficacious as a safety measure in offices to smother waste basket fires. An asbestos blanket should be kept instantly available in garages, theatres and all places where fire hazards exist. Raybestos-Manhattan makes fire blankets 6 ft. by 6 ft. from light weight cloths in a number of grades, and recommends as the most durable a blanket of pure asbestos cloth, Grade AAAA, made from Style 15P180 cloth, which is the fabric designed for and used in the manufacture of air-mail bags.

BELTS FOR BLUE PRINT MACHINES

BLUE PRINT machines operate with safety and efficiency when equipped with asbestos cloth belts. Raybestos-Manhattan belts of asbestos cloth have been in service many years. They disseminate heat more easily than cotton belts and are much more durable.

ASBESTOS BELTS FOR STEREOTYPE MAT DRYERS

RAYBESTOS-MANHATTAN weaves a specially designed cloth for equipping mat-drying machines in printing establishments. Style 10M325 is an asbestos metallic fabric that holds the mat against the drying roll and permits the hot vapor to pass through to the air. Grade AAA cloth shows least deterioration under sustained heat of the dryer during idle periods. Lower grades serve the purpose for a time, but the AAA grade is most economical.

ASBESTOS BELTING

RAYBESTOS-MANHATTAN asbestos belting for conveying hot glass from blowing machines is woven in various widths and thicknesses in three types: (1) non-metallic, consisting of plain yarn without treatment; (2) asbestos-metallic, having wire-reinforcement in all strands; (3) an asbestos metallic body and one face of plain, non-metallic yarn. Raybestos-Manhattan belts conform to small pulleys without undue strain upon the opposite face of the belt. Available in several grades, in widths from 1½" to 30", in thickness from ⅛" to ½" or more.

ASBESTOS CURTAINS

ASBESTOS CURTAINS for theatres and school auditoriums are a safety provision required under city and state building codes. The U. S. Bureau of Standards has issued a report on tests of curtains and has made recommendations which have been adopted by various states. Raybestos-Manhattan weaves asbestos cloth which meets every stipulation called for in the highest grade safety curtains.

DYED ASBESTOS

THE DYEING OF asbestos textile products has, up to the present time, met a limited demand for roving and yarn. It is practicable to coat asbestos fibre with certain dyes, which however will not penetrate the body of the fibre, as the individual fibre of asbestos is impervious. Nevertheless, asbestos textiles retain an application of color for prolonged periods.

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WOVEN ASBESTOS TAPE (OR LISTING)

Woven asbestos tapes are produced in two classes, plain or non-metallic, and asbestos metallic. Two types are made for the electrical industry, ferrous and non-ferrous. The range in grade runs from Commercial to AAAA for all tapes over 1/32" in thickness. The thin tapes are standard in Underwriters grade.

The laboratory control under which all Raybestos-Manhattan tapes are made maintains strict adherence to specifications of the electrical industry, of railroads and of the American Society for Testing Materials. This is evident in the workmanship, uniformity of weave, even edges, tensile strength, width, thickness and maximum footage consistent with acceptable texture.

Ferrous type means that the magnetic iron in the tape does not exceed 2% and that the total iron—magnetic and chemically combined—does not exceed 6%. In non-ferrous tape the magnetic iron does not exceed 0.75% and the total iron 1.75%. The Raybestos-Manhattan fibre used for both types runs well below the amount of iron permissible.

USES

Raybestos-Manhattan asbestos woven tape has fireproofing, electrical and heat insulating qualities to a high degree. Tapes .015", .020", .025" and .030" thick are designed especially for electrical insulation.

For wrapping thermocouple rods 1/32" tape is generally preferred. Heavier tapes—1/16" and 1/8"—are designed for heat insulation and general purposes.

Asbestos metallic tapes are applicable where service conditions are abrasive, where greater strength is required or where high temperature prevails. Metallic tapes for special purposes are available in a wide range of widths and thicknesses.

For fireproofing electrical cables Raybestos-Manhattan 1/8" x 2" tape has superior merit in its flexibility, close texture and maximum footage. It wins approval of discriminating engineers.

