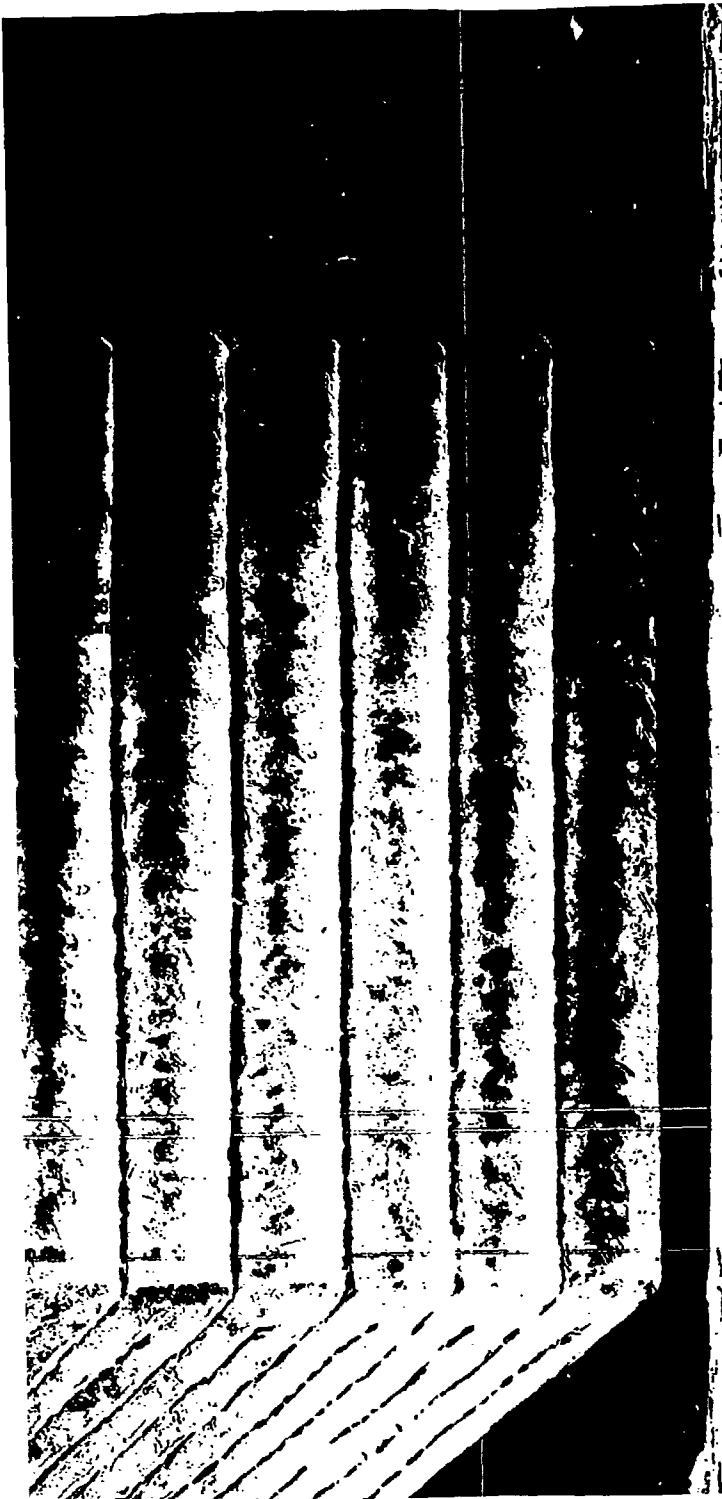


(303) 770-1000 - 3111



Johns-Manville

+3000F

INSULATION

-400F

INSULATION FOR HIGH TEMPERATURE
ELECTRICITY GENERATION AND INDUSTRIAL
PROCESSING
REFRACTORIES
INSULATION FOR LOW TEMPERATURE
LIQUID AND GASEOUS MEDIA



PLAINTIFF'S
EXHIBIT
JM-2402

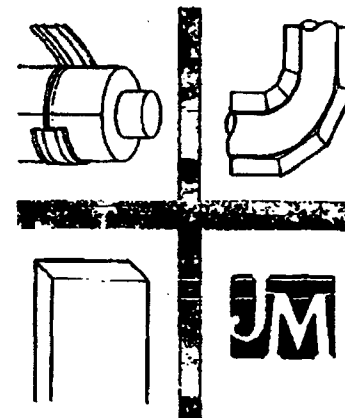
INDUSTRIAL &
HIGH TEMPERATURE

PLUMBING, HEATING
& AIR CONDITIONING

INSULATING FIRE BRICK

JOHNS-MANVILLE INSULATIONS

industrial &
high temperature



450541

Johns-Manville

INSULATION

PRODUCT INFORMATION

type: Pipe & Block
temp limit: 1200F



FINISHES & WEATHER-
RESISTANCE

PLUMBING, HEATING
& AIR CONDITIONING

J-M THERMOBESTOS® pipe and block insulation

DESCRIPTION: A molded, high temperature pipe and block insulation, J-M Thermobestos is composed of hydrous calcium silicate bonded with asbestos fibers. It is a completely inorganic insulating material which, because of its light weight, low thermal conductivity, great structural strength and insolubility in water, is ideal for high temperature piping and equipment.

AVAILABLE FORMS: Thermobestos is furnished in both sectional pipe insulation and block form. The pipe insulation comes in a complete selection of sizes up to 24" x 4" half sections. 25" through 33" pipe sizes are available in quad segments. Scored blocks 12" x 36" in thicknesses from 1 1/2" to 3 1/2" are available for application on curved surfaces representing a diameter range from 34" through 180". Scored blocks are furnished with three equally spaced scores. Beveled blocks are also available in widths of 6", 12", and 18", by 36" lengths, in a full range of thicknesses.

USES: Especially recommended for use in the power generation and process industries on indoor and outdoor piping and equipment operating at temperatures to 1200F. Thermobestos is light enough for easy handling and fast application. Repeated wettings have no permanent effect on it which makes it ideal for installations subjected to weather, or for insulating underground steam lines. Because it will not burn or carry flame, it may also be advantageously specified for use in the presence of inflammable gases and liquids.

ADVANTAGES

Exceptional Strength

Similar in chemistry and composition to a very fine concrete, Thermobestos will withstand unusual operating abuse without appreciable damage.

Extreme Lightness

Thermobestos is as light as many insulating materials possessing a fraction of its strength and durability.

Chemically Stable

100% inorganic, will neither burn nor rot.

Not Damaged by Water

Can be soaked in water without damage. After drying, conductivity will be as good as new.

Easy Application

Thermobestos is purposely made in large blocks and half-sections to facilitate handling and reduce number of joints.

Low Conductivity

Thermobestos offers the lowest k factor of all insulations in general use throughout the power generation and process industries.

450549

THERMOBESTOS PIPE & BLOCK INSULATION

Specification Data

PHYSICAL PROPERTIES*

Density (dry)	11 lbs per cu ft
Tensile Strength (number of ruptures)	85 psi
Compressive Strength (based on 2" thickness of block)	125 psi to produce 5% compression
Linear Shrinkage	1.5% after 24-hr soaking period at 1200°F
Maximum Service Temperature	1200°F

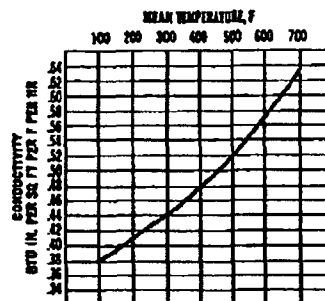
*The physical and chemical properties of Johns-Manville Thermobestos represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are suitable as a technical service and are subject to change without notice. Check the Johns-Manville district office for current information.

COMPLIANCE WITH GOVERNMENT SPECS

Pipe Insulation:
MIL I-2781
Grade I, Class B, to 600°F
Grade II, Class D, to 750°F
Grade III, Class E, Type I and II, to 1200°F
MIL I-523 Type II, Class A and B, to 1200°F

Block Insulation:
MIL-I-2819
Class I, to 600°F (except that 2000°F)
Class 2, to 1200°F
MIL-I-523 Type I, to 1200°F

THERMAL CONDUCTIVITY



COMPLIANCE WITH ASTM STANDARDS

Pipe and Block Insulation:
G533, to 1200°F



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Sales Office in Principal Cities

Johns-Manville

INSULATION

type: Pipe
temp limit: 1200F



J-M METAL-ON® pipe insulation

■ **DESCRIPTION:** J-M Metal-On pipe insulation consists of high temperature Thermobestos pipe insulation pre-jacketed at the factory with top-quality aluminum. Furnished as an integral package (including a built-in isolation felt), a section of Metal-On snaps on the pipe and locks tightly in place to seal out weather and protect insulation indefinitely. Joints are sealed with either "Regular" or "One Piece" aluminum "snap straps." No sheet metal screws are used. The aluminum alloy jacket is especially selected to give superior corrosion resistance and strength.

■ **AVAILABLE FORMS:** Furnished in pipe insulation form only. Available in 36" sections in a complete range of sizes up to 24" pipe size by 1" thickness.

■ **USES:** Particularly recommended for use in the power generation, petroleum, chemical and allied industries, especially on outdoor installations, at operating temperatures to 1200°F.

■ ADVANTAGES

Installation Savings

Both insulation and jacket are furnished in a single package. Installed in a single operation.

Excellent Weather Protection

Keeps insulation dry during installation, thus avoiding electrolytic corrosion of aluminum through direct contact with wet insulation common where jacket is installed as a separate operation.

Proper Jacket Thickness

Jacket thickness designed to provide, at lowest cost, outstanding appearance, stiffness, workability, and resistance to abuse.

Integral Isolation Felt

A built-in, properly designed barrier between jacketing and insulation.

Easy to Remove

Rapid, easy removability for repairs and maintenance.

For Specification Data, including physical and thermal properties, recommended thicknesses, compliance with specifications, etc., see Thermobestos pipe insulation brochure IN-169A.

450543

METAL-ON Application Details



Section of Metal-On pipe insulation is held open lengthwise, matted over pipe, and fastened in place with one strap.



Aluminum "snap strap" containing a permanently plastic sealing compound is matted over joint to seal out water.



Ordinary sealant is quickly and easily applied to hold strap tightly in place with J-M Metal-On Banding Wheel.



Prefabricated aluminum covers are available. Other fittings can be finished with exceptional weatherproofing and aluminum mastic paint. Two methods of insulating fittings are shown above.



The J-M Metal-On Cutter has been specially developed for easy band cutting of aluminum jacket only.



Jacket cut is started by prying cutting point through aluminum with head of hand.

COLOR SNAP STRAPS AVAILABLE FOR EASY COLOR CODING

Colored Metal-On snap straps may be installed in place of regular straps on any Metal-On job for color coding purposes. The following colors, which are permanent and require no maintenance, are available: scarlet red, vermilion blue, sulphur yellow, meadow green, shiny black, and orange orange.



GUIDE SPECIFICATIONS

STRAIGHT PIPING

All piping shall be insulated with Johns-Manville Thermobestos according to recommended thicknesses. (See Thermobestos specification data in brochure JN-169A).

The insulation shall be applied over clean dry pipe with all joints butted firmly together. Double layer insulation, when required, shall be applied with joints staggered. The inner layer secured with wire loops on 12-inch (maximum) centers, and outer layer applied in the same manner as single layer construction. The Thermobestos shall be jacketed with a minimum thickness of .016-inch aluminum, of alloy No. 5005, 1145 or 3003. A moisture barrier shall be provided between the Thermobestos and the aluminum. The insulation and aluminum shall be secured in place by a continuous friction type joint to provide a positive weatherproof seal along the entire length of the aluminum jacket. Also, a .016-inch aluminum preformed strap of minimum width of 1 1/4 inch and containing a permanently plastic weatherproof

sealant shall be centered on bands in end of jacket and secured over each circumferential joint, then secured in place with 1/2-inch (minimum) aluminum banding (.020-inch minimum thickness), or 1/2-inch stainless steel banding (.015-inch minimum thickness).

FITTINGS

Fittings shall be insulated with prefabricated Thermobestos sections. In addition to the standard specification which applies as to finish (aluminum covers, painted asbestos cloth, Insulbrite, etc.), the following shall apply:

A .016-inch aluminum preformed strap, of the same size as used on the straight piping, and containing a permanently plastic weatherproof sealant, shall be centered over the circumferential joint made where the fitting butts against the straight section of pipe. The straps shall be secured in place with 1/2-inch (minimum) aluminum (.020-inch) or stainless steel (.015-inch) bands.

Johns-Manville

PRODUCT INFORMATION

type: Scored Block
temp. limit: 1200F

J-M THERMOBESTOS® scored block insulation

DESCRIPTION: A molded, high temperature block insulation, J-M Thermobestos is composed of hydrous calcium silicate bonded with asbestos fibers. It is a completely inorganic insulating material which, because of its light weight, low thermal conductivity, great structural strength and insolubility in water, is ideal for use on large high temperature piping and equipment.

AVAILABLE FORMS: Scored Thermobestos blocks are furnished flat with three V-shaped score marks molded longitudinally on 3-inch centers on one side. This permits cracking along bottom of score marks so that blocks will fit diameters ranging from 34 to 180 inches.

All scored blocks are 12" x 36" overall, in the following thicknesses: 1 1/2", 2", 2 1/2", 3", and 3 1/2".

USES: Scored Thermobestos blocks are recommended for application on large-diameter piping and equipment. Vees are approximately 3/8" in width at the open end, and taper to 0" at the bottom, i.e., about 3/8" from the unscored side. By placing scored side against pipe or equipment (so that score marks are parallel to axis) and pressing outer edges toward pipe surface, the bottoms of the Vees are cracked thus permitting block to conform to cylindrical contour. Width of top of Vee makes block adaptable for diameters ranging from 34 to

180 inches. The net effect is the same as applying four 3-inch blocks simultaneously.

ADVANTAGES:

Adaptable

May be used on flat or cylindrical surfaces full width, or in multiples (from one to four) of 3-inch blocks.

Smooth Finish

Requires minimum finishing cement. (However, end joints should be filled with J-M 450 or 301 cement.)

Easy Application

12" wide blocks speed work, reduce number of joints.

Exceptional Strength

When properly applied Thermobestos is only cracked (not broken) along score marks and does not separate into individual 3-inch blocks.

Low Conductivity

Thermobestos has a k factor of only .52 at 500F mean temperature.

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22 East 40th Street, New York, N. Y. 10016

Sales offices in principal cities

• 450545

450546

THERMOBESTOS SCORED BLOCK INSULATION

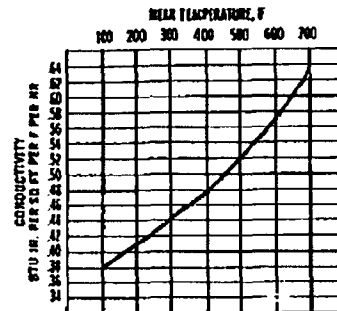
Specification Data

PHYSICAL PROPERTIES*

Density (dry)	13 lbs per cu ft
Transverse Strength (modulus of rupture)	85 psi
Compressive Strength (based on 2" thickness of block)	180 psi to produce 5% compression
Linear Shrinkage	1.5% after 24-hr soaking period at 1200F
Maximum Service Temperature	1200F

*The physical and chemical properties of Johns-Manville Thermobestos represent typical values which obtained in accordance with accepted test methods and are subject to change without notice. Check the Johns-Manville district office to obtain current information.

THERMAL CONDUCTIVITY



COMPLIANCE WITH GOVERNMENT SPECS

Block Insulation:
MIL-12015
(Class 1 to 600F (except 1 to 1200F)
Class 2 to 1200F
MIL-1523 Type 1, to 1200F

COMPLIANCE WITH ASTM STANDARDS

Block Insulation:
C533



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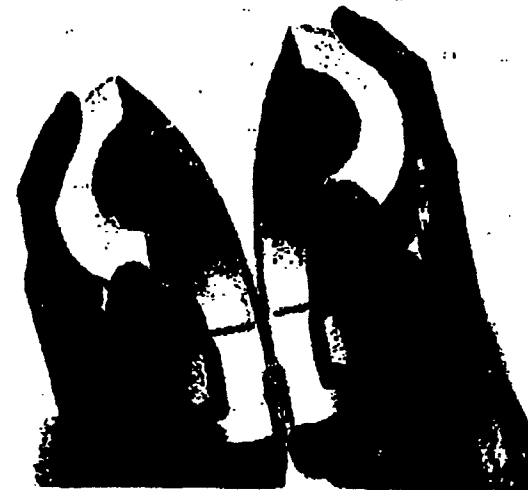
Sales Offices in Principal Cities

450547

Johns-Manville

PRODUCT INFORMATION

type: Molded 90°
Elbow Insulation
temp. limit: 1200F



J-M THERMOBESTOS LD MOLDED 90° ELBOW pipe fitting insulation

DESCRIPTION: A molded pipe fitting insulation designed to fit 90° elbows on Thermobestos® and Metal-On® pipe insulation systems. Made of hydrous calcium silicate for strength and durability.

AVAILABLE FORMS: Thermobestos LD molded pipe fitting insulation is presently furnished to fit 90° elbows in both threaded and long radius welded sizes up through 12" IPS and in nominal thicknesses of 1", 1½" and 2", to match standard pipe insulation. Mitered sections of Metal-On (precision-cut at the factory) to fit elbows, sweeps, bends and valves are also available up to 24" pipe size.

Thermobestos LD elbows can be finished with canvas, Insulokote® ET weatherproofing mastic reinforced with DuraMesh® porous glass fiber fabric, or a preformed Metal-On aluminum jacket.

USES: Especially recommended for use in the power generation and process industries on indoor and outdoor piping operating at temperatures to 1200F. Thermobestos LD elbows are light enough for easy handling and fast application. Repeated wettings have no permanent effect on them, thus making them ideal for installations subject to weather, or for insulating underground steam lines. Because they will not burn or carry flame, they may also be advantageously specified for use in the presence of inflammable gases and liquids.

*J-M Trademark

ADVANTAGES

Easy Application

There's no fuss, no muss, no time-consuming assembling problem with Thermobestos LD elbows. Just select two sections of the required size, dip them over the 90° pipe elbow, secure them together and apply finish. You can do a fast, accurate job every time with factory-molded fittings the exact size you need.

Chemically Stable

100% inorganic, will neither burn nor rot.

Exceptional Strength

Similar in chemistry and composition to a very fine concrete, Thermobestos LD elbows will withstand undue operating abuse without appreciable damage.

Lightweight

Thermobestos LD elbows are as light as many insulating materials possessing a fraction of their strength and durability.

Not Damaged by Water

Can be soaked in water without damage. After drying, conductivity will be as good as new.

Low Conductivity

Thermobestos LD elbows offer the lowest k factor of all insulations in general use throughout the power generation and process industries.

