AIR-CONDITIONING

FLAME-SAFE GC
Specification Data

PHYSICAL PROPERTIES**

FOIL-FACED GLASS CLOTH JACKET

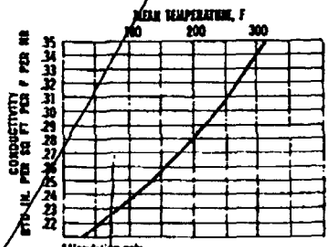
Beach Puncture (ASTM-D-781-59T)	424 oz. in./in. tear
Tensile strength—Ultimate (ASTM-D-828-60)	233 lbs./in. width
Mullen Burst (ASTM-D-774-63T)	343 PSI

GENERAL

Temperature Limit	500°*
Moisture absorption	less than 0.2% by volume
Alkalinity	less than 0.8% expressed as Na_2O
Corrosivity (with steel, copper, aluminum)	does not cause or accelerate
Capillary (after 24 hours)	negligible
Shrinkage	none
Resistance to fungus and bacteria	does not breed or promote

**Average values obtained in accordance with accepted test methods.
*See note on other side.

THERMAL CONDUCTIVITY††



††Insulation only.

COMPLIANCE WITH CODES AND STANDARDS

Flame-Safe GC meets the Fire Hazard Classification requirements of ASTM E-84 as tested by U.L.

	Composite Product Rating
Flame Spread	20
Fuel Contributed	20
Smoke Developed	30

U.L. guide 40 [illegible] Card R1048

COMPLIANCE WITH GOVERNMENT SPECS

HH-I-[illegible] Form C, Type VII, Class 2 replacing HH-I-552, 553, 558
HH-I-[illegible] Form C Type V, replacing HH-I-562, 563
MIL-I-22264

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

172423

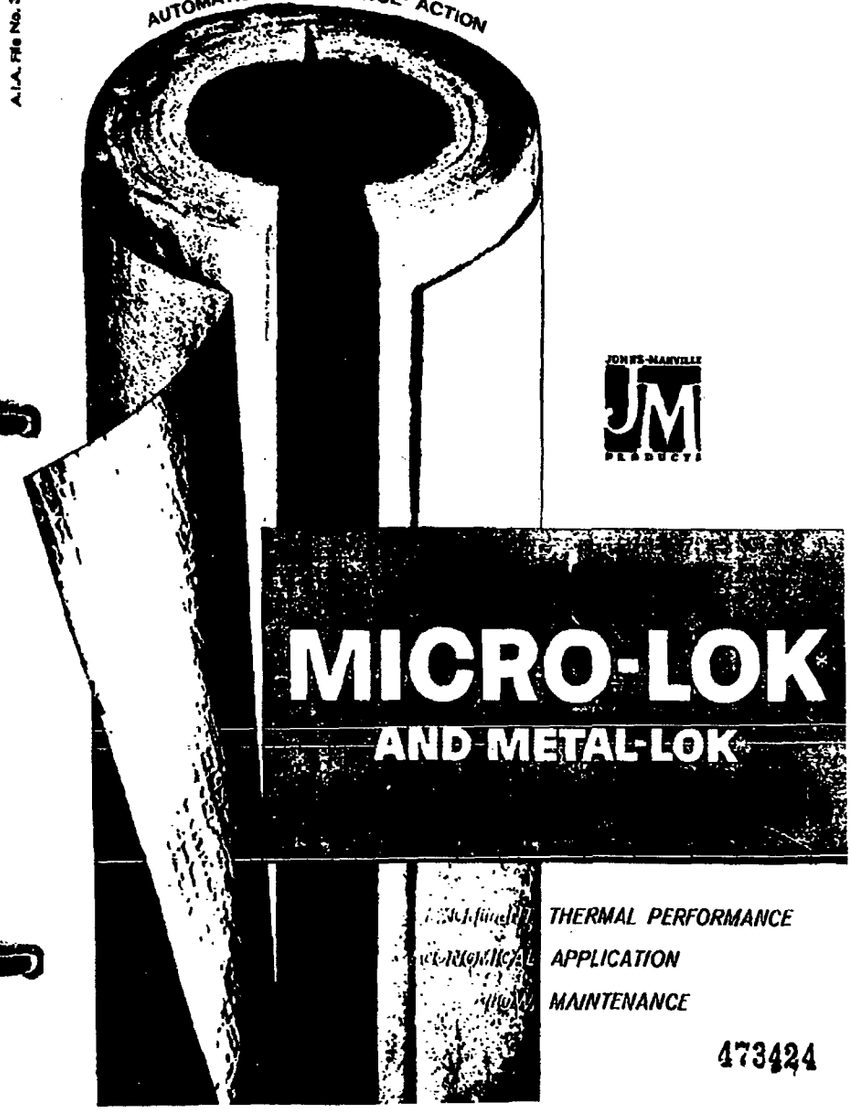
DI-713A 3/66

Litho in U.S.A.

ONE-PIECE CONSTRUCTION + TOUGHNESS + RESILIENCY
. . . A COMBINATION THAT BUILDS PRODUCT SUPERIORITY

A.I.A. File No. 37-D-2

AUTOMATIC "SPRING-HINGE" ACTION



JOHNS-MANVILLE JM PRODUCTS

MICRO-LOK*
AND METAL-LOK*

THERMAL PERFORMANCE
APPLICATION
MAINTENANCE

473424

PLAINTIFF'S EXHIBIT JM-2368

J-M Micro-Lok is designed for

ECONOMICAL APPLICATION AND PERFORMANCE

For service to 500 F...