The 1/16" tape in 1", 1½", 2", 2½" and 3" width is used extensively by railroads as locomotive steam pipe insulation.

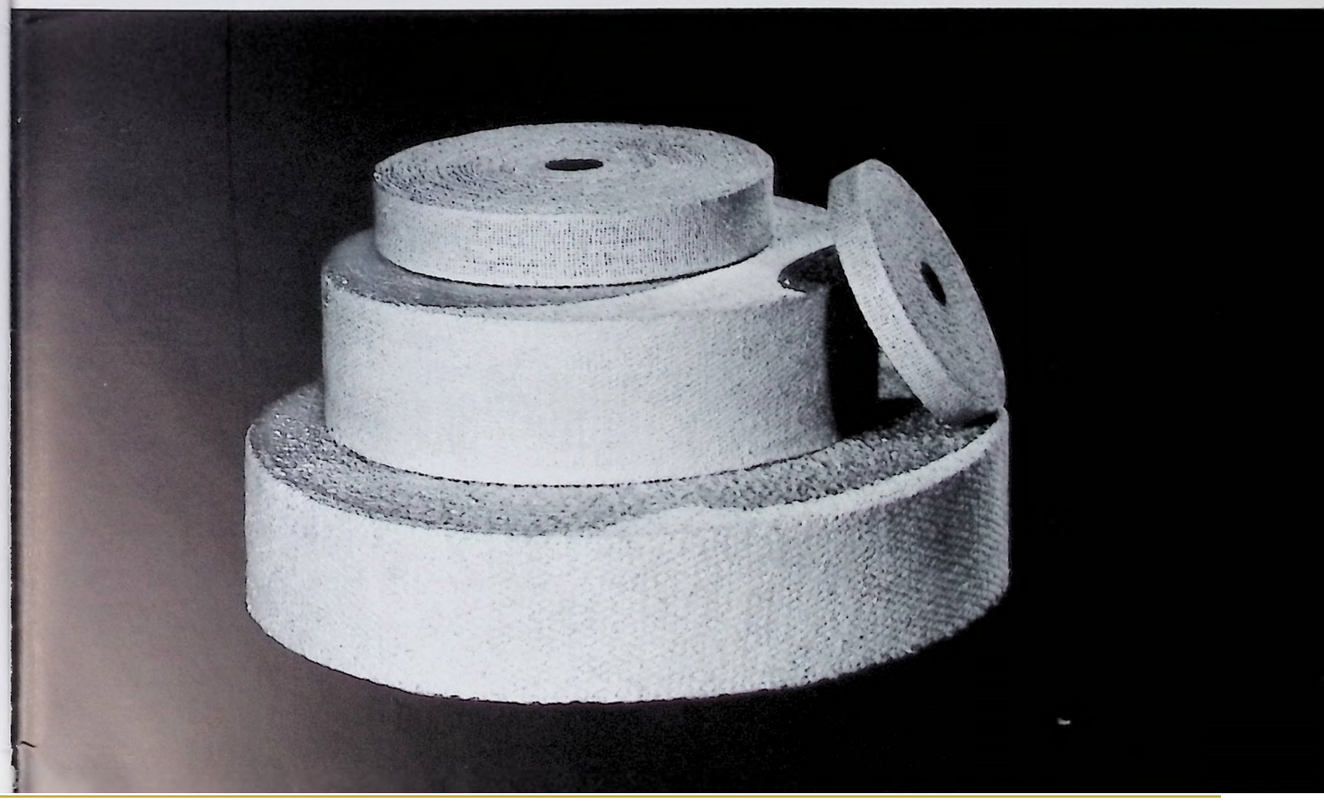
WOVEN ASBESTOS TAPE (OR LISTING)

RANGE OF SIZES

	WIDTH	THICKNESS
Electrical	½" to 3"	.015" to 1/32"
Plain and Metallic for general purposes	½" to 6"	1/16" to 3/8"
Heavy Metallic	2" to 24"	1/8" to 1"