450548

FINISHES & WEATHER-
PROOFING MATERIALS
PLUMBING, HEATING
& AIR CONDITIONING

INSULATING FIRE BRICK

THERMOBESTOS LD ELBOW INSULATION

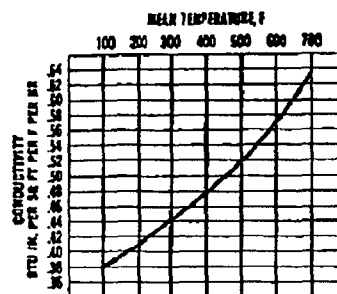
Specification Data

PHYSICAL PROPERTIES*

Density (lb/ft ³)	13 lbs per cu ft
Tensile Strength (tensiles of rupture)	93 psi
Compressive Strength (Based on 2" thickness of block)	163 psi to produce 5% compression
Linear Shrinkage	1.5% after 24-hr soaking period at 1200F
Maximum Service Temperature	1200F

*The physical and chemical properties of Johns-Manville Thermobestos represent typical values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are reported as a technical service and are subject to change without notice. Consult the Johns-Manville directory office to obtain current information.

THERMAL CONDUCTIVITY



COMPLIANCE WITH GOVERNMENT SPECS

MSL-42761
Grade I, Class b, to 600F
Grade II, Class d, to 750F
Grade III, Class e, Type I, to 1200F

MSL-523 Type II, Class A, to 1200F

COMPLIANCE WITH ASTM STANDARDS

CS31, to 1200F



Johns-Manville

22 East 40th Street • New York, N.Y. 10016

After July 1, 1972

At Greenwood Plaza • Denver, Colorado 80217

Sales Offices in Principal Cities

450549

Johns-Manville

PRODUCT INFORMATION

type: Pipe Insulation
temp. limit: 1000F



J-M SILICATED THERMOBESTOS

pipe insulation

DESCRIPTION: J-M Silicated Thermobestos® is rigid hydrous calcium silicate pipe insulation for austenitic stainless steel piping to 1000F. It is bonded with asbestos fiber and was especially developed to help impede the deposit on the pipe of chlorides which have been associated with stress corrosion cracking.

AVAILABLE FORMS: Half sections of pipe insulation come in a complete selection of sizes up to 24" x 4". Pipe sizes 25" through 33" are available in quad segments. All sections are 36" long.

USES: Especially recommended for use on indoor and outdoor stainless steel process piping operating at temperatures to 1000F. Silicated Thermobestos is light enough for easy handling and fast application. While repeated wettings have no permanent effect on it, it must not be considered a prevention against stress corrosion cracking. Proper insulation system design and careful maintenance are both essential for minimizing the problem of stress corrosion cracking.

ADVANTAGES:

Unusual Strength

Silicated Thermobestos will withstand hard operating abuse without appreciable damage.

Lightweight

Silicated Thermobestos is as light as many insulating materials possessing a fraction of its strength and durability.

Chemically Stable

100% inorganic, will neither burn nor rot.

Not Damaged by Water

Can be soaked in water without damage. After drying, conductivity will be as good as new.

Easy Application

Silicated Thermobestos is purposely made in half-sections to facilitate handling and to reduce the number of joints.

High Insulating Value

Has a thermal conductivity of only .52 at 500F mean temperature.

450550

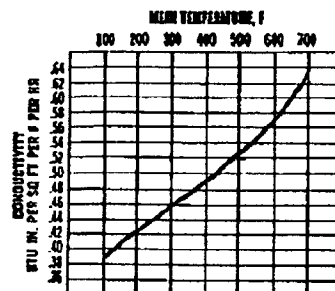
SILICATED THERMOBESTOS

Specification Data*

PHYSICAL PROPERTIES*

Density (dry)	15 lbs per cu ft
Transverse Strength (average of rupture)	75 psi
Compression Strength (based on 2" thickness)	165 psi to produce 5% compression
Linear Shrinkage	1.5% after 24-hr soaking period at 1000F
Maximum Service Temperature	1000F

THERMAL CONDUCTIVITY



COMPLIANCE WITH GOVERNMENT SPECS

RM 1523 Type II, to 1000F
(except density)

COMPLIANCE WITH ASTM STANDARDS

C533, to 1000F
(except density)

*The physical and chemical properties of Johns-Manville silicated ThermoBestos represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check the Johns-Manville district office for more complete information.



Johns-Manville

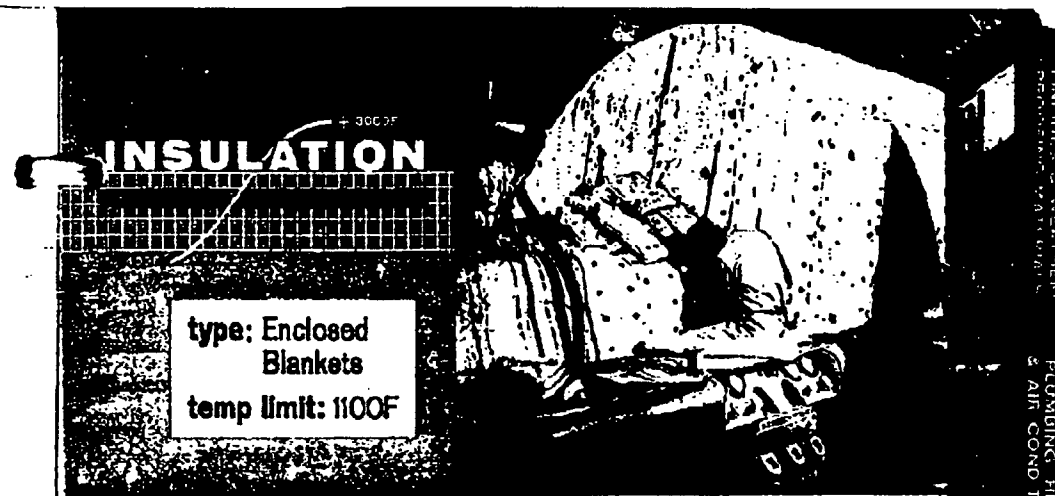
22 East 40th Street • New York, N.Y. 10016

After July 1, 1972

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Sales Offices in Principal Cities

450551



J-M TURBINE BLANKETS

enclosed mineral fiber insulation

■ **DESCRIPTION:** J-M Turbine Blankets consist of a high temperature felted mineral insulation fully enclosed in a wire inserted asbestos cloth for temperature exposure to 850F, or a stainless steel mesh for temperatures from 850F to 1100F. The density and thickness of the felt are uniform to assure full insulating value.

■ **AVAILABLE FORMS:** Field-fabricated by authorized contractors to accurately fit area to be insulated in sizes and shapes according to contour of surfaces. Available also directly from J-M per blueprint. See reverse side for typical construction details.

■ **USES:** J-M Turbine Blankets are recommended for those areas requiring an easily removable and replaceable high temperature insulation such as turbine flanges, flange flanges and valve bonnets.

■ ADVANTAGES

Removable

Lightweight J-M Turbine Blankets are furnished in convenient sizes with all necessary hooks or other fasteners for easy installation and removal.

Chemically Stable

Being inorganic, mineral fibers are incombustible and moisture resistant. Felt is tough and will not pull apart during handling.

High Insulating Value

Density of mineral fiber felt is carefully controlled at 8 lbs. per cubic foot. Has a thermal conductivity of 0.40 at 400F mean temperature.

Uniform Thickness

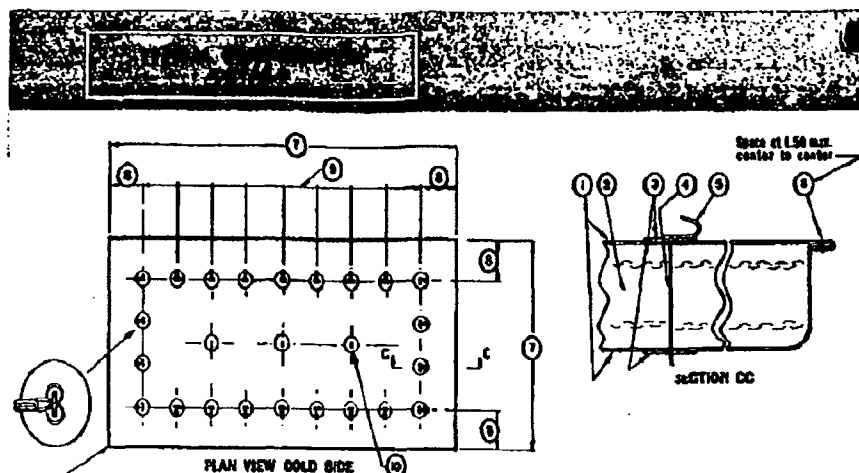
Uniform fiber orientation results in consistent thickness and eliminates thin spots.

Field or Factory Fabricated

Each blanket made to conform to rigid specifications.

450552

TURBINE BLANKET Specification Data



Blankets may be covered to full being insulated as shown on layout drawing for each order or application.

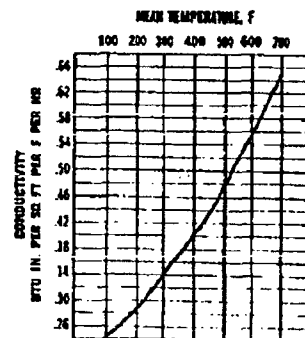
NOTES

1. Wire inserted asbestos cloth or stainless steel mesh.
2. Mineral fiber felt insulation.
3. Tufting.
4. Monel or stainless steel wire.
5. Wire locking hook.
6. Wire stitch or staple.
7. Length and width to vary in accordance with job requirements.
8. Standard 4". On odd size blankets this dimension may be varied.
9. Tufting with hooks equally spaced apart from 4" to 6".
10. Tufting to be placed on approximately 12" centers.

RECOMMENDED THICKNESS

Temperature °F	Inner Layer (Mesh Enclosed)	Outer Layer (Wire inserted asbestos Cloth Enclosed)
250 to 450	None	1 1/2"
450 to 650	None	2"
650 to 850	None	3"
850 to 1000	2"	2"
1000 to 1100	2 1/2"	2"

THERMAL CONDUCTIVITY



Johns-Manville 450553

22 East 40th Street, New York, N.Y. 10016

Sales offices in principal cities

Made in U.S.A.

04-5124 7-17

Johns-Manville

INSULATION PRODUCT INFORMATION

type: Faced Blanket
temp limit: 1000F



J-M BANROC® BLANKETS mineral fiber insulation

DESCRIPTION: A felted, spun mineral fiber blanket secured between outer facings of metal fabric. Facing varies depending upon service requirements. The density and thickness of the blanket are carefully controlled to assure full insulating value. The density of the felt in the standard blanket is 8 lbs per cubic foot.

AVAILABLE FORMS:

No. 1--1" wire mesh both sides.

No. 2--1" wire mesh and stucco lath.

No. 2A--1" wire mesh and expanded metal lath.

No. 2B--1" wire mesh 3/8" ribbed lath (rib turned in).

No. 3--Stucco lath both sides.

No. 3A--Expanded metal lath both sides.

No. 3B--Stucco lath one side, expanded metal lath other side.

No. 4--Stucco lath and 3/8" ribbed lath (rib turned in).

No. 4A--Stucco lath and 3/8" ribbed lath (rib turned out).

No. 5--Stucco lath and 3/8" ribbed lath (rib turned in).

No. 5A--Stucco lath and 3/8" ribbed lath (rib turned out).

No. 6--3/8" ribbed lath both sides.

No. 7--No. 12 mesh fly screen both sides.

No. 8--3/8" ribbed lath (rib turned in) and 3/8" ribbed lath (rib turned out).

USES: Where the convenience of a flexible insulation, plus excellent thermal efficiency, is desired, J-M Banroc Blankets offer the highest quality mineral fiber product available today. This insulation is used for industrial baking ovens, dryers, ducts and breechings, and similar equipment. Banroc Blankets are adaptable to flat or curved surfaces and do not back in handling. They are easily cut on the job to fit around obstructions and irregular equipment, and may be used under normal conditions for temperatures to 1000F.

450554

MADE IN U.S.A.

FINISHES & WEATHER-
RESISTANT WITH A
PLUMBING, HEATING
& AIR CONDITIONING

INSULATING FIRE BRICK

■ ADVANTAGES:

Easy Handled

Higher strength and body improves "handability"
... fibers will not dislodge around edges.

Uniform Thickness

More uniform fiber orientation results in uniform
thickness and eliminates thin spots.

Light Weight

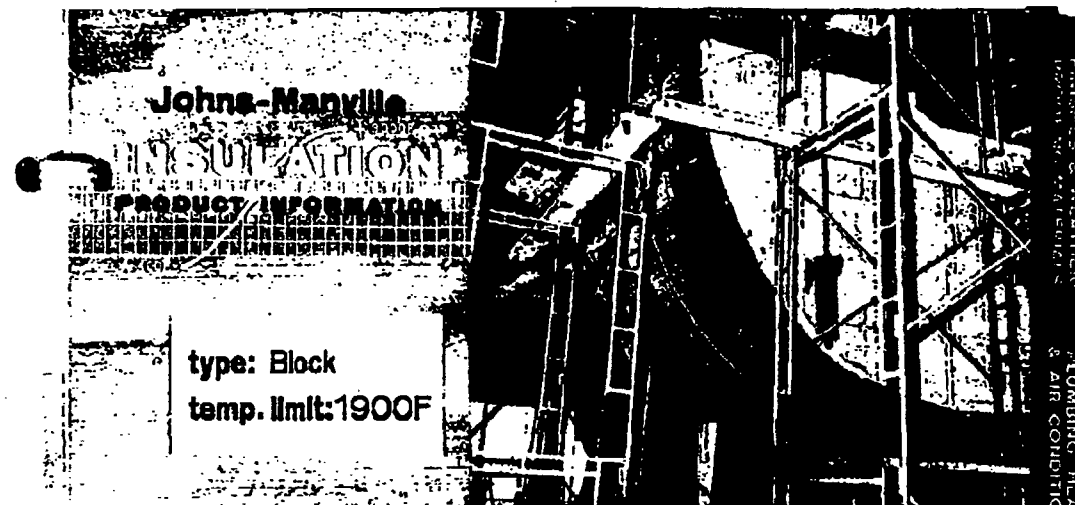
.67 per sq ft per 1 inch thickness.

Square Edges

Makes possible firmer and squarer blanket edges, both
as furnished and as cut on the job.

Factory Fabricated

Each blanket made to conform to rigid product specs.



Johns-Manville

INSULATION
PRODUCT INFORMATION

type: Block
temp. limit: 1900F

BANROC BLANKETS Specification Data

COMPLIANCE WITH GOVERNMENT SPECS

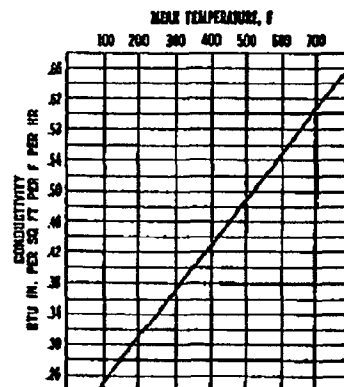
NS-4558a, Form C, Class II
NS-4563, Amendment 1—Type I, Class A, B & C
MIL-42049 B
ASTM-C552-66T, Class II

STANDARD SIZES AND THICKNESSES

Blanket Size, inches	Thickness, inches
24 x 48	1" to 8" by 1/4" increments
24 x 96	

*The values given herein are average typical values obtained in tests
done with accepted test methods and are subject to change. Check
nearest J-M district office for latest information.

THERMAL CONDUCTIVITY



J-M H.T. BANROC® block insulation

■ **DESCRIPTION:** H.T. Banroc block insulation is a structurally strong and thermally effective insulating material made from felted spun mineral wool fibers bonded with a clay binder.

■ **AVAILABLE FORMS:** Finished in block form only in thicknesses from 1/2" to 4"; lengths up to 36"; widths to 24".

■ **USES:** For insulating furnaces, boilers, heated vessels and tanks.

■ ADVANTAGES

Easy Application

Mineral wool composition makes possible impaling of insulation directly on studs or clips.

Large Sheet Size

Large size sheets, 24" x 36", cut installation costs.

Fireproof

Made from mineral fibers which will not burn.

Low Conductivity

H.T. Banroc has a k factor of .625 at 800F.

PHYSICAL PROPERTIES*

Density (dry)	16 lbs per cu ft
Transverse Strength	60 psi
Resilience of rupture	
Linear Shrinkage	less than 4%
After heating at 1800F	

COMPLIANCE WITH SPECIFICATIONS

Commercial Standards CS-111, Block, Classes A, C, D
U. S. Coast Guard, Structural Insulation, 2", NS-1007/22/0
NS-1558a, Form A, Class S
NS-1564, Form I, Types A, B, C, D
ASTM-C512-67, Class D

STANDARD SIZES AND THICKNESSES

Length, inches	Width, inches	Thickness, inches
18, 24, and 36	6, 12, 18, and 24	1/2 to 4 (1/4 inch increments)

THERMAL CONDUCTIVITY*

MEAN TEMPERATURE, F	200	400	600	800	1000	1200
k	.380	.420	.510	.525	.535	.590

Conductivity: 0.625 in. per sq. ft. per F per in.

*The values given herein are average typical values obtained in tests done in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.



Johns-Manville

22 East 40th Street - New York N. Y. 10016
Sales Offices in Principal Cities

450555

450556

Johns-Manville

PRODUCT INFORMATION

type: Block
temp limit: 1000F



J-M BANROC® M BLOCK

mineral fiber insulation

DESCRIPTION: A block type insulation made from felted, high temperature resistant spun mineral fibers with binder added. Banroc M Block has a density of 8 lbs. per cubic foot which is carefully controlled during manufacture to assure full insulating effectiveness and superior handling characteristics.

AVAILABLE FORMS: Furnished in block form only in thicknesses from 1" to 3" (can be made up to 8" by applying additional layers); widths of 18" or 24"; length 48".

USES: For insulating furnaces, boilers, heated vessels and tanks.

Special Note: Banroc M Block can only be used when held in place with metal sheet, bolts or nuts.

COMPLIANCE WITH GOVERNMENT SPECS

NSM-558a, Form A, Class 3
NSM-6612-67, Classes A, A- and B

ADVANTAGES

Easy
Application

Mineral wool composition makes possible impaling of insulation directly on studs or clips.

Large
Sheet Size

Large size sheet—18" or 24" wide, 48" long—cut installation costs.

Fireproof

Made from mineral fibers which will not burn.

Low
Conductivity

Banroc M Block has a K factor of .48 at 500F mean.

THERMAL CONDUCTIVITY

CONDUCTIVITY BTU IN. PER SQ FT PER F PER HR

MEAN TEMPERATURE F					
200	300	400	500	600	700
.50	.54	.60	.68	.86	.85

The values given herein are average values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M office for latest information.