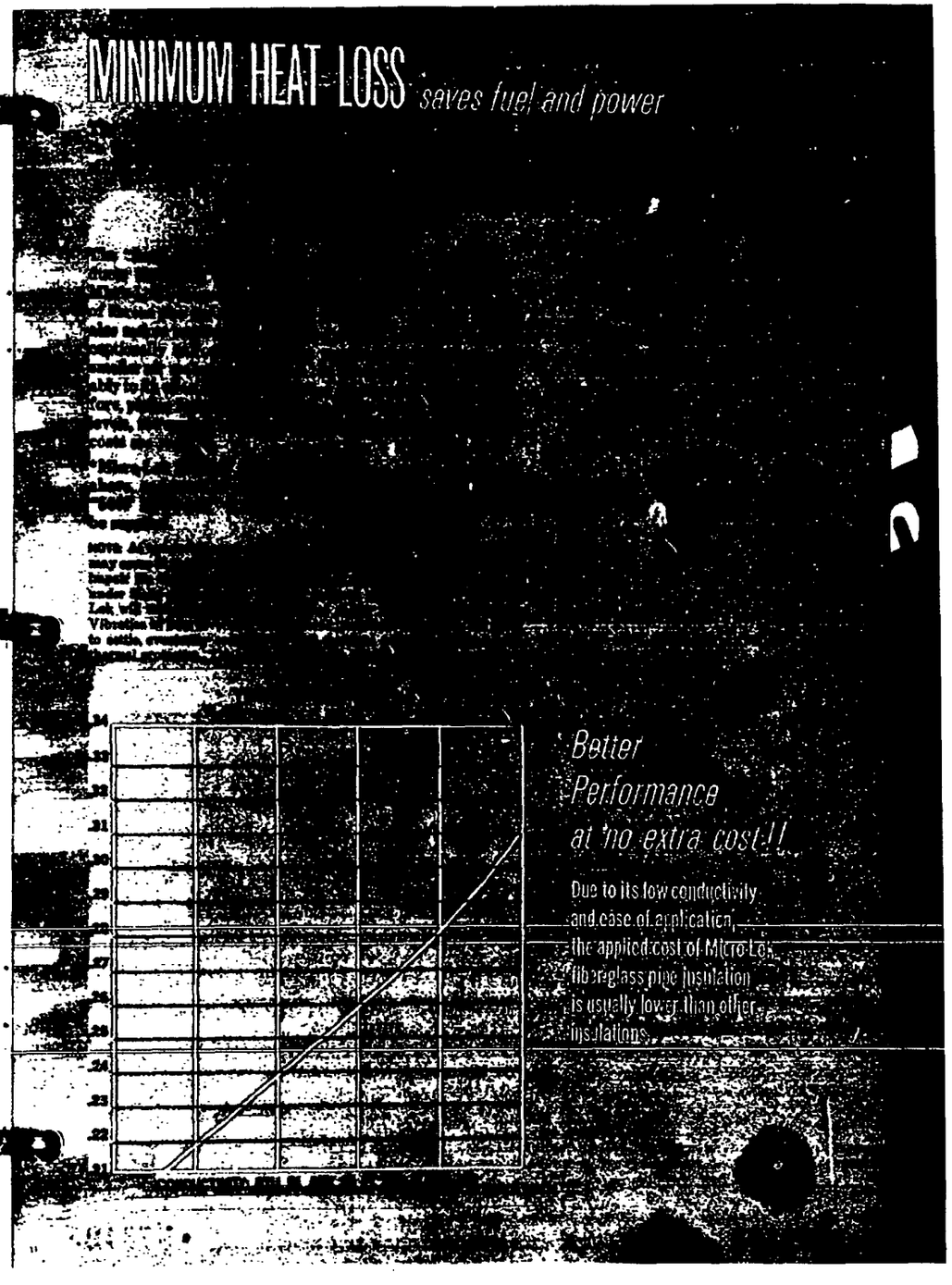
J-M Micro-Lok is a highly effective, one-piece, lightweight pipe insulation made of long, fine, flame-attenuated glass fibers. It is designed for temperatures from zero to 500 degrees F.* The three-foot sections are mandrel-wound in one piece, then cut longitudinally through one wall and partially through the other. Due to the remarkable strength and pliability of the fibers a "hinge" is thus formed, allowing the section to be opened uniformly, and with only slight effort, over its entire length. When the leverage is released it closes automatically and firmly. This feature speeds and simplifies application. The one-piece design also augments the thermal effectiveness of Micro-Lok because there is only one longitudinal joint—half as many as two-piece pipe insulations.



Micro-Lok pipe insulation is available with a variety of factory-applied jackets for the thermal protection of brine, refrigerant and special process lines; hot and chilled water lines; dual temperature, steam and other hot lines to 500 F.* It is made in various wall thicknesses and a wide range of standard iron pipe and copper tubing sizes. (See Page 8.)

*See Page 3.

• 472425



AIR-CONDITIONING

RESILIENCY

forestalls damage

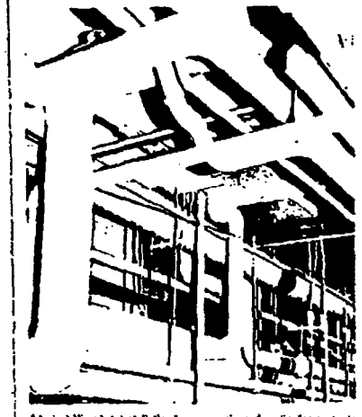


When insulated pipes must withstand abuse from such things as ladders, planks, and workmen's tools and shoes, the resiliency of Micro-Lok offers protection against torn jackets which would take time and money to patch.

During service on piping there is much less chance of vapor barriers or protective jackets on Micro-Lok being punctured or torn from accidental impact. This is due to the exceptional resiliency of the glass fibers which absorb blows or compression, allowing the jacket to flex and then return to original position. Jackets on heavier density pipe insulation are more apt to shear or puncture because they lack this cushioning support.

UNIFORMITY

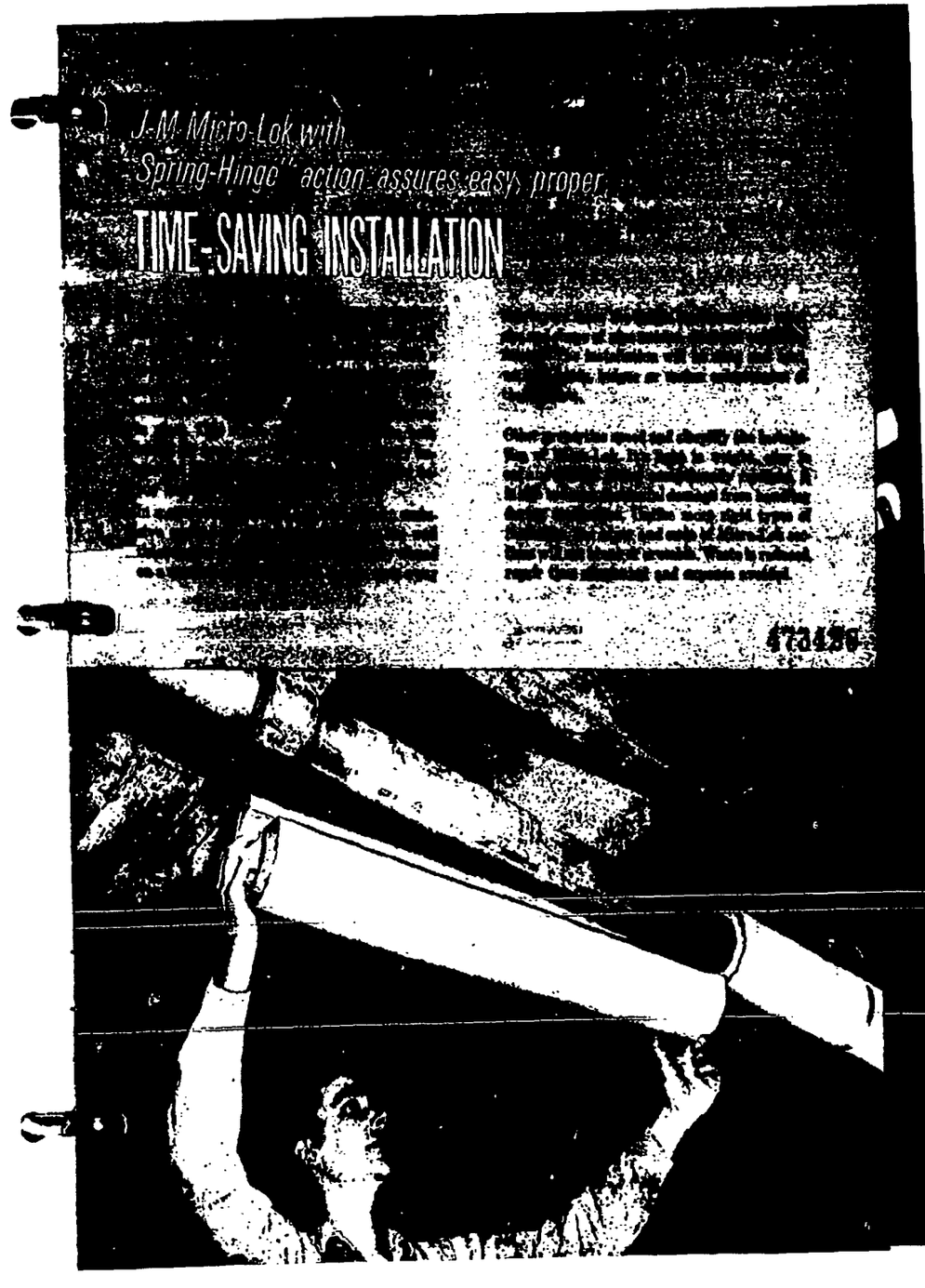
assured through manufacturing skills



A typical Micro-Lok installation by an experienced applicator presents a neat, trim appearance in a mechanical equipment room. Elbows and tees fabricated from Micro-Lok assure the same thermal effectiveness throughout the system.

Micro-Lok pipe insulation sections are precision-made and uniform in both inside and outside diameter, as well as in wall thickness. Accuracy of the inside diameter is due to winding on highly polished steel mandrels. Wall thicknesses are consistent and the outside surfaces are smooth and true because, in the manufacturing process, each section is accurately sized by an exclusive J-M patented process. This assures proper alignment with adjacent sections, as well as a tailored appearance for the entire pipe system.

172427



FACTORY-APPLIED JACKETS

to meet hot and cold line service conditions

All jackets have a minimum 1½" longitudinal lap.* Canvas jackets also have a minimum 2½" circumferential lap on one end. All jackets (except canvas) are sealed at the butt joints by a 4"-wide strip of the jacketing material, supplied in the carton.

*WP jackets, in 45 lb and 55 lb weights, are factory-supplied for all Micro-Lok with a 2" O.D. or below. Sizes above 2" O.D. will have the 45 lb and 55 lb WP jackets factory-applied.

CANVAS

Standard, 4 oz, 6 oz, and 8 oz. Available on all sizes and thicknesses from ½" IPS to 30" IPS and ⅝" CT to 12⅛" CT. Metal bands furnished at additional charge. Canvas is also available, factory-applied over vapor barrier jackets when specified.

[illegible]

All pipe lines operating below ambient temperatures require a vapor barrier jacket to prevent condensation. Fittings, valves and tees should be properly vapor-sealed. (Recommended: A heavy coating of J-M Insulkote†, ST, reinforced with J-M Duramesh* and finished with Insulkote, ST.)

GP: General purpose jacket for service temperature range from 50 F to 250 F, and available only on ½" and ¾" thicknesses. Consists of heavy white kraft laminated to a vapor barrier of aluminum foil.

WX: A 3-ply laminate of 60 lb white kraft, 0.001 aluminum foil, and 55 lb asphalt-saturated kraft. Vapor transmission rate: .02 perms, maximum.

FR (Flame-Bar): A fire-resistant 3-ply jacket of 35 lb white bleached kraft, bonded to aluminum foil with self-extinguishing adhesive, and reinforced with fiber glass yarn for added resistance to tearing and puncture. Meets NBFU 90-A. Vapor transmission rate: .02 perms, maximum.

[illegible]

WP: Weather-resistant jacket in 35 lb, 45 lb and 55 lb weights.

New! J-M METAL-LOK†

metal-jacketed Micro-Lok for service to 500 F*

—provides long-lasting, economical protection from heat loss, moisture damage and abuse.



Metal-Lok saves installation time because insulation and jacket go on in one operation.

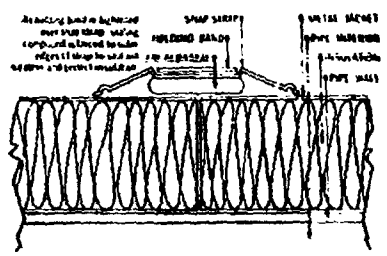
J-M Metal-Lok fiber glass pipe insulation offers all the properties and benefits of Micro-Lok *plus* the protection of a factory-applied, polished aluminum jacket. It is ideal for hot lines to 500 F.* and piping systems exposed to weather. Metal-Lok is available in standard pipe insulation sizes from 3½" O.D. to 28" O.D. Above 28" O.D. jackets can be supplied but not factory-attached.

The .016" polished aluminum jacket is lined with a factory-laminated moisture barrier. In installing Metal-Lok, the longitudinal lap fits snugly in the Z-joint. This holds the jacket to rigid, uniform diameter.

Circumferential joints are dependably sealed with a factory-formed aluminum snap-strap, 2" wide. This is lined with J-M Albaseal*, a high-penetration, permanently plastic sealing compound which seals the joint as the outer holding band is tightened.

Metal-Lok is light in weight, easy to handle and apply. Cuts can be readily made through both jacket and insulation with various types of hand or power saws. Elbows and tees can be finished with matching aluminum fitting covers which are usually fastened with pop rivets.

†J-M trademark *See Page 3.



RECOMMENDED THICKNESSES

HEATED PIPING INSULATION

[illegible]								
[illegible]								
¾								
¾								
1								
1¼								
1½	1							
2	1							
2½	1							
3	1							
3½	1							
4	1							
6	1½							
8	1½							
10	1½							
12	1½							
14 & up	1½							

NOTE: Tabulated thicknesses are [illegible] operating conditions and [illegible]
†From "New to Delaware [illegible]

COLD PIPING INSULATION

Pipe Temperature, F				
0-24				
25-49				
50-70				

*Thicknesses are calculated [illegible]
Ambient Condition No. 1 [illegible]
Ambient Condition No. 2 [illegible]

SPECIFICATION DATA

PHYSICAL PROPERTIES
Temperature Limit
Conductivity
Moisture Absorption
Alkalinity
Corrosivity —
(with steel, copper, [illegible])
Capillarity (after 24 hours)
Shrinkage
Resistance to Fungus and [illegible]

*See Page 3.

473429

STANDARD SIZES

IRON PIPE

NOMINAL PIPE SIZE	O.D. OF PIPE	½" WALL		¾" WALL		1" WALL		1¼" WALL		1½" WALL		2" WALL		2½" WALL		3" WALL		3½" WALL	
		ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.
⅛	.405	.50	1.405	.75	2.125	1.094	2.813	1.406	3.437										
¼	.540	.50	1.540	.75	2.250	.984	2.906	1.547	3.594										
⅜	.675	.50	1.675	.75	2.375	.875	2.938	1.438	3.625										
1	1.315	.50	2.315	.75	2.875	1.063	3.441	1.563	4.441										
1¼	1.660	.50	2.660	.75	3.156	.875	3.438	1.625	4.969										
1½	1.900	.50	2.900	.75	3.400	1.000	3.900	1.500	4.900	2.313	6.529								
2	2.375	.50	3.375	.75	3.875	1.031	4.437	1.563	5.500	2.094	6.563								
2½	2.875	.50	3.875	.75	4.375	1.031	4.937	1.313	5.501	1.844	6.563								
3	3.500	.50	4.500	.75	5.000	1.000	5.500	1.531	6.562	2.032	7.564								
3½	4.000	.50	5.000	.75	5.500	1.001	6.002	1.251	6.562	1.782	7.572								
4	4.500	.50	5.500	.75	6.000	1.031	6.563	1.531	7.562	2.032	8.564								
4½	5.000	.50	6.000	.75	6.500	1.101	7.202	1.351	7.552	1.782	8.572								
5	5.563	.50	6.563	.75	7.062	1.000	7.562	1.500	8.562	2.000	9.562								
6	6.625	.50	7.625	.75	8.125	.953	8.203	1.453	9.563	2.031	10.687	2.500	11.625	3.000	12.625	3.500	13.625		
7	7.625	.50	8.625	.75	9.125	.903	9.203	1.531	10.687	2.031	11.687	2.500	12.625	3.000	13.625	3.500	14.625		
8	8.625	.50	9.625	.75	10.125	1.031	10.687	1.531	11.687	2.031	12.687	2.500	13.625	3.000	14.625	3.500	15.625		
9	9.625	.50	10.625	.75	11.125	1.031	11.687	1.531	12.687	2.156	13.937	2.500	14.625	3.000	15.625	3.500	16.625		
10	10.750	.50	11.750	.75	12.250	.969	12.656	1.594	13.938	2.094	14.734	2.500	15.250	3.000	16.250	3.500	17.250		
11	11.750	.50	12.750	.75	13.250	1.094	13.906	1.594	14.938	2.094	15.734	2.500	16.250	3.000	17.250	3.500	18.250		
12	12.750	.50	13.750	.75	14.250	1.094	14.906	1.594	15.938	2.094	16.734	2.500	17.250	3.000	18.250	3.500	19.250		
14	14.000	.50	15.000	.75	15.500	.969	15.531	1.469	16.938	1.969	17.938	2.500	18.000	3.000	20.000	3.500	21.000		
15	15.000	.50	16.000	.75	16.500	.969	16.531	1.469	17.938	1.969	18.938	2.500	20.000	3.000	21.000	3.500	22.000		
16	16.000	.50	17.000	.75	17.500	.969	17.531	1.469	18.938	1.969	19.938	2.500	21.000	3.000	22.000	3.500	23.000		
17	17.000	.50	18.000	.75	18.500	.969	18.531	1.469	19.938	1.969	20.938	2.500	22.000	3.000	23.000	3.500	24.000		
18	18.000	.50	19.000	.75	19.500	.969	19.531	1.469	20.938	1.969	21.938	2.500	23.000	3.000	24.000	3.500	25.000		
19	19.000	.50	20.000	.75	20.500	.969	20.531	1.469	21.938	1.969	22.938	2.500	24.000	3.000	25.000	3.500	26.000		
20	20.000	.50	21.000	.75	21.500	.969	21.531	1.469	22.938	1.969	23.938	2.500	25.000	3.000	26.000	3.500	27.000		
21	21.000	.50	22.000	.75	22.500	.969	22.531	1.469	23.938	1.969	24.938	2.500	26.000	3.000	27.000	3.500	28.000		
22	22.000	.50	23.000	.75	23.500	.969	23.531	1.469	24.938	1.969	25.938	2.500	27.000	3.000	28.000	3.500	29.000		
23	23.000	.50	24.000	.75	24.500	.969	24.531	1.469	25.938	1.969	26.938	2.500	28.000	3.000	29.000	3.500	30.000		
24	24.000	.50	25.000	.75	25.500	.969	25.531	1.469	26.938	1.969	27.938	2.500	29.000	3.000	30.000	3.500	31.000		
25	25.000	.50	27.000	.75	27.500	.969	27.531	1.469	28.938	1.969	29.938	2.500	31.000	3.000	32.000	3.500	33.000		
27	27.000	.50	28.000	.75	28.500	.969	28.531	1.469	29.938	1.969	30.938	2.500	32.000	3.000	33.000	3.500	34.000		
28	28.000	.50	29.000	.75	29.500	.969	29.531	1.469	30.938	1.969	31.938	2.500	33.000	3.000	34.000	3.500	35.000		
30	30.000	.50	31.000	.75	31.500	.969	31.531	1.469	32.938	1.969	33.938	2.500	35.000	3.000	36.000	3.500	37.000		

AVAILABLE IN MULTIPLE LAYER COMBINATIONS ONLY.

COPPER TUBING

TUBE I.D.	TUBE O.D.	½" WALL		¾" WALL		1" WALL		1¼" WALL		2" WALL		2½" WALL		3" WALL	
		ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.	ACTUAL	O.D.
½	⅝	.50	1.625	.75	2.125	1.031	2.812	1.438	3.438						
¾	⅞	.50	1.750	.75	2.250	.969	2.812	1.531	3.812						
1	1⅛	.50	1.875	.75	2.375	.844	2.812	1.406	3.938						
1¼	1⅜	.50	2.125	.75	2.625	1.031	2.812	1.531	3.938						
1½	1⅝	.50	2.375	.75	2.875	.906	3.438	1.406	4.438						
2	2⅛	.50	2.625	.75	3.125	1.156	3.438	1.656	4.438						
2½	2⅝	.50	3.125	.75	3.625	.906	4.438	1.406	5.500						
3	3⅛	.50	3.625	.75	4.125	1.031	4.438	1.719	5.500						
3½	3⅝	.50	4.125	.75	4.625	.844	5.500	1.469	6.563						
4	4⅛	.50	4.625	.75	5.125	1.219	5.500	1.719	6.563						
5	5⅛	.50	5.125	.75	5.625	1.219	6.563	1.719	7.563						
6	6⅛	.50	6.125	.75	6.625	1.219	7.563	1.719	8.563						
7	7⅛	.50	7.125	.75	7.625	1.219	8.563	1.719	9.563						
8	8⅛	.50	8.125	.75	8.625	1.219	9.563	1.719	10.563	2.000	12.125	2.500	13.125	3.000	14.125
9	9⅛	.50	9.125	.75	9.625	1.219	10.563	1.719	11.563	2.000	13.125	2.500	14.125	3.000	15.125
10	10⅛	.50	10.125	.75	10.625	1.219	11.563	1.719	12.563	2.000	14.125	2.500	15.125	3.000	16.125
12	12⅛	.50	12.125	.75	12.625	1.219	13.563	1.719	14.563	2.000	16.125	2.500	17.125	3.000	18.125

AVAILABLE IN MULTIPLE LAYER COMBINATIONS ONLY.

For thicknesses above 3½", use multiple-layer combinations

HEAT TRANSMISSION

Expressed in Btu per linear foot per hour (based on 80F ambient air temperature)

NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU	NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU	NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
½	0	1	71	– 7.65	½	0	1	78	– 6.77	1	0	1	79	– 10.2
½	0	1½	73	– 6.74	½	0	1½	79	– 5.88	1	0	1½	80	– 8.83
½	0	2	76	– 5.48	½	0	2	81	– 4.64	1	0	2	82	– 6.99
½	25	1	78	– 6.49	½	25	1	80	– 5.53	1	25	1	81	– 8.03
½	25	1½	74	– 5.38	½	25	1½	76	– 4.36	1	25	1½	77	– 7.03
½	25	2	75	– 4.73	½	25	2	77	– 3.78	1	25	2	78	– 5.83
½	50	1	75	– 3.82	½	50	1	76	– 4.21	1	50	1	74	– 4.90
½	50	1½	76	– 3.00	½	50	1½	76	– 3.46	1	50	1½	76	– 3.93
½	50	2	77	– 2.54	½	50	2	77	– 3.03	1	50	2	77	– 3.51
½	75	1	78	– 0.62	½	75	1	78	– 0.72	1	75	1	79	– 0.81
½	75	1½	78	– 0.51	½	75	1½	79	– 0.59	1	75	1½	79	– 0.66
½	75	2	80	– 0.45	½	75	2	80	– 0.51	1	75	2	80	– 0.56
½	100	1	84	2.53	½	100	1	84	2.94	1	100	1	84	3.45
½	100	1½	82	2.09	½	100	1½	83	2.40	1	100	1½	83	2.73
½	100	2	82	1.84	½	100	2	82	2.09	1	100	2	83	2.39
½	150	1	93	8.31	½	150	1	94	10.6	1	150	1	94	12.7
½	150	1½	89	7.67	½	150	1½	89	8.79	1	150	1½	90	10.2
½	150	2	86	6.74	½	150	2	87	7.68	1	150	2	87	8.44
½	200	1	103	16.8	½	200	1	104	19.5	1	200	1	105	22.0
½	200	1½	95	13.8	½	200	1½	98	15.8	1	200	1½	97	18.3
½	200	2	91	12.1	½	200	2	92	13.8	1	200	2	92	15.1
½	250	1	113	25.0	½	250	1	115	29.0	1	250	1	116	32.3
½	250	1½	102	20.5	½	250	1½	103	23.5	1	250	1½	103	26.1
½	250	2	97	18.0	½	250	2	98	20.4	1	250	2	98	22.4
½	300	1	124	34.0	½	300	1	125	39.6	1	300	1	126	44.1
½	300	1½	110	27.8	½	300	1½	111	31.9	1	300	1½	111	35.3
½	300	2	102	24.3	½	300	2	103	27.7	1	300	2	103	30.4
½	350	1	134	44.8	½	350	1	136	51.2	1	350	1	137	56.5
½	350	1½	117	35.8	½	350	1½	119	41.1	1	350	1½	118	45.2
½	350	2	107	31.3	½	350	2	108	35.6	1	350	2	105	38.9
½	400	1	145	55.0	½	400	1	147	63.2	1	400	1	148	69.1
½	400	1½	125	44.6	½	400	1½	126	51.3	1	400	1½	125	56.2
½	400	2	114	39.0	½	400	2	115	44.3	1	400	2	112	48.4

NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
1	400	½	329	593
1	"	1	315	488
1	"	1½	303	397
1	"	2	298	343
1½	0	½	71	−109
1½	"	1	36	− 7.75
1½	"	1½	36	− 7.10
1½	"	2	37	− 6.21
1½	25	½	73	− 8.32
1½	"	1	74	− 7.67
1½	"	1½	77	− 6.45
1½	"	2	77	− 5.61
1½	"	2½	78	− 4.95
1½	50	½	74	− 5.66
1½	"	1	76	− 4.67
1½	"	1½	77	− 4.28
1½	"	2	78	− 3.64
1½	"	2½	79	− 2.79
1½	"	3	79	− 2.43
1½	75	½	79	− 1.90
1½	"	1	79	− 0.88
1½	"	1½	79	− 0.73
1½	"	2	80	− 0.52
1½	100	½	84	4.10
1½	"	1	83	3.26
1½	"	1½	82	2.93
1½	"	2	81	2.12
1½	150	½	93	15.1
1½	"	1	90	12.6
1½	"	1½	89	10.9
1½	"	2	84	7.21
1½	200	½	105	27.3
1½	"	1	98	21.5
1½	"	1½	95	18.7
1½	"	2	88	13.4
1½	250	½	117	40.6
1½	"	1	106	34.9
1½	"	1½	102	29.7
1½	"	2	91	20.4
1½	300	½	126	55.3
1½	"	1	114	43.4
1½	"	1½	108	37.6
1½	"	2	95	27.7
1½	"	2½	92	25.4
1½	"	3	89	22.3
1½	350	½	140	71.7
1½	"	1	122	56.0
1½	"	1½	115	48.1
1½	"	2	101	35.1
1½	"	2½	98	32.3
1½	"	3	94	28.6
1½	400	½	153	89.4
1½	"	1	131	69.6
1½	"	1½	123	60.4
1½	"	2	108	43.6
1½	"	2½	104	40.5
1½	"	3	100	35.6
1½	0	½	75	−9.92
1½	"	1	76	− 8.37
1½	"	1½	77	− 7.58
1½	"	2	78	− 6.87
1½	25	½	74	−8.96
1½	"	1	76	− 8.32
1½	"	1½	77	− 7.58
1½	"	2	78	− 6.87
1½	"	2½	78	− 6.33
1½	"	3	79	− 6.03

NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
2	50	½	74	− 7.77
2	"	1	76	− 6.68
2	"	1½	77	− 6.00
2	"	2	78	− 5.89
2	"	2½	78	− 5.28
2	"	3	79	− 4.97
2	75	½	79	− 1.23
2	"	1	79	− 1.04
2	"	1½	79	− 0.85
2	"	2	80	− 0.66
2	100	½	84	6.44
2	"	1	83	4.25
2	"	1½	82	3.49
2	"	2	81	2.71
2	150	½	96	20.0
2	"	1	91	15.6
2	"	1½	88	12.8
2	"	2	85	9.91
2	"	2½	83	8.36
2	200	½	107	30.1
2	"	1	99	23.0
2	"	1½	94	19.2
2	"	2	89	17.8
2	"	2½	86	15.0
2	"	3	85	13.8
2	250	½	118	53.9
2	"	1	107	41.6
2	"	1½	100	34.0
2	"	2	93	28.4
2	"	2½	93	27.2
2	"	3	91	25.4
2	300	½	130	73.6
2	"	1	116	56.8
2	"	1½	108	46.2
2	"	2	97	35.7
2	"	2½	97	30.1
2	"	3	95	27.2
2	350	½	142	95.3
2	"	1	124	73.0
2	"	1½	113	56.5
2	"	2	101	45.0
2	"	2½	95	36.7
2	"	3	90	33.6
2	400	½	130	74.0
2	"	1	108	57.1
2	"	1½	99	46.0
2	"	2	95	41.4
2	"	2½	92	34.3
2½	0	½	74	−12.6
2½	"	1	76	−10.2
2½	"	1½	77	− 8.51
2½	"	2	78	− 7.67
2½	"	2½	78	− 7.03
2½	"	3	79	− 6.72
2½	25	½	74	−10.2
2½	"	1	76	− 8.85
2½	"	1½	77	− 7.16
2½	"	2	78	− 5.98
2½	"	2½	78	− 5.39
2½	"	3	78	− 5.09
2½	50	½	73	− 8.10
2½	"	1	76	− 7.86
2½	"	1½	77	− 6.75
2½	"	2	78	− 6.03
2½	"	2½	78	− 5.33
2½	"	3	78	− 4.83

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NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
2½	75	½	79	− 1.55
2½	"	1	79	− 1.38
2½	"	1½	79	− 0.98
2½	"	2	80	− 0.84
2½	100	½	84	6.37
2½	"	1	83	4.55
2½	"	1½	82	4.01
2½	"	2	82	3.44
2½	150	½	98	23.4
2½	"	1	91	18.1
2½	"	1½	88	14.7
2½	"	2	86	12.6
2½	"	2½	84	10.2
2½	200	½	107	42.3
2½	"	1	98	32.5
2½	"	1½	94	26.4
2½	"	2	91	22.6
2½	"	2½	87	18.3
2½	250	½	119	63.1
2½	"	1	108	48.3
2½	"	1½	100	39.2
2½	"	2	96	33.5
2½	"	2½	91	27.1
2½	300	½	131	86.2
2½	"	1	117	65.7
2½	"	1½	107	53.2
2½	"	2	101	45.5
2½	"	2½	95	36.7
2½	"	3	93	33.6
2½	350	½	143	112.
2½	"	1	125	84.8
2½	"	1½	114	68.5
2½	"	2	107	58.5
2½	"	2½	99	47.2
2½	"	3	93	39.3
2½	400	½	121	83.3
2½	"	1	113	72.7
2½	"	1½	103	58.6
2½	"	2	98	48.8
2½	"	2½	93	43.9
3	0	½	74	−13.2
3	"	1	76	−11.0
3	"	1½	77	− 9.64
3	"	2	77	− 8.64
3	"	2½	78	− 8.03
3	"	3	78	− 7.72
3	25	½	74	−12.3
3	"	1	76	− 9.24
3	"	1½	77	− 7.70
3	"	2	78	− 6.77
3	"	2½	78	− 6.07
3	"	3	78	− 5.87
3	50	½	73	−12.1
3	"	1	75	− 9.23
3	"	1½	77	− 6.41
3	"	2	77	− 6.41
3	"	2½	78	− 5.13
3	"	3	79	− 4.59
3	75	½	79	− 2.06
3	"	1	79	− 1.58
3	"	1½	80	− 1.09
3	"	2	80	− 1.00
3	100	½	83	6.45
3	"	1	83	6.45
3	"	1½	82	4.47
3	"	2	82	4.47
3	"	2½	81	3.57
3	150	½	98	31.1
3	"	1	91	23.7
3	"	1½	87	18.4
3	"	2	87	16.4
3	"	2½	85	13.1

NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
3	200	½	120	74.7
3	"	1	108	58.7
3	"	1½	102	48.6
3	"	2	96	35.0
3	"	2½	98	34.1
3	250	½	132	102.
3	"	1	117	77.1
3	"	1½	108	63.2
3	"	2	99	47.6
3	"	2½	94	39.5
3	"	3	91	34.7
3	300	½	144	132.
3	"	1	127	98.5
3	"	1½	116	81.4
3	"	2	104	61.0
3	"	2½	97	50.7
3	"	3	94	44.5
3	"	3½	91	39.8
3	400	½	124	101.
3	"	1	109	75.6
3	"	1½	101	63.8
3	"	2	97	55.3
3	"	2½	94	49.5
3½	0	½	73	−18.4
3½	"	1	75	−13.1
3½	"	1½	77	−10.5
3½	"	2	77	− 9.43
3½	25	½	75	−11.5
3½	"	1	75	−11.5
3½	"	1½	77	− 9.20
3½	"	2	78	− 7.68
3½	"	2½	78	− 6.84
3½	50	½	73	−12.1
3½	"	1	75	− 9.23
3½	"	1½	77	− 6.41
3½	"	2	77	− 6.41
3½	"	2½	78	− 5.13
3½	"	3	79	− 4.59
3½	75	½	79	− 2.06
3½	"	1	79	− 1.58
3½	"	1½	80	− 1.09
3½	"	2	80	− 1.00
3½	100	½	83	6.45
3½	"	1	83	6.45
3½	"	1½	82	4.47
3½	"	2	82	4.47
3½	"	2½	81	3.57
3½	150	½	98	31.1
3½	"	1	91	23.7
3½	"	1½	87	18.4
3½	"	2	87	16.4
3½	"	2½	85	13.1

NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., F	BTU
4	200	½	132	83.3
4	"	1	120	63.1
4	"	1½	113	53.6
4	"	2	107	43.6
4	"	2½	103	38.1
4	"	3	99	34.3
4	250	½	145	143.
4	"	1	127	111.
4	"	1½	119	94.1
4	"	2	108	76.1
4	"	2½	101	66.5
4	"	3	98	58.7
4	300	½	158	183.
4	"	1	138	141.
4	"	1½	128	119.
4	"	2	118	96.7
4	"	2½	111	85.3
4	"	3	107	75.3
4	"	3½	103	69.6
4	"	4	99	63.9
4	400	½	135	94.7
4	"	1	115	69.7
4	"	1½	105	56.3
4	"	2	97	43.4
4	"	2½	93	37.3
4	"	3	90	33.9
4	"	3½	87	30.8
4	"	4	85	28.2
4	500	½	166	146.
4	"	1	140	104.
4	"	1½	128	85.8
4	"	2	118	70.3
4	"	2½	111	61.8
4	"	3	106	55.2
4	"	3½	102	50.1
4	"	4	98	45.8
4	600	½	196	209.
4	"	1	164	148.
4	"	1½	150	122.
4	"	2	138	100.
4	"	2½	130	88.1
4	"	3	124	79.1
4	"	3½	119	72.4
4	"	4	115	66.8
4	700	½	226	272.
4	"	1	189	192.
4	"	1½	173	159.
4	"	2	159	131.
4	"	2½	150	116.
4	"	3	143	104.
4	"	3½	137	94.9
4	"	4	132	87.1
4	800	½	256	337.
4	"	1	214	238.
4	"	1½	196	198.
4	"	2	180	165.
4	"	2½	170	147.
4	"	3	162	132.
4	"	3½	155	121.
4	"	4	150	111.

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NOM. PIPE SIZE INCHES	PIPE TEMPERATURE, F	NOM. THICKNESS INCHES	OUTSIDE SURF. TEMP., F	BTU

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NOM. PIPE SIZE (INCHES)	PIPE TEMPERATURE, °F	NOM. THICKNESS (INCHES)	OUTSIDE SURF. TEMP., °F	BTU
1/2	50	1/2	72	24.6
		1	72	13.5
		2	72	10.0
	100	1/2	77	63.5
		1	77	36.6
		2	77	29.4
	150	1/2	82	103.
		1	82	59.9
		2	82	43.7
	200	1/2	87	144.
		1	87	83.3
		2	87	60.4
	250	1/2	92	186.
		1	92	107.
		2	92	78.2
	300	1/2	97	231.
		1	97	134.
		2	97	97.0
	350	1/2	102	278.
		1	102	161.
		2	102	117.
	400	1/2	107	326.
		1	107	189.
		2	107	137.
	450	1/2	112	375.
		1	112	217.
		2	112	158.
3/4	50	1/2	72	30.5
		1	72	16.7
		2	72	12.4
	100	1/2	77	78.7
		1	77	45.5
		2	77	36.4
	150	1/2	82	127.
		1	82	74.3
		2	82	54.2
	200	1/2	87	179.
		1	87	103.
		2	87	74.9
	250	1/2	92	230.
		1	92	133.
		2	92	97.0
	300	1/2	97	287.
		1	97	166.
		2	97	121.
	350	1/2	102	344.
		1	102	200.
		2	102	145.
	400	1/2	107	402.
		1	107	234.
		2	107	170.
	450	1/2	112	460.
		1	112	268.
		2	112	195.
1	50	1/2	72	37.7
		1	72	20.6
		2	72	15.3
	100	1/2	77	97.3
		1	77	56.2
		2	77	45.0
	150	1/2	82	157.
		1	82	91.8
		2	82	67.0
	200	1/2	87	221.
		1	87	128.
		2	87	92.6
	250	1/2	92	285.
		1	92	165.
		2	92	120.
	300	1/2	97	355.
		1	97	205.
		2	97	150.
	350	1/2	102	425.
		1	102	247.
		2	102	180.
	400	1/2	107	497.
		1	107	289.
		2	107	210.
	450	1/2	112	569.
		1	112	331.
		2	112	241.
1 1/4	50	1/2	72	46.9
		1	72	25.6
		2	72	19.0
	100	1/2	77	121.
		1	77	69.9
		2	77	55.9
	150	1/2	82	195.
		1	82	114.
		2	82	83.3
	200	1/2	87	275.
		1	87	159.
		2	87	115.
	250	1/2	92	354.
		1	92	205.
		2	92	149.
	300	1/2	97	441.
		1	97	255.
		2	97	186.
	350	1/2	102	528.
		1	102	307.
		2	102	224.
	400	1/2	107	617.
		1	107	359.
		2	107	261.
	450	1/2	112	707.
		1	112	411.
		2	112	299.
1 1/2	50	1/2	72	54.2
		1	72	29.6
		2	72	21.9
	100	1/2	77	140.
		1	77	80.8
		2	77	64.5
	150	1/2	82	226.
		1	82	132.
		2	82	96.2
	200	1/2	87	318.
		1	87	184.
		2	87	133.
	250	1/2	92	410.
		1	92	237.
		2	92	172.
	300	1/2	97	510.
		1	97	295.
		2	97	215.
	350	1/2	102	611.
		1	102	355.
		2	102	259.
	400	1/2	107	713.
		1	107	415.
		2	107	302.
	450	1/2	112	817.
		1	112	475.
		2	112	346.
2	50	1/2	72	73.2
		1	72	40.0
		2	72	29.6
	100	1/2	77	189.
		1	77	109.
		2	77	87.0
	150	1/2	82	305.
		1	82	178.
		2	82	130.
	200	1/2	87	430.
		1	87	248.
		2	87	180.
	250	1/2	92	554.
		1	92	320.
		2	92	233.
	300	1/2	97	689.
		1	97	398.
		2	97	290.
	350	1/2	102	825.
		1	102	479.
		2	102	349.
	400	1/2	107	963.
		1	107	560.
		2	107	408.
	450	1/2	112	1104.
		1	112	642.
		2	112	467.
2 1/2	50	1/2	72	90.5
		1	72	49.5
		2	72	36.6
	100	1/2	77	234.
		1	77	135.
		2	77	108.
	150	1/2	82	378.
		1	82	220.
		2	82	161.
	200	1/2	87	532.
		1	87	307.
		2	87	223.
	250	1/2	92	686.
		1	92	396.
		2	92	289.
	300	1/2	97	853.
		1	97	493.
		2	97	359.
	350	1/2	102	1021.
		1	102	593.
		2	102	432.
	400	1/2	107	1192.
		1	107	693.
		2	107	505.
	450	1/2	112	1366.
		1	112	794.
		2	112	578.
3	50	1/2	72	103.
		1	72	56.6
		2	72	41.8
	100	1/2	77	268.
		1	77	155.
		2	77	123.
	150	1/2	82	433.
		1	82	252.
		2	82	184.
	200	1/2	87	609.
		1	87	352.
		2	87	256.
	250	1/2	92	785.
		1	92	453.
		2	92	330.
	300	1/2	97	977.
		1	97	564.
		2	97	411.
	350	1/2	102	1168.
		1	102	679.
		2	102	494.
	400	1/2	107	1364.
		1	107	793.
		2	107	578.
	450	1/2	112	1563.
		1	112	909.
		2	112	662.
3 1/2	50	1/2	72	116.
		1	72	63.9
		2	72	47.2
	100	1/2	77	303.
		1	77	175.
		2	77	139.
	150	1/2	82	490.
		1	82	284.
		2	82	208.
	200	1/2	87	688.
		1	87	398.
		2	87	289.
	250	1/2	92	887.
		1	92	512.
		2	92	373.
	300	1/2	97	1104.
		1	97	637.
		2	97	464.
	350	1/2	102	1321.
		1	102	767.
		2	102	558.
	400	1/2	107	1542.
		1	107	896.
		2	107	653.
	450	1/2	112	1767.
		1	112	1027.
		2	112	748.
4	50	1/2	72	129.
		1	72	71.0
		2	72	52.4
	100	1/2	77	337.
		1	77	194.
		2	77	154.
	150	1/2	82	545.
		1	82	315.
		2	82	231.
	200	1/2	87	764.
		1	87	442.
		2	87	321.
	250	1/2	92	985.
		1	92	569.
		2	92	414.
	300	1/2	97	1227.
		1	97	708.
		2	97	516.
	350	1/2	102	1468.
		1	102	852.
		2	102	620.
	400	1/2	107	1713.
		1	107	996.
		2	107	726.
	450	1/2	112	1963.
		1	112	1141.
		2	112	831.
5	50	1/2	72	154.
		1	72	85.2
		2	72	62.9
	100	1/2	77	405.
		1	77	233.
		2	77	185.
	150	1/2	82	654.
		1	82	378.
		2	82	277.
	200	1/2	87	917.