APPROXIMATE FEET PER POUND

WIDTH	.015" THICK	.020" THICK	.025" THICK	.030" 1/32" THICK	PLAIN 1/16" THICK	ASBESTOS-METALLIC 1/16" THICK
½"	320 ft.	215 ft.	145 ft.	125 ft.	75 ft.	65 ft.
¾"	215 "	165 "	110 "	85 "	50 "	45 "
1"	175 "	123 "	90 "	60 "	40 "	32 "
1⅛"	150 "	102 "	80 "	54 "	35 "	29 "
1¼"	138 "	98 "	70 "	50 "	30 "	27 "
1½"	120 "	88 "	60 "	40 "	24 "	22 "
2"	90 "	65 "	45 "	30 "	20 "	17 "
2½"	70 "	58 "	35 "	24 "	17 "	13 "
3"	55 "	45 "	30 "	19 "	14 "	10 "



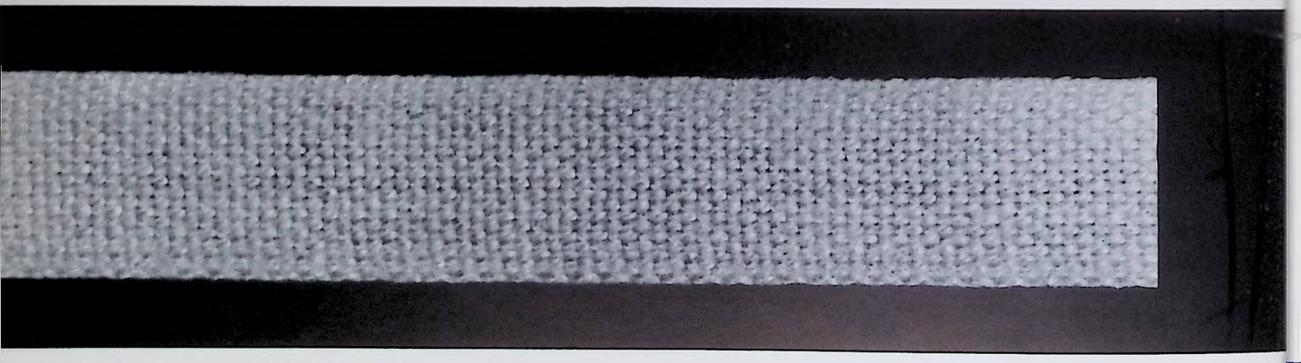
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WOVEN ASBESTOS OIL BURNER WICKING

WICKS MADE of Cyprus asbestos ("Carpasian flax") about 400 years B. C. by Callimachus, the Greek architect and sculptor, were used in lamps to give a never-failing light in the temple of Minerva at Athens.

Asbestos wicks as used today perform a different function than the early wicks used for illumination. The various types of burners designed to distill kerosene and burn it as a vapor mixed with air depend for highest efficiency upon an asbestos wick designed by research to produce a balanced supply of vaporized fuel. Raybestos-Manhattan has given much study to this application of asbestos and owns numerous patents granted on improvements in wick construction.

Correct blending of fibres in the yarn and the proper twist result in a product which gives maximum efficiency, endurance and economy of fuel. Different designs are made to meet the functional requirements of the various types of burners in common use. Asbestos wicks have a triple duty in kerosene burners: to produce a quick flame, to support a hot flame and to supply the minimum amount of fuel required for these purposes. In general, any wick of the proper height will serve in any burner, but the variation in gravity of fuel, in the feed system of the fuel and in mixing shells of the burner affect wick performance, so that the style of wick which gives best results is best determined by the consumer in her particular stove. There is in the Raybestos-Manhattan list of wicking a best wick for each consumer's requirements.