450558



Johns-Manville

22 East 40th Street - New York, N. Y. 10016

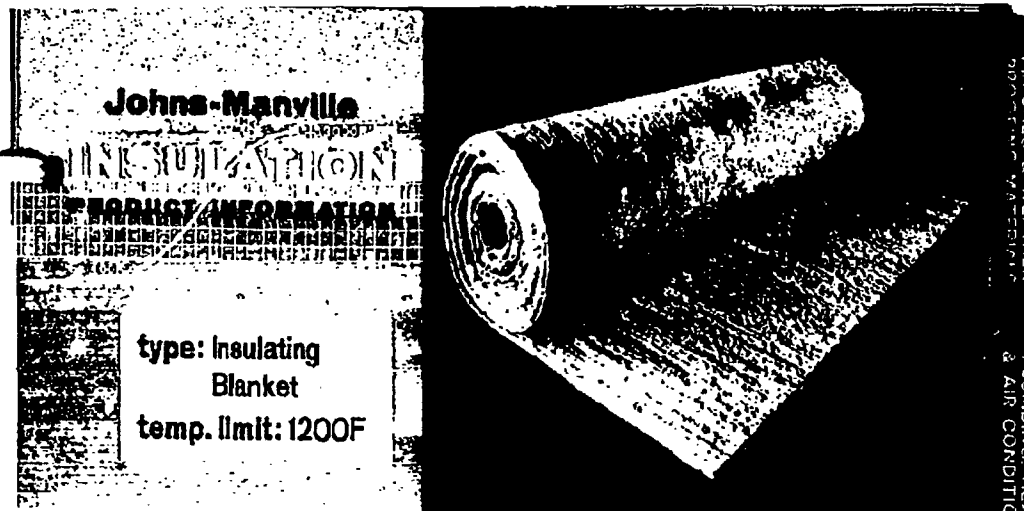
Sales Offices in Principal Cities

450557

JM
Johns-Manville

22 East 40th Street - New York, N. Y. 10016

Sales Offices in Principal Cities



Johns-Manville

PRODUCT INFORMATION

type: Insulating
 Blanket
 temp. limit: 1200F

PIPE SHEET & WEATHER
 PROTECTANT

PLUMBING, HEATING
 & AIR CONDITIONING

INSULATING FIBRE BRICK

J-M GLAS-MAT 1200

fiber glass insulating blanket

■ **DESCRIPTION:** Glas-Mat 1200® is a mechanically bonded glass fiber insulating blanket for industrial, marine and process applications to 1200F. It is manufactured entirely of long textile glass fibers and contains no binders, thereby assuring insulation efficiency during extended exposure at elevated temperatures.

■ **AVAILABLE FORMS:** Glas-Mat 1200 is made in 1/2" and 1" thicknesses and in 60" widths. Roll lengths are 75' for 1/2" thickness and 45' for 1" thickness.

■ **USES:** Glas-Mat 1200 is ideal for ship turbines; marine, industrial and process piping; power generating equipment; and industrial furnaces and ovens operating at service temperatures up to 1200F.

■ ADVANTAGES:

**Low
 Conductivity**

Glas-Mat 1200 has low thermal conductivity at temperatures to 1200F.

Non Toxic

Glas-Mat 1200 is non-hazardous to health.

**Easy
 to Apply**

Good drapability. Conforms to irregular surfaces.

Non-combustible

Because of its glass fiber composition, Glas-Mat 1200 is non-combustible.

Resists Vibration

Glas-Mat 1200 has excellent vibration resistance.

Chemically Stable

Non-alkaline and chemically stable. Will not contribute to metal corrosion.

**Odorless and
 Inert**

Glas-Mat 1200 won't create or absorb odors. Immune to deterioration. Won't sustain vermin, fungi or bacteria.

**Moisture
 Resistant**

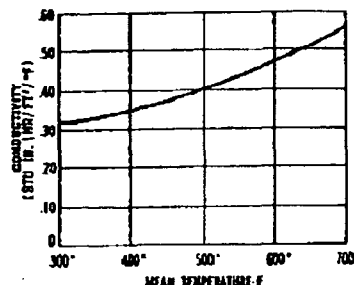
Inorganic glass fibers will not absorb water and are moisture resistant.

®JM Trademark

450560

GLAS-MAT 1200 Specification Data*

THERMAL CONDUCTIVITY



MR-404110, Type II

STANDARD DIMENSIONS AND WEIGHTS

Density (pcf)	Width (feet)	Thickness (inches)	Weight (lb./sq. ft.)	Std. length (feet)	Sq. ft. per roll	Roll Weight (lb.)
75	60	1	5	75	375	120
113	60	1	15	45	225	215

*The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.



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22 East 40th Street - New York, N. Y. 10016

Sales Offices in Principal Cities

450561

Made in U.S.A.

Johns-Manville

PRODUCT INFORMATION

type: Insulated Panel
temp. limit: 450F



J-M METAL-ON insulating system for heated tanks

DESCRIPTION: J-M Metal-On insulating system for heated tanks combines specially formulated J-M Spin-Glas® insulation and a facing of embossed diamond rib aluminum sheet for weather protection and good appearance. Metal-On insulating system for heated tanks is secured to a tank by nine 1/4" steel studs welded to the tank through pre-drilled holes in the panel. A specially designed nut and washer assembly closes the holes and holds the panels firmly and permanently.

AVAILABLE FORMS: Regularly furnished in panels covering a net area of 24 sq. ft. Aluminum facing is 100" x 50.3", insulation is 96" x 48", by 1", 1 1/4", 2" or 3" thick. Special 1/4" threaded studs and nut-washer assembly are furnished with panels.

USES: J-M Metal-On insulating system for heated tanks was designed primarily for the insulation of heated tanks and vessels, but can be used for housings, ducts, broodings or other surfaces to which securement can be made by welding studs.

ADVANTAGES:

Highly Efficient Insulation

Spin-Glas conductivity at 200F mean is below 0.32.

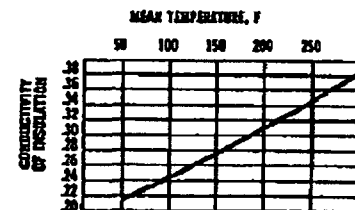
Rapid Installation

Metal-On insulating system for heated tanks is applied rapidly, since elaborate layout and pre-welding of studs or other fasteners is eliminated. In most cases, complete scaffolding can be eliminated and cable-supported power hoist platforms can be utilized. These features provide lower installed cost. Cut-outs for manholes, pipes, etc. are made readily with hand or portable power tools.

Good Appearance

Metal-On insulating system for heated tanks provides long-lasting weather protection and attractive appearance under normal atmospheric conditions. Horizontal laps are 4", vertical side laps are 2 1/4".

THERMAL CONDUCTIVITY



NOTE: The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

*J M Trademark

450562



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22 East 40th Street • New York, N. Y. 10016

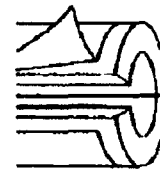
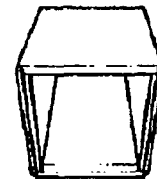
Sales Offices in Principal Cities

450563

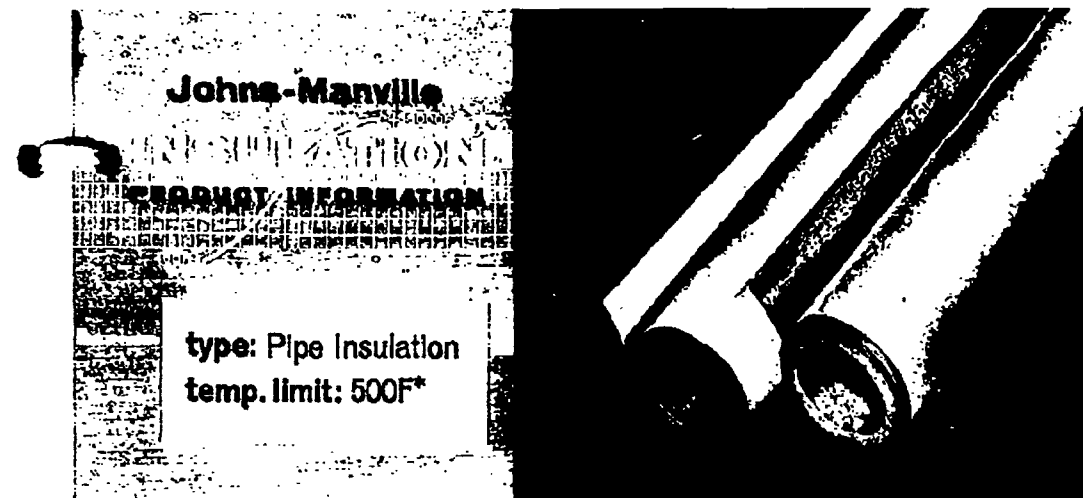
PRINTED IN U.S.A.

JOHNS-MANVILLE INSULATIONS

**plumbing, heating
& air conditioning**



450564



Johns-Manville

PRODUCT INFORMATION

type: Pipe Insulation
temp. limit: 500F*

J-M FLAME-SAFE fiber glass pipe insulation

■ DESCRIPTION: J-M Flame-Safe® pipe insulation is made from long, fine, flame-attenuated glass fibers, bonded with a thermosetting resin. All sections are accurately and uniformly made in one piece for easy, fast application. Jackets are factory-applied. Fire and Smoke Hazard Classification ratings have been obtained on all Flame-Safe products on a COMPOSITE basis—pipe insulation, jacket and the adhesive used to secure the jacket to the insulation. Please refer to the section on Fire and Smoke Safety, below, and the ratings on the reverse side.

Each section of Flame-Safe is color coded to insure selection and use of the specified type at the job site, and to facilitate inspection. Colored printing around each end shows pipe size, wall thickness and type of jacket. Printing is covered when butt strips are applied.

■ AVAILABLE FORMS: Flame-Safe is produced in 3-foot sections for IPS 1½" to 30" and CT sizes from ½" to 12", depending on thickness. The various jackets are described on the back of this sheet.

■ USES: Flame-Safe is designed for service up to 500F* on commercial, power or process lines where maximum fire-safety, resistance to physical abuse and the utmost in appearance is desired.

■ ADVANTAGES:

Fire and Smoke Safety

All Flame-Safe pipe insulation meets, on a composite basis, the fire and smoke safety requirements of federal, state and local building codes, including CISA and Corps of Engineers.

Strong and Durable

The combination of resilient fiber glass insulation and tough jackets offers the highest degree of resistance to mechanical abuse during and after installation, insuring superior installed appearance.

Ready to Paint

Because the glass cloth on the exterior of the GVB jacket is pre-sized at the factory, it is ready for painting if desired. However, the pleasing off-white and textured appearance makes painting unnecessary in many instances. Type VB may also be painted and a latex or water-based paint is recommended.

Economical to Apply

The one-piece construction, light weight and simplicity of design speed on-the-job handling and application. Both jacket and insulation are measured, cut and installed in one piece. Butt strips of the same jacket material are enclosed in the cartons for sealing the circumferential joints.

Saves Fuel and Power

A low k factor of .22 at 75F mean permits more efficient temperature control. Snug closure guards against heat loss.

*Flame Safe for 500F service is available in 1" thickness and above. Unless 500F material is specified on the order, Flame Safe for 375F will be supplied.

450565

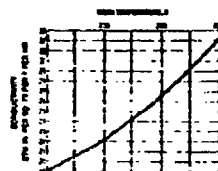
FLAME-SAFE Specification Data¹

GENERAL PROPERTIES OF INSULATION

Temperature limit	500F*
Moisture absorption	less than 0.2% by volume
Alkalinity	less than 0.6% expressed as Na ₂ O
Corrosivity	On mild steel, copper, aluminum does not cause or accelerate
Capillarity	negligible
Shrinkage	none
Resistance to fungi and bacteria	does not breed or promote

*See note on other side.

THERMAL CONDUCTIVITY



DESCRIPTIONS OF JACKETS

GVB Glass cloth Vapor Barrier for exposed piping up to 500F. Tough, pie-sized glass cloth with vapor barrier coating on the inside surface. Permanent fire and smoke safety. Porosity well below appearance. Water vapor permeability: .02 perm.

VB Vapor Barrier for piping up to 500F. White kraft bonded to aluminum foil, reinforced with fiber glass yarn. Kraft paper is permanently treated with mercury salt treated to ensure permanent fire and smoke safety, and to prevent corrosion of foil. Water vapor permeability: .02 perm.

For systems exposed to weather or subject to physical abuse. ML Flame-Safe ML, also known as JM Metal-Jacketed with factory-applied .016" aluminum or .010" stainless steel jacket with special longitudinal Z-joint closure and factory-supplied snap-strap.

PHYSICAL PROPERTIES OF JACKETS

Jacket Type	Water Vapor Permeability ASTM E96	Break Pressure ASTM D-781-59D	Tensile Strength - Ultimate	Modulus Rupture ASTM D-774-63D
GVB	.02 perm	150 oz. in./in. test	100 lb./in. width*	300 psi
VB	.02 perm	50 oz. in./in. test	30 lb./in. width**	70 psi

* ASTM D-962-61 ** LAPP-401-603

COMPLIANCE WITH CODES AND STANDARDS

All Flame-Safe pipe insulations are tested for Fire and Smoke Hazard Classification ratings on a COMPOSITE basis - insulation, jacket and moisture used to secure jacket to insulation - in accordance with ASTM E-84, NFPA 255 and UL 723. Ratings do not exceed the following:

COMPLIANCE WITH GOVERNMENT SPECS

MIN. 1-22314
FM-1-55A Form B, Type III, Class 12 and Class 13

Composite Product Rating
FNC 25/80

See notes given when the subject of this data is used in design. Check the nearest JM branch office for latest information.

JM
Johns-Manville

450566

120 E. 1st St., Denver, Colo. 80202

Branch offices in all major industrial areas

IN-713A (1/71)

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Johns-Manville

INSULATION PRODUCT INFORMATION

type: Pipe
temp. limit: 500F*



J-M FLAME-SAFE ML metal-jacketed fiber glass pipe insulation

DESCRIPTION: J-M Flame-Safe® ML pipe insulation (also known as J-M Micro-Lock) consists of a high quality, polished metal jacket, factory-applied over J-M Flame-Safe fiber glass pipe insulation. The insulation is made of long, fine glass fibers bonded with a thermosetting resin. The metal jacket, especially selected for good appearance, strength and resistance to corrosion and damage, has a longitudinal seam closure with a special Z-joint construction that locks the insulation and jacket quickly and securely in place, and to rigid, uniform diameter. Circumferential butt joints are dependably sealed and weather-proofed with a factory-supplied, 2" wide "snap-strap", lined with J-M Alkaseal®, a permanently-plastic sealing compound, and secured with an outer holding band. Rivets or metal screws are not required. Elbows or fittings are finished with J-M Miter Seals, mastic or preformed aluminum covers.

AVAILABLE FORMS: J-M Flame-Safe ML is made in 36-inch lengths, in standard thicknesses and a complete range of IPS and CT sizes where the outside diameter of the insulation is at least 3 1/2" and no more than 24". Above 24" O.D., jackets are supplied but not factory-attached. Flame-Safe ML is available with .016" aluminum or .010" stainless steel jackets, or with .010" aluminum on special order.

USES: Flame-Safe ML is designed for use on all hot lines to 500 F° and piping systems exposed to weather or subject to physical abuse. It is also ideal for systems where good appearance is essential. Thick-ness should be as recommended in the J-M Flame-Safe brochure, Form IN-767A.

* Flame-Safe ML for 500F service is available in 1" thicknesses and above, and must be specified on the order. Unless so specified, Flame-Safe ML for 375F will be supplied.

ADVANTAGES:

Economical to Apply

Light weight, simplicity of design and one-piece construction speed on-the-job handling and application.

Fire and Smoke Safety

Fire hazard classification ratings not exceeding 25 Flame Spread and 50 Smoke Developed have been attained by Flame-Safe ML, following tests on the composite product in accordance with accepted test methods (ASTM E-84, NFPA 255 and UL 723).

Saves Fuel and Power

Low k factor of .225 at 75F mean, permits more efficient temperature control. Snap closures at the seams and joints also guard against heat loss or gain.

Dependable Weather Protection

Because Flame-Safe ML is pre-jacketed, the insulation keeps dry during installation, thus avoiding electrolytic corrosion of aluminum through direct contact with wet insulation which might occur when jacket is applied as a separate operation at the job site.

Easy to Remove

Flame-Safe ML can be easily and quickly removed and replaced when line repair, maintenance or alteration become necessary.

450567

J-M FLAME-SAFE ML Specification Data

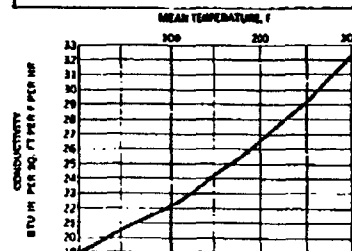
PHYSICAL PROPERTIES*

Temperature limit	500°F
Moisture absorption	less than 0.2% by volume
Alkalinity	less than 0.05% expressed as NaOH
Corrosivity	does not corrode or discolorate
with steel, copper, aluminum	
Capillary action 24 hours	negligible
Shrinkage	none
Resistance to fungus and bacteria	does not breed or promote

* The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

* See note on other side.

THERMAL CONDUCTIVITY



APPLICATION DETAILS



Section of Flame-Safe ML can be easily opened full length for placing over pipe. It holds itself in position for easy fitting of longitudinal joint closure.



Aluminum "saw strap" containing permanently plastic sealing compound is squeezed around joint to seal out weather.



Metal band, quickly and easily applied, holds "saw-strap" firmly in place. Band is tightened with J-M Banding Wrench or regular banding tool.



J-M Miter Seals (Type B, C and D only) are made to fit most elbows, tube turns, sweeps and bends. Other fittings can be finished with conventional waterproofing materials and aluminum mastic paint, or elbows with pre-formed aluminum covers.

See "Installation Tips" for Flame-Safe ML and covers on Page 42, brochure JM-251A.

COLOR-CODED STRIP-STRAPS AVAILABLE FOR EASY COLOR CODING

Colored aluminum strip-straps may be installed in place of regular straps for color coding purposes. The following colors, which are permanent and require no maintenance, are available: scarlet red, cascade blue, sandblast yellow, meadow green, ebony black and orange orange.

COMPLIANCE WITH GOVERNMENT SPECS

MS-1550a, Form B, Type III, Class 12
MS-423244



Johns-Manville

22 East 19th Street, New York 10, N.Y.
Sales Offices Everywhere

450568

Johns-Manville

PRODUCT INFORMATION

type: Pipe Fittings
Insulation
temp. limit: 0F to 500F

J-M UNI-FIT*

One-Piece PVC, Insulated, Fitting Covers

DESCRIPTION: PVC Covers pre-molded in one piece in several shapes and sizes to hold an insulation insert and fit snugly over a variety of fittings. The insulation is J-M fiber glass. The insulated cover simplifies and speeds up the work of providing adequate insulation plus vapor barrier around fittings.

AVAILABLE COVERS: For 45° and 90° Elbows, Tees, and Valves—IPS Sizes 1/2" through 12"; CT sizes 1/4" through 6 1/2" O.D.s.

APPLICATIONS: For use in insulating chilled water, hot water, steam, and other piping systems in commercial, institutional, industrial construction. Meets requirements of Federal, State and local codes, and federal and military specifications as shown on the reverse side. For use with J-M FLAME-SAFE[®] pipe insulation.

ADVANTAGES:

Fire and Smoke Safety

The PVC cover is self-extinguishing. Flame spread—25 or less. Fuel contributed—0 (by ASTM E-84). The J-M insulation meets the safety requirements of federal, state and local codes, including GSA and Corps of Engineers.

* J-M Trademark

Strong and Durable

Flexible PVC cover accepts blows and crushing, then returns to original shape. Withstands water, most acids and alkalis, chemical washdowns. Resists alcohols, aliphatic hydrocarbons, and oils. Insulation will not settle or separate in vibration.

Neat Appearance, Paintable

Attractive, off-white UNI-FIT cover provides excellent appearance. The smooth finish may be painted if desired.

Simple, Fast Installation

As shown in the UNI-FIT Installation Guide, there are three basic steps as follows: wrap the fiber glass insert around the fitting and tuck it in as necessary; pop on the fitting cover and smooth it into position; secure with staples, tacks, or tape as required. No tools required. Can be installed by hand, by only one skilled or semi-skilled workman.

