

MANUFACTURING TECHNOLOGY

Johns-Manville research, engineering and production specialists combine their knowledge and skills to develop modern, efficient and economical equipment and production methods. A modernization and improvement program assures that J-M products are made under the best possible working conditions on modern machinery utilizing the latest safety features.

QUALITY CONTROL

Trained engineers and chemists subject raw materials and finished products to rigid controls. Finished products are inspected to assure their uniformity and adherence to J-M's high standards. Quality control specialists also work with J-M research scientists and production engineers in developing new products and improving existing ones.

ENGINEERING

Engineers keep a close watch on equipment and processes as part of the continuing program to improve production. Wherever needed, new machines and equipment are installed to increase production capacity, improve product quality and make work easier. The problems of disposal of industrial wastes are given constant attention in the community interest.

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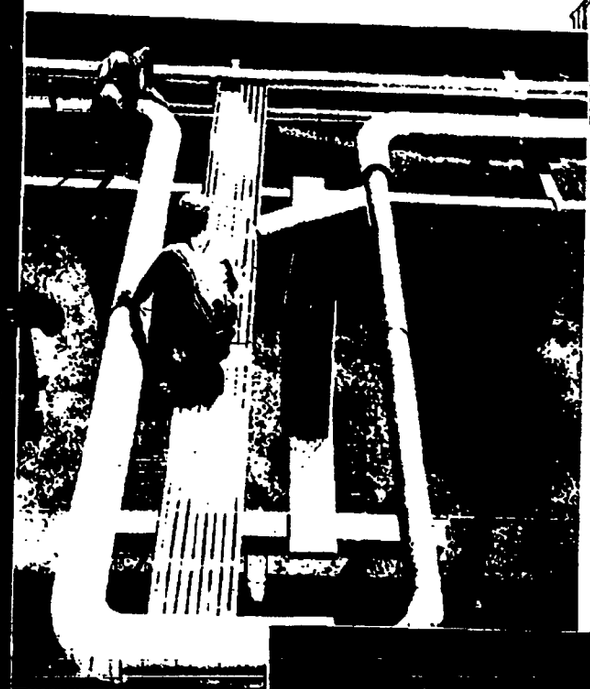
IN-3148

Johns-Manville THERMOBESTOS® PIPE AND BLOCK INSULATION



STRONG · LOW "K"
NOT DAMAGED
BY WATER

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PLAINTIFF'S
EXHIBIT
JM-2325

THERMOBESTOS
—a completely inorganic insulating material...

made from asbestos, diatomaceous silica and lime

Johns-Manville Thermobestos is composed of lime and diatomaceous silica taken from natural deposits estimated to be millions of years old. These basic ingredients are bonded with asbestos fibers possessing the tensile strength of piano wire.

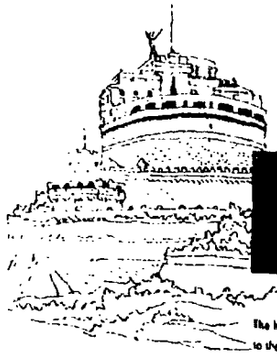
An important feature in the manufacture of Thermobestos is the special steam process to which the insulation is subjected after the initial molding. Live steam converts the lime and diatomaceous silica into hydrous calcium silicate, a substance noted for its tough, hard composition as well as its ability to withstand repeated wetting without harm.

The result 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 process equipment which must withstand the rigors of severe outdoor operating conditions.









Chemically analogous to the early Roman concretes used in such structures as St. Angelo Castle, Thermobestos also withstands time and weather.

For longer lasting installations...

The hydrous calcium silicate from which Thermobestos is made is chemically analogous to the calcium silicate mortars and cements produced from lime and pozzolanic aggregates by the builders of antiquity. Like these earlier materials it is strong, hard and virtually everlasting. It differs from them principally in its very much lower density which gives it a lightness and low thermal conductivity surprising in so strong a material.

Such structures as St. Angelo Castle in Rome, erected in 138 A.D., the famous Appian Way, started three hundred years before Christ, and the great system of Roman Aqueducts, all built with calcium silicate concretes, are still in an excellent state of preservation after a score of centuries. Thermobestos has, by virtue of its similar chemical composition, the same resistance to time and weather that so strikingly characterizes these ancient concretes.

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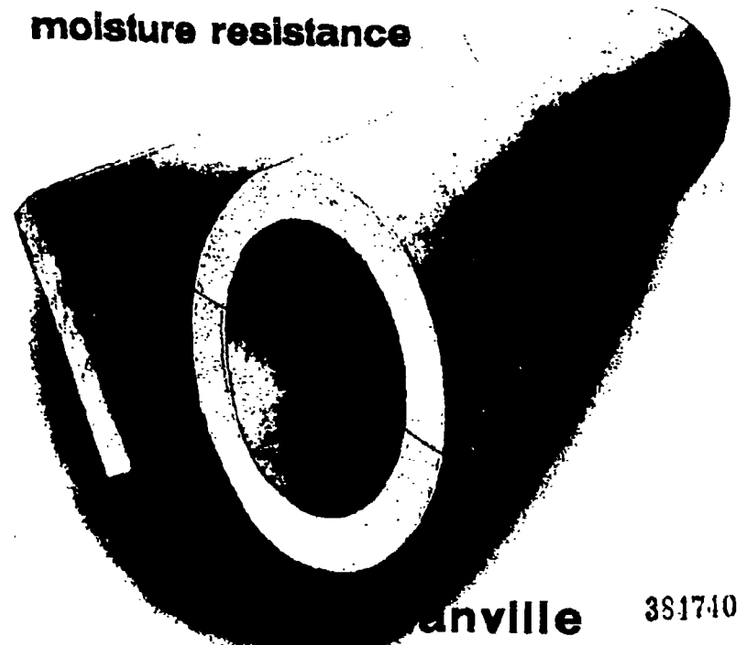
For extra strength... for minimum heat loss... for maximum moisture resistance



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Johns-Manville THERMOBESTOS
Pipe and Block Insulation

Developed for the most rugged industrial service—Johns-Manville Thermobestos is a superior high temperature pipe and block insulation especially recommended for use in the power generation and process industries on indoor and outdoor piping and equipment operating at temperatures to 1200F. It has the lowest k factor of all insulations in general use in these industries.

Repeated wettings have no permanent effect on Thermobestos. It is light enough for easy handling and fast application, and its unusual structural strength resists breakage and will withstand unusual service abuse. Because it will not burn or carry flame, Thermobestos is ideal for use in the presence of inflammable gases and liquids.

The preferred calcium silicate insulation — Thermobestos has received wide acceptance in the petroleum, chemical, power generation, marine and other industries where its unique combination of properties means excellent temperature control as well as practically unlimited service life. Its consistently outstanding performance has made Thermobestos the preferred calcium silicate insulation for rugged service to 1200F.

Comes in a complete range of sizes — 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 32" pipe sizes are available in quad segments. Scored blocks 12" x 36" in thicknesses from 1½" to 3½" 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.

6 Reasons why you can have confidence in THERMOBESTOS

Exceptional Strength Johns-Manville Thermobestos is remarkably strong and rigid. Walk on it! Place ladders against it! Use a pipe insulated with it as a scaffold support! Thermobestos can "take it". Similar in chemistry and composition to a very fine concrete, Thermobestos will withstand unusual operating abuse without appreciable damage.

Extreme Lightness "Heft" a piece of Thermobestos. You'll be surprised at its lack of weight. Even the largest section can be easily balanced in one hand – for the outstanding strength and toughness of Thermobestos do not make it heavy. On the contrary, Thermobestos is as light as many insulating materials possessing a fraction of its strength and durability.

Chemically Stable Replacement and maintenance costs practically disappear when you specify Thermobestos, for it is so chemically stable that in ordinary circumstances it will last indefinitely. Being 100% inorganic it will neither burn nor rot. Sudden or severe atmospheric changes, condensation, or continuous exposure to high temperatures have no measurable effect on its insulating value.

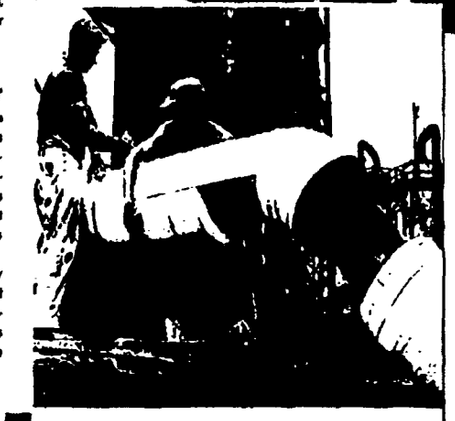
Easy Application Thermobestos is purposely made in large blocks and half-sections to facilitate handling and reduce the number of joints. Its light weight and hard, firm, non-crumbling texture speed application, keep installation costs low and make the material ideal for the shop prefabrication of special shapes.

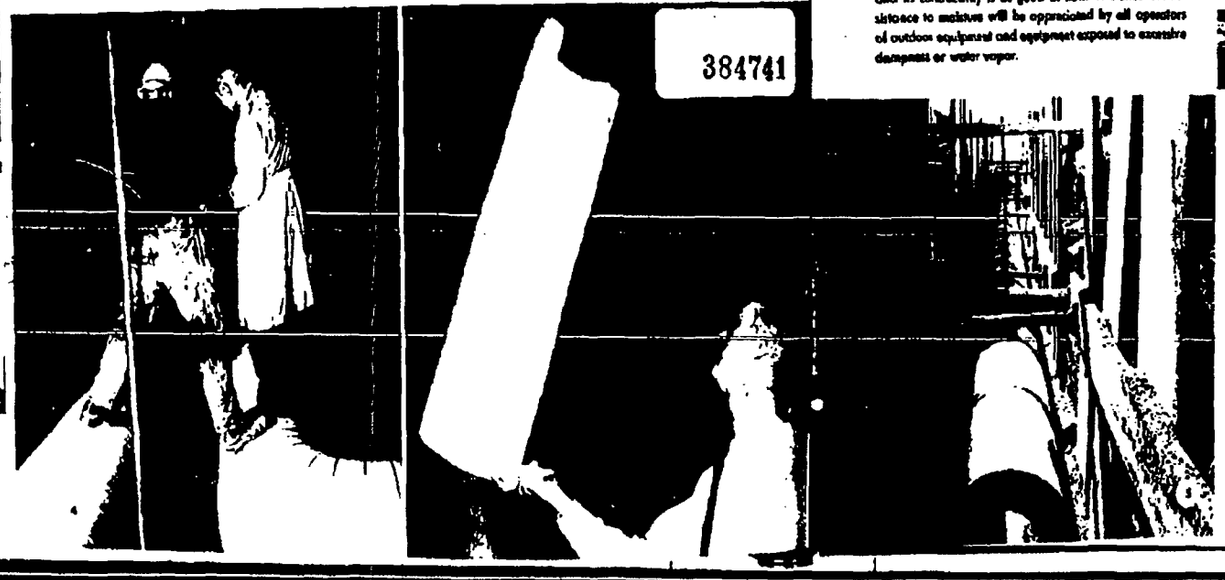
Not Damaged by Water

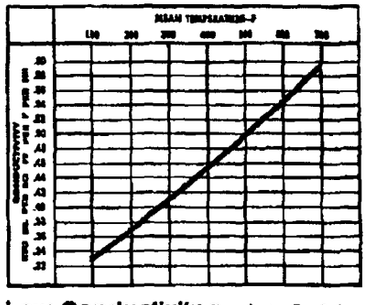
Thermobestos is ideal for insulating underground steam mains like this one being installed for a large midwestern public utility company. Placed underground and completely covered with a wet concrete "solid pour", it supports the entire weight of the heavy steel pipe, and serves as the sole buffer between it and the concrete. Because it will not crumble or disintegrate with wetting, Thermobestos is unequalled for this rigorous service.

You can soak a piece of Thermobestos in water for a day or a year and still walk on it without damage. Dry it out and its conductivity is as good as new. This excellent resistance to moisture will be appreciated by all operators of outdoor equipment and equipment exposed to excessive dampness or water vapor.









Low Conductivity Thermobestos offers the lowest k factor of all insulations in general use throughout the power generation and process industries. This low conductivity makes possible accurate, uniform temperature control, helps reduce fuel costs and contributes materially to operating efficiency.