STANDARD WIDTHS

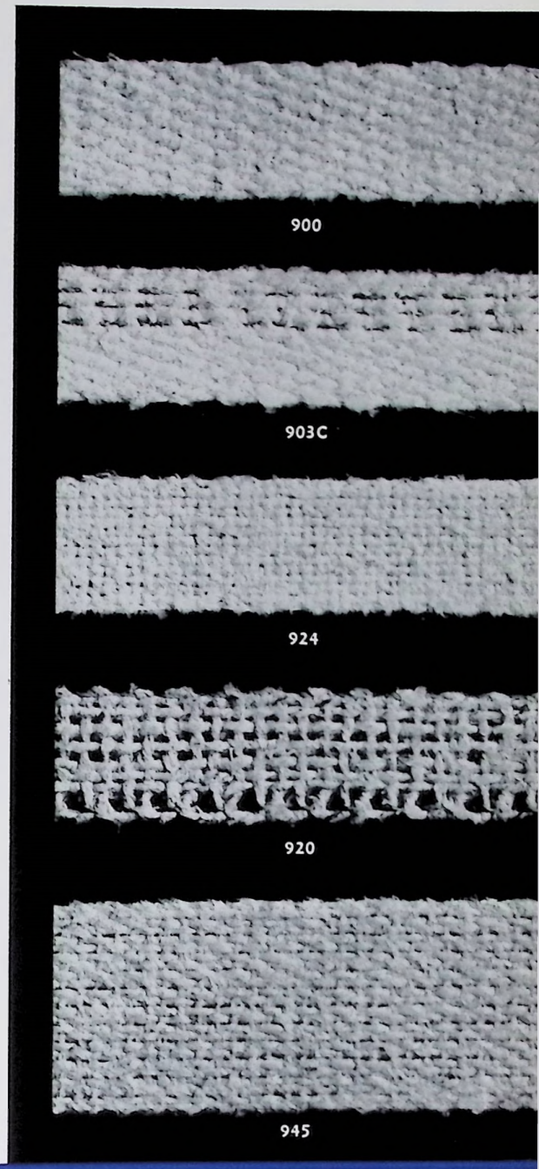
Range Burners	7/8", 1"
Needle Valve Burners	3/4", 7/8", 1"
Stoves, Heaters	1 1/4", 1 3/8", 1 7/16", 1 1/2"
General thickness	1/16"
Put up in 100-ft. rolls. Also cut to wick lengths.	
Boxed Wicking	6 feet per box
	12 feet per box
	100 feet per box

WOVEN ASBESTOS OIL BURNER WICKING

APPROXIMATE WEIGHTS AND FOOTAGE

STYLE NO.	WIDTH	POUNDS PER 100 FT.	FEET PER LB.
900	7/8"	2.5	40
	1"	2.9	35
903-C	7/8"	2.85	35
	1"	3.25	30
920	7/8"	2.5	40
	1"	2.8	36
922	7/8"	2.6	38
	1"	2.9	34.5
908	1 1/4"	2.9	34.5
	1 3/8"	3.4	29.4
924	7/8"	2.5	39
	1"	2.8	36
	1 1/4"	3.5	29
	1 3/8"	3.84	26
	1 7/16"	4.0	25
	1 1/2"	4.3	23.25
945	7/8"	1.8	55.5
	1"	2.1	47.5
	1 1/4"	2.55	39
	1 3/8"	2.75	36.33
	1 7/16"	2.9	34.5
	1 1/2"	3	33.33

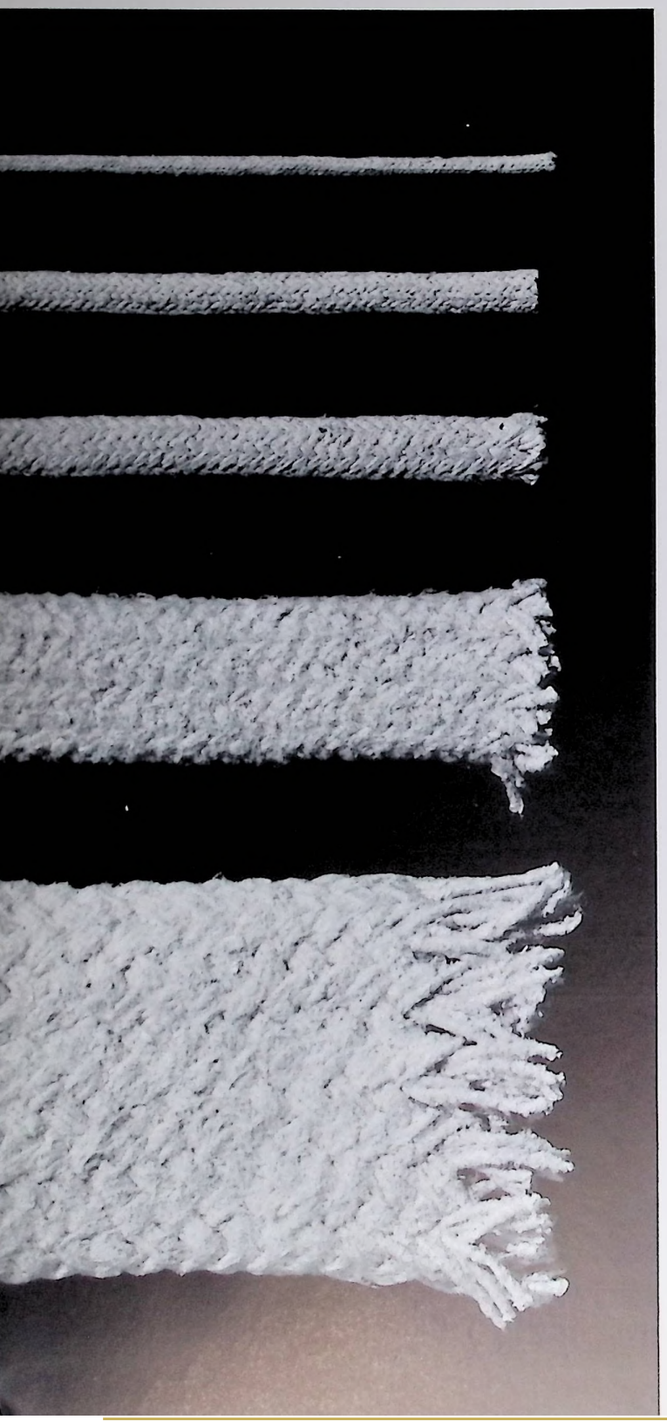
ACTUAL SIZE ILLUSTRATIONS





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ASBESTOS TUBING OR SLEEVING



Braided asbestos tubing is produced in many sizes as a fireproof flexible sleeving to insulate electrical wires and cables, to cover rods of thermocouples, and as a sleeving on tools to handle hot glassware.

Woven asbestos tubing as designed by Raybestos-Manhattan for insulating bus bars promotes safety at switch boards and transforming stations. The tubings are woven in sizes to fit all standard bus bars. The texture of the tubing presents a good surface for the application of electrical varnish to make the insulation impervious to moisture.

Light tubings intended for electrical insulation should be Underwriters Grade. For both heat and electrical insulation Grade AA or Grade AAA is recommended, depending on the maximum temperature developed. Heavy tubings are available in all standard grades.

The list of sizes denotes in all cases a braided tubing that goes easily on a mandrel equivalent to the nominal inside diameter of the tubing. Each tubing will expand to go over a larger mandrel or contract to fit a smaller one.

Outside diameters may be varied considerably dependent upon the size and number of plies of yarn used, which indicates also that the wall can be made in a number of thicknesses. These facts affect the footage per pound.

Braided tubing is supplied plain or sized as ordered. Sized tubing makes application easier on small wires.

Shipping packages 1, 5 and 10 lb. spools; 25 and 50 lb. reels.

BRAIDED ASBESTOS TUBING

LIGHT WALL — Approximately 1/32"

I.D.	O.D.	FT/LB*	YARN NO.
1/32"	x 3/32"	440	2410
3/64"	x 3/32"	300	1810
1/16"	x 1/8"	230	1410
3/32"	x 5/32"	175	1210
7/8"	x 3/16"	172	1510
5/32"	x 7/32"	138	1610
3/16"	x 9/32"	66	1420
1/4"	x 11/32"	85	810

HEAVY WALL—Approximately 1/16" and Up

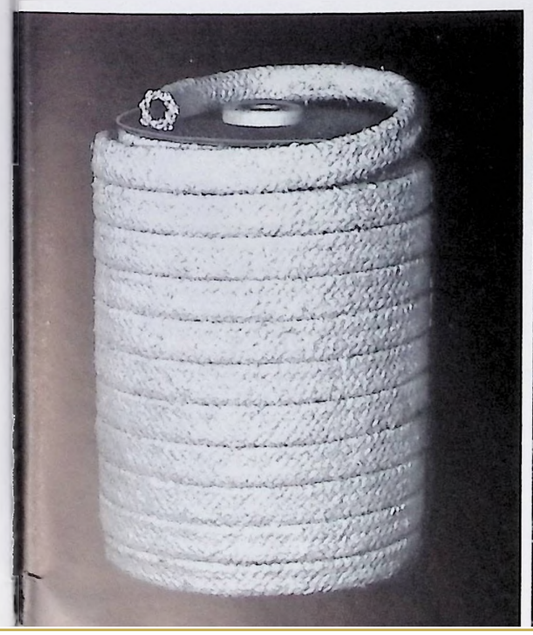
I.D.	O.D.	FT/LB*	YARN NO.
1/64"	x 1/8"	85	1420
1/32"	x 3/16"	71	1220
1/16"	x 3/16"	109	1010
3/32"	x 7/32"	80	1220
1/8"	x 1/4"	65	1420
5/32"	x 9/32"	80	1520
3/16"	x 5/16"	64	1020
1/4"	x 3/8"	45	1020
5/16"	x 7/16"	46	1020
3/8"	x 1/2"	21	1020
3/8"	x 9/16"	21	1020
1/2"	x 5/8"	20	1020
9/16"	x 11/16"	22	1220
5/8"	x 3/4"	15½	1020
3/4"	x 7/8"	15	1020
7/8"	x 1"	14¾	1020

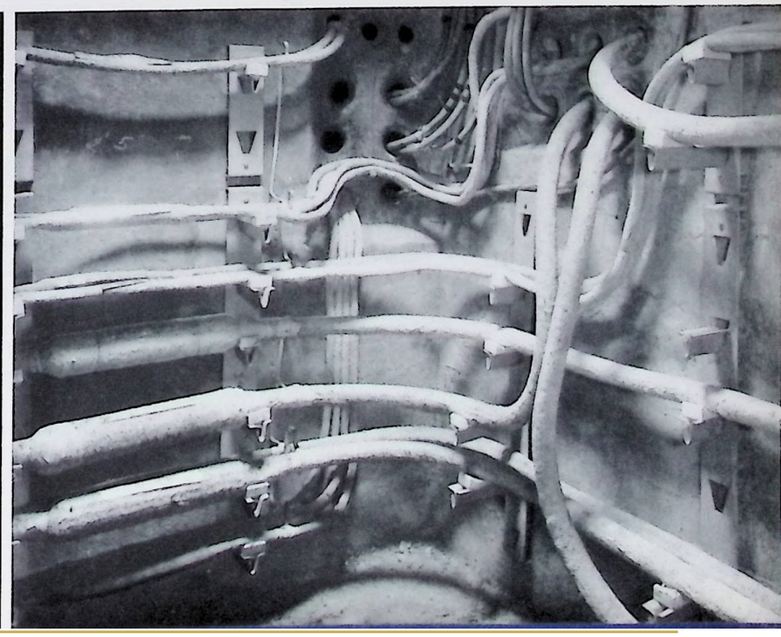
BRAIDED CABLE TUBING

I.D.	WT. LBS. PER 100 FT.	ENDS UP
1"	13.1	3
1½"	16.6	2
2"	18.5	2
2¼"	20	3
2½"	21.5	3
3"	24.6	3
3½"	26.5	3
4"	29.5	4
4½"	34	4
5"	40	4

*Feet per pound and diameters are somewhat nominal. Braided tubing is susceptible of comparatively wide contraction and expansion. Footage herein specified is for flat tubing. When expanded and in place the length is approximately 8% less.

A considerable variation in footage per pound is possible due to whether a loose or tight braid is wanted.





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