450568

J-M UNI-FIT

Specification Data

GENERAL PROPERTIES

Thermal Conductivity	At 74° mean temp., "K" = .27. 0°F to 500°F.
Temperature Limits	Will not burn or support combustion.
Non-Combustible	Fibers cannot absorb moisture.
Vapor and Moisture Resistant	Resistance to moisture facilitates rapid drying out.
Sanitary	Odorless. Will not absorb odors. Provides no food for insects, rodents, or mold.
Non-Corrosive	Will not cause corrosion when in contact with aluminum or steel as tested under alternating damp and dry conditions.
Vibration Proof	Will not settle or expand. Vibration helps the insulation expand into voids, if any.

SPECIFICATION DATA

PVC Jacketing—Felt, Spec. 1-P-533C Composition A Type II Grade GU.

All fiber glass insulation—

MI-5556a Mar. 7, 1963 Supersedes MI-563 and MI-542	Insulation Blankets, Felt, Mineral Fiber, Industrial Types	Form B Type I Class 7 Class 8	Blankets, and Felt, Resinable 1000F to below ambient
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MI-1-228238 Oct. 16, 1964 Int. And. I Apr. 21, 1965	Industrial Felt, Thermal and Sound Absorption Felt, Fibrous Glass, Flexible	Type I Thermal Class 8
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Meets requirements of most Federal, State, and local codes. Accepted for commercial, institutional, industrial, residential purposes in all parts of U.S.

UNI-FIT PRE-MOLDED ONE-PIECE PVC
INSULATED FITTING SPECIFICATIONS

GENERAL:

Where the factory-premolded one-piece PVC insulated fitting covers are to be used, the proper factory pre-cut insulation shall be applied to the fitting. The ends of the insulation shall be tucked snugly into the throat of the fitting and the edges adjacent to the pipe covering tucked and tucked in. Fully insulating the pipe fitting. The one-piece PVC fitting cover is then secured by stapling, tack fastening, banding or taping the ends to the adjacent pipe covering.

CHILLED:

Chilled water systems shall be insulated as above and have all seam edges of the cover sealed with vapor-barrier adhesive mastic or equal. The circumferential edges of cover shall be wrapped with vapor-barrier pressure sensitive color matching tape. The tape shall extend over the adjacent pipe insulation and have an overlap on itself at least 2 inches on the downstream side.

HOT:

On fittings where temperature exceeds 250°F, 2 layers of the factory pre-cut insulation inserts shall be applied with a few wrappings of twine on first layer, to be sure there are no voids or hot spots. The fitting cover shall then be applied over the insulation as described above, in "General."

REFERENCE:

The same procedure for 2-layer insulation described above is to be followed on insulating fittings for pipe temperature 35°F and lower. In addition, the seam edges of the PVC fitting cover shall be sealed with vapor-barrier adhesive mastic or equal. The circumferential edges shall be wrapped with vapor-barrier pressure sensitive color matching tape. The tape shall extend over the adjacent pipe insulation, and have an overlap on itself at least 2 inches on the downstream side.

NOTE: The contractor will insulate all unfitted piping leaving all fittings un-insulated until after tests are completed.

THE PHYSICAL AND CHEMICAL PROPERTIES OF NONCOMBUSTIBLE UNI-FIT REPRESENT TYPICAL, AVERAGE VALUES OBTAINED IN ACCORDANCE WITH ACCEPTED TEST METHODS AND ARE SUBJECT TO NORMAL MANUFACTURING VARIATIONS. THEY ARE SUPPLIED AS A TECHNICAL SERVICE AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. CHECK THE JOHNS-MANVILLE DISTRICT OFFICE TO ASSURE CURRENT INFORMATION.



Johns-Manville

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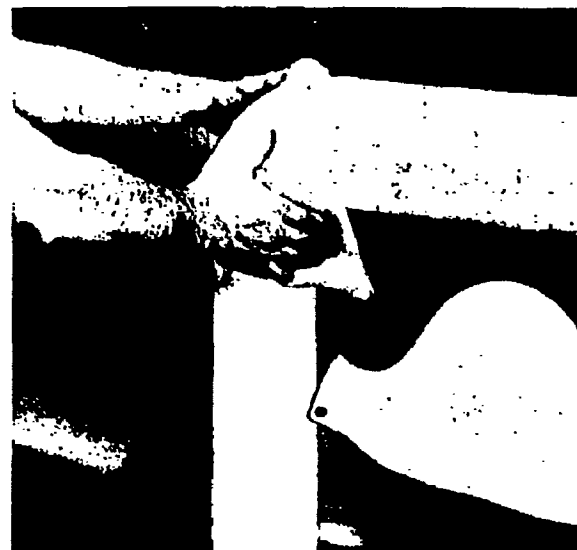
Sole Offices in Principal Cities

• 450571

Uni-Fit*

ONE-PIECE PVC INSULATED
FITTING COVERS

Selection and Installation Guide



Johns-Manville

U.S. PATENT NO. 3,497,529 • CANADA PATENT NO. 876,544 • ENGLAND PATENT NO. 1,134,437 • OTHER PATENTS PENDING

• 450571

INSTALLATION INSTRUCTIONS—UNI-FIT ELBOW COVER

Long radius sweeps, tees, valves, etc. are installed by following the same general instructions shown here



1. Apply UNI-FIT Tack Fasteners on both sides of one end of the cover. Place pre-cut UNI-FIT insulation against elbow.

See note (B) and other notes listed below.



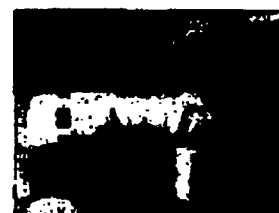
2. Tuck points of UNI-FIT insulation into inside radius of the elbow. Keep fiberglass fluffed up as much as possible.

Steps 4 and 5 are used where cold piping is insulated to effectively vapor seal fitting joints.



3. Fold ends of UNI-FIT insulation against ends of pipe covering, leaving UNI-FIT insulation fluffed up as much as possible. Tuck and fold so as to cover all bare surfaces.

A few loose wrappings of twine on the second layer are recommended on fittings operating below 35°F. or above 250°F. to insure that no insulation voids are present.



4. For chilled water piping, apply UNI-FIT Vapor Barrier Mastic bead approximately 1/8" in diameter around pipe covering, close to the end of the pipe covering. Steps 4 and 5 are not necessary for hot fittings.

All circumferential edges of cover should also be wrapped with Tape as recommended in note (E).



5. For chilled water piping, apply a thin bead along one edge of the fitting cover. Be sure to fold this edge in first as described in step #8. Use just enough mastic to insure a good seal. The use of too much mastic will cause it to squeeze out past the laps and dirty the fitting cover and your hands. Be sure all circumferential edges of cover are additionally sealed using UNI-FIT Tape.



6. Note fitting cover as shown and place against fluffed out UNI-FIT insulation.

All chilled water and outdoor piping shall be taped on ends and sealed on the inside radius with UNI-FIT Vapor Barrier Mastic Adhesive.



7. Press hard enough to compress UNI-FIT insulation down to where fitting cover makes intimate contact with pipe covering.

Pressure should be applied in the direction the thumb is pointing.



8. The next two steps require a little practice before speed and a perfect fit can be accomplished. Learn to press the fitting down with the right hand as shown and then press and slide in a continuous motion against the inside lap with the left hand. Finish the second lap with the right hand fingers. On mastic beaded covers—be sure to press the beaded edge in place first.



9. Grasp the fitting as shown after positioning and lapping properly, in preparation to fastening in place.

Press Tack Fasteners in place. On very large fittings the use of a wire on each end, alternately tightening until positioned, can allow one man to do the job effectively.



10. On fitting covers used over cold piping, be sure to tape over leaks. Staples will not work well on the UNI-FIT fitting covers, since they are difficult to puncture. We recommend the use of tack fasteners.



11. Apply bands, color matched Tape, or over-lapping of pipe covering jacketing material, to finish off smoothly. Fitting cover is not designed to go over tar paper or aluminum jacketing. These jackets should be applied over the fitting cover. Test method is recommended here.



12. Finished fittings for 1" and 3/4" pipe sizes are shown here. Total time for installation for these fittings should take 2-5 minutes the first time they are installed. After a couple dozen fittings are installed (to develop skill and speed) installation time will come down.

THINGS TO REMEMBER

- Check the table and be sure you match the cover size to the pipe covering you are using. Your most accurate measuring method is to use the tape measure supplied in each box of formfit.
- On fittings requiring more than 1 thickness of insulation you will be required to add an additional piece of insulation to the one furnished.
- Sufficient insulation must be used to reduce the surface temperature of the insulation to below 150°F. before applying cover.
- Where extra hard fittings are required, the cover fitting should be tacked up on pipe covering and insulation cement (equivalent to the shape of the molded cover). The cement should then be applied in place and pressed in place against the fitting cover. (Do not vapor seal fittings or they will not come in thoroughly due to being made flat due to steam generation under the cover.)
- On fittings used for chilled or cold water, where cover is difficult to blanket in place, use a few wraps of twine. Hand up proper shape as you work. Do not apply cement directly to fitting. Be sure to install fitting cover in place as described in steps 4 and 5. If not installing cement, use twine to hold the fitting in place. Due to the weight of the water, the twine will hold the fitting in place.

All circumferential edges of cover shall be wrapped with UNI-FIT Vapor Barrier pressure sensitive tape. The tape shall extend over the adjacent pipe insulation and have an overlap on itself at least 2" on the downward side.

On welded fittings, it is possible to apply a molded fiberglass, teleglass, urethane or calcium silicate fitting under the pipe cover. Costs for this type of installation will be considerable higher than the soffit fitting. Insulation value of either method (using fiberglass for an example) would be the same. For teleglass, styrofoam and calcium silicate the soffit fitting would be a better insulator.

Hard fittings are not recommended unless special conditions require it. The high impact strength of UNI-FIT Covers allows them to take considerable abuse with plenty of "no damage snap-back."

Where fitting covers are used with urethane pour-in-place method, be sure to cut the pour hole at the very highest point of the installed fitting. After completing fitting, cover hole with Tape or vapor seal mastic. In cold damp weather it is advisable to heat up the fitting to about 70° to 90°F. prior to applying cover and pour urethane. This can be done with a propane torch or other method.

9. Vendor's Office Address: Onondaga is 5 or 6 miles
W. of the city of Onondaga. Road name: Twenty-five
Mile Run. Approx. Box # 210. Office number of
the City of Onondaga: 315-339-1111. This number

2. Tank Enclosure: In care of 500. Carriage road.
Order number of "148-27 Tank Enclosure" factory
received.

054524

[illegible]

2000.

That we were surprised that he included no curves that have at least one of the corner nodes with a 180° vertex, since otherwise models are equal. The previous formal definition of corner shall be weakened with "all 180° vertex, since at least one of the corner nodes is 180°". The last shall extend over the definition of "middle" and have an extension for all of these nodes in the diagram.

12

On leaving where temperature exceeds 90°F., a layer of the factory product 1/8" insulation must be applied with a low wrappling of thin or fine paper, but also there are no voids or hot spots. The finish cover shall then be applied over the insulation as described above in "Finish".

DEEMERDANT:

The same model is for 2 layer insulation described above is to be followed on insulation fittings for pipe temperatures 250°F and lower. In addition, the center of the 2" O.D. fitting cover shall be covered with 1 1/2" O.D. vapor barrier between a section of pipe. The vapor barrier shall extend 3" on either side of the fitting. The vapor barrier pressure shall not be less than 100 psi. The tape shall extend over the adjacent pipe insulation, and have an overlap on each of at least 2 inches on the dimensions of the

NOTE: The contractor will install all required piping leaving all fittings unprotected until after tests are completed.

JOHNS-MANVILLE-EXCLUS'VE

RESEARCH REPORT, DOCUMENT NO. 10, 1960, AND 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2

FAST • CLEAN • EASY • ECONOMICAL

CHECK THESE REVERTS:

For, since, again, practicing, the eyes must be used with
both above, the hands, to bring on the right hand.

Assured sheep feed and maintenance cost. No further on feeding. Discharge light is time and cost.

Some of the individuals involved in the "Reds" case are
Mr. [redacted] and Mr. [redacted] who are working in the [redacted]

Applicator must separately cover adhesive on top and bottom. Turn stripes at "9 o'clock" will do the job.

SS works only w/ no or cold weather

Large and well styled when quickly. They smooth and
 Oct. They are large with very narrow a strong, light bond.

Same applicator fluid, applicator and method for both
functional tests and ball string.

If positive (i.e. before exiting) done, simply remove the following annotation.

One container will do ANY part of the high 'equation'

It is necessary to represent the structure of the system as an explicit, formal, graph, based on a set of nodes.

He stated he was not in contact with the subject. He
has no knowledge of the subject. J. E. O. 100-100000

The "M. P. Smith Co." is a firm in the city of
of an attorney at law in the city of
to the city of the city of the city of
of the city of the city of the city of

A heavily non-linear, polynomial synthesis of activation
coefficient, activation order, a threshold type of a polynomial
connects the field explicitly and non-linearly over the surfaces of
the top or high class. This activates the influence, and
after a short period (about 30 seconds) for this activation
to "decay," the top or high class is ready for recall. The
level is "activated" and stored . . . and, next, important
information.

the brother, an attractive, an triple or employment offer
than the non-activating members are needed.

Just like the top or bottom girls on a basketball team, the top and bottom actresses on the BBS audition on the top and bottom of a hierarchy of three categories of actress or actresses, as soon as the actresses auditioned (about 1/2 of each) and with the nine actresses in place, some of the top or bottom actresses signed the actresses' contract. You have from 1/2 to 1/3 minutes or other something the actresses had to complete the contract. If you don't get to be in one of the actresses' list, one, it's not like the actresses had again.

The Positive Sealing System can be used only with LHM Flame-Seal VPS (Nuclear Power Corporation). The system uses a positive pressure of gas from the factory and connected to the VPS and isolation. LHM Flame-Seal VPS also has a system which is also available for conventional high temperature sealing methods.

37
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450578

650571

...CONTINUED...

FIRE and SMOKE SAFETY

J-M Flame-Safe VBC pipe insulation applied by the Positive Sealing System meets, on a composite basis*, the fire and smoke safety requirements of NFPA 90A Standards as tested in accordance with ASTM E-84, NFPA 255 and UL 723.

*Insulation, jacket, adhesive used to secure the jacket to the insulation, adhesive on the laps and butt strips, and P65 activator fluid tested together as a single unit.

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450574

aerotube®

the perfect
anti-sweat
insulation
for
bent tubing





J-M AEROTUBE
is designed for gas
bent tubing and fit

Insulation for use of
gas, oil, steam, etc.
is quick, easy
to install and durable

no heating.

450577

J-M Aerotube Sheets
are easy to apply.
Cut-outs for fittings,
manholes and pipes
are no problem and
the finished job is
neat and attractive.

for oversize piping and tanks

J-M AEROTUBE SHEET INSULATION

For insulating large tanks and vessels of irregular shapes, specify Aerotube Sheet Insulation; it will do the job efficiently, easily and economically. These "king size" sheets (48" x 36") are applied with J-M 57 Adhesive to metal surfaces operating at temperatures as high as 180F. When used on cold surfaces, multiple layers of Aerotube sheets may be required below zero. Sheets are furnished 1/4" through 1" thickness in 1/4" increments.

For oversize pipes - with adhesive applied only at the joints - Aerotube Sheets applied with J-M 57 Adhesive can be used on lines operating as high as 220F.

Aerotube Sheet Insulation is made from the same material as Aerotube - flexible, foamed plastic. It offers you these benefits:

LONG-LASTING INSULATING EFFICIENCY - These tough sheets won't rot or deteriorate... retain their high insulating efficiency... thermal conductivity being 0.26 Btu. hr. sq. ft. (F. in.) at 70F mean temperature.

NO VAPOR BARRIER NEEDED - The closed cell structure of foamed plastic locks out both air and moisture, eliminating the need for a separate vapor barrier. For outdoor installations Aerotube Sheets should be protected with a vinyl lacquer type coating.

LOW-COST INSTALLATION - Aerotube Sheets are cut quickly and easily with ordinary tools. They are applied directly to the metal surface with J-M 57 Adhesive... no supports are required.

SELF-EXTINGUISHING - Aerotube Sheets will burn very slowly when in direct contact with hot flame. This material does not carry flame and burning stops as soon as the flame is removed.

CORROSIVE RESISTANT - Aerotube is not affected by common corrosive chemicals, oils, or fungus. Solvents have only a slight effect on the sheet. Ten percent solutions of sulfuric and hydrochloric acids and sodium hydroxide have no adverse effects on Aerotube. Solvents such as methyl ethyl ketone, toluene, and trichloroethylene cause minor swelling of the material, but do not dissolve the sheets.

450577

J-M AEROTUBE stops sweating is designed for installation on bent tubing and fittings

BUILT-IN VAPOR BARRIER STOPS CONDENSATION

Aerotube has a closed cell structure that stops the passage of air and water vapor. This foamed plastic material has a water vapor transmission rating of less than 0.1 perm-in.

QUICK INSTALLATION TIME AND COSTS

Since Aerotube is supplied in tubular form, it may be slipped over pipe or tubing before pipe connections are made. This results in substantial labor savings. Where connections have already been made, Aerotube is easily slit longitudinally with a sharp knife and snapped onto the pipe. Equally important is the fact that Aerotube, because of its closed cell structure, does not require a separate vapor barrier.

SMOOTH SURFACE

Aerotube has a remarkably smooth, uniform outer surface which assures an attractive finished job.

OZONE RESISTANT

Because Aerotube is ozone resistant it can be used on sharp bends and elbows without cracking at the point of stress.

COMES IN 6-FOOT LENGTHS AND 1/2" TO 3" DIAMETER SIZES

Aerotube is manufactured in 6' lengths in the following iron pipe and copper tubing sizes: nominal 3/8" thick (3/8" through 3"); nominal 1/2" thick (1/2" through 5"); nominal 3/4" thick (3/4" through 5"). Fifty-foot continuous coils are also available in selected wall thicknesses and pipe sizes.

J-M AEROTUBE is a foamed plastic, tubular pipe insulation for use at temperatures up to 32°F. Its extreme flexibility and resiliency permit quick, easy installation on bent tubing and fittings. Aerotube is clean, odorless and durable. It flame retards and is self-extinguishing.

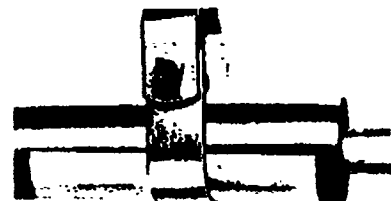
It is recommended for use on virtually all types of lines in plumbing, heating and refrigeration installations.

UNDERGROUND INSULATION—Flexible Aerotube Pipe Insulation may be installed on underground piping and fittings on lines operating as low as 32°F, except where the water table rises above the pipe level at any time. Application is the same as for piping above ground, except that the insulation must be finished with two coats of Insulokote ST reinforced with Duramesh Type 931 embedded in the first coat while wet.

Where there is danger of damaging the insulation due to heavy aggregates in the backfill, first cover Aerotube Pipe Insulation with several inches of sand or pebbles.

If Flexible Aerotube is buried deeper than 1', it must be protected from compression by the earth overburden with rigid conduit or other self-supporting material.

