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INSULATION SYSTEMS MANUAL

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Commercial & Industrial Insulation Systems Manual

OWENS CORNING
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Organized To Help Solve Design Problems
This manual has been organized by *system* rather than by product to aid engineers and other specifying factors in the choice of the proper insulation for a given application.

In general, the greatest benefit will be realized if the book is used as follows:

A. Identify type of application by system.
Commercial
Plumbing
Mechanical Piping
Equipment
Air Handling
Industrial
Piping
Equipment
Vessels and tanks
Boilers and chimneys

B. Determine Temperature Range

C. Choose products from the Selection Guide Indexes

D. Refer to PRODUCT DATA sheets for technical data.

E. Refer to SPECIFICATIONS for recommended products and application in the appropriate sections

Each section is self-contained with product data and detailed specifications

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Pub. No. CC-5496, 1/68

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DIVIDEND DE ENGINEERING

a service to aid in selecting optimum insulation thickness

introduction

Dividend Engineering is a new system for calculating optimum thickness of insulation which includes performance and cost considerations.

basic reasons for insulation / The basic reasons for using insulation usually combine all or some of the following:

- Process Control
- Condensation Prevention
- Personnel Protection
- Heat (gain or loss) Saving

The first three factors are usually straight forward and present no problems. Heat Saving, however, due to economic variables is complex.

DE solves the economic dilemma / The purpose of Dividend Engineering is to provide a usable tool for designers so that they can determine true economic thickness of insulation and its relation to return on investment and to equipment needed to produce heat or to refrigerate.

factors considered in DE / To determine true economic thickness these significant factors are included in a Dividend Engineering analysis.

1. Cost of insulation applied 2. Cost of heat energy 3. Cost of money 4. Depreciation-plant 5. Depreciation-insulation 6. Conductivity (k) of insulation 7. Operating temperature 8. Size of pipe or surface area. 9. Capital investment in heat-producing equipment 10. Hours of operation 11. Maintenance Costs.

how to get dividend engineering / Contact your local Fiberglas Branch Office to see how easily you can take advantage of the Owens-Corning Fiberglas Dividend Engineering Service.

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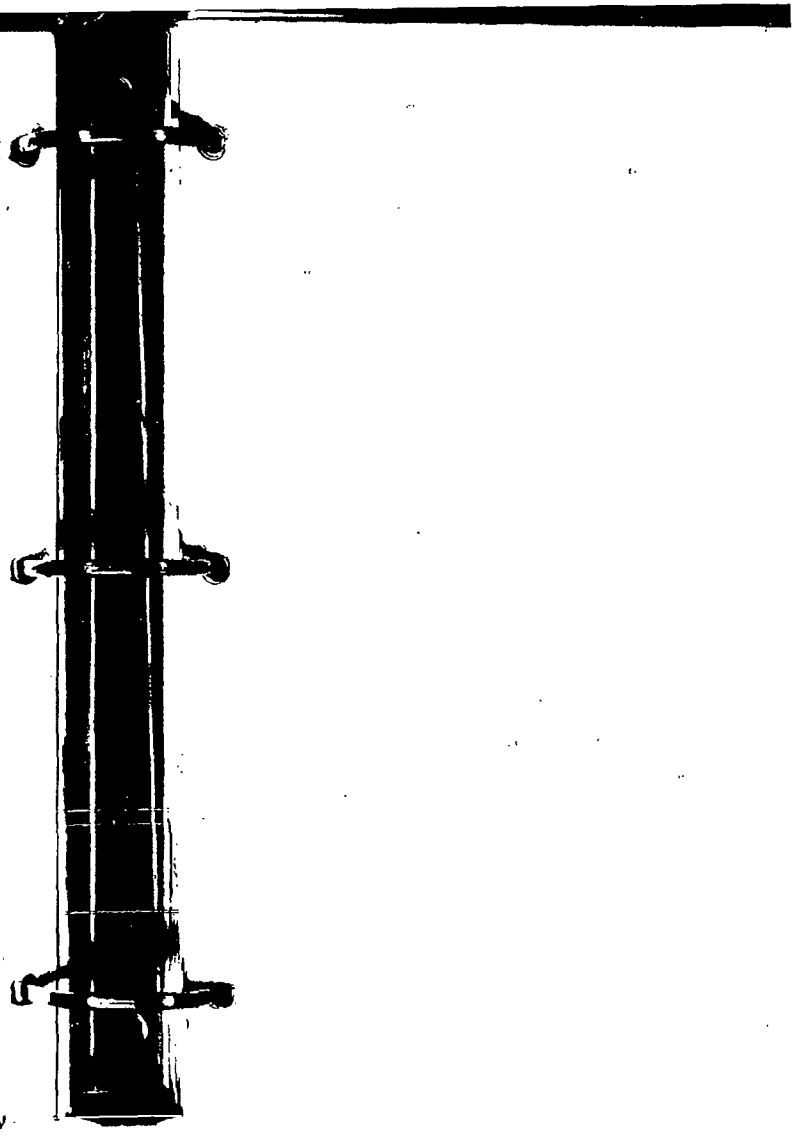

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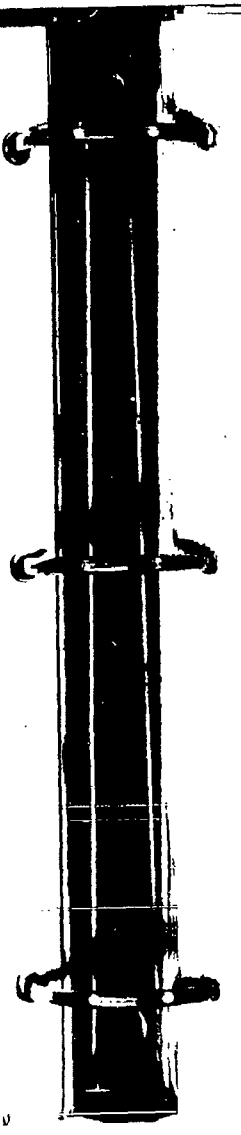

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INSULATION OF PLUMBING PIPING & EQUIPMENT SYSTEMS

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.

selection guide

system	temp. range	products	data page	spec. page
PIPING		**PIPE INSULATIONS**		
Chilled Drinking Water	35-50F	Heavy Density	1.1	1.S.1
Rainwater Leaders		One-Piece	1.2	1.S.1
		Fiberglas 25 C-P	1.8	1.S.7
Drain Lines (Best Soft Copper Connections)	35-50F	O-C Flexible Tubing	1.3	1.S.2
Domestic Cold Water	50-60F	Heavy Density	1.1	1.S.3
Boiler Makeup Water		One-Piece	1.2	1.S.3
		Fiberglas 25 C-P	1.8	1.S.7
Domestic Hot Water	to 180F	Heavy Density	1.1	1.S.4
Tempered Water		One-Piece	1.2	1.S.4
Booster Heater Water		Fiberglas 25 H-P	1.7	1.S.6
EQUIPMENT		**EQUIPMENT INSULATIONS**		
Hot Water Storage Tanks	150-180F	700 Series	1.5	1.S.5
Heat Exchangers		Kaylo Block	1.6	1.S.5
Hot Water Generators		Fiberglas 25 H-E	1.9	1.S.8
Booster Heaters				

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plumbing piping systems
mechanical piping system
January 1969

Pipe Insulati



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 Insulatio precision molded pipe covering composed of Fibe wool resin-bonded and formed in two half cyli up to 12" IPS. It is available in 3 ft. long sectio 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.

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plumbing piping systems 1.1
mechanical piping systems 2.1
January 1969

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

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moisture absorption

capillarity

flammability

specific heat

sleeve connection

thermal conductivity

mean temperature

specification compliance

Type I, Class I and II

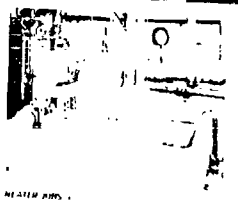
Type II, Class I and 2

Form G, Type III, Class II







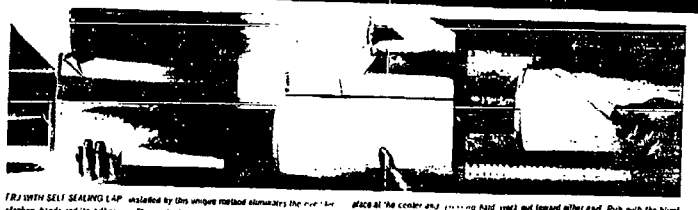




PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)		
		CONCEALED	EXPOSED	OUTDOORS
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	110-140 110-120	Pre-Sized Glass Cloth—completely fire safe glass cloth jacket, pre-sized for pulled lines. End joint butt strips furnished.	Pre-Sized Glass Cloth—pre-sized vapor retarder/cloth butt overlap. May be left as is or painted any color.	Glas Klad—factory applied .016 embossed aluminum or .014 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 .016 embossed aluminum without Pittsburgh seam, having a two-inch overlap at the longitudinal seam and a 2" overlap on end joint.
Mechanical				
Heating Hot Water Steam and Condensate Fuel Oil Piping High Temperature Hot Water	150-210 250-450 200-450 250-450	FRJ with Self Sealing Lap—FRJ Glass Reinforced Foil-kraft is a laminate of white kraft and foil, reinforced with strong glass yarns, furnished with factory applied adhesive. Meets requirements of GSA 301-1, Type A. Material can be cut and folded, and stub-tests produce tears up to 4500 lbs. Butt joint closures and points 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 paints.	Same as Concealed.
COLD PIPING				
Plumbing				
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	50-65 33-65 33-65	ABOVE 60F Universal Fire Retardant (UFR)—Low rate vapor barrier designed for piping operating at 50F and above. Meets requirements of GSA 301-1 Type C.	UFR—no further finish required. Neat white attractive finish.	Glas Klad—factory applied .016 embossed aluminum or .016 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 .016 embossed aluminum without Pittsburgh seam, having a two-inch overlap at the longitudinal seam and a 2" overlap on end joint.
		BELOW 60F 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 spalling adhesive. Excellent vapor barrier with low perm rating. Jacket can be used on inside, outside locations and subterranean lines from —120F to +540F. Butt joint strips in place and these are furnished. Also available without the Self Sealing Lap feature.	FRJ with Self Sealing Lap—no further finish required. While appearance presents neat finished job.*	Roofing Felt—available factory cut on 15 lb or 30 lb roofing felt complete with longitudinal overlap and end joint strips inspired.
Mechanical				
Chilled Water—Primary and Secondary Brine Lines Refrigerant Suction	35-55 15-25 —40 to 35			Note: All cold lines running outdoors require a outdoor protective jacket in addition to the factory applied vapor barrier or sealing felt or metal, field applied in the weather.

*May be finished with field applied 8 oz. canvas, mastic & 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 points 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 at the center and ... hand over and 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.

29130

DESIGN CONSIDERATIONS

The only temperature range of Fiberglas Heavy Density Pipe Insulation ... from one manufacturer to answer all the mechanical and plumbing ... exposed, outdoors, hot or cold. A selection of jackets matched to ... assures maximum perform... at the most economical cost.

Self Sealing Lap on FRJ (Fire Retardant Jacket) assures a positive ... on the pipe. This technological advance employs a unique chemical ... the vapor tap tightly as when. The heat also becomes stronger each ... used on the end joints. The use of staples, bands and messy adhesives ... of fashionable and other application defects. In addition FRJ with ... exact white appearance and is glass fiber reinforced to resist damage.

Pre-Sized Glass Cloth Jacket factory applied to Fiberglas Heavy Den... insulation for heated lines. No lagging is required before painting. ... not crinkle or rot. Will...s show a low Flame Spread of 15; Fuel Co...

Universal Fire Retardant Jacket applied to ½" and 1" thickness p... for cold service plumbing and conditions. The vapor barrier chemical... remain intact down to 50F. For colder lines, from —60 to +50F, FRJ ...

Fabulous Cold Lines are insulated with sectional segments, or pre-cut... wrapped with glass tape and sealed with vapor barrier mastic. For ... lining cement, canvassed and lapped.

Fiberglas will not burn, rot or shrink. With two millennia of FRJ or Pr... completely fire safe.

The exceptional low k factor means maximum economy and perform... poured or outdoors.

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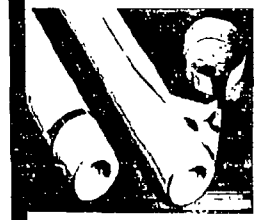
PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS



1 Standard Canvas
2 Pre Sized Glass Cloth
3 Universal Fire Retardant Jacket



4 Glass Kloth embossed aluminum
5 Glass Kloth stainless steel
6 Roofing Felt



7 Fire Retardant Jacket
8 FRJ with Self Sealing Lap

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)		OUTDOORS
		CONCEALED	EXPOSED	
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	110-180 110-130	Pre-Sized Glass Cloth—completely fire safe glass cloth jacket, pre-sized for paint base. End joint butt strips furnished. **Universal Fire Retardant**—Fire safe—for use on 36 hot pipe. Complies to requirements of GSA Spec 30I 1, Type C Standard Canvas Jacket—low cost—provides base for painting. Weights 6 or 8 oz. weights available	Pre-Sized Glass Cloth—pre-sized surface eliminates field priming. May be left as is or painted any color. Canvas: 6 oz. or 8 oz.—normally sized and painted	Glas Klad—factory applied .016 embossed aluminum or .018 stainless steel. Complete with 2" butt 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. Roofing Felt—available with factory applied 35 #s or 55 #s roofing felt complete with aluminum overlap. End joint straps supplied
Mechanical				
Heating Hot Water Steam and Condensate Fuel Oil Piping High Temperature Hot Water	150-350 250-450 250-450 250-450	**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 spalling adhesive. Meets requirements of GSA 30I 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. Can may be painted with water based paint.* **May be finished with field applied 6 oz. canvas, strapped & painted.*	
COLD PIPING				
Plumbing				
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	50-65 35-65 33-65	**ABOVE 60F** **Universal Fire Retardant (UFR)**—low cost—a vapor barrier designed for piping operating at 50F and above. Meets requirements of GSA 30I 1 Type C **BELOW 60F** **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 30I-1, Type A Jackets. Laminated with flame spalling 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.	UFR—no further finish required. Neat white attractive finish **FRJ with Self Sealing Lap**—no further finish required. White appearance presents neat finished job.* **May be finished with field applied 6 oz. canvas, strapped & painted*	Glas Klad—factory applied .016 embossed aluminum or .018 stainless steel. Complete with 2" butt 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. Roofing Felt—available factory cut in 35 #s or 55 #s overlap for complete with longitudinal overlap and joint straps supplied **Note:** All cold lines running outdoors require a weather proofing jacket in addition to the factory applied vapor barrier jacket. Strapping of corrugated metal field applied to the insulation

DESIGN CONSIDERATIONS

The wide temperature range of Fiberglas Heavy Density Pipe Insulation permits the specifier to select material from one manufacturer to meet all the mechanical and plumbing system insulation requirements, concealed, exposed, outdoors, hot or cold. A selection of jackets installed in mill 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 installation and other application defects. In addition FRJ with Self Sealing Lap is fire retardant, presents a neat white appearance and a glass fiber reinforced for wear and tear.

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

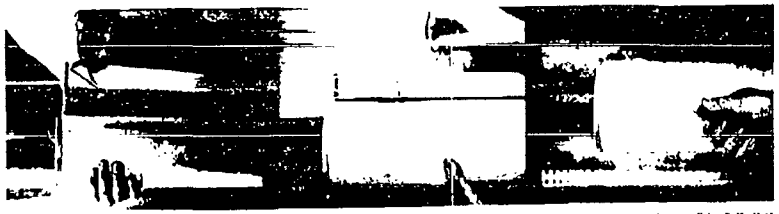
Universal Fire Retardant Jacket applied to 1½" and 2" thickness provides a fire resistive economical insulation for cold service plumbing line conditions. The vapor barrier characteristics are adequate for use on cold water service lines down to 50F. For colder lines, from -60 to -20F, FRJ is required.

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 fittings are made smooth with insulating cement, canvassed and sized.

Fiberglas will not burn, rot or shrink. When the addition of FRJ or Pre Sized Glass Cloth 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.





FRJ with SELF SEALING LAP installed by this unique method eliminates the need for sealing 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 lap and peel off the balance (3) press the lap in place at the center and, pressing hard, work it toward each end. Rub with the blunt edge of a knife. End joints are sealed with a similar butt strip of the same Self Sealing vapor barrier material.

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291310

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performance characteristics

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

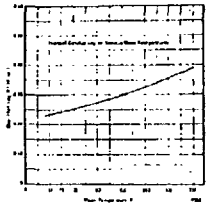
capillarity:
none (after 24 hours)

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
400	0.327

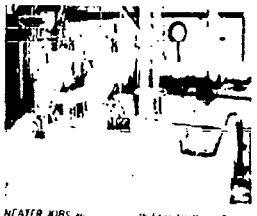
specification compliance:

[illegible] Insulation Pipe Covering, Standard and Insulation Board Specification Type I, Class A and B.

[illegible] Insulation, Thermal Mineral Wool (Fiber) and Pipe Insulation (Felted Type) Type II, Class B and C.

[illegible] Insulation, Block, Boards, Blankets, Felts, Sheets (Preformed Pipe Covering and Pipe Insulation, Thermal Insulation Felted Type) Form D, Type III, Class 12.

[illegible]



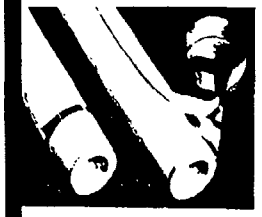
HEATER JOBS an[illegible] Fiberglas Heavy Density Pipe Insulation. [illegible] cleaner with square m[illegible]



1 Standard Canvas
2 Pre Sized Glass Cloth
3 Universal Fire Retardant



4 Glass Mesh, embossed aluminum
5 Glass Mesh, stainless steel
6 Backing Felt



7 Fire Retardant Jacket
8 FRI with Self Sealing Lap



[illegible] HOUSE [illegible] of [illegible] [illegible] [illegible]

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Address _____

City _____ State

Please Print

recommended thickness

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

(90F ambient air)

pipe surface temperature	40 F		25 F		0 F		−20 F		−60 F		40 F		25 F		0 F		−20 F		−60 F	
	90% relative humidity										80% relative humidity									
condition	chilled water		ice water		brine		special brine		refrig. vessels		chilled water		ice water		brine		special brine		refrig. vessels	
pipe sizes	11*	83	11*	83	11	100	11	100	11	100	11	100	11	100	11	100	11	100	11	100
½	1½	½	1½	½	2½	1	3	2	3½	2	1½	½	2½	1	3	2	3½	2	4½	3
1	1½	½	1½	½	2½	1	3	2	3½	2	1½	½	2½	1	3	2	3½	2	4½	3
1½	1½	½	1½	½	2½	1	3	2	3½	2	1½	½	2½	1	3	2	3½	2	4½	3
2	1½	½	2	½	2½	1	3½	2	3½	2	1½	½	2½	1	3	2	3½	2	4½	3
2½	2	½	2	½	2½	1	3½	2	4	2½	1½	½	2½	1	3	2	3½	2	4½	3
3	2	½	2	½	2½	1	3½	2	4	2½	1½	½	2½	1	3	2	3½	2	4½	3
4	2	½	2	½	2½	1	3½	2	4½	2½	1½	½	2½	1	3	2	3½	2	4½	3
5	2	½	2	½	2½	1	3½	2	4½	2½	1½	½	2½	1	3	2	3½	2	4½	3
6	2	½	2	½	2½	1	3½	2	4½	2½	1½	½	2½	1	3	2	3½	2	4½	3
7	2	½	2	½	2½	1	3½	2	4½	2½	1½	½	2½	1	3	2	3½	2	4½	3
8	2	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
9	2	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
10	2	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
11	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
12	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
13	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
14	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
15	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
16	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
17	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
18	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
19	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
20	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
21	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
22	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
23	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4
24	2½	1	2½	1	3	1½	3½	2½	4½	3	2	1	3	1½	3½	2½	4½	3	5½	4

*Minimum thickness available when 1½" (38 mm) or 1", when 2½" (64 mm) is 1½".

OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial Division 717 Fifth Avenue, New York, New York 10022
General Offices: Toledo, Ohio 43601

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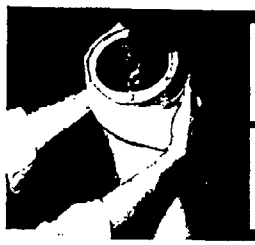
plumbing piping systems 1.3
mechanical piping systems 8.3
January 1969

Pipe Insulations



One-Piece Pipe Insulations

A versatile, efficient, quick applying pipe insulation for hot and cold piping from −30F to 400F.

uses

Fiberglas* One-Piece Pipe Insulation is adaptable to all types of piping systems operating at temperatures from −30F to 400F. 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.

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PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED OR SOLD FACE TYPE) CONCEALED	EXPOSED	OUTDOORS
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	100-140 120-130	Standard Coarse Jacket—low cost—provides lotus line painting. Stamps 6 or 8 in. widths available.	Fiberglas ZS HAP—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-UF-8333.	Roofing Felt—available with a factory-applied 45 lb. roofing felt complete with longitudinal overlap. End joint strips supplied.
Mechanical				
Heating Hot Water Steam and Condensate Feed Hot Pump High Temperature Hot Water	250-210 210-150 210-150 250-450	FSJ with Self Sealing Lap—FSJ (Foil Scrim Jacket) is a laminate of white kraft and foil, reinforced with skinny glass yarns, laminated with flame sealing adhesive. Meets requirements of GSA HH-I, Type II, Jacket can be used on insulated, cold surface temperatures down to 60°F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.		
COLD PIPING				
Plumbing				
Domestic Cold Water Chilled Drinking Water Ice Water Coolers	50-65 35-55 35-65	FSJ with Self Sealing Lap—provides a positive vapor seal for all cold and chilled water lines. FRK (Flame Retardant Jacket) is a laminate of white kraft and foil reinforced with skinny glass yarns. Meets requirements of GSA HH-I, Type II jackets. Laminated with flame sealing adhesive. LowPerm vapor barrier with low permeability 0.02. Jacket may be used on inside, dual-temperature and reinforced lines from —20°F to 170°F. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.		
Mechanical				
Chilled Water—Primary and Secondary Dual-Temp Refrigerant Suction	35-55 40-250 —20 to —15		Fiberglas ZS HAP—a completely U.L. rated cold pipe insulation system. U.L. rating includes jacket, insulation, fittings and accessories. Available on Fiberglas Heavy Density Pipe Insulation only. See data sheet 1-UF-8333.	Roofing Felt—available with a factory-applied 45 lb. roofing felt complete with longitudinal overlap. End joint strips supplied. All cold lines requiring outdoor insulation require an additional weatherproofing jacket of roofing felt or metal, field-applied to the insulation.

DESIGN CONSIDERATIONS

The wide temperature range of Fiberglas One-Piece Pipe Insulation permits the specifier to insure easy maintenance in accord with the mechanical and plumbing system insulation requirements exposed, outdoors, hot or cold. A selection of jackets matched to cold use and factory applied to assure maximum performance at the most economical cost.

The Self Sealing Lap on FSJ (Foil Scrim Kraft Jacket) assures a positive vapor seal and serves to lock on the pipe. This technological advance employs a unique chemical bonding agent that activates the protective facility in place. The bond also becomes stronger with age. Butt joint strips of the same material on flanged joints. Elbows of straight bends and angle adhesives are also furnished and the ends of fabricants and other application details, to maintain FSJ with Self Sealing Lap at the critical cold water appearance and to glass fiber reinforced to assist damage.

Pre-Sized Glass Cloth Jacket factory applied to Fiberglas One-Piece Pipe Insulation is a canvas insulation for finished lines. No lagging incorporated before painting. The jacket is thick, consists of not reinforced cut. UL tests show a low Flame Spread of 10, Fuel Contributed, 0, Smoke Developed

Fiberglas formed fittings are supplied with mitered segments, or pre-molded Fiberglas fittings which snugly joint with glass fabric reinforced multi-vapor barrier mastic. For hot lines the fittings to insure no leaking around, contoured and sized.

Fiberglas will not break, rot or shrink. With the addition of FSJ or Pre-Sized Glass Cloth Jacket, it completely U.L. rated.

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

Cautions: Owens Corning Fiberglas Insulations are to be applied only with approved adhesive mechanical fastening devices as published in Accessory Materials Data Pub. No. 4-UA-3420. Fiberglas accepts no responsibility or liability for the performance of materials when used that have not been approved in writing by O-C-F Testing Laboratories.

performance characteristics

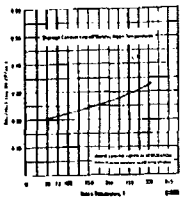
moisture absorption: 0.2% by volume in 96 hrs at 120F and 95% RH

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
400	0.73

specification compliance:

HH-I-552 Type I Class A and B

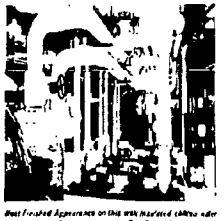
HH-I-558a Form D, Type III, Class 12

HH-I-562 Type II

MIL-I-22344B (Ships)



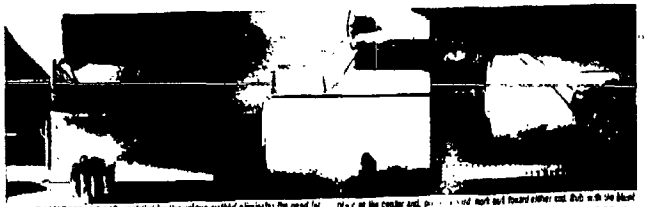
1. Standard Coarse.
2. Roofing Felt
3. FSJ.
4. FSJ with Self Sealing Lap



Neat Finished Appearance on this well insulated chilled water system is one of the reasons why One-Piece Pipe Insulation is used widely in equipment rooms.



Self Sealing Lap ... vapor seal on ... cold water ...



FSJ WITH SELF SEALING LAP assisted by this unique molded eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal at all points 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 ... (Note at the center and, ... end mark and found either end. Work with the blunt ... of a knife. End joints ... with a 3" wide butt strip of the same Self-Sealing vapor barrier material

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PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS



1. Standard Canvas.



2. Roofing Felt.



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

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)		OUTDOORS
		CONCEALED	EXPOSED	
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	110 MD 110-130	Standard Canvas Jacket—low cost—provides base for painting. Weaves 6 oz 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-DH-4865.	Roofing Felt—available with a factory-applied 45 lb. roofing felt complete with longitudinal overlap. End joint strips as optional.
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 proofing adhesive. Meets requirements of GSA 308-1, Type A. *Jacket can be stored un-heated, and dual-temperature loses up to 450°* Butt seal strips to close end joints are furnished. Also available without the Self Sealing Lap feature		
COLD PIPING				
Plumbing				
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	50-65 35-65 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 308-1, Type A jackets. Laminated with Conn sealing adhesive. Excellent vapor barrier with low perm rating 0.02. Jacket can be used to heated, dual-temperature and refrigerant lines from —20°F to 450°. Butt joint strips to close end joints are furnished. Also available without the Self Sealing Lap feature.		
Mechanical				
Chilled Water—Primary and Secondary Dual-Temp Refrigerant Suction	35-55 40-200 —30 to —35		Fiberglas 25 S-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-DH-4378.	Roofing Felt—available with a factory-applied 45 lb. roofing felt complete with longitudinal overlap. End joint strips supplied. All cold lines running outdoors require an additional weatherproofing jacket of roofing felt or metal, field-applied to the insulation.

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 in end use and factory applied to the insulation ensures 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 pasted 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 costly 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.

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

Fittings for cold lines are contained with sectional segments, as 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, contoured 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.

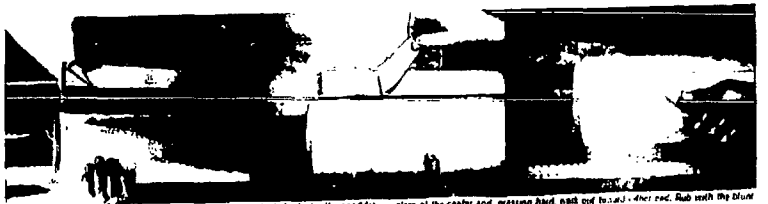
The exceptional low k factor means maximum economy and performance for all piping systems, concealed, exposed or outdoors.

Caution: Owens-Corning Fiberglas Insulations are to be applied only with approved adhesives, sealers and mechanical fastening devices as published in Accessory Materials List, Pub. No. 4-AM-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.





Self Sealing Lap vapor barrier jacket can be vapor sealed with an attractive low cost factory or cold weather and dust-temperature



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 points 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 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 4" wide butt strip of the same Self-Sealing vapor barrier material.

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name _____
firm _____
title _____
address _____
city _____ State

Please Print c

performance characteristics

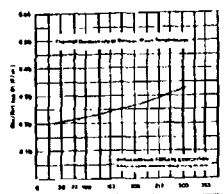
moisture absorption: 0.2% by volume 25 hrs at 120F and 95% RH

specific heat: 0.20 Btu/lb. F.

shrinkage: None

alkalinity: pH

thermal conductivity: Unusually low thermal conductivity shown on chart



mean temperature	k
75F	0.23
40F	0.21

specification compliance:

HH.I-552 Type I Class A and B

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

HH.I-562 Type II

UNL I-22344B (Ships)



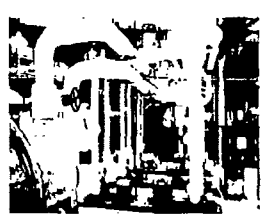
1. Standard Curves.



2. Roofing Felt.



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



Heat Finished Appearance on this wall insulated chilled water system is one of the reasons why One-Piece Pipe Insulation is used widely in equipment rooms



Self Sealing Lap ... vapor seal, with an ... cold water service and ...

291314

recommened thickness

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

pipe temp. temp. diff. (F)	200 120			300 220			400 120		
	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	10.
2	1	24	94	1½	36	97	1½	58	102
2½	1½	24	91	2	35	95	2	68	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	68	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	88	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) RL-heat loss ... BTU/hr/lineal foot ST-surface temperature (F)

cold and dual-temperature lines (50 F at 80% R.H.)

pipe surface temperature	50 F or above		40 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

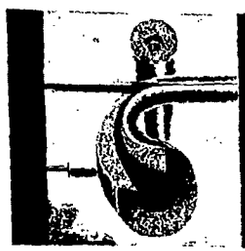
RT-recommended thickness (inches) HG-heat gain

291317

OWENS CORNING FIBERGLAS

plumbing systems 1.3
mechanical piping systems 2.3
October, 1968

Piping Insulations



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 refrigerant 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 0.25 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.

OWENS-CORNING FIBERGLAS CORPORATION
Construction Materials Division, 717 Fifth Avenue, New York, New York 10022
Telephone (Area 4601)
Litho in U.S.A. Jan 1969

performance characteristics

density, lbs./cu ft. (avg.)	6½
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 90 F	33 F	0 F
BELOW	(Prevention of condensation on indoor piping under a maximum severity of 80 F and 55% R.H. Typical of those conditions that are air-conditioned spaces and sealed elsewhere.)	½" thru 2" IPS	Nom. ½"	Nom. ½"	Nom. ½"
		Over 2" thru 6" 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. Normal and fairly consistent upper limit conditions existing in the U.S. which exceed this degree of severity.)	½" thru 2" IPS	Nom. ½"	Nom. ½"	Nom. 1"
		Over 2" thru 6" IPS	Nom. ½"	Nom. ½"	Nom. 1"
SEVERE	(Prevention of condensation on indoor piping under a maximum severity of 90 F and 80% R.H. Typical of those conditions that occur where moisture content is abnormal, as poorly ventilated cooking areas where the temperature may be assumed below ambient.)	½" thru 6" IPS	Nom. 1"	Nom. 1½"	Available on Request

*For conditions less severe than those listed, lesser use of insulation may be considered because O-C Flexible Tubing Insulation is used primarily on short runs.

flexible tubing sizes

iron pipe sizes (IPS) ½" to 4"
copper tubing (CT) ½" O.D.–3⅛" O.D.
Wall thickness—inches (nominal) ½", ½", ½"
Inside Diameters—inches ½" 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 75 ft.

flexible sheet sizes

Standard size—24" x 72"
Sheet thickness—¾₆", ¼", ⅜", ½", ⅝", 1"
convenient rolls—½" x 24" x 150' ½" x 24" x 55'
¾" x 24" x 120' 1" x 24" x 40'
1½" x 24" x 75'

specification compliance

ASH-I 03573
MIL-P-15789 D

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 FF 57 69, Insul-coustic VIAC 550 or Alkyd-Chlorinated Rubber Paint or Pressitite 762 protective coating.



OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial Construction Materials Division, 717 Fifth Avenue, New York, New York 10022
Toledo, Ohio 43601

291320

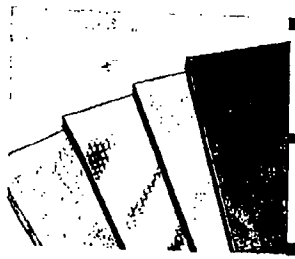
Pub. No. 5-MS-3247-B

Litho U.S.A. Oct. 1968

OWENS CORNING FIBERGLAS

plumbing systems 1.5
mechanical equipment 3.2
air handling systems 4.4
pumps & process equipment 6.1
vessels & tanks 7.3
boilers & chimneys 8.5
January, 1969

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 minimum 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 character istics 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.

291321

MMERCIAL & INDUSTRIA
SULATION SYSTEMS MAN

a registered copy of the Fiberglas

[illegible] fill out the "Registration" card and Owens-Corning Fiberglas will keep you [illegible] of free fuel and technical information fo[illegible] Also, write us a "Change of Addr[illegible] to advise us of your address changes.

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performance chara[illegible]

sound absorption coefficients (2" thick #6 mounting)

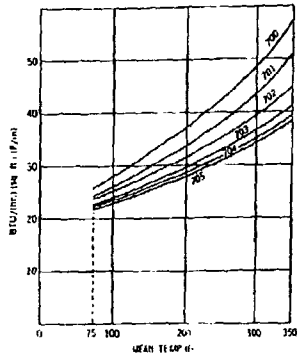
TYPE	125	250	500	1000	2000	4000	NRC
701	.34	.70	.96	.97	.86	.83	.87
702	.28	.77	.96	.93	.87	.87	.89
703	.32	.74	.97	.98	.87	.85	.89
704	.27	.79	.98	.99	.88	.86	.91
705	.48	.82	.97	.99	.90	.86	.92

size and density

Type	Density (pcf)	Thickness (in ½" increments)	Compressive Strength (psi at 10% deformation)	Standard Size	Thermal Conductivity (BTU mean temp.
700	1.00	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 or promote
odor	odorless
humidity and temperature effect	Cycling con[illegible] [illegible] blistering or crumbling
corrosion	does not accelerat[illegible] of copper, steel or aluminum

291323

facings

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

SF — .0025 aluminum foil (UL Rate-F)
FRK — Foil-reinforced kraft
SP — Duplex Laminated kraft

fire hazard classification

	Unfaced (703, 704, 705)	Foil-faced (703, 704, 705)
flame spread	10-20	15-20
fuel contributed	10-15	15-35
smoke developed	0-20	0

(compared to untreated Red Oak as 100)

application recommendations

Type 700, 701, 702 — Lightweight unfaced flexible insulations or 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 on pipe or 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 Temp.	Type 700 RT	Type 700 HL	Type 700 ST	Type 703 RT	Type 703 HL	Type 703 ST	Type 704 RT	Type 704 HL	Type 704 ST
150	1½	11	87	1½	10	86	1½	10	86
250	2	20	95	2	21	93	2	20	92
350	3	29	98	2½	31	95	2½	30	94
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	½	5.1	90%
25	½	6.4	87%
30	1	6.1	87%
35	1	7.1	85%
40	1½	5.7	90%
45	1½	6.3	89%
50	2	5.4	90%

specification compliance

HH-I-542, Type I	703
HH-I-542, Type II	701, 702, 703
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 I, Class 1.	700, 701, 702
HH-I-562, Type I, Class 2.	703**, 704, 705
HH-I-562, Type II, Class D, (360°F+)	701, 702, 703
HH-I-564, Form I & II, Class A.	703**, 704, 705
Navy Bureau of Yards and Docks, 16Y1	703**, 704, 705
Corps of Engineers, C.E.—30L.8L .11 thru .17	703**, 704, 705

**Type 703 is normally produced to synthetic white specifications of Caustic-Soda Silicate Specification a unpaid flexible glass wool blanket for use on flat or curved surfaces and for use in combining facings.

***Lower removal of 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-IM-3400. 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.

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OWENS/CORNING FIBERGLAS

OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial Construction Materials Division 717 Fifth Avenue New York New York 10022
General Offices Toledo Ohio 43601

Pub No 1 IN-78/3 K

291324

Litho in U.S.A. Jan. 1969

OWENS CORNING FIBERGLAS

plumbing systems 1.6
mechanical equipment 3.6
power & process equipment 6.5
vessels & tanks 7.7
boilers & chimneys 8.3
January, 1969

Equipment Insulation





Kaylo & Kaylo 20 Block Insulation

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

uses

Kaylo* 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 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 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.

benefits

high thermal efficiency—both Kaylo and Kaylo 20 offer excellent thermal efficiency coupled with high strength. A low k of .40 for Kaylo 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 wear 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.

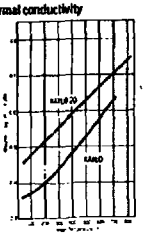
*Kaylo is a registered trademark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corp.

291325

performance characteristics

	KAYLO	KAYLO 20
density:	11 pcf approx.	12 pcf approx.
flexural strength: (ASTM C-203)	over 50 lb/sq. in.	90 lb/sq. in.
compressive strength: (ASTM C-165) at 5% deformation	125 psi	130 psi
resistance to abrasion: (conventional temperature test — loss in weight before heating)	after 10 minutes 10% after 20 minutes 20%	
dimensional stability:	linear shrinkage after heating for 24 hours in muffle at 1200 F. -1.4%	
pH factor:	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 installation. 5. Capital investment in heat production equipment. 6. Temperature differential. 7. Size of the pipe or surface. 8. Conductivity of insulation.

for hot piping, the tabulated thicknesses are optimum thicknesses calculated on an "Economic"* basis for heat conservation under average operating conditions and assure adequate temperature control. Other conditions may warrant the use of other thicknesses.

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

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

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

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	103	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	123	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	148

*calculated

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

Operating Temp F	Power ET	Power HL	Power ST	Process ET	Process HL	Process 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 I.

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 and Kaylo 20 insulation sizes are available, Kaylo and Kaylo 20 beveled lags may be used to insulate piping. Lags beveled to fit pipes from 18" to 36" in diameter are available in thicknesses of 1½", 2", 2½", 3". Lags are 36" long and 3" wide.

application recommendations

Kaylo 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

OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial Construction Materials Division
717 Fifth Avenue, New York, New York 10022 • General Offices, Toledo, Ohio 43601

291326

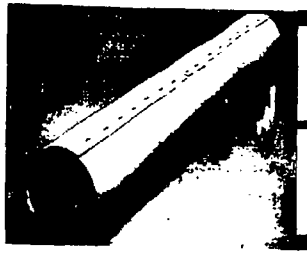
PUB. NO. MIM-4149-A

PRINTED IN U.S.A. 9-69

OWENS CORNING FIBERGLAS

plumbing piping systems 1.7
mechanical piping systems 6.6
power and process piping systems 6.8
December, 1968

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.

291327

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

ethafaily:
ph 9

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

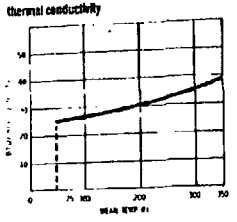
Jacket

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 ex... of fittings in a piping sys... is used. ...sheet, Type H, ...

**Note: This rating is for the pi... tem is limited to 21/2" ...

finish

The factory pre-sized white finish eliminates the necessity of sizing the jacket before painting and the seal 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-over 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 O-CF Joint Sealing Tape, Type ...H. The wrapping is subsequently coated with O-CF 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-...

291328

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. Temp. Diff.	200 120			300 220			400 320			450 370		
IPS	RT	HL	ST	RT	HL	ST	RT	HL	ST	RT	HL	ST
¼	½	39	105	½	34	126	1	39	115	1	47	123
½	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	26	94	1½	60	101	1½	74	113	1½	86	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	164	111
9	1	80	97	1½	110	101	2	138	106	2	174	111
10	1½	69	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	95	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) NO—heat gain

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plumbing piping systems 1.8
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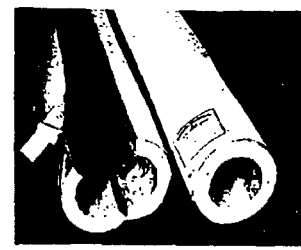
power and process piping systems 5.4
December, 1968

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 non-combustible 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 tap 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 tap 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.

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performance characteristics

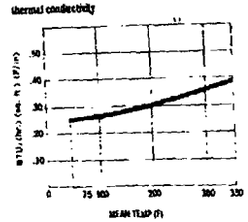
Insulation

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 #SS83 40 U 8 15)

	Fiberglas 25 C-P Pipe Insulation System
Flame Spread	
Fuel Contributed	
Smoke Developed	

**Note: Test ratings for the pipe ... of fittings in a piping system ... form 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 vinyl 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 thin 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 Fitting Tape and coated with another coating of O-CF Fitting Mastic, Type C.

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

specification compliance

ASTM C 552: Type II Class 1, Type III Class 1, Type IV Class 1, Type V Class 1

ASTM C 553: Type II Class 1, Type III Class 1, Type IV Class 1, Type V Class 1

Federal Specification HH-I-558: Form D-Type III Class 17

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.

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 20% R.H.	3F
90 F at 80% R.H.	7F

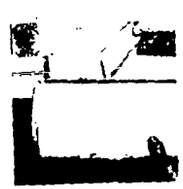
3. Piping operating down to freezing temperature or cycling hot and cold temperatures should be insulated for maximum performance during the coolest part of the cold cycle.

Economic Thickness—Ambient Still Air At 90F

Pipe Surface Temperature 35 F	PIPE SIZES											COPPER TUBING nominal size					
Condition No Water	½	¾	1	1½	2	2½	3	4	5	6	8	½	¾	1	1½	2	3
95% RELATIVE HUMIDITY	¾	1	1¼	1½	2	2½	3	4	5	6	8	¾	1	1¼	1½	2	3
Recommended Thickness (in.)	1½	1½	2	2	2	2½	2½	2½	2½	2½	3	1½	1½	1½	1½	2	2
	1½	2	2	2	2½	2½	2½	2½	2½	2½	3	2½	1½	1½	2	2	2½
Heat Gain (Btu/ft/hr.)	5	6	7	8	10	12	15	17	21	25	31	32	3.9	3.8	5.0	6.1	6.8	8.5
	3	5	7	9	11	14	16	19	23	28	32	45	3.5	4.2	5.4	5.8	7.6	8.8
60% RELATIVE HUMIDITY																		
Recommended Thickness (in.)	½	½	1	1	1	1	1	1	1½	1½	1½	1½	½	½	½	½	1	1
	½	1	1	1	1	1	1	1½	1½	1½	1½	1½	½	½	½	1	1	1
Heat Gain (Btu/ft/hr.)	6	8	9	12	16	20	23	28	32	39	46	50	4.5	5.5	6.9	8.8	11.1	14.0
	7	9	10	14	20	25	24	29	35	43	55	73	6.9	5.2	7.8	8.0	10.8	10.9

*Minimum thickness insulation above 32° and 0 to 3", above 24" and 0 to 10".







Fiberglas 25 C-P Pipe Insulations installed by this unique method eliminates the need for stapling, bands and lap adhesives. The contact adhesive offers a positive vapor seal at all joints and spreads applied. It is as easy as 1-2-3: (1) start to peel the release paper off the vapor barrier, (2) apply in spot and peel off the balance (3) place the lap in place at the center and, pressing hard, work out toward either end. Butt 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.

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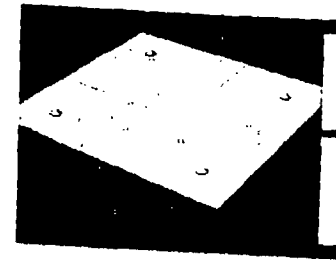
December, 1968

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 flash 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 consistent thermal efficiency performance.

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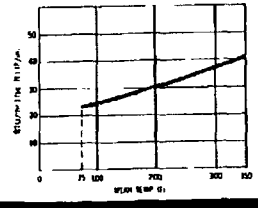
performance characteristics

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 these recommendations.

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 ½" 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 cls 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

(10F 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/Hr-hr)
ST – surface temperature (F)

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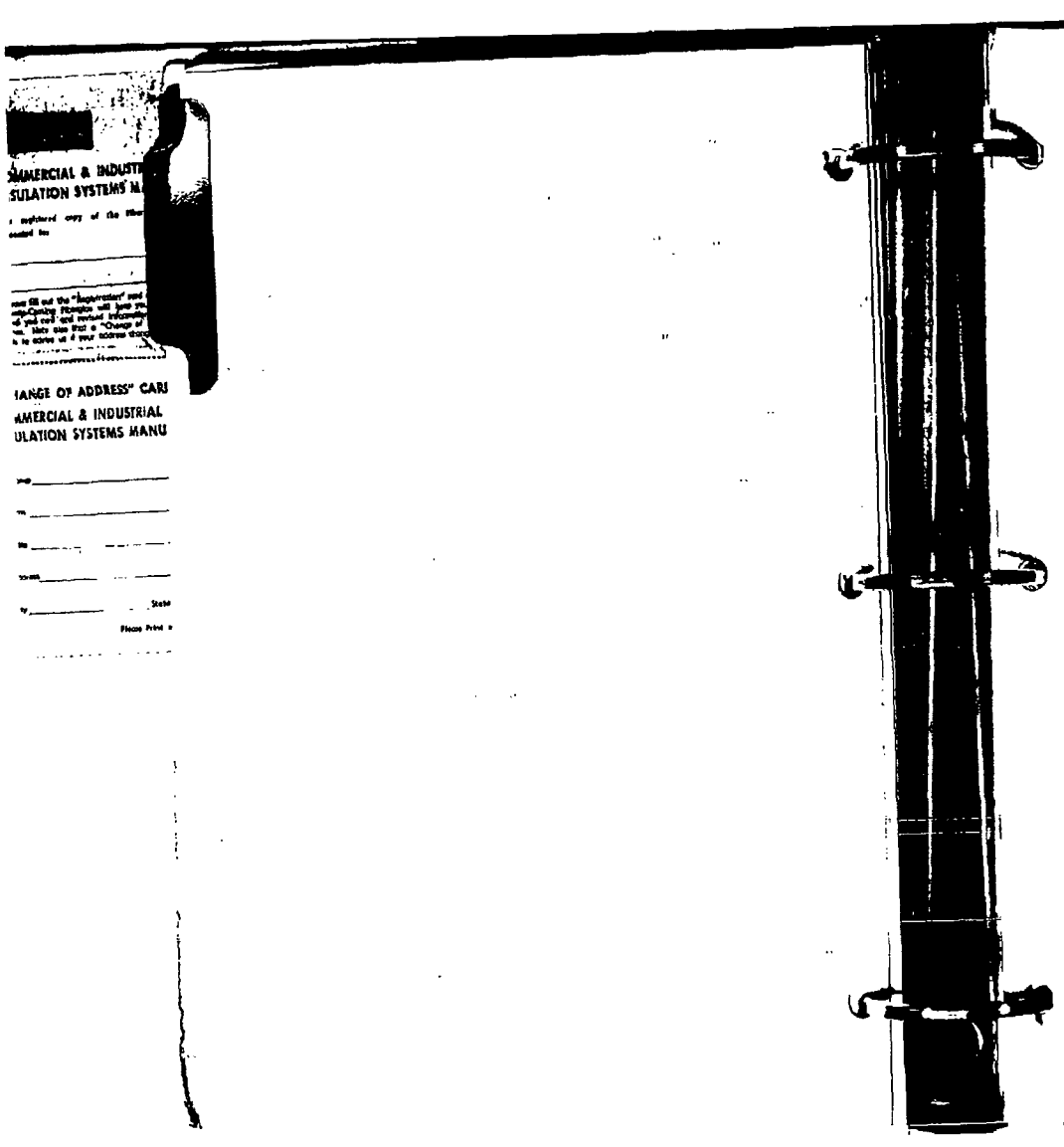

FIBERGLAS

Plumbing Systems 1.5.1

Date 1-10-66

Revised _____

application specifications

CHILLED DRINKING WATER RAINWATER LEADERS

Insulate all (Chilled Drinking Water) (Horizontal Rainwater Leader) piping 35F to 50F with --- inch nominal thick Fiberglas:

a) Heavy Density Sectional
b) One Piece

pipe insulation having a factory applied

a) Self Sealing Lap (SSL)
b) Fire Retardent (FRJ)
c) Dual Temp (WDT)

vapor barrier jacket.

CONCEALED

Piping - Apply insulation to pipe with all sides and end joints butted tightly. Seal off ends of insulation with Vapor Barrier Mastic* at each fitting and at 21' intervals on continuous runs.

a) Adhere SSL jacket by removing release paper after the insulation is installed on pipe and sealing the lap starting in the center of each section, working towards ends. Lap must be pressurized by rubbing with hard tool such as the back of a knife blade. 3" Butt Strips are installed in the same manner at the joint between sections.

b) Adhere the factory applied (FRJ) (WDT) Vapor Barrier lap smoothly and securely at the longitudinal laps with a white Vapor Barrier Adhesive.* Adhere 3" wide butt strips smoothly and securely over all end joints with the Vapor Barrier Adhesive to insure a continuous Vapor Barrier.

Fittings - Insulate all fittings, flanges, valves and strainers with mitered segments of pipe insulation, oversized pipe insulation, or molded fittings. Coat each fitting with two 1/8" coats of an approved Vapor Barrier Mastic* reinforced with Glass Fabric extending 2" onto adjacent pipes.

EXPOSED

All piping exposed in finished spaces and Mechanical Equipment Rooms shall be additionally finished with:

The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements

*Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives & other accessory materials

a) 6 oz. canvas smoothly pasted in place with Lagging Adhesive and sized with one brush coat of Lagging Adhesive.*

b) Pre-Sized Glass Cloth adhered with lagging adhesive.* Fittings shall be covered with 6 oz. canvas saturated with Lagging Adhesive.*

OUTDOOR

Piping - All piping exposed to the weather shall be additionally finished with:

a) 45 lb. roofing felt wired at 9" o. c. with 16 ga. annealed Copper wire with all joints lapped a minimum of 2" and positioned to shed water.

b) .010" corrugated aluminum jacket, all joints lapped a minimum of 2" secured with 1/2" aluminum strappings and seals, at 12" o. c.

Fittings - Shall be weather proofed with:

a) Two 1/8" thick wet coats of Outdoor breather Mastic,* reinforced with Glass fabric,* extending two inches onto the adjacent pipe insulation.

b) Preformed Metal covers secured in place with aluminum strapping.

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FIBERGLAS

Plumbing Systems 15.2

Date 1.10.66

Revised _____

application specifications

DRAIN LINES

Heat Soft Copper Connections

Insulate all drain lines from drip pans or equipment to soil piping, and all bent soft copper connections in other cold plumbing systems, that normally contain 35F to 70F water with _____ inch thick O. C. Flexible Tubing.

CONCEALED

Piping - On pipe or tubing not yet installed, Unslit Flexible Tubing shall be slipped over the full length of the piping or tubing leaving a sufficient amount of exposed piping for connections. After connections are made and tested, apply insulation over fittings so as to cover all piping completely. Slit insulation shall be used on systems which are to be insulated after installation. Seal all butt joints and slit insulations with OC-500 Adhesive.

Fittings - Flexible tubing shall be slipped over copper tubing fittings. Iron pipe or cast bronze fittings are to be sleeved (insulated) with a larger diameter of flexible tubing insulation nested over the covering on adjacent piping and adhered with OC-500 Adhesive.

EXPOSED AND OUTDOORS

Exposed piping may be finished (by others) with an approved Non-bleeding paint.

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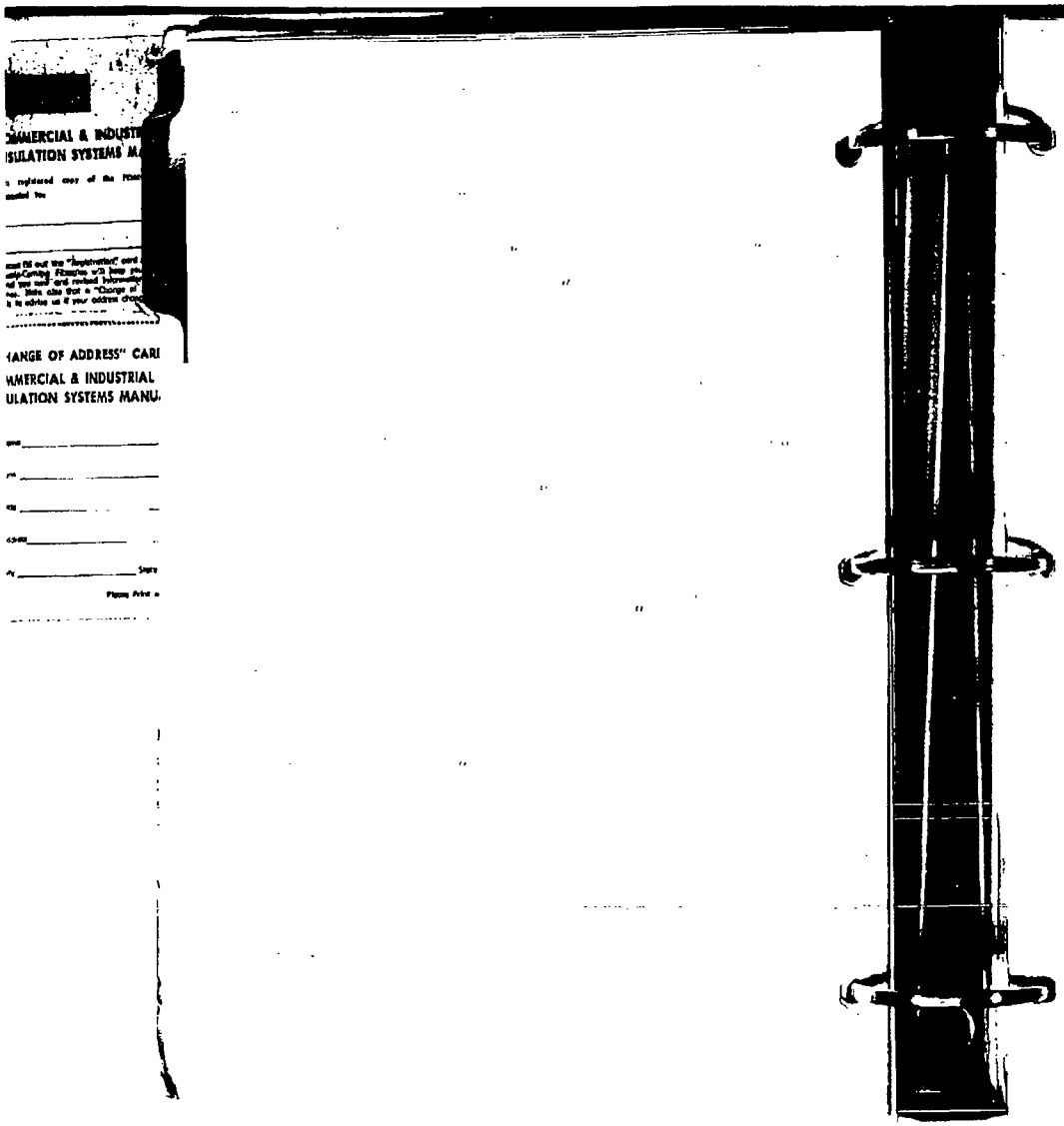
The above specification is general in nature. Application procedure is at the discretion and request-bility of the Design Engineer to meet specific job requirements

**Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives & other necessary materials.*

LITHO U.S.A. JAN 1966
PUB. NO. 5-MR-5412



FIBERGLAS

Plumbing Systems 1.5.3

Date 1-10-66

Revised

DOMESTIC COLD WATER BOILER MAKE-UP WATER

Insulate all (Domestic Cold Water) (Boiler Make-up Water) piping operating from 50F to 70F with _____ inch thick Fiberglas:

a) Heavy Density Sectional
b) One Piece

pipe insulation having a factory applied

a) Universal Fire Retardant (UFR)
b) Universal (WUJ)

Vapor Barrier Jacket.

CONCEALED

Piping - Apply insulation to clean dry piping with all joints tightly butted. Adhere the factory applied vapor barrier jacket lap smoothly and securely at the longitudinal laps with a White Vapor Barrier Adhesive.* Adhere 3" wide butt joint strips over all end joints with Vapor Barrier Adhesive* to insure a continuous Vapor Barrier.

Fittings - Insulate all fittings on piping up to 3" IPS with OC-110 insulating Cement and on longer sizes with Molded Fittings or mitered segments to the same thickness as the adjacent insulation vapor seal with two 1/8" wet coats of Vapor Barrier Mastic* reinforced with Glass Fabric* extending 2" onto the adjacent insulation.

EXPOSED

Piping - Additionally, cover all insulation exposed locations and mechanical equipment rooms with factory applied:

a) 6 oz. Canvas adhered with Lagging Adhesive.*
b) Pre-Sized Glass Cloth adhered to pipe insulation with Lagging Adhesive.* Saturate with Lagging Adhesive.*

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**Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials.*

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Fittings - Shall be covered with 6 oz. canvas saturated with Lagging Adhesive*

NOTE: Staples are not to be used on any Vapor Barrier Jacket.

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LITHO U.S.A. JAN 1966

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Plumbing Systems 1.5.4

Date 1-10-66

Revised _____

application specifications

DOMESTIC HOT WATER · TEMPERED WATER BOOSTER HEATER WATER

Insulate all Domestic (Hot Water Piping) (Tempered Water) Booster Heater Water) up to 180F with _____ inch thick Fiberglas:

a) Heavy Density Sectional
b) One Piece

pipe insulation having a factory applied

a) Universal Fire Retardent
b) White Universal
c) Pre-Sized Glass Cloth
d) Standard Canvas

jacket.

CONCEALED

Piping - Apply insulation to the pipe with side and end joints butted tightly. Seal jacket legs and butt joint strips with an approved Lagging Adhesive.*

Fittings - Insulate fittings for piping up to 3" IPS with OC-110 Cement and on longer sizes with Molded Fittings or mitered segments, wired in place to the same thickness as adjacent insulation. Jacket fittings with 6 oz. canvas saturated with lagging adhesive.*

EXPOSED

Piping - In exposed locations and Mechanical Equipment Rooms shall be jacketed with factory applied:

a) 6 oz. Canvas
b) Pre-Sized Glass Cloth

Fittings - Shall be covered with 6 oz. canvas saturated with Lagging Adhesive.*

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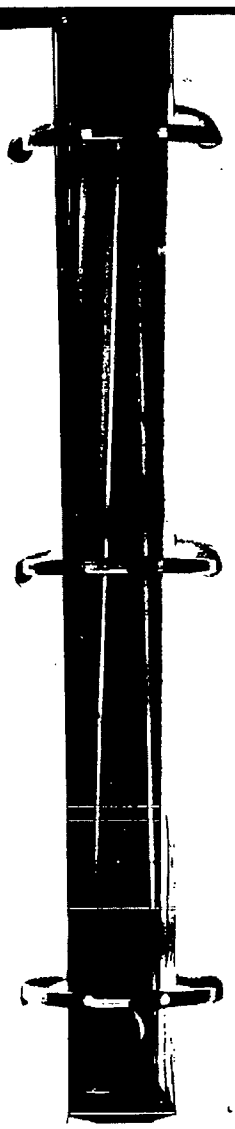
This sheet specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

*Refer to Accessory Materials List for suggested manufacturer of mastics, adhesives & other necessary materials.

LITHO U.S.A. JAN 1966
PUB NO. 5 IN-3418



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Plumbing Systems 1.5.5

Date 1-10-66

Revised 2-4-69

application specifications

HOT WATER STORAGE TANKS · HEAT EXCHANGERS
HOT WATER GENERATORS · BOOSTER HEATERS

Insulate all (Hot Water Storage Tanks), (Heat Exchangers), (Hot Water Generators), (Booster Heaters) 150F to 180F, with _____ inch thick Owens-Corning Fiberglas:

a) Type 704
b) Kaylo Block

The insulation shall be cut or mitered where necessary to fit the shape and contour of the equipment. The insulation shall be banded or wired in place on 12 inch centers or impaled over pins on 18 inch centers. Points up all open joints with OC-110 Insulating Cement.

Apply 1" hexagonal mesh over insulation, lacing edges together. Apply 1/2" thick coat of OC-110 Insulating Cement and trowel to a smooth finish. Adhere 8 oz. canvas over the cement with an approved lagging adhesive.* Size canvas with one brush coat of lagging adhesive.*

* Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials.

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PUB. NO. 5-IN-3418-A

OWENS CORNING FIBERGLAS

Plumbing Systems	1.S.6
Mechanical Piping Systems	2.S.5
Power & Process Piping	5.S.5
Date	4-1-67
Revised	7-10-68

application specification

FIBERGLAS 25* : H-P

hot piping up to 450F

Figure 1

Apply Fiberglas Molded or Segmental Insulation to fittings equal in thickness to that of the insulation to be applied to adjoining pipe and securely fasten in place, using wire.

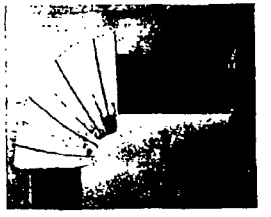

Figure 2

Apply pipe insulation and staple the longitudinal overlap using 9/16" coated staples† at 2" spacings. The stapler shall have a flaring attachment for better staple holding power. Butt adjoining sections firmly together.

†DUO-FAST or equal.



Figure 3

Apply butt-joint strips, making sure the coated or dull side is out. (The side imprinted with a trademark is the inside face of the cloth). Center the strip for a snug fit and fasten with two staples, one each approximately ½" from each edge.

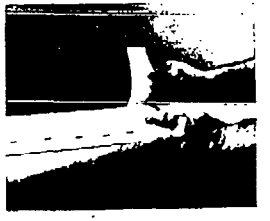

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Figure 4
Apply a skim coat of SC 30 Insulating Cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply a light coat of either OCF Fitting Mastic, Type H or Benjamin Foster Sealfas Mastic #30-36, U.L. labeled.



Figure 5
Wrap the fitting with Fiberglas Fitting Tape overlapping the preceeding layer by 1 to 2". Also overlap mastic and Fiberglas Fitting Tape by 2" on adjoining sections of pipe insulation.

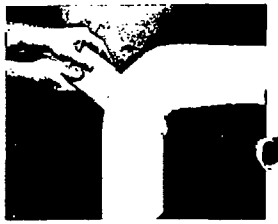
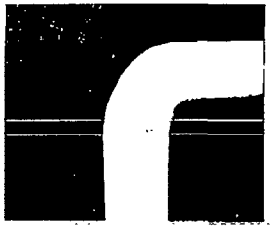


Figure 6
Apply a second coat of mastic over the Fiberglas Fitting Tape, working it into the mesh of the cloth — smooth the surface. Mastic shall be applied at a rate of not less than 40 sq. ft. per gallon (approximately ¼" wet film thickness) for rated performance.



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PUB NO 51N-3121 B

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OWENS-CORNING FIBERGLAS

Plumbing Systems 1.5.7
Mechanical Piping Systems 2.5.6
Power & Process Piping 5.5.4
Date 7-10-68
Revised

application specification
FIBERGLAS 25* : C-P
cold piping system down to 35F

Figure 1
Apply Fiberglas Molded or Segmental Insulation to fittings equal in thickness to that of the insulation to be applied to adjoining pipe and securely fasten in place, using wire.

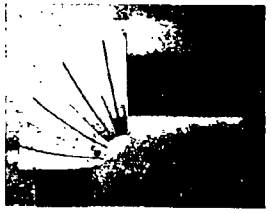

Figure 2
Apply pipe insulation and remove release paper from factory applied pressure sensitive adhesive strip on the longitudinal lap.

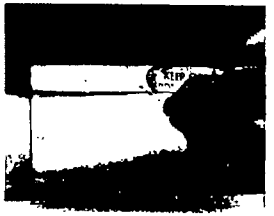

Figure 3
Seal longitudinal lap to the adjacent surface starting at the center of the section and working toward each edge. Rub hard with the back of a knife or a nylon sealing tool for proper seal.



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Figure 4
Apply the pressure sensitive adhesive coated butt strips and rub down firmly using the back of a knife or a nylon sealing tool to obtain good bonding. Note: Minimum ambient application temperature for this adhesive is 35°F. Surfaces must be thoroughly dry and free from dust.



Figure 5
Apply a skim coat of SC-30 Insulating cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply OCF Fitting Mastic, Type C, U.L. labeled.



Figure 6
Wrap the fitting with Fiberglas Fitting Tape overlapping the preceeding layer by 1 to 2". Also overlap mastic and Fiberglas Fitting Tape by 2" on adjoining sections of pipe insulation

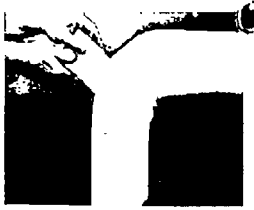
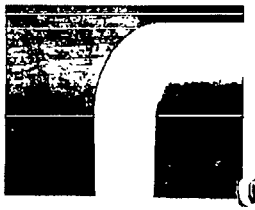


Figure 7
Apply a second coat of OCF Fitting Mastic Type C over the Fiberglas Fitting Tape, working it into the mesh of the cloth--smooth the surface. Mastic shall be applied at a rate of not less than 10 sq. ft. per gallon (approximately 1/16" wet film thickness) for rated performance.



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OWENS-CORNING FIBERGLAS

Plumbing Systems	1.S.8
Mechanical Equipment	3.S.3
Air Handling Systems	4.S.10
Date	4-1-67
Revised	7-10-68

application specifications

FIBERGLAS 25* : H-E

hot equipment up to 450F

Figure 1 — Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type H (Pressure Sensitive, U.L. labeled)



Figure 2
Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers



Figure 3
Cut Fiberglas 25 Insulation to dimension and impale on pins. Apply pressure on facing in the area of the pin penetration. For elbows, cut pie-shaped pieces for top and bottom. Make sure insulation fits tightly at the seams before impaling.

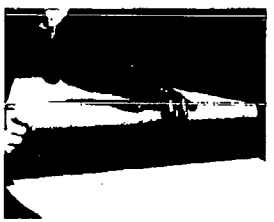

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Figure 4
Apply the pressure sensitive adhesive coated butt strips and rub down firmly using the back of a knife or a nylon sealing tool to obtain good bonding. Note: Minimum ambient application temperature for this adhesive is 35°F. Surfaces must be thoroughly dry and free from dust.



Figure 5
Apply a skim coat of SC-30 Insulating cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply OCF Fitting Mastic, Type C, U.L. labeled.



Figure 6
Wrap the fitting with Fiberglas Fitting Tape overlapping the preceeding layer by 1 to 2". Also overlap mastic and Fiberglas Fitting Tape by 2" on adjoining sections of pipe insulation.

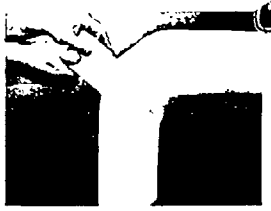
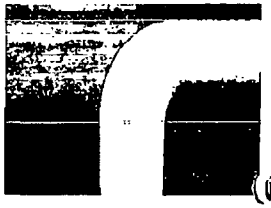


Figure 7
Apply a second coat of OCF Fitting Mastic Type C over the Fiberglas Fitting Tape working it into the mesh of the cloth — smooth the surface. Mastic shall be applied at a rate of not less than 40 sq. ft. per gallon (approximately 1/16" wet film thickness) for rated performance.



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OWENS-CORNING FIBERGLAS

Plumbing Systems	1.5.8
Mechanical Equipment	3.5.3
Air Handling Systems	4.5.10
Date	4-1-67
Revised	7-10-68

application specifications

FIBERGLAS 25* : H-E

hot equipment up to 450F

Figure 1 — Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type H (Pressure Sensitive, U.L. labeled)



Figure 2
Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers.

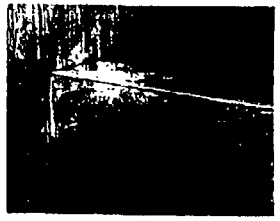

Figure 3
Cut Fiberglas 25 Insulation to dimension and impale on pins. Apply pressure on facing in the area of the pin penetration. For elbows, cut pie-shaped pieces for top and bottom. Make sure insulation fits tightly at the seams before impaling.



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Figure 4

Groove Fiberglas 25 board for curved surfaces and fabricate flanges. The board should be scored with a grooving tool, saw or knife to half the board thickness, and the material removed from the slot. Flanges should not overlap the top and bottom boards. All wool shall be scraped from the flanges before sealing.

The smaller the radius of the board, the smaller the space between cuts.



Figure 5

Install side pieces making sure the edge of the insulation is flush with the top and bottom board surfaces.

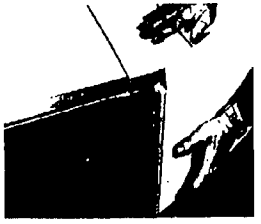

Figure 6

Cut pins to length as required and apply pre-finished fastener caps. Pins should protrude 1/8" to 3/16" above the surface of the insulation. If more than 1/16" shows, cut it off to the correct length before applying the cap. This will assure a tight fit of insulation to the surface.



Figure 7

Apply OCF Joint Sealing Tape Type H to all transverse and logitudinal seams after insuring you have a dry dust-free surface. Use the nylon sealing tool to apply pressure to the joint and make a good bond. Do not remove all the release paper from the tape but rather gradually pull it back as required. This keeps dust, etc. from fouling the adhesive surface. Make sure the tape is properly aligned with the seam before it is sealed down.



Figure 8

Use nylon sealing tool on all taped joints. This will result in a good bond and reduce air pocket and "fish-mouths." For a superior bond, use a 300F iron on the tape.



Figure 9

Insulating the throat of an elbow. Prepare a Fiberglas 25 board of correct dimensions for the throat and fabricate the top and bottom flanges. Next, use a grooving tool, knife or saw and groove the board facing side up. Cut at least half way through the insulation.

Slit sections may also be used as an alternate to the one-piece method described above.



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Figure 10
Complete insulating the throat. Impale insulation, cut pins to correct length, install caps, and strip the top and bottom flaps.

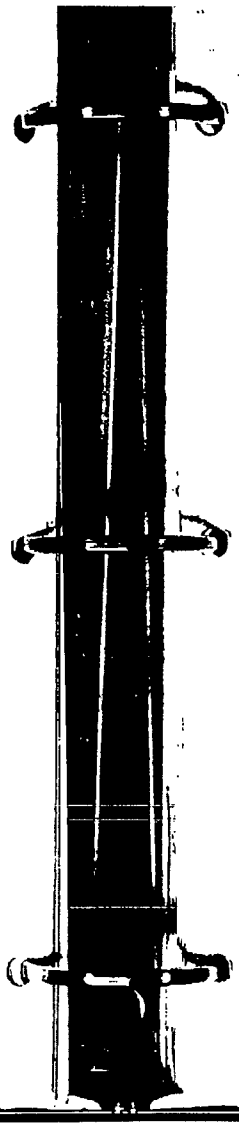


Figure 11
Where curved surfaces are encountered and the joint sealing tape must be notched to conform to the curvature, cut an additional length of tape to half width and apply over the notched tape surface. This will yield a neater finished appearance and improve adhesion in these areas.



Figure 12
Completed insulation of rectangular duct.





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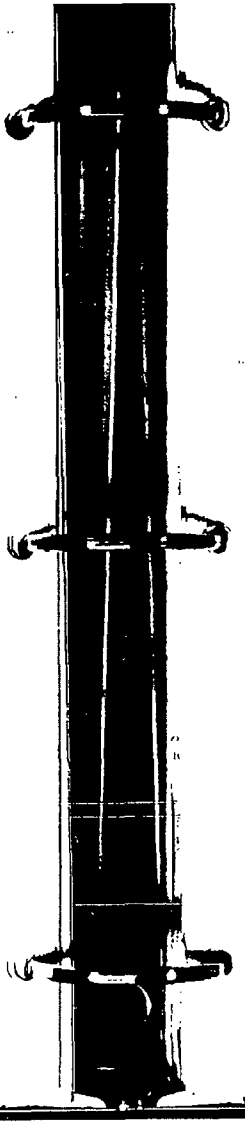

OWENS-CORNING
FIBERGLAS

plumbing piping systems 1.8
mechanical piping systems 6.8
January 1969

Pipe Insulations



One-Piece Pipe Insulations

A versatile, efficient, quick applying pipe insulation for hot and cold piping from 30F to 400F.

uses

Fiberglas* One Piece Pipe Insulation is adaptable to all types of piping systems operating at temperatures from −30F to 400F. 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.

*TM Reg O.C. & Cmp

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performance characteristics

moisture absorption: 0.7% by volume in 96 hrs at 120F and 95% RH

specific heat: 0.30 Btu/lb./°F

shrinkage: None

alkalinity: pH9

thermal conductivity: Unusually low thermal conductivity shown on chart

mean temperature °F	k
75	0.23
40	0.21

specification compliance

HH-I-552 Type I, Class A and B

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

HH-I-562 Type II

MIL-I-22344B (Ships)

1. Standard Canvas.

2. Roofing Felt.

3. FRJ

4. FRJ with Self-Sealing Lap.

PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)		OUTDOORS
		CONCEALED	EXPOSED	
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	110-180 110-130	Standard Canvas Jacket—lowest—provides base for painting. Heavier 4 oz 8 oz weights available.	Fiberglas 25 U.P.—a completely U.L. rated hot pure stainless system. U.L. rating on choice jacket, insulation, fittings and accessories. Available on Fiberglas Heavy Duty Pipe insulation only. See data sheet 1-IN-3035.	Roofing Felt—available with a factory applied 15 lb. roofing felt complete with longitudinal overlap. End joint strip supplied.
Mechanical				
Heating Hot Water Steam and Condensate Fuel Oil Piping High Temperature Hot Water	250-210 210-450 210-450 250-450	FRJ with Self Sealing Lap—FRJ (Foil Reinforced Jacket) is a laminate of white kraft and foil, reinforced with strong glass yarns, laminated with flame sealing adhesives. Meets requirements of ASTA 302-1, Type A. Jacket can be used on heated, cool-temperature lines up to 450F. Self sealing straps to close end joints are furnished. Also avail able without the Self Sealing Lap feature.		
COLD PIPING				
Plumbing				
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	55-65 55-65 55-65	FRJ with Self Sealing Lap—provides a positive vapor seal for all cold and chilled water lines. FRJ (Foil Reinforced Jacket) is a laminate of white kraft and foil reinforced with strong glass yarns. Meets requirements of ASTA 302-1, Type A jackets. Laminated with flame sealing adhesives. Excellent vapor barrier with low perm rating 0.02. Jacket can be used on heated, cool-temperature and refrigerated lines from —30F to 450F. Butt foil strips to close end joints are furnished. Also available without the Self Sealing Lap feature.		
Mechanical				
Chilled Water—Primary and Secondary Dual-Temp Refrigerant Suction	35-55 40-210 -30 to -35		Fiberglas 25 U.P.—a completely U.L. rated cold pure stainless system. U.L. rating on choice jacket, insulation, fittings and accessories. Available on Fiberglas Heavy Duty Pipe insulation only. See data sheet 1-IN-3035.	Roofing Felt—available with a factory applied 15 lb. roofing felt complete with longitudinal overlap. End joint strip supplied. All cold lines running outdoors require an additional weatherproofing jacket of roofing felt or metal field-applied to the installation.

DESIGN CONSIDERATIONS

[illegible] Fiberglas One-Piece Pipe Insulation permits the specifier to [illegible] and plumbing system insulation [illegible] requires, outdoors [illegible] or cold. A selection of jackets available in easy one and factory applied [illegible] ensures proper application at the most economical cost.

The Self Sealing Lap on FRJ (Foil Reinforced Jacket) assures a positive vapor and dirt barrier [illegible] on the pipe. This technological advance employs a unique blend of bonding agent that instantly [illegible] the pearl lap tightly in place. The hand also increases strength of lap. Butt joint strips of the [illegible] cover the end joints. The use of staples, bands and heavy adhesives are eliminated and the [illegible] of fabricating and other application defects. In addition, FRJ with Self Sealing Lap is fire retardant [illegible] vapor barrier and has a glass fiber reinforced to resist damage.

Pre-Sized Glass Cloth Jacket factory applied to Fiberglas One-Piece Pipe Insulation [illegible] insulation for insulated lines. Its lapping is recessed before grooving. The jacket is tough, resists [illegible] not mildew or rot. It seals where a hot Flame Spread of 25, Fuel Contribution, 0, Smoke Developed [illegible]

Fittings for cold lines are insulated with mitered segments, or pre-molded Fiberglas fitting kit which [illegible] wrapped with glass fabric and coated with vapor barrier mastic. Hot hot lines hot fittings made [illegible] tailing cement, covered and sized.

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

We recommend that a factor making measurement economy and performance for all piping systems, [illegible] power or outdoors.

Caution: Owens Corning Fiberglas insulations are to be applied only with approved adhesive [illegible] mechanical fastening devices as published in Accessory Materials List, Pub. No. 4-IA-3430. [illegible] plus accepts no responsibility or liability for the performance of materials other than [illegible] but which appeared in markets by O-C-F Testing Laboratories.

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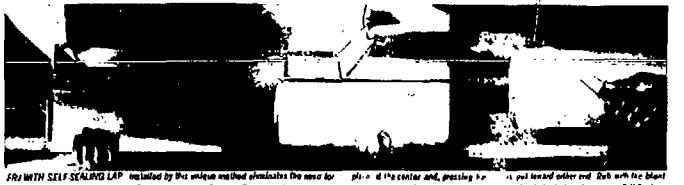
Steel Banding Apers system is one of the [illegible] at most widely in equip

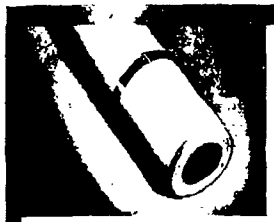


Self Sealing [illegible] vapor seal at the end [illegible] cold water [illegible] and a

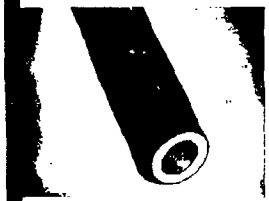


FRJ WITH SELF SEALING LAP insulated by this unique method eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal on all joints and speeds application. It's as easy as 1, 2, 3: (1) start to peel the release paper off the vapor barrier, (2) apply to pipe and peel off the balance, (3) press the lap in [illegible] of the center and, pressing [illegible] peel forward either end. Butt with the blunt edges of [illegible] ends. End joints are sealed [illegible] 3" wide butt strip of the same Self Sealing vapor barrier material.

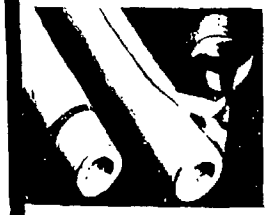
PIPE INSULATION SELECTION CHART—PLUMBING & MECHANICAL SYSTEMS



1 Standard Canvas.



2. Roofing Felt



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

SERVICE REQUIREMENT	TEMPERATURE °F	JACKETS AVAILABLE (RECOMMENDED IN BOLD FACE TYPE)		OUTDOORS
		CONCEALED	EXPOSED	
HOT PIPING				
Plumbing				
Domestic Hot Water Tempered Water	110-180 110-130	**Standard Canvas Jacket**—low cost—provides base for painting. Heavyweight 6 oz. 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-8863.	**Roofing Felt**—available with a factory applied 45 lb. roofing felt complete with longitudinal overlap. End joint strips supplied.
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 resisting adhesive. Meets requirements of CGA 301-1, Type A. Jacket can be used on heated, cold or 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				
Domestic Cold Water Chilled Drinking Water Rain Water Leaders	50-65 35-65 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 CGA 301-1, Type A Jackets. Laminated with flame resisting adhesive. Provides 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.		
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-C378.	**Roofing Felt**—available with a factory-applied 45 lb roofing felt complete with longitudinal overlap. End joint strips supplied. All cold lines running outdoors require an additional weatherproofing jacket of roofing felt or metal, field-applied to the insulation.

DESIGN CONSIDERATIONS

The wide temperature range of Fiberglas One-Piece Pipe Insulation permits the specifier to select material from one manufacturer to cover all the mechanical and plumbing systems including commercials, concealed, exposed, outdoors, hot or cold. A selection of jackets supplied in cost 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 giant lap tightly in place. The bond also becomes tougher with age. Butt joint strips of the same material are used on the end joints. The usual staples, bands and messy adhesives are eliminated and the attendant problems of fishmouths and other application defects. In addition FRJ with Self Sealing Lap offers attractive, pleasing neat white appearance and is glass fiber reinforced to resist damage.

Pre-Sized Glass Cloth Jacket factory-applied to Fiberglas One-Piece Pipe Insulation is a completely U.L. rated insulation for heated lines. No lagging is required before painting. This 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.

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

Fiberglas will not burn, rot or shrink. With the addition of FRJ or Pre-Sized Glass Cloth Jacket, the assembly 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, stitches 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 on this list unless approved in writing by O-CF Testing Laboratories.



Self Sealing Lap vapor barrier jacket ... vapor seal with an attractive ... cold water service and dual-temperature ...

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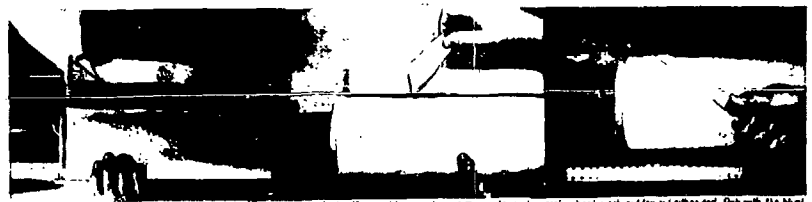

FRJ WITH SELF SEALING LAP installed by this unique method eliminates the need for stapling, bands and lap adhesives. The contact type adhesive offers a positive vapor seal at all points and speeds application. It's as easy as 1, 2, 3: (1) start to peel the release paper off the vapor barrier. (2) apply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

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Name
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Title
Address
City State
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performance characteristics

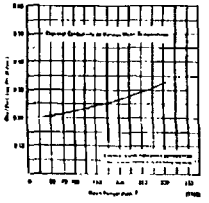
moisture absorption: 0.2% by volume 95 hrs at 120F and 95% RH

specific heat: 0.20 Btu/lb F

shrinkage: None

alkalinity: pH

thermal conductivity: Unusually low thermal conductivity shown on chart



mean temperature	k
25F	0.23
40F	0.21

specification compliance:

HH-I-552 Type I, Class A and B

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

HH-I-562 Type II

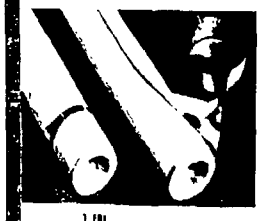
MIL-I-22344B (Ships)



1. Standard Canvas.



2. Reading Felt.



3. FRI
4. FRI with Self-Sealing Lap



Next Finished Appea... system is one of the ... is used widely in equip...



Self Sealing Lap ... combines a positive vapor seal, ... cold water service and ... appearance for

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recommended thickness

heated piping to 450F (ALF ambient still air)

pipe temp. temp. diff. IPS	200 120			300 120			400 120		
	RT	HL	ST	RT	HL	ST	RT	HL	ST
½	1	13	91	1	24	104	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	23	93	1½	31	96	1½	50	102
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	95			
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 (40 F at 80% R.H.)

pipe surface temperature	50 F or above		40 F to 35 F		34 F to 0 F		0 F to 30 F	
pipe size	RT	HQ	RT	HQ	RT	HQ	RT	HQ
½	½	4	½	5	1	8	1½	8
¾	½	5	½	6	1	9	1½	10
1	½	6	½	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	[illegible]
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) HQ-heat gain

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OWENS CORNING FIBERGLAS

OWENS-CORNING FIBERGLAS CORPORATION
Industrial ... Materials Division, 717 Fifth Avenue, New York, New York 10022
General Off...

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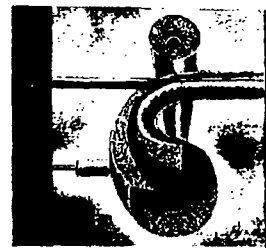
Pub. No. 1 IN 3409 5

Litho in U.S.A. Jan. 1969

OWENS CORNING FIBERGLAS

plumbing systems 1.2
mechanical piping systems 2.2
October, 1968

Piping Insulations



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 refrigerant 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.

291359

performance characteristics

density, lbs./cu.ft. (avg.) 6½

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 Use Temperature: 50 F	20 F	0 F
MILD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NORMAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SEVERE	[illegible]	[illegible]	[illegible]	[illegible]	Available on Request

* Conservation [illegible] O-C Flexible Tubing Insulation is used primarily on short runouts

flexible tubing sizes

iron pipe sizes (IPS) ¼" to 4"

copper tubing (CT) ¼" O.D.–3½" O.D.

Wall thickness—inches (nominal) [illegible]

Inside Diameters—inches ½" 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 75 ft.

flexible sheet sizes

Standard size—24" x 72"

Sheet thickness—5/16", ⅜", ½", ⅝", ¾", 1"

continuous rolls—5/16" x 24" x 150' ½" x 24" x 55'

⅜" x 24" x 120' ¼" x 24" x 40'

½" x 24" x 75'

specification compliance

HH I-00573

MIL-P-15280-D

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 Akkyd Chlorinated Rubber Paint or Presslite 762 protective coating



OWENS/CORNING FIBERGLAS

OWENS-CORNING FIBERGLAS CORPORATION

Industrial and Co[illegible] Construction Materials Division 717 Fifth Avenue, New York, New York 10022

General Offices, To[illegible] 01

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Pub. No. 1-MS-3247-B

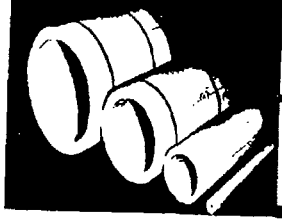
Litho U.S.A. Oct 1968

OWENS CORNING FIBERGLAS

mechanical piping systems 2.5

January, 1969

Pipe Insulation



Kaylo Pipe Insulation

for hot water heating, high temperature hot water, steam condensate piping systems and all heated lines to 1200F

uses

Kaylo* is particularly suitable for use on high temperature piping systems where high performance and extended temperature range are required. Kaylo is widely used on hot piping where a great degree of physical abuse resistance is required, such as boiler and equipment rooms.

description

Kaylo Pipe Insulation is a rigid white hydrous calcium silicate insulation molded in sections for all types of indoor and outdoor piping that requires an abuse resistant, durable, efficient insulation, for temperatures up to 1200F.

benefits

rugged—Kaylo Pipe Insulation is a strong and rigid material that resists mechanical damage during shipping, installation and service. It is well suited for riser piping in exposed locations.

versatile—Kaylo's extended temperature range offers broader use for all hot piping to 1200F.

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.



Kaylo Pipe Insulation cuts cleanly with straight square edges. The final result is well insulated piping with a neat finished appearance. Mitered fittings are finished with insulating cement and covered with canvas.



Kaylo Mod Pipe Insulation combines weatherproofing and insulation in one application. Attractive, maintenance-free factory-applied jackets of stainless steel and aluminum are complete with long-lifetime locking seams and end joint butt strips.

* Kaylo is a registered trademark of Owens-Corning Fiberglas Corp.

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[redacted] fill out the "Registration" card
[redacted] Corning Fiberglas, will keep you
[redacted] and mail out revised information
[redacted]. Make also sure a "Change of
[redacted] to advise us if your address change

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SULATION SYSTEMS MAN

Name _____
Firm _____
Title _____
Address _____
City _____ State
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performance characteristics

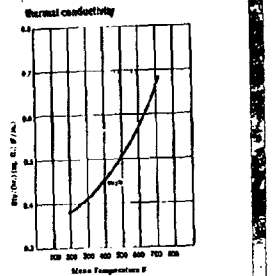
density.....approximately 11 lbs. per cu. ft.
flexural strength (ASTM C-446) over 50 lb. per sq. in.

resistance to abrasion
(conventional tumbling test-loss in weight after 10 min.)
before heating.....9%
after heating for 24 hours
at 750 F.....5%
at 1000 F.....4%
at 1200 F.....3%

alkalinity.....ph 10

dimensional stability
linear shrinkage after heating for 24 hours in muffle
at 750 F.....0.8%
at 1000 F.....0.9%
at 1200 F.....1.4%

specific heat.....0.22 Btu/lb F.



specification compliance

HH-I-00523c Insulation Block, Pipe Covering and Cement, Thermal, Calcium silicate (for temperatures up to 1200F) Type II (Pipe covering) Classes A thru E.

MIL-I-2781D Insulation Pipe Covering, Thermal, Grade 1, Class B; Grade 2, Class D; Grade 3, Class E, Type I and 2.

economic thickness—ambient air at 88F

Pipe Temp. & Temp. Diff.	250 / 120			400 / 320			600 / 520		
IPS	ET	HL	ST	ET	HL	ST	ET	HL	ST
—	1	17	95	1½	40	105	2	63	113
—	1	19	97	1½	42	110	2	71	117
1	1	20	95	1½	50	109	2½	70	107
1¼	1	26	99	2	52	101	2½	81	111
1½	1	27	98	2	55	104	2½	84	112
2	1	32	98	2	61	104	2½	96	112
2½	1¼	26	90	2	64	101	3	93	105
3	1½	33	93	2	79	101	3	111	108
3½	1½	33	90	2½	72	99	3	115	103
4	1½	40	93	2½	83	102	3½	118	105
4½	1½	36	93	2½	82	102	3½	120	107
5	1½	43	95	2½	94	105	3½	137	110

economic thickness

table key
ET—economic thickness (inches)
HL heat loss (Btu/sq. ft. hr)
ST surface temperature (F)

Importance of specifying economic thickness
Selection of insulation thicknesses for any specific application should take into consideration at least the following 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 hot piping, the tabulated thicknesses are optimum thicknesses calculated on an "Economic"* basis for heat conservation under average operating conditions and assure adequate temperature control. Special conditions may warrant the use of other thicknesses.

*From "How to Determine Economic Thickness of Insulation"—National Insulation Manufacturers Association. economic thickness—based F-deg. to 1200F (80F ambient still air)

sizes

thickness Kaylo Pipe Insulation is available in single layer thicknesses from 1" to 3" depending upon pipe size. Kaylo Copper Tubing Insulation is available in single layer thicknesses of 1" and 1½".

Pipe Temp. & Temp. Diff.	250 / 120			400 / 320			600 / 520		
IPS	ET	HL	ST	ET	HL	ST	ET	HL	ST
6	2	46	96	3	96	106	4	148	104
7	2	47	92	3	104	103	4	155	107
8	2	55	93	3	115	109	4	169	106
9	2	56	92	3	123	107	4	182	110
10	2	65	93	3½	124	98	4	200	107
11	2	73	92	3½	133	98	4	205	107
12	2	81	92	3½	142	98	4½	210	105
14	2½	72	90	3½	157	99	5	213	103
16	3	70	88	4	158	97	6	202	99
18	3	78	88	5	147	92	6½	212	97
20	3	85	88	5	153	93	6½	229	98
24	3	100	89	5	178	93	6½	268	99

pipe sizes Kaylo Pipe Insulation is available to fit nominal pipe sizes from ½" to 39" in diameter, and nominal copper tubing sizes from ¼" to 3" in diameter. It is manufactured to Dimensional Standards sizes to permit nesting in multiple-layer applications.

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

Jackets

Jackets are factory-applied on Sectional Pipe and Tube Insulation. On multisegmental forms they are furnished but not adhered.

canvas—Kaylo Sectional Pipe Insulation includes standard canvas jackets, at an additional charge, on thicknesses up to and including 1" depending on pipe size.

8 oz. canvas jacket is available for all types, sizes and thicknesses of Kaylo Pipe and Tube Insulation at an additional charge.

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

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General [illegible] 43601

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PUB NO [illegible]

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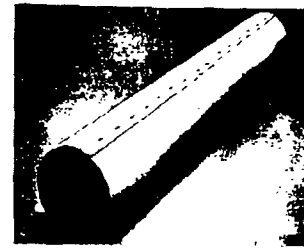
OWENS-CORNING FIBERGLAS

plumbing piping systems 1.2
mechanical piping systems 2.6
power and process piping systems 8.6
December, 1963

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 "H" are trademarks of Owens-Corning Fiberglas Corporation.

291363

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 limitations:
heated lines to 450F

alkalinity:
ph 9

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

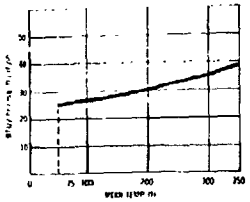
jacket

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 Insulation System
Flame Spread	25**
Fuel Contributed	10
Smoke Developed	25

*note: This rating is for the s... of fittings in a pipeline to ... its ...

**note: This rating is for the pi... tem is limited to 2½ di...

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 O-CF Joint Sealing Tape, Type H. The wrapping is subsequently coated with O-CF Fitting Mastic, Type H or Benjamin Foster