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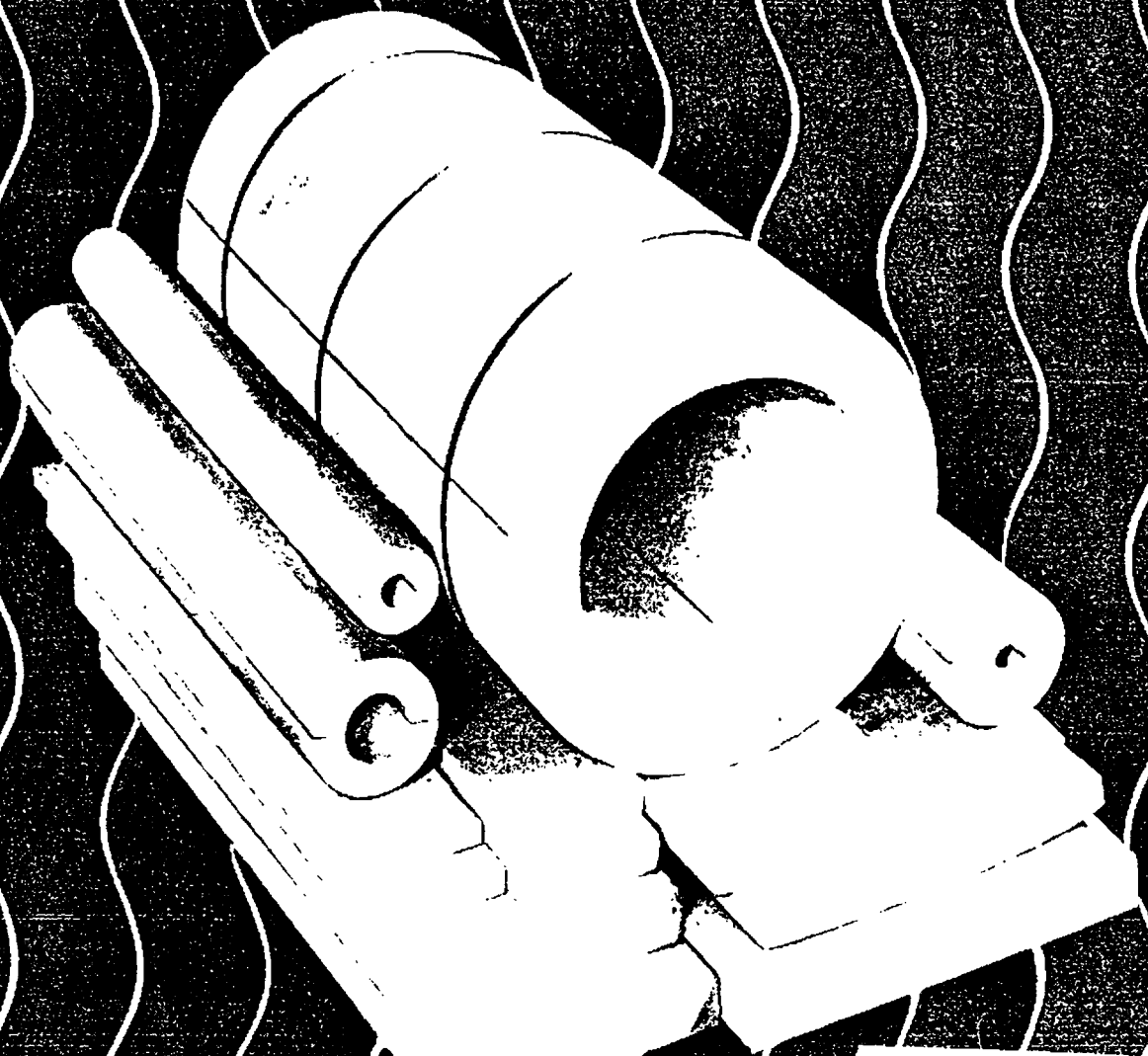
DATE: 0000

DOC#: OC046

DOCUMENT DESCRIPTION: Sales Literature

1953 TO 4/58

for temperatures up to 1200° F.



PLAINTIFF'S EXHIBIT
OCF-43

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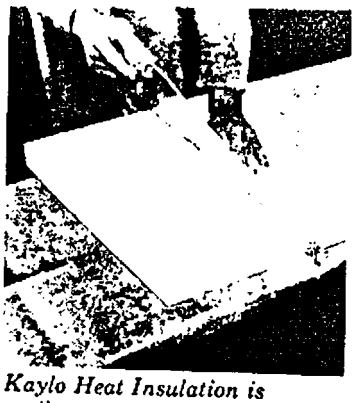
OWENS-CORNING FIBERGLAS

OWENS-CORNING FIBERGLAS CORPORATION

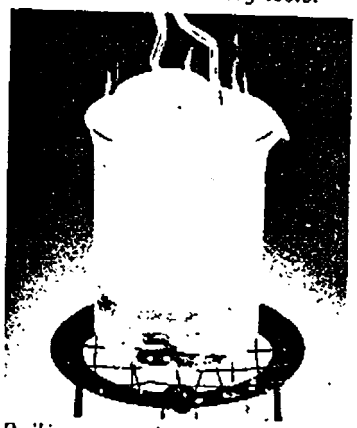
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KAYLO

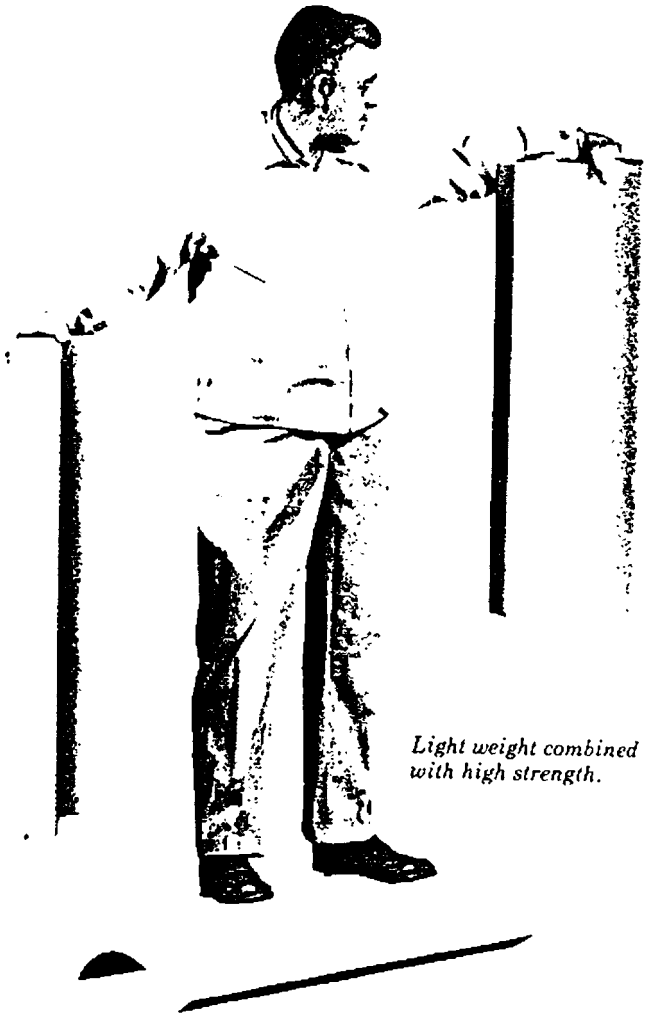
HEAT INSULATION



Kaylo Heat Insulation is easily cut with ordinary tools.



Boiling water does not break it down.



Light weight combined with high strength.

KAYLO®

HEAT INSULATION

HYDROUS CALCIUM SILICATE

Kaylo Heat Insulation is made of a chemical compound of lime and silica developed by Owens-Illinois Glass Company. Although not glass, it is made of materials similar to those used in glass, and with which Owens-Illinois has had long experience. The technical name is hydrous calcium silicate. Since it is a chemically reacted material, it contains no added binder. For mechanical effects, a small amount of asbestos fiber is included at the time of manufacture.

Few materials have been so thoroughly tested. Owens-Illinois began work on hydrous calcium silicates in 1938, but no material was offered to the general market until 1943. Thousands of installations since that time havo proved field superiority, yet research and product development are still continuing.

Kaylo Heat Insulation is made both as block and as molded pipe insulation, with the widest range of sizes, forms and thicknesses of any high temperature insulation available. Kaylo hydrous calcium silicate combines the most desirable physical characteristics of heat insulating materials to a degree not equalled by other materials on the market. This means outstanding performance and economical application for the user.

PERFORMANCE

Kaylo Heat Insulation is *effective up to 1200°F.*, performing efficiently on temperatures through the hot water and low pressure steam range and also through temperatures in the super-heated steam range. Therefore, a single material can be used for high temperatures which usually require combinations of two different insulating materials.

The *low coefficient of conductivity*, or "k", of Kaylo Heat Insulation places it among the most efficient insulations for temperatures up to 1200°F. (The name "Kaylo" is derived from the fact that "k" is low for the material.) Its high insulation value comes from the extremely small pore structure. So small and numerous are its insulating air spaces that they present a material internal surface of approximately 100 acres per cubic foot of insulation.

Water does not break down Kaylo Heat Insulation. Even when saturated, it retains an appreciable percentage of its strength. After being soaked for long periods of time and then dried, it returns to its original thermal efficiency and strength, without apparent shrinking or warping.

Kaylo Heat Insulation is effective after long service. It remains strong and efficient over the years and shows little shrinkage after exposure to temperatures up to 1200°F.

APPLICATION

With a weight of only *11 pounds per cubic foot*, handling, shipping and application are simplified.

Kaylo Heat Insulation has flexural strength, compressive *strength and resistance to abrasion far above normal requirements* for heat insulation. Breakage during installation, therefore, is usually negligible.

Block or pipe insulation *can be cut, scored or sawed with ordinary tools* of the trade. The material is *non-irritating to the skin* and non-toxic.

PHYSICAL CHARACTERISTICS

DENSITY.....Approximately 11 lb. per cu. ft.

FLEXURAL STRENGTH.....50 lb. per sq. in.

COMPRESSIVE STRENGTH (at 5% deformation)

Before heating.....150 lb. per sq. in.
After heating for 24 hours
- at 750° F.....144 lb. per sq. in.
- at 1000° F.....123 lb. per sq. in.
- at 1200° F.....117 lb. per sq. in.

After boiling for 24 hours (while wet).....74 lb. per sq. in.

LOSS IN WEIGHT

After heating for 24 hours
- at 750° F.....5.5%
- at 1000° F.....7.9%
- at 1200° F.....9.8%

After boiling for 24 hours (after drying)..0.2%

RESISTANCE TO ABRASION

(Conventional tumbling test-loss in weight after 10 minutes)
Before heating.....2.2%
After heating for 24 hours
- at 750° F.....3.7%
- at 1000° F.....5.7%
- at 1200° F.....6.9%

DIMENSIONAL STABILITY

Linear shrinkage after heating for 24 hours
- at 750° F.....0.8%
- at 100° F.....0.9%
- at 1200° F.....1.5%

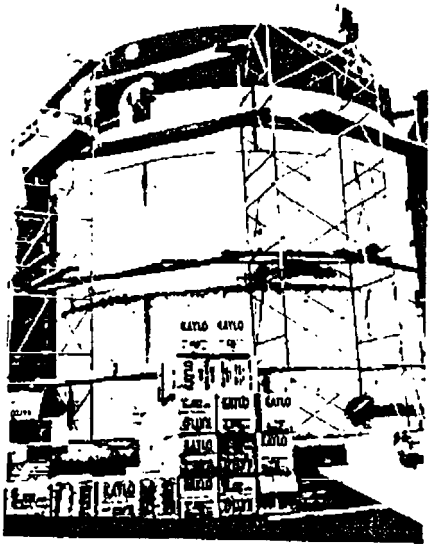
Elongation after saturation (max.).....0.04%

MOISTURE ADSORPTION (volume)

After 6 hours exposure in atmosphere of 120° F. and 90% Relative Humidity...0.9%

CONDUCTIVITY (K)

At 100° F. mean temperature.....0.35
At 500° F. mean temperature.....0.54

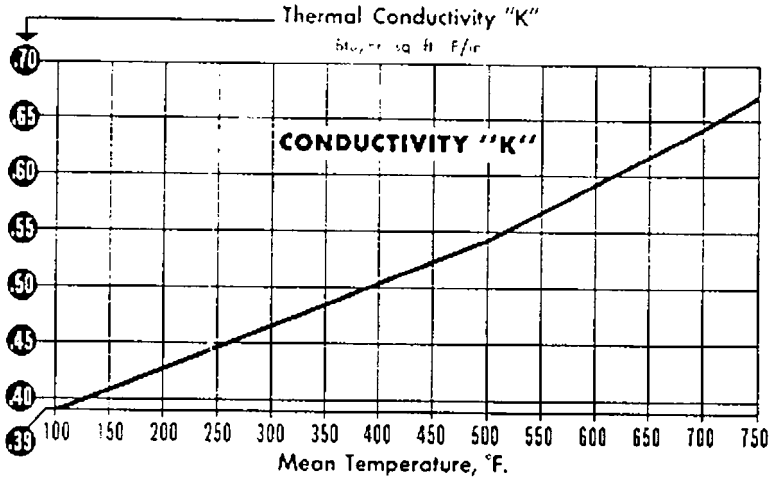


Applicators like its light weight and good "handleability".

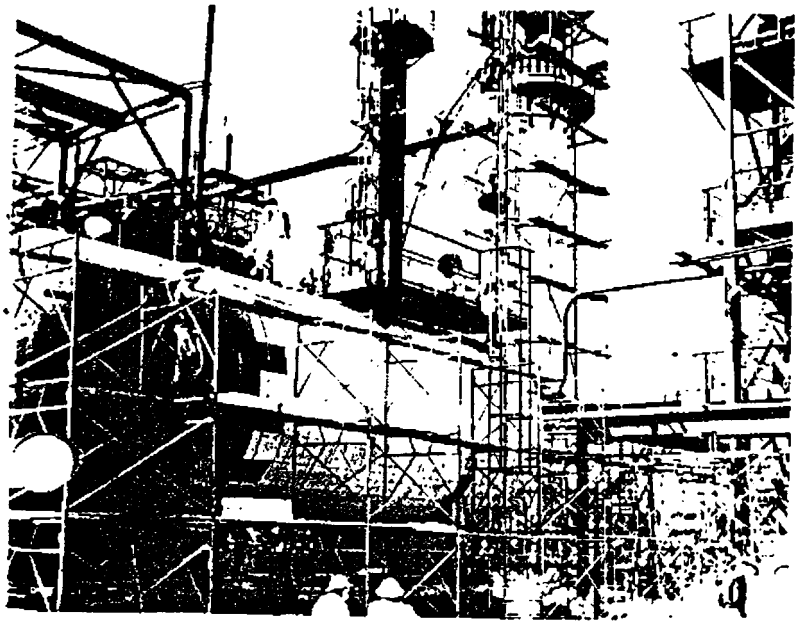
TYPICAL APPLICATIONS

Inside or outside, for temperatures up to 1200°F., Kaylo Heat Insulation is used for such equipment as:

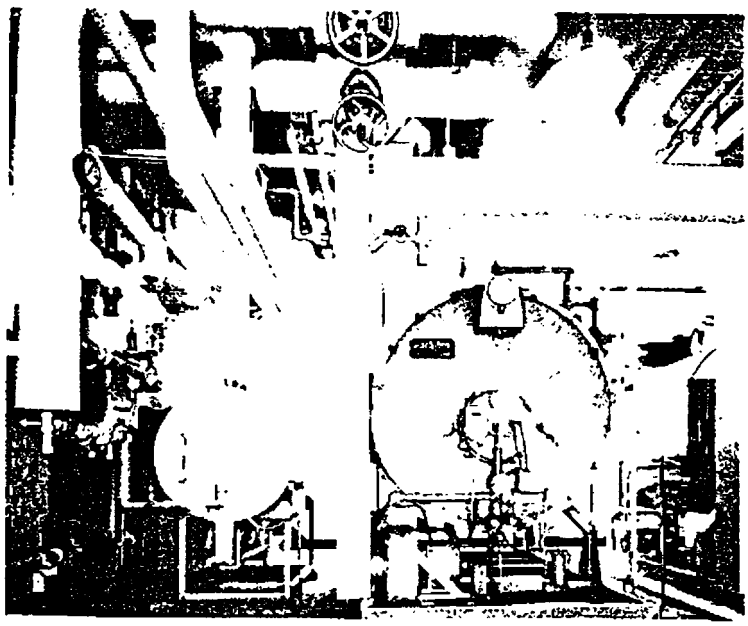
Autoclaves	Kilns
Boilers	Lehrs
Breechings	Locomotives
Chilling Pits	Ovens
Condensers	Precipitators
Dryers	Process Equipment
Evaporators	Steam Lines
Furnaces	Tanks
Heat Exchangers	Towers
Hot Air Ducts	Turbines
	Vessels



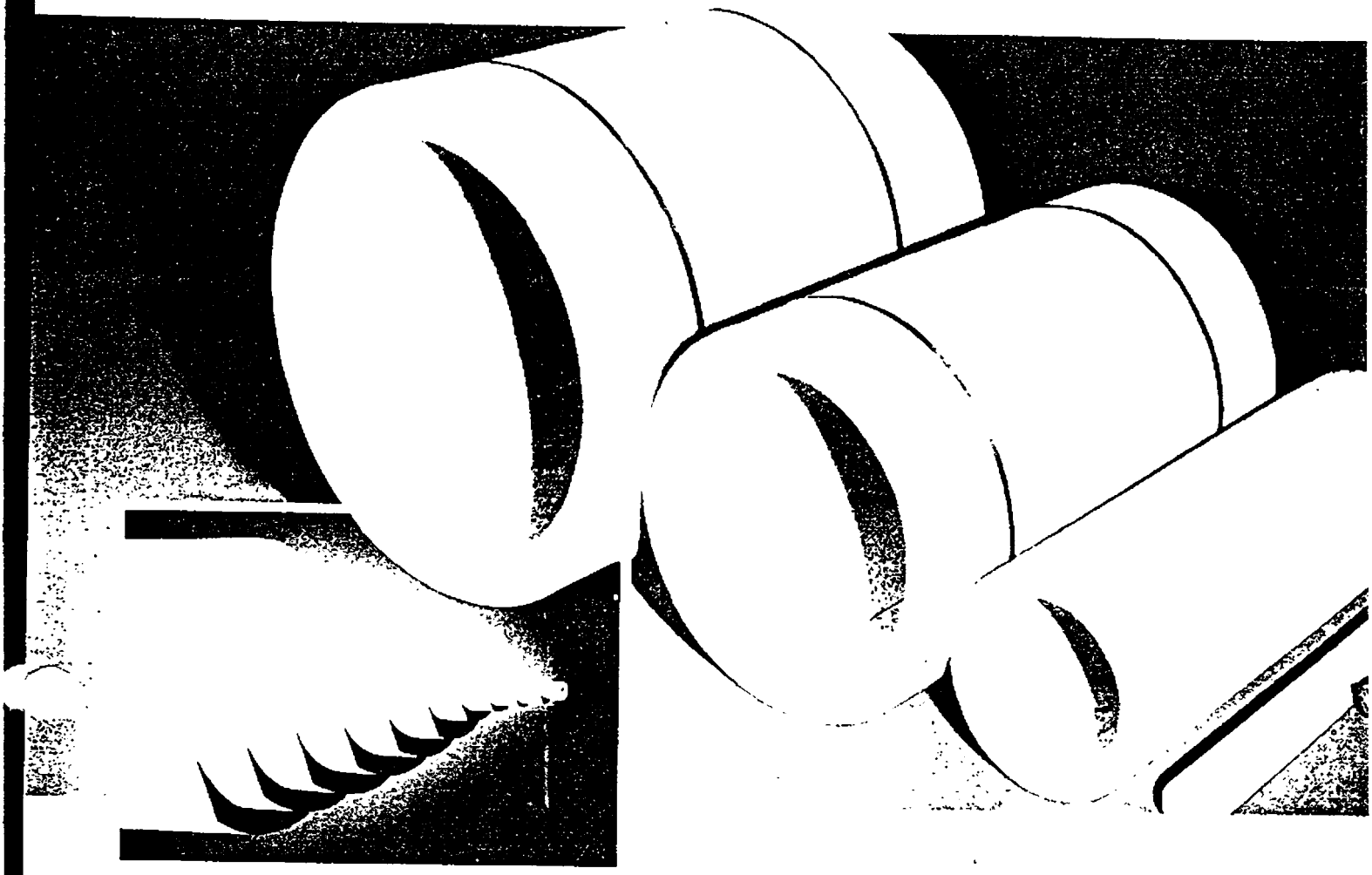
Strength of material and large units mean more economical application, less waste.



The smooth surfaces and straight edges of the material help make a neat finished job.



KAYLO PIPE INSULATION



Kaylo Pipe Insulation reduces inventory requirements because of two features — its wide effective temperature range (up to 1200°F.) and its Simplified Dimensional Standards, which allow nesting.

Kaylo Pipe Insulation is produced in Simplified Dimensional Standards of thicknesses and diameters for pipe sizes from ½" to 23". O. D.'s of insulation correspond to O. D.'s of standard pipes, assuring proper fit for each pipe size and for nesting, when necessary. With this system of snug nesting, Kaylo Pipe Insulation fits all operating conditions, requires less items — reduces maintenance stock.

Where plant operating economics demand greater insulation thicknesses, consult detailed data in Kaylo Information Files.

Unshaded = *surface temp. under 140 F*
Light Shaded = *surface temp. 140 F to 145 F*
Heavy Shaded = *surface temp. 145 F to 150 F*

Note that shading indicates different surface temperatures.

NOMINAL PIPE SIZE—IN.	TEMP. DIFFERENCE—HOT SURFACE TO AIR, DEG. F.										
	200	300	400	500	600	700	800	900	1000	1100	1200
½	1	1	1	1½	1½	1½	2	2	2½	3	3
¾	1	1	1	1½	1½	1½	2	2	2½	3	3
1	1	1	1	1½	1½	1½	2	2	2½	3	3
1¼	1	1	1	1½	1½	2	2	2½	2½	3	3
1½	1	1	1	1½	1½	2	2½	2½	3	3	3
2	1	1	1½	1½	2	2	2½	2½	3	3	3
2½	1	1	1½	1½	2	2½	2½	3	3	3	3½
3	1	1	1½	1½	2	2½	2½	3	3	3½	3½
3½	1	1	1½	2	2	2½	3	3	3½	4	4
4	1	1	1½	2	2	2½	3	3	3½	4	4
6	1½	1½	1½	2	2	2½	3	3	3½	4	4
8	1½	1½	1½	2	2	2½	3	3½	3½	4	4½
10	1½	1½	1½	2	2	2½	3	3½	4	4	4½
12	1½	1½	1½	2	2½	3	3	3½	4	4½	5
14	1½	1½	1½	2	2½	3	3	3½	4	4½	5
16	1½	1½	1½	2	2½	3	3	3½	4	4½	5
18 to 72	1½	1½	1½	2	2½	3	3	3½	4	4½	5

Standard sizes, thicknesses and forms:

Kaylo Pipe Insulation is available as a standard item in sectional and tri-segmental forms and in thicknesses through 3".

Red lines below show equal O.D. for selection of nesting sizes in conformance with *Simplified Practice Recommendation R-40-41, Dimensional Standards.*

NOMINAL PIPE SIZE	PIPE O.D.	NOMINAL THICKNESS OF INSULATION																	
		1		1½		2		2½		3		3½		4		4½		5	
		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.
½	.84	1.00	2.88	1.56	4.00	2.06	5.00	2.35	5.56	2.88	6.63								
¾	1.05	.90	2.88	1.46	4.00	1.96	5.00	2.24	5.56	2.77	6.63								
1	1.32	1.08	3.50	1.58	4.50	2.11	5.56	2.64	6.63	3.14	7.63								
1¼	1.66	.99	3.50	1.40	4.50	1.94	5.56	2.47	6.63	2.97	7.63								
1½	1.90	1.03	4.00	1.58	5.00	1.82	5.56	2.35	6.63	2.85	7.63								
2	2.38	1.03	4.50	1.56	5.56	2.09	6.63	2.59	7.63	3.09	8.63	3.59	9.63	4.16	10.75	4.66	11.75	5.16	12.75
2½	2.88	1.08	5.00	1.31	5.56	1.84	6.63	2.34	7.63	2.84	8.63	3.34	9.63	3.91	10.75	4.41	11.75	4.91	12.75
3	3.50	1.00	5.56	1.53	6.63	2.03	7.63	2.53	8.63	3.03	9.63	3.59	10.75	4.09	11.75	4.59	12.75	5.22	14.00
3½	4.00	.75	5.56	1.28	6.63	1.78	7.63	2.28	8.63	2.78	9.63	3.34	10.75	3.84	11.75	4.34	12.75	4.97	14.00
4	4.50	1.03	6.63	1.53	7.63	2.03	8.63	2.53	9.63	3.09	10.75	3.59	11.75	4.09	12.75	4.72	14.00	5.22	15.00
4½	5.00	.78	6.63	1.28	7.63	1.78	8.63	2.28	9.63	2.84	10.75	3.34	11.75	3.84	12.75	4.47	14.00	4.97	15.00
5	5.56	1.00	7.63	1.50	8.63	2.00	9.63	2.66	10.75	3.06	11.75	3.66	12.75	4.19	14.00	4.69	15.00	5.19	16.00
6	6.63	.94	8.63	1.44	9.63	2.00	10.75	2.50	11.75	3.00	12.75	3.63	14.00	4.13	15.00	4.63	16.00	5.13	17.00
7	7.63			1.50	10.75	2.00	11.75	2.50	12.75	3.13	14.00	3.63	15.00	4.13	16.00	4.63	17.00	5.13	18.00
8	8.63			1.50	11.75	2.00	12.75	2.63	14.00	3.13	15.00	3.63	16.00	4.13	17.00	4.63	18.00	5.13	19.00
9	9.63			1.50	12.75	2.13	14.00	2.63	15.00	3.13	16.00	3.63	17.00	4.13	18.00	4.63	19.00	5.13	20.00
10	10.75			1.56	14.00	2.06	15.00	2.56	16.00	3.06	17.00	3.56	18.00	4.06	19.00	4.56	20.00	5.06	21.00
11	11.75			1.66	15.00	2.06	16.00	2.56	17.00	3.06	18.00	3.56	19.00	4.06	20.00	4.56	21.00	5.06	22.00
12	12.75			1.55	16.00	2.05	17.00	2.55	18.00	3.05	19.00	3.65	20.00	4.05	21.00	4.55	22.00	5.05	23.00
14	14.00			1.42	17.00	1.92	18.00	2.42	19.00	2.92	20.00	3.42	21.00	3.92	22.00	4.42	23.00	4.92	24.00
15	15.00			1.42	18.00	1.92	19.00	2.42	20.00	2.92	21.00	3.42	22.00	3.92	23.00	4.42	24.00	4.92	25.00
16	16.00			1.41	19.00	1.91	20.00	2.41	21.00	2.91	22.00	3.41	23.00	3.91	24.00	4.41	25.00	4.91	26.00
17	17.00			1.41	20.00	1.91	21.00	2.41	22.00	2.91	23.00	3.41	24.00	3.91	25.00	4.41	26.00		
18	18.00			1.41	21.00	1.91	22.00	2.41	23.00	2.91	24.00	3.41	25.00	3.91	26.00				
19	19.00			1.41	22.00	1.91	23.00	2.41	24.00	2.91	25.00	3.41	26.00						
20	20.00			1.41	23.00	1.91	24.00	2.41	25.00	2.91	26.00								
21	21.00			1.41	24.00	1.91	25.00	2.41	26.00										
22	22.00			1.41	25.00	1.91	26.00												
23	23.00			1.41	26.00														

SINGLE LAYER ONLY

SINGLE OR DOUBLE LAYER

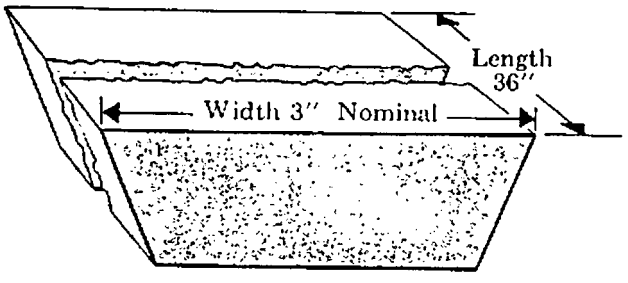
MULTIPLE LAYER ONLY

FORMS

SECTIONAL

TRI-SEGMENT

KAYLO



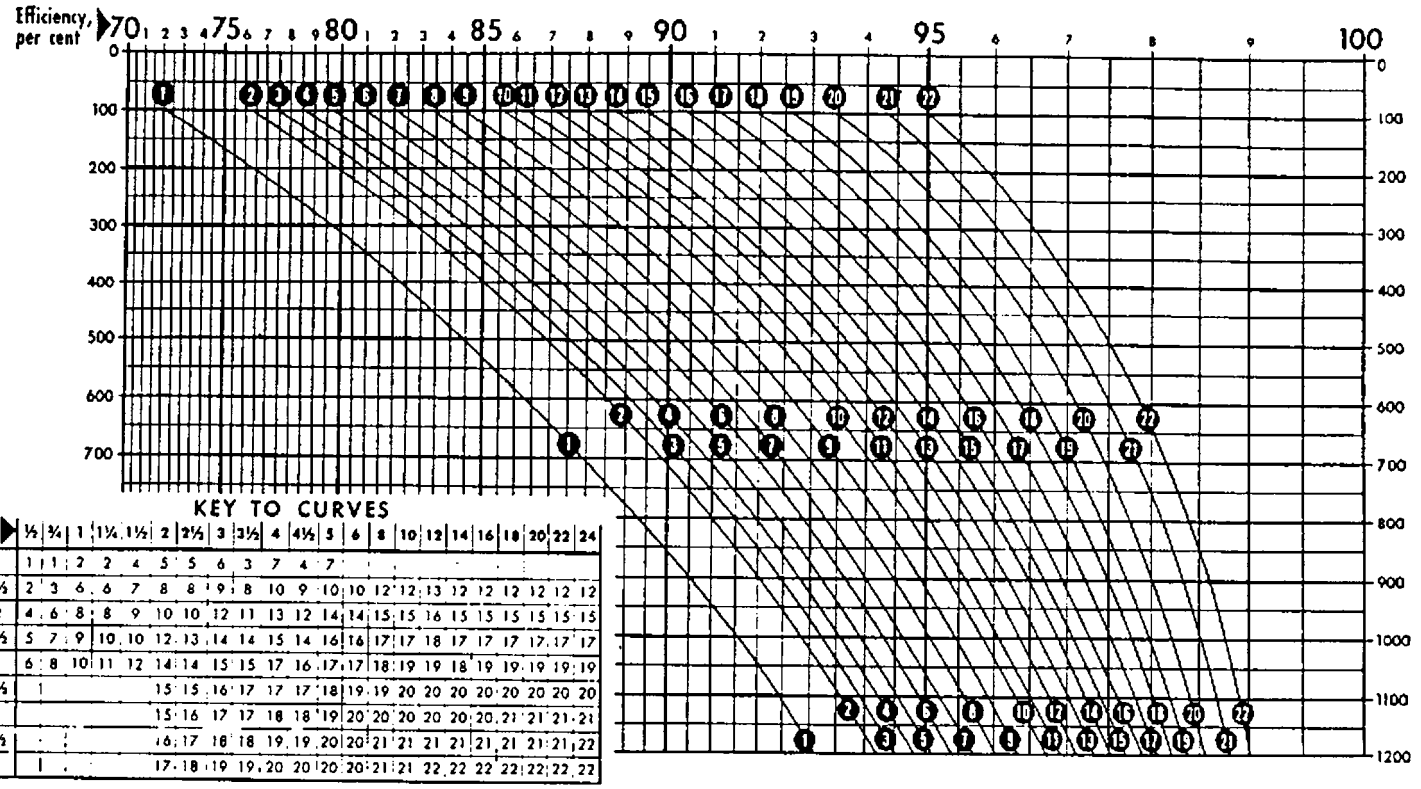
BEVELED LAGS

For pipe sizes greater than those indicated above, Kaylo Beveled Lags may be used. These lags are blocks of Kaylo insulation, nominally 3" wide, beveled to fit snugly on standard sizes of heated piping. Lags beveled to fit pipes from 21" to 36" in diameter are available in thicknesses of 1½", 2", 2½" and 3". Lags are 36" long.

KAYLO® PIPE INSULATION

Insulation Efficiencies:

Efficiency x Bare Pipe Heat Loss=Heat Saved By Insulation BTU/Lin.Ft./hr.
100-Efficiency x Bare Pipe Heat Loss=Heat Loss Through Insulation BTU/Lin.Ft./hr.



KEY TO CURVES

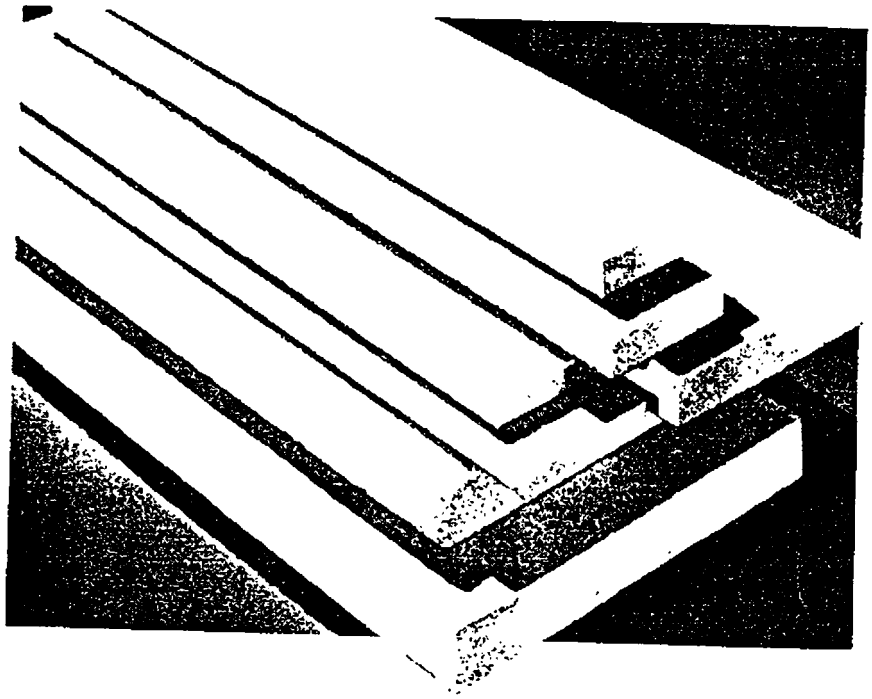
Pipe Size → / INSULATION THICKNESS—INCHES	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	8	10	12	14	16	18	20	22	24
1	1	1	2	2	4	5	5	6	3	7	4	7										
1½	2	3	6	6	7	8	8	9	8	10	9	10	10	12	12	13	12	12	12	12	12	12
2	4	6	8	8	9	10	10	12	11	13	12	14	14	15	15	16	15	15	15	15	15	15
2½	5	7	9	10	10	12	13	14	14	15	14	16	16	17	17	18	17	17	17	17	17	17
3	6	8	10	11	12	14	14	15	15	17	16	17	17	18	19	19	18	19	19	19	19	19
3½		1				15	15	16	17	17	17	18	19	19	20	20	20	20	20	20	20	20
4						15	16	17	17	18	18	19	20	20	20	20	20	20	21	21	21	21
4½						16	17	18	18	19	19	20	20	21	21	21	21	21	21	21	21	22
5	1					17	18	19	19	20	20	20	21	21	22	22	22	22	22	22	22	22

Bare Pipe Heat Loss:

BTU per lineal foot, per hour. Still ambient air 80°F.

NOMINAL PIPE SIZE / Temperature diff., deg. F., pipe to air →	100	200	300	400	500	600	700	800	900	1000	1100	1200
½	55	136	247	394	581	820	1120	1482	1929	2469	3115	3862
¾	67	167	304	483	716	1013	1381	1835	2391	3064	3869	4825
1	82	206	373	595	884	1252	1709	2275	2967	3805	4809	6002
1¼	102	255	464	741	1103	1565	2139	2851	3722	4778	6044	7547
1½	115	289	526	841	1252	1780	2434	3247	4242	5448	6894	8613
2	141	355	647	1036	1546	2199	3013	4022	5260	6761	8562	10700
2½	168	423	773	1240	1853	2639	3619	4945	6330	8141	10317	12904
3	202	502	930	1493	2234	3186	4373	5850	7663	9863	12507	15651
3½	228	575	1052	1691	2533	3616	4968	6649	8714	11222	14236	17822
4	255	642	1176	1892	2836	4051	5570	7458	9780	12599	15988	20022
4½	281	708	1298	2090	3137	4481	6164	8258	10834	13962	17724	22201
5	310	782	1435	2312	3472	4965	6834	9161	12022	15500	19680	24659
6	364	920	1691	2728	4100	5870	8075	10848	14248	19763	23347	29267
8	464	1178	2169	3506	5280	7570	10443	14024	18436	23801	30261	37955
10	572	1447	2668	4318	6512	9350	12912	17355	22833	29500	37525	47089
12	671	1699	3137	5086	7675	11031	15243	20505	26993	34891	44402	55742
14	731	1851	3419	5544	8374	12042	16649	22403	29502	38143	48557	60967
16	828	2098	3877	6294	9514	13692	18941	25499	33597	43451	55330	69493
18	926	2348	4344	7059	10672	15374	21277	28660	37775	48873	62249	78204
20	1022	2592	4797	7800	11806	17009	23554	31742	41848	54161	69003	86704
22	1117	2835	5250	8539	12935	18642	25829	34817	45917	59439	75746	95196
24	1213	3078	5706	9286	14071	20291	28122	37917	50023	64771	82564	103784

KAYLO HEAT INSULATING BLOCK



The complete range of standard widths up to 18" and thicknesses up to 3" allows Kaylo Heat Insulating Block to be used as single layer insulation for flat surfaces up to 700°F. and in double layers from 700°F through 1200°F, even in temperature ranges which usually requires two thickness of dissimilar materials.

Recommended Thicknesses:*

(in inches)

	TEMP. DIFF. HOT SURFACE TO AIR DEG. F.										
Temp. Diff.	200	300	400	500	600	700	800	900	1000	1100	1200
Thickness	1	1	1½	2	2½	3	3	3½	4	4½	5

**Unshaded.* ☐ *= Surface temp. under 140°F.*
Heavy shaded = Surface temp. 145°F. to 150°F.

Standard Sizes and Thicknesses*

(in inches)

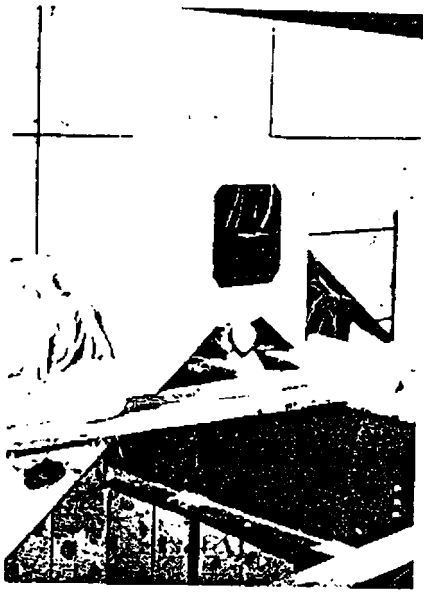
Thicknesses: 1, 1½, 2, 2½, 3
Widths: 6, 12, 18
Length: 36

* Curved block and thicknesses over 3" available only on special order.