Protect against prolonged exposure to surface water at the point where the insulation enters the soil by heavy roofing paper jacket.



RIGID AEROTUBE

J-M Rigid Aerotube—a foamed plastic insulation with excellent load-bearing properties—is recommended for the following applications:

- At hanger locations and other installations where insulation must support a load or is exposed to mechanical abuse.
- For underground pipes operating as low as 32°F, provided water table does not rise above pipe level at any time.

NOTE: When used for underground installation, Rigid Aerotube should be covered with several inches of sand or pebbles to prevent damage from heavy aggregates in the backfill. Finish insulation with two coats of Insulokote ST reinforced with Duramesh Type 931 embedded in the first coat while wet. A heavy roofing paper jacket will protect against prolonged exposure to surface water at the point the insulation enters the soil.

- For all locations where flexible Aerotube would be compressed more than desirable.

Rigid Aerotube is available in half sections 36" long, in 1/2" and 3/4" thicknesses.

AEROTUBE is easy to apply... needs no special tools

ON STRAIGHT PIPE RUNS

New Jobs

Aerotube is slipped over the open end of straight or curved tubing or pipe. Bated ends are brush-coated with J-M 57 Adhesive and pressed firmly together as soon as adhesive is non-tacky to touch.

Existing Piping

Where piping is already in place Aerotube can be slit longitudinally (any sharp knife will do the trick) and the insulation snapped in place.



ON FITTINGS

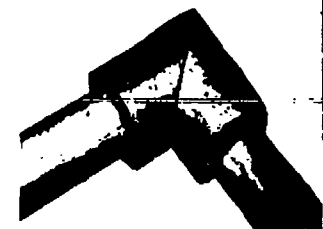
Sweat Type

Sweat type fittings can be insulated with Aerotube of the same size as that used on adjacent tubing. Fitting insulation is easily made up from properly miter-cut pieces of Aerotube, carefully slit, and snapped into place over the fitting. Joined surfaces are cemented together.



Screw Type

Screw type fittings are readily insulated with "sleeves" of Aerotube having an inside diameter large enough to fit over the insulation on the adjacent piping (see table of Sleeving Sizes on back cover). Sleeve-type fitting is made up by cementing two miter-cut pieces of Aerotube together with J-M 57 Adhesive. Fitting is then split and snapped into position, all joints being cemented together.



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STANDARD SIZES, PACKAGING DATA and DIMENSIONS

SIZE FOR ORDERING, INCHES	TUBING & PIPE SIZE			CARTON CONTENTS					
	Copper Tubing		Lead Pipe, inches	1/4" Thick		1/2" Thick		3/4" Thick	
	Nom. Inches	O.D. Inches		Lbs. Ft./Ctn.	Wt. Lbs./Ctn.	Lbs. Ft./Ctn.	Wt. Lbs./Ctn.	Lbs. Ft./Ctn.	Wt. Lbs./Ctn.
1/8" ID	1/8"	3/8"	—	420	19	270	23	150	23
1/4" ID	1/4"	1/2"	1/4"	340	18	240	20	120	20
3/8" ID	3/8"	1/2"	3/8"	270	16	210	18	120	19
1/2" ID	1/2"	5/8"	—	240	17	180	19	120	20
3/4" ID	3/4"	7/8"	1/2"	210	16	160	18	98	18
1" ID	—	—	5/8"	150	14	240	33	180	32
1 1/4" ID	1	1 1/8"	—	150	15	240	31	180	32
1 1/2" ID	1 1/4"	1 3/8"	1	240	25	180	29	138	33
1 3/4" ID	1 1/2"	1 5/8"	—	240	25	180	28	132	32
2" ID	1 3/4"	1 7/8"	1 1/4"	180	25	150	29	114	33
2 1/4" ID	—	—	1 1/2"	150	30	150	33	84	28
2 1/2" ID	2	2 1/4"	—	150	45	120	40	84	36
2" IPS	—	—	2	96	36	96	38	72	37
2 1/4" IPS	2 1/4"	2 1/2"	—	96	29	96	41	60	43
2 1/2" IPS	—	—	2 1/2"	96	39	72	34	64	33
3 1/4" ID	3	3 1/4"	—	72	35	72	37	48	37
3" IPS	—	—	3	54	28	54	31	36	29
3 1/2" ID	3 1/2"	3 3/4"	—	—	—	54	34	36	36
3 3/4" IPS	—	—	3 3/4"	—	—	48	33	30	34
4 1/4" ID	4	4 1/4"	—	—	—	42	32	30	29
4" IPS	—	—	4	—	—	36	30	24	27
5" IPS	—	—	5	—	—	24	20	24	40

* Available in 50-foot rolls, nominal 1/2" and nominal 3/4" wall series, carton contents available upon request.

PHYSICAL AND THERMAL PROPERTIES

PROPERTY	VALUE
Density, lb./cu. ft. (approx.)	0.4
Thermal conductivity, Btu./hr. sq. ft. °F./in.	0.25
25° max. to 250° max.	0.27
250° max. to 250° max.	0.28
Temperature Limit, °F.	250
Expansion, %	—0.6
Thermal stability, % shrinkage	2.8-4.5
25 days, 150°	2.8-4.5
25 days, 250°	2.8-4.5
25 days, 250°	2.8-4.5
Water vapor transmission, perm. in.	1.5-2.0
Water absorption, %	—
25 days, 150°	1.7
ASTM D1056-62T, % by weight	1.7
Organic solubility	good
Order	ASTM D1056-62T
Fire rating, ASTM D1692-65T	self-extinguishing

The figures given in this table are average values obtained in accordance with accepted test methods.

* Available pipe insulation with methacrylate glass temperatures up to 250°. When the pipe size is smaller than 3" IPS and Available pipe insulation and describe sheet are secured by cementing together only the edges, the temperature limit is 250°. 1/4" and 3/8" Adhesive may be used with pipe insulation applications up to 250°. Adhesive sheet applied with full adhesive coverage on curved or flat metal surfaces may be applied to surfaces operating up to 100° using J-M 17 Adhesive.

Below 200° Flexible Adhesive will be hard and start to become brittle. This characteristic does not affect the low conductivity property relative to other vapors.

COMPLIANCE WITH GOVERNMENT SPECIFICATIONS

Available Pipe Insulation complies with specification MIL-P-12100, Type R, Form 1, and Federal Specification MIL-12011, Class 1.

Available Sheet Insulation complies with specification MIL-P-12100, Type R, Form 2, and Federal Specification MIL-12011, Class 2.

RECOMMENDED THICKNESSES

NORMAL DESIGN CONDITIONS*			
Pipe Size, in.	100°	250°	50°
1/8" ID through 3" IPS	1/4" sheet	1/2" sheet	1/4" sheet
Over 3" IPS through 10" IPS	1/4" sheet	1/2" sheet	1/4" sheet
Over 10" IPS	1/4" sheet	1/2" sheet	1/4" sheet
MILD DESIGN CONDITIONS**			
1/8" ID through 3" IPS	1/4" sheet	1/2" sheet	1/4" sheet
Over 3" IPS through 10" IPS	1/4" sheet	1/2" sheet	1/4" sheet
Over 10" IPS	1/4" sheet	1/2" sheet	1/4" sheet
SEVERE DESIGN CONDITIONS***			
1/8" ID through 3" IPS	1/4" sheet	1/2" sheet	1/4" sheet
Over 3" IPS	1/4" sheet	1/2" sheet	1/4" sheet

* Normal Design Conditions: Max. temp. 250°, rel. hum. 50%
** Mild Design Conditions: Max. temp. 250°, rel. hum. 50%
*** Severe Design Conditions: Max. temp. 250°, rel. hum. 50%
NOTE: Available for zero if on special request.

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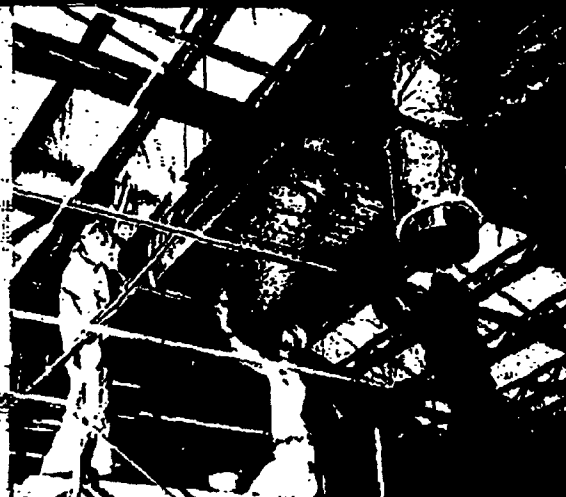
Sales Offices in Principal Cities



Johns-Manville

PRODUCT INFORMATION

type: Flexible Blanket
temp. limit: 250F*



J-M R-SERIES MICROLITE® (R-4, R-6, R-8) fiber glass duct insulations

DESCRIPTION: The J-M R-Series Micro-lite duct insulations represent a modern and more realistic concept of raising thermal performance. This principle eliminates the guess-work regarding density, thickness, fiber diameter, etc., in specifying insulation, and establishes assurance that the requirements for thermal performance are met. The designation "R" stands for thermal "resistance" (excluding facings) and is calculated from the formula $R = \frac{L}{k}$ (where "L" is thickness and "k" is the thermal conductivity).

Made of extremely fine, flame-retarded glass fibers, bonded with a thermosetting resin, the R-Series, blanket-type insulations are lightweight, highly resilient and flexible.

AVAILABLE FORMS: R-Series Micro-lite is available in three performance-rated types, R-4, R-6 and R-8, indicating the thermal resistance of each as shown on the reverse side. It is supplied in roll form and with any of six factory-applied vapor barrier facings. Information on sizes and facings is also shown on the back of this sheet.

USES: For the control of heat loss or gain, or the prevention of condensation, these R-Series insulations offer maximum thermal performance at low cost. They are ideal for use on round or rectangular sheet metal ducts in cooling and heating systems, plenums or other surfaces where temperature control is essential.

ADVANTAGES:

High Thermal Performance

Performance is considerably more effective than most 1/4", 1/2" and 3/4" thick fiber glass blanket insulation commercially available.

Resilient and Flexible

Resists swelling, breakdown or sagging from vibration. Yields readily to impact; protects facings from puncturing and tearing. Easy to form around corners and curved surfaces. Resilience helps to prevent undue compression at duct corners. Fits snugly around hangers and fittings.

Fire Safety

R-Series Micro-lite, with certain facings, meets the requirements of NFPA 90A and 90B Standards, and FIA on a composite basis (insulation, adhesive and facing). The UL fire hazard ratings are shown on the other side.

Strong

Long glass fibers give high tensile strength to blankets. They won't pull apart during normal application and won't sag when properly applied.

* For service temperatures above and below, consult the local Johns-Manville Industrial Insulations representative.

HEATING & WEATHER-
PROOFING MATERIALS

MISCELLANEOUS

INSULATING FIRE-BRICK
& REFRACTORIES

MAKITA 10-77

450580

450581

Easy to Handle and Apply

Light weight and flexibility of blanket makes it easy to wrap around ducts or to conform to surface irregularities. Easily cut with ordinary knife. Can be applied with adhesives or mechanical fasteners.

Durable

Glass fibers are incombustible. They resist the effects of moisture; will not decompose, mildew, sustain vermin or fungi. No salt-treated kraft is used in the laminated jackets, thus preventing possible corrosion of foil vapor barriers.

R-SERIES MICROLITE Specification Data**

THERMAL RESISTANCE

R-4	4.0 (minimum) at 75F mean temp.
R-6	6.0 (minimum) at 75F mean temp.
R-8	8.0 (minimum) at 75F mean temp. (facing not included)

UNDERWRITERS' LABORATORIES FIRE HAZARD CLASSIFICATION

The following products meet the Fire Hazard Classification requirements of NFPA 90A and 90B Standards and FIA as tested by U.L. as a composite product (insulation, adhesive and facing). UL Guide No. 40 UB.3. Card R371A.

R-Series Microlite with FSK
R-Series Microlite with ALI
R-Series Microlite with Class I Vinyl

INC 25/50

FACING INFORMATION

FSK	Reinforced Foil and Paper (Foil-Screen-Kraft) Aluminum foil (minimum 7 mil) reinforced with fiber glass yarn mesh and laminated to 32-oz. kraft, UL rated.
RSL	Lightweight Vapor Barrier Paper (Reinforced Kraft, Light Two thicknesses of 30 lb. kraft reinforced with fiber glass yarn mesh (1" x 1" spacing) in asphalt laminate. Combustible.
FSR	Lightweight Foil and Paper (Foil-Screen-Kraft, Lightweight Aluminum foil (minimum .35 mil) reinforced with light fiber glass yarn mesh and laminated with asphalt to 50-lb. kraft. Combustible.
ALI	Aluminum Foil .002" thick. UL rated.
WV	White Polyethylene Vinyl .015" thick. Effective vapor barrier. Combustible.
CLS I V	Class I Vinyl .004" thick. White pigmented. Meets NFPA 90A and 90B, UL rated.

*Available only from DuPont, Ohio and Cleveland, Texas.

All R-Series Microlite insulations have one 2-inch seam tab on package.

GENERAL PROPERTIES

Temperature (maximum)	250F*
Moisture Absorption	Less than 0.2% by volume
Acid/alkali	Less than 0.5% expressed as NaOH
Corrosivity (with steel, copper or aluminum)	Does not cause or accelerate
Odor	None
Capillary action 24 hours	Negligible
Shrinkage	None
Resistance to fungi and bacteria	Does not breed or promote

* See footnote on other side.

PACKAGING INFORMATION

TYPE	BLANKET WIDTH (INCHES)	ROLL LENGTH (FEET)
R-4	48	100
R-6	48	100
R-8	48	50

Available faced only.

** The physical and chemical properties of Johns-Manville R-Series Microlite represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check the Johns-Manville product data for more complete information.

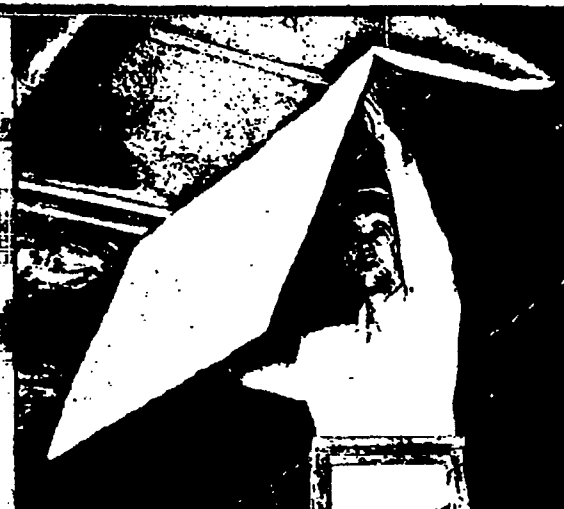


Johns-Manville 450582

Johns-Manville

PRODUCT INFORMATION

type: Flexible Blanket
temp. limit: 350F* Unfaced
250F* Faced



J-M MICROLITE* fiber glass duct insulation

DESCRIPTION: Microlite is a lightweight, highly resilient, blanket-type thermal and acoustical insulation made of long, extremely fine, flame-retarded glass fibers, bonded with a thermosetting resin.

AVAILABLE FORMS: Microlite is available in a variety of densities, thicknesses, widths and roll lengths. It can be supplied plain or with various vapor barriers or facings to meet service conditions. Where sealing methods require, faced Microlite can be supplied with a 3-inch lap or tab.

USES: Microlite is recommended as thermal insulation for the exterior of rectangular and round sheet metal ducts in heating or cooling systems. It is also ideal for plenums or other spaces or surfaces where temperatures must be controlled.

ADVANTAGES:

Reduces Heat Transfer

For warm air ducts, Microlite reduces heat loss, increases system efficiency, cuts down fuel costs. For air conditioning systems it permits more accurate control of cooled air during distribution, conserves power and helps prevent condensation.

Fire Safety

Microlite, with certain facings, meets the requirements of NFPA 90A and 90B Standards and FIA as a composite blank (insulation, adhesive and facing) as well as the plain form. The kraft paper used in the FSK laminate is chemically treated rather than salt treated to assure permanent fire safety and prevention of possible corrosion caused by salt. The UL fire hazard ratings are shown on the other side.

* For service temperatures above those listed, consult the local Johns-Manville industrial insulation representative.

Resilient and Flexible

The remarkable resilience of Microlite prevents the insulation from packing down and losing its effectiveness. It also means that full insulating thickness is more easily retained at the corners of the ducts. Microlite also absorbs accidental impact, reducing the danger of rips and punctures in vapor barriers. The flexibility of Microlite makes it easy to apply, more manageable in difficult working areas, and more conformable to curved surfaces.

Strong

The long glass fibers in Microlite give it high tensile strength. It won't pull apart during normal handling; can be pulled over duct corners, past hangers and through narrow openings without damage. After proper application it won't sag.

Easy to Handle and Apply

Microlite is lightweight, clean and easy to cut with an ordinary knife. It is easy to maneuver into proper position on ducts, to fit around hangers and to form around elbows, T's, etc. Microlite is readily attached with various mechanical fasteners or J-M adhesives.

Durable

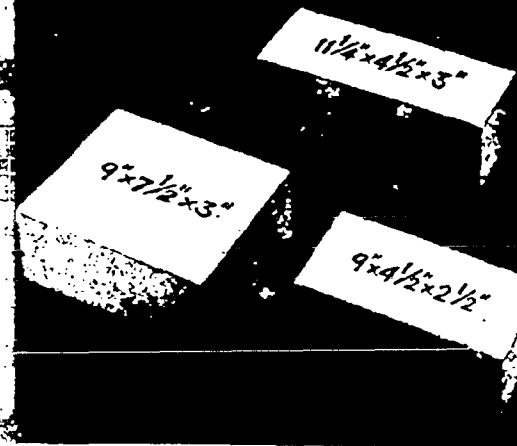
The glass fibers in Microlite are incombustible. Being non-cellular and non-hygroscopic, they resist the effects of moisture. The fibers will not deteriorate; are unaffected by oil, grease and most acids; provide no subsurface for fungi or vermin.

450583

Johns-Manville

PRODUCT INFORMATION

type: Insulating Fire Brick
temp limits: Up to 3200°F



J-M INSULATING FIRE BRICK (including the ZELIE® JUMBO® series)

DESCRIPTION: Johns-Manville produces seven types of Insulating Fire Brick to provide operators and builders of high temperature equipment seven opportunities to get the one insulating fire brick that's right for a given service.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties for its recommended service.

Made from high quality refractory clays (plus alumina for the higher temperatures), these insulating fire brick contain a carefully graded organic filler which is burned out during manufacture to give a uniform, controlled pore structure.

The ZELIE JUMBO Series offers larger sizes than conventional straights for use in a wide variety of wall construction, making possible a lower installed cost.

AVAILABLE TYPES:

- JM-32 — for temperatures to 3200°F exposed.
- JM-3070 — for temperatures to 3070°F exposed.
- JM-24 — for temperatures to 2800°F exposed.
- JM-26 — for temperatures to 2600°F exposed.
- JM-SL — for temperatures to 2300°F exposed; to 2500°F back-up in limited service.
- JM-23 — for temperatures to 2300°F exposed.
- JM-20 — for temperatures to 2000°F exposed.

USES: Recommended for use as insulating refractory lining or as back-up insulation behind other refractory protection in kilns, furnaces, fires, refining vessels and heaters, regenerators, gas producers and mains, soaking pits, stress-relieving furnaces, reactor chambers and similar high temperature industrial equipment.

ADVANTAGES

High Insulating Value

The light weight and high insulating value of J-M Insulating Fire Brick make possible thinner furnace walls, improved efficiency and lower operating costs.

Quick Heat Up

Furnaces can be brought up to operating temperatures with unusual speed, resulting in increased production.

Lower Installed Cost

With the ZELIE JUMBO sizes, fewer pieces are handled than with conventional-sized brick. There are fewer joints and less mortar is required.

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450586

INSULATING FIRE BRICK Specification Data

PHYSICAL PROPERTIES

	JM-32	JM-3000	JM-28	JM-26	JM-5L	JM-23	JM-20
Temperature Limit	3200F*	3000F*	2800F*	2600F*	2300F**	2300F*	2000F*
Approximate Density, pcf	75	65	58	51	43	38	29
Modules of Rupture, psi	155	200	180	150	140	140	105
Cold Crushing Strength, psi	290	400	300	210	180	200	155
Linear Shrinkage, percent	1.2 at 3150F	10.8 at 3000F	1.4 at 2750F	1.0 at 2600F	1.0 at 2500F	0.1 at 2300F	0.0 at 2000F
Reversible Thermal Expansion, percent	0.6-0.7 at 2000F	0.65-0.75 at 2025F	0.65-0.75 at 2000F	0.65-0.75 at 2000F	0.65-0.75 at 2000F	0.5-0.6 at 2000F	0.5-0.6 at 2000F

The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check current J-M product office for latest information.
* Block never exposed. ** Exposed. 7500F back-up in limited service.
† 24-hr simulated Service Panel Test; all others 20-hr testing period.

STANDARD SIZES

All Insulating Fire Brick are available in accurately-fired 9" straight and shapes in the 2 1/2" and 3" series. Special sized and shapes are also available up to a maximum of 23 1/2" x 9" x 3" for JM-20 and 23, a minimum of 24" x 9" x 3" for JM-5L, 26, 28, 3000 and 32.

The 26LJM JUMBO Series has a standard 3" thickness and is available in the following sizes for all types:

13 1/2" x 4 1/2" x 3"
13 1/2" x 9" x 3"
11 1/2" x 4 1/2" x 3"
11 1/2" x 9" x 3"
7 1/2" x 9" x 3"
6 1/2" x 9" x 3"
24" x 9" x 2 1/4"
24" x 9" x 3"

* In JM-20 and JM-23, the length is 23 1/2" instead of 24". Shipped in 24" lengths only.

THERMAL CONDUCTIVITY

Thermal Conductivity k/in. per sq ft per ft per 1/2 in.	JM-32	JM-3000	JM-28	JM-26	JM-5L	JM-23	JM-20
Mean Temp., F.							
500	3.95	3.72	2.68	2.42	1.92	1.82	0.95
1000	3.98	3.30	2.80	2.72	2.34	1.20	1.11
1500	4.01	3.38	3.14	3.02	2.76	1.32	1.28
2000	4.04	3.46	3.35	3.33	3.18	1.55	—

Compliance With Government Specs

All statements requesting compliance must appear on the purchase order. Government regulations prohibit the certification of compliance after shipment has been made.

Johns-Manville

22 East 40th Street, New York, N.Y. 10016

Sales offices in principal cities

450587

Johns-Manville

INSULATION

PRODUCT INFORMATION

type: Block
temp limit: 1900F

J-M SUPEREX® block insulation

DESCRIPTION: J-M Superex block insulation is composed of calcined diatomaceous silica blended with other insulating materials and bonded with asbestos fiber. These light weight, large size blocks will withstand temperatures up to 1900F with negligible shrinkage. Their unique combination of low conductivity and high stability at elevated temperatures provide excellent efficiency and long, maintenance-free service.

Ever since its introduction, Superex has demonstrated its versatility as a high temperature insulation. Today, for example, it economically insulates 90% of this country's hot blast stoves.

AVAILABLE FORMS: Furnished in flat or curved blocks in the following sizes: Flat or curved, 3" or 6" wide by 18" or 36" long. Flat only, 9" or 12" wide by 18" or 36" long. Thicknesses range from 1" to 4".

USES: Superex blocks are widely used for equipment operating at temperatures to 1900F including boiler furnaces, hot blast stoves, mains and busile pipes, hot gas flues, soaking pits, petroleum cracking furnaces, producer gas minus, and metalurgical furnaces of various types.

ADVANTAGES

High Compressive Strength

Compresses only 1/4" (2" thickness) under a pressure of 85 lbs per square inch.

Low Conductivity at High Temperatures

Superex has a conductivity of .82 at 1000F mean temperature.

Low Heat Shrinkage

Has a linear shrinkage of only 2.7% at 1900F.

Dimensional Uniformity

Straight, true edges and close tolerances make possible snug joints.

Light Weight

Ideal for handling movable high temperature equipment.

Large Size Blocks

Large 12" x 36" blocks speed application and reduce the number of joints.

450588

SUPEREX Specification Data

PHYSICAL PROPERTIES*

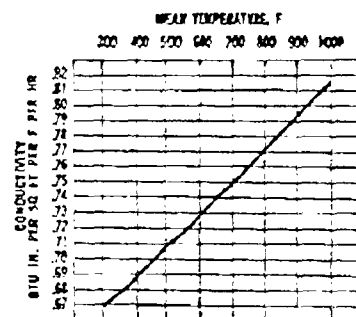
Density (dry)	24 lbs per cu ft
Tensile Strength (wet/dry of rupture)	180 psi
Compressive Strength	85 psi to produce 1% compression in 2" thickness
Linear Shrinkage (after 72 hr setting period at indicated temperature)	2.7% at 1800F
Maximum Service Temperature	1800F

*The figures given in this table are average values obtained in standard tests with accurate test methods.

COMPLIANCE WITH GOVERNMENT SPECS

ASTM A-722 Type B, Class 2 and 4

THERMAL CONDUCTIVITY



STANDARD SIZES AND THICKNESSES

Length, inches	Width, inches	Thickness, inches
18 and 36	3, 6, 9, 12 or 18 or 24	1 through 4 1 1/2 through 6

NOTE: For special sizes and curved blocks consult your nearest Johns-Manville office.

Johns-Manville

PRODUCT INFORMATION

type: Pipe & Block
temp limit: 1600F



J-M SUPEREX-M® pipe and block insulation

DESCRIPTION: Superex-M pipe and block insulation is, like Superex, a high temperature product composed of calcined diatomaceous silica blended with other insulating materials and bonded with asbestos fiber. Recommended for use at service temperatures to 1600F, it possesses lower density and conductivity than regular Superex.

AVAILABLE FORMS: Superex-M is furnished in both block and pipe insulation forms. The pipe insulation comes in 3 ft. half sections, in thicknesses ranging from 1" to 3 1/4". In pipe sizes up to 14". Segments furnished for pipe sizes larger than 14". Blocks come in the following sizes: Flat or curved, 3" or 6" wide by 18" or 36" long. Flat only, 4" or 12" wide by 18" or 36" long. Thicknesses range from 1" to 4".

USES: In addition to being used (to 1600F) for the installations listed under Superex, Superex-M is also often specified in combination with J-M RSC Magnesia or Thermobestos to give greater insulating value for a given service temperature and insulation thickness. In such cases, the Superex-M is always placed next to the hot surface in sufficient thickness to reduce the temperature on the outer layer to its safe limit.

ADVANTAGES

High Compressive Strength

Compresses only 1/4" (2" thickness) under a pressure of 70 lbs per square inch.

Low Conductivity at High Temperatures

Superex-M has a conductivity of .74 at 1000F.

Dimensional Uniformity

Straight, true edges and close tolerances make possible snug joints.

Low Heat Shrinkage

Has a linear shrinkage of only 2.0% at 1600F.

Large Sizes

In both block and sectional pipe insulation form, Superex-M comes in large sizes which means faster, more economical installation.

Johns-Manville

450588

General Headquarters, 22 East 40th Street, New York, N. Y. 10018

Offices in all large cities

MADE IN U.S.A.

450590

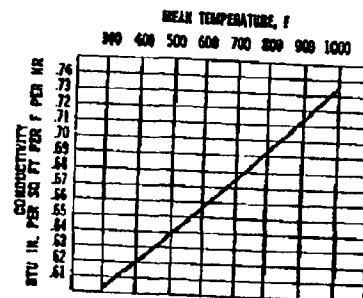
SUPEREX-M

Specification Data*

PHYSICAL PROPERTIES

Density (dry)	25 lbs per cu ft
Transmittance (modular - 4" surface)	90 psi
Compressive Strength	70 psi to produce 1% compression in 2" thickness
Linear Shrinkage after 24 hr swelling heat at indicated temperature	2.0% at 1900F
Maximum Service Temperature	1900F

THERMAL CONDUCTIVITY



*The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

COMPLIANCE WITH GOVERNMENT SPECS

Pipe Insulation:
MIL-12781D
Grade UL, Class E, Type 2

Block Insulation:
MIL-12819D
Class 3 and 4

STANDARD SIZES AND THICKNESSES

Pipe Insulation:	Thickness, inches (to fit standard pipe sizes)	
Length		
3-ft sections and segments	Nominal 1 through 6" pipe size only, 1 1/2, 2, 2 1/2 and 3	
Block Insulation:	Width, inches	Thickness, inches
Length, inches		
18 and 36	3 & 6 flat or curved 5 & 12 flat only	1 through 4 1 1/2 through 4

Johns-Manville 450591
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Sales Offices in Principal Cities

Johns-Manville

INSULATION

PRODUCT INFORMATION

type: Block
temp. limit: 1900F

J-M SUPEREX SG block insulation

DESCRIPTION: J-M Superex SG insulation is a composite insulation consisting of calcined diatomaceous silica (Superex) factory-bonded to a 3/4"-thick 6 pcf compressible blanket composed of fine, open-entangled glass fibers (J-M No. 1000 Series Spin-Glas®). The relative thickness of the laminate is designed to incorporate the desired properties of low overall thermal conductivity, high thermal stability and required compressibility dictated by the trend toward higher operating temperatures in blast furnace stoves. The fibrous outer layer compresses under pressure, thus minimizing the frictional drag stress between insulation and steel shell that may occur during operation as a result of expansion of the brickwork. Friction forces as a possible cause of base plate distortion or shell plate rupture are thereby eliminated.

(For additional information on this subject, see "Recent Improvements in Blast Furnace Stove Design," by Frank A. Bercyanski, Vice President of Engineering, A. E. Anderson Construction Corporation, Buffalo, New York. Copies are available from our New York office upon request.)

AVAILABLE FORMS: Furnished in flat blocks 6", 9" or 12" wide by 18" or 36" long. Composite thickness ranges from 2 1/4" to 5".

USES: Superex SG is designed specifically for use in blast furnace stoves.

ADVANTAGES:

High Compressibility

A composite thickness of 2 1/4" Superex and 1/2" Spin-Glas blanket compresses 10% under a pressure of only 1 1/2 lbs. per square inch after heating at 1900F on the hot face. Recovery after release of pressure results in a return to 97% of the original thickness. The high strength, low permeability, refractoriness, and thermal stability of Superex is retained for the hot face service.

Low Thermal Conductance

The thermal conductance of any thickness of the laminate can be calculated from the two curves shown on the reverse side of this sheet.

Dimensional Uniformity

Straight, true edges and close tolerances make possible snug joints.

Large-Size Block

Large 12" x 36" blocks speed application and reduce the number of joints.

*J-M Trademark

FINISHES & WEATHER-
PROOFING MATERIALS

MISCELLANEOUS

450592

SUPEREX SG

Specification Data

GENERAL PROPERTIES

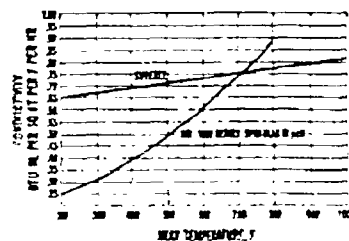
Insurexity of 2 1/4" Superex and 1 1/2" No. 100 Series Soft-Fill

Density (pcf) 18 1/2 lbs/cu ft

Linear Shrinkage (Superex after 24-hour soaking) 2.7% at 1800F

Maximum Service Temperature 1800F

THERMAL CONDUCTIVITY



COMPRESSIVE STRENGTH

Compressed Thickness (in.)	Load to Compress, psi			
	As Received	1600F	1800F	1900F
2.00	0	0	0	0
2.80	1.4	0.6	0.6	0.4
2.75	3.5	2.4	1.5	1.6
2.50	22.6	21.1	12.5	12.5
2.25	65.0	129.0	70.0	73.0

RECOVERY OF 3" SUPEREX SG AFTER COMPRESSION

Compressed Thickness (in.)	%	Thickness of Superex SG After Release (percent of original thickness)			
		As Received	1600F	1800F	1900F
2.80	97	99	98	99	99
2.75	92	97	97	97	97
2.50	87	95	93	93	93

The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

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Sales offices in principal cities

450508

Johns-Manville

PRODUCT INFORMATION

type: Fill
temp limit: 2400F



J-M AGGREGATES AND FILLS

DESCRIPTION: Johns-Manville lightweight aggregates and fills are available in a wide selection for temperatures through 2400F.

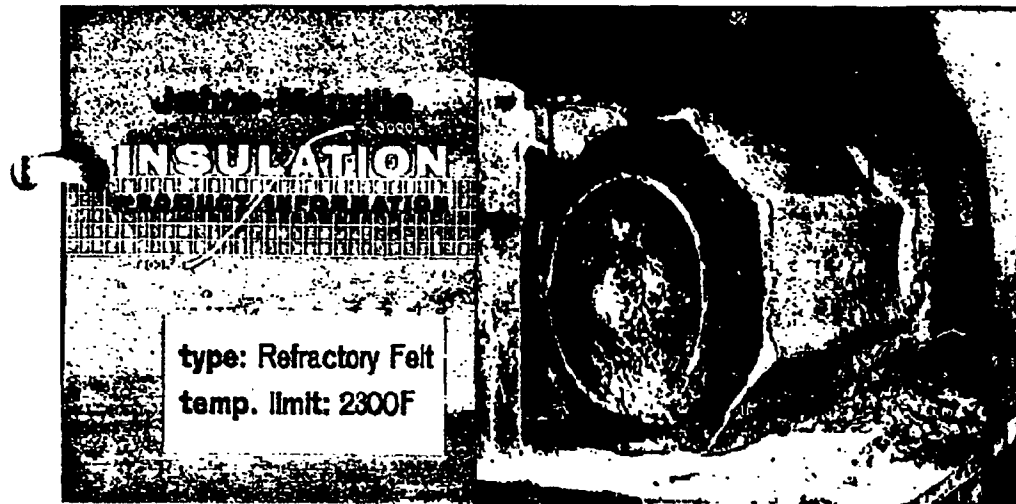
JM-Zefic and JM-2400 L.W. Aggregates may be mixed with calcium aluminate cement to form an insulating refractory concrete for various operating conditions. SI-O-Cel C-3 may be mixed with calcium aluminate or portland cement for lower temperature conditions. By selection of the aggregate,

an insulating refractory concrete can be made with the characteristics desired for constructing core, jacketing and casing ovens, foundations and bases of heated equipment, furnace doors, and many special shapes. In addition, all materials listed below may be used as fills for insulating irregular spaces in high temperature equipment, making it possible to conserve heat where other forms of insulation cannot be economically installed.

AVAILABLE TYPES

Name	Composition	Temperature Limit, F	Approx density to which fills are normally packed, lbs per cu ft	Packaging
JM-2400 L.W. Aggregate	silicate	2400	50	80-lb bags
JM-Zefic L.W. Aggregate	silicate	2400	31	65-lb bags
SI-O-Cel C-3	calcined, coarse-graded diatomaceous silica	2000	31	50-lb bags
SI-O-Cel Insulating Powder	finely ground diatomaceous silica	1600	17	50-lb bags
SI-O-Cel Coarse Grade	similar to SI-O-Cel Insulating Powder, but more coarsely ground	1500	22	50-lb bags

450508



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22 East 40th Street, New York, N. Y. 10016
Sales offices in principal cities

J-M CERAFELT⁺ refractory fiber felt

DESCRIPTION: J-M Cerafelt is a light-weight, refractory-fiber insulation notable for its excellent thermal and chemical stability. Made predominantly of alumina and silica, it combines lightness, heat resistance, low conductivity and high sound-absorption qualities.

AVAILABLE FORMS: Cerafelt is furnished in sheets and rolls in the following dimensions:

Density: 3, 4, 6, 8, 10, 12, 14, 16 and 24 pcf
Thickness: 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1 1/8" and 2"
Width: 12", 18", 24", 36", 42" and 48"
Length: (sheets) 4' and 8'
(rolls) 3 lb. through 2 lb. density also available in 25' rolls in following thicknesses:
3 lb.—1/4" through 2"
4 lb.—1/4" through 2"
6 lb.—1/4" through 1 1/4"
8 lb.—1/4" through 1"

Also available in hose form J-M CERAFELT in 25-lb. hoses (18" x 18" x 24').

USES: Recommended for a great variety of high temperature industrial applications such as insulation protection in repairing open hearth roofs; on cover-type annealers to fill openings for electrical access; expansion joints in kilns, furnaces and boiler walls.

ADVANTAGES:

High Heat Resistance

Will withstand continuous exposure to a full 2300F.

Low Thermal Conductivity

Unusually low conductivity at high temperatures due to opacity of basic fibers to infra-red radiation.

Light Weight

Weights as little as 1/40th equal volume of hard fire brick.

Chemically Stable

Non-alkaline and chemically stable. Contains no corrosion-promoting agents.

450595

Johns-Manville

PRODUCT INFORMATION

[illegible]

Fiber

2010
8-24

[illegible]

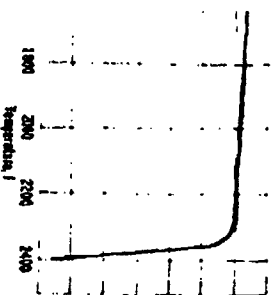
* The various pre-brins are usually typical colors selected to blend with selected lens materials and are subject to change. Check with lens fabricator for their selection.

**BOUND ABSORPTION
COEFFICIENTS (6000)**

Tubules numbered	Spores per tubule					
	115	250	500	1,000	2,000	4,000
1	0.10	0.70	0.79	0.96	0.79	0.76
2	0.16	0.70	0.37	0.94	0.90	0.87
3	0.52	0.69	0.18	0.32	0.93	0.83
4	0.33	0.76	0.11	0.90	0.89	0.90
5	0.55	0.79	0.34	0.91	0.90	0.84
6	0.70	0.86	0.13	0.94	0.92	0.88

* **Three Resonance Calibrations**—The average of the most abundant isotopes of the three elements in the frequency range of 220, 500, 1000 and 1600 cycles per second.

1000 1200 1400 1600 1800 2000
WAVELENGTHS



Hotting practice is the subject of films that did not develop at the specified temperatures after exposure for 23 hours. A stability of 49-50% is used as a guide to recommended storage temperature limit.

52

Johns-Manville 450.596

J-M CERAFIBER® bulk refractory fiber

ADVANTAGES

**High Heat
Resistance**

With withdrawal continuous exposure to a fix

Low Thermal Conductivity

Universally low conductivity at high temperatures to capacity of basic films to infrared radiation.