		1	87	530.
		2	87	385.
	250	1/2	92	1182.
		1	92	683.
		2	92	497.
	300	1/2	97	1472.
		1	97	850.
		2	97	619.
	350	1/2	102	1762.
		1	102	1022.
		2	102	744.
	400	1/2	107	2056.
		1	107	1195.
		2	107	871.
	450	1/2	112	2356.
		1	112	1369.
		2	112	997.
6	50	1/2	72	179.
		1	72	99.4
		2	72	73.4
	100	1/2	77	472.
		1	77	272.
		2	77	216.
	150	1/2	82	763.
		1	82	441.
		2	82	323.
	200	1/2	87	1070.
		1	87	618.
		2	87	449.
	250	1/2	92	1379.
		1	92	797.
		2	92	580.
	300	1/2	97	1718.
		1	97	992.
		2	97	722.
	350	1/2	102	2056.
		1	102	1193.
		2	102	868.
	400	1/2	107	2399.
		1	107	1394.
		2	107	1016.
	450	1/2	112	2749.
		1	112	1598.
		2	112	1163.
8	50	1/2	72	230.
		1	72	127.
		2	72	94.2
	100	1/2	77	606.
		1	77	349.
		2	77	277.
	150	1/2	82	980.
		1	82	566.
		2	82	415.
	200	1/2	87	1374.
		1	87	793.
		2	87	577.
	250	1/2	92	1771.
		1	92	1023.
		2	92	744.
	300	1/2	97	2206.
		1	97	1274.
		2	97	927.
	350	1/2	102	2640.
		1	102	1525.
		2	102	1109.
	400	1/2	107	3080.
		1	107	1779.
		2	107	1294.
	450	1/2	112	3529.
		1	112	2038.
		2	112	1482.
10	50	1/2	72	287.
		1	72	159.
		2	72	118.
	100	1/2	77	757.
		1	77	436.
		2	77	346.
	150	1/2	82	1224.
		1	82	707.
		2	82	518.
	200	1/2	87	1716.
		1	87	991.
		2	87	721.
	250	1/2	92	2212.
		1	92	1278.
		2	92	929.
	300	1/2	97	2756.
		1	97	1592.
		2	97	1158.
	350	1/2	102	3298.
		1	102	1905.
		2	102	1386.
	400	1/2	107	3847.
		1	107	2222.
		2	107	1616.
	450	1/2	112	4408.
		1	112	2546.
		2	112	1852.
12	50	1/2	72	344.
		1	72	191.
		2	72	141.
	100	1/2	77	907.
		1	77	523.
		2	77	415.
	150	1/2	82	1466.
		1	82	847.
		2	82	621.
	200	1/2	87	2056.
		1	87	1187.
		2	87	864.
	250	1/2	92	2650.
		1	92	1531.
		2	92	1113.
	300	1/2	97	3302.
		1	97	1907.
		2	97	1387.
	350	1/2	102	3951.
		1	102	2282.
		2	102	1660.
	400	1/2	107	4608.
		1	107	2662.
		2	107	1936.
	450	1/2	112	5280.
		1	112	3050.
		2	112	2218.
14	50	1/2	72	401.
		1	72	223.
		2	72	164.
	100	1/2	77	1057.
		1	77	610.
		2	77	484.
	150	1/2	82	1708.
		1	82	987.
		2	82	724.
	200	1/2	87	2396.
		1	87	1384.
		2	87	1007.
	250	1/2	92	3089.
		1	92	1784.
		2	92	1297.
	300	1/2	97	3849.
		1	97	2222.
		2	97	1617.
	350	1/2	102	4605.
		1	102	2659.
		2	102	1935.
	400	1/2	107	5370.
		1	107	3101.
		2	107	2257.
	450	1/2	112	6154.
		1	112	3554.
		2	112	2586.
16	50	1/2	72	459.
		1	72	255.
		2	72	188.
	100	1/2	77	1209.
		1	77	698.
		2	77	554.
	150	1/2	82	1953.
		1	82	1128.
		2	82	828.
	200	1/2	87	2740.
		1	87	1583.
		2	87	1152.
	250	1/2	92	3533.
		1	92	2040.
		2	92	1484.
	300	1/2	97	4402.
		1	97	2542.
		2	97	1849.
	350	1/2	102	5267.
		1	102	3041.
		2	102	2213.
	400	1/2	107	6142.
		1	107	3547.
		2	107	2581.
	450	1/2	112	7038.
		1	112	4065.
		2	112	2958.
18	50	1/2	72	516.
		1	72	287.
		2	72	211.
	100	1/2	77	1360.
		1	77	785.
		2	77	623.
	150	1/2	82	2197.
		1	82	1269.
		2	82	931.
	200	1/2	87	3081.
		1	87	1780.
		2	87	1296.
	250	1/2	92	3974.
		1	92	2295.
		2	92	1669.
	300	1/2	97	4951.
		1	97	2860.
		2	97	2080.
	350	1/2	102	5924.
		1	102	3421.
		2	102	2489.
	400	1/2	107	6907.
		1	107	3990.
		2	107	2903.
	450	1/2	112	7915.
		1	112	4572.
		2	112	3327.
20	50	1/2	72	573.
		1	72	319.
		2	72	234.
	100	1/2	77	1511.
		1	77	872.
		2	77	692.
	150	1/2	82	2441.
		1	82	1410.
		2	82	1035.
	200	1/2	87	3423.
		1	87	1977.
		2	87	1440.
	250	1/2	92	4415.
		1	92	2550.
		2	92	1855.
	300	1/2	97	5501.
		1	97	3178.
		2	97	2311.
	350	1/2	102	6582.
		1	102	3801.
		2	102	2766.
	400	1/2	107	7674.
		1	107	4433.
		2	107	3226.
	450	1/2	112	8795.
		1	112	5080.
		2	112	3697.
24	50	1/2	72	688.
		1	72	383.
		2	72	281.
	100	1/2	77	1813.
		1	77	1047.
		2	77	831.
	150	1/2	82	2929.
		1	82	1692.
		2	82	1242.
	200	1/2	87	4107.
		1	87	2372.
		2	87	1728.
	250	1/2	92	5298.
		1	92	3060.
		2	92	2226.
	300	1/2	97	6601.
		1	97	3813.
		2	97	2773.
	350	1/2	102	7898.
		1	102	4561.
		2	102	3319.
	400	1/2	107	9209.
		1	107	5319.
		2	107	3871.
	450	1/2	112	10554.
		1	112	6096.
		2	112	4436.

AIR-CONDITIONING

APPLICATION SPECIFICATIONS

Johns-Manville offers detailed "Insulation Specification" sheets for Micro-Lok Pipe Insulation, written in accordance with climatic conditions, design preferences and installation techniques or practices prevailing in various regions of the country. They're available from the local J-M representative or from J-M sales offices.

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