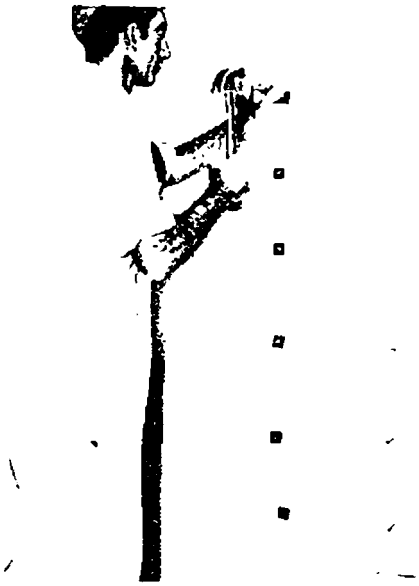
Applying Kaylo Heat Insulating Block to locomotive boiler, using tie wires.



Insulating ducts and boiler at power plant, using laced tie wires and wire mesh for finishing cement.

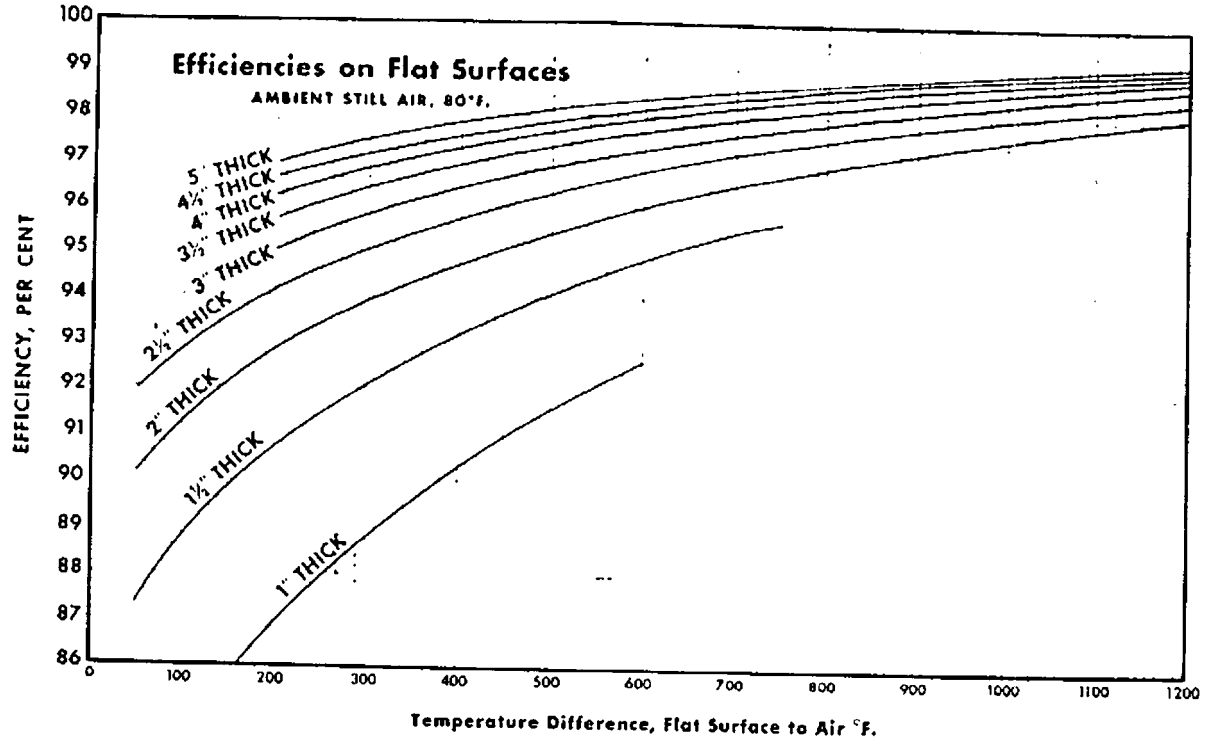


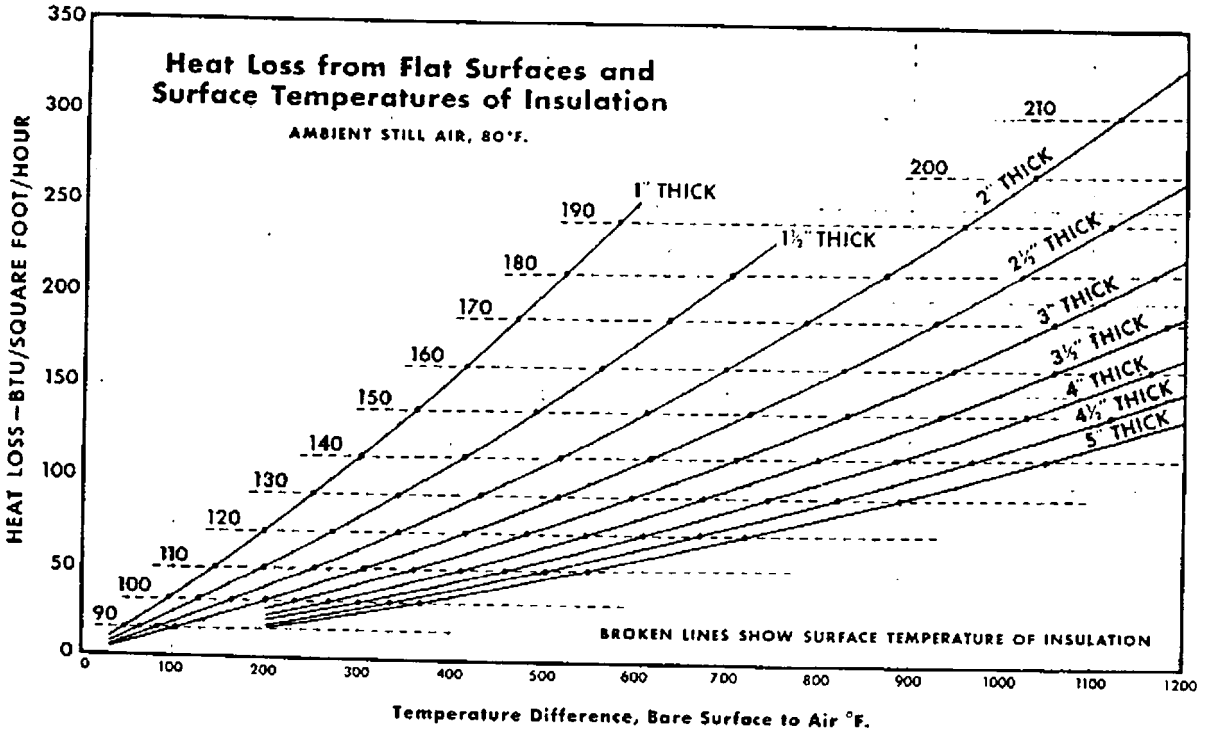
Drying oven installation using studs and speed clips for fastening insulation.



KAYLO HEAT INSULATING BLOCK

Heat Loss, Surface Temperatures, and Efficiencies

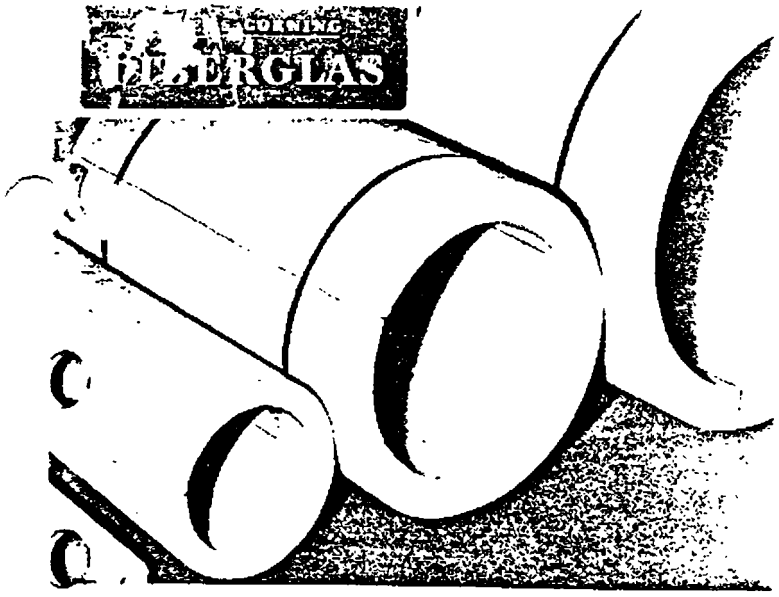




For Additional Information Write:

OWENS-CORNING FIBERGLAS CORPORATION
NICHOLAS BUILDING
TOLEDO 1, OHIO

RICHMOND INSULATION SALES CORP.
54-18 43rd Street Maspeth, N. Y.
Telephone: RAvenswood 9-6408



high temperature insulation for indoor and outdoor piping up to 1200°F. operating temperature

Kaylo pipe insulation

Kaylo Pipe Insulation, a white, rigid hydrous calcium silicate heat insulation, manufactured by Owens-Illinois Glass Company and distributed nationally by Owens-Corning Fiberglas Corporation, effectively insulates indoor and outdoor piping up to 1200°F.*

This thoroughly tested and field-proven material contains the physical properties most desired for efficient, durable insulation work. Kaylo Pipe Insulation's thermal effectiveness, high strength and moisture resistance are unattained by most other insulating materials.

A chemically reacted material, Kaylo Pipe Insulation contains no added binder. For mechanical effects, a small amount of asbestos fiber is included at the time of manufacture.

jackets

canvas—Kaylo Sectional Pipe Insulation includes standard canvas jackets, at no additional charge, on thicknesses up to and including 2½". Standard canvas is available on segmental forms at a slight additional cost. Bands are available for use with this product at slight additional charge and will be furnished on request.

6 oz. and 8 oz. canvas jackets are available for all types, sizes and thicknesses of Kaylo Pipe and Tube Insulation at an additional charge. These jackets are factory applied on Sectional Pipe and Tube Insulation. On Multi-segmental forms, they are furnished but not adhered.

sizes

thickness—Kaylo Pipe Insulation is available in thicknesses from 1" to 3" depending upon pipe size. Kaylo Tube Insulation is available in thicknesses of 1" and 1½".

pipe sizes—Kaylo Pipe Insulation is available to fit pipe from ½" to 39" in diameter. Kaylo Tube Insulation will fit copper tubing from ½" to 3⅛" in diameter.

forms—Kaylo Pipe Insulation is available in sectional or multisegmental form depending upon pipe size. All insulation is furnished in 3' sections.

*T. M. Owens-Illinois Glass Co.

offers . . .

high efficiency—Among the most efficient insulations for temperatures up to 1200°F. Low "k" results from extremely small and numerous insulating air spaces.

simplified dimensional standards—Sizes are designed to permit nesting of one size over another to produce greater thicknesses than available in single layer or to produce "broken joint" concept.

water resistance—Kaylo Pipe Insulation retains an appreciable percentage of its strength even after complete saturation in water. After a cycle of soaking and drying, it returns to its original thermal efficiency and strength with no shrinkage or warping.

high strength—High flexural strength, compressive strength and resistance to abrasion far above normal requirements for heat insulation, greatly reduce installation and service breakage.

easy fabrication—Ordinary tools of the trade sufficient for all cutting, sawing or scoring. Non-irritating to the skin and non-toxic. Offers pleasant handling characteristics.

long life—Remains strong and efficient over the years. Dimensionally stable with little shrinkage. Has superior life characteristics over other types of high temperature insulations.

versatility—Performs efficiently at temperatures through the hot water and low pressure steam range in addition to temperatures in the superheated steam range. One high temperature material to do the job usually requiring combinations of two different insulating materials.

42 012 0759

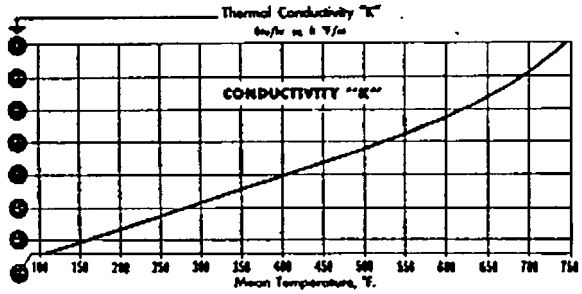
limitations

Kaylo Pipe Insulation is designed for temperatures up to 1200°F. and is not recommended when operating temperatures of piping exceed this limit.

physical properties

density ..... approximately 11 lb. per cu. ft.
flexural strength ..... 50 lb. per sq. in.
compressive strength (at 5% deformation)
before heating ..... 150 lb. per sq. in.
after heating for 24 hours
at 750°F. ..... 144 lb. per sq. in.
at 1000°F. ..... 123 lb. per sq. in.
at 1200°F. ..... 117 lb. per sq. in.
after boiling for 24 hours
(while wet) ..... 74 lb. per sq. in.
loss in weight
after heating for 24 hours
at 750°F. 5.5%
at 1000°F. 7.9%
at 1200°F. 9.8%
after boiling for 24 hours (after drying) 0.2%
resistance to abrasion
(conventional tumbling test-loss in weight after 10 min.)
before heating 2.2%
after heating for 24 hours
at 750°F. 3.7%
at 1000°F. 5.7%
at 1200°F. 6.9%
dimensional stability
linear shrinkage after heating for 24 hours
at 750°F. 0.8%
at 1000°F. 0.9%
at 1200°F. 1.5%
elongation after saturation (max.) 0.04%
moisture adsorption (volume)
after 6 hours exposure in atmosphere of 120°F. and 90% relative humidity 0.9%

thermal conductivity



specification compliance

HH-I-523a Insulation Block, Pipe Covering and Cement, Thermal, Calcium Silicate (For Temperatures up to 1200°F.)
MIL-I-2781B Insulation Pipe Covering, Thermal



Kaylo Pipe Insulation applies easily and quickly with standard application methods.



Kaylo Pipe Insulation presents a superior final appearance when applied to a variety of irregularly-shaped high temperature vessels.

design data

The following data is presented to aid in the design of Kaylo Pipe Insulation modified to meet specific needs. Recommendations are generalized and should be modified to meet local conditions and job requirements.

recommended thicknesses

Economical thicknesses of insulation vary to a substantial degree in different industries principally because of:

1: Cost of fuel and operation time
2: Fixed charges or anticipated life of installation

Because these two factors vary greatly by industry, a single table of recommended thickness would be only an approximation. To approach more closely a true "Economical Thickness," the recommended thickness data on the following three pages is presented for three major industry groups:

1: Commercial and Industrial
2: Power and Utility
3: Process and Industries

exceptions

Economical Thickness recommendations may not apply where insulation is applied for process temperature control, personnel protection or fire protection for specific areas. Refer to Kaylo Performance Data Book for insulation design for such conditions. See pages 37-39.

insulation thickness standards

This table presents reference data for information on the actual thicknesses according to the simplified Dimensional Standard system. See pages 40-41.

insulation efficiencies

This table and graph enable making the determination of thermal efficiencies for thicknesses from 1"-5" for pipe to air temperatures from 100° to 1200°F. See page 41.

42 012 0760

design data

r ommended thickness of Kaylo pipe insulation

COMMERCIAL AND INDUSTRIAL DESIGN

(Figures are based on ambient still air at 80° F)

pipe temp.	280R				480F				680F			
temperature difference	200F				400F				600F			
pipe size	RT	HL	E	ST	RT	HL	E	ST	RT	HL	E	ST
½	1	32.5	76.1	106	2	56	86.8	105	2½	73.3	91.1	107
¾	1	38.9	76.7	110	2	59	87.8	108	2½	81.8	91.9	109
1	1	40.8	80.2	107	2	64	89.2	107	3	86.0	93.1	107
1¼	1½	38.0	85.1	99	2½	67	91.0	105	3½	93.0	94.1	106
1½	1½	42.6	85.3	101	2	73.9	91.2	107	3½	97.8	94.5	107
2	1½	48.3	86.4	101	2½	79.5	92.3	106	3½	108.0	95.1	108
2½	1½	50.0	88.2	99	2	94	92.4	110	3½	115.0	95.6	107
	1½	63.7	87.5	103	2½	102	93.2	109	4	125.0	96.1	107
4	1½	76.8	88.0	105	2½	120	93.7	110	4	145.0	96.4	109
5	1½	91.4	88.3	106	3	124	94.6	106	4	164.0	96.7	109
6	1½	107	88.4	107	3	141	94.8	108	4½	172.0	97.1	107
7	1½	116	88.9	107	3	152	95.1	107	4½	188.0	97.2	108
8	1½	129	89.0	107	3	167	95.2	108	4½	206.0	97.3	109
9	1½	142	89.1	108	3	181	95.4	109	4½	222.0	97.4	110
10	1½	151	89.6	107	3	200	95.4	110	5	226.0	97.6	108
12	1½	174	89.8	108	3½	206	95.9	107	5	256	97.7	109
14	1½	202	89.1	110	3½	227	95.9	108	5	280	97.7	110
16	2	182	91.3	104	3½	253	96.0	108	5½	293	97.9	108
18	2	202	91.4	104	3½	280	96.0	109	5½	321	97.9	109
20	2	222	91.4	104	3½	305	96.1	109	5½	350	97.9	110
24	2	262	91.5	105	3½	358	96.1	110	5½	400	98.0	110

... —Recommended Thickness. HL—Heat Loss Btu/Lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

42 012 0761

ping to 1200°F.

ylo pipe insulation

design data

recommended thickness of Kaylo pipe insulation

POWER AND UTILITY INDUSTRIES

(Figures are based on ambient still air at 80° F)

e temp.	280F				480F				680F				880F				1080F				1280F			
perature ference	200F				400F				600F				800F				1000F				1200F			
pe size	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST
½	1"	32.5	76.1	106	1½"	58.4	85.2	113	2"	83.6	89.8	118	2½"	104	93.0	116	3"	128	94.8	116	3½"	150	96.1	115
¾	1"	38.9	76.7	110	1½"	67.4	86.0	117	2"	95.0	90.6	122	2½"	116	93.7	120	3"	143	95.3	122	3½"	170	96.5	123
1	1"	40.8	80.2	107	1½"	73.4	87.7	116	2"	103	91.8	121	2½"	132	94.2	124	3½"	155	95.8	122	3½"	193	96.8	125
1¼	1"	52.0	79.6	113	1½"	82.2	88.9	117	2½"	108	93.1	117	3"	140	95.1	122	3½"	172	96.6	124	4"	203	97.4	125
1½	1"	52.6	81.8	110	1½"	92.3	89.0	121	2½"	119	93.3	121	3"	158	95.3	125	3½"	178	96.8	122	4"	206	97.6	121
	1"	60.8	82.9	111	1½"	105	89.9	122	2½"	128	94.2	119	3"	165	95.9	124	4"	190	97.2	121	4½"	228	97.9	125
2½	1"	69.9	83.5	112	1½"	108	91.3	117	2½"	151	94.3	124	3"	164	96.1	122	4"	204	97.5	121	4½"	245	98.1	125
3	1"	82.6	83.7	114	2"	116	92.2	115	2½"	164	94.9	123	3½"	190	96.8	121	4½"	222	97.7	121	5"	263	98.3	124
4	1"	98.2	84.7	114	2"	139	92.7	118	3"	172	95.8	118	3½"	222	97.0	124	4½"	252	98.0	123	5½"	295	98.4	125
5	1"	120	84.7	116	2"	164	92.9	119	3"	199	96.0	120	4"	233	97.5	120	4½"	288	98.1	125	5½"	328	98.5	125
6	1"	156	83.0	122	2"	185	93.2	120	3"	227	96.1	122	4"	262	97.6	122	5"	305	98.5	123	6"	355	98.7	125
7	1½"	116	88.9	107	2"	206	93.4	121	3"	244	96.4	121	4"	288	97.7	123	5"	333	98.5	124	6"	384	98.8	127
8	1½"	129	89.0	107	2"	228	93.5	122	3"	268	96.5	122	4"	315	97.8	124	5"	362	98.5	125	6"	420	98.9	129
9	1½"	142	89.1	108	2"	238	93.9	120	3"	291	96.6	123	4"	340	97.7	125	5½"	376	98.6	124	6"	456	98.9	130
10	1½"	151	89.6	107	2"	267	93.8	122	3"	322	96.6	125	4½"	344	98.0	122	5½"	405	98.7	125	6"	498	98.9	132
12	1½"	174	89.8	108	2"	308	93.9	123	3½"	330	97.0	120	4½"	391	98.1	123	6"	444	98.8	124	6"	564	99.0	135
14	1½"	202	89.1	110	2½"	294	94.7	118	3½"	366	97.0	122	4½"	429	98.1	125	6"	482	98.8	126	6"	614	99.0	138
16	1½"	228	89.1	111	2½"	330	94.8	119	3½"	407	97.0	123	5"	441	98.3	122	6"	525	98.8	127	6"	688	99.0	139
18	1½"	253	89.2	111	2½"	366	94.8	119	3½"	450	97.1	124	5"	484	98.3	123	6"	584	98.9	128	6"	740	99.0	140
20	1½"	279	89.2	111	2½"	401	94.9	120	3½"	494	97.1	126	5"	526	98.3	123	6"	636	98.9	129	6"	810	99.1	141
24	1½"	331	89.2	111	2½"	472	94.9	121	4"	517	97.5	120	5"	613	98.4	125	6"	740	98.9	131	6"	925	99.1	143

T—Recommended Thickness. HL—Heat Loss Btu/Lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

42 012 0762

esign data

mmended thickness of Kaylo pipe insulation

PROCESS INDUSTRY

(Figures are based on ambient still air at 80° F)

np.	280F				480F				680F				880F				1080F				1280F			
ture ice	200F				400F				600F				800F				1000F				1200F			
ize	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST
½	1"	32.5	76.1	106	1"	70 8	82.0	130	1½"	129	88 5	129	1½"	134	90 8	145	2"	158	93 6	144	2½"	175	95.5	137
¾	1"	38.9	76.7	110	1"	84.5	82.5	138	1½"	108	89 3	136	2"	135	92.5	137	2"	179	94 2	150	2½"	196	95.9	142
	1"	40.8	80.2	107	1"	89.0	85 0	132	1½"	118	90 6	135	2"	147	93 5	136	2½"	188	95 6	139	2½"	225	96 3	148
1¼	1"	52.0	79.6	113	1"	114	84 6	144	1½"	132	91.6	136	2"	173	93.9	144	2½"	203	95.7	144	3"	236	96.9	145
1½	1"	52.6	81 8	110	1"	115	86.3	138	1½"	148	91.7	141	2"	169	94.8	135	2½"	224	95.9	149	3"	259	97 0	150
2	1"	60.8	82.9	111	1"	133	87.2	140	1½"	169	92.3	143	2"	204	94 9	144	2½"	241	96 4	146	3"	279	97.2	148
½	1"	69.9	83.5	112	1"	152	87 7	143	1½"	174	93.4	136	2"	216	95.6	140	2½"	256	96 9	143	3"	298	97.7	146
3	1"	82.6	83.7	114	1"	160	87.9	146	1½"	222	93 0	149	2½"	234	96.0	138	3"	279	97 2	142	3½"	321	97.9	144
4	1"	98.2	84.7	114	1"	215	88.6	147	2"	222	94 5	136	2½"	276	96.3	142	3"	323	97 4	144	3½"	375	98.1	148
5	1"	120	84.7	116	1½"	199	91.4	131	2"	262	94.7	139	2½"	318	96.5	144	3"	375	97.6	148	4"	393	98.4	142
6	1"	156	83 0	122	1½"	232	91.5	133	2"	297	94.9	140	2½"	364	96.6	147	3½"	380	98.1	140	4"	441	98.5	145
7	1½"	116	88.9	107	1½"	252	91.9	132	2"	332	95.1	142	2½"	405	96.7	148	3½"	417	98 2	142	4"	486	98.6	147
8	1½"	129	89.0	107	1½"	280	92.0	133	2"	366	95.2	143	2½"	431	96.9	147	3½"	456	98.1	143	4"	532	98.6	148
9	1½"	142	89.1	108	1½"	307	92.1	134	2"	384	95 5	141	2½"	470	97.0	148	3½"	495	98.1	145	4"	576	98.6	150
10	1½"	151	89.6	107	1½"	328	92.4	133	2"	430	95 4	143	3"	458	97.4	141	3½"	545	98.2	147	4½"	581	98.8	145
12	1½"	174	89.8	108	1½"	380	92.5	134	2"	496	95.5	145	3"	526	97.4	142	3½"	623	98.2	149	4½"	660	98.8	147
14	1½"	202	89.1	110	1½"	439	92.1	138	2"	566	95.3	149	3"	585	97.4	145	4"	624	98.4	144	4½"	725	98.8	150
16	1½"	228	89.1	111	1½"	496	92.1	139	2"	636	95.4	150	3"	655	97.4	147	4"	694	98.4	145	5"	742	98.9	145
18	1½"	253	89.2	111	1½"	553	92.2	140	2½"	589	96.2	139	3"	725	97.5	148	4"	764	98.4	147	5"	815	99.0	146
20	1½"	279	89.2	111	1½"	608	92.2	141	2½"	646	96.2	140	3"	794	97.5	149	4"	835	98.5	147	5"	888	99.0	147
	1½"	331	89.2	111	1½"	721	92.2	141	2½"	759	96.3	141	3½"	819	97.8	141	4"	976	98.5	149	5"	1032	99.0	149

T—Recommended Thickness. HL—Heat Loss/lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

42 012 0763

It's the low that counts

,ing to 1200°F.

. pipe insulation

design data

insulation thickness standards

IRON PIPE SIZES (IPS)

nom. pipe size	O.D. of pipe	single layer only				single or double layer						multiple layer only							
		nom. 1"		nom. 1½"		nom. 2"		nom. 2½"		nom. 3"		nom. 3½"		nom. 4"		nom. 4½"		nom. 5"	
		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.
½"	.84	1.00	2.88	1.56	4.00	2.06	5.00	2.89	6.66	3.39	7.66								
¾"	1.05	.90	2.88	1.46	4.00	1.96	5.00	2.79	6.66	3.29	7.66								
1"	1.32	1.08	3.50	1.58	4.50	2.11	5.56	2.66	6.66	3.16	7.66								
1¼"	1.66	.90	3.50	1.66	5.00	1.94	5.56	2.48	6.66	2.98	7.66								
1½"	1.90	1.03	4.00	1.53	5.00	2.36	6.66	2.86	7.66	3.36	8.86								
2"	2.38	1.04	4.50	1.57	5.56	2.12	6.66	2.62	7.66	3.12	8.66	3.62	9.66	4.18	10.78	4.68	11.78	5.20	12.81
2½"	2.88	1.04	5.00	1.87	6.66	2.37	7.66	2.87	8.66	3.37	9.66	3.93	10.78	4.43	11.78	4.95	12.81	5.57	14.06
3"	3.50	1.00	5.56	1.55	6.66	2.05	7.66	2.55	8.66	3.05	9.66	3.61	10.78	4.11	11.78	4.63	12.81	5.25	14.06
3½"	4.00	1.30	6.66	1.80	7.66	2.30	8.66	2.80	9.66	3.36	10.78	3.86	11.78	4.38	12.81	5.00	14.06	5.50	15.06
4"	4.50	1.05	6.66	1.55	7.66	2.05	8.66	2.55	9.66	3.11	10.78	3.61	11.78	4.13	12.81	4.75	14.06	5.25	15.06
4½"	5.00	1.30	7.66	1.80	8.66	2.30	9.66	2.86	10.78	3.36	11.78	3.88	12.81	4.50	14.06	5.00	15.06	5.51	16.09
5"	5.56	1.02	7.66	1.52	8.66	2.02	9.66	2.58	10.78	3.08	11.78	3.59	12.81	4.22	14.06	4.72	15.06	5.23	16.09
6"	6.63	.95	8.66	1.45	9.66	2.02	10.78	2.52	11.78	3.03	12.81	3.66	14.06	4.16	15.06	4.68	16.09	5.13	17.00
7"	7.63			1.52	10.78	2.02	11.78	2.53	12.81	3.16	14.06	3.66	15.06	4.17	16.09	4.63	17.00	5.13	18.00
8"	8.63			1.52	11.78	2.03	12.81	2.66	14.06	3.16	15.06	3.67	16.09	4.13	17.00	4.63	18.00	5.13	19.00
9"	9.63			1.53	12.81	2.16	14.06	2.66	15.06	3.17	16.09	3.63	17.00	4.13	18.00	4.63	19.00	5.13	20.00
10"	10.75			1.59	14.06	2.09	15.06	2.61	16.09	3.06	17.00	3.56	18.00	4.06	19.00	4.56	20.00	5.06	21.00
11"	11.75			1.58	15.06	2.09	16.09	2.55	17.00	3.05	18.00	3.55	19.00	4.05	20.00	4.54	21.00	4.55	22.00
12"	12.75			1.59	16.09	2.05	17.00	2.55	18.00	3.05	19.00	3.55	20.00	4.05	21.00	4.54	22.00	4.55	23.00
14"	14.00			1.42	17.00	1.92	18.00	2.42	19.00	2.92	20.00	3.42	21.00	3.92	22.00	4.42	23.00	4.92	24.00
15"	15.00			1.42	18.00	1.92	19.00	2.41	20.00	2.92	21.00	3.42	22.00	3.92	23.00	4.41	24.00	4.92	25.00
16"	16.00			1.41	19.00	1.91	20.00	2.41	21.00	2.91	22.00	3.41	23.00	3.91	24.00	4.41	25.00	4.91	26.00
17"	17.00			1.41	20.00	1.91	21.00	2.41	22.00	2.91	23.00	3.41	24.00	3.91	25.00	4.41	26.00	4.91	27.00
18"	18.00			1.41	21.00	1.91	22.00	2.41	23.00	2.91	24.00	3.41	25.00	3.91	26.00	4.41	27.00	4.91	28.00
19"	19.00			1.41	22.00	1.91	23.00	2.41	24.00	2.91	25.00	3.41	26.00	3.91	27.00	4.41	28.00	4.91	29.00
20"	20.00			1.41	23.00	1.91	24.00	2.41	25.00	2.91	26.00	3.41	27.00	3.91	28.00	4.41	29.00	4.91	30.00
21"	21.00			1.41	24.00	1.91	25.00	2.41	26.00	2.91	27.00	3.41	28.00	3.89	29.00	4.41	30.00	4.91	31.00
22"	22.00			1.41	25.00	1.91	26.00	2.41	27.00	2.91	28.00	3.39	29.00	3.89	30.00	4.41	31.00	4.91	32.00
23"	23.00			1.41	26.00	1.91	27.00	2.41	28.00	2.91	29.00	3.39	30.00	3.89	31.00	4.41	32.00	4.91	33.00
24"	24.00			1.41	27.00	1.91	28.00	2.41	29.00	2.91	30.00	3.39	31.00	3.89	32.00	4.41	33.00	5.00	34.00
25"	25.00			1.46	28.00	1.98	29.00	2.50	30.00	3.02	31.00	3.44	32.00	3.96	33.00	4.48	34.00	5.00	35.00
26"	26.00			1.46	29.00	1.98	30.00	2.50	31.00	3.02	32.00	3.44	33.00	3.96	34.00	4.48	35.00	5.00	36.00
27"	27.00			1.46	30.00	1.98	31.00	2.50	32.00	3.02	33.00	3.44	34.00	3.96	35.00	4.48	36.00	5.00	37.00
28"	28.00			1.46	31.00	1.98	32.00	2.50	33.00	3.02	34.00	3.44	35.00	3.96	36.00	4.48	37.00	5.00	38.00
29"	29.00			1.46	32.00	1.98	33.00	2.50	34.00	3.02	35.00	3.44	36.00	3.96	37.00	4.48	38.00	5.00	39.00
30"	30.00			1.46	33.00	1.98	34.00	2.50	35.00	3.02	36.00	3.44	37.00	3.96	38.00	4.48	39.00	5.00	40.00
31"	31.00			1.46	34.00	1.98	35.00	2.50	36.00	3.02	37.00	3.44	38.00	3.96	39.00	4.48	40.00	5.00	41.00
32"	32.00			1.46	35.00	1.98	36.00	2.50	37.00	3.02	38.00	3.44	39.00	3.98	40.00	4.48	41.00	5.00	42.00
33"	33.00			1.46	36.00	1.98	37.00	2.50	38.00	3.02	39.00	3.48	40.00	3.98	41.00	4.48	42.00	5.00	43.00
34"	34.00			1.46	37.00	1.98	38.00	2.50	39.00	3.02	40.00	3.48	41.00	3.98	42.00	4.48	43.00	5.00	44.00
35"	35.00			1.46	38.00	1.98	39.00	2.50	40.00	3.02	41.00	3.48	42.00	3.98	43.00	4.48	44.00	5.00	45.00
36"	36.00			1.46	39.00	1.98	40.00	2.50	41.00	3.02	42.00	3.48	43.00	3.98	44.00	4.48	45.00	5.00	46.00
37"	37.00			1.46	40.00	1.98	41.00	2.50	42.00	3.02	43.00	3.48	44.00	3.98	45.00	4.48	46.00	5.00	47.00
38"	38.00			1.46	41.00	1.98	42.00	2.50	43.00	3.02	44.00	3.48	45.00	3.98	46.00	4.48	47.00	5.00	48.00
39"	39.00			1.46	42.00	1.98	43.00	2.50	44.00	3.02	45.00	3.48	46.00	3.98	47.00	4.48	48.00	5.00	49.00

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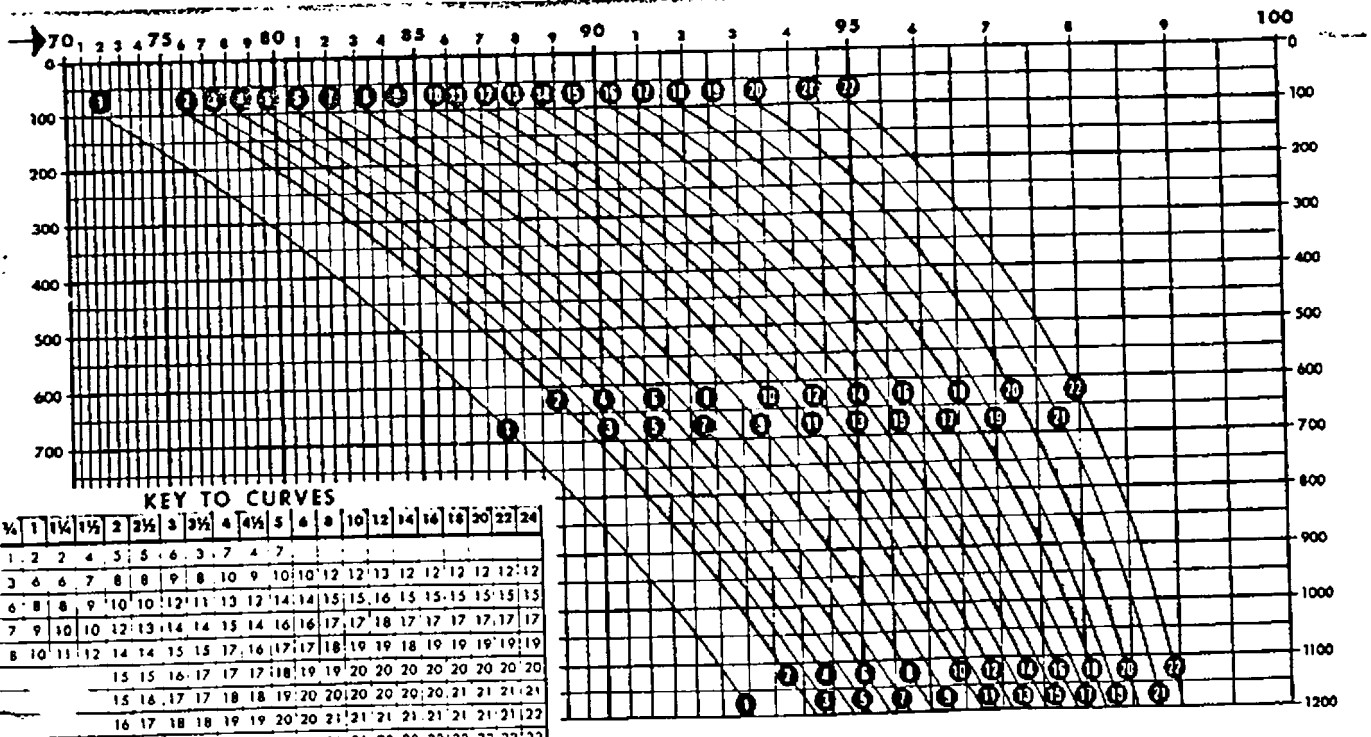
design data

insulation thickness standards

COPPER TUBING (CT)

of e n.)	nom. tube size	single layer			
		nom. 1"		nom. 1½"	
		actual	O.D.	actual	O.D.
₂"	⅜"	1.18	2.88	1.49	3.50
₈"	½"	1.11	2.88	1.42	3.50
₄"	⅝"	1.05	2.88	1.61	4.00
₈"	¾"	.99	2 88	1.55	4.00
₈"	1"	1.17	3.50	1.42	4.00
4"	1¼"	1.05	3.50	1.55	4.50
⅛"	1½"	1.17	4.00	1.42	4.50
⅛"	2"	.91	4.00	1.41	5.00
⅜"	2½"	.91	4.50	1.45	5.56
⅛"	3"	.91	5.00	1.73	6.66

insulation efficiencies



KEY TO CURVES

½	1	1¼	1½	2	2½	3	3½	4	4½	5	6	8	10	12	14	16	18	20	22	24
1	2	2	4	5	5	6	3	7	4	7										
3	6	6	7	8	8	9	8	10	9	10	10	12	12	13	12	12	12	12	12	12
6	8	8	9	10	10	12	11	13	12	14	14	15	15	16	15	15	15	15	15	15
7	9	10	10	12	13	14	14	15	14	16	16	17	17	18	17	17	17	17	17	17
8	10	11	12	14	14	15	15	17	16	17	17	18	19	19	18	19	19	19	19	19
				15	15	16	17	17	17	18	19	19	20	20	20	20	20	20	20	20
				15	16	17	17	18	18	19	20	20	20	20	20	20	21	21	21	21
				16	17	18	18	19	19	20	20	21	21	21	21	21	21	21	21	22
				17	18	19	19	20	20	20	20	21	21	22	22	22	22	22	22	22

42 012 0765

it's the low K that counts

ping to 1200°F.

lo pipe insulation

specification

for insulation of piping
with Kaylo pipe insulation

1: Insulating materials

All heated pipes shall be insulated to the thickness noted on drawings or as shown in the following table with Kaylo Pipe Insulation as distributed by Owens-Corning Fiberglas Corporation.

TABLE OF RECOMMENDED INSULATION THICKNESS

Recommended Thicknesses vary according to use.

(See pages 37-39 for Complete Recommended Thickness Table.)

2: Application

All Pipe Insulation shall be applied over clean, dry surfaces, butting adjoining sections firmly together. Insulation on pipes under 12" diameter shall have factory-applied canvas pasted neatly in place and be secured with factory furnished bands spaced on not greater than 18" centers.

Insulation on pipes over 12" diameter and all outdoor piping shall be wired in place with 16 gauge soft annealed wire on no greater than 9" centers. Where double layer insulation is applied, the first layer shall be wired in place without jacket; the second layer shall be applied with all joints staggered.

All flanges, valves and fittings shall be insulated with fabricated mitered segments of pipe insulation equal in thickness to the insulation on the adjoining pipe. Fittings on pipe size of 3" and smaller may be insulated with insulating cement of equal thickness.

3: Surface finish

Indoor piping under 12" diameter not subject to abrasion or mechanical abuse requires no finish in addition to the factory-furnished canvas and bands. Piping over 12" diameter shall be finished with 6-ounce canvas pasted in place.