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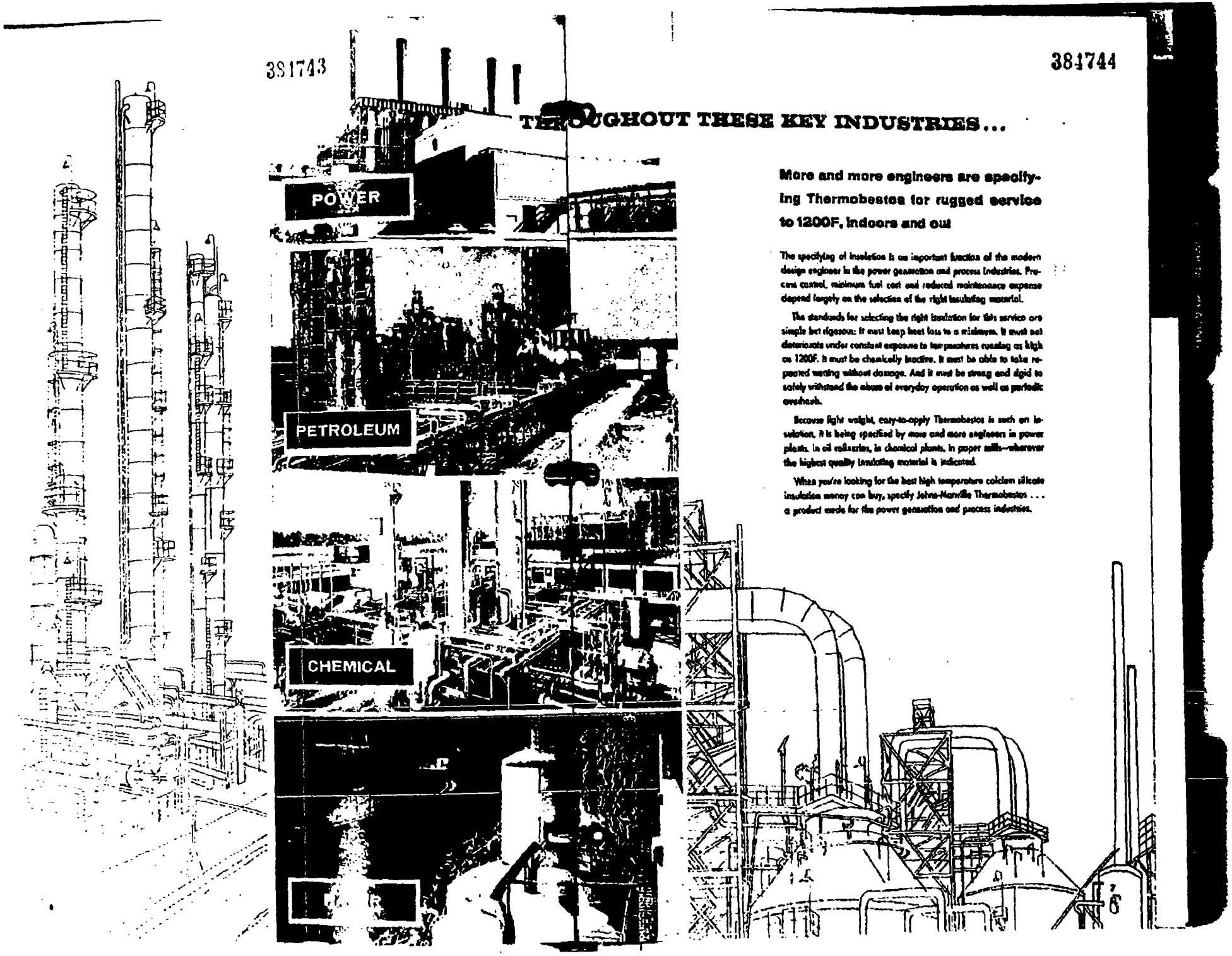


THROUGHOUT THESE KEY INDUSTRIES...

More and more engineers are specifying Thermobestos for rugged service to 1200F, indoors and out

The specifying of insulation is an important function of the modern design engineer in the power generation and process industries. Process control, minimum fuel cost and reduced maintenance expense depend largely on the selection of the right insulating material.

The standards for selecting the right insulation for this service are simple but rigorous: it must keep heat loss to a minimum. It must not deteriorate under constant exposure to temperatures running as high as 1200F. It must be chemically inactive. It must be able to take repeated wetting without damage. And it must be strong and rigid to safely withstand the abuse of everyday operation as well as periodic overhauls.

Because light weight, easy-to-apply Thermobestos is such an insulation, it is being specified by more and more engineers in power plants, in oil refineries, in chemical plants, in paper mills—wherever the highest quality insulating material is indicated.

When you're looking for the best high temperature calcium silicate insulation money can buy, specify Johns-Manville Thermobestos . . . a product made for the power generation and process industries.

FOR BETTER FIT ON VALVES AND TURNS...

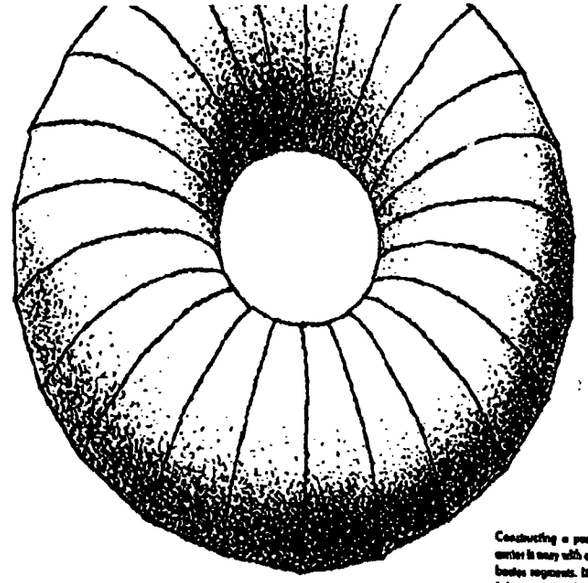
Prefabricated Thermobestos sections assure snug fit, eliminate slipshod "fudging"

Pipe bends and valves present relatively difficult fitting problems where ordinary insulations are used. And all too often these problems are solved by slipshod workmanship and too great a reliance on fills and cements. When the specified insulation is Thermobestos, however, these fitting problems are greatly simplified. For the strong, hard texture of Thermobestos—which retains its sharp edges without crumbling—makes it possible to prefabricate tube turns, valve covers and other special shapes from standard sections of Thermobestos pipe insulation.

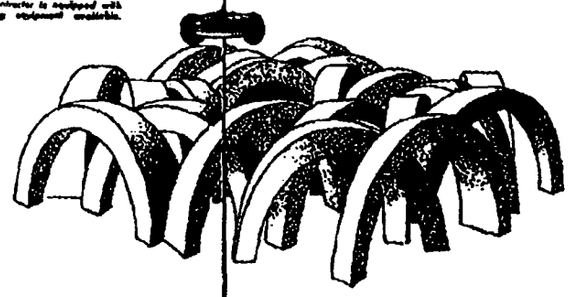
With properly designed and operated power cutting equipment*, Thermobestos segments are easily produced and assembled into the required shape. The segments can be cut with such complete accuracy that tube turns of any radius can be fitted as readily as a straight length of pipe. Because these segments fit together as snugly as the interlocking pieces of a jigsaw puzzle, there are no gaps or hollows to be filled with insulating cement or other filler.

Large valves, normally covered with a number of longitudinal wedges—rough-cut on the job—wired together and "fudged" with plenty of cement, can be neatly and permanently insulated with a few shop prefabricated half sections of Thermobestos.

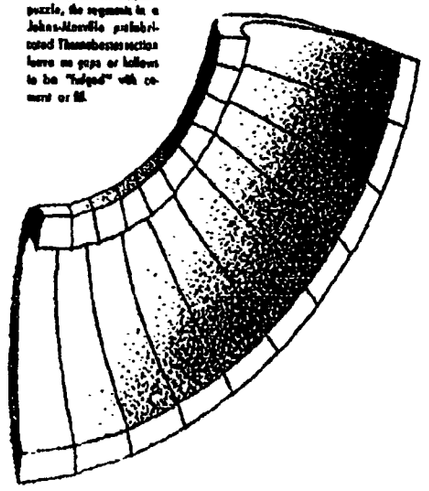
*Your Johns-Manville Insulation Contractor is equipped with the most modern prefabricating equipment available.



Constructing a perfect circle of any diameter is easy with accurately cut Thermobestos segments. It's just as easy to prefabricate special sections to fit tube turns of any radius.

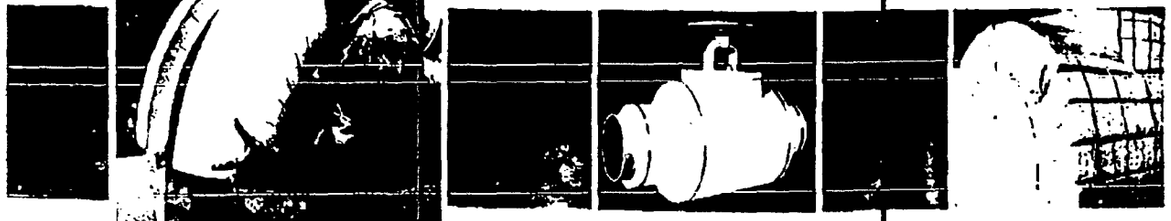


Fitting together as snugly as the pieces in a jigsaw puzzle, the segments in a Johns-Manville prefabricated Thermobestos section leave no gaps or hollows to be "fudged" with cement or fill.





The hard, non-crumbling texture of Thermobestos permits the material to be readily cut into segments which retain sharp edges. (Accuracy in prefabrication is obtained by the use of power cutting equipment and proper templets.)



A few large sections of Thermobestos, prefabricated the "J-M" way before application and secured in place with seal [illegible] of the valve in this illustration are a glove.

Usual "on-the-job" valve cover combines many pieces of ordinary insulation with plenty of wire, block scraps and cement. Compare this with the "J-M" way (left).

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PIPE INSULATION

J-M Thermobestos

SPECIFICATION DATA

PHYSICAL AND THERMAL PROPERTIES*	
Property	Value
Density (lbs)	11 lb per cu. ft.
Insulating Strength (medium of fracture)	95 kv
Compressive Strength (based on 2" thickness of block)	365 psi. in section 1% compression
Linear Shrinkage	1.5% after 24 hr. soaking period at 1200F
Maximum Service Temperature	1300F
Conductivity at Mean Temperature (Btu in. per sq. ft. per hr.)	400F 500F 600F 700F 800F 900F 1000F
	33 33 43 46 54 55 65

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

COMPLIANCE WITH GOVERNMENT SPECIFICATIONS
Pipe Insulation
MIL-I-2781 Grade I, Class A, to 850F Grade II, Class A, to 700F Grade III, Class A, Type I, to 1050F FEDERAL SS-I-523 Class 2, to 1200F
Block Insulation
MIL-I-2849 Class A, to 850F Class B, to 1600F FEDERAL SS-I-523 Class 1, to 1200F
COMPLIANCE WITH ASTM STANDARDS
Pipe Insulation: C195-56T, to 1200F — **Block Insulation**: C344-54T, to 1200F

APPROXIMATE WEIGHT OF THERMOBESTOS PIPE INSULATION PER STANDARD 3-FT. SECTION, POUNDS

Insulation Thickness, inches	Nominal Pipe Size, inches												
	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	
1	1.35	1.77	1.87	2.07	2.18	2.52	2.98	3.35	3.72	4.24	4.78	5.05	
1½	2.75	2.65	3.33	3.42	3.98	4.56	5.42	5.98	7.15	7.05	8.58	9.88	
2	4.45	4.38	5.28	5.38	6.18	6.97	8.06	8.55	9.95	10.5	12.3	13.7	
2½	7.07	7.76	7.68	7.96	8.98	9.78	12.1	11.7	13.5	13.2	16.1	15.4	
3	9.73	10.4	10.3	10.7	12.0	12.5	15.4	14.5	18.1	17.4	20.4	19.4	

Insulation Thickness, inches	Nominal Pipe Size, inches												
	6	7	8	9	10	11	12	14	15	16	17	18	
1	5.66	—	—	—	—	—	—	—	—	—	—	—	
1½	8.78	9.25	10.5	10.3	12.3	12.8	13.0	14.0	15.0	16.0	16.9	17.1	
2	13.0	14.3	15.6	16.5	17.6	21.1	22.5	23.3	24.1	25.9	27.7	29.1	
2½	17.0	18.7	19.7	20.7	21.5	23.5	25.3	28.1	30.1	31.7	33.2	34.2	
3			23.7	25.5	26.7	29.1	31.5	35.9	36.9	38.6	41.5	43.6	

STANDARD SIZES

Length, inches	Nominal Thickness, inches	For copper tubing
36	1, 1½, 2, 2½, 3, 3½, 4	Up to and including 4-in. nominal Pipe Size. Fits O.D. of copper tubing with nominal diameter from ⅛ to 8 inch.

RECOMMENDED THICKNESSES†

Temperature of Pipe, F	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200
Nominal Pipe Size, In.	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10	to 10
Ductile Iron	1½	1½	2	2½	2½	3	3½	3½	4	4½	5	5½	6	6½	7

Nominal Thickness, inches

Utility—Steam Generation

Pipe Size												
½	1	1	1	1½	1½	1½	2	2½	2½	2½	3	
¾	1	1	1	1½	1½	1½	2	2½	2½	2½	3	
1	1	1	1	1½	1½	2**	2	2½	2½	3	3	3½
1¼	1	1	1½	1½	2**	2**	2½	2½	3	3	3½	4
1½	1	1½	1½	2**	2**	2½	2½	3	3	3½	4	4
2	1	1½	1½	2	2**	2½	2½	3	3½	3½	4	4
2½	1	1½	2	2	2½	2½	3	3	3½	4	4	4½
3	1½	1½	2	2	2½	2½	3	3	3½	4	4	4½
3½	1½	1½	2	2	2½	2½	3	3	3½	4	4	5
4	1½	1½	2	2½	2½	3	3	3½	4	4	4½	5
4½	1½	1½	2	2½	2½	3	3	3½	4	4	4½	5
5	1½	1½	2	2½	3**	3	3½	4	4	4½	5	5
6	1½	1½	2	2½	3**	3	3½	4	4½	5	5	5½
7	1½	2	2	2½	3**	3	4	4	4½	5	5½	6
8	1½	2	2	2½	3**	3	4	4	5	5	6	6
9	1½	2	2	2½	3**	3	4	4½	5	5½	6	6½
10	1½	2	2	3	3**	3½	4	4½	5	5½	6	6½
11	1½	2	2	3	3**	3½	4	5	5	6	6½	7
12	1½	2	2½	3	3**	3½	4	5	5½	6	6½	7
14 & 16	1½	2	2½	3	3**	4	4½	5½	6	6½	7	7½

Process

Pipe Size												
½ & ¾	1	1	1	1	1	1	1	1½	1½	1½	1½	
1	1	1	1	1	1	1	1½	1½	1½	1½	2	
1¼	1	1	1	1	1	1	1½	1½	1½	2	2	
1½	1	1	1	1	1	1½	1½	1½	2	2	2	2½
2	1	1	1	1	1	1½	1½	1½	2	2	2	2½
2½	1	1	1	1	1	1½	1½	1½	2	2	2	2½
3	1	1	1	1	1½	1½	1½	2	2	2	2½	2½
3½	1	1	1	1	1½	1½	1½	2	2	2½	2½	2½
4	1	1	1	1	1½	1½	1½	2	2	2½	2½	2½
4½	1	1	1	1	1½	1½	1½	2	2	2½	2½	2½
5	1	1	1	1	1½	1½	1½	2	2	2½	2½	2½
6	1	1	1	1½	1½	1½	1½	2	2	2½	2½	2½
7	1½	1½	1½	1½	1½	1½	2	2	2	2½	2½	2½
8	1½	1½	1½	1½	1½	2	2	2	2½	2½	2½	3
9	1½	1½	1½	1½	1½	2	2	2½	2½	2½	3	3
10	1½	1½	1½	1½	2	2	2	2½	2½	2½	3	3½
11	1½	1½	1½	1½	2	2	2	2½	2½	2½	3	3½
12	1½	1½	1½	1½	2	2	2	2½	2½	2½	3	3½
14 & 16	1½	1½	1½	1½	2	2	2	2½	2½	3	3	3½

Commercial—Full Year Operation

Pipe Size												
½ & ¾	1	1½	2	2½**	3½**							
1	1	1½	2	2½**	3**							
1¼	1	2	2½	3**	3**							
1½	1½	2	2½	3**	3½**							
2	1½	2	2½	3**	3½**							
2½	1½	2	2½	3**	3½**							
3	1½	2	3	3**	4**							
3½	1½	2	3	3½**	4**							
4	1½	2	3	3½**	4**							
4½	1½	2	3	3½**	4**							
5	1½	2	3	3½**	4**							
6	1½	2	3	3½**	4**							
7	1½	2	3	3½**	4**							
8	1½	2	3	3½**	4**							
9	1½	2½	3	3½**	4**							
10	1½	2½	3	3½**	4**							
11	1½	2½	3	3½**	4**							
12	1½	2½	3½	4**	4½**							
14 & 16	2	2½	3½	4**	4½**							

Commercial—Seasonal Operation

Pipe Size						
½ & ¾	1	1	1½	1½	2	
1	1	1	1½	2	2	
1¼	1	1½	2	2	2½**	
1½	1	1½	2	2	2½**	
2	1	1½	2	2	2½**	
2½	1	1½	2	2	2½**	
3	1	1½	2	2	2½**	
3½	1	1½	2	2	2½**	
4	1	1½	2	2	2½**	
4½	1	1½	2	2	2½**	
5	1	1½	2	2	2½**	
6	1	1½	2	2	2½**	
7	1	1½	2	2	2½**	
8	1	1½	2	2	2½**	
9	1	1½	2	2	2½**	
10	1	1½	2	2	2½**	
11	1	1½	2	2	2½**	
12	1	1½	2	2	2½**	
14 & 16	1	1½	2	2	2½**	

RECOMMENDED THICKNESSES†

Temperature of Surface, F	100 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 450	451 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1001 to 1100	1101 to 1200
Nominal Thickness, inches	1	1	1	1½	1½	2	2	2½	2½	3	3½	4	4½	5	5½

Utility—Steam Generation

	1½	1½	2	2½	3	3	3½	4	4	4½	4½

Process

	1	1	1½	1½	1½	2	2	2	2½	2½	3

Commercial—Full Year Operation

	2½	2½	3½	4	4½	–	–	–	–	–	–

Commercial—Seasonal Operation

	1	1	1½	2	2½	–	–	–	–	–	–

†Tabulated thicknesses are minimum thicknesses calculated on an economic Heat Flow to Determine Economic Thickness of Insulation—National Insulation Manufacturers Association) basis for heat conservation under average operating conditions and severe adverse temperature control. Other conditions may warrant the use of other thicknesses.

WARRANTY

JOHNS-MANVILLE warrants its Lots and that all Products sold hereunder are manufactured in accordance with the applicable Specifications and are free from defects in material and workmanship using our Specifications as a standard. The limit of our liability for failure of any of our Products to meet the foregoing warranty or for breach of any other warranty express or implied, shall be to supply an equivalent amount of products for any Products returned to us and found to be defective by us. Due to the widely varying conditions under which our Products are used and installed we offer no warranty, express or implied, as to their length of service life or suitability for any particular purpose. In no event shall we be liable for incidental or consequential damages. No person is authorized to bind us for any further warranty obligation beyond that stated in this paragraph.

BLOCK INSULATION

STANDARD SIZES

Length, inches	Thickness, inches	Width, inches
36	1, 1½, 2, 2½, 3, 3½ and 4	6 and 12

Notes for special plan and curved blocks consult your nearest J-M office

Pipe Insulation

HEAT TRANSMISSION

Nom. Pipe Size, Inches	Pipe Temp., F	Nom. Thickness, Inches	Outside Surf. Temp., F	Btu
½	100	1	83	2.46
½	"	1½	82	2.05
½	"	2	81	1.81
½	200	1	97	65.7
½	"	1½	98	55.0
½	"	2	97	51.7
½	"	2½	95	49.3
½	300	1	111	109.5
½	"	1½	109	95.3
½	"	2	108	87.8
½	"	2½	107	83.9
½	"	3	105	81.6
½	400	1	126	154.6
½	"	1½	123	135.1
½	"	2	122	126.7
½	"	2½	120	121.9
½	"	3	117	118.6
½	500	1	141	199.3
½	"	1½	139	174.8
½	"	2	136	164.6
½	"	2½	134	157.7
½	"	3	131	153.6
½	"	3½	128	151.1
½	600	1	165	244.6
½	"	1½	159	214.2
½	"	2	156	201.9
½	"	2½	153	193.7
½	"	3	150	188.6
½	"	3½	147	185.4
½	700	1	189	289.9
½	"	1½	184	253.8
½	"	2	180	239.3
½	"	2½	176	229.6
½	"	3	173	223.6
½	"	3½	170	219.7
½	800	1	214	335.3
½	"	1½	208	293.5
½	"	2	204	276.8
½	"	2½	200	265.5
½	"	3	196	258.5
½	"	3½	193	254.0
½	900	1	239	380.8
½	"	1½	232	333.5
½	"	2	228	314.4
½	"	2½	223	301.6
½	"	3	219	293.6
½	"	3½	216	288.4
½	1000	1	264	426.3
½	"	1½	257	373.2
½	"	2	252	351.9
½	"	2½	247	337.5
½	"	3	242	328.4
½	"	3½	238	322.6
½	1100	1	289	471.8
½	"	1½	281	412.9
½	"	2	276	389.1
½	"	2½	271	373.2
½	"	3	265	363.1
½	"	3½	261	356.7
½	1200	1	314	516.8
½	"	1½	305	452.3
½	"	2	300	426.3
½	"	2½	294	408.8
½	"	3	288	397.7
½	"	3½	283	390.7
¾	100	1	83	2.96
¾	"	1½	82	2.36
¾	"	2	81	2.08
¾	"	2½	80	1.92
¾	"	3	79	1.82
¾	200	1	97	68.7
¾	"	1½	96	57.5
¾	"	2	95	54.0
¾	"	2½	94	51.5
¾	"	3	92	49.8
¾	300	1	111	114.5
¾	"	1½	109	99.6
¾	"	2	107	91.8
¾	"	2½	105	87.7
¾	"	3	103	85.3
¾	400	1	126	161.6
¾	"	1½	123	141.2
¾	"	2	121	132.4
¾	"	2½	119	127.4
¾	"	3	116	124.0
¾	500	1	141	208.3
¾	"	1½	138	182.7
¾	"	2	135	172.0
¾	"	2½	133	164.9
¾	"	3	130	160.5
¾	"	3½	127	157.9
¾	600	1	165	255.6
¾	"	1½	158	223.9
¾	"	2	155	210.9
¾	"	2½	152	202.4
¾	"	3	149	197.1
¾	"	3½	146	193.8
¾	700	1	189	303.0
¾	"	1½	183	265.2
¾	"	2	178	249.9
¾	"	2½	174	239.9
¾	"	3	171	233.6
¾	"	3½	168	229.5
¾	800	1	214	350.4
¾	"	1½	207	306.8
¾	"	2	202	288.9
¾	"	2½	198	277.2
¾	"	3	194	269.5
¾	900	1	239	397.8
¾	"	1½	231	348.4
¾	"	2	226	328.0
¾	"	2½	221	314.7
¾	"	3	217	306.0
¾	"	3½	213	300.4
¾	1000	1	264	445.3
¾	"	1½	256	389.9
¾	"	2	250	367.4
¾	"	2½	245	352.4
¾	"	3	240	342.9
¾	"	3½	235	336.8
¾	1100	1	289	492.8
¾	"	1½	280	431.1
¾	"	2	274	406.4
¾	"	2½	268	389.9
¾	"	3	263	379.4
¾	"	3½	258	372.8
¾	1200	1	314	540.0
¾	"	1½	304	472.5
¾	"	2	298	445.5
¾	"	2½	291	427.4
¾	"	3	286	416.0
¾	"	3½	280	408.7
1	100	1	83	3.16
1	"	1½	82	2.56
1	"	2	81	2.28
1	"	2½	80	2.12
1	"	3	79	2.02
1	200	1	97	72.6
1	"	1½	96	61.4
1	"	2	95	57.9
1	"	2½	94	55.4
1	"	3	92	53.7
1	300	1	111	120.4
1	"	1½	109	105.5
1	"	2	107	97.7
1	"	2½	105	93.6
1	"	3	103	91.3
1	400	1	126	169.5
1	"	1½	123	149.1
1	"	2	121	140.3
1	"	2½	119	135.3
1	"	3	116	131.9
1	500	1	141	218.2
1	"	1½	138	192.6
1	"	2	135	181.9
1	"	2½	133	174.8
1	"	3	130	170.4
1	"	3½	127	167.8
1	600	1	165	267.6
1	"	1½	158	235.9
1	"	2	155	222.9
1	"	2½	152	214.4
1	"	3	149	209.1
1	"	3½	146	205.8
1	700	1	189	317.0
1	"	1½	183	279.2
1	"	2	178	263.9
1	"	2½	174	253.9
1	"	3	171	247.6
1	"	3½	168	243.5
1	800	1	214	366.4
1	"	1½	207	322.8
1	"	2	202	304.9
1	"	2½	198	293.2
1	"	3	194	285.5
1	"	3½	191	280.5
1	900	1	239	415.8
1	"	1½	231	366.4
1	"	2	226	346.0
1	"	2½	221	332.7
1	"	3	217	324.0
1	"	3½	213	318.4
1	1000	1	264	465.3
1	"	1½	256	409.9
1	"	2	250	387.4
1	"	2½	245	372.4
1	"	3	240	362.9
1	"	3½	235	356.8
1	1100	1	289	514.8
1	"	1½	280	453.1
1	"	2	274	428.4
1	"	2½	268	411.9
1	"	3	263	401.4
1	"	3½	258	394.8
1	1200	1	314	564.0
1	"	1½	304	496.5
1	"	2	298	469.5
1	"	2½	291	451.4
1	"	3	286	440.0
1	"	3½	280	432.7
1¼	100	1	83	3.66
1¼	"	1½	82	2.96
1¼	"	2	81	2.68
1¼	"	2½	80	2.52
1¼	"	3	79	2.42
1¼	200	1	97	80.6
1¼	"	1½	96	69.4
1¼	"	2	95	65.9
1¼	"	2½	94	63.4
1¼	"	3	92	61.7
1¼	300	1	111	128.4
1¼	"	1½	109	113.5
1¼	"	2	107	105.7
1¼	"	2½	105	101.6
1¼	"	3	103	99.3
1¼	400	1	126	177.5
1¼	"	1½	123	157.1
1¼	"	2	121	148.3
1¼	"	2½	119	143.3
1¼	"	3	116	139.9
1¼	500	1	141	226.2
1¼	"	1½	138	200.6
1¼	"	2	135	189.9
1¼	"	2½	133	182.8
1¼	"	3	130	178.4
1¼	"	3½	127	175.8
1¼	600	1	165	275.6
1¼	"	1½	158	243.9
1¼	"	2	155	230.9
1¼	"	2½	152	222.4
1¼	"	3	149	217.1
1¼	"	3½	146	213.8
1¼	700	1	189	325.0
1¼	"	1½	183	287.2
1¼	"	2	178	271.9
1¼	"	2½	174	261.9
1¼	"	3	171	255.6
1¼	"	3½	168	251.5
1¼	800	1	214	374.4
1¼	"	1½	207	330.8
1¼	"	2	202	312.9
1¼	"	2½	198	301.2
1¼	"	3	194	293.5
1¼	"	3½	191	288.5
1¼	900	1	239	423.8
1¼	"	1½	231	374.4
1¼	"	2	226	354.0
1¼	"	2½	221	340.7
1¼	"	3	217	332.0
1¼	"	3½	213	326.4
1¼	1000	1	264	473.3
1¼	"	1½	256	417.9
1¼	"	2	250	395.4
1¼	"	2½	245	380.4
1¼	"	3	240	370.9
1¼	"	3½	235	364.8
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1¼	"	2½	268	419.9
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1½	100	1	83	4.06
1½	"	1½	82	3.26
1½	"	2	81	2.98
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1½	"	1½	96	75.2
1½	"	2	95	71.7
1½	"	2½	94	69.2
1½	"	3	92	67.5
1½	300	1	111	134.2
1½	"	1½	109	119.3
1½	"	2	107	111.5
1½	"	2½	105	107.4
1½	"	3	103	105.1
1½	400	1	126	183.3
1½	"	1½	123	162.9
1½	"	2	121	154.1
1½	"	2½	119	149.1
1½	"	3	116	145.7
1½	500	1	141	232.8
1½	"	1½	138	207.2
1½	"	2	135	196.5
1½	"	2½	133	189.4
1½	"	3	130	185.0
1½	"	3½	127	182.4
1½	600	1	165	281.2
1½	"	1½	158	249.5
1½	"	2	155	236.5
1½	"	2½	152	228.0
1½	"	3	149	222.7
1½	"	3½	146	219.4
1½	700	1	189	330.6
1½	"	1½	183	292.8
1½	"	2	178	277.5
1½	"	2½	174	267.5
1½	"	3	171	261.2
1½	"	3½	168	257.1
1½	800	1	214	380.0
1½	"	1½	207	336.4
1½	"	2	202	318.5
1½	"	2½	198	306.8
1½	"	3	194	299.1
1½	"	3½	191	294.1
1½	900	1	239	429.4
1½	"	1½	231	380.0
1½	"	2	226	359.6
1½	"	2½	221	346.3
1½	"	3	217	337.6
1½	"	3½	213	332.0
1½	1000	1	264	478.9
1½	"	1½	256	423.5
1½	"	2	250	401.0
1½	"	2½	245	386.0
1½	"	3	240	376.5
1½	"	3½	235	370.4
1½	1100	1	289	528.4
1½	"	1½	280	466.7
1½	"	2	274	442.0
1½	"	2½	268	425.5
1½	"	3	263	415.0
1½	"	3½	258	408.4
1½	1200	1	314	578.0
1½	"	1½	304	510.5
1½	"	2	298	483.5
1½	"	2½	291	465.4
1½	"	3	286	454.0
1½	"	3½	280	446.7
2	100	1	83	4.96
2	"	1½	82	3.96
2	"	2	81	3.58
2	"	2½	80	3.38
2	"	3	79	3.26
2	200	1	97	104.5
2	"	1½	96	91.3
2	"	2	95	86.8
2	"	2½	94	83.8
2	"	3	92	81.8
2	300	1	111	162.4
2	"	1½	109	144.5
2	"	2	107	135.1
2	"	2½	105	129.9
2	"	3	103	127.1
2	400	1	126	221.8
2	"	1½	123	197.2
2	"	2	121	186.5
2	"	2½	119	180.4
2	"	3	116	176.4
2	500	1	141	281.6
2	"	1½	138	250.7
2	"	2	135	237.8
2	"	2½	133	229.2
2	"	3	130	223.8
2	"	3½	127	220.7
2	600	1	165	340.2
2	"	1½	158	301.9
2	"	2	155	286.1
2	"	2½	152	275.8
2	"	3	149	269.4
2	"	3½	146	265.4
2	700	1	189	400.0
2	"	1½	183	354.2
2	"	2	178	335.7
2	"	2½	174	323.7
2	"	3	171	316.1
2	"	3½	168	311.1

Nom. Pipe Size, Inches	Pipe Temp., F	Nom. Thickness, Inches	Outside Surf. Temp., F	Btu

Nom. Pipe Size, Inches														
Pipe Temp., F														
Nom. Thickness, Inches														
Outside Surf. Temp., F														
Btu														

Nom. Pipe Size, Inches														
Pipe Temp., F														
Nom. Thickness, Inches														
Outside Surf. Temp., F														
Btu														

Nom. Pipe Size, Inches														
Pipe Temp., F														
Nom. Thickness, Inches														
Outside Surf. Temp., F														
Btu														

Nom. Pipe Size, Inches														
Pipe Temp., F														
Nom. Thickness, Inches														
Outside Surf. Temp., F														
Btu														

Nom. Pipe Size, Inches														
Pipe Temp., F														
Nom. Thickness, Inches														
Outside Surf. Temp., F														
Btu														

Nom. Pipe Size, Inches														
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Outside Surf. Temp., F														
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Nom. Pipe Size, Inches										
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Outside Surf. Temp., F										
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Nom. Pipe Size, Inches										
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Outside Surf. Temp., F										
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Nom. Pipe Size, Inches										
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Nom. Pipe Size, Inches										
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Nom. Pipe Size, Inches										
Pipe Temp., F										
Nom. Thickness, Inches										
Outside Surf. Temp., F										
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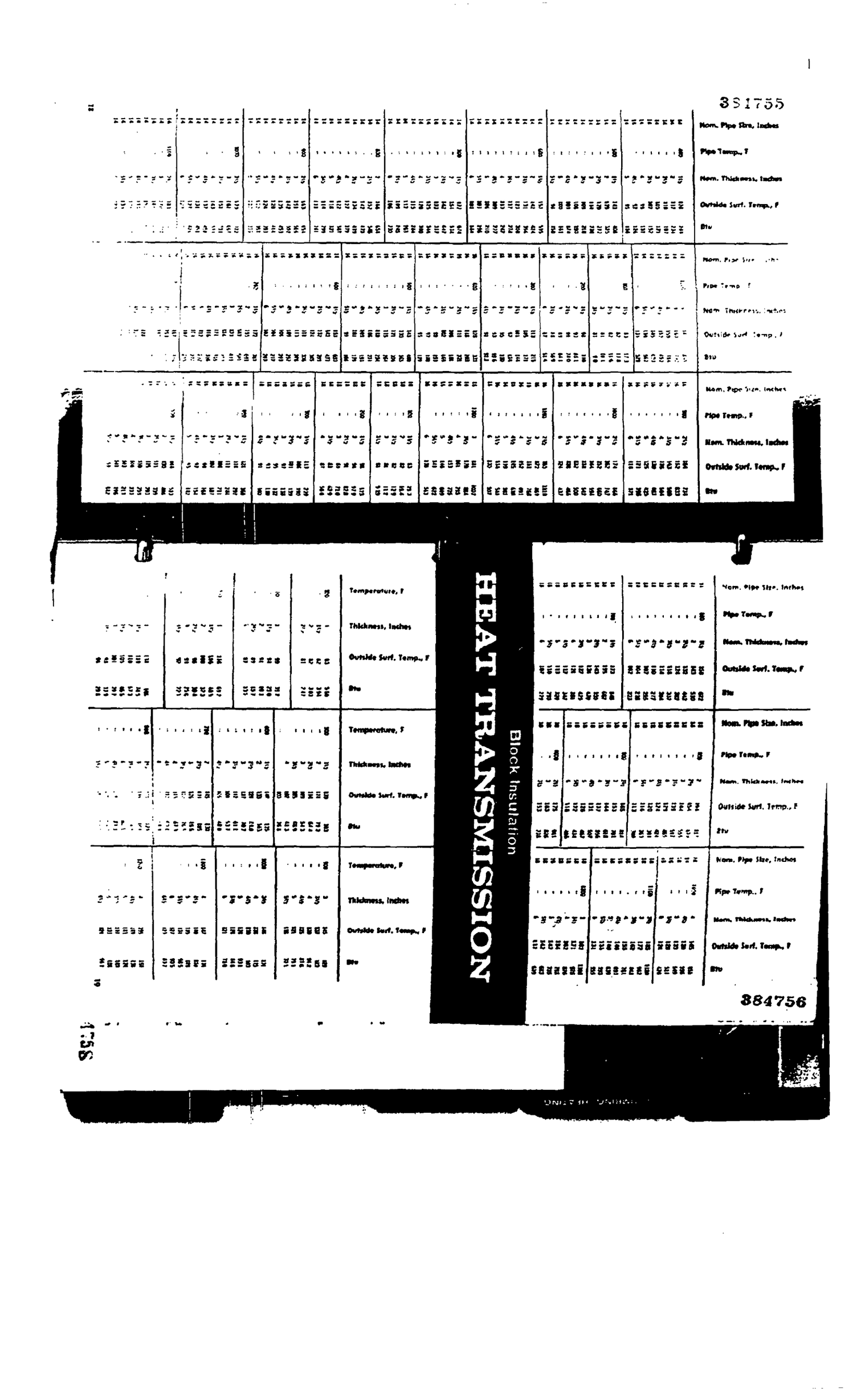
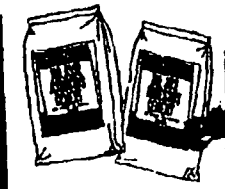
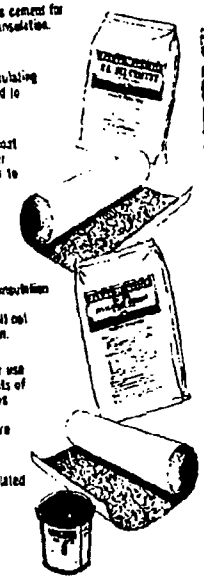
Nom. Pipe Size, Inches										
Pipe Temp., F										
Nom. Thickness, Inches										
Outside Surf. Temp., F										
Btu										


Nom. Pipe Size, Inches
Pipe Temp., F
Nom. Thickness, Inches
Outside Surf. Temp., F
Btu
Temperature, F
Thickness, Inches
Outside Surf. Temp., F
Btu
HEAT TRANSMISSION
Block Insulation

FOR J-M QUALITY ALL THE WAY...







J-M No. 302 Insulating Cement – A very high quality asbestos cement for insulating fittings and sealing joints or for use as a finish over other insulation. May be troweled to a smooth, hard surface. Furnished in 100 lb bags. Covering capacity 25 bd ft per 100 lbs.

J-M No. 302 Insulating Cement – An asbestos cement for insulating pipe fittings or for use as a finish over other insulation. May be troweled to a smooth hard surface. Furnished in 50 and 100 lb bags. Covering capacity 19 bd ft per 100 lbs.

J-M No. 301 Insulating Cement – An hydraulic setting, one coat application cement for insulating pipe fittings and as a finish over other insulation. Negligible drying shrinkage permits application in one layer to desired thickness. Hardens within a few hours. Furnished in 50 lb bags. Covering capacity 36 bd ft per 100 lbs.

J-M No. 480 Insulating Cement – A mineral wool cement for insulating flanges and other irregular surfaces. Furnished in 50 lb bags. Covering capacity 50 bd ft per 100 lbs.

J-M Double Coated Flexstone® – A rugged, heavy duty, weatherproofing jacket especially recommended for the protection of insulation on outdoor pipes and small diameter cylindrical vessels. Composed of asphalt-saturated asbestos felt coated with a mineral-filled asphalt. Will not embrittle under prolonged exposure to sunlight. Supplied in rolls 36 in. wide, each roll containing 108 sq ft and weighing 50 lbs.

J-M Asbestos Firetard® – A weatherproof jacket designed for use where resistance to the spread of fire is of primary importance. Consists of laminations of heavy asphalt-saturated asbestos felt and plain asbestos felt. Affords excellent insulation protection. Recommended for weatherproofing outdoor pipes and small diameter vessels wherever fire hazards are present. Supplied in rolls 32 in. wide, each roll containing 108 sq ft and weighing 55 lbs.

J-M Insulkote® – A weatherproof coating for use on outdoor insulated tanks and vessels. Compounded of selected and processed bitumens, asbestos fiber and mineral fillers. Furnished ready-mixed in two consistencies to facilitate trowel or spray application. Available in water-vapor barrier, non water vapor-barrier and combination purpose types. Furnished in 1, 5, 30 and 55 gal containers. 1 gal covers approximately 8 sq ft to a thickness of ½ in.

Johns-Manville

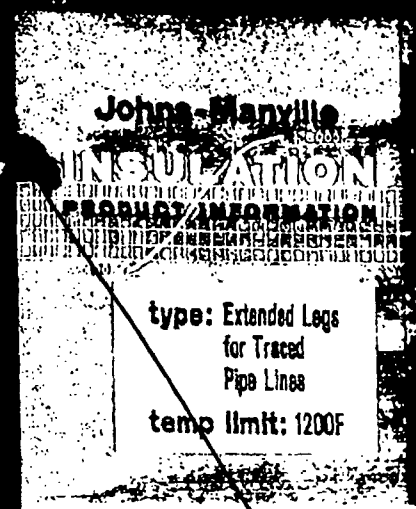
22 East 40th Street • New York, N.Y. 10016

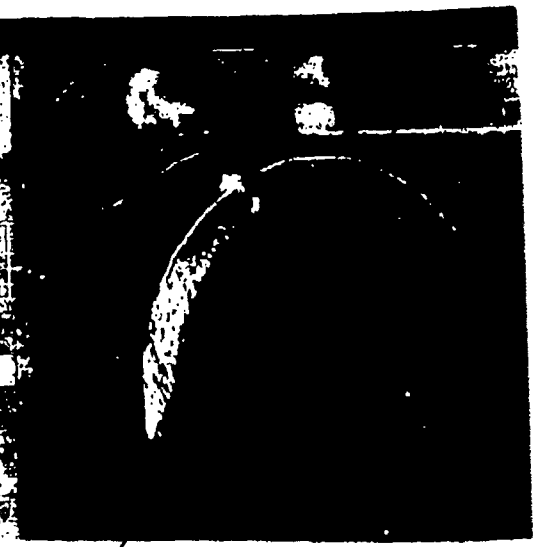
Sales Offices in Principal Cities

JM

381757

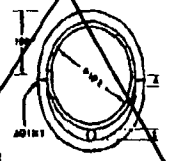
Litho in U.S.A.





J-M THERMOBESTOS® extended legs for steam or electrical traced pipe lines

DESCRIPTION: Composed of hydrous calcium silicate bonded with asbestos fibers, J-M Thermobestos with extended legs is a high-temperature pipe insulation molded with ⅜" legs on each end of the half circles—or ⅜" straight beyond 180° (½ dimension "A" on adjacent sketch). Extended legs provide allowance for the traced line and the dimension of "B", as shown on the sketch, will be ¾". For special size extended legs, consult J-M sales representative.



AVAILABLE FORMS: Thermobestos is furnished in a complete selection of sectional pipe sizes up to 24" x 3" thick half-sections. Larger sizes are available in quad segments from 25" to 33" P/S in 1½, 2, 2½ and 3" thicknesses. For special applications, Thermobestos with extended legs can be furnished as Metal-On®, a factory-applied aluminum or stainless steel jacket.

USES: For indoor and outdoor piping and equipment, operating at temperatures to 1200F, that have either steam or electrical traced pipe lines. Especially recommended for use in the power generation and chemical and process industries.

ADVANTAGES: Traced lines present a shape problem for insulations which are furnished in half circles; to fit both the main line and the traced line would require an oval insulation a size larger than normal. An oversize insulation does not provide a snug fit and, consequently, lacks physical strength. Extended legs provide an elliptical shape that fits both the main pipe and the traced line properly. In addition, the smaller size insulation made possible by extended legs permits substantial savings in material costs.

Thermobestos with extended legs also offers these 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 availability.

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.

381758