■ AVAILABLE FORMS: Certificate is available in hard built form, printed in 25-lb. boxes (18" x 18" x 24").

Chemically
Stable

**Non-dilute and chemically stable. (contains
fluorine promoting agents)**

Resilient

Kevlar refractory fibers means that you'd not completely fail.

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CERAFIBER

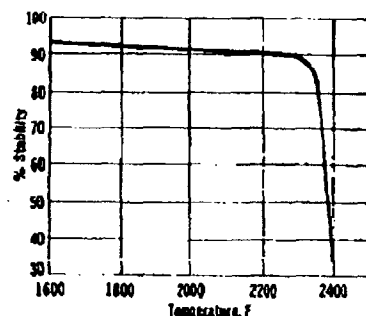
Specification Data

PHYSICAL PROPERTIES*

Service Temperature (F)	2300
Density (pcf)	3 to 8
Specific Heat (Btu/Lb/F)	
200F	0.20
1000F	0.25
1800F	0.27
Thermal Conductivity (Btu in./sq. ft./in./F)	
200F	0.99
1000F	1.30
Typical Chemical Analysis (%)	
SiO ₂	54.0
Al ₂ O ₃	45.5
Fe ₂ O ₃	0.21
BaO	0.15

* The figures given on this table are typical values determined by a series of tests conducted under J.C.I.F. methods. They are subject to reasonable variations in results and are not suitable for specification requirements.

THERMAL STABILITY



Thermal stability is a measure of a refractory fiber's resistance to elevated temperature. Refractory fibers tend to devitrify or lose their glassy structure and become crystalline and brittle as the temperature is increased.

Stability percentage is the amount of fiber that did not devitrify at the specified temperature after exposure for 24 hours. A stability of 40-50% is used as a guide to recommended service temperature limit.

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450598

Johns-Manville

INSULATION PRODUCT INFORMATION

type: Refractory Fiber
Paper
temp. limit: 2300F



J-M CERAPAPER® refractory fiber paper

■ **DESCRIPTION:** Cerapaper is a lightweight refractory fiber paper which is flexible and very resistant to high temperatures and thermal shock to 2300F. In addition, it retains a high degree of resilience at high temperatures while maintaining a very low thermal conductivity.

■ **AVAILABLE FORMS:** Furnished in rolls, in three thicknesses (.020", .040" and .080"), from 12" to 36" widths. See table on reverse side for roll lengths.

■ **USES:** For packings and paper tapes or sheets needed for high temperatures (2300F). Can be used for high temperature gaskets, combustion chamber linings, tap hole plug covers, and expansion joint material for molten metal troughs. Also an excellent thermal insulation for a wide variety of applications in areas with small clearances.

* J-M Trademark

■ ADVANTAGES:

Low Specific Heat

Cerapaper does not store large amounts of heat and therefore can be heated or cooled almost instantaneously.

Low Thermal Conductivity

Unusually low conductivity at high temperatures, as low as 0.65 at 1000F mean temperature.

Resists Thermal Shock

Can be cycled rapidly from cryogenic temperatures to 2300F without degradation.

Good Mechanical Properties

Is very flexible, with good tensile strength and high resilience.

450599

J-M CERAPAPER Specification Data

PHYSICAL PROPERTIES*

		Type Number		
		1-175	1-176	1-177
Melting Point	Over 3200F	Based Thickness, inches---		
		Approx. Thickness, inches (uncompressed)		
Maximal Temperature Limit	2300F	Density, pcf		
		Weight, lbs/1000 sq ft		
Specific Gravity of Fibers	2.61	Sg ft per lb		
		Lb per sq ft		
Specific Heat	0.27 Btu/lb F	Tensile Strength, psi		
		Average Fiber Diameter		
Wear Factor	5%	Machine direction		
		Cross direction		
Chemical Analysis of Fibers	Alumina: Al ₂ O ₃ 46 Silica: SiO ₂ 54	Modulus Checking, inches		
		Machine direction		
Cross direction				
		Modulus, psi		

*The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

**Thickness measured at 8 psi compression, per Tappi Method T-471 (roll)

THERMAL CONDUCTIVITY (average values)

Mean Temp., F	R ₁₀ in. per sq ft per F per in.
700	.28
500	.41
1000	.65
1300	.82
1700	1.09
2000	1.33

AVAILABLE ROLL SIZES AND THICKNESSES

		Length, ft (approx)					
		12" width			24" width		
Thickness, inches		5 lb	10 lb	25 lb	5 lb	10 lb	25 lb
.070	156	312	781	78	156	300	260
.080	90	881	454	45	90	227	151
.090	47	95	238	23	47	119	79

Width, inches 12, 24, 36 - 1/16 Sizes, lbs: 5, 10, 25 ± 10%
*36"-wide rolls are available in all thicknesses, but only in 25-lb rolls.

Johns-Manville

22 East 40th Street, New York, N. Y. 10016

Sales offices in principal cities

450600

INSULATION

type: Refractory Felt
temp. limit: 2700F

J-M FIBERCHROME® refractory fiber felt

DESCRIPTION: Fiberchrome is a strong, long fiber, flexible felt thermal insulation suitable for continuous operating temperatures up to 2700F. It is formed from an alumina-silica composition and has the ability to retain a soft fibrous structure at 2700F. These fibers have high temperature resistance, good thermal stability and good resistance to vibration and physical abuse. Fiberchrome is unaffected by chemicals except for hydrofluoric and phosphoric acids, and strong alkalis. If wet by water or oil, its thermal and physical properties will be fully restored to normal after drying.

AVAILABLE FORMS: Fiberchrome is furnished in sheets and rolls in the following dimensions:

Thickness: 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1 1/2" and 2"
Width: 12", 18", 24", 30", 42" and 48"
Length: (sheets) 4' and 8'
(rolls) 3 ft. through 8 ft. density also available in 25' rolls in following thicknesses:

3 lb.-1/4" through 2"
4 lb.-1/4" through 2"
8 lb.-1/4" through 1"
8 lb.-1/4" through 1"

Also available in bulk form in 75-lb. bags (18" x 18" x 24")

USES: Developed to meet the demand for a high temperature, lightweight insulation to meet a wide range of industrial applications. Its balance of lightness, low thermal conductivity and durability, plus its ability to take a full 2700F temperature, make it an economically sound investment for use anywhere a higher-temperature fibrous and resilient insulation is needed.

© J-M Trademark

ADVANTAGES:

High Temperature Limit

Suitable for 2700F temperature limit for continuous operation; higher for transient service.

Remains Flexible

Retains its soft fibrous structure at 2700F.

Low Thermal Conductivity

Unusually low conductivity at higher temperatures due to opacity of basic fibers to infra-red radiation.

Chemically Stable

Non-alkaline and chemically stable. Contains no corrosion-promoting agents.

Easy Application

Sheets are easy to handle, cut and fit.

450601

FIBERCHROME FIBER FELT Specification Data

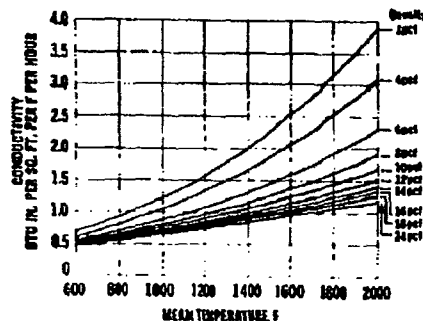
PHYSICAL PROPERTIES

Service Temperature (°F)	2700
Density (pcf)	3 to 24
Specific Heat (Btu/lb/°F)	
200°F	0.20
1000°F	0.25
1800°F	0.27
Typical Chemical Analysis (%)	
SiO ₂	55.0
Al ₂ O ₃	40.5
Cr ₂ O ₃	4.0
Fe ₂ O ₃	0.21
Na ₂ O	0.15

Airflow Resistance (cfm/in. w.g./sq. ft./in.)

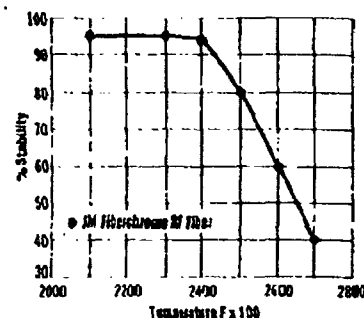
F	3	4	6	8	10	12	14	16	24
75	10.9	64.4	31.1	18.9	12.8	8.9	6.7	4.3	2.6
1000	54.5	32.7	15.6	9.4	6.4	4.4	3.3	2.2	1.6
2000	39.2	23.6	11.2	6.8	4.3	3.2	2.4	1.5	0.9

THERMAL CONDUCTIVITY



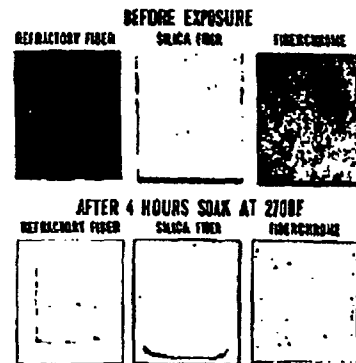
The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest information.

THERMAL STABILITY



Thermal stability is a measure of a refractory fiber's resistance to elevated temperature. Refractory fibers tend to densify or lose their fibrous structure and become crystalline and brittle as the temperature is increased.

Stability percentage is the amount of fiber that did not densify at the specified temperature after exposure for 24 hours. A stability of 40-50% is used as a guide to recommended service temperature limit.



Before and after photo of high-temperature simulations shows advantages of new Fiberchrome. Identical 4 x 4" insulating test samples of refractory (pyro-silica) fiber, silica fiber, and Fiberchrome are subjected to a simultaneous four-hour soak at 2700°F. Both the refractory fiber and the silica fiber evidenced considerable shrinkage, while the Fiberchrome shrank almost imperceptibly (3.7 percent). In addition, Fiberchrome retained its fibrous form in contrast to the softening and marked embrittlement exhibited by the other test materials.

Johns-Manville

22 East 40th Street, New York, N. Y. 10016

Sales offices in principal cities

450603

Johns-Manville

LINK SUBSTITUTION
PRODUCT INFORMATION

type: Bulk Refractory
Fiber
temp. limit: 2700°F

J-M FIBERCHROME® bulk refractory fiber

DESCRIPTION: J-M Fiberchrome is a strong, long fiber, bulk refractory fiber suitable for continuous operating temperatures up to 2700°F. It is formed from an alumina-silica composition and has the ability to retain a soft fibrous structure at 2700°F. These fibers have high temperature resistance, good thermal stability and good resistance to vibration and physical abuse. Fiberchrome is unaffected by chemicals except for hydrofluoric and phosphoric acids, and strong alkalis. If wet by water or oil, its thermal and physical properties will be fully restored to normal after drying.

AVAILABLE FORMS: Fiberchrome is furnished in loose bulk form, packed in 25-lb. boxes (18" x 18" x 24").

USES: Developed to meet high temperature insulation and fill requirements of industry, its unique properties recommend it for use in critical locations where irregular areas and hard-to-reach spaces rule out the use of a regular sheet insulation. Its balance of light weight, low thermal conductivity and durability, plus its ability to take a full 2700°F temperature, make it an economically sound investment for use anywhere a high temperature fibrous and resilient insulation or fill is needed.

ADVANTAGES:

High Temperature Limit

Suitable for 2700°F temperature limit for continuous operation; higher for transient service.

Remains Flexible

Retains its soft fibrous structure at 2700°F.

Low Thermal Conductivity

Usually low conductivity at higher temperatures due to opacity of basic fibers to infra-red radiation.

Chemically Stable

Non-flammable and chemically stable. Contains no corrosion-promoting agents.

Resilient

Resilient refractory fibers assure complete filling of voids.

© J-M Corporation

450603

FIBERCHROME FIBER

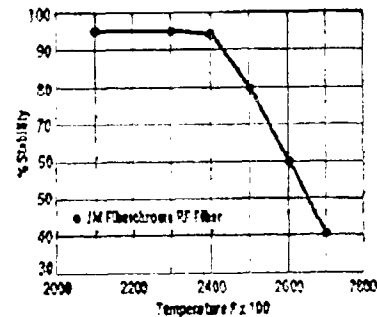
Specification Data

PHYSICAL PROPERTIES*

Service Temperature (F)	2700
Density (pcf)	3 to 6
Specific Heat (Btu/lb/F)	
200F	0.28
1000F	0.25
1800F	0.27
Thermal Conductivity (Btu in./sq. ft./F./hr.)	
800F	0.98
1000F	1.30
Typical Chemical Analysis (%)	
SiO ₂	55.0
Al ₂ O ₃	40.5
Cr ₂ O ₃	4.0
Fe ₂ O ₃	0.21
Na ₂ O	0.15

*The figures given in this table are typical values determined by a series of tests conducted under accepted methods. They are subject to reasonable variations in results and are not suitable for SPECIFIC USE REQUIREMENTS.

THERMAL STABILITY



Thermal stability is a measure of a refractory fiber's resistance to elevated temperature. Refractory fibers tend to devitrify or lose their glassy structure and become crystalline and brittle as the temperature is increased.

Stability percentage is the amount of fiber that did not devitrify at the specified temperature after exposure for 24 hours. A stability of 40-50% is used as a guide to recommended service temperature limit.

Johns-Manville

22 East 40th Street, New York, N. Y. 10016

Sales offices in principal cities

450601

Johns-Manville

INSULATION

PRODUCT INFORMATION

type: Insulating Sleeve

temp limit: 2600F

J-M FIBERCHROME® skid and support insulation

DESCRIPTION: Johns-Manville Fiberchrome skid and support insulation is made of refractory fiber and is designed to resist high furnace temperatures and mechanical abuse involved in slab, billet, and bloom reheating furnaces. Exceptionally easy to handle, install and maintain, its balance of light weight, low thermal conductivity and durability make it an economically sound investment for this service.

AVAILABLE FORMS: Furnished in cylindrical sleeve form 12" long by 1" thick, in diameters to 15". Also available with stainless steel embedding to facilitate securement to skid rail or other critical areas.

USES: Recommended for skid and support pipe application in slab, billet, and bloom reheating furnaces.

ADVANTAGES:

Low Conductivity

Thermal conductivity of .71 at 1000F.

Fast Installation

Lightweight, easy to cut and fit.

Economical

Much less expensive than most castable refractories. Savings at fuel cost of \$0.50 per million Btu approx. equals \$0.04 sq. ft. of pipe surface.

Made of Refractory Fiber

Won't crack or break due to changes in thermal stresses.

450605

FIBERCHROME INSULATING SLEEVE

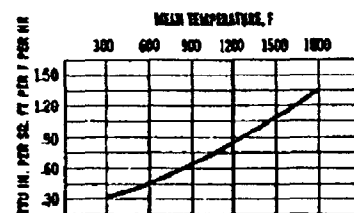
Specification Data

PHYSICAL PROPERTIES*

Linear Shrinkage, % at 2400F	3.3
Density, pcf	12
Heat loss at 2400F (Btu per sq ft pipe surface per hr)	
Uninsulated	85,880
Insulated with Fibchrom	4,180

*Data figures given in this table are average values obtained in accordance with accepted test methods.

THERMAL CONDUCTIVITY



CHEMICAL ANALYSIS (%)

SiO ₂	52.3
Al ₂ O ₃	39.2
Cr ₂ O ₃	3.2
Fe ₂ O ₃	0.1
CaO	0.04
MgO	0.10
Mn ₂ O ₃	0.01
K ₂ O	W
Na ₂ O	0.08
LOI	4.9

ACCESSORY MATERIAL REQUIREMENTS

Standard Pipe Size, inches	Fibrous Insulation, lb/sq ft	Cross-Hatch Bonding Compound, gal/sq ft	Slide-Invest Broad Coating, gal/sq ft	Slide-Invest Broad Coating, lb/sq ft	Slide-Invest Broad Coating, lb/sq ft	Slide-Invest Broad Coating, lb/sq ft
2.5	.84	.02	.05	5.7	46	
3.0	.85	.02	.06	6.5	50	
3.5	.85	.025	.065	7.0	54	
4.0	.86	.025	.07	7.6	58	
5.0	.87	.025	.08	8.8	64	
6.0	.89	.03	.10	10.1	70	
8.0	.11	.03	.11	12.5	84	

*Approximately 2.5 lbs of Broad Coating required to cover standard steel method on steel pipes.

Johns-Manville

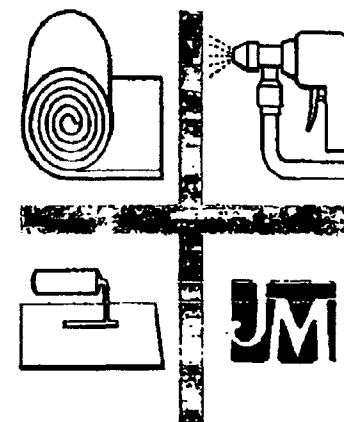
22 East 40th Street, New York, N. Y. 10016

Sales offices in principal cities

450606

JOHNS-MANVILLE INSULATIONS

finishes & weather-proofing materials



450607

Johns-Manville

PRODUCT INFORMATION

**type: Insulating &
Finishing Cements**
temp limit: Various



MISCELLANEOUS

J-M INSULATING & FINISHING CEMENTS

■ **DESCRIPTION:** Johns-Manville Insulating and Finishing Cements have been produced for use with J-M insulating materials. The Insulating Cements are ideal for insulating irregular surfaces where it would be impracticable to apply pipe or block insulation. Finishing Cements are used to give insulation a hard, smooth finish which can be painted or weatherproofed.

■ **AVAILABLE TYPES:**
FINISHING CEMENTS

No. 375 Cement A hydraulic-setting, insulating and finishing cement especially designed for one-coat application. Because of extremely low drying shrinkage, it hardens in a few hours to a smooth, crack-free surface. It may be painted with a water-base paint as soon as firm, thus permitting completion of job in one operation. Recommended for insulating small steel pipe fittings and as a finish over block insulation. Not recommended for use over non-absorptive insulating surfaces or under very slow-drying conditions.

No. 352 Cement General purpose, all asbestos fiber cement with good troweling and finishing properties. Generally used as a finish over block insulation and for general utility applications.

INSULATING CEMENTS

Superex Insulating Cement For use with Superex or Thermabestos pipe and block insulation for patching, pointing up joints, and covering irregular shapes.

No. 500 Cement An expanded vermiculite cement recommended for specialized uses in the metal producing industries. Effectively seals against air infiltration. Particularly adapted to gun application.

No. 460 Cement A mineral fiber cement with excellent adhesion qualities on cold surfaces. A good insulator, compared with other types of cements, it can be applied in heavy layers.

450608

450608

INSULATING & FINISHING CEMENTS

Specification Data

PHYSICAL PROPERTIES*

	FINISHING CEMENTS		INSULATING CEMENTS		
Packaging lbs per bag	37 1/2	50	Superex 50	460	500
Temperature Limit	1400F	1000F	1900F	1800F	1800F
Coverage per 100 lbs Applied & dried 1" thick	33 sq ft	17 sq ft	45 sq ft	35 sq ft	67 sq ft
Approximate Ratio water to mix per 100 lbs	12 gals	12 gals	30 gals	25 gals	36 gals
Density, Dry	40 pcf	63 pcf	27 pcf	34 pcf	16 pcf
Base Material	hydraulic setting cement	asbestos	diatom- ceous silica	mineral wool	expanded vermiculite
Color	light gray dries white	gray	light brown	gray	golden gray

*The values given herein are average for all values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M district office for latest interpretation.

THERMAL CONDUCTIVITY

	MEAN TEMPERATURE, F										
	201	303	401	500	600	700	800	900	1000		
As 37 1/2	.84	.86	.89	.92	.95	.97	1.00	1.05	1.10		
As 50	2.10	2.30	2.10	2.10	2.10	2.10	2.10	2.10	2.10		
As 460	.81	.86	.91	.96	1.01	1.06	1.11	1.11	1.21		
As 500	.74	.79	.83	.88	.92	.97	1.02	1.06	1.11		
Superex	.75	.77	.79	.82	.84	.86	.89	.91	.91		

CONDUCTIVITY: BTU IN PER SQ FT PER F PER HR

SHORT FORM SPECIFICATIONS

FINISH OVER BLOCKS

Asbestos cement (J-M No. 352) in two coats, or hydraulic setting cement (J-M No. 375) in one coat shall be applied over hexagonal wire mesh stretched tightly over blocks and securely wired in place. The first coat of asbestos cement shall be left rough and allowed to dry thoroughly before applying second coat. Second coat of asbestos cement shall be mixed 7 to 1 by weight with portland cement and troweled smooth. Insulating cement (J-M No. 460) may be substituted for first coat in lieu of asbestos cement.

VALVES, FITTINGS AND FLANGES

On piping 4" and larger, valves, fittings and flanges shall be insulated with pipe or block insulation of same material fabricated in sections, or pieces wired in place, and finished with a finishing and smoothing coat of asbestos cement (in pipe sizes smaller than 4" insulating cement (J-M No. 460) shall be used with an asbestos cement (J-M No. 352) finish. J-M No. 375 shall be applied in one coat over small pipe fittings.



Johns-Manville

22 East 10th Street, New York, N. Y. 10003
Sales Offices in Principal Cities

450610

Johns-Manville

INSULATING CEMENTS
PRODUCT INFORMATION

type: Protective Coating
temp limit: 250F

J-M INSULKOTE® weather protective coatings

DESCRIPTION: Developed as high quality protective coatings, J-M Insulkotes are compounded of selected and processed bitumens, asbestos fiber and mineral fillers. These formulations were chosen after careful development and testing to give maximum protection at lowest applied cost to insulated tanks and process equipment. Insulkote effectively seals out water, preserves maximum insulation efficiency, helps prevent rusting and corrosion of expensive equipment.

USES: Recommended for weather-protecting insulated vessels, tanks, piping and equipment.

ADVANTAGES

Durable

Insulkote effectively seals out water, preserves maximum insulation efficiency, helps prevent rusting and corrosion of expensive equipment.

Keeps Out Water

Years of service in the field have shown that Insulkote resists acid or alkaline atmospheres and will stand up under the most adverse weather conditions. Its composition minimizes surface cracking and crazing under sudden temperature changes. A jet black material, it will not fade after it is applied—patches will not contrast with weathered coating.

Easily Applied

Furnished ready-mixed in two consistencies to facilitate quick, easy brush or spray application.

*Trowel application. **Spray gun application.

450610

INSULKOTE

Specification Data

PHYSICAL PROPERTIES*

Type	Insulkote ET	Insulkote Primer E	Insulkote ST	Insulkote SG	Insulkote Primer S
Application	emulsion	emulsion	solvent	solvent	solvent
Weight per gal	10 lbs.	8.5 lbs.	9.5 lbs.	9.5 lbs.	8.5 lbs.
Coverage as applied	16 gal per 100 sq ft 1/4" thick	75 sq ft per gal	8 gal per 100 sq ft 1/4" thick	8 gal per 100 sq ft 1/4" thick	100 sq ft per gal
Percent shrinkage (air-dried)	50	50	75	75	25
Water vapor penetration in perms - for recommended thickness	2 to .5	---	0 to .1	.1 to 2	---
Temperature use range	100 to 250F	100 to 250F	up to 250F	up to 250F	up to 250F

Order: E - emulsion type; S - solvent type; T - primer consistency; G - spray gun consistency.
 *The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check user's data for specific values for test conditions.
 **Spray gun application makes some test through bounce and "drip factor." Amount of test varies with air velocities and types of surface.
 All solvents have some degree of toxicity and proper ventilation should be provided where material is used in enclosed spaces.

PACKAGING INFORMATION

INSULKOTE

Available in 5 gallon pails, and 30 or 55 gallon drums.

APPLICATION SPECIFICATIONS

INSULKOTE ET On asbestos cement no primer is required, but cement should be dry and hexagonal wire mesh reinforcement used. Coating should be troweled on to a thickness of approximately 1/4", and care should be taken to see that it is forced through the mesh so as to make a good bond with the cement. The mesh should not be exposed to the weather at any point.

On mineral fiber insulations, Insulkote Primer E should be applied, and Insulkote ET troweled on while the primer is still tacky. Wire mesh reinforcement is not required except where movement or vibration may occur.

INSULKOTE ST When applied on dry asbestos cement no primer is required, but hexagonal wire mesh reinforcement should be used. Troweling should be done firmly to make sure the coating is thoroughly forced through the mesh. Insulkote ST should not be applied in thicknesses greater than 1/4". Application to a greater thickness may cause slumping while there is still solvent in the coating.

On mineral fiber insulations, Insulkote Primer S should be applied prior to application of Insulkote

ST. Wire mesh reinforcement is not required except where movement or vibration may occur.

INSULKOTE SG On asbestos cement no primer is required, but wire mesh reinforcement should be used except under certain conditions where it may be desirable to substitute a glass fabric Duramesh reinforcement, preferably a 10 x 10 mesh. In the latter case, a coating of Insulkote SG, approximately 1/16" thick, shall be sprayed on the surface to be covered, and the glass fabric rolled or pressed into this coating. A second coat of Insulkote SG shall then be sprayed on to give a total wet thickness of approximately 1/4".

When used as metal protection, no primer or wire reinforcement is required. Metal must be clean and dry at time of application.

When used on mineral fiber insulations, a coat of Insulkote Primer S should be sprayed on before applying the Insulkote SG.

NOTE: If a mesh or grid and old paint is desired, the mesh should be applied to the surface and then primed with aluminum paint or shellac.



Johns-Manville

27 East 40th Street, New York 17, N.Y. 10016
 Sales Offices in Major Cities

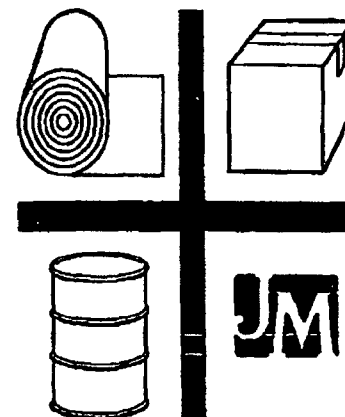
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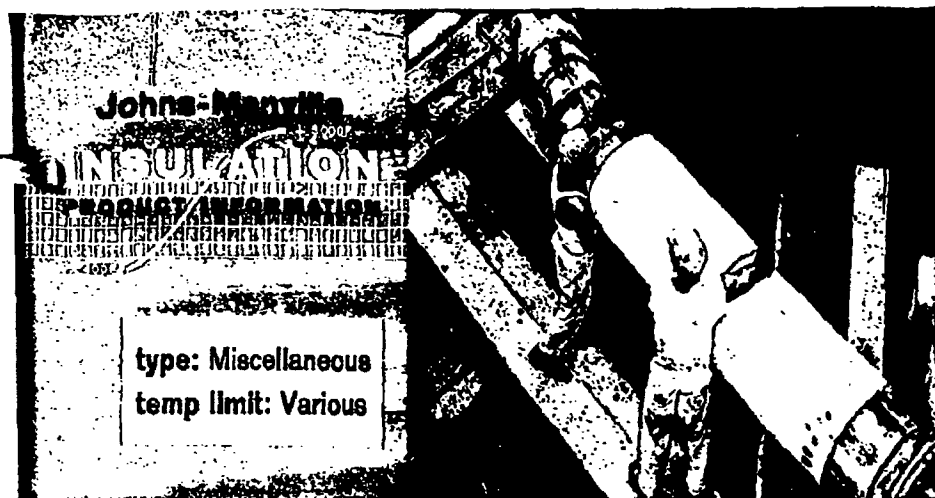
450611

JOHNS-MANVILLE INSULATIONS

miscellaneous



450612



Johns-Manville

INSULATION

PRODUCT INFORMATION

type: Miscellaneous
temp limit: Various

J-M MISCELLANEOUS INSULATIONS

Insulation	Description	Use	Temp. Limit	Standard Sizes
Asbestos Roll Fire-Felt®	A soft, flexible asbestos felt in roll form.	To insulate heated surfaces where space does not permit thicker or more rigid materials.	800F	Standard rolls contain 100 sq ft; 36" wide: 1/8", 1/4", 3/8", 1/2" and 3/4" thick.
Asbestos Cloth Blankets	Asbestos cloth envelope filled with asbestos fibers; wire tufted.	To insulate irregular surfaces where insulation must be readily removable.	850F	Made to order in 1 1/2", 2" and 2 1/2" thicknesses; may be used in double-layer combinations through 4 1/2" thickness.
Fibron Adhesive	A strong silicate soda and asbestos fiber cement. Easily applied and quick drying.	For temporary bonding of insulation to brick, concrete, metal or other surfaces as well as for bonding prefab fittings.	500F	Standard drums (lbs): 12, 60, 75, 175, 350 and 600. 12 lbs to a gal.
Ceillinite®	Made from Asbestos Roll Fire-Felt, reinforced on one side with asbestos cloth.	For an interlining in steel cars, in fireproofing electrical apparatus and for similar services.	800F	Standard rolls contain 100 sq ft, 1/4" and 1/2" thick; in strips 1" to less than 6" wide by 15' long.
Lapstic®	A heavy brushing fibrous cut-back asphaltic cement.	For sealing the laps of weatherproof insulation jackets.	140F	1 and 5 gal. containers, 7.7 lb/gal.

The information given here is subject to change and should be checked for currency with nearest J-M district office.

• 450613

Johns-Manville

22 East 40th Street, New York, N.Y. 10016
Offices in principal cities

Johns-Manville**INSULATION
PRODUCT INFORMATION**

type: Asbestos Paper
and Rollboard

J-M ASBESTOS PAPER AND ROLLBOARD

■ **DESCRIPTION:** A felted sheet material in thicknesses from .006" to .125" composed principally of asbestos fiber and a small percentage of binder. Available in standard rolls of various widths and sizes, also in tape form. Johns-Manville makes a variety of types to fit the needs of home, shop and industry. Used where an insulation of minimum thickness is required to protect against fire, heat or corrosion. Many specialty uses.

■ **AVAILABLE TYPES:**

Commercial Asbestos Paper and Rollboard — A medium length fiber paper with high fiber content (minimum 95%). Satisfactory for most general purpose uses in plant, shop or home. A safety covering for heating ducts. Good for temperatures up to 400°F (or to 800°F where loss of strength is not critical).

Fibroid Asbestos Paper — Similar to above but specially processed for electrical applications. Primarily a base sheet or inorganic carrier for treatment with dielectric resins and varnishes.

Long Fiber Asbestos Paper — Made with high grade long asbestos fiber (minimum fiber content 88%). For use as a thermal insulation; gasketing; base sheet for saturating.

High Strength Fibroid Asbestos Paper — Similar to long fiber asbestos paper but specially processed for Class B electrical applications. A base sheet for saturating with electrical varnishes and resins to form a dielectric.

Special Long Fiber Asbestos Paper for Electrolytic Cells — A high quality paper, uniform throughout, for use as diaphragms in electrolytic cells.

Doublex Asbestos Paper — Completely inorganic, will not burn, char or smoke. Has high wet strength. Developed for use as neon sign pattern paper. Also used as liner for foundry funnels and pouring gates. Temperature limit 800°F (or 1200°F where some embrittlement and loss of strength is not critical).

Asbestos Welding Paper — A 32-lb. paper, 1/16" thick, with low organic content, used to protect adjacent parts from heat, smoke, sparks during welding. Also used to control cooling rate in annealing process.

Type GT Asbestos Paper — Asbestos paper integrally reinforced on the paper machine with a reinforcement of strong glass threads. It can be used "as is" wherever a strong heat-and-flame-resistant sheet is needed.

■ **ADVANTAGES**

Excellent
Mechanical Properties

Fast, easy to apply and safe to handle; easily strong for most needs.

Heat Resistant

J-M Asbestos Paper will withstand high temperatures that would damage conventional papers and rollboards.

450611

ASBESTOS PAPER AND ROLLBOARD

Specification Data

PHYSICAL PROPERTIES*

COMMERCIAL AND FIBROID ASBESTOS PAPER

Thickness, inches			Weight, lbs per 100 sq ft			Tensile Strength, lbs per in. width (typ)		Tear Strength, (Standard) (grams (typ))		Breaking Strength, (Method) lbs (unit)	Asbestos Fiber Content, % (min)	Fe ₂ O ₃ Content, % (max)
Nom	Min	Max	Typ	Min	Max	30	60	30	60			
.012	.010	.014	4.0	3.5	4.5	10	4	40	60	4	95	5
.015	.013	.018	6.0	5.5	6.5	12	5	70	100	8	95	5
.018	.016	.020	8.0	7.5	8.5	13	6	85	125	8	95	5
.022	.020	.024	10.0	9.5	10.5	14	8	125	150	8	95	5
.026	.023	.028	12.0	11.5	12.5	15	9	130	170	8	95	5
.029	.027	.032	14.0	13.5	14.5	15	9	140	180	10	95	5
.032	.030	.035	16.0	15.5	16.5	15	9	150	190	10	95	5
.062	.058	.067	32.0	30.0	35.0	15	11	265	275	20	95	5

COMMERCIAL ASBESTOS ROLLBOARD

.094	.085	.103	48.0	43.0	53.0	14	11	180	450	25	98	5
.125	.117	.138	61.0	57.0	71.0	13	10	460	500	25	98	5

LONG FIBER AND HIGH STRENGTH FIBROID ASBESTOS PAPERS**

.035	.035	.038	2.1	1.8	2.4	7	3	25	40	5	88	5
.047	.045	.048	2.2	1.9	2.5	8	4	35	45	5	88	5
.058	.056	.059	2.5	2.2	2.8	9	5	48	50	7	88	5
.070	.068	.071	3.6	3.2	4.2	10	6	50	70	8	90	5
.075	.073	.077	4.0	3.5	4.5	13	6	80	100	8	98	5
.078	.077	.080	4.0	3.5	4.5	14	6	120	145	9	98	5
.080	.078	.082	5.0	4.3	5.7	15	7	150	190	10	98	5
.075	.073	.077	11.5	10.7	12.3	17	9	190	225	12	98	5
.080	.078	.084	13.6	12.6	14.6	20	11	250	295	12	98	5
.080	.078	.084	22.5	20.5	24.5	21	13	300	340	20	98	5
.067	.058	.065	30.0	27.0	33.0	23	15	375	425	18	98	5

DOUBLEX ASBESTOS PAPER

.067	.069	.065	5.75	5.5	6.0	8	3	40	60	4	80	5
.027	.020	.026	10.0	9.2	10.2	16	6	100	120	8	80	5

ASBESTOS WELDING PAPER

.067	.058	.064	34	30	35	19	8	240	305	12	98	5
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*The values given herein are average typical values obtained in accordance with accepted test methods and are subject to change. Check nearest J-M product office for latest information.

**Same properties apply to Special Long Fiber Asbestos Paper for Electronic Cells.

Johns-Manville

22 East 40th Street, New York, N.Y. 10016

Sales offices in principal cities

450616

Johns-Manville
INSULATION
PRODUCT INFORMATION

type: Sheet
temp limit: 1200F

J-M ASBESTOS MILLBOARD Insulating sheet material

DESCRIPTION: Johns-Manville Asbestos Millboard is a dense, rigid sheet or board material formed of asbestos fibers and a small amount of binder. A natural light gray in color, Millboard sheets are furnished in standard sizes of 42" x 48", in thicknesses ranging from 1/32" to 1/2". Cut pieces can also be supplied.

AVAILABLE FORMS

No. 106 Millboard—A general purpose, high utility millboard suitable for most uses. It will withstand temperatures to 800F.

No. 102 Millboard—A higher quality millboard than No. 106. Will withstand temperatures to 1000F.

No. 219 Millboard—This is a premium grade millboard, specially treated for greater strength. Suitable for temperatures to 1100F; it can be used up to 1800F where some loss of strength is not detrimental.

C Grade Millboard—This millboard contains an especially long grade of asbestos fiber. It is suitable for temperatures to 1200F; embrittlement occurs above this limit. Where brittleness is not objectionable, may be used at temperatures up to 1800F.

XXX Millboard—This millboard is inorganically bonded. It is suitable for applications where organic matter cannot be tolerated.

Silicated Millboard—All grades of millboard can be specially treated to increase surface hardness. Where such sheets are required, the word "silicated" should appear on the order before the millboard type. Weight of Silicated Millboard is approximately 5% higher than for unsilicated.

Special—Millboards for special purposes can be tailored to service requirements.

USES: J-M Asbestos Millboard is recommended for applications which require a sheet or board insulation for protection against fire, heat, acid fumes, etc. Frequently used as a fire-resistant lining for floors, partitions, ceilings, stoves and grates. It has been found particularly valuable in the steel industry where literally scores of uses have been discovered for this versatile material.

ADVANTAGES

Versatile

Adapted to literally scores of industrial applications.

Fireproof

Made of asbestos, the world's most famous fireproof material.

450616

ASBESTOS MILLBOARD

Specification Data

THICKNESSES, TOLERANCES AND WEIGHTS*

Thickness, Inches	Thickness, Inches	Lbs. per 47" x 47" Sheet			
		ST-86	ST-82	ST-78	T-Grade
0.007	1.1	2.5	2.1	1.9	1.7
0.008	1.1	2.3	2.0	1.8	1.6
0.009	1.1	2.1	1.9	1.7	1.5
0.010	1.1	1.9	1.7	1.5	1.4
0.011	1.1	1.7	1.5	1.3	1.2
0.012	1.1	1.5	1.3	1.1	1.0
0.013	1.1	1.3	1.1	0.9	0.8
0.014	1.1	1.1	0.9	0.7	0.6
0.015	1.1	0.9	0.7	0.5	0.4
0.016	1.1	0.7	0.5	0.3	0.2
0.017	1.1	0.5	0.3	0.2	0.1
0.018	1.1	0.3	0.2	0.1	0.0
0.019	1.1	0.2	0.1	0.0	0.0
0.020	1.1	0.1	0.0	0.0	0.0
0.021	1.1	0.0	0.0	0.0	0.0
0.022	1.1	0.0	0.0	0.0	0.0
0.023	1.1	0.0	0.0	0.0	0.0
0.024	1.1	0.0	0.0	0.0	0.0
0.025	1.1	0.0	0.0	0.0	0.0

*Standard weights may vary from 10% below to 10% above

THERMAL CONDUCTIVITY

The thermal conductivity for these materials is in the range of 1.0 to 1.5 Btu ft/hr sq ft per °F per inch.

The values given herein are average typical values obtained in accordance with the test methods described in the specification. They are not to be used as a basis for design or specification.



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