Piping located outdoors shall be finished with 45-lb. roofing felt jacket with all joints lapped not less than 2". Jackets shall be wired with 16 ga. copper wire on not greater than 9" centers or banded on 12" centers with ½" galvanized bands. Other suitable weatherproof jackets such as metal, asphalt or plastic coating may be applied according to the jacket manufacturers' specifications.

Insulation on flanges, valves and fittings shall be covered with a ¼" coat of finishing cement. Portland cement to a maximum of 25% dry weight may be added if a harder finish is desired. Insulation located indoors shall be further finished with canvas neatly pasted in place.

All insulation on flanges, valves and fittings located outdoors shall be covered with asphalt weatherproof mastic reinforced with an open mesh glass fabric. Mastic shall be applied in sufficient thickness to give a ⅛" dry coat and shall be troweled neatly over the fitting and lapped over the jacket on the adjacent pipe.

The specification is recommended as written. Minor variances of application procedure may be made at the discretion and responsibility of the design engineer to meet specific job requirements.

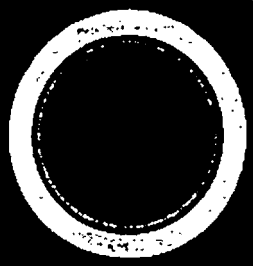
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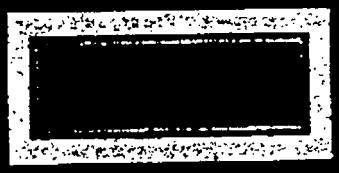
for insulation of piping with Kaylo pipe insulation

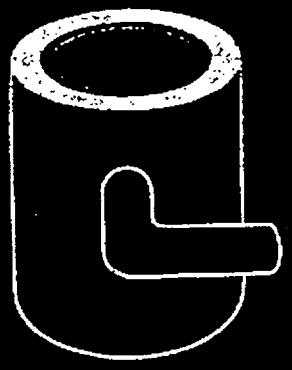
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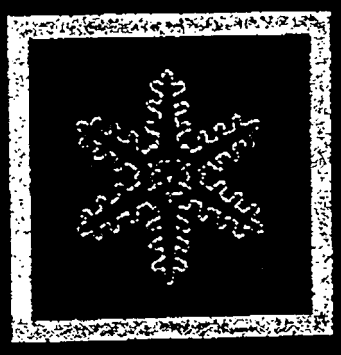
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industrial insulations manual



OWENS-CORNING
FIBERGLAS

industrial insulations manual

If you specify, buy or use industrial insulations, we believe you will find this Fiberglas® Manual a ready source of ideas for saving money and achieving efficiency.

We do not claim that Fiberglas insulations are your best choice for every industrial use. But within their fields of application—which covers almost every industrial need—these carefully engineered products offer you extra values because of their unique combination of properties. Here are some of the benefits you can expect . . .

®T. M., Owens-Corning Fiberglas Corp.

Fiberglas k = .25

Insulation "A" k = .32

Insulation "B" k = .34 (100°F. mean temp.)

Insulation "C" k = .41

Insulation "D" k = .52

greater efficiency with equal thicknesses

Because the maze of fine Fiberglas fibers entraps countless tiny air cells, Fiberglas insulations have exceptionally low "k" values. Result . . . when equal thicknesses are specified, Fiberglas products give superior heat control . . . as shown by the typical illustration above. This feature can be of value when rigid control of heat in process equipment or maximum effective heat control is desired.

1.00"

3.25" 1.38"

2.12" 1.63"

lesser thicknesses for equal efficiency

The low "k" value of Fiberglas insulations means that, where a certain insulating efficiency is desired, it can be achieved with lesser thicknesses of Fiberglas insulation as the illustration of a typical condition above shows. Thus, maximum economy consistent with insulating requirements is often possible using Fiberglas insulations.

fewer maintenance problems

Durable, inorganic Fiberglas insulations offer long life to all installations. They won't rot, shrink, warp or buckle. They are light in weight . . . reducing danger of sagging problems, will not corrode or accelerate corrosion of metal surfaces and, because of their resilient nature, stand up well in service.

wide temperature range

Fiberglas offers the most complete line of industrial insulations in the industry. Properly specified and applied these materials offer superior performance at temperatures from sub-zero to 1800° F.

a solution for every industrial insulation problem

There is a Fiberglas insulation to specifically meet almost every industrial insulation need in their temperature range. The wide selection of types, sizes and densities permits the designer to obtain a desirable combination of cost, performance, appearance and any other specific properties desired.

lower application costs

The light weight and workability of Fiberglas insulations permits easy handling and fast, inexpensive application. All products are exceptionally easy to cut and fit. Factory applied finishes cut down the need for job site application of jackets, finishes, etc.

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Fiberglas pipe insulations

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low pressure pipe insulation 19-22
dual temperature pipe insulation 23-30
low temperature pipe insulation 31-40
Kaylo pipe insulation 41-48
Kaylo-20 pipe insulation 49-52
blanket type pipe insulation 53-56
Aerowrap pipe insulation 57-60

Fiberglas duct insulations

PF duct insulation 63-66
coated duct insulation 67-70
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Fiberglas cold storage insulations

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roof insulation 113-114

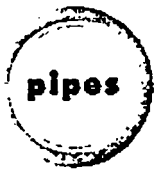
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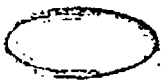
for choosing the correct

OWENS-CORNING FIBERGLAS

insulation









application	operating temp. range
HOT PIPING	
Hot Water and LP Steam	up to 250°F.
Steam	up to 400°F.
High Pressure Steam	up to 1000°F.
High Pressure Steam	up to 1200°F.
Super Temperature Steam	1200 to 1800° F.
Traced and Nested Lines	up to 400°F.
Traced and Nested Lines	up to 1000°F.
Hot Piping—Maintenance	up to 400°F.
COLD PIPING	
Cold Water	down to 50°F.
Dual-temperature	35° to 200°F.
Chilled and Ice Water	down to 35°F.
Brine and Heavy Brine	34 to 0°F.
Refrigerants	−1 to −60°F.
Special Process	−61 to 120°F.
HEAT., VENT. & AIR COND. DUCTS	
Exterior Applications (thermal)	
Hot Air Systems	
Concealed, Rectangular	up to 250°F.
	up to 250°F.
Concealed, Round	up to 250°F.
Exposed, Rectangular	up to 250°F.
	up to 250°F.
Exposed, Round	up to 250°F.
Dual or Cold Air Systems	
Concealed, Rectangular	down to 35°F.
	down to 35°F.
Concealed, Round	down to 35°F.
Exposed, Rectangular	down to 35°F.
Exposed, Round	down to 35°F.
Interior Application (thermal and acoustical)	
Hot and Cold Air, Rectangular	up to 250°F.
	down to 35°F.
	up to 250°F.
	down to 35°F.
Hot and Cold Air, Round	up to 250°F.
	down to 35°F.
HOT EQUIPMENT	
Breechings	up to 400°F.
Condensers	up to 400°F.
Driers	
Ducts, process	
Evaporators	
Heat Exchangers	
Hydrators	up to 1000°F.
Kilns	up to 1200°F.
Ovens	1200 to 1800°F.
Stills	
Tanks, storage	
Turbines	
Vessels, processing	
COLD EQUIPMENT	
Brine Tanks	50 to −120°F.
Chillers	
Compressors	
Heat Exchangers	
Refrigerant Tanks	
Tanks, Storage	
Vessels, storage	
COLD STORAGE ROOMS	
Cooler and Chiller, Ceiling	70 to 35°F.
Cooler and Chiller, Wall	70 to 35°F.
Cooler and Chiller, Floor	70 to 35°F.
Freezer and Sharp Freezer, Roof	34 to −60°F.
Freezer and Sharp Freezer, Ceiling	34 to −60°F.
Freezer and Sharp Freezer, Wall	34 to −60°F.
Freezer and Sharp Freezer, Floor	34 to −60°F.

NOTE: For design data on ducts used outdoors see the Industrial product sheet concerned.

recommended insulation	type	data pages	specifications page
Low Pressure Pipe Insulation	Molded—Rigid	19-21	22
Standard Pipe Insulation	Molded—Rigid	9-17	18
Blanket-type Pipe Insulation	Flexible	53-55	56
Kaylo Pipe Insulation	Molded—Rigid	41-47	48
Kaylo-20 Pipe Insulation	Molded—Rigid	49-51	52
Aerowrap Pipe Insulation	Flexible	57-59	60
Blanket-type Pipe Insulation	Flexible	53-55	56
Aerowrap Pipe Insulation	Flexible	57-59	60
Low Pressure Pipe Insulation	Molded—Rigid	19-21	22
Dual-Temp Pipe Insulation (White)	Molded—Rigid	23-29	30
Dual-Temp Pipe Insulation (White)	Molded—Rigid	23-29	30
Low-Temp Pipe Insulation (Black)	Molded—Rigid (Mult.Layer)	31-39	40
Flexible Duct Insulation	Flexible	75-76	76
PF Duct Insulation	Semi-rigid	63-65	66
Flexible Duct Insulation	Flexible	75-76	76
PF Duct Insulation	Semi-Rigid	63-65	66
Coated Duct Insulation	Semi-Rigid	67-69	70
Flexible Duct Insulation	Flexible	75-76	76
Faced Flexible Duct Insulation	Flexible	77-78	78
Vapor Seal Duct Insulation	Semi-Rigid	71-73	74
Faced Flexible Duct Insulation	Flexible	77-78	78
Vapor Seal Duct Insulation	Semi-Rigid	71-73	74
Faced Flexible Duct Insulation	Flexible	77-78	78
Coated Duct Insulation	Semi-Rigid	67-69	70
Flexible Duct Liner	Flexible	79-80	80
Flexible Duct Liner	Flexible	79-80	80
PF Insulation	Board—Rigid	83-85	86
Block Insulation	Block—Rigid	87-88	88
Metal-Mesh Blankets	Flexible	89-91	92
Kaylo Block Insulation	Block—Rigid	93-94	94
Kaylo-20 Block Insulation	Block—Rigid	95-96	96
PF Insulation	Board—Rigid	83-85	86
AE Board	Rigid	105-107	108
AE Board	Rigid	105-107	108
AE-F Board	Rigid	109-111	112
AE-F Board and Roof Insulation	Rigid	109-111 and 113	112 and 114
AE Board and PF Insulation Board	Rigid	105-107	108
PF Insulation Board and AE Board	Rigid	99-103 and 105-107	104 and 108
AE-F Board	Rigid	109-111	112

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industrial insulations are . . .

manufactured to exacting standards

constantly improved by practical research

backed by years of industrial experience

OWENS-CORNING FIBERGLAS

industrial distributor-contractors are . . .

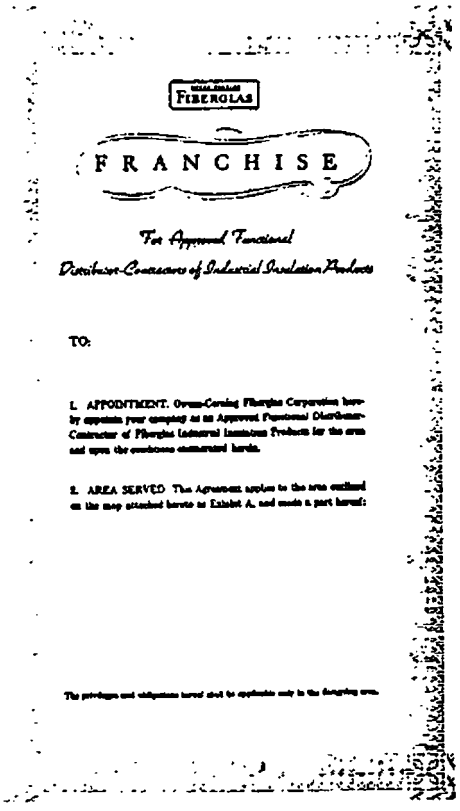
financially sound and competently managed

backed by years of application experience

schooled in Fiberglas product application

capable of handling complete contracts

located to serve the entire country



OWENS-CORNING FIBERGLAS

FRANCHISE

For Approved Functional Distributor-Contractors of Industrial Insulation Products

TO:

1. APPOINTMENT. Owens-Corning Fiberglas Corporation hereby appoints your company as an Approved Functional Distributor-Contractor of Fiberglas Industrial Insulation Products for the area and upon the conditions enumerated herein.

2. AREA SERVED. This Agreement applies to the area outlined on the map attached hereto as Exhibit A, and made a part hereof.

The privileges and obligations hereof shall be applicable only in the designated area.

you can entrust your insulation

problems to franchised Fiberglas

distributor-contractors with complete

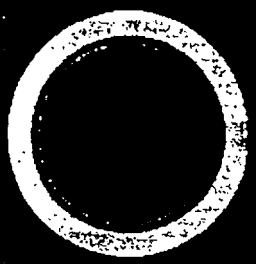
confidence in the best job, with the

best materials, at the best price.

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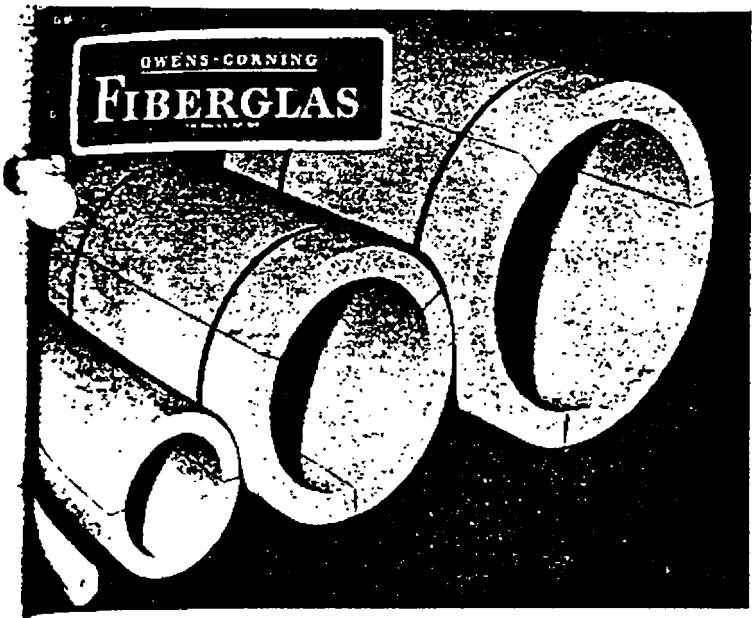
OWENS-CORNING
FIBERGLAS



pipe insulations

[illegible] A.I. June 1952

pipe insulations



high temperature insulation for indoor and outdoor piping up to 1200°F. operating temperature

Kaylo pipe insulation

Kaylo Pipe Insulation, a white, rigid hydrous calcium silicate heat insulation, manufactured by Owens-Illinois Glass Company and distributed nationally by Owens-Corning Fiberglas Corporation, effectively insulates indoor and outdoor piping up to 1200 F.*

This thoroughly tested and field-proven material contains the physical properties most desired for efficient, durable insulation work. Kaylo Pipe Insulation's thermal effectiveness, high strength and moisture resistance are unattained by most other insulating materials.

A chemically reacted material, Kaylo Pipe Insulation contains no added binder. For mechanical effects, a small amount of asbestos fiber is included at the time of manufacture.

jackets

canvas—Kaylo Sectional Pipe Insulation includes standard canvas jackets, at no additional charge, on thicknesses up to and including 2½". Standard canvas is available on segmental forms at a slight additional cost. Bands are available for use with this product at slight additional charge and will be furnished on request.

6 oz. and 8 oz. canvas jackets are available for all types, sizes and thicknesses of Kaylo Pipe and Tube Insulation at an additional charge. These jackets are factory applied on Sectional Pipe and Tube Insulation. On Multi-segmental forms, they are furnished but not adhered.

sizes

thickness—Kaylo Pipe Insulation is available in thicknesses from 1" to 3" depending upon pipe size. Kaylo Tube Insulation is available in thicknesses of 1" and 1½".

pipe sizes—Kaylo Pipe Insulation is available to fit pipe from ½" to 39" in diameter. Kaylo Tube Insulation will fit copper tubing from ½" to 3⅛" in diameter.

forms—Kaylo Pipe Insulation is available in sectional or multisegmental form depending upon pipe size. All insulation is furnished in 3' sections.

*T. M. Owens-Illinois Glass Co

offers . . .

high efficiency—Among the most efficient insulations for temperatures up to 1200°F. Low "k" results from extremely small and numerous insulating air spaces.

simplified dimensional standards—Sizes are designed to permit nesting of one size over another to produce greater thicknesses than available in single layer or to produce "broken joint" concept.

water resistance—Kaylo Pipe Insulation retains an appreciable percentage of its strength even after complete saturation in water. After a cycle of soaking and drying, it returns to its original thermal efficiency and strength with no shrinkage or warping.

high strength—High flexural strength, compressive strength and resistance to abrasion far above normal requirements for heat insulation, greatly reduce installation and service breakage.

easy fabrication—Ordinary tools of the trade sufficient for all cutting, sawing or scoring. Non-irritating to the skin and non-toxic. Offers pleasant handling characteristics.

long life—Remains strong and efficient over the years. Dimensionally stable with little shrinkage. Has superior life characteristics over other types of high temperature insulations.

versatility—Performs efficiently at temperatures through the hot water and low pressure steam range in addition to temperatures in the superheated steam range. One high temperature material to do the job usually requiring combinations of two different insulating materials.

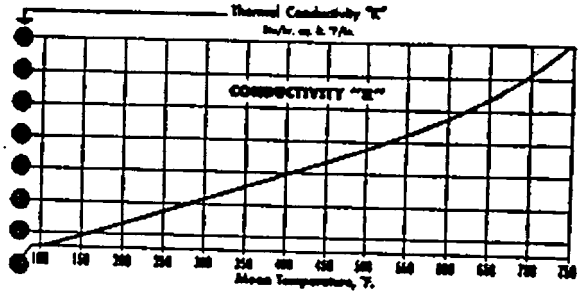
limitations

Kaylo Pipe Insulation is designed for temperatures up to 1200°F. and is not recommended when operating temperatures of piping exceed this limit.

physical properties

density ..... approximately 11 lb. per cu. ft.
flexural strength ..... 50 lb. per sq. in.
compressive strength (at 5% deformation)
before heating ..... 150 lb. per sq. in.
after heating for 24 hours
at 750°F. ..... 144 lb. per sq. in.
at 1000°F. ..... 123 lb. per sq. in.
at 1200°F. ..... 117 lb. per sq. in.
after boiling for 24 hours
(while wet) ..... 74 lb. per sq. in.
loss in weight
after heating for 24 hours
at 750°F. 5.5%
at 1000°F. 7.9%
at 1200°F. 9.8%
after boiling for 24 hours (after drying) 0.2%
resistance to abrasion
(conventional tumbling test-loss in weight after 10 min.)
before heating 2.2%
after heating for 24 hours
at 750°F. 3.7%
at 1000°F. 5.7%
at 1200°F. 6.9%
dimensional stability
linear shrinkage after heating for 24 hours
at 750°F. 0.8%
at 1000°F. 0.9%
at 1200°F. 1.5%
elongation after saturation (max.) 0.04%
moisture adsorption (volume)
after 6 hours exposure in atmosphere of 120°F. and 90% relative humidity 0.9%

thermal conductivity

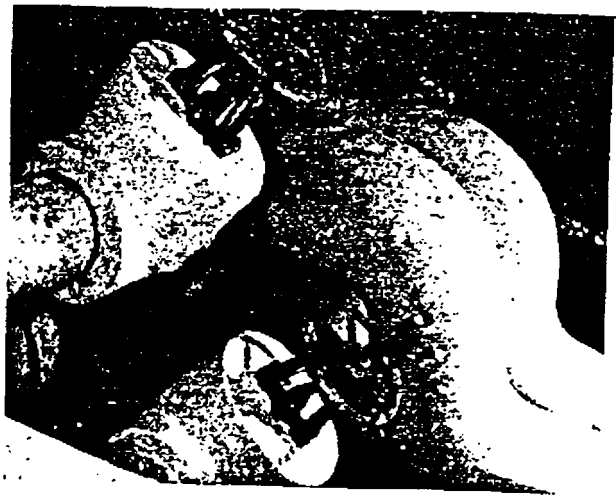


specification compliance

HH-I-523a Insulation Block, Pipe Covering and Cement, Thermal, Calcium Silicate (For Temperatures up to 1200°F.)
MIL-I-2781B Insulation Pipe Covering, Thermal



Kaylo Pipe Insulation applies easily and quickly with standard application methods.



Kaylo Pipe Insulation presents a superior final appearance when applied to a variety of irregularly-shaped high temperature vessels.

design data

The following data is presented to aid in the design of Kaylo Pipe Insulation modified to meet specific needs. Recommendations are generalized and should be modified to meet local conditions and job requirements.

recommended thicknesses

Economical thicknesses of insulation vary to a substantial degree in different industries principally because of:

1: Cost of fuel and operation time
2: Fixed charges or anticipated life of installation

Because these two factors vary greatly by industry, a single table of recommended thickness would be only an approximation. To approach more closely a true "Economical Thickness," the recommended thickness data on the following three pages is presented for three major industry groups:

1: Commercial and Industrial
2: Power and Utility
3: Process and Industries

exceptions

Economical Thickness recommendations may not apply where insulation is applied for process temperature control, personnel protection or fire protection for specific areas. Refer to Kaylo Performance Data Book for insulation design for such conditions. See pages 43-45.

Insulation thickness standards

This table presents reference data for information on the actual thicknesses according to the simplified Dimensional Standard system. See pages 46-47.

Insulation efficiencies

This table and graph enable making the determination of thermal efficiencies for thicknesses from 1"-5" for pipe to air temperatures from 100° to 1200°F. See page 47.

design data

6a
Ow

recommended thickness of Kaylo pipe insulation

COMMERCIAL AND INDUSTRIAL DESIGN

(Figures are based on ambient still air at 80° F)

pipe temp.	280F				480F				680F			
temperature difference	200F				400F				600F			
pipe size	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST
½	1″	32.5	76.1	106	2″	56	86.8	105	2½″	73.3	91.1	107
¾	1″	38.9	76.7	110	2″	59	87.8	108	2½″	81.8	91.9	109
1	1″	40.8	80.2	107	2″	64	89.2	107	3″	86.0	93.1	107
1¼	1½″	38.0	85.1	99	2½″	67	91.0	105	3½″	93.0	94.1	106
1½	1½″	42.6	85.3	101	2″	73.9	91.2	107	3½″	97.8	94.5	107
2	1½″	48.3	86.4	101	2½″	79.5	92.3	106	3½″	108.0	95.1	108
2½	1½″	50.0	88.2	99	2″	94	92.4	110	3½″	115.0	95.6	107
3	1½″	63.7	87.5	103	2½″	102	93.2	109	4″	125.0	96.1	107
4	1½″	76.8	88.0	105	2½″	120	93.7	110	4″	145.0	96.4	109
5	1½″	91.4	88.3	106	3″	124	94.6	106	4″	164.0	96.7	109
6	1½″	107	88.4	107	3″	141	94.8	108	4½″	172.0	97.1	107
7	1½″	116	88.9	107	3″	152	95.1	107	4½″	188.0	97.2	108
8	1½″	129	89.0	107	3″	167	95.2	108	4½″	206.0	97.3	109
9	1½″	142	89.1	108	3″	181	95.4	109	4½″	222.0	97.4	110
10	1½″	151	89.6	107	3″	200	95.4	110	5″	226.0	97.6	108
12	1½″	174	89.8	108	3½″	206	95.9	107	5″	256	97.7	109
14	1½″	202	89.1	110	3½″	227	95.9	108	5″	280	97.7	110
16	2″	182	91.3	104	3½″	253	96.0	108	5½″	293	97.9	108
18	2″	202	91.4	104	3½″	280	96.0	109	5½″	321	97.9	109
20	2″	222	91.4	104	3½″	305	96.1	109	5½″	350	97.9	110
24	2″	262	91.5	105	3½″	358	96.1	110	5½″	400	98.0	110

T—Recommended Thickness. HL—Heat Loss Btu/Lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

piping to 1200°F.

Kaylo pipe insulation

design data

recommended thickness of Kaylo pipe insulation

POWER AND UTILITY INDUSTRIES

(Figures are based on ambient still air at 80° F)

pipe temp.	280F				480F				680F				880F				1080F				1280F			
temperature difference	200F				400F				600F				800F				1000F				1200F			
pipe size	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST
½	1"	32.5	76.1	106	1½"	58.4	85.2	113	2"	83.6	89.8	118	2½"	104	93.0	116	3"	128	94.8	116	3½"	150	96.1	115
¾	1"	38.9	76.7	110	1½"	67.4	86.0	117	2"	95.0	90.6	122	2½"	116	93.7	120	3"	143	95.3	122	3½"	170	96.5	123
1	1"	40.8	80.2	107	1½"	73.4	87.7	116	2"	103	91.8	121	2½"	132	94.2	124	3½"	155	95.8	122	3½"	193	96.8	125
1¼	1"	52.0	79.6	113	1½"	82.2	88.9	117	2½"	108	93.1	117	3"	140	95.1	122	3½"	172	96.6	124	4"	203	97.4	125
1½	1"	52.6	81.8	110	1½"	92.3	89.0	121	2½"	119	93.3	121	3"	158	95.3	125	3½"	178	96.8	122	4"	206	97.6	121
2	1"	60.8	82.9	111	1½"	105	89.9	122	2½"	128	94.2	119	3"	165	95.9	124	4"	190	97.2	121	4½"	228	97.9	125
2½	1"	69.9	83.5	112	1½"	108	91.3	117	2½"	151	94.3	124	3"	164	96.1	122	4"	204	97.5	121	4½"	245	98.1	125
3	1"	82.6	83.7	114	2"	116	92.2	115	2½"	164	94.9	123	3½"	190	96.8	121	4½"	222	97.7	121	5"	263	98.3	124
4	1"	98.2	84.7	114	2"	139	92.7	118	3"	172	95.8	118	3½"	222	97.0	124	4½"	252	98.0	123	5½"	295	98.4	125
5	1"	120	84.7	116	2"	164	92.9	119	3"	199	96.0	120	4"	233	97.5	120	4½"	288	98.1	125	5½"	328	98.5	125
6	1"	156	83.0	122	2"	185	93.2	120	3"	227	96.1	122	4"	262	97.6	122	5"	305	98.5	123	6"	355	98.7	125
7	1½"	116	88.9	107	2"	206	93.4	121	3"	244	96.4	121	4"	288	97.7	123	5"	333	98.5	124	6"	384	98.8	127
8	1½"	129	89.0	107	2"	228	93.5	122	3"	268	96.5	122	4"	315	97.8	124	5"	362	98.5	125	6"	420	98.9	129
9	1½"	142	89.1	108	2"	238	93.9	120	3"	291	96.6	123	4"	340	97.7	125	5½"	376	98.6	124	6"	456	98.9	130
10	1½"	151	89.6	107	2"	267	93.8	122	3"	322	96.6	125	4½"	344	98.0	122	5½"	405	98.7	125	6"	498	98.9	132
12	1½"	174	89.8	108	2"	308	93.9	123	3½"	330	97.0	120	4½"	391	98.1	123	6"	444	98.8	124	6"	564	99.0	135
14	1½"	202	89.1	110	2½"	294	94.7	118	3½"	366	97.0	122	4½"	429	98.1	125	6"	482	98.8	126	6"	614	99.0	138
16	1½"	228	89.1	111	2½"	330	94.8	119	3½"	407	97.0	123	5"	441	98.3	122	6"	525	98.8	127	6"	688	99.0	139
18	1½"	253	89.2	111	2½"	366	94.8	119	3½"	450	97.1	124	5"	484	98.3	123	6"	584	98.9	128	6"	740	99.0	140
	1½"	279	89.2	111	2½"	401	94.9	120	3½"	494	97.1	125	5"	526	98.3	123	6"	636	98.9	129	6"	810	99.1	141
24	1½"	331	89.2	111	2½"	472	94.9	121	4"	517	97.5	120	5"	613	98.4	125	6"	740	98.9	131	6"	925	99.1	143

T—Recommended Thickness. HL—Heat Loss Btu/Lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

design data

recommended thickness of Kaylo pipe insulation

PROCESS INDUSTRY

(Figures are based on ambient still air at 80° F)

pipe temp.	280F				480F				680F				880F				1080F				1280F			
temperature difference	200F				400F				600F				800F				1000F				1200F			
pipe size	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST	T	HL	E	ST
½	1"	32.5	76.1	106	1"	70.8	82.0	130	1½"	129	88.5	129	1½"	134	90.8	145	2"	158	93.6	144	2½"	175	95.5	137
¾	1"	38.9	76.7	110	1"	84.5	82.5	136	1½"	108	89.3	136	2"	135	92.5	137	2"	179	94.2	150	2½"	196	95.9	142
1	1"	40.8	80.2	107	1"	89.0	85.0	132	1½"	118	90.6	135	2"	147	93.5	136	2½"	188	95.6	139	2½"	225	96.3	141
1¼	1"	52.0	79.6	113	1"	114	84.6	144	1½"	132	91.6	136	2"	173	93.9	144	2½"	203	95.7	144	3"	236	96.9	143
1½	1"	52.6	81.8	110	1"	115	86.3	138	1½"	148	91.7	141	2"	169	94.8	135	2½"	224	95.9	149	3"	259	97.0	150
2	1"	60.8	82.9	111	1"	133	87.2	140	1½"	169	92.3	143	2"	204	94.9	144	2½"	241	96.4	146	3"	279	97.2	147
2½	1"	69.9	83.5	112	1"	152	87.7	143	1½"	174	93.4	136	2"	216	95.6	140	2½"	256	96.9	143	3"	298	97.7	148
3	1"	82.6	83.7	114	1"	180	87.9	146	1½"	222	93.0	149	2½"	234	96.0	136	3"	279	97.2	142	3½"	321	97.9	144
4	1"	98.2	84.7	114	1"	215	88.6	147	2"	222	94.5	136	2½"	276	96.3	142	3"	323	97.4	144	3½"	375	98.1	147
5	1"	120	84.7	116	1½"	199	91.4	131	2"	262	94.7	139	2½"	318	96.5	144	3"	375	97.6	148	4"	393	98.4	149
6	1"	156	83.0	122	1½"	232	91.5	133	2"	297	94.9	140	2½"	364	96.6	147	3½"	380	98.1	140	4"	441	98.5	149
7	1½"	116	88.9	107	1½"	252	91.9	132	2"	332	95.1	142	2½"	405	96.7	148	3½"	417	98.2	142	4"	486	98.6	149
8	1½"	129	89.0	107	1½"	280	92.0	133	2"	366	95.2	143	2½"	431	96.9	147	3½"	456	98.1	143	4"	532	98.6	149
9	1½"	142	89.1	108	1½"	307	92.1	134	2"	384	95.5	141	2½"	470	97.0	148	3½"	495	98.1	145	4"	576	98.6	150
10	1½"	151	89.6	107	1½"	328	92.4	133	2"	430	95.4	143	3"	458	97.4	141	3½"	545	98.2	147	4½"	581	98.8	149
12	1½"	174	89.8	108	1½"	380	92.5	134	2"	496	95.5	145	3"	526	97.4	142	3½"	623	98.2	149	4½"	660	98.8	149
14	1½"	202	89.1	110	1½"	439	92.1	138	2"	566	95.3	149	3"	585	97.4	145	4"	624	98.4	144	4½"	725	98.8	150
16	1½"	228	89.1	111	1½"	496	92.1	139	2"	636	95.4	150	3"	655	97.4	147	4"	694	98.4	145	5"	742	98.9	149
18	1½"	253	89.2	111	1½"	553	92.2	140	2½"	589	96.2	139	3"	725	97.5	148	4"	764	98.4	147	5"	815	99.0	149
20	1½"	279	89.2	111	1½"	608	92.2	141	2½"	646	96.2	140	3"	794	97.5	149	4"	835	98.5	147	5"	888	99.0	149
24	1½"	331	89.2	111	1½"	721	92.2	141	2½"	759	96.3	141	3½"	819	97.8	141	4"	976	98.5	149	5"	1032	99.0	149

T—Recommended Thickness. HL—Heat Loss/lin. ft./hr. E—Insulation Efficiency. ST—Surface Temperature.

design data

insulation thickness standards

IRON PIPE SIZES (IPS)

nom. pipe size	O.D. of pipe	single layer only				single or double layer						multiple layer only							
		nom. 1"		nom. 1½"		nom. 2"		nom. 2½"		nom. 3"		nom. 3½"		nom. 4"		nom. 4½"		nom. 5"	
		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.
½"	.84	1.00	2.88	1.56	4.00	2.06	5.00	2.89	6.66	3.39	7.66								
¾"	1.05	.90	2.88	1.46	4.00	1.96	5.00	2.79	6.66	3.29	7.66								
1"	1.32	1.08	3.50	1.58	4.50	2.11	5.56	2.66	6.66	3.16	7.66								
1¼"	1.66	.90	3.50	1.66	5.00	1.94	5.56	2.48	6.66	2.98	7.66								
1½"	1.90	1.03	4.00	1.53	5.00	2.36	6.66	2.86	7.66	3.36	8.86								
2"	2.38	1.04	4.50	1.57	5.56	2.12	6.66	2.62	7.66	3.12	8.66	3.62	9.66	4.18	10.78	4.68	11.78	5.20	12.81
2½"	2.88	1.04	5.00	1.87	6.66	2.37	7.66	2.87	8.66	3.37	9.66	3.93	10.78	4.43	11.78	4.95	12.81	5.57	14.06
3"	3.50	1.00	5.56	1.55	6.66	2.05	7.66	2.55	8.66	3.05	9.66	3.61	10.78	4.11	11.78	4.63	12.81	5.25	14.06
3½"	4.00	1.30	6.66	1.80	7.66	2.30	8.66	2.80	9.66	3.36	10.78	3.86	11.78	4.38	12.81	5.00	14.06	5.50	15.06
4"	4.50	1.05	6.66	1.55	7.66	2.05	8.66	2.55	9.66	3.11	10.78	3.61	11.78	4.13	12.81	4.75	14.06	5.25	15.06
4½"	5.00	1.30	7.66	1.80	8.66	2.30	9.66	2.86	10.78	3.36	11.78	3.88	12.81	4.50	14.06	5.00	15.06	5.51	16.09
5"	5.56	1.02	7.66	1.52	8.66	2.02	9.66	2.58	10.78	3.08	11.78	3.59	12.81	4.22	14.06	4.72	15.06	5.23	16.09
6"	6.63	.95	8.66	1.45	9.66	2.02	10.78	2.52	11.78	3.03	12.81	3.66	14.06	4.16	15.06	4.68	16.09	5.13	17.00
7"	7.63			1.52	10.78	2.02	11.78	2.53	12.81	3.16	14.06	3.66	15.06	4.17	16.09	4.63	17.00	5.13	18.00
8"	8.63			1.52	11.78	2.03	12.81	2.66	14.06	3.16	15.06	3.67	16.09	4.13	17.00	4.63	18.00	5.13	19.00
9"	9.63			1.53	12.81	2.16	14.06	2.66	15.06	3.17	16.09	3.63	17.00	4.13	18.00	4.63	19.00	5.13	20.00
10"	10.75			1.59	14.06	2.09	15.06	2.61	16.09	3.06	17.00	3.56	18.00	4.06	19.00	4.56	20.00	5.06	21.00
11"	11.75			1.58	15.06	2.09	16.09	2.55	17.00	3.05	18.00	3.55	19.00	4.05	20.00	4.54	21.00	4.55	22.00
12"	12.75			1.59	16.09	2.05	17.00	2.55	18.00	3.05	19.00	3.55	20.00	4.05	21.00	4.54	22.00	4.55	23.00
14"	14.00			1.42	17.00	1.92	18.00	2.42	19.00	2.92	20.00	3.42	21.00	3.92	22.00	4.42	23.00	4.92	24.00
15"	15.00			1.42	18.00	1.92	19.00	2.41	20.00	2.92	21.00	3.42	22.00	3.92	23.00	4.41	24.00	4.92	25.00
16"	16.00			1.41	19.00	1.91	20.00	2.41	21.00	2.91	22.00	3.41	23.00	3.91	24.00	4.41	25.00	4.91	26.00
17"	17.00			1.41	20.00	1.91	21.00	2.41	22.00	2.91	23.00	3.41	24.00	3.91	25.00	4.41	26.00	4.91	27.00
18"	18.00			1.41	21.00	1.91	22.00	2.41	23.00	2.91	24.00	3.41	25.00	3.91	26.00	4.41	27.00	4.91	28.00
19"	19.00			1.41	22.00	1.91	23.00	2.41	24.00	2.91	25.00	3.41	26.00	3.91	27.00	4.41	28.00	4.91	29.00
20"	20.00			1.41	23.00	1.91	24.00	2.41	25.00	2.91	26.00	3.41	27.00	3.91	28.00	4.41	29.00	4.91	30.00
21"	21.00			1.41	24.00	1.91	25.00	2.41	26.00	2.91	27.00	3.41	28.00	3.89	29.00	4.41	30.00	4.91	31.00
22"	22.00			1.41	25.00	1.91	26.00	2.41	27.00	2.91	28.00	3.39	29.00	3.89	30.00	4.41	31.00	4.91	32.00
23"	23.00			1.41	26.00	1.91	27.00	2.41	28.00	2.91	29.00	3.39	30.00	3.89	31.00	4.41	32.00	4.91	33.00
24"	24.00			1.41	27.00	1.91	28.00	2.41	29.00	2.91	30.00	3.39	31.00	3.89	32.00	4.41	33.00	5.00	34.00
25"	25.00			1.46	28.00	1.98	29.00	2.50	30.00	3.02	31.00	3.44	32.00	3.96	33.00	4.48	34.00	5.00	35.00
26"	26.00			1.46	29.00	1.98	30.00	2.50	31.00	3.02	32.00	3.44	33.00	3.96	34.00	4.48	35.00	5.00	36.00
27"	27.00			1.46	30.00	1.98	31.00	2.50	32.00	3.02	33.00	3.44	34.00	3.96	35.00	4.48	36.00	5.00	37.00
28"	28.00			1.46	31.00	1.98	32.00	2.50	33.00	3.02	34.00	3.44	35.00	3.96	36.00	4.48	37.00	5.00	38.00
29"	29.00			1.46	32.00	1.98	33.00	2.50	34.00	3.02	35.00	3.44	36.00	3.96	37.00	4.48	38.00	5.00	39.00
30"	30.00			1.46	33.00	1.98	34.00	2.50	35.00	3.02	36.00	3.44	37.00	3.96	38.00	4.48	39.00	5.00	40.00
31"	31.00			1.46	34.00	1.98	35.00	2.50	36.00	3.02	37.00	3.44	38.00	3.96	39.00	4.48	40.00	5.00	41.00
32"	32.00			1.46	35.00	1.98	36.00	2.50	37.00	3.02	38.00	3.44	39.00	3.98	40.00	4.48	41.00	5.00	42.00
33"	33.00			1.46	36.00	1.98	37.00	2.50	38.00	3.02	39.00	3.48	40.00	3.98	41.00	4.48	42.00	5.00	43.00
34"	34.00			1.46	37.00	1.98	38.00	2.50	39.00	3.02	40.00	3.48	41.00	3.98	42.00	4.48	43.00	5.00	44.00
35"	35.00			1.46	38.00	1.98	39.00	2.50	40.00	3.02	41.00	3.48	42.00	3.98	43.00	4.48	44.00	5.00	45.00
36"	36.00			1.46	39.00	1.98	40.00	2.50	41.00	3.02	42.00	3.48	43.00	3.98	44.00	4.48	45.00	5.00	46.00
37"	37.00			1.46	40.00	1.98	41.00	2.50	42.00	3.02	43.00	3.48	44.00	3.98	45.00	4.48	46.00	5.00	47.00
38"	38.00			1.46	41.00	1.98	42.00	2.50	43.00	3.02	44.00	3.48	45.00	3.98	46.00	4.48	47.00	5.00	48.00
39"	39.00			1.46	42.00	1.98	43.00	2.50	44.00	3.02	45.00	3.48	46.00	3.98	47.00	4.48	48.00	5.00	49.00

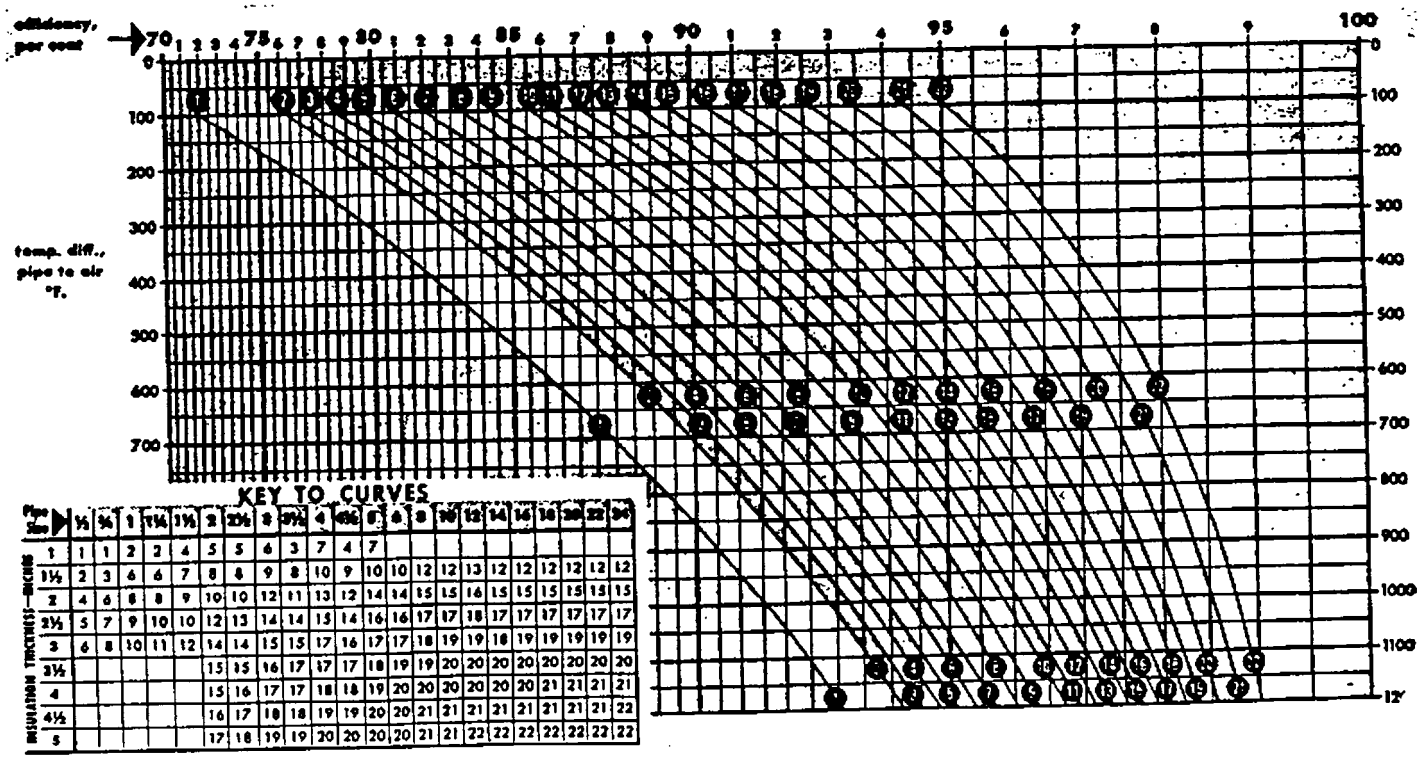
design data

insulation thickness standards

COPPER TUBING (CT)

O.D. of tube (nom.)	nom. tube size	single layer			
		nom. 1"		nom. 1½"	
		actual	O.D.	actual	O.D.
½"	⅜"	1.18	2.88	1.49	3.50
⅝"	½"	1.11	2.88	1.42	3.50
¾"	⅝"	1.05	2.88	1.61	4.00
⅞"	¾"	.99	2.88	1.55	4.00
1⅛"	1"	1.17	3.50	1.42	4.00
1⅜"	1¼"	1.05	3.50	1.55	4.50
1⅝"	1½"	1.17	4.00	1.42	4.50
2⅛"	2"	.91	4.00	1.41	5.00
2⅝"	2½"	.91	4.50	1.45	5.56
3⅛"	3"	.91	5.00	1.73	6.66

insulation efficiencies



KEY TO CURVES

Pipe size ▶	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	8	10	12	14	16	18	20	22	24
1	1	1	2	2	4	5	5	6	3	7	4	7										
1½	2	3	6	6	7	8	8	9	8	10	9	10	10	12	12	13	12	12	12	12	12	12
2	4	6	8	8	9	10	10	12	11	13	12	14	14	15	15	16	15	15	15	15	15	15
2½	5	7	9	10	10	12	13	14	14	15	14	16	16	17	17	18	17	17	17	17	17	17
3	6	8	10	11	12	14	14	15	15	17	16	17	17	18	19	19	18	19	19	19	19	19
3½						15	15	16	17	17	17	18	19	19	20	20	20	20	20	20	20	20
4						15	16	17	17	18	18	19	20	20	20	20	20	21	21	21	21	21
4½						16	17	18	18	19	19	20	20	21	21	21	21	21	21	21	21	22
5						17	18	19	19	20	20	20	20	21	21	22	22	22	22	22	22	22

INSULATION THICKNESS—INCHES

specification

for insulation of piping with Kaylo pipe insulation

1: Insulating materials

All heated pipes shall be insulated to the thickness noted on drawings or as shown in the following table with Kaylo Pipe Insulation as distributed by Owens-Corning Fiberglas Corporation.

TABLE OF RECOMMENDED INSULATION THICKNESS

Recommended Thicknesses vary according to use.

(See pages 43-45 for Complete Recommended Thickness Table.)

2: Application

All Pipe Insulation shall be applied over clean, dry surfaces, butting adjoining sections firmly together. Insulation on pipes under 12" diameter shall have factory-applied canvas pasted neatly in place and be secured with factory furnished bands spaced on not greater than 18" centers.

Insulation on pipes over 12" diameter and all outdoor piping shall be wired in place with 16 gauge soft annealed wire on no greater than 9" centers. Where double layer insulation is applied, the first layer shall be wired in place without jacket; the second layer shall be applied with all joints staggered.

All flanges, valves and fittings shall be insulated with fabricated mitered segments of pipe insulation equal in thickness to the insulation on the adjoining pipe. Fittings on pipe size of 3" and smaller may be insulated with insulating cement of equal thickness.

3: Surface finish

Indoor piping under 12" diameter not subject to abrasion or mechanical abuse requires no finish in addition to the factory-furnished canvas and bands. Piping over 12" diameter shall be finished with 6-ounce canvas pasted in place.

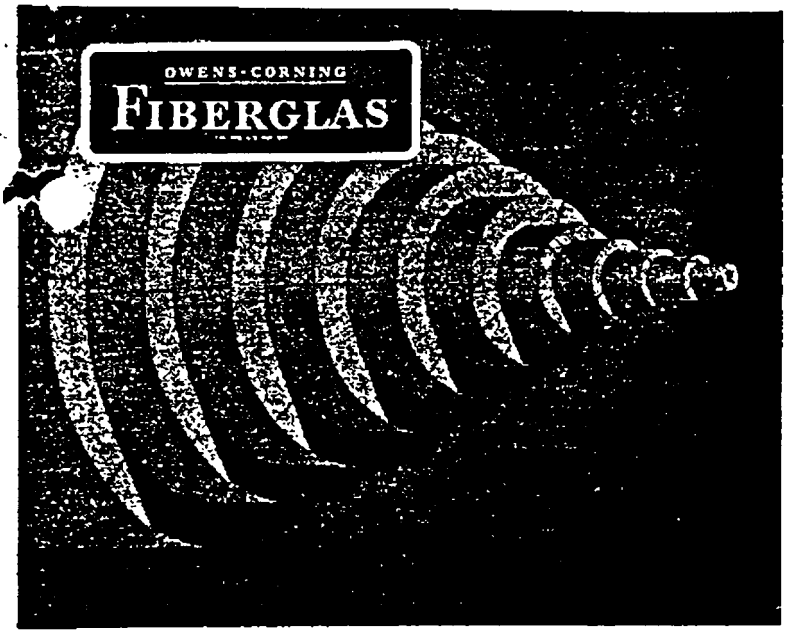
Piping located outdoors shall be finished with 45-lb. roofing felt jacket with all joints lapped not less than 2". Jackets shall be wired with 16 ga. copper wire on not greater than 9" centers or banded on 12" centers with ½" galvanized bands. Other suitable weatherproof jackets such as metal, asphalt or plastic coating may be applied according to the jacket manufacturers' specifications.

Insulation on flanges, valves and fittings shall be covered with a ¼" coat of finishing cement. Portland cement to a maximum of 25% dry weight may be added if a harder finish is desired. Insulation located indoors shall be further finished with canvas neatly pasted in place.

All insulation on flanges, valves and fittings located outdoors shall be covered with asphalt weatherproof mastic reinforced with an open mesh glass fabric. Mastic shall be applied in sufficient thickness to give a ⅛" dry coat and shall be troweled neatly over the fitting and lapped over the jacket on the adjacent pipe.

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The specification is recommended as written. Minor variances of application procedure may be made at the discretion and responsibility of the design engineer to meet specific job requirements.



piping to 1800°F.

Kayl.-20 pipe insulatio

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July, 195

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high temperature insulation and fireproofing for indoor or outdoor piping up to 1800°F. operating temperature

Kaylo-20 pipe insulation

Kaylo-20 Insulation, a new high-temperature calcium silicate heat insulation developed and manufactured by Owens-Illinois extends the range of Kaylo Heat Insulation offered by Owens-Corning Fiberglas** to include temperatures up to 1800°F. with all the properties of moisture resistance and high strength of standard Kaylo material.*

This new product, which is a light pink color and can in this way be distinguished from standard Kaylo material, combines the most desirable physical characteristics of heat insulation materials to a degree not equalled by most other materials in its temperature range. It is designed for all high temperature applications including fireproofing.

jackets

canvas—Standard canvas jackets are provided at no additional charge with Kaylo-20 Sectional Pipe and Tube Insulation on thicknesses up to and including 2½". Bands are available for use with this product at a small additional charge and will be shipped only on request.

6 oz. and 8 oz. canvas jackets are available on all types, sizes and thicknesses of Kaylo-20 Pipe Insulation at additional charge. These jackets are factory applied on sectional pipe and tube insulation. On multi-segmental insulation, they are furnished but not adhered.

sizes

thickness—Kaylo-20 Pipe Insulation is available in thicknesses from 1" to 3" depending upon pipe size. Kaylo-20 Tube Insulation is available in thicknesses of 1" and 1½".

pipe sizes—Kaylo-20 Pipe Insulation is available to fit pipe from ½" to 39" in diameter. Kaylo-20 Tube Insulation in copper tubing sizes will fit tubing from ½" to 3⅛".

forms—Kaylo-20 Pipe Insulation is available in sectional or multi-segmental form depending upon pipe size. All insulation is furnished in 3' sections.

*T.M., Owens-Illinois Glass Co.
**T.M., Owens-Corning Fiberglas Corp

offers . . .

simplified dimensional standards—O.D.'s of insulation correspond to those of standard pipe assuring proper fit for each pipe size and permit nesting of insulation to build up greater thicknesses than those available in standard thicknesses. Kaylo-20 Insulation also may be used with outer layers of standard Kaylo or Fiberglas Pipe Insulation to provide the ultimate balance of cost and efficiency.

high efficiency—Kaylo-20 Insulation ranks among the most efficient insulations in its temperature range.

water resistance—Kaylo-20 Pipe Insulation retains an appreciable percentage of its strength even when saturated with water. After being soaked and then dried, it returns to its original thermal efficiency and strength without shrinkage or warping.

high strength—Kaylo-20 Insulation has flexural strength, compression strength and resistance to abrasion far above normal requirements for heat insulation, reducing breakage during installation and in service.

easy fabrication—Kaylo-20 Insulation can be cut, scored or sawed with ordinary tools of the trade. It is non-irritating to the skin and non-toxic.

low shrinkage—Kaylo-20 Insulation is highly dimensionally stable at the temperatures for which it is designed. Even at 1800°F. it will not crumble but retains its original form.

fireproofing—The resistance of this insulation to high temperatures makes it extremely useful for fireproofing piping.

limitations

Kaylo-20 material is designed for temperatures up to 1800°F. It should not be used when operating temperatures of piping exceed this limit.

it's the low [illegible] that counts

design data

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insulation thickness standards

IRON PIPE SIZES (IPS)

nom. pipe size	O.D. of pipe	single layer only				single or double layer					
		nom. 1"		nom. 1½"		nom. 2"		nom. 2½"		nom. 3"	
		actual	O.D.	actual	O.D.	actual	O.D.	actual	O.D.	actual	O.D.
½	.84	1.00	2.88	1.56	4.00	2.06	5.00	2.89	6.66	3.39	7.66
¾	1.05	.90	2.88	1.46	400.	1.96	5.00	2.79	6.66	3.29	7.66
1	1.32	1.08	3.50	1.58	4.50	2.11	5.56	2.66	6.66	3.16	7.66
1¼	1.66	.90	3.50	1.66	5.00	1.94	5.56	2.48	6.66	2.98	7.66
1½	1.90	1.03	4.00	1.53	5.00	2.36	6.66	2.86	7.66	3.36	8.66
2	2.38	1.04	4.50	1.57	5.56	2.12	6.66	2.62	7.66	3.12	8.66
2½	2.88	1.04	5.00	1.87	6.66	2.37	7.66	2.87	8.66	3.37	9.66
3	3.50	1.00	5.56	1.55	6.66	2.05	7.66	2.55	8.66	3.05	9.66
3½	4.00	1.30	6.66	1.80	7.66	2.30	8.66	2.80	9.66	3.36	10.78
4	4.50	1.05	6.66	1.55	7.66	2.05	8.66	2.55	9.66	3.11	10.78
4½	5.00	1.30	7.66	1.80	8.66	2.30	9.66	2.86	10.78	3.36	11.78
5	5.56	1.02	7.66	1.52	8.66	2.02	9.66	2.58	10.78	3.08	11.78
6	6.63	.95	8.66	1.45	9.66	2.02	10.78	2.52	11.78	3.03	12.81
7	7.63			1.52	10.78	2.02	11.78	2.53	12.81	3.16	14.06
8	8.63			1.52	11.78	2.03	12.81	2.66	14.06	3.16	15.06
9	9.63			1.53	12.81	2.16	14.06	2.66	15.06	3.17	16.09
10	10.75			1.59	14.06	2.09	15.06	2.61	16.09	3.06	17.00
11	11.75			1.58	15.06	2.09	16.09	2.55	17.00	3.05	18.00
12	12.75			1.59	16.09	2.05	17.00	2.55	18.00	3.05	19.00
14	14.00			1.42	17.00	1.92	18.00	2.42	19.00	2.92	20.00
15	15.00			1.42	18.00	1.92	19.00	2.41	20.00	2.92	21.00
16	16.00			1.41	19.00	1.91	20.00	2.41	21.00	2.91	22.00
17	17.00			1.41	20.00	1.91	21.00	2.41	22.00	2.91	23.00
18	18.00			1.41	21.00	1.91	22.00	2.41	23.00	2.91	24.00
19	19.00			1.41	22.00	1.91	23.00	2.41	24.00	2.91	25.00
20	20.00			1.41	23.00	1.91	24.00	2.41	25.00	2.91	26.00
21	21.00			1.41	24.00	1.91	25.00	2.41	26.00	2.91	27.00
22	22.00			1.41	25.00	1.91	26.00	2.41	27.00	2.91	28.00
23	23.00			1.41	26.00	1.91	27.00	2.41	28.00	2.91	29.00
24	24.00			1.41	27.00	1.91	28.00	2.41	29.00	2.91	30.00
25	25.00			1.46	28.00	1.98	29.00	2.50	30.00	3.02	31.00
26	26.00			1.46	29.00	1.98	30.00	2.50	31.00	3.02	32.00
27	27.00			1.46	30.00	1.98	31.00	2.50	32.00	3.02	33.00
28	28.00			1.46	31.00	1.98	32.00	2.50	33.00	3.02	34.00
29	29.00			1.46	32.00	1.98	33.00	2.50	34.00	3.02	35.00
30	30.00			1.46	33.00	1.98	34.00	2.50	35.00	3.02	36.00
31	31.00			1.46	34.00	1.98	35.00	2.50	36.00	3.02	37.00
32	32.00			1.46	35.00	1.98	36.00	2.50	37.00	3.02	38.00
33	33.00			1.46	36.00	1.98	37.00	2.50	38.00	3.02	39.00
34	34.00			1.46	37.00	1.98	38.00	2.50	39.00	3.02	40.00
35	35.00			1.46	38.00	1.98	39.00	2.50	40.00	3.02	41.00
36	36.00			1.46	39.00	1.98	40.00	2.50	41.00	3.02	42.00
37	37.00			1.46	40.00	1.98	41.00	2.50	42.00	3.02	43.00
38	38.00			1.46	41.00	1.98	42.00	2.50	43.00	3.02	44.00
39	39.00			1.46	42.00	1.98	43.00	2.50	44.00	3.02	45.00

COPPER TUBING (CT)

O.D. of tube (nom.)	nom. tube size	single layer			
		nom. 1"		nom. 1½"	
		actual	O.D.	actual	O.D.
½	⅜	1.18	2.88	1.49	3.50
⅝	½	1.11	2.88	1.42	3.50
¾	⅝	1.05	2.88	1.61	4.00
⅞	¾	.99	2.88	1.55	4.00
1⅛	1	1.17	3.50	1.42	4.00
1⅜	1¼	1.05	3.50	1.55	4.50
1⅜	1½	1.17	4.00	1.42	4.50
2⅛	2	.91	4.00	1.41	5.00
2⅝	2½	.91	4.50	1.45	5.56
3⅛	3	.91	5.00	1.73	6.66

◀ Sizes above 3" available in multiple layers

Note: Insulation for the nominal pipe size range of 25"-39" is furnished to fit a range of 5 pipe sizes. The last segment applied must be cut to fit accurately.

specification

for insulation of piping
with Kaylo-20 pipe insulation

1: Insulating materials

All heated pipes shall be insulated to the thickness noted on drawings or as shown in the following table with Kaylo 20 Pipe Insulation as distributed by Owens-Corning Fiberglas Corporation.

TABLE OF RECOMMENDED INSULATION THICKNESS

Recommended Thicknesses vary according to use.

(See pages 50-51 for Complete Recommended Thickness Table.)

2: Application

All Pipe Insulation shall be applied over clean, dry surfaces, butting adjoining sections firmly together. Insulation on pipes under 12" diameter shall have factory-applied canvas pasted neatly in place and be secured with factory furnished bands spaced on not greater than 18" centers.

Insulation on pipes over 12" diameter and all outdoor piping shall be wired in place with 16 gauge soft annealed wire on no greater than 9" centers. Where double layer insulation is applied, the first layer shall be wired in place without jacket; the second layer shall be applied with all joints staggered.

All flanges, valves and fittings shall be insulated with fabricated mitered segments of pipe insulation equal in thickness to the insulation on the adjoining pipe. Fittings on pipe size of 3" and smaller may be insulated with a suitable insulating or refractory cement of equal thickness.

3: Surface finish

Indoor piping under 12" diameter not subject to abrasion or mechanical abuse requires no finish in addition to the factory-furnished canvas and bands. Piping over 12" diameter shall be finished with 6-ounce canvas pasted in place.

Piping located outdoors shall be finished with 45-lb. roofing felt jacket with all joints lapped not less than 2". Jackets shall be wired with 16 ga. copper wire on not greater than 9" centers or banded on 12" centers with ½" galvanized bands. Other suitable weatherproof jackets such as metal, asphalt or plastic coating may be applied according to the jacket manufacturers' specifications.

Insulation on flanges, valves and fittings shall be covered with a ¼" coat of finishing cement. Portland cement to a maximum of 25% dry weight may be added if a harder finish is desired. When located indoors, finish with canvas neatly pasted in place.

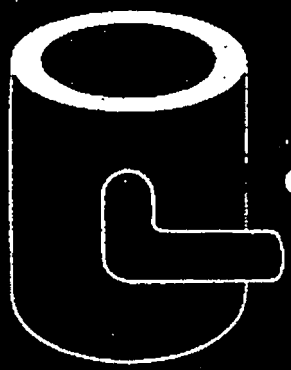
When located outdoors, cover with asphalt weatherproof mastic reinforced with an open mesh glass fabric. Mastic shall be applied in sufficient thickness to give a ⅛" dry coat and shall be troweled neatly over the fitting and lapped over the jacket on the adjacent pipe.

The specification is recommended as written. Minor variances of application procedure may be made at the discretion and responsibility of the design engineer to meet specific job requirements.

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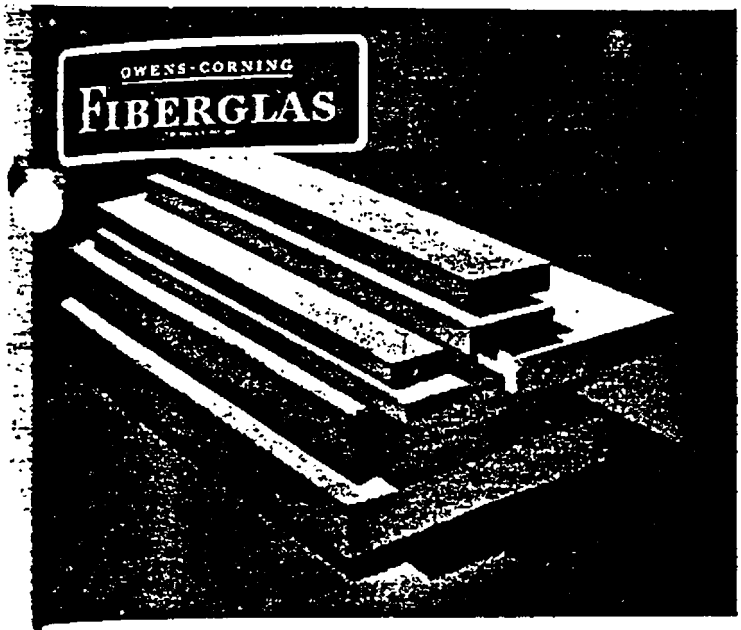
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OWENS-CORNING
FIBERGLAS



equipment insulations

equipment insulations



high temperature insulation for heated equipment up to 1200°F.

Kaylo block insulation

Kaylo Block Insulation, a white, rigid hydrous calcium silicate heat insulation developed and manufactured by Owens-Illinois Glass Company and distributed nationally by Owens-Corning Fiberglas Corporation, effectively insulates indoor and outdoor heated equipment up to 1200°F. Kaylo Block Insulation offers excellent heat insulation, high strength and moisture resistance to a variety of high temperature installations. A chemically-reacted material, it contains asbestos fibers for reinforcement. Kaylo Block Insulation combines the most desirable physical characteristics of heat insulating materials to a degree not equalled by most other materials on the market. This means outstanding performance and economical application for the user.*

offers . . .

high efficiency—Low "k" places it among the most efficient insulations in its temperature range. Eliminates the need of two dissimilar materials in the temperature range of 600°F. to 1200°F. Insulating effectiveness results from countless tiny entrapped air pockets.

water resistance—Retains an appreciable percentage of its strength even when saturated with water. Returns to its original strength and efficiency if briefly wetted, with no shrinkage or warpage.

high strength—Exhibits light weight, superior flexural strength, and resistance to abrasion to a degree far above normal requirements for a heat insulation. Reduced breakage during installation and in service. Temperatures up to 1200°F. have no effect on its strength.

easy fabrication—Ordinary tools of the trade sufficient for all cutting, scoring or sawing. Light weight, pleasant handling and non-irritating, non-toxic nature make it a well-liked worker's material.

low shrinkage—Remains effective after long service at high temperatures. Dimensionally stable, it shows little shrinkage even after exposure to high temperatures. Won't crumble but retains its original form.

versatility—Performs efficiently on temperatures through the hot water and low pressure steam range in addition to temperatures in the superheated steam range.

beveled lags

For pipe sizes greater than those for which Kaylo Insulation sizes are available, Kaylo Beveled Lags may be used to insulate piping. These lags are blocks of Fiberglas Insulation beveled to fit snugly on large standard sizes of heated piping. Lags beveled to fit pipes from 18" to 36" in diameter are available in thicknesses of 1½", 2" 2½", and 3"; 36" long.

sizes

width—3", 6", 12" and 18"

length—18" to 36"

thicknesses—1", 1½", 2", 2½" and 3"

form—block

limitations

Kaylo Block Insulation is designed for application on high temperature equipment operating up to 1200°F. It should not be used on vessels operating above that limit. For underground use, it requires a good moisture and vapor barrier. On outdoor use, it should be protected with a weatherproof finish. All values given are subject to normal manufacturing and testing tolerances.

*T. M. Owens-Illinois Glass Company

physical properties

density: approximately 11 lb. per cu. ft.

flexural strength: 50 lb./sq. in.

compressive strength: (at 5% deformation)
before heating
144 lb./sq. in. at 1000°F.; 123 lb./sq. in. at 1200°F.
150 lb./sq. in. at 750°F.; 117 lb./sq. in.
after boiling for 24 hr., 74 lb./sq. in. (cubic mold)

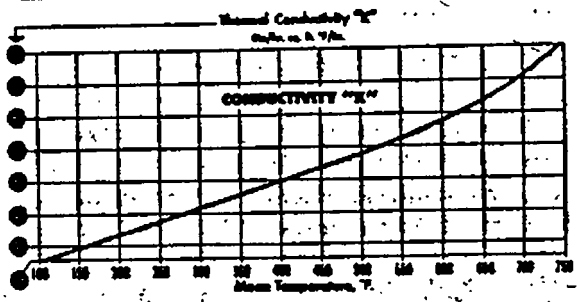
loss in weight: after heating for 24 hr.
at 750°F.–5.5% at 1000°F.–7.9% at 1200°F.–9.8%
after boiling for 24 hr. (aft. dry) –0.2%

resistance to abrasion: (weight loss after 10 min.)
before heating 2.2%
(after heating for 24 hr.)
at 750°F.–3.7% at 1000°F.–5.7% at 1200°F.–6.9%

dimensional stability: linear shrinkage after heating for 24 hours
at 750°F.–0.8% at 1000°F.–0.9% at 1200°F.–1.5%
elongation after saturation (max.) 0.04%

moisture adsorption: (volume)
(after 6 hours exposure in atmosphere of 120°F. and 90% relative humidity) 0.9%

thermal conductivity



design data

recommended thicknesses

(ambient temperature 80° F.)

equipment temperature	COMMERCIAL RT	COMMERCIAL HL	COMMERCIAL E	COMMERCIAL ST	POWER RT	POWER HL	POWER E	POWER ST	PROCESS RT	PROCESS HL	PROCESS E	PROCESS ST
to 200	1	41	84.8	105	1	41	84.8	105	1	41	84.8	105
201-300	2	43	92.8	106	1	78	87.2	124	1	78	87.2	124
300-400	3	45	95.9	106	1½	83	92.3	125	1	119	89.1	142
400-500	4	46	97.0	107	2½	72	95.8	120	1½	115	93.4	140
600	5	48	98.2	108	3	79	96.9	123	1½	148	94.2	153
700					3½	83	97.7	125	2	140	96.1	151
800	not applicable				4½	79	98.4	124	2½	137	97.2	150
900					5	84	98.9	126	3	135	97.9	149
1000					6	79	99.0	124	3½	136	98.4	148
1100					6½	83	99.2	125	4	136	98.8	148
1200					7	89	99.3	127	4½	138	99.0	149

RT—Rec. Thick HL—Heat Loss E—Efficiency ST—Surface Temp.

specification

for the insulation of heated equipment with Kaylo block insulation

1: Insulating material

All high temperature equipment shall be insulated with..... thick Kaylo Block Insulation as distributed by Owens-Corning Fiberglas Corporation.

2: Application methods

FOR CURVED SURFACES OVER 39" O.D.—Hold in place with ½" galvanized steel bands on work up to 48" diameter and ¾" bands on work over 48" diameter. Bands to be spaced on 12-18 inch centers. Point-up and then apply hexagonal wire mesh or metal lath, wiring to bands and laced edges. Note: The maximum temperature for the bands should be established by the metal band manufacturer due to the expansion of the equipment when heated.

FOR FLAT SURFACES—Hold in place with 6 gauge annealed wire or ⅛" wire cables attached to welded rods or studs. Point-up and then apply hexagonal wire mesh or metal lath over entire surface. Securely fasten down and lace the edges.

FOR IRREGULAR SURFACES—Apply a filler coat of insulating cement to cover the high points of all irregularities. Trowel to a level surface before applying blocks. Then follow recommended specifications, above, for flat surfaces.

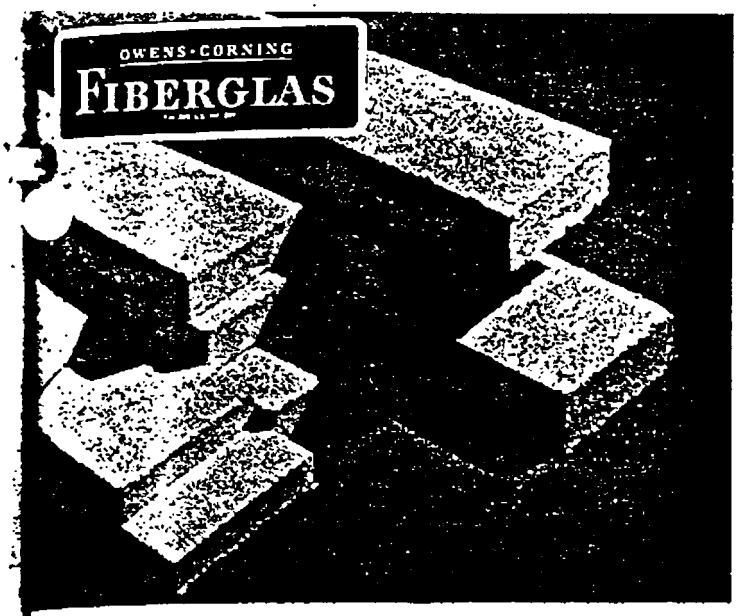
3: Finishing methods

MINIMUM INDOOR FINISH—(base for further finishes.) Apply ½" coat of mineral wool insulating cement. Let dry. Apply ¼" coat of finishing cement.

GOOD INDOOR FINISH—does not require painting. To minimum finish, apply 6 or 8 oz. canvas between coats of white lagging adhesive.

WEATHER RESISTANT FINISH FOR OUTDOOR WORK—Over minimum finish trowel two coats of a suitable asphalt or vinyl base weather resistant mastic reinforced with Fiberglas fabric between coats. Each coat to be at least ⅛" thick. Reinforce coating with open weave glass fabric.

The specification is recommended as written. Minor variances of application procedure may be made at the discretion and responsibility of the design engineer to meet specific job requirements.



high temperature insulation and fireproofing for heated equipment up to 1800°F.

Kaylo-20 block insulation

This new high temperature calcium silicate block insulation developed and manufactured by Owens-Illinois Glass Co. extends the use of Kaylo Equipment Insulation to include temperatures up to 1800°F. This new product adds increased temperature tolerance to the properties of moisture resistance, high strength and superior heat insulation performance of standard Kaylo Block Insulation.*

This new product which is colored a slight pink and in this way can be distinguished from standard Kaylo Insulation, brings the most desirable physical characteristics of heat insulation material to this high temperature range. It may be used as single layer insulation for flat surfaces up to 700°F. and in double layers from this temperature to 1800°F. or may be used as a first layer with standard Kaylo or Fiberglas Block.

The high temperature limit suits this product to all high temperature applications including refractory wall backing for furnaces and boilers and fireproofing of equipment and vessel skirts.

sizes

thicknesses: 1, 1½, 2, 2½, and 3 inches

widths: 3, 6, 12, and 18 inches

length: 18 and 36 inches

special forms: Curved block and thicknesses over three inches are available on special order.

Kaylo-20 beveled lags: For pipe sizes greater than those for which Kaylo-20 Pipe Insulation sizes are available, Kaylo-20 Beveled Lags may be used to insulate piping. These lags are blocks of Kaylo-20 Insulation, beveled to fit snugly on large standard sizes of heated piping. Lags beveled to fit pipes from 18" to 36" in diameter are available in thicknesses of 1½", 2", 2½" and 3". Lags are 36" long.

*T. M. Owens-Illinois Glass Company

offers . . .

high efficiency—The low coefficient of conductivity, or "k" of Kaylo-20 Block places it among the most efficient insulation in its temperature range.

water resistance—Kaylo-20 Block retains an appreciable percentage of its strength even when saturated with water. After soaking and then being dried, both in tests and in service, it returns to original efficiency and strength with no shrinkage or warpage.

high strength—Kaylo-20 Block combines light weight with superior flexural strength, compressive strength and resistance to abrasion. These properties, far above normal requirements for heat insulation, serve to reduce breakage during installation and in service. Even at 1800°F. this material retains its strength.

easy fabrication—Kaylo-20 Block can be cut, scored or sawed with ordinary tools of the trade. Light weight, pleasant handling and non-irritating and non-toxic nature contribute to worker well-being on the job.

low shrinkage—Kaylo-20 Block will remain effective after long service at high temperatures. Dimensionally stable, it shows little shrinkage even after exposure to temperatures up to 1800°F. It will not crumble but retains its original form.

fireproofing—The resistance of Kaylo-20 block to high temperatures makes it extremely useful material for fireproofing metal work.

limitations

Kaylo-20 Block is designed for temperatures up to 1800°F. It should not be used when operating temperatures exceed this limit.

Properties and characteristics have been determined from laboratory tests. Data is subject to change without notice and is subject to normal manufacturing and testing tolerances.

physical properties

density:
approximately 12 lbs. per cu. ft.

flexural strength:
50 lbs. per sq. in.

compressive strength:
100 lbs. per sq. in. at 5% deformation.

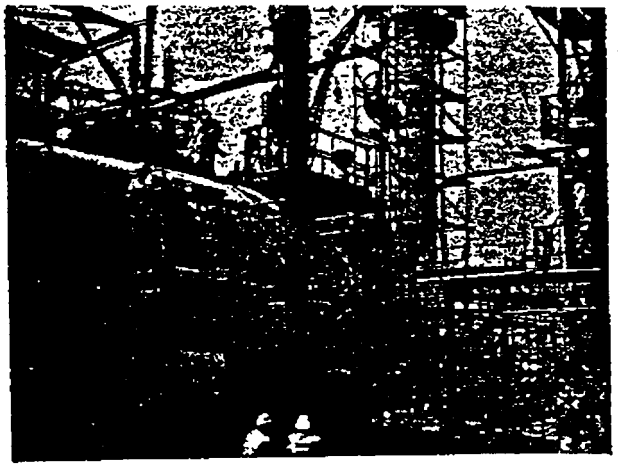
dimensional stability: (linear shrinkage after heating for 6 hours at 1800°F.) less than 1.5%.

moisture adsorption: (by volume after 6 hours exposure in atmosphere of 120°F. and 90% relative humidity) 0.9%.

working temperature:
up to 1800°F.



Kaylo Block can be easily cut with ordinary tools of the trade to fit around any obstruction.



Kaylo-20 Block may be attached to equipment with tie wires, laced tie wires or studs and speed clips or other accepted attaching methods. Finish may be cement over wire mesh or other standard finish for insulated equipment.

design data

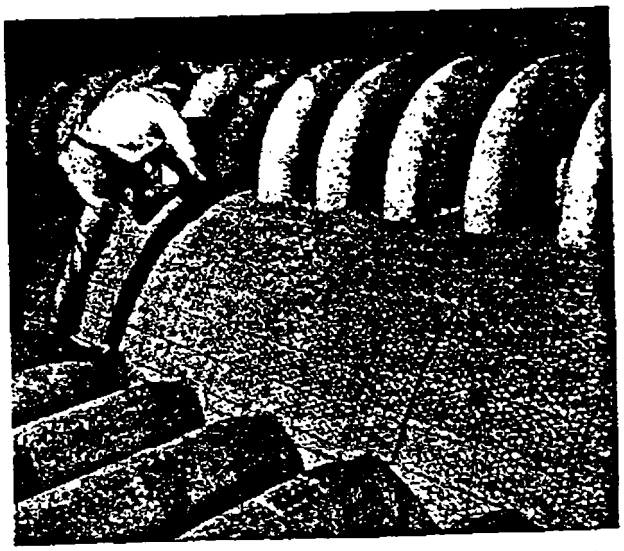
The table below presents recommended thicknesses of Kaylo Block for different temperatures of equipment. These are average figures and may be adjusted to meet special conditions encountered on specific jobs. Kaylo heat loss data is available for use where plant operating economics or other conditions may require special insulation engineering.

recommended thicknesses

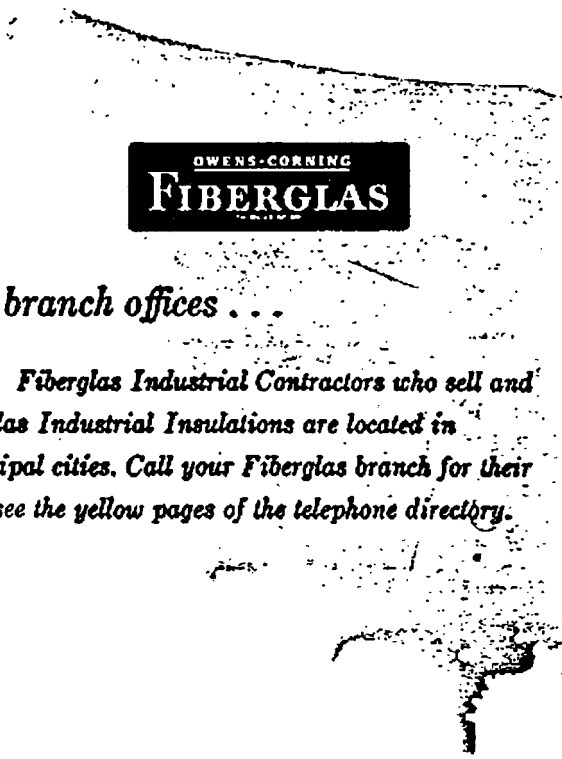
temp. diff: hot surface to air deg. F.
—80°F. ambient temperature

temp. diff.	1100	1200	1300	1400	1500	1600	1700	1800
thickness	5½	6	6½	7	7½	8	8½	9

For temperatures to 1200°F. use standard Kaylo block at recommended thicknesses.



Here, Kaylo Pipe and Block insulation are used to effectively insulate intricate high temperature equipment.



OWENS-CORNING
FIBERGLAS

branch offices . . .

Fiberglas Industrial Contractors who sell and apply Fiberglas Industrial Insulations are located in principal cities. Call your Fiberglas branch for their addresses or see the yellow pages of the telephone directory.

ALBANY, N. Y. Room 810, 11 North Pearl Street
ALBUQUERQUE, N. M. P.O. Box 7067, Old Town Station
ANCHORAGE, ALASKA Post Rd. & Ship Creek, P.O. Box 833
ATLANTA 3, GA. 1726 Fulton National Bank Building
BALTIMORE 1, MD. 409 Baltimore Life Building
BIRMINGHAM, ALA. 2229½ First Ave., North
BOISE, IDAHO 2525 Ark Street
BOSTON 16, MASS. 820 Statler Office Building
BUFFALO 2, N. Y. 401 Hodge Building
CHARLESTON, W. VA. 312 Berman Building, Virginia St.
CHARLOTTE, N. C. 1106 Johnston Building
CHICAGO 1, ILL. 3236 Pure Oil Building
CINCINNATI 6, OHIO Room 1031, 2330 Victory Parkway
CLEVELAND 15, OHIO 1024 Hanna Building
COLUMBUS 15, OHIO 2110 Leveque-Lincoln Tower
DALLAS 4, TEXAS 101 United Bankers Life Building
DAYTON 2, OHIO 129 N. Ludlow Street
DENVER 1, COLO. P.O. Box 806
DETROIT 2, MICH. 516-517 New Center Building
FORT WAYNE, IND. 255 Central Building
FRESNO, CALIF. 427 P Street
GRAND RAPIDS 2, MICH. 424 McKay Tower
GREENSBORO, N. C. 221 Watson Building
GREENVILLE, S. C. Room 216, Capers Building
HARTFORD, CONN. 36A Woodland Street
HOUSTON 19, TEXAS 1939 West Gray Street, Room 204
INDIANAPOLIS 4, IND. 625 Architects & Builders Building
JACKSONVILLE, FLA. Room 420, Atlantic National Bank Building
KANSAS CITY 10, MO. 2610 Power & Light Building
KNOXVILLE, TENN. 404 Burwell Building
LOS ANGELES 5, CALIF. 3445 W. Eighth Street
LOUISVILLE, KY. 2106 Hahn Street
MEMPHIS, TENN. 814 Dermon Building, 46 North Third Street
MIAMI, FLA. Box 987, Coral Gables, Fla.
MILWAUKEE 3, WIS. 7140 Plankinton Building
MINNEAPOLIS 2, MINN. 1700 Rand Tower
MOBILE, ALA. P.O. Box 995
NEWARK 2, N. J. 1625 Broad Street
NEW ORLEANS 12, LA. 307 Pan American Life Building
NEW YORK 22, N. Y. 16 East 56th Street
NORFOLK, VA. Room 203, 810 West 21st Street
OMAHA, NEB. 230 Keeline Building
PEORIA, ILL. 700 First National Bank Building
PHILADELPHIA 3, PENNA. 1616 Walnut Street Building
PHOENIX, ARIZ. 1860 West Fillmore Street
PITTSBURGH, PENNA. 631 Gateway Center Building No. 2
PORTLAND 4, ORE. 1044 Pacific Building
RICHMOND 19, VA. 1010 Central National Bank Building
ROCK ISLAND, ILL. 1907 2nd Ave.
SACRAMENTO 14, CALIF. 1615 Thornton Avenue
ST. LOUIS 1, MO. 1006 Olive Street
SALT LAKE CITY 1, UTAH 336 South Third, West
SAN ANTONIO, TEXAS 335 New Moore Building
SAN DIEGO 3, CALIF. 3543 Fifth Avenue
SAN FRANCISCO 4, CALIF. 1200 17th Street
SAN JOSE 10, CALIF. San Jose Builders' Exchange
SEATTLE 4, WASH. 1077 Dexter Horton Building
SPOKANE, WASH. 3044 E. Trent Avenue
SYRACUSE, N. Y. 218 Harrison St.
TOLEDO 1, OHIO 642 National Bank Building
TULSA, OKLA. 902 American Airlines Building
WASHINGTON 6, D. C. 806 Connecticut Avenue, N. W.
WICHITA, KAS. 2520 East Kellogg
INTERNATIONAL DIVISION 16 East 56th St., New York, N. Y.

Owens-Corning Fiberglas Corporation

GENERAL OFFICES AND GENERAL PRODUCTS, Toledo, Ohio *PACIFIC COAST, Santa Clara, Calif.* *TEXTILE PRODUCTS, New York, N.Y.*

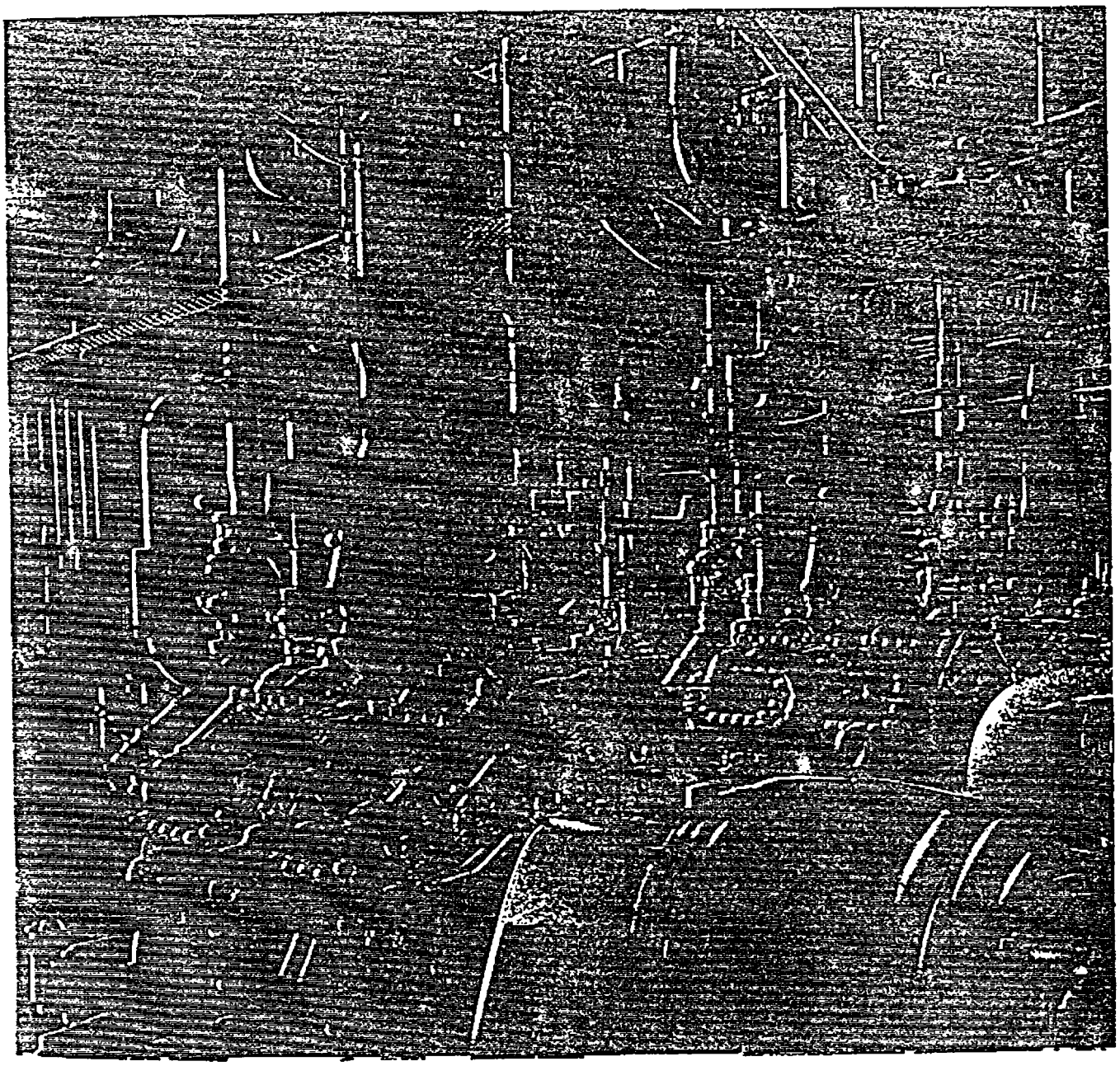
it's the low K that counts

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OWENS/CORNING FIBERGLAS

Mechanical insulation systems



Owens-Corning Fiberglas
October 1969
15
MECHANICAL SYSTEMS INSULATIONS

INSULATION selection guide

PLUMBING PIPING & EQUIPMENT SYSTEMS

system	temp. range	products	page
PIPING Chilled Drinking Water Rainwater Leaders	35-50F	**PIPE INSULATIONS** **Heavy Density** One-Piece Fiberglas 25 C-P	 4-9 10-14 15-17
Drain Lines *(Bent Soft Copper Connections)*	35-50F	**O-C Flexible Tubing**	**18-19**
Domestic Cold Water Boiler Makeup Water	50-60F	**Heavy Density** One-Piece Fiberglas 25 C-P	4-9 10-14 15-17
Domestic Hot Water Tempered Water Booster Heater Water	to 180F	**Heavy Density** One-Piece Fiberglas 25 H-P	4-9 10-14 20-22
EQUIPMENT Hot Water Storage Tanks Heat Exchangers Hot Water Generators Booster Heaters	150-180F	**EQUIPMENT INSULATIONS** **700 Series** Kaylo Block Fiberglas 25 H-E	 **23-25** 26-27 28-29

Products shown in BOLD FACE type are recommended for use for the services shown based on performance and widespread acceptance. Other products are listed because of local conditions or product preference.

MECHANICAL PIPING SYSTEMS

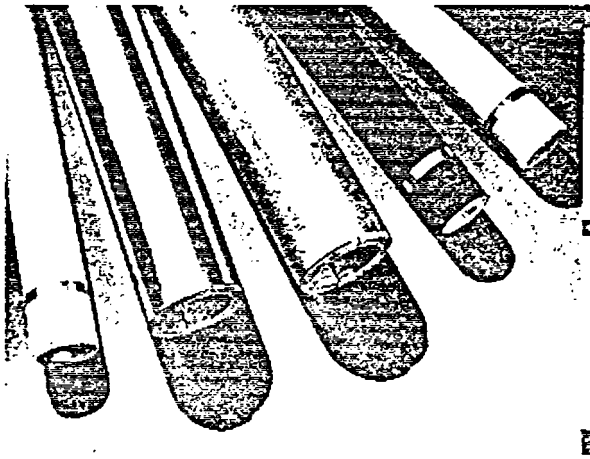
system	temp. range	products	page
PIPING		**PIPE INSULATIONS**	
Refrigerent Suction Chilled Water (Primary and Secondary) Cooling Tower Water (IPS)	−20 to 35F	**Heavy Density** One-Piece Fiberglas 25 C-P	4-9 10-14 15-17
Refrigerent Suction Chilled Water *(Bent Soft Copper Connections)*	0 to 70F	**O-C Flexible Tubing**	18-19
Dual—Temperature Make-Up Water	35 to 60F	**Heavy Density** One-Piece Fiberglas 25 C-P	4-9 10-14 15-17
Heating Hot Water Fuel Oil Piping High Temperature Hot Water Steam and Condensate	to 1200F	**Heavy Density (to 450F)** One-Piece (to 400F) Kaylo (to 1200 F) Fiberglas 25 H-P (to 450F)	4-9 10-14 30-31 20-22

MECHANICAL EQUIPMENT

temperature	products	page
Cold Equipment − 20F to 70F	**Type 705** Fiberglas 25 C-E	23-25 32-33
Hot Equipment 70F to 1200F	**Type 704 (to 450F)** I-S Board (to 850F) Metal Mesh Blanket (to 1000F) Kaylo Block (to 1200F) Fiberglas 25 H-E (to 450F)	23-25 34-35 36-37 26-27 28-29

OWENS/CORNING FIBERGLAS

Pipe Insulations



Heavy Density Sectional Pipe Insulation

a multi-purpose rigid pipe insulation
for all types of piping systems
operating at temperatures from -120F to 450F

uses

Fiberglas* Heavy Density Sectional Pipe Insulation has a broad range of uses for hot and cold piping. It is available with a variety of factory-applied jackets to provide for appearance, vapor barrier, fire safety or weatherproofing to permit selection of the correct insulation for the service requirements from —120F to 450F. See page 2 for a complete selection guide.

description

Fiberglas Heavy Density Sectional Pipe Insulation is a precision molded pipe covering composed of Fiberglas wool resin-bonded and formed in two half cylinders up to 12" IPS. It is available in 3 ft. long sections to fit all sizes of pipe and tubing from ½" IPS to 33".

benefits

superior thermal efficiency—Fiberglas Sectional Pipe Insulation because of its low k factor provides high efficiency with resultant cost savings. The closely knit glass fibers form millions of air pockets to retard the flow of heat for greater fuel savings and more precise temperature control.

resists compression—Heavy Density Fiberglas Pipe Insulation resists compression and mechanical damage because it is denser than other glass fiber pipe insulations. This means less chance of unsightly damage and puncture of the vapor barrier on cold lines.

dimensionally stable—Fiberglas will not shrink or rot and will withstand thermal shock.

easy to fabricate—Fiberglas Heavy Density Pipe Insulation is easy to cut and fit in the field with an ordinary knife. No special tools are required and the firm clean-cut sections knit tightly together forming an efficient thermal barrier at fittings and joints. The rigid, sectional form lends itself to accurate shop fabrication of valve and fitting covers.

inorganic—The special compounded glass fibers are completely inert. They will not corrode steel, copper or aluminum pipe and will not cause stress corrosion in stainless steel.

factory applied jackets—A wide variety of factory-applied jackets are available to provide vapor barrier protection, weather resistance, fire safety or damage resistance. These jackets speed application in the field. The new Self-Sealing Lap jacket further simplifies installation and assures a moisture vapor barrier seal at the joints.

*Trademark Registered Owens-Corning Fiberglas Corp

performance characteristics

moisture absorption:
0.2% by volume—96 hrs. at 120F and 95% RH

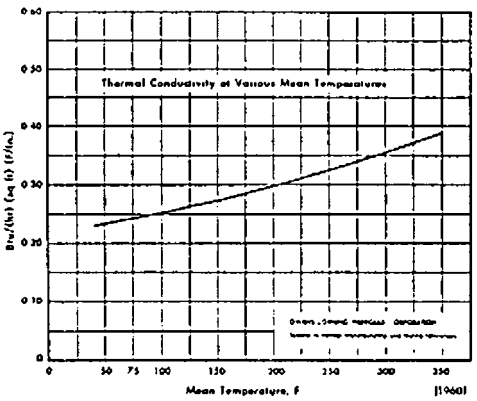
capillarity:
negligible (after 24 hours)

alkalinity:
ph 9

specific heat:
0.20 Btu/lb.F

stress corrosion:
will not cause stress corrosion, cracking of stainless steel

thermal conductivity:

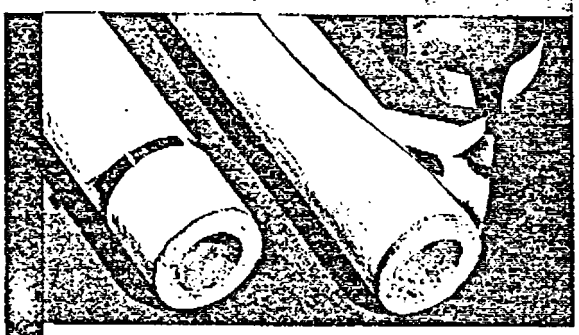


mean temperature	k
75F	0.240
40F	0.227

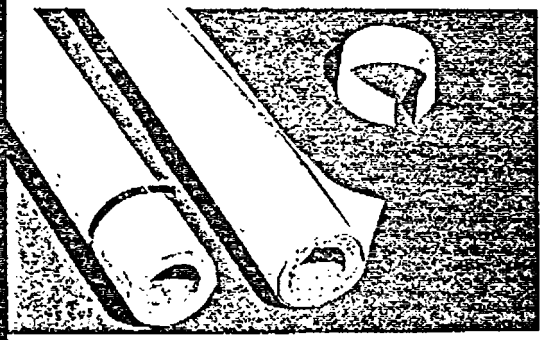
specification compliance:

HH-I-558a Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering) and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type). Form D, Type III, Class 12.

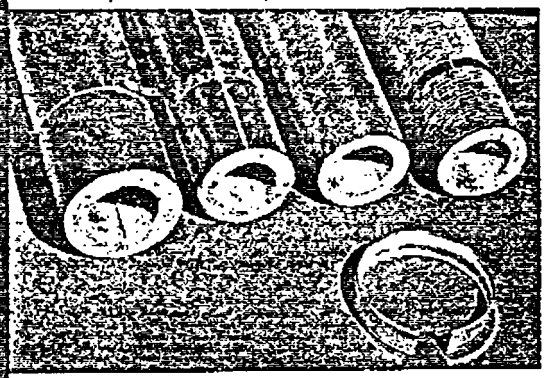
ASTM Specification 231-51T



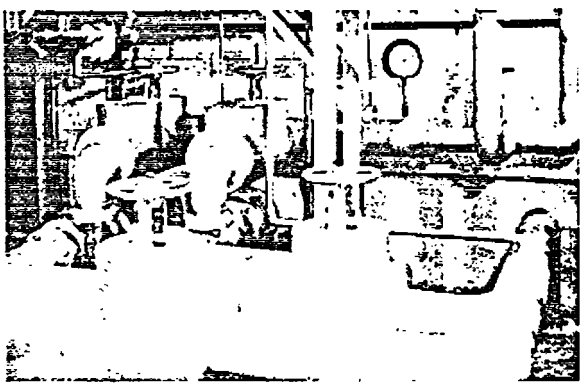
Fire Retardant Jacket, left. FRJ with Self Sealing Lap and end joint sealing strip.



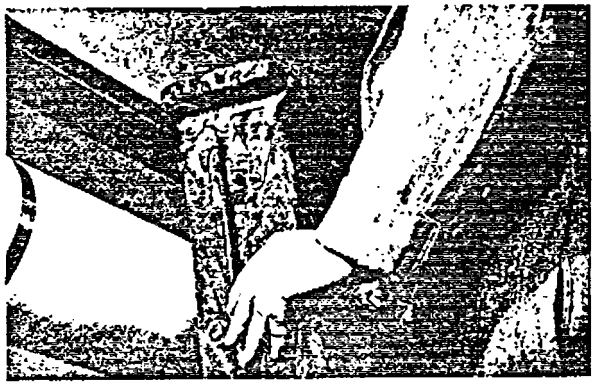
Standard Canvas Jacket, left. Pre-Sized Glass Cloth with end joint closure strip.



Glass Klad Metal Jacket, left to right: .016 Embossed Aluminum with snap-in locking joint; .010 Stainless Steel with snap-in locking joint; .010 Embossed Aluminum with overlapping jacket laps on end and longitudinal joints; End joint sealing butt strips for end joint closure.



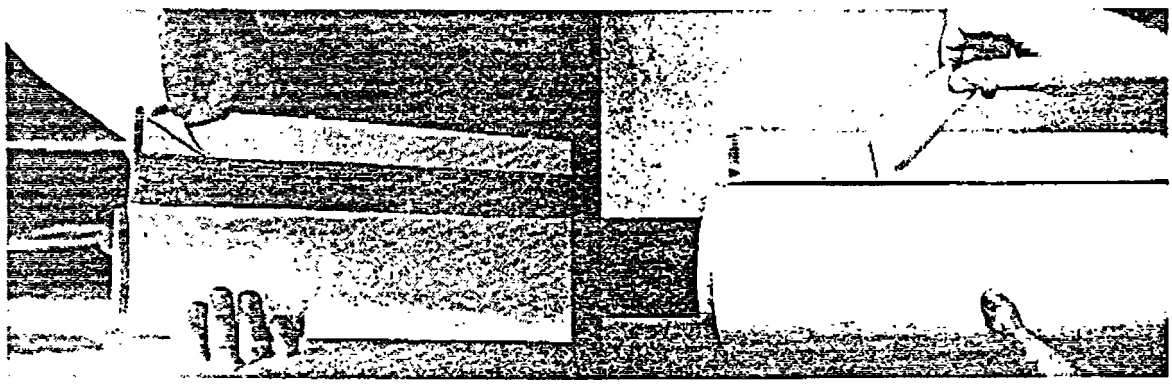
NEATER JOBS are possible with Fiberglas Heavy Density Pipe Insulation because of its inherent rigidity. It cuts cleaner with square neat edges.



ABUSE RESISTANT—Heavier density means less chance of damage from ladders or other mechanical abuse during installation or in service.

PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)	
		CONCEALED	EXPOSED
HOT PIPING			
Plumbing			
Domestic Hot Water	110-180	**Fiberglas 25 Jacket—completely fire safe glass cloth jacket, pre-sized for paint base. End joint butt strips furnished.**	**Fiberglas 25 Jacket—pre-sized surface eliminates field priming. May be left as is or painted any color.**
Tempered Water	110-130	**Standard Canvas Jacket**—low cost—provides base for painting. Heavier 6 or 8 oz. weights available.	**Canvas**; 6 oz. or 8 oz.—normally sized and painted.
Mechanical			
Heating Hot Water	150-210	**FRJ with Self Sealing Lap**—FRJ (Fire Retardant Jacket) is a laminate of white kraft and foil, reinforced with strong glass yarns, laminated with flame snuffing adhesive. Meets requirements of GSA 301-1, Type A. Jacket can be used on heated, and dual-temperature lines up to 450F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.	**FRJ with Self Sealing Lap**—no further finish required. Neat, white attractive finish. Or, may be painted with water based paint.*
Steam and Condensate	210-450		
Fuel Oil Piping	210-450		
High Temperature Hot Water	250-450		
			**May be finished with field applied 6 oz. canvas, sizing & paint.*
COLD PIPING			
Plumbing			
Domestic Cold Water	50-65		
Chilled Drinking Water	35-65		
Rain Water Leaders	33-65		
		FRJ with Self Sealing Lap—provides a positive vapor seal for all cold and chilled water lines. FRJ (Fire Retardant Jacket) is a laminate of white kraft and foil reinforced with strong glass yarns. Meets requirements of GSA 301-1, Type A jackets. Laminated with flame snuffing adhesive. Excellent vapor barrier with low perm rating 0.02. Jacket can be used on heated, dual-temperature and refrigerant lines from —120F to 450F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.	**FRJ with Self Sealing Lap**—no further finish required. White appearance presents neat finished job.*
Mechanical			
Chilled Water—Primary and Secondary	35-55		
Dual-Temp	40-210		
Refrigerant Suction	—50 to +35		
			**May be finished with field applied 6 oz. canvas, sizing & paint.*



FRJ WITH SELF-SEALING LAP—installed by this unique method eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal at all joints and speeds application. It's as easy as 1, 2, 3: (1) start to peel the release paper off the vapor barrier, (2) apply to pipe and peel off the balance, (3) press the lap in

OUTDOORS

Glas Klad—factory applied .016 embossed aluminum or .010 stainless steel. Complete with integral longitudinal Pittsburgh seam and butt joint strips that lock out the weather. Butt joint strips are furnished, with weatherproof mastic protected with release paper. Also available with .010 embossed aluminum without Pittsburgh seam, having a two-inch overlap at the longitudinal seam and a 2" overlap on end joint.

Glas Klad—factory applied .016 embossed aluminum or .010 stainless steel. Complete with integral longitudinal Pittsburgh seam and butt joint strips that lock out the weather. Butt joint strips are furnished with weatherproof mastic protected with release paper. Also available with .010 embossed aluminum without Pittsburgh seam, having a two-inch overlap at the longitudinal seam and a 2" overlap on end joint.

Note:
All cold lines running outdoors require a weatherproofing jacket, in addition to the factory applied vapor barrier.

DESIGN CONSIDERATIONS

The wide temperature range of Fiberglas Heavy Density Pipe Insulation permits the specifier to select material from one manufacturer to answer all the mechanical and plumbing system insulation requirements, concealed, exposed, outdoors, hot or cold. A selection of jackets matched to end use and factory applied to the insulation assures maximum performance at the most economical cost

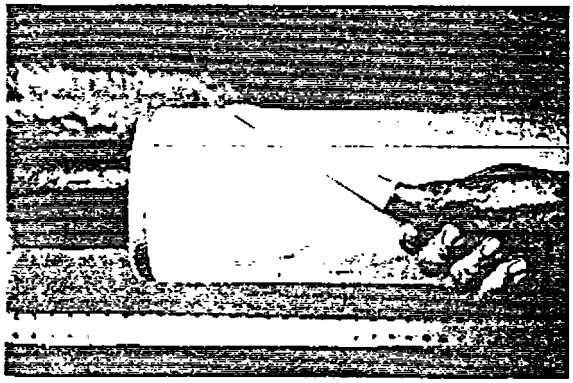
Self Sealing Lap on FRJ (Fire Retardant Jacket) assures a positive vapor seal and serves to hold the insulation on the pipe This technological advance employs a unique chemical bonding agent that instantly seals and holds the joint lap tightly in place The bond also becomes stronger with age Butt joint strips of the same material are used on the end joints The use of staples, bands and messy adhesives are eliminated and the attendant problems of fishmouths and other application defects In addition FRJ with Self Sealing Lap is fire retardant, presents a neat white appearance and is glass fiber reinforced to resist damage

Fiberglas 25 Jacket factory-applied to Fiberglas Heavy Density Pipe Insulation is a completely fire-safe insulation for hot or cold lines . No lagging is required before painting. The jacket is tough, resists damage and will not mildew or rot.

Fittings for cold lines are insulated with mitered segments, or pre-molded Fiberglas fittings which is subsequently wrapped with glass fabric and coated with vapor barrier mastic For hot lines the fitting is made smooth with insulating cement, canvased and sized.

Fiberglas will not burn, rot or shrink. With the addition of FRJ or Fiberglas 25 Jacket, the insulation is completely fire-safe.

The exceptional low k factor means maximum economy and performance for all piping systems, concealed, exposed or outdoors



place at the center and, pressing hard, work out toward either end. Rub with the blunt edge of a knife. End joints are sealed with a 3" wide butt strip of the same Self-Sealing vapor barrier material.

recommended thickness

Selection of insulation thicknesses for any specific application should take into consideration the following important criteria. 1. Cost of insulation applied. 2. Cost of heat energy. 3. Cost of capital. 4. Cost of depreciation-plant and insulation. 5. Capital investment in heat production equipment. 6. Temperature differential. 7. Size of the pipe or surface. 8. Conductivity of insulation.

cold piping—Proper thickness (see overleaf for tables) is required for efficient operation and to prevent condensation on the insulation surface. Specifically:

1. Designed thickness should be specified to result in a surface temperature above the Dew-Point temperature of the surrounding air. Generally this is equal to or greater than the "economical thickness" despite the relatively higher cost of cold Btu's.

2. Insulation thickness should be based on ambient air conditions and corresponding permissible temperature differences.

Ambient Air Condition	Permissible temp. drop (between ambient air and insulation surface)
90 F at 90% R.H.	3 F
90 F at 80% R.H.	7 F

3. Piping operating down to freezing temperatures or at fluctuating hot and cold temperatures should be insulated for maximum performance during the coolest part of the cold cycle.

recommened thickness

heated piping to 450F (80F ambient air)

Pipe Temp. / Temp. Diff.	200 / 120			300 / 220			400 / 320			450 / 370		
IPS	RT	HL	ST	RT	HL	ST	RT	HL	ST	RT	HL	ST
½	1	13	91	1	24	101	1½	32	100	1½	39	105
¾	1	15	94	1	29	106	1½	42	104	1½	45	120
1	1	16	92	1	30	102	1½	42	104	1½	49	108
1¼	1	20	95	1½	27	95	1½	45	104	2	51	104
1½	1	21	93	1½	31	96	1½	50	107	2	57	107
2	1	24	94	1½	36	97	1½	58	107	2	60	103
2½	1½	24	91	2	36	95	2	60	104	2	72	108
3	1½	25	90	2	39	94	2½	56	97	2½	69	98
3½	1½	31	92	2	47	96	2½	58	96	2½	71	99
4	1½	30	90	2	47	94	2½	64	97	2½	80	100
4½	1½	34	92	2	58	97	2½	58	96	2½	84	102
5	1½	38	91	2	58	95	2½	80	100	3	70	98
6	1½	29	88	2	56	94	2½	95	101	3	95	99
7	1½	44	91	2	74	95	2½	100	98	3	100	99
8	1½	50	93	2	76	95	2½	104	100	3	112	99
9	1½	58	91	2	80	96	2½	118	99	3	114	100
10	2	48	88	2½	76	93	3	111	97	3	135	101
12	2	56	89	2½	88	93	3	127	98	3½	138	98
14	2	63	89	2½	99	94	3	142	98	3½	153	99

HL—heat loss . . . Btu/hr/lineal foot ST—surface temperature (F)
RT—recommended thickness HG—heat gain

recommended thickness

cold piping & dual-temperature (minus 60 to 200F)

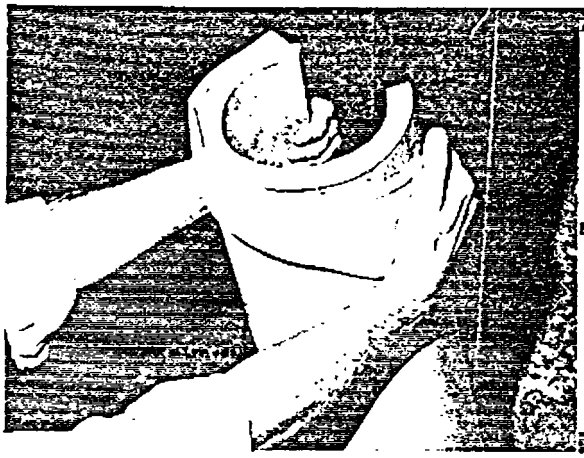
(90F ambient air)

		90% relative humidity										80% relative humidity									
pipe surface temperature		40 F		35 F		0 F		—30 F		—60 F		40 F		35 F		0 F		—30 F		—60 F	
condition		chilled water		ice water		brine		special brine		refrig-erants		chilled water		ice water		brine		special brine		refrig-erants	
pipe sizes		RT*	HG	RT*	HG	RT	HG	RT	HG	RT	HG	RT	HG	RT	HG	RT	HG	RT	HG	RT	HG
	½	1½	3.8	1½	5	2½	6	3	7	3½	7	¾	5.4	¾	6	1	8	1½	9	1½	11
	¾	1½	4.3	1½	5	2½	6	3	7	3½	8	¾	6.2	¾	7	1½	8	1½	10	2	10
	1	1½	4.7	1½	6	2½	6	3	8	3½	9	¾	7.1	¾	8	1½	8	1½	11	2	11
	1¼	1½	5.3	2	6	2½	7	3	9	3½	11	¾	8.4	1	9	1½	9	1½	12	2	14
	1½	1½	6.0	2	7	3	8	3½	8	3½	10	¾	9.4	1	9	1½	10	2	12	2	15
	2	1½	5.8	2	7	3	8	3½	10	4	11	¾	11.0	1	10	1½	12	2	13	2	16
	2½	2	7.2	2	8	3	10	3½	11	4	12	¾	12.6	1	12	1½	15	2	16	2½	17
	3	2	7.5	2	9	3	10	4	11	4½	13	1	12	1	14	1½	16	2	17	2½	18
	4	2	9.1	2	10	3	12	4	13	4½	15	1	14	1	16	1½	18	2	20	2½	21
	5	2	10.6	2½	11	3½	13	4	15	4½	17	1	18	1	20	1½	23	2	24	2½	25
	6	2	12.4	2½	12	3½	14	4½	16	5	18	1	21	1	24	2	21	2	27	2½	28
	7	2	13.8	2½	14	3½	15	4½	17	5	19	1	24	1	28	2	23	2	30	2½	31
	8	2	15	2½	15	3½	17	4½	18	5	21	1	25	1	29	2	26	2	33	2½	34
	9	2	16	2½	16	4	17	4½	20	5½	22	1	27	1½	24	2	27	2	35	2½	37
	10	2	17	2½	17	4	18	4½	22	5½	24	1	32	1½	26	2	30	2	39	2½	41
	11	2½	16	2½	19	4	20	4½	23	5½	25	1	32	1½	29	2	31	2	41	3	38
	12	2½	17	2½	21	4	21	5	24	5½	26	1	34	1½	32	2	36	2½	39	3	41
	14	2½	19	2½	23	4	23	5	28	6	27	1	41	1½	35	2	41	2½	44	3	46
	16	2½	21	2½	25	4	25	5	28	6	29	1	44	1½	39	2	45	2½	49	3	50
	18	2½	24	2½	28	4	29	5	31	6	32	1	52	1½	43	2	50	2½	54	3	56
	20	2½	26	2½	31	4	31	5	33	6	35	1	57	1½	48	2	55	2½	60	3	62
	24	2½	30	3	32	4½	33	5½	37	6	41	1	70	1½	55	2	64	2½	70	3	73
	30	2½	37	3	32	4½	40	5½	43	6½	48	1	82	1½	70	2	79	2½	83	3	88
	33	2½	40	3	45	4½	47	5½	51	6½	54	1	91	1½	77	2	88	2½	92	3	98
copper tubing	½	1½	3.5	1½	3.8							¾	4.0	¾	4.3						
	⅝	1½	3.2	1½	3.5							¾	4.4	¾	4.9						
	¾	1½	3.5	1½	3.8							¾	4.8	¾	5.3						
	⅞	1½	3.9	1½	4.2							¾	5.2	¾	5.8						
	1⅛	1½	4.5	1½	5.0							¾	6.3	¾	6.9						
	1⅜	1½	4.9	1½	5.4							¾	7.2	¾	7.8						
	1⅝	1½	5.6	1½	6.1							¾	8.0	¾	8.8						
	2⅛	1½	6.0	2	5.8							¾	9.8	1	8.0						
	2⅝	2	6.3	2	6.8							¾	11.5	1	11.1						
	3⅛	2	6.6	2	7.6							¾	13.3	1	10.6						
	3⅝	2	7.8	2	8.5							1	12.8	1	14.0						
	4⅛	2	7.9	2½	8.6							1	11.7	1	10.9						
	5⅛	2	9.2	2½	9.6							1	13.9	1	15.2						
	6	2	12.7	2½	11.3							1	16.1	1	17.6						

*Minimum thickness available above 12" IPS is 1", above 24" IPS is 1½".

OWENS/CORNING FIBERGLAS

Pipe Insulations



One-Piece Pipe Insulations

A versatile, efficient, quick applying pipe insulation for hot and cold piping from −30F to 450F.

uses

Fiberglas* One-Piece Pipe Insulation is adaptable to all types of piping systems operating at temperatures from −30F to 450F. It is available with a variety of factory-applied jackets for appearance, vapor barrier, fireproofing or waterproofing to permit selection of the right combination of insulation and jacket for the service condition requirement.

description

Fiberglas One-Piece Pipe Insulation is a resilient lightweight pipe insulation molded from fine glass fibers in cylindrical form. A single longitudinal seam, which is opened to apply to the pipe, springs closed when in place. It is available with a variety of factory-applied jackets for appearance and function.

benefits

economical application—One-piece unit is applied quickly, easily, even in the larger sizes.
easy fabrication—Only a knife is needed for fabrication of the most intricate fittings.

efficient—Because of its very low k factor, it is possible to reduce the thickness of insulation to provide thermal efficiency equivalent to other non-fibrous materials with savings in material costs. Conversely, the same thickness of One-piece provides better thermal efficiency, which results in savings in operating expense due to reduction in heat loss.

permanent — Completely U.L. rated — Inorganic glass fiber construction will not shrink, rot or cause metal corrosion.

multi-purpose—The variety of applications means less inventory. A selection of factory-applied jackets are available for surface finish, vapor barrier, weather protection, fire proofing or damage resistance. The new Self-Sealing lap jacket speeds application in the field and assures a positive vapor barrier.

damage resistant—The resilient glass fibers spring back when bumped, and One-Piece will not break if accidentally dropped during installation.

*T.M Reg. O-C F. Corp.

performance characteristics

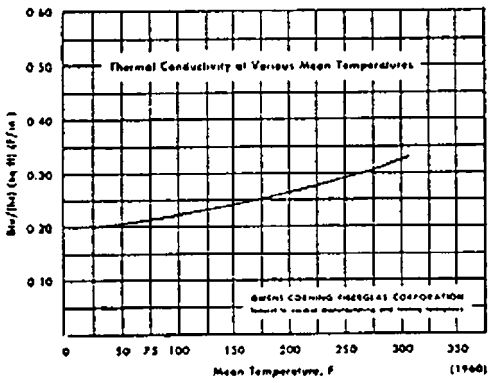
moisture absorption: 0.2% by volume 96 hrs. at 120F and 95% RH

specific heat: 0.20 Btu/lb. F.

shrinkage: None

alkalinity: ph9

thermal conductivity: Unusually low thermal conductivity shown on chart



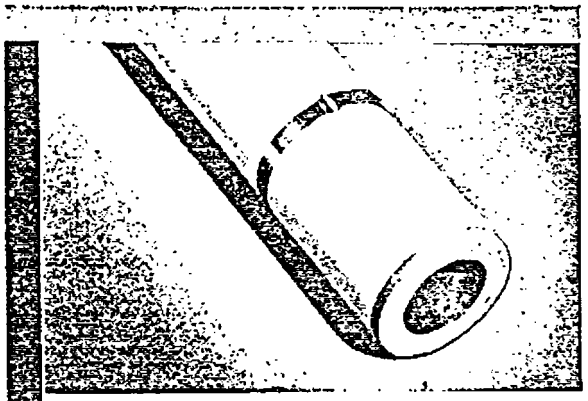
mean temperature	k
75F	0.23
40F	0.21

specification compliance:

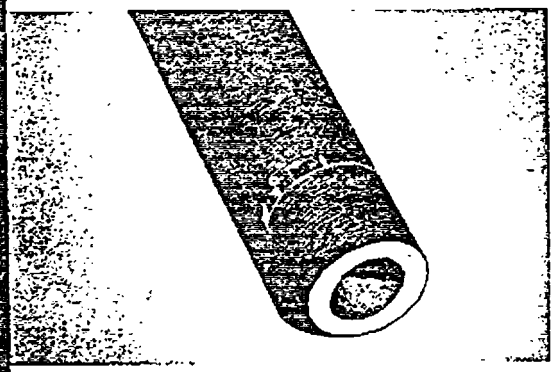
HH-I-558a Form D, Type III, Class 12

HH-I-562 Type II

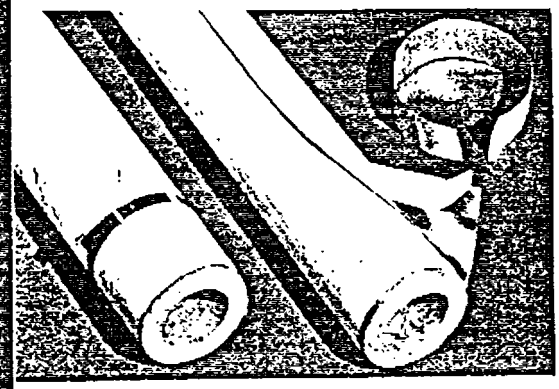
MIL-I-22344B (Ships)



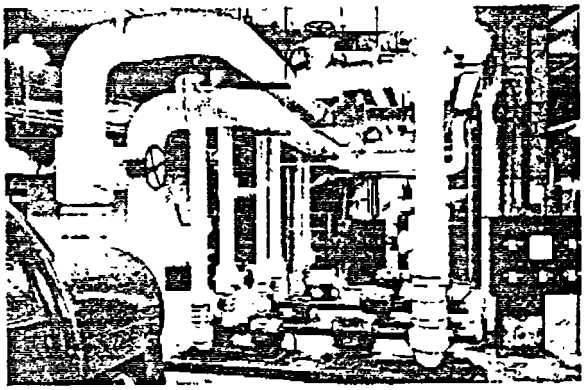
1. Standard Canvas.



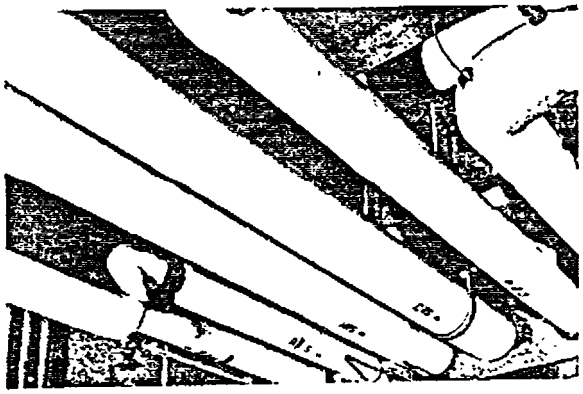
2. Weatherproof Jacket.



3. FRJ.
4. FRJ with Self-Sealing Lap.



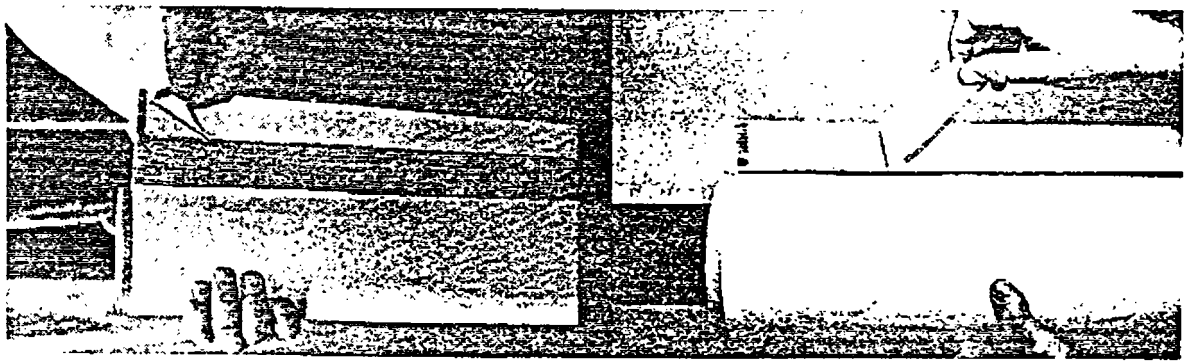
Neat Finished Appearance on this well insulated chilled water



Self Sealing Lap vapor barrier jacket combines a positive vapor seal with an attractive fire safe finished appearance for

PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)	
		CONCEALED	EXPOSED
HOT PIPING			
Plumbing			
Domestic Hot Water Tempered Water	110-180 110-130	**Standard Canvas Jacket**—low cost—provides base for painting. Heavier 6 or 8 oz. weights available.	
			Fiberglas 25 H-P—a completely U.L. rated hot pipe insulation system. U.L. rating includes jacket, insulation, fittings and accessories. **Available on Fiberglas Heavy Density Pipe Insulation only. See data sheet 1-IN-3853.**
Mechanical			
Heating Hot Water Steam and Condensate Fuel Oil Piping High Temperature Hot Water	150-210 210-450 210-450 250-450	**FRJ with Self Sealing Lap**—FRJ (Fire Retardant Jacket) is a laminate of white kraft and foil, reinforced with strong glass yarns, laminated with flame snuffing adhesive. Meets requirements of GSA 301-1, Type A. Jacket can be used on heated, and dual-temperature lines up to 450F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.	
COLD PIPING			
Plumbing		**FRJ with Self Sealing Lap**—provides a positive vapor seal for all cold and chilled water lines. FRJ (Fire Retardant Jacket) is a laminate of white kraft and foil reinforced with strong glass yarns. Meets requirements of GSA 301-1, Type A jackets. Laminated with flame snuffing adhesive. Excellent vapor barrier with low perm rating 0.02. Jacket can be used on heated, dual-temperature and refrigerant lines from —30F to 450F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.	
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	50-65 35-65 33-65		
Mechanical			
Chilled Water—Primary and Secondary Dual-Temp Refrigerant Suction	35-55 40-210 —30 to —35		**Fiberglas 25 C-P**—a completely U.L. rated cold pipe insulation system. U.L. rating includes jacket, insulation, fittings and accessories. **Available in Fiberglas Heavy Density Pipe Insulation only. See data sheet 1-IN-4376.**



FRJ WITH SELF-SEALING LAP—installed by this unique method eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal at all joints and speeds application. It's as easy as 1, 2, 3: (1) start to peel the release

OUTDOORS

A suitable weatherproof jacket applied over no wrap or factory jacket

DESIGN CONSIDERATIONS

The wide temperature range of Fiberglas One-Piece Pipe Insulation permits the specifier to select material from one manufacturer to answer all the mechanical and plumbing system insulation requirements, concealed, exposed, outdoors, hot or cold. A selection of jackets matched to end use and factory applied to the insulation assures maximum performance at the most economical cost.

The Self Sealing Lap on FRJ (Fire Retardant Jacket) assures a positive vapor seal and serves to hold the insulation on the pipe. This technological advance employs a unique chemical bonding agent that instantly seals and holds the joint lap tightly in place. The bond also becomes stronger with age. Butt joint strips of the same material are used on the end joints. The use of staples, bands and messy adhesives are eliminated and the attendent problems of fishmouths and other application defects. In addition FRJ with Self Sealing Lap is fire retardant, presents a neat white appearance and is glass fiber reinforced to resist damage.

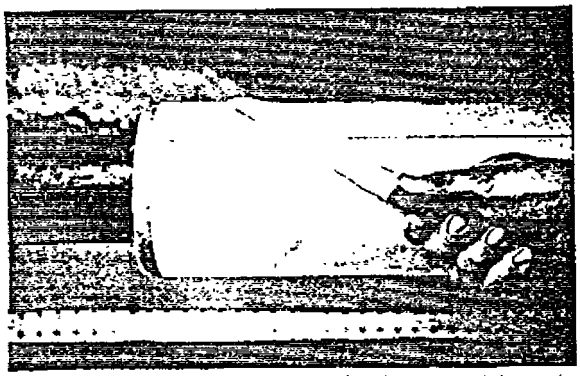
Pre-Sized Glass Cloth Jacket factory applied to Fiberglas Heavy Density Pipe Insulation is a completely U L rated insulation for heated lines No lagging is required before painting The jacket is tough, resists damage and will not mildew or rot UL tests show a low Flame Spread of 10; Fuel Contributed 0, Smoke Developed, 0

Fittings for cold lines are insulated with mitered segments, or pre-molded Fiberglas fittings which is subsequently wrapped with glass fabric and coated with vapor barrier mastic. For hot lines the fitting is made smooth with insulating cement, canvased and sized.

Fiberglas will not burn, rot or shrink. With the addition of FRJ or Pre-Sized Glass Cloth Jacket, the insulation is completely U L. rated.

The exceptional low k factor means maximum economy and performance for all piping systems, concealed, exposed or outdoors.

Caution: Owens-Corning Fiberglas Insulations are to be applied only with approved adhesives, mastics and mechanical fastening devices as published in Accessory Materials List, Pub. No 4-IN-3430. Owens-Corning Fiberglas accepts no responsibility or liability for the performance of materials other than those listed in this list unless approved in writing by O-CF Testing Laboratories.



place at the center and, pressing hard, work out toward either end. Rub with the blunt edge of a knife. End joints are sealed with a 3" wide butt strip of the same Self-Sealing vapor barrier material.

recommened thickness

heated piping to 450F (80F ambient still air)

pipe temp. / temp. diff. / IPS	200 / 120			300 / 220			400 / 320		
	RT	HL	ST	RT	HL	ST	RT	HL	ST
½	1	13	91	1	24	101	1½	32	100
¾	1	15	94	1	29	106	1½	42	104
1	1	16	92	1	30	102	1½	42	104
1¼	1	20	95	1½	27	95	1½	45	104
1½	1	21	93	1½	31	96	1½	50	107
2	1	24	94	1½	36	97	1½	58	107
2½	1½	24	91	2	36	95	2	60	104
3	1½	25	90	2	39	94			
3½	1½	31	92	2	47	96			
4	1½	30	90	2	47	94			
4½	1½	34	92	2	58	97			
5	1½	38	91	2	58	95			
6	1½	29	88	2	56	94			
7	1½	44	91	2	74	95			
8	1½	50	93	2	76	95			
9	1½	58	91	2	80	96			
10	2	48	88						
12	2	56	89						
14	2	63	89						

Specify Fiberglas Heavy Density Pipe Insulation for thickness above 2".

RT-recommended thickness (inches) HL-heat loss . . . BTU/hr. lineal foot ST-surface temperature (F)

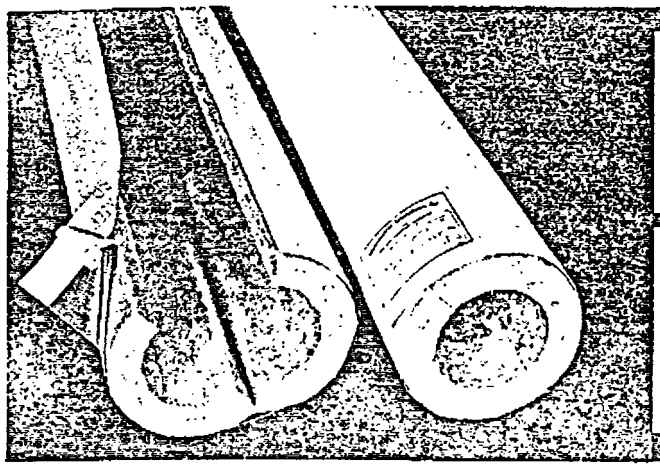
cold and dual-temperature lines (90 F at 80% R.H.)

pipe surface temperature	50 F or above		49 F to 35 F		34 F to 0 F		0 F to −30 F	
pipe size	RT	HG	RT	HG	RT	HG	RT	HG
½	½	4	¾	5	1	8	1½	8
¾	½	5	¾	6	1	9	1½	10
1	½	6	¾	7	1½	8	1½	11
1¼	½	7	¾	8	1½	9	1½	12
1½	½	8	¾	9	1½	10	1½	13
2	½	10	¾	11	1½	12	1½	15
2½	½	12	¾	13	1½	15	2	15
3	¾	11	¾	15	1½	16	2	17
3½	¾	12	1	12	1½	18	2	19
4	¾	13	1	14	1½	18	2	20
4½	¾	14	1	15	1½	22	2	23
5	¾	15	1	19	1½	23	2	23
6	¾	17	1	22	1½	25	2	26
7	1	18	1	25	1½	28	2	29
8	1	20	1	27	1½	31	2	32
9	1	22	1	29	1½	34	2	35
10	1	25	1	32	1½	36	2	38
11	1	25	1	34	1½	39	2	41
12	1	26	1	35	1½	43	2	44

RT-recommended thickness (inches) HG-heat gain

OWENS/CORNING FIBERGLAS

Pipe Insulation



Fiberglas 25 C-P Pipe Insulation System

A U.L. rated noncombustible pipe insulation system for cold service piping operating at temperatures down to −120 F

uses

Recommend for use on all cold or dual-service piping operating from 35°F. to 450°F. where rated noncombustible fire safety is desired—such as, commercial and institutional buildings, schools, hospitals, and places of public assembly. Also recommended for processing lines where fire safety is a paramount criterion. Fiberglas 25*C-P Pipe Insulation System is composed

description

of Fiberglas Heavy Density Sectional Pipe Insulation jacketed with a vapor barrier laminate of aluminum foil and pre-sized glass cloth. The jacket has a pressure sealing lap adhesive (on sizes up to 12" IPS x 2") to eliminate the use of staples, adhesives, or bands. The fittings are also non-combustible.

benefits

fire safety—a complete insulation system with a UL rating including pipe fittings, vapor barrier and mastic when installed in accordance with recommended procedures.

ready for painting—factory pre-sized glass cloth jacket and matching tape and mastic system do not require field sizing. If desired, painting may be omitted. If painting is required see "Application recommendations."

damage resistant—the extra heavy density pipe insulation and extra tough woven glass cloth jacket resists damage on exposed lines.

lower operating cost—the exceptional thermal efficiency of Fiberglas Heavy Density pipe insulation contributes to lower operating cost of cooling equipment and piping.

no condensation drippage—the foil vapor barrier and pressure sensitive lap when applied as per instruction, assure a positive vapor seal. Fittings also provide a vapor seal.

installation savings—Fiberglas 25 C-P pipe insulation system meets all existing standards for fire safety and its uses may result in lower insurance costs.

*Fiberglas (Reg. U.S. Pat. Off.) and "25" are trademarks of Owens-Corning Fiberglas Corporation.

performance characteristics

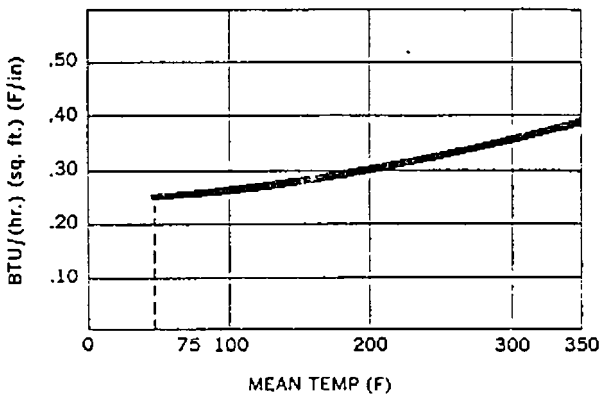
Insulation

moisture absorption: 0.2% by volume 96 hrs. at 120F and 95% RH
specific heat: 0.20 Btu/lb. F
shrinkage: none
alkalinity: ph 9
capillarity: negligible after 24 hrs.
dimensional stability — will not warp, shrink, rot or decompose.
vermin and rodent resistant—provides no sustenance.
temperature limitation—recommended for chilled or dual-temperature piping from 35°F. to 450°F.

Jacket

vapor transmission rate: .05 perms
burst strength: 300 psi

thermal conductivity



fire hazard classification

Maximum Fire Hazard Classifications for building materials and insulations as noncombustible have been established as follows:

	Acceptable
Flame Spread	25
Fuel Contributed	50
Smoke Developed	50

Fiberglas 25 C-P Pipe Insulation Systems, including fittings, is considerably below the maximum allowable. This is your assurance that you can specify and use Fiberglas 25 C-P Pipe Insulation System without the danger of contributing to the spread of fire or that combustion will liberate excessive smoke. The system has been designed to meet the stringent fire safety requirements of the GSA and Corps of Engineers.

Underwriters Laboratories
(Pipe & Equipment Coverings R5583 40 U 8.15)

	**Fiberglas 25 C-P Pipe Insulation System
Flame Spread	20
Fuel Contributed	5
Smoke Developed	40

**Note. This rating is for the pipe insulation plus an unlimited number of fittings in a piping system if materials and application conform to those recommended.

application recommendations

The self sealing lap feature on Fiberglas 25 C-P Pipe Insulation sections makes installation on straight runs of pipe a simple procedure. The only precaution needed is to keep all contact adhesive surfaces clean and to rub hard all longitudinal and circumferential seams. The end joints are sealed with a factory furnished joint sealing strip with pressure sealing adhesive.

Fittings are fabricated from mitered segments of Fiberglas Heavy Density pipe insulation or commercially available molded insulation fitting covers.

Fitting insulation is coated with a skim coat of SC-30 insulating cement to smooth out the insulation and, permitted to dry. O-CF Fitting Mastic, Type C, is then applied over Fiberglas Reinforcing Cloth and coated with another coating of O-C-F Fitting Mastic, Type C.

If painting is required, no sizing is necessary; but, to maintain the noncombustible rating of the system, only Glidden acrylic latex paint (No. 5370) is approved for use.

specification compliance

HH-I-558a, Form D, Type III, Class 12

Recommended Thickness

Selection of insulation thicknesses for any specific application should take into consideration the following important criteria. 1. Cost of insulation applied. 2. Cost of heat energy. 3. Cost of capital. 4. Cost of depreciation-plant and insulation. 5. Capital investment in heat production equipment. 6. Temperature differential. 7. Size of the pipe or surface. 8. Conductivity of insulation.

for cold piping, proper thickness is required for efficient operation and to prevent condensation on the insulation surface.

Specifically:

1. Designed thickness should be specified to result in a surface temperature above the Dew-Point temperature of the surrounding air. Generally this is equal to or greater than the "economical thickness" despite the relatively higher cost of cold Btu's.

2. Insulation thickness should be based on ambient air conditions and corresponding permissible temperature differences.

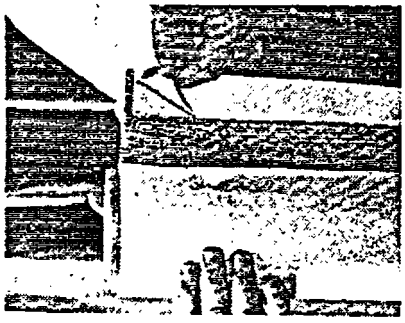
Ambient Air Condition	Permissible temp. drop (between ambient air and insulation surface
90 F at 90% R.H.	3F
90 F at 80% R.H.	7F

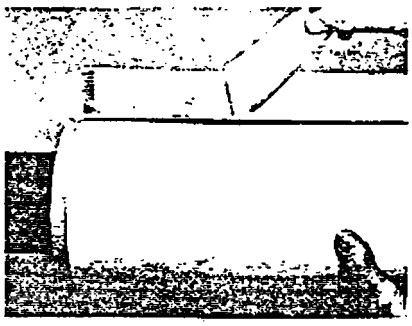
3. Piping operating down to freezing temperature or cycling hot and cold temperatures should be insulated for maximum performance during the coolest part of the cold cycle.

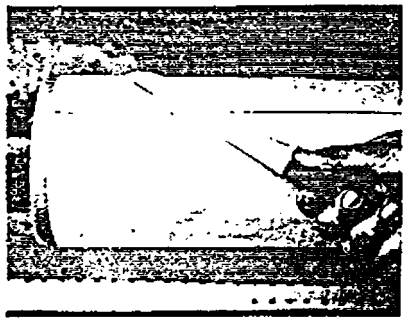
Recommended Thickness —Ambient Still Air At 90F

Pipe Suface Temperature 35 F Condition Ice Water	PIPE SIZES												copper tubing nominal size						
90% RELATIVE HUMIDITY	½ ¾	1 1¼	1½ 2	2½ 3	4 5	6 7	8 9	10 11	12 14	16 18	20 24	30 33	⅜ ½	⅝ ¾	1 1¼	1½ 2	2½ 3	3½ 4	5 6
Recommended Thickness (in.)	1½ 1½	1½ 2	2 2	2 2	2 2½	2½ 2½	2½ 2½	2½ 2½	2½ 2½	2½ 2½	2½ 3	3 3	1½ 1½	1½ 1½	1½ 1½	1½ 2	2 2	2 2½	2½ 2½
Heat Gain (Btu/lf/hr.)	5 5	6 6	7 7	8 9	10 11	12 14	15 16	17 19	21 23	25 28	31 32	32 45	3.8 3.5	3.8 4.2	5.0 5.4	6.1 5.8	6.8 7.6	8.5 8.6	9.6 11.3
80% RELATIVE HUMIDITY																			
Recommended Thickness (in.)	¾ ¾	¾ 1	1 1	1 1	1 1	1 1	1 1½	1½ 1½	1½ 1½	1½ 1½	1½ 1½	1½ 1½	¾ ¾	¾ ¾	¾ ¾	¾ 1	1 1	1 1	1 1
Heat Gain (Btu/lf/hr.)	6 7	8 9	9 10	12 14	16 20	24 28	29 24	26 29	32 35	39 43	48 55	70 77	4.3 4.9	5.3 5.8	6.9 7.8	8.8 8.0	11.1 10.6	14.0 10.9	15.2 17.6

*Minimum thickness available above 12" IPS is 1", above 24" IPS is 1½"



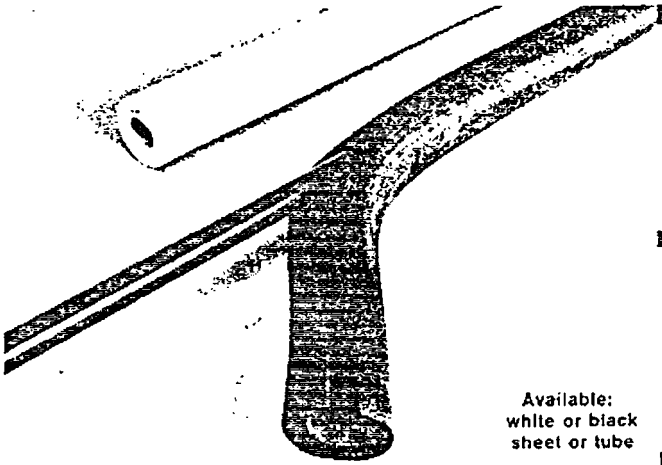




Fiberglas 25 C-P Pipe Insulations installed by this unique method eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal at all joints and speeds application. It's as easy as 1,2,3: (1) start to peel the release paper off the vapor barrier, (2) apply to pipe and peel off the balance. (3) place the lap in place at the center and, pressing hard, work out toward either end. Rub with the blunt edge of a knife. End joints are sealed with a 3" wide butt strip of the same Self-Sealing vapor barried material.

OWENS/CORNING FIBERGLAS

Piping Insulations



Available:
white or black
sheet or tube

O-C Flexible Tubing and Sheet Insulation

a flexible foamed plastic insulation for hot or cold copper tubing and iron pipe operating at temperatures from -50° to 220°F.

uses

O-C Flexible Tubing is recommended for use on cooling and heating water lines, chilled drinking water and refrigerent suction lines. The flexible feature of this resilient insulation allows it to conform to gradual bends. Available unslit to slide over tubing or pipes before they are installed, or, slit to apply over piping already in place.

description

O-C Flexible Tubing Insulation is made from an expanded elastomeric plastic blend. Millions of tiny cells, each filled with an inert gas, make this product an extremely efficient insulator. It is resilient and soft, returning to full thickness after being compressed. The inside surface is powdered to make it easy to slip over the pipe or tubing.

benefits

Efficient—a low thermal conductivity of 0.26 at 70° mean temperature assures minimum heat loss or gain—maximum performance of equipment.

Built-In Vapor Barrier—the closed cell structure eliminates the need for a separate vapor barrier and protects against moisture condensation on cold lines.

Uniform Thickness—strict quality control assures constant diameters and thicknesses, providing a snug fit on the pipe, and smooth butt joints.

Fast Application—available in two forms, slit and unslit. Means faster application. No banding required. The unslit material slips over gradual bends with ease.

Broad Uses—temperature range from —50° to 220°F makes possible insulation of most lines commonly used in commercial heating and air conditioning.

Flexible and Resilient—designed for exceptional ease of handling. It is so flexible it can be tied in knots—so resilient it springs back to original shape when untied. Resists mechanical abuse. Softer for winter flexibility and ease of application.

performance characteristics

density, lbs./cu.ft. (avg.).....6.65

thermal conductivity (Btu-in/sq.ft.-hr°F)

70°F mean temperature.....0.26

90°F mean temperature.....0.27

water absorption, % by volume (ASTM D1056).....0.5

water vapor transmission perm-in.....less than 0.05

maximum temperature limit continuous use F.....—50° to 220°

fire rating per ASTM D-635...Self extinguishing

ozone resistance.....Good

odor.....Extremely low level

Recommended Thicknesses

	DESIGN CONDITIONS*	PIPE SIZE	O-C Flexible Tubing Thickness for Line Temperature 50 F	32 F	0 F
MILD	(Prevention of condensation on indoor piping under a maximum severity of 80 F and 50% R.H. Typical of these conditions most air conditioned spaces and arid climates.)	⅜" thru 2" IPS	Nom. ⅜"	Nom. ½"	Nom. ½"
		Over 2" IPS thru 4" IPS	Nom. ½"	Nom. ½"	Nom. ½"
NORMAL	(Prevention of condensation on indoor piping under a maximum severity of 85 F and 70% R.H. Research and field experience suggest indoor conditions anywhere in the U.S. seldom exceed this degree of severity.)	⅜" ID thru 2" IPS	Nom. ⅜"	Nom. ½"	Nom. ¾"
		Over 2" IPS thru 4" IPS	Nom. ½"	Nom. ½"	Nom. ¾"
SEVERE	(Prevention of condensation on indoor piping under a maximum severity of 90 F and 80% R.H. Typical of these conditions: indoor areas where excessive moisture is introduced, or poorly ventilated confined areas where the temperature may be depressed below ambient.)	⅜" ID thru 4" IPS	Nom. ¾"	Nom. ¾"	Available on Request

* Consideration for condensation only. Heat gain of coolant not considered because O-C Flexible Tubing Insulation is used primarily on short run-outs.

flexible tubing sizes

Iron pipe sizes (IPS) ¼" to 6"
copper tubing (CT) ⅜" O.D.—3⅛" O.D.
Wall thickness—inches (nominal) ⅜"*, ½", ¾"
Inside Diameters—inches ⅜" to 3"
*Up to 2" IPS and CT only.
Length of Sections
Standard Carton — 6 Feet
Made to order — Any length
Coil lengths up to 150 ft

flexible sheet sizes

Standard size—24" x 72" and 30" x 72" (depending on thickness)
Sheet thickness—1/16", ⅛", ¼", ⅜", ½", ¾", 1"
continuous rolls—⅛" x 30" x 150', ⅜" x 30" x 74'
1/16" x 30" x 150', ½" x 30" x 54'
¼" x 30" x 120'

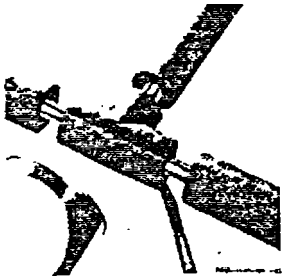
specification compliance

HH-I-573b
MIL-P-15280-E (GSA-F55)

application

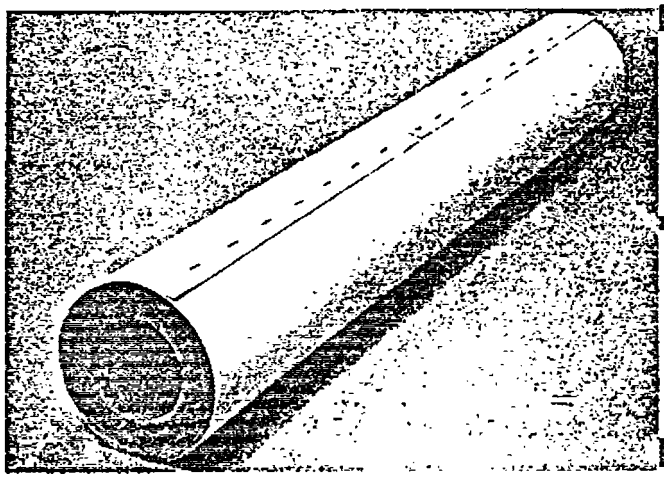
Insulation can be slipped over pipe or tubing before installation or snapped over piping already connected. All joints are sealed with O-C 500 adhesive. Paint both edges of slit as porous surfaces of tubing require it for firm bond. This tenacious adhesive forms a strong resilient bond which grows stronger with age. It is water and oil resistant.

Flexible tubing insulation can be slipped right over copper tube fittings. Cast bronze fittings or fittings on iron pipe can be "sleeved" with a larger diameter of insulation nested over the covering on the pipe and adhered with O-C 500 adhesive. O-C Flexible Tubing Insulation should be protected from the weather on lines running outdoors with: Benjamin Foster's BF 57-68; Insul-coustic VIAC 550 or Aklyd-Chlorinated Rubber Paint or Presstite 762 protective coating.



OWENS/CORNING FIBERGLAS

Pipe Insulation



Fiberglas 25 H-P Pipe Insulation System

A noncombustible pipe insulation system for hot service piping operating at temperatures up to 450°F.

uses

Recommended for use on all heated piping operating at temperatures up to 450°F. where a complete noncombustible insulation system is desired, for commercial and institutional buildings, schools, hospitals and places of public assembly. Also recommended for processing lines where fire safety is a paramount criterion.

description

Fiberglas 25* H-P Pipe Insulation System is composed of Fiberglas Heavy Density Sectional Pipe Insulation jacketed with a white pre-sized glass cloth jacket. Longitudinal jacket flaps are secured with flare-door staples. End joints are closed with a glass cloth tape stapled firmly in place.

benefits

fire safety a complete insulation system with a UL rating including pipe fittings, and mastic when installed in accordance with recommended procedures.

ready for painting factory pre-sized glass cloth jacket and matching tape and mastic system do not require field sizing. If desired, painting may be omitted. "See Application Recommendations."

damage resistant the extra heavy density pipe insulation and extra tough woven glass cloth jacket resists damage on exposed lines.

lower operating cost the exceptional thermal efficiency of Fiberglas Heavy Density pipe insulation contributes to lower operating cost of heating equipment and piping.

*Fiberglas (Reg. U.S. Pat. Off.) and "25" are trademarks of Owens-Corning Fiberglas Corporation.

performance characteristics

Insulation

dimensional stability:
will not warp, shrink, rot or decompose

specific heat:
0.20 Btu/lb F.

vermin and rodent resistance:
provides no sustenance

temperature limitation:
heated lines to 450F

alkalinity:
ph 9

stress corrosion:
will not cause stress corrossion cracking of stainless steel

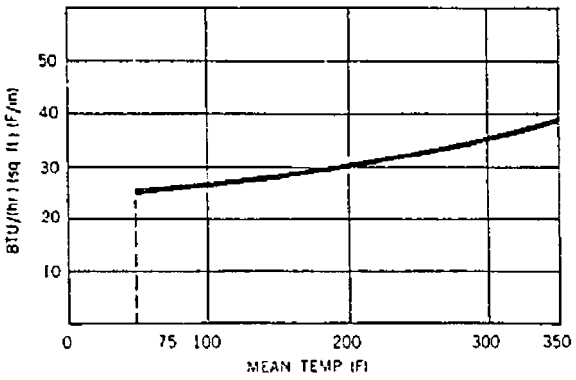
Jacket

permanence:
mildew resistant. Will not rot or shrink. Vermin and rodent proof.

burst strength:
exceptional glass-cloth strength exceeds that of canvas

Pre-sized Glass-Cloth	8 oz Canvas
300 psi	211 psi

thermal conductivity



fire hazard classification

Maximum Fire Hazard Classification for building materials and insulations as noncombustible has been established as follows:

	Acceptable
Flame Spread	25
Fuel Contributed	50
Smoke Developed	50

Fiberglas 25 H-P Insulation System, including fittings, is below the maximum allowable. This is your assurance that you can specify and use Fiberglas 25 H-P Pipe Insulation System without the danger of contributing to the spread of fire or that combustion will liberate excessive smoke. The system has been designed to meet the stringent fire safety requirements of the GSA and Corps of Engineers.

Underwriters Laboratories
(Pipe & Equipment Coverings R5583 40 U 8.15)

	Fiberglas 25 H-P Pipe Insulation System	
Flame Spread	20*	25**
Fuel Contributed	15	10
Smoke Developed	20	35

*Note: This rating is for the pipe insulation plus an unlimited number of fittings in a piping system when O-CF Fitting Mastic, Type H, is used.

**Note: This rating is for the pipe insulation plus fittings when the system is limited to 25% of fittings and BF 30-36 is used.

finish

The factory pre-sized white finish eliminates the necessity of sizing the jacket before painting and the neat white surface may be left unpainted if desired. Fitting finish is also compatible with the insulation jacket. If painting is required, Glidden acrylic latex paint (No. 5370) is approved for use.

application recommendations

Fiberglas 25 H-P Insulation System is installed on the pipe by stapling the longitudinal jacket flap securely with flare-door staples on 2" centers. End joints are closed by wrapping with factory-furnished pre-sized glass cloth tape stapled in place.

Fittings are insulated with Fiberglas molded or segmental Insulation and wrapped with Fiberglas Reinforcing Cloth, Type H. The wrapping is subsequently coated with O-C-F Fitting Mastic, Type H or Benjamin Foster 30-36.

federal specification compliance

Fiberglas 25 H-P Pipe Insulation System meets the requirements of Federal Specifications, HH-I-558a Form D; Type III, Class 12.
ASTM C547-67

recommend thickness

selection of an insulation thickness for any specific application should take into consideration the following important criteria: 1. Cost of insulation applied. 2. Cost of heat energy. 3. Cost of capital. 4. Cost of depreciation-plant and insulation. 5. Capital investment in heat production equipment. 6. Temperature differential. 7. Size of the pipe surface. 8. Conductivity of insulation.

The thicknesses shown in the table, below, are based on the optimum balance of these consideration for selecting an insulation thickness for performance and economy.

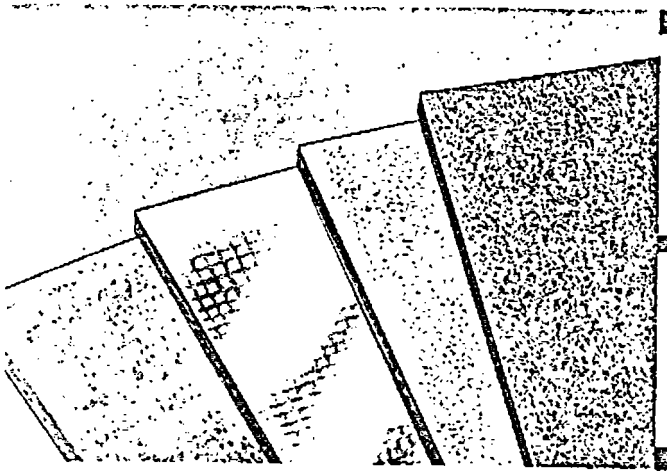
recommended thickness-heated piping to 450F (80F Ambient still air.)

Pipe Temp.	200			300			400			450		
Temp. Diff.	120			220			320			370		
IPS	RT	HL	ST	RT	HL	ST	RT	HL	ST	RT	HL	ST
½	½	19	105	½	34	125	1	39	115	1	47	123
¾	½	22	107	1	29	106	1	46	122	1	56	131
1	½	25	107	1	30	102	1	48	117	1	60	129
1¼	1	20	95	1	37	108	1	62	125	1	75	135
1½	1	21	93	1	39	106	1	63	121	1½	62	112
2	1	24	94	1	45	106	1	73	122	1½	70	113
2½	1	28	94	1½	50	101	1½	74	113	1½	88	121
3	1	32	94	1½	50	101	1½	76	110	1½	93	116
3½	1	30	95	1½	56	103	1½	94	111	1½	114	118
4	1	39	95	1½	57	101	1½	94	112	1½	114	118
4½	1	38	95	1½	72	104	1½	118	115	1½	148	121
5	1	50	95	1½	70	100	1½	114	115	1½	140	121
6	1	57	97	1½	85	101	1½	128	115	2	125	110
7	1	62	96	1½	90	100	1½	142	110	2	136	108
8	1	68	96	1½	100	101	2	125	107	2	154	111
9	1	80	97	1½	110	101	2	138	106	2	174	111
10	1½	59	91	1½	110	101	2	146	106	2	180	111
11	1½	64	91	1½	120	101	2	168	106	2	194	111
12	1½	80	96	1½	149	107	2	171	106	2	209	112
14	1½	92	92	1½	171	110	2	190	108	2½	199	107
16	1½	93	92	2	133	97	2½	181	103	2½	223	108
18	1½	101	92	2	148	97	2½	204	103	2½	248	108
20	1½	110	92	2	162	97	2½	222	103	2½	271	108
24	1½	131	93	2	194	98	2½	266	104	2½	320	109
30	2	132	92	2	257	98	2½	323	103	2½	361	105

RT—recommended thickness HL—heat loss, Btu/hr/lineal foot ST—surface temperature (F) HG—heat gain

OWENS/CORNING FIBERGLAS

Equipment Insulation



Industrial Insulation 700 Series

a highly versatile group of Fiberglas insulating boards designed to insulate ductwork and equipment operating at temperatures up to 450F.

uses

The 700 Series boards have been designed primarily to insulate heating and air conditioning ducts, ovens, tanks, boilers, hot water generators and other hot equipment.

type 700 — a low cost flexible material suitable for insulating factory-fabricated metal panels and for packing into irregular spaces

type 701 — A lightweight resilient insulation, in board form, used on vessels having irregular surfaces where the exterior finish is supported by welded studs, pins or other mechanical attachments

type 702 — More rigid than 701 and is recommended for use on equipment and ductwork subject to minmum maintenance and construction abuse

type 703 — A semi-rigid board recommended for use on equipment, vessels and air conditioning ductwork.

description

Fiberglas * 700 Series Industrial Insulations are made of inorganic glass fibers pre-formed into semi-rigid to rigid rectangular boards of varying densities. The series consists of Type 700, 701, 702, 703, 704 and 705. Each type has specific thermal and physical characteristics which makes it suitable for the uses described. Type 703, 704 and 705 are available with a variety of factory-applied vapor-barrier facings to prevent condensation on cold surfaces and to provide a neat finished appearance. Fire Retardant Facings are available.

type 704 — A rigid board recommended for use on heating and air conditioning ductwork in exposed areas where sharp, true corners and smooth surfaces are desired.

type 705 — A rigid board with very high strength characteristics for use on chillers, hot and cold equipment, heating and air conditioning ductwork where greater abuse resistance and good appearance is required.

benefits

lower operating costs — the exceptional thermal efficiency of Fiberglas 700 Series Insulations lowers operating costs.

end-use tailored — a variety of densities and facings offers a selection of products to meet specific performance and economic requirements.

continuous in-place performance — 700 Series resists damage, maintains structural integrity and efficiency. Thickness stays uniform.

neat, finished appearance — the boardlike characteristics of the heavier density 703, 704 and 705 products provide neat square corners. The factory-applied facings present an attractive finished appearance.

fire safe — Fiberglas is inherently fire safe. The unfaced boards and the Aluminum Foil Faced 703, 704 and 705 have UL Flame Spread ratings of less than 25.

*T.M. Reg O-C. F. Corp.

performance characteristics

sound absorption coefficients (2" thick #6 mounting)

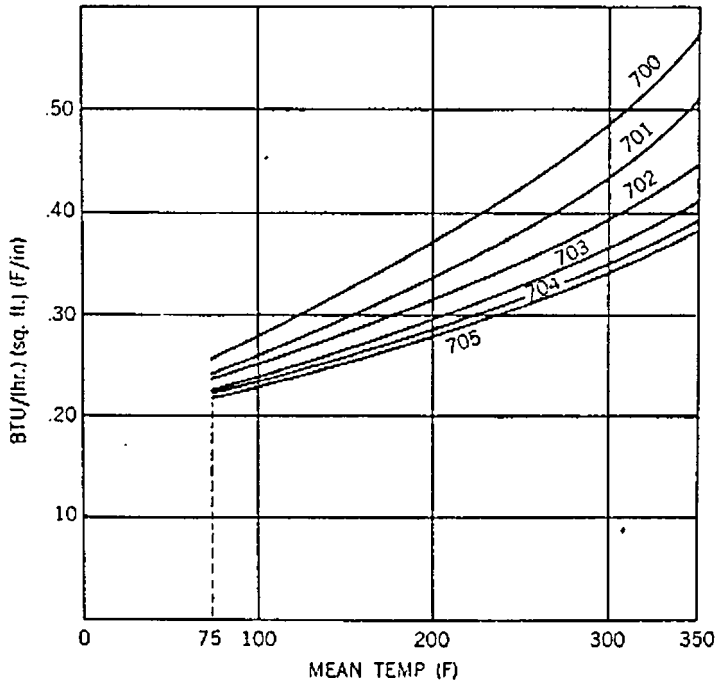
TYPE	125	250	500	1000	2000	4000	NRC
701	.34	.70	.96	.97	.86	.83	.87
702	.28	.77	.96	.98	.87	.87	.89
703	.32	.74	.97	.98	.87	.85	.89
704	.27	.79	.98	.99	.88	.86	.91
705	.48	.82	.97	.99	.90	.86	.92

size and density

Type	Density (pcf)	Thickness (in ½" increments)	Compressive Strength (psf at 10% deformation)	Standard Size	Therm. Cond. @ 75F Mean Temp.
700	1.08	1"—4"	3†		0.260
701	1.58	1"—4"	4.5†		0.242
702	2.25	1"—3"	9.5†	24" x 48"*	0.235
703	3.00	1"—2"	100		0.230
704	4.20	1"—2"	200		0.230
705	6.00	1"—2"	350		0.220

*For special applications, boards up to 48" x 96" are available. †After compression packaged.

thermal conductivity



moisture absorption	less than 0.2% by volume
bacteria and fungus resistance	does not breed nor promote
odor	odorless
humidity and temperature effect	cycling conditions will not cause spalling or crumbling
corrosion	does not accelerate corrosion of copper, steel or aluminum.

facings

Type 703, 704 and 705 are also available with the following factory applied vapor barrier facings:

FF — .0025 aluminum foil (UL Rated)
FRK — Foil-reinforced kraft
SF — Duplex Laminated kraft

fire hazard classification

	unfaced (700, 701, 702)	(703, 704, 705)	foil-faced (703, 704, 705)
flame spread	10-20	15	15-20
fuel contributed	10-15	15	20-35
smoke developed	0-20	0	0

(compared to untreated Red Oak as 100)

application recommendations

Type 700, 701, 702 — Lightweight unfaced flexible insulations in board form for use on vessels having irregular surfaces where the exterior is supported by welded studs or stiffeners and not by the insulation itself. The products are self-supporting but are generally secured with mechanical fasteners and protected by sheet metal.

Type 703, 704, 705 — These board insulations are normally impaled on welded pins on flat surfaces. They are cut in segments and banded in place on irregular surfaces. Unfaced boards are normally finished with reinforced insulating cement or weatherproof mastic. Faced boards, with joints taped to provide a continuous vapor barrier, may be left unfinished or may be canvas jacketed.

recommended thickness — heated equipment

(80F ambient air)

Surface	Type 701			Type 703			Type 704		
Temp.	RT	HL	ST	RT	HL	ST	RT	HL	ST
150	1½	11	87	1½	10	86	1½	10	86
250	2	24	95	2	21	93	2	20	92
350	3	29	98	2½	31	99	2½	30	98
450	3½	40	105	3	40	105	3	39	104

RT — recommended economic thickness, inches.
HL — heat loss (Btu/ft²-hr.).
ST — surface temperature (F).

thickness to prevent condensation

cold ducts and equipment

The following chart indicates the recommended thickness of Type 703, 704, 705 Faced Duct Insulation for installation on cold air ducts at various temperature differences (duct to air). Also shown are values for heat gain and approximate maximum relative humidity allowable.

Temperature Differences	Recommended Thickness (inches)	Heat Gain Btu/ft²-hr	Permissible Relative Humidity
20	¾	5.1	90%
25	¾	6.4	87%
30	1	6.1	89%
35	1	7.1	88%
40	1½	5.7	90%
45	1½	6.3	89%
50	2	5.4	90%

specification compliance

HH-I-558a, Form A, Class 1.	702, 703**, 704, 705
HH-I-558a, Form A, Class 2.	703**, 704, 705
HH-I-558a, Form B, Type 1, Class 7.	700, 701, 702
Navy Bureau of Yards and Docks, 16Yf	703**, 704, 705
Corps of Engineers, C.E.—301.08, .11 thru .17	703**, 704, 705

**Type 703 C is specially produced for contracts where certification of compliance to the above Federal Specification is required. Available plain or faced for use on hot or cold equipment and for air conditioning ductwork.

***Waiver required on upper temperature limit.

limitations

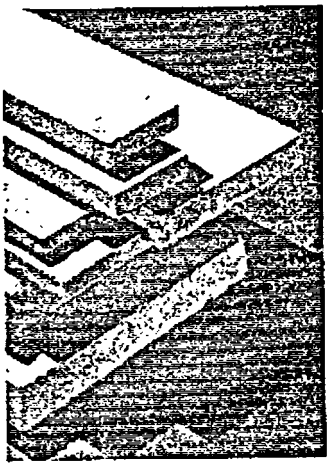
Industrial insulation 700 series, plain, should not be used on surfaces operating at temperatures above 450F. Types 703, 704, 705 faced products should not be used on surfaces operating at temperatures greater than 250F except that FF may be used at a maximum thickness of 2½ inches up to 450F.

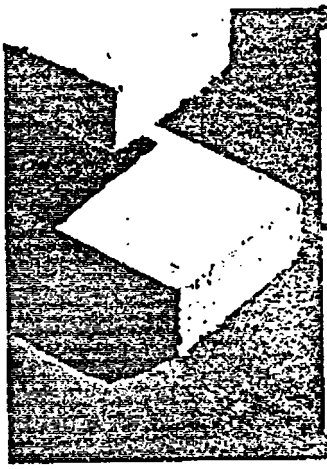
caution

Owens-Corning Fiberglas Insulations are to be applied only with approved adhesives, mastics and mechanical fastening devices as published in Accessory Materials List, Pub. No. 4-IN-3430. Owens-Corning Fiberglas accepts no responsibility or liability for the performance of materials other than those listed unless approved in writing by O-CF Testing Laboratories.

OWENS/CORNING FIBERGLAS

Equipment Insulation





Kaylo 10 & Kaylo 20 Block Insulation

rigid calcium silicate insulations for all types of heated equipment operating at temperatures up to 1800F.

uses

Kaylo 10* Block is for use on indoor or outdoor equipment operating at temperatures up to 1200F. Kaylo block is ideally suited for use on stainless steel vessels and equipment as it helps inhibit stress corrosion cracking. Typical applications are for boilers, breeching, tanks, vessels. Kaylo 10 Block is white in color.

Kaylo 20* with its high temperature limit of 1800F extends its use to include refractory wall backing for furnaces and boilers and fireproofing of equipment and vessel skirts.

description

Kaylo 10 and Kaylo 20 Block Insulations are rigid hydrous calcium silicate heat insulations reinforced with asbestos fibers. They are strong, efficient and are highly resistant to abrasion and moisture damage. Kaylo 20 has a slightly pink color to distinguish it from Kaylo 10.

benefits

high thermal efficiency—both Kaylo 10 and Kaylo 20 offer excellent thermal efficiency coupled with high strength. A low k of .40 for Kaylo 10 and .52 for Kaylo 20 at 200F mean temperature proves that Kaylo will provide significant savings in operating costs over the life of the equipment.

resistant to abuse—resists mechanical damage because of hard, tough, reinforced structure.

strong—less breakage in shipment and handling. High temperatures have little effect on strength characteristics.

will not cause stress corrosion cracking— Kaylo will not cause stress corrosion cracking of stainless steel because Kaylo contains less than 200 ppm soluble chlorides as well as an inhibitor which prevents trace quantities of chlorides from the atmosphere or other sources from causing cracking and possible failure of piping and equipment.

resistant to moisture damage—unlike many other insulations, Kaylo is not affected appreciably from moisture damage. It regains thermal efficiency and strength after drying out. Outdoor installations must be weatherproofed, however, for long continuous service.

dimensionally stable—Kaylo does not shrink appreciably in service, even at elevated temperatures. This means less heat leakage at the joints. And Kaylo will not warp or crack in service.

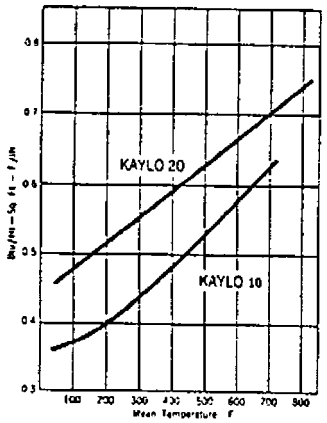
fabricates easily—ordinary insulators tools are all that is required to fabricate Kaylo. It cuts with a clean true edge for tighter fit at the joints. Fittings are neater, faster.

*Kaylo is a registered trademark (Reg U. S. Pat. Off.) of Owens-Corning Fiberglas Corp.

performance characteristics

	KAYLO 10	KAYLO 20
density:	11 pcf approx.	12 pcf. approx.
flexural strength: (ASTM C-203)	60 psi average	90 lb/sq. in.
compressive strength: (ASTM C-165) at 5% deformation	125 psi	130 psi
resistance to abrasion: (ASTM C-421)	after 10 minutes, 20% max. after 20 minutes, 45% max.	
dimensional stability: (ASTM C-356)	linear shrinkage after heating for 24 hours in muffle at 1200F.—1.4%	
alkalinity:	ph 10	

thermal conductivity



economic thickness*

Selection of insulation thicknesses for any specific application should take into consideration the following important criteria. 1. Cost of insulation applied. 2. Cost of heat energy. 3. Cost of capital. 4. Cost of depreciation—plant and insulation. 5. Capital investment in heat production equipment. 6. Temperature differential. 7. Size of the pipe or surface. 8. Conductivity of insulation.

*From "How to Determine Economic Thickness of Insulation"—National Insulation Manufacturers Association.

economic thickness—Kaylo 10 block to 1200 F—ambient still air 80 F

ET—economic thickness HL—heat loss
ST—surface temperature Btu/hr/lin/foot

THICK	200 F		300 F		400 F		500 F		600 F		700 F		800 F		900 F		1000 F		1100 F		1200 F	
	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.	HEAT LOSS	SURF. TEMP.
1.000	38	103	72	124	109	147																
1.500	27	96	51	111	78	127	107	145														
2.000	21	93	40	104	60	117	83	130	107	145												
2.500	17	90	33	100	49	110	68	121	87	133	109	146										
3.000	14	89	28	97	42	105	57	115	74	125	92	136	112	148								
3.500	13	88	24	95	36	102	49	110	64	119	80	129	97	139	116	150						
4.000	11	87	21	93	32	99	44	107	56	114	70	123	85	132	102	142	120	153				
4.500	10	86	19	91	28	97	39	104	50	111	63	118	76	127	91	136	107	145	125	156		
5.000	9	85	17	90	26	96	35	101	46	108	57	115	69	122	82	130	97	139	113	149	130	159
5.500	8	85	16	89	23	94	32	100	42	105	52	112	63	118	75	126	88	134	103	143	118	152
6.000	7	85	14	89	22	93	30	98	38	103	48	109	58	115	69	122	81	130	94	138	109	146

*calculated

Kaylo 20 Block to 1800 F—ambient still air 80 F

Operating Temp. F	Power			Process		
	ET	HL	ST	ET	HL	ST
1300	7½	111	136	6	135	148
1400	8	117	139	6½	143	152
1500	8	123	142	7	151	155
1600	8½	129	145	7	158	159
1700	9	135	148	7½	165	163
1800	9½	141	151	7½	172	166

specification compliance

HH-I-523c Insulation Block, Pipe Covering, Thermal, (Calcium Silicate for temperatures up to 1200°F). Type 1.

MIL-I-2819E Insulation Block, Thermal. Class 1, 2, and 3. ASTM C533-67.

MIL-I-24244 (ships) Insulating Materials, Thermal, with Special Corrosion and Chloride Requirements (Kaylo only), . Type 3A, 3B.

sizes

thickness—1", 1½", 2", 2½", 3", 3½" and 4"
width—3", 6", 12" and 18"
length—18" to 36"
form—Block

beveled lags

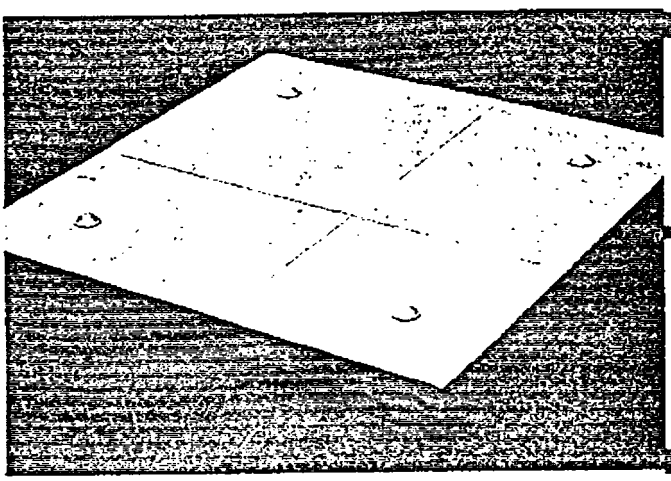
For pipe sizes greater than those for which Kaylo 10 and Kaylo 20 Pipe Insulation sizes are available, Kaylo 10 and Kaylo 20 beveled lags may be used to insulate piping. Lags beveled to fit pipes from 18" to 72" in diameter are available in thickness of 1½," 2", 2½", 3". Lags are 36" long and 3" wide.

application recommendations

Kaylo 10 and Kaylo 20 Block Insulations are held in place by mechanically fastening with bands, welded rods or studs. The insulation may be finished with a trowel coat of insulating cement, canvassed and painted. Outdoor installations require weatherproofing with mastics or metal jacketing.

OWENS/CORNING FIBERGLAS

Equipment Insulation



Fiberglas 25 H-E Equipment Insulation System

A noncombustible rigid board insulation system for hot service ducts and equipment operating at temperatures up to 450°F.

uses

Recommended for use on all hot mechanical equipment and ductwork operating up to 450°F, where the ultimate in noncombustibility is desired.

description

A Fiberglas 25* H-E Equipment Insulation System for heated surface service consists of a rigid insulation board of glass fibers faced with a noncombustible pre-sized Fiberglas cloth. Other components of the system include a noncombustible pressure sealing joint tape and pre-finished metal fastener caps attached to welded pin anchors.

benefits

fire safety—a complete insulation system with UL rating on board, facing, joint tape, fastening device.

ready for painting—the pre-sized white glass cloth facing, matching tape and fastener caps do not require field sizing prior to painting. If painting is required, use recommended paint.

damage resistant—the tough finely woven glass cloth facing resists damage and the rigid insulation board absorbs most impact blows without damage.

lower operating cost—the uniform, factory controlled board thickness assures constant thermal efficiency performance.

*Fiberglas (Reg. U.S. Pat. Off.) and "25" are trademarks of Owens-Corning Fiberglas Corporation.

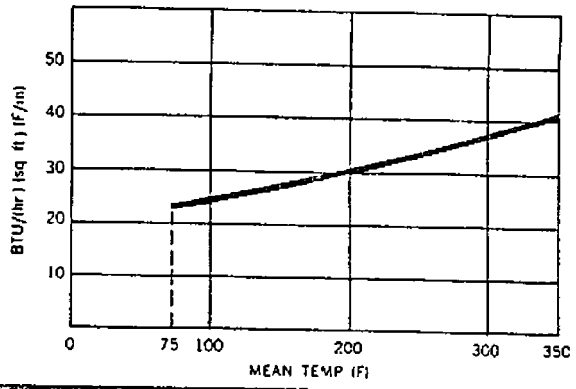
performance characteristics

dimensional stability:
will not warp, shrink, rot or decompose
vermin and rodent resistant:
provides no sustenance
flame hazard classification:

Flame Spread	25
Flame Contributed	10
Smoke Developed	50

temperature limitations:
recommended for heated surfaces when temperatures do not exceed 450°F.
jacket burst strength:
300 psi

thermal conductivity:



sizes
Width 24", Length 48", Thickness 1", 1½", 2".

fire hazard classification
Maximum Fire Hazard classification for building materials and insulation as noncombustible has been established as follows:

	Acceptable
Flame Spread	25
Fuel Contributed	50
Smoke Developed	50

Fiberglas 25 H-E Insulation System, including fittings, performs below the maximum allowable. This is your assurance that you can specify and use this system without the danger of contributing to the spread of fire or that combustion will liberate excessive smoke. The system has been designed to meet the stringent fire safety requirements of GSA and Corps of Engineers.

Underwriters Laboratories
(Pipe & Equipment Coverings R5583 40 U 8.15)

	*Fiberglas 25 H-E Insulation System
Flame Spread	25
Fuel Contributed	10
Smoke Developed	50

*Note: This rating is for the composite product and includes the use of O-CF Type H Joint Sealing Tape if materials and application conform to those recommended.

specification compliance
meets the stringent fire safety requirements of GSA and Corps of Engineers HH-I-558a, Form A, Class 1 & 2.
ASTM C392-63
Meets NFPA 90A fire hazard requirements.

application recommendations
Fiberglas 25 H-E Equipment Insulation System is installed by impaling the insulation boards on welded pins spaced 3" in from each corner of the board with intermediate pins on no greater than 21" centers.

After boards are impaled, the welded pins are cut to extend ⅛" beyond the face of the board and a self-locking cap is pushed onto the pin.

All insulation raw edges and butt joints are to be sealed with O-CF Joint Sealing Tape, Type H. Tape is a pressure-sealing type requiring no separate adhesive. Pressurize tape by rubbing hard with a plastic sealing tool.

Ductwork els and other sharp radius bends require prescoring of the insulation board to conform to the curved surface.

If painting is required, no sizing is necessary; but to maintain the noncombustibility of the system, only Glidden acrylic latex paint (No. 5370) is approved for use.

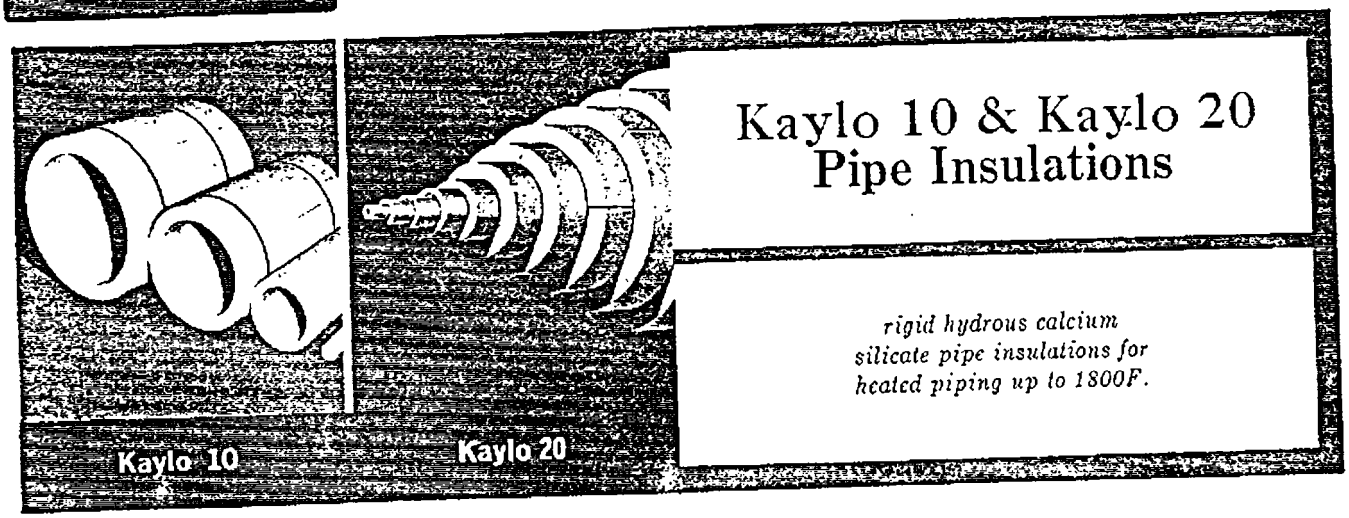
recommended thickness—heated equipment
(80F ambient still air)

Operating temp.	RT	HL	ST
150F	1	15	89
250F	1½	29	98
350F	2	39	104
450F	2	61	117

RT — recommended economic thickness, inches.
HL — heat loss (Btu/ft²-hr.).
ST — surface temperature (F).

OWENS/CORNING FIBERGLAS

Pipe Insulation



Kaylo 10 & Kaylo 20 Pipe Insulations

rigid hydrous calcium silicate pipe insulations for heated piping up to 1800F.

uses

Kaylo 10 is recommended for use on heated piping operating up to 1200F and Kaylo 20 extends the temperature range to 1800F. These thoroughly field-tested insulations have the physical properties most desirable for efficient, durable work for indoor and outdoor, power and process piping. A variety of jackets are available for surface finish and weatherproofing.

description

Kaylo 10† & Kaylo 20* pipe insulations are rigid hydrous calcium silicate heat insulations for use on all heated piping up to 1800F—indoors and out. These products are precision molded in sections or segments from a chemically reacted material. A small amount of asbestos fiber is added to improve mechanical strength. Kaylo 10 is white. Kaylo 20 has a slight pinkish color to distinguish it from Kaylo 10.

benefits

lower operating costs — Kaylo Insulations have exceptional thermal efficiency. The low k factor of .40 at 200 mean temperature means lower operating cost, better temperature control for process operations.

rugged — Kaylo Pipe Insulations are strong and rigid to resist mechanical abuse in shipping, handling and in service

versatile — Kaylo's extended temperature range covers a broad number of uses with one material. All heated piping requirements to 1800F and in sizes from ⅛" to 30" IPS can be met with Kaylo and Kaylo 20.

will not cause stress corrosion cracking — Kaylo will not cause stress corrosion cracking of stainless steel because Kaylo contains an inhibitor, and has less than 200 ppm soluble chlorides.

unaffected by moisture — Kaylo can be completely saturated in water without appreciable loss of strength and regains its strength and thermal value after drying out.

clean, neat installation — Kaylo cuts cleanly leaving a sharp square edge for neater appearance on fittings. Rigid manufacturing tolerances assure uniform, smooth, unbroken joints.

variety of jackets — A variety of factory-applied jackets allows a selection of product for indoor finished appearance or for weatherproofing insulation on outdoor lines.

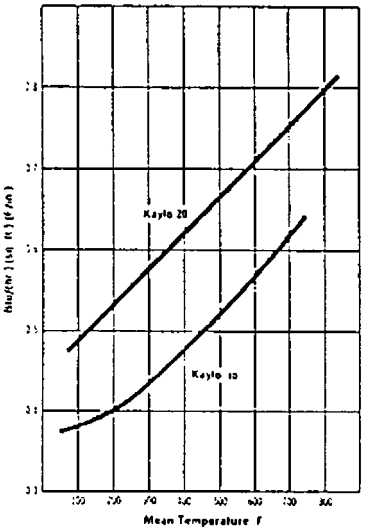
nesting sizes - Kaylo Pipe Insulations are manufactured to Simplified Dimensional Standards to permit nesting sizes for double layer applications.

†Kaylo is a registered trademark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corp.

performance characteristics

	Kaylo 10	Kaylo 20
density (approx.)	11 lb. pcf.	12 lb. pcf.
flexural strength (ASTM C-446)	75 lbs./sq. in.	75 lbs./sq. in.
compression strength (ASTM C-165) at 5% deformation	125 psi	110 psi
resistance to abrasion (Conventional tumbling test-loss in weight before heating) (ASTM C-421)	after 10 minutes, 20% max.	after 20 minutes, 45% max.
corrosion resistance	does not cause or accelerate corrosion of steel, aluminum, or stainless steel	
dimensional stability linear shrinkage after heating for 24 hours in a muffle (ASTM C-356)		
% length loss	1.4 (at 1200F)	2.0 (at 1800F)

thermal conductivity



sizes

thickness — Kaylo Pipe Insulation is available in single or double layer thicknesses from 1" to 3" depending upon pipe size. Kaylo Tube Insulation is available in single layer thicknesses of 1" and 1½".

pipe sizes — Kaylo Pipe Insulation is available to fit nominal pipe sizes from ½" to 39" in diameter. Kaylo Tube Insulation will fit nominal copper tubing sizes from ⅜" to 3" in diameter.

forms — Kaylo Pipe Insulation is available in sectional or multisegmental form depending upon pipe size. All insulation is furnished in 3 ft. sections.

jackets

canvas — Standard canvas & 8 oz. canvas jacket are available for all types, sizes and thicknesses of Kaylo Pipe and Tube Insulation at an additional charge. These jackets are factory applied on Sectional Pipe and Tube Insulation. On Multisegmental forms, they are furnished but not adhered. Bands are available for use with this product at slight additional charge and will be furnished on request.

Kaylo Klad — Kaylo is also available with an embossed aluminum jacket .016" thick or .010" thick stainless steel jacket. These jackets provide greater resistance to mechanical damage and present a neat finished appearance to pipe lines. The longitudinal seam has a self-locking joint. Butt sealing strips with integral mastic and protective asbestos cover are furnished for sealing end joints.

specification compliance

HH-I-523c — Insulation Block and Pipe Covering Thermal (Calcium Silicate for Temperatures up to 1200F). Type II, Class A through F.

MIL-I-2781D (Int. Amend. 1) — Insulation Pipe Covering, Thermal: Grade I, Class b; Grade II, Class d; Grade III, Class e, Type I and II.

MIL-I-24244 (Ships) — Insulation Materials, Thermal, with Special Corrosion and Chloride Requirements, Type 1A, 1C, 1D, 1E.

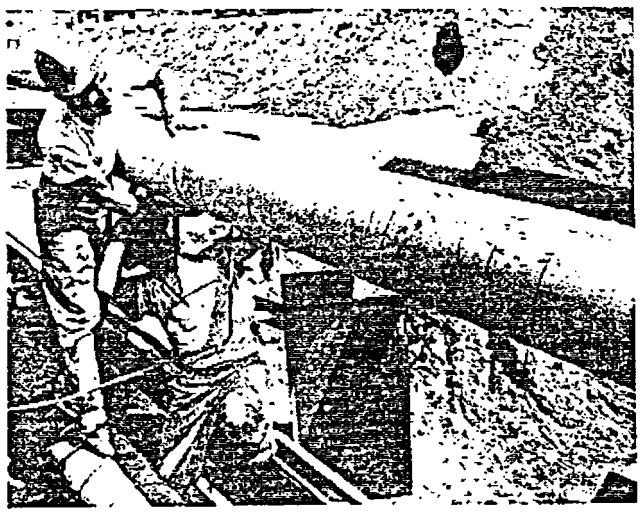
ASTM C533-67

application recommendations

outdoor lines — Kaylo Pipe Insulations are mechanically fastened by wiring in place using 16 gauge wire on 9" centers and subsequently covered with a weatherproof jacket of metal or 45 lb. roofing felt. See Application Specifications for complete details.

indoor lines — Kaylo for indoor piping work is furnished with a factory-applied canvas jacket and held in place with bands or wire. The jacket has overlapping joint flaps that are smoothly pasted in place. Canvas should be sized to provide a base for painting.

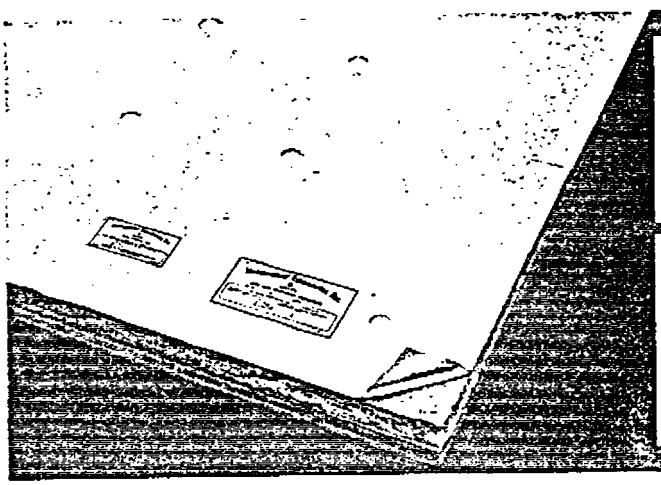
fittings — Fitting are insulated with mitered segments of Kaylo wired in place and finished with a ¼" layer of insulating cement. Flanges and valves are insulated with oversized pipe insulation. They are finished off with canvas pasted in place for indoor lines or reinforced waterproof mastic for outdoor lines.



For tables on economic thickness refer to Owens-Corning Fiberglas Corporation Pub. No. 1-IN-4350-B (page 5.3 in Mechanical Insulation Systems manual, Pub. No. 14-IN-2600-A)

OWENS/CORNING FIBERGLAS

Equipment Insulation



Fiberglas 25 C-E Equipment Insulation System

A noncombustible rigid board insulation and vapor barrier system for cold and dual-temperature service ducts and equipment operating at temperatures down to –120 F

uses

Recommended for use on all cold or dual-temperature service rectangular ducts and cooling equipment where the ultimate in noncombustibility is desired. Boards are impaled over welded pins and held in place with white fastener caps vapor sealed with mastic.

description

A Fiberglas 25* C-E Equipment Insulation System for cold temperature service consists of a rigid board of glass fibers faced with a noncombustible vapor barrier facing. The facing is a laminate of vapor tight aluminum foil and pre-sized glass cloth. Joints are sealed with a noncombustible vapor barrier pressure sensitive adhesive tape to form a complete vapor tight system.

benefits

fire safety—the only complete insulation system with UL rating on board, vapor barrier, joint tape, mastic and fastening device.

ready for painting—the pre-sized glass cloth facing, matching tape and fastener caps, do not require field sizing. They may be left unpainted if desired.

damage resistant—the tough finely woven glass cloth facing resists damage and the semi-rigid insulation board is resilient thereby absorbing impact and resisting damage.

lower operating cost—the uniform, factory controlled board thickness assures constant thermal efficiency performance.

no condensation drippage—the factory-applied glass cloth and foil vapor barrier and the taping system make the system vapor tight to resist vapor penetration.

*Fiberglas (Reg. U.S. Pat. Off.) and "25" are trademarks of Owens-Corning Fiberglas Corporation.

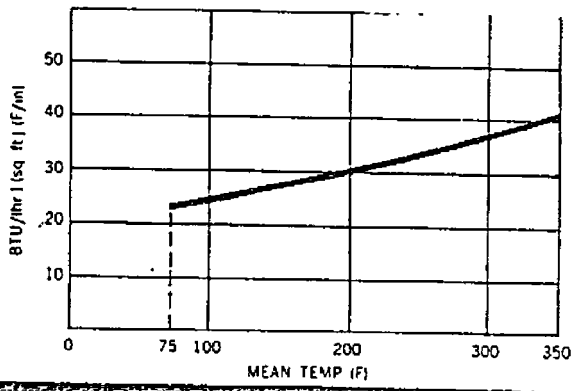
performance characteristics

dimensional stability:
will not warp, shrink, rot or decompose
vermin and rodent resistant:
provides no sustenance
flame hazard classification:

Flame Spread	20
Flame Contributed	10
Smoke Developed	35

temperature limitations:
recommended for heated surfaces when temperatures do not exceed 450°F. or fall below 35°F.
vapor transmission rate:
.05 perms

thermal conductivity



sizes
Width 24", Length 48", Thickness 1", 1½", 2".

fire hazard classification
Maximum Fire Hazard Classification for buidling materials and insulation as noncombustible has been established as follows:

	Acceptable
Flame Spread	25
Fuel Contributed	50
Smoke Developed	50

Fiberglas 25 C-E Insulation System, including joint sealing treatment, is considerably below the maximum allowable. This is your assurance that you can specify and use this system without the danger of contributing to the spread of fire or that combustion will liberate excessive quantities of smoke. The system has been designed to meet the stringent fire safety requirements of GSA and Corps of Engineers.

Underwriters Laboratories
(Pipe & Equipment Coverings R5583 40 U 8.15)

	**Fiberglas 25 C-E Insulation Systems
Flame Spread	20
Fuel Contributed	10
Smoke Developed	35

**NOTE: This rating is for the composite product and includes the use of O-CF Type C Joint Sealing Tape for sealing joints.

specification compliance
Meets the stringent fire safety requirements of GSA and Corps of Engineers HH-I-558a, Form A, Class 1 & 2.

Meets NFPA 90 A Fire Hazard Classification.

application recommendations
The Fiberglas 25 C-E Insulation System is installed by impaling the insulation boards on welded pins spaced 3" in from each corner of the board with intermediate pins of no greater than 21" centers.

After boards are impaled, the welded pins are cut to extend ⅛" beyond the face of the board. A self-locking cap is pushed onto the pin after coating with OC Fitting Mastic (Type C) to provide a vapor seal.

All insulation edges and butt joints are to be sealed with O-CF Type C Joint Sealing Tape.Tape is a pressure sealing type requiring no separate adhesive. Pressurize tape by rubbing hard with a nylon sealing tool.

Ductwork els and other sharp radius bends require prescoring of the insulation board to conform to the curved surface.

If painting is required, no sizing is necessary; but, to maintain the noncombustibility of the system, only Glidden acrylic latex paint (No. 5370) is to be used.

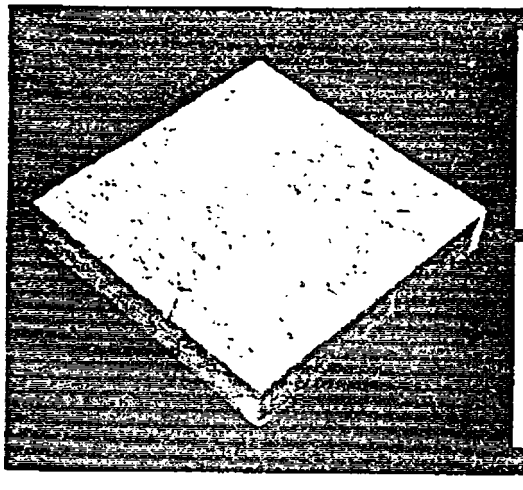
thickness to prevent condensation
cold ducts and equipment

The following chart indicates the recommended thickness for installation on cold air ducts at various temperature differences (duct to air). Also shown are values for heat gain and approximate maximum relative humidity allowable.

Temperature Differences	Recommended Thickness (inches)	Heat Gain Btu/ft²-hr	Permissible Relative Humidity
20	¼	5.1	90%
25	¼	6.4	87%
30	1	6.1	89%
35	1	7.1	88%
40	1½	5.7	90%
45	1½	6.3	89%
50	2	5.4	90%

OWENS/CORNING FIBERGLAS

Equipment Insulation



Intermediate Service Board

a lightweight, highly efficient, semi-rigid insulation for service temperatures up to 850F

uses

Fiberglas* I-S Board Insulation is designed for use on boilers, breechings, ducts, chimney liners and other heated equipment operating at temperatures up to 850 F. It is designed for use in applications where an outside facing of steel sheet or metal mesh (with or without finishing cement) is provided.

description

Intermediate Service Insulation (I-S) is a lightweight insulation composed of Fiberglas fibers bonded together in semi-rigid, boardlike form with a special high temperature binder.

benefits

lowers operating costs—Fiberglas Intermediate Service Board is an extremely efficient thermal insulation. A low k factor of .30 at 200 F mean temperature means lower fuel costs due to less heat loss—more comfortable working conditions in equipment rooms. This superior thermal efficiency is attained because of finer fiber construction and the complete absence of shot or unfiberized material. Heat flow tests on a 600 F power plant duct insulated partially with I-S insulation and with a 8 pcf mineral wool insulation showed that I-S board had superior heat flow characteristics over an 18-month period of continuous service.

lower cost installation—the lightweight feature of I-S Board Insulation means easier handling; and the larger size pieces, up to 4' x 4', speed installation and reduce the number of joints to leak heat. Larger sizes are possible because of unusual structural integrity. The insulation will not crumble or break; cuts cleanly for good tight joints; conforms readily to irregularities and curved surfaces and returns to full thickness if compressed.

continuous in-place performance— Fiberglas Intermediate Service Board will not slump or deteriorate in severe service conditions. The insulation easily passed the rugged Navy Test Mil-I-15475C (Ships). Paragraph 4.5.3 which requires vibration at 12 cps through an arc of .015" for 100 hours at 750F, without setting.

*Trade-mark O-C Fiberglas Corp.

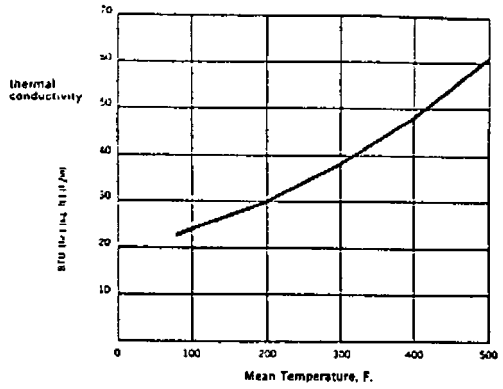
performance characteristics

sizes: 2′ x 2′; 2′ x 4′; 4′ x 4′

thicknesses: 1 to 4″ in ½″ increments.

moisture absorption: less than 0.2% by weight

specific heat: 0.20 Btu/ lb., F



heat transfer data

operating temperature (ambient still air 80 F)

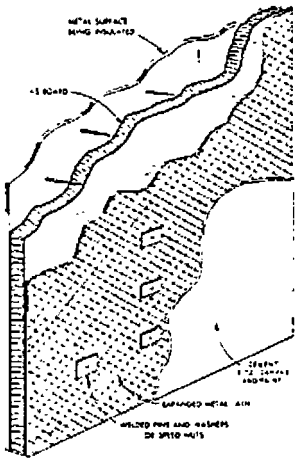
thickness in inches	450 F		500 F		550 F		600 F		650 F		700 F		750 F		800 F		850 F	
	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp	heat loss	surf temp
2.0	61	117	73	125	88	133	103	143	121	154	140							
2.5	49	110	59	116	71	123	84	131	98	140	113	149	131	160	149			
3.0	41	105	50	110	59	116	70	123	82	130	95	138	110	147	125	156	143	
3.5	36	102	43	106	51	111	60	117	71	123	82	130	94	138	108	146	123	155
4.0	31	99	38	103	45	107	53	112	62	118	72	124	83	130	95	138	108	146
4.5	28	97	34	101	40	104	47	109	55	114	64	119	74	125	84	131	96	138
5.0	25	95	30	99	36	102	43	106	50	110	58	115	66	121	76	126	86	133
5.5	23	94	28	97	33	100	39	104	45	108	53	112	61	117	69	122	79	128
6.0	21	93	25	96	30	98	35	102	42	105	48	109	55	114	63	119	72	124
6.5	19	92	23	94	28	97	33	100	39	103	45	107	51	111	59	116	67	121
7.0	18	91	22	93	26	96	31	99	36	102	41	105	48	109	54	113	62	118
7.5	17	90	20	92	24	95	29	97	32	100	39	104	45	107	51	111	58	115

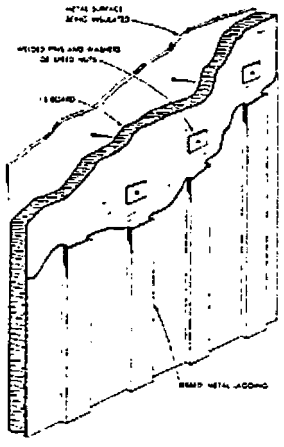
limitations

I-S Board must be applied flush against the hot surface with an exterior finish of sheet metal mesh (with or without a cement coating) whenever it is exposed to temperatures in excess of 350 F. There will be no rapid decomposition of the product after inserting a 1300F probe into the insulation for 20 minutes with the hot surface at 850F when the product is applied as noted above.

application recommendations

Fiberglas Intermediate Service Insulation is installed on flat and curved surfaces by attaching with welded pins or studs and finishing with sheet metal; or metal mesh and insulating cement, canvassed and painted. Pins with speed washers, or studs and nuts are installed on a maximum spacing of 18″ and not farther than 6″ from the edge of the insulation. The insulation is normally impaled over the pins or studs and the enclosing sheet metal or metal mesh is secured to the same fasteners. Joints of the sheet metal finish are offset from the joints of the insulation. Double-layer application is recommended for temperature over 600 F.





federal specification compliance

MIL-I-15475C (Ships) (except for fusing temperature)

HH-I-558a Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering) and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type), Form A, Class 3 (waiver needed on compression strength)

OWENS/CORNING
FIBERGLAS
TRADE MARK

Equipment Insulation



SEE NEXT PAGE FOR DESCRIPTION OF LATH FACINGS

Metal Mesh Blankets

an efficient,
high temperature insulating blanket
for service up to 1000F

uses

Fiberglas* Metal Mesh Blankets are especially suitable for heated industrial equipment with surface irregularities and projections such as seams, laps, flanges and rivet heads. They do an excellent insulating job when used on boilers, vessels, industrial ovens, breechings, tanks and many other types of industrial equipment operating at temperatures up to 1000F.

description

Fiberglas Metal Mesh Blankets are made from fibrous glass wool faced on one or both sides with wire mesh or metal lath to provide a suitable base for cement or mastic finishes. The blankets are flexible and resilient to conform to irregular or curved surfaces. A selection of mesh facings is available to best match the service requirements.

benefits

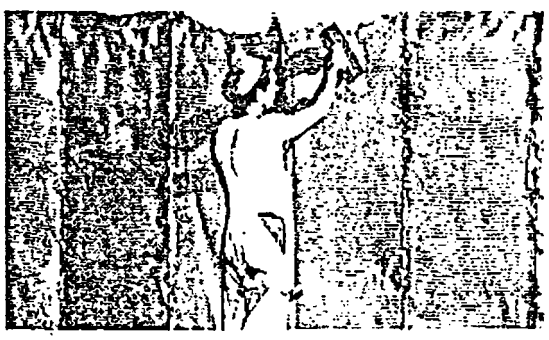
lowers operating costs—the exceptionally low k factor of Fiberglas Metal Mesh blankets reduces fuel costs substantially, thereby improving the return on investment for the insulation. It also controls excessive heat for more comfortable working conditions and personnel protection.

lowers installation cost—large blankets cover greater areas reducing installation cost. No tedious block-by-block hand layup. No drilling for studs. Blankets are easily impaled over welded studs or pins with speed washers or may be held in place with wire ties.

neat appearance—the factory-applied metal mesh surface provides a base for a smooth trowell coat of insulating cement which may be further finished with canvas and painted. Outdoor installations are finished with weatherproof mastic or sheet metal.



On large flat or irregular surfaces, blankets are impaled over welded pins or studs and secured with suitable mechanical fasteners. Edges of blankets are laced together.



For a good indoor finish apply ½" layer of O-C 110 Insulating Cement. Canvas is then applied with lagging adhesive over the insulating cement.

*T.M. REG. OCF CORP

performance characteristics

moisture absorption . less than 0.2% by volume

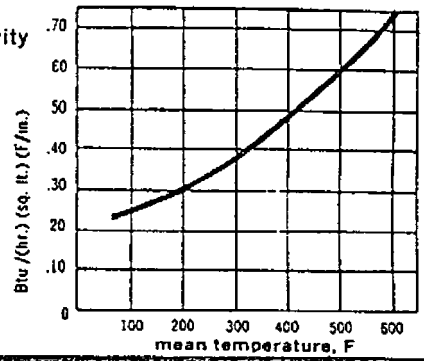
temperature resistance no sag, slump or loss of thickness at 1000 F

bacteria and fungus resistance . does not breed nor promote

odor . . . . . essentially odorless

temperature limit . . . . . 1000 F

specific heat . . . . . 0.20 Btu/lb., F.



sizes
width — 12" (min.) 24" (max.)
length — 24" (min.) 96" (max.)
thickness — 1" — 6" (½" increments)
form — blanket

facings

"O"—Fiberglas blanket tufted by tie wires to a metal facing on opposite sides. Recommended where a resilient surface is needed to conform to irregularities on the equipment surface.

"R"—Hi-Rib metal lath with a ⅜" rib. Used where maximum rigidity is required in a blanket. Metal rib turned to the outside (ATR) or toward insulation (RAT). Turned-out rib provides air space between insulation and hot surfaces, often advantageous when insulating steel breeching sheets to increase the overall insulating efficiency of the blanket.

"H"—Conventional 1" hexagonal poultry netting galvanized prior to weaving. The most flexible metal facing. Recommended where a blanket must be shaped to irregular surfaces and where movement of the blanket in a panel is to be prevented. Not a suitable base for insulating cement.

"L"—Expanded metal lath with ½" mesh. Ideal base for insulating or finishing cement. Recommended where a smooth finish is desired on large, flat or curved surfaces.

recommended thicknesses

Recommended thickness, heat loss, efficiency and surface temperature data are provided for the various Commercial, Power and Process Industries so that the design engineer can better select the thickness required for his specific job conditions. On outdoor work increase recommended thickness at least ½ inch to compensate for wind conditions.

(Ambient Air 80F)

Surface Temp. Amb. Air 80°F	COMMERCIAL			POWER			PROCESS		
	RT	HL	ST	RT	HL	ST	RT	HL	ST
200	.75	35	102	1.5	21	91	1.0	26	93
300	1.5	38	103	2.0	30	95	1.5	37	99
400	2.5	38	103	2.5	39	100	2.0	47	104
500				3.0	47	104	2.5	58	109
600				3.5	56	108	3.0	68	114
700				4.0	64	112	3.5	79	120
800				5.0	74	117	4.0	90	125
900				5.5	83	122	4.5	101	131
1000				6.0	94	127	5.0	114	137

RT—recommended thickness—inches
HL—heat loss—btu/ft.²/hr.
ST—surface temperature—(F)

application recommendations

for round equipment over 36" O.D.

Hold the Metal Mesh Blankets in place with ¾" metal bands on 12" to 18" centers. Lace metal edges that butt together with No. 16 galvanized annealed wire.

for large flat or irregular surfaces

Impale Metal Mesh Blankets over suitable welded fastener on 12" to 18" centers. Lace metal edges that butt together place. Blankets shall be butted firmly and laced with No. 16 galvanized annealed wire. On large vessels or ducts operating at temperatures over 600 F expansion joints are required on not greater than 16 foot centers. (Blankets are available with ⅜" metal rib (ATR) which provides an air space between the insulation and the hot surface for improved thermal performance.)

finishing methods

minimum indoor finish (or base for further finishes). Apply ½" coat of O-C Insulating Cement. Let dry.

good indoor finish (does not require painting). To minimum indoor finish apply resin base lagging adhesive, 6 or 8 oz. canvas and a final brush coat of the lagging adhesive.

weather resistant finish for outdoor work. Trowel two coats of suitable asphalt or vinyl base weather resistant mastic with glass fabric reinforcement between coats. Each coat is to be at least ⅛" wet thickness.

specification compliance

HH-I-563 Insulation, Mineral Wool; Blanket, Felt, and Industrial-Batt (For Heated Surfaces); Type 1, Class A and B.

HH-I-558a Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering) and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type), Form C, Class 10.

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OWENS/CORNING FIBERGLAS

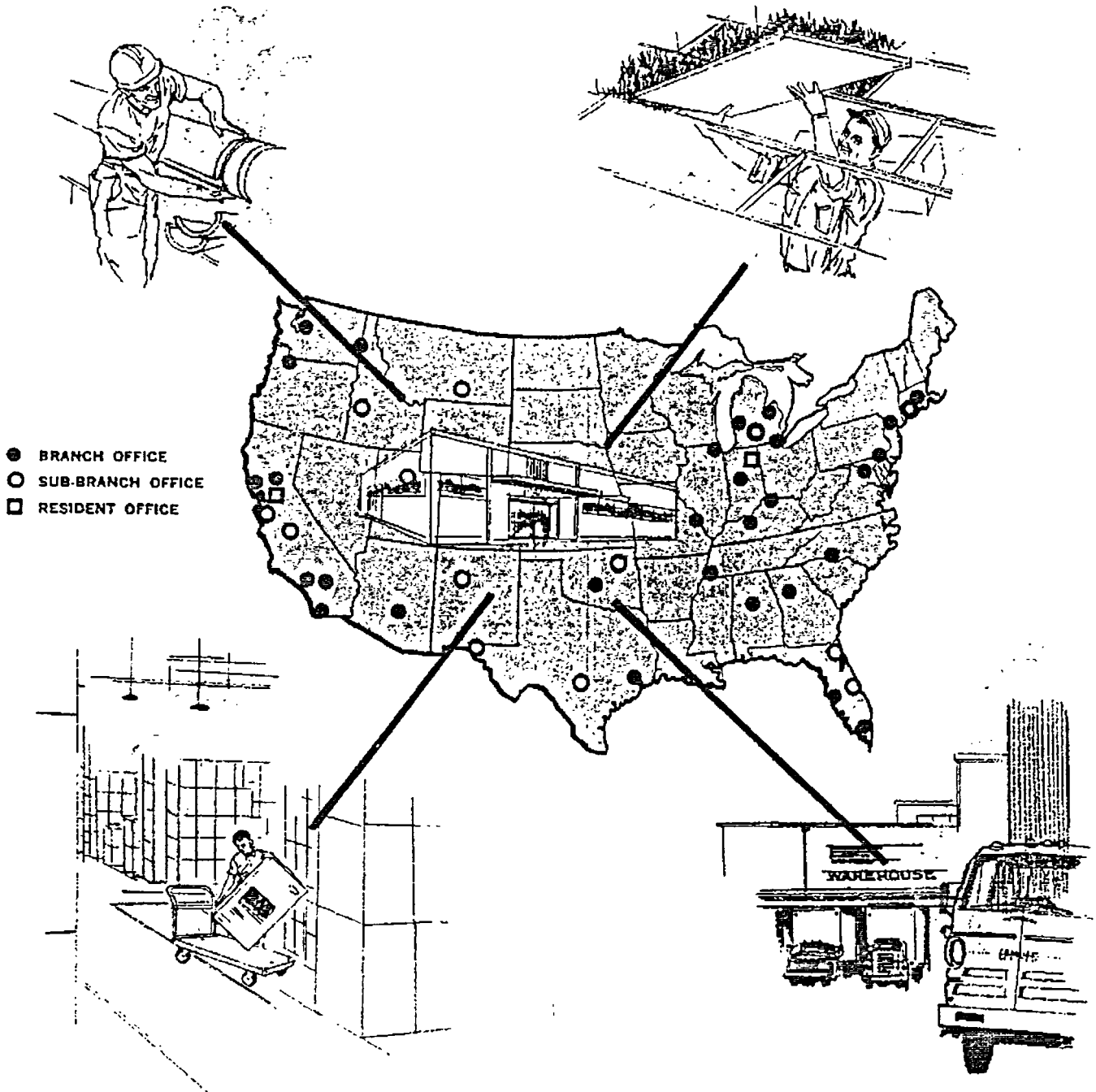
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Industrial and Commercial
Construction Materials Division
Fiberglas Tower, Toledo, Ohio 43601

OWENS/CORNING FIBERGLAS

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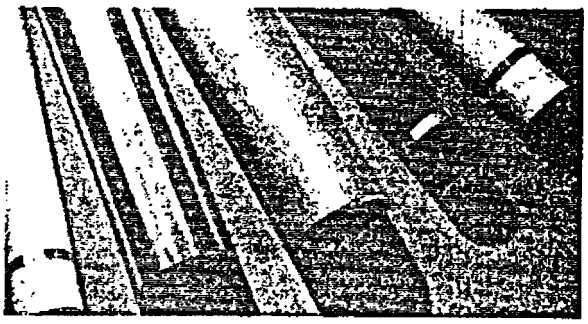
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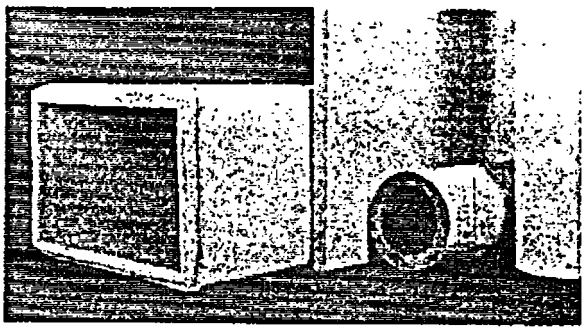
OWENS/CORNING FIBERGLAS

SUPPLY AND CONTRACTING DIVISION



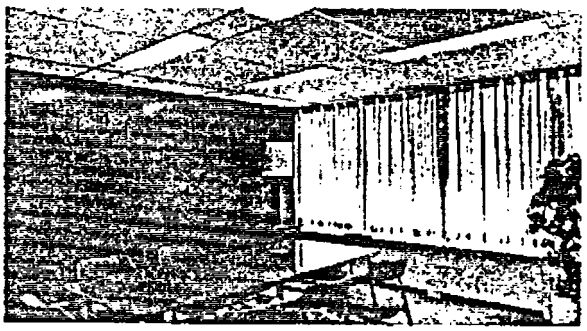
INDUSTRIAL INSULATIONS

OCF offers a full line of industrial insulation products including insulation materials for power and processing piping systems, plumbing, heating and air-conditioning piping systems, hot and cold vessels, tanks, boilers, turbines and related duct work. Fiberglas pipe insulation is designed not only for cold piping systems but hot piping systems up to 400°F. For higher temperature piping systems Kaylo insulation is recommended for applications to 1200°F—Kaylo 20 to 1800°F. A wide range of Fiberglas Rigid and Semi Rigid Boards, Metal Mesh Blankets, Kaylo Block and Kaylo 20 Block insulation materials are available for hot or cold equipment. Fiberglas and Kaylo Block are also well suited for insulating vessels, tanks, boilers and chimneys.



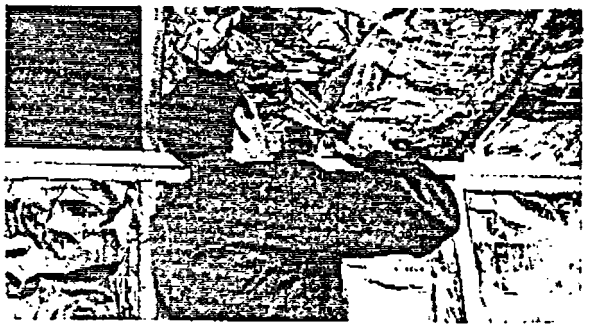
AIR HANDLING

Fiberglas Duct Systems are a combination of thermal and acoustical insulations with an integral vapor barrier jacket. The highly efficient insulation is rigid, uniform, heavy density Fiberglas. The attractive, flame retardant, puncture resistant, vapor barrier jacket is either a laminate of vinyl and foil reinforced with Fiberglas yarn or embossed kraft and foil reinforced with Fiberglas yarn. A complete line of Duct Liner and Duct Wrap insulation products are also available for use with existing duct systems. OCF Supply and Contracting Units also supplies a variety of Fiberglas filters to meet industrial requirements. Many allied products are also available through the local S & C Unit including such items as flexible tubing.



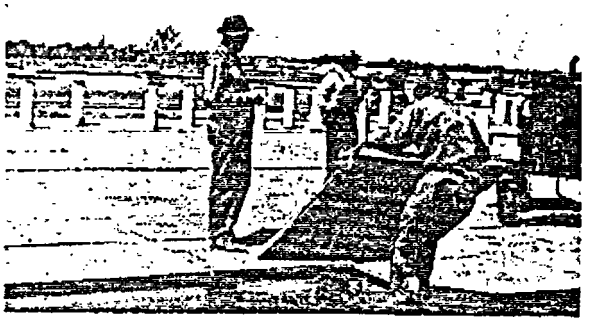
ACOUSTICAL MATERIALS

Fiberglas ceiling panels, tiles and ceiling boards are dimensionally stable. They are the only acoustical materials guaranteed in writing not to warp buckle or sag. They provide low cost, low maintenance, acoustically efficient, high light reflection non-combustible ceiling treatments. Fiberglas acoustical materials also provide the most efficient insulation of any sound control product: Fiberglas acoustical products not only efficiently reduce noise and heat loss but present a neat finished appearance.



BUILDING INSULATIONS

To insure having the correct product for any building insulation application, each OCF S & C Unit carries a full line of building insulation products. Included are Fiberglas Kraft Faced, Foil Faced, and Friction Fit building insulations as well as Sill Sealer for foundation sealing, Pouring Wool for ceilings and Perimeter insulation for crawl space walls. A special Fiberglas blanket insulating material is available for insulating metal buildings. Every type of insulation material required for the complete insulation of cold storage systems is available from OCF. Translucent flat or corregated Fiberglas reinforced plastic panels are offered for a variety of applications.

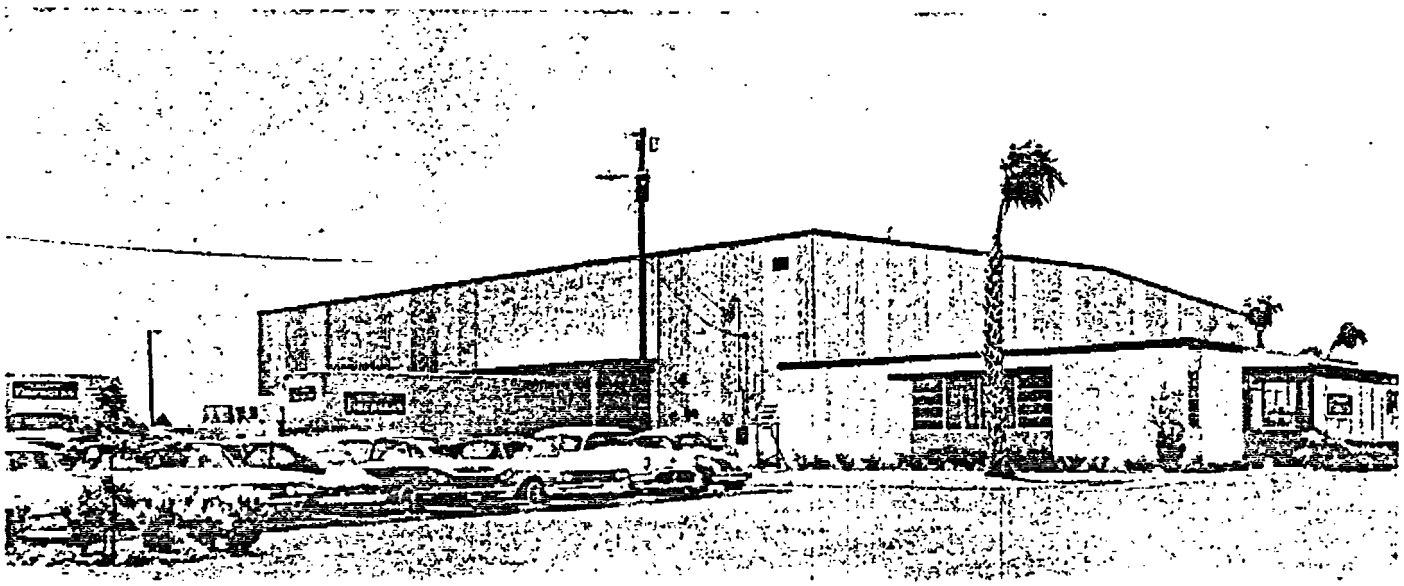


ROOFING PRODUCTS

OCF also supplies a complete line of roof insulating materials. Built-up Roofing Membrane, Fiberglas Vapor Barrier, Fiberglas Roof Insulation are only a few of the products available through the local S & C Unit. Fiberglas reinforced Roof Tape, Cant Strip and other Fiberglas roofing accessories are available through the Units. Fiberglas Roof Insulation is composed of durable glassfibers faced with a tough, glass fiber reinforced asphalt and kraft mopping surface. Handling and installation are facilitated by its light weight. In-place performance is assured because Fiberglas cannot rot, warp, buckle or shrink. Fiberglas boards are made in large 3' x 4' and 4' x 4' sizes and are available in thickness ranging from ¾" through 2½".

DISTRIBUTION SERVICES

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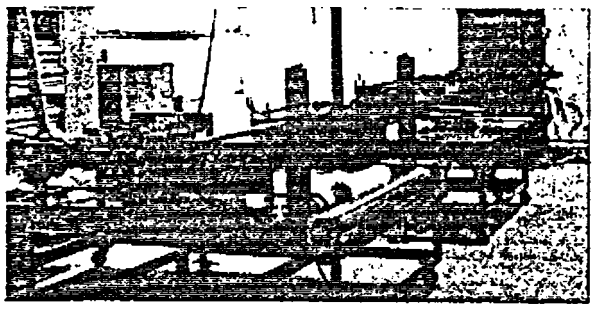


WAREHOUSE SERVICE

Modern OCF Supply and Contracting Division office and warehouse facilities are strategically located across the country providing convenient outlets to industry and the Plant Engineer for a full line of OCF construction materials and related products. The objective of each OCF Supply and Contracting Unit is to maintain sufficient local inventory of these products to provide fast, efficient and economical service to meet critical shutdown and maintenance schedules.

TRUCKING SERVICE

Owens-Corning Fiberglas recognizes that it is not enough to simply make their construction materials readily available and that these products can be conveniently used only if they are delivered to the right place at the right time. This is why the OCF Supply and Contracting Division operates a large fleet of delivery trucks to insure the timely and economical delivery of OCF products from the warehouse to the industrial plant.



FABRICATION SERVICE

To meet the individual needs of its customers, OCF Supply and Contracting Division also makes available fabrication services to custom fabricate OCF construction materials. This service can reduce both the cost and the time required to install these products at the industrial plant location.

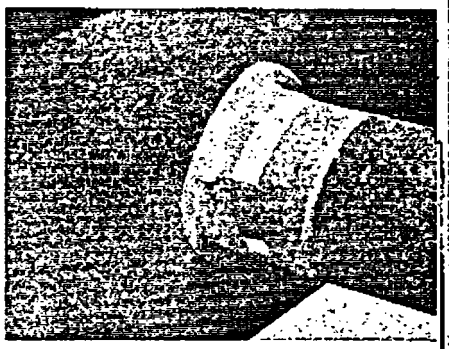
TECHNICAL SERVICE

To assist the Plant Engineer and the Maintenance Foreman, OCF Supply and Contracting Division has trained salesmen and construction personnel equipped to recommend products and application methods for installation of OCF construction products.

COMPLETE PACKAGE

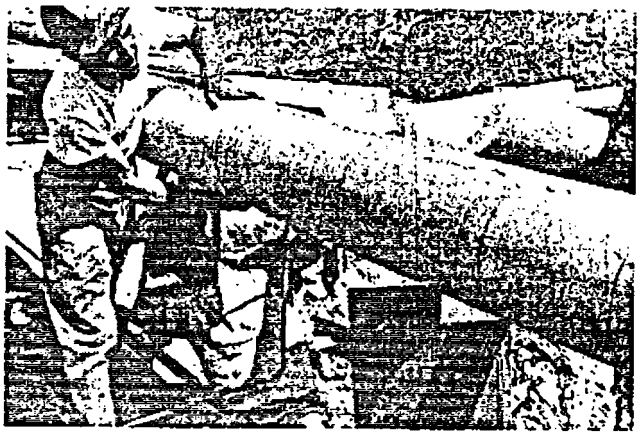


Each local OCF Supply and Contracting Division warehouse carries, in addition to its complete line of OCF materials, a full line of allied products and accessories for the complete installation of these construction materials. This "one stop shop" concept eliminates the need for multiple purchases and deliveries to complete a maintenance project.



OWENS-CORNING FIBERGLAS

SUPPLY AND CONTRACTING DIVISION



INDUSTRIAL INSULATION CONTRACTING SERVICES

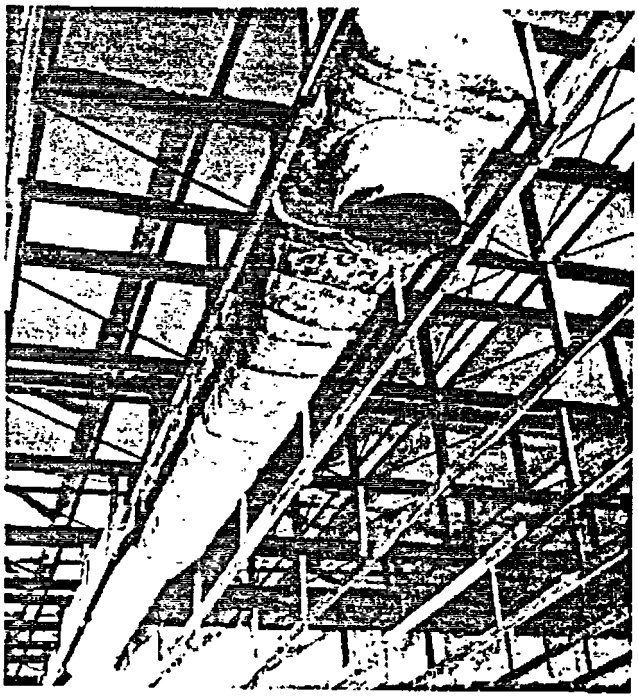
To further assist its customers, Owens-Corning Fiberglas Supply and Contracting Division provides complete installation services through most of its units. Trained, experienced estimating and field construction personnel are equipped to handle every type and size of insulation contract including insulation of hot and cold piping equipment, vessels, duct work and boilers.

The OCF field unit can choose from a complete line of immediately available insulation materials and accessories which cover a temperature range of from sub-zero to 1800°F.

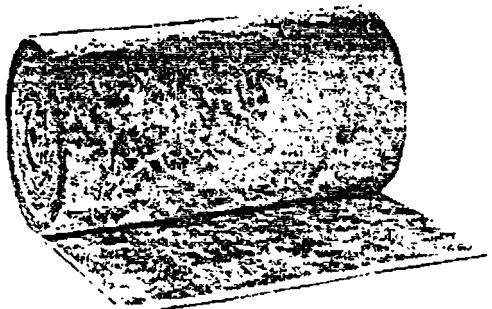


A large crew of experienced journeymen construction workers are regularly employed on a year-round basis in order to promptly meet customer construction schedules. Competent field foremen are available to coordinate the insulation work with other construction crews.

To further assist its field Supply and Contracting Units, Owens-Corning Fiberglas is specially staffed to provide complete insulation designs to meet every kind of industrial insulation requirement. Owens-Corning is a manufacturer, supplier and contractor, experienced in insulation contracts ranging from hundreds of dollars to millions of dollars in size and scope.



From start to finish—from accurate estimates and prompt bids, through quality application and on-time competition of work, Owens-Corning Fiberglas contracting service assure the customer of a job well done.



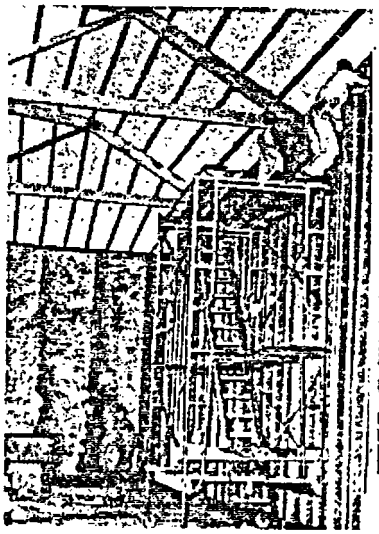
CONTRACTING SERVICES

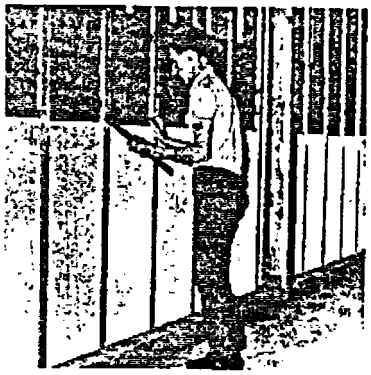
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COLD STORAGE CONTRACTING SERVICE

A highly specialized area of the insulation field is the design, engineering and application of insulation materials for low-temperature rooms. OCF Supply and Contracting Units have crews of skilled workmen with years of experience in this particular field of insulation work. Food storage warehouses, processing plants and walk-in refrigerators are among the many successful cold storage applications executed by the Supply and Contracting Division. The illustrations at the right show the construction of a Non-Conducting Stud Dry Wall System just one of many types of Cold Storage Systems available through the Owens-Corning Fiberglas Supply and Contracting Division.

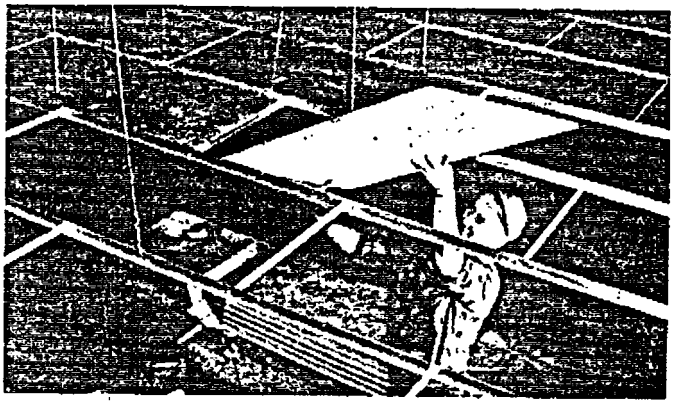


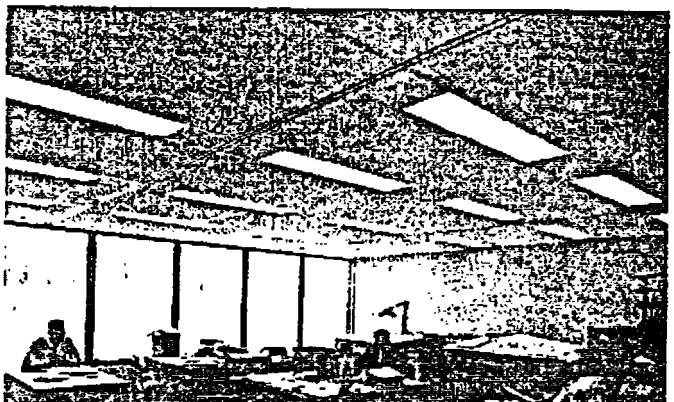




ACOUSTICAL CONTRACTING SERVICE

Owens-Corning Fiberglas Supply and Contracting Division acoustical contracting departments are set up to provide customers with complete acoustical contracting service. This service includes estimating, engineering and design, and the capability to install acoustical ceilings of all types, including acoustical specialty applications. S & C acoustical contracting Units across the country have acquired valuable experience in the acoustical installation field in determining the best design and economies in this rapidly changing installation field. This experience combined with the technical assistance and wide range of acoustical materials available from OCF, adds great value to the service the Supply Contracting Division is able to offer the customer.





OWENS/CORNING FIBERGLAS

SUPPLY AND CONTRACTING DIVISIONS

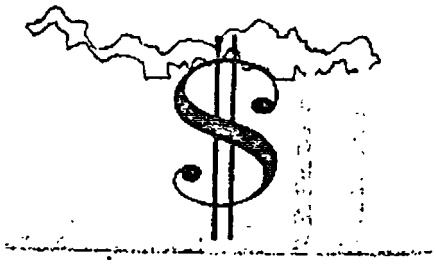
S&C LOCATION	DISTRIBUTION SERVICES					CONTRACTING SERVICES		
	Indust. Insula.	Air Handling	Acoust. Matls.	Wall & Panel Systs.	Rfg. Prod.	Indust. Insula.	Acoust.	Cold Storage
ALBUQUERQUE, N.M. 87104** P.O. Box 7067, Old Town Station 1011 Saw Mill Road, N.W. 505—243-4583	●	●	●	●	●	●	●	●
ANCHORAGE, ALASKA 99501** P. O. Box 833 1907 Post Road 907—275-8344	●	●	●	●		●	●	●
ATLANTA, GEORGIA P. O. Box 20114—Station "N" 30325 1605 Marietta Blvd., N. W. 30318 404—355-6821		●	●	●	●			
BALTIMORE, MARYLAND 21237* 6601 Moravia Road 301—488-8200	●	●	●	●	●	●		●
BILLINGS, MONTANA** P. O. Box 1501 59103 920 3rd Avenue, N. 59101 406—252-8496	●	●	●	●	●	●	●	●
BIRMINGHAM, ALABAMA 35201* P. O. Box 1933 112 S. 14th Street 205—252-4184		●	●	●	●			
BOISE, IDAHO 83701** P. O. Box 138 325 Grove Street 208—342-9311	●	●	●	●	●	●	●	●
CHARLOTTE, N. CAROLINA 28201* P. O. Box 10857 4100 Cheasapeake Drive 704—392-8366	●	●	●	●	●			
CINCINNATI, OHIO 45241* 2987 Exon Drive 513—563-2323	●	●		●	●	●		●
CHICAGO, ILLINOIS 60007* 2300 Estes Avenue Elk Grove Village 312—439-5330		●	●	●	●			
DETROIT, MICHIGAN 48237* 15300 West Eight Mile Road 313—547-8000	●	●	●	●	●	●	●	●
EAST HARTFORD, CONNECTICUT 06108** P. O. Box 8146 181 Burnham Street 203—289-6411	●	●	●	●	●			
EL PASO, TEXAS** P. O. Box 1650 79949 120 N. Cotton 79901 915—533-8208	●	●	●	●	●	●	●	●
FLINT, MICHIGAN 48504* G-4099 Dolan Drive 313—787-2595	●	●	●	●	●	●	●	●
FORT WAYNE, INDIANA 46802** 203 E. Berry Street Room 920 Anthony Wayne Bldg. 219—743-5341	●	●	●	●	●	●		●
FRESNO, CALIFORNIA 93709** P. O. Box 671 77 "M" Street 209—233-5871	●	●	●	●	●	●	●	●
GRAND RAPIDS, MICHIGAN 49508* 1055 36th Street, S.E. 616—241-0181	●	●	●	●	●	●	●	●
HOUSTON, TEXAS* P. O. Box 328 77008 3375 West 11th 77001 713—869-6311	●	●	●	●	●	●		●
INDIANAPOLIS, INDIANA 46219* P. O. Box 19093 2749 Tobey Avenue 317—898-1140	●	●	●	●	●	●		●
JACKSONVILLE, FLORIDA 32205** 5350 Overmyer Drive P. O. Box 6797 904—388-4681		●	●	●	●			
N. KANSAS CITY, MISSOURI* P. O. Box 591 64141 1207 Macon Street 64116 816—842-6444	●	●	●	●	●	●		●
LANSING, MICHIGAN 48911** 719 E. St. Joseph St. 517—372-4930	●	●	●	●	●	●	●	●

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S&C LOCATION	DISTRIBUTION SERVICES					CONTRACTING SERVICES		
	Indust. Insula.	Air Handling	Acoust. Matls.	Wall & Panel Systs.	Rfg. Prod.	Indust. Insula.	Acoust.	Cold Storage
LOS ANGELES, CALIFORNIA 90022* P. O. Box 22045 5933 Telegraph Road 213—723-9781	●	●	●	●		●	●	●
LOUISVILLE, KENTUCKY 40217* 2106 Hahn Street 502—637-2588	●	●	●	●	●	●		●
MEMPHIS, TENNESSEE 38109* P. O. Box 9416 323 Saturn Drive 901—397-4415	●	●	●	●	●			●
MIAMI, FLORIDA 33162* 56 N.E. 181st Street N. Miami Beach, Florida 305—624-8463		●	●	●	●			
NEWARK, NEW JERSEY 07029* 43-57 Harrison Avenue, Harrison, N.J. 201—484-2800	●	●	●	●	●			
OKLAHOMA CITY, OKLAHOMA 73118* 4610 N. Cooper Street 405—528-2727	●	●	●	●	●			
ORLANDO, FLORIDA 32805** 541-543 W. Grant Street 305—425-3481			●	●	●			
PHILADELPHIA, PENNSYLVANIA 19312* 592 W. Swedesford Road Berwyn, Pennsylvania [illegible]—647-2700	●	●	●	●	●	●		●
[illegible]ENIX, ARIZONA* [illegible]0 W. Fillmore 85007 P. O. Box 6050 85009 602—258-4541	●	●	●	●		●	●	●
PORTLAND, OREGON 97209* 320 N.W. Hoyt Street 503—226-6781	●	●	●	●		●	●	●
PROVIDENCE, RHODE ISLAND 02916* [illegible]9 Newman Ave. Rumford, Rhode Island 401—434-7435	●	●	●	●	●			
SACRAMENTO, CALIFORNIA* P. O. Box F 95813 1041 Fee Drive 95815 916—927-1341	●	●	●	●		●	●	●
SALT LAKE CITY, UTAH 84119** 840 W. 2600, South 801—487-6204	●	●	●	●	●			
SAN ANTONIO, TEXAS 78209** 1104 N. Cherry Street 512—222-9544	●	●	●	●	●	●		●
SAN BERNARDINO, CALIFORNIA 92410* 456 Industrial Road 714—885-3496	●	●	●	●		●	●	●
SAN DIEGO, CALIFORNIA 92110* 1033 Cudahy Place 714—276-5820	●	●	●	●		●	●	●
SOUTH SAN FRANCISCO, CALIFORNIA 94080* 477 Forbes Boulevard 415—873-7400	●	●	●	●		●	●	●
SAN JOSE, CALIFORNIA 95112** 1723 Junction Avenue 408—297-9520	●	●	●	●		●	●	●
SEATTLE, WASHINGTON 98108* 6020 Maynard Avenue, S. 206—763-2800	●	●	●	●		●	●	●
SPOKANE, WASHINGTON* Terminal Box 2945 99220 Spokane Industrial Park, Bldg. 5 509—924-6011	●	●	●	●	●	●	●	●
ST. LOUIS, MISSOURI 63042* [illegible] Schuetz Road [illegible]nd Heights, Missouri 432-3790	●	●	●	●	●	●		●
TAMPA, FLORIDA 33601* P. O. Box 3327 811 North 50th Street 813—248-5081		●	●	●	●			
TULSA, OKLAHOMA** P. O. Box 4769 74114 6558 E. 42nd Street 74145 918—627-1220	●	●	●	●	●			

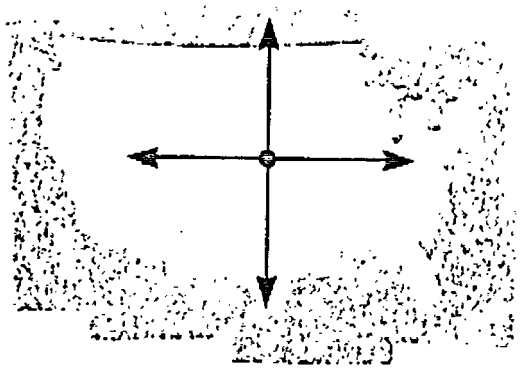
OWENS/CORNING FIBERGLAS

SUPPLY AND CONTRACTING DIVISION



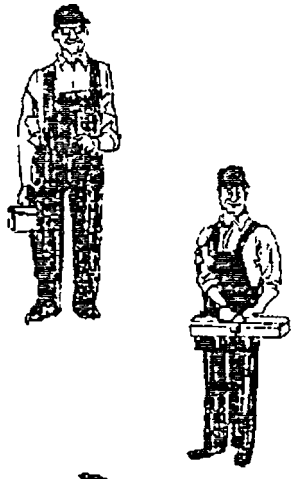
FINANCIAL RESPONSIBILITY

The Owens-Corning Fiberglas Supply and Contracting Division is backed by the capital resources of the corporation. Thus, customers need have no worry regarding the sound financial responsibility of any OCF Supply and Contracting Unit.



LOCAL ORIENTATION

Each OCF Supply and Contracting Unit is organized to provide the customer with local services and local advantages. The needs of the locale itself dictate the type of materials to be stocked and the kinds of contracting services to be rendered. Each OCF Supply and Contracting Unit has a working knowledge of legal requirements, tax regulations and other administrative practices important to each local situation.



EXPERIENCE

Contracting and sales personnel, engineers, managers, estimators, and field superintendents, are well qualified to handle their special jobs because they have been carefully selected and thoroughly trained. They have the additional advantage of being able to call upon the experience gained by a nationwide contracting, distributing organization.



FIELD ORGANIZATION

OCF Supply and Contracting Units throughout the country regularly employ skilled mechanics from the various trades. The regular employment of competent local construction workers is a distinct advantage to the customer. It is further assurance of good workmanship, timely performance, and a job well done.

OWENS CORNING FIBERGLAS CORPORATION
SUPPLY & CONTRACTING DIVISION TOLEDO, OHIO 43601

Regional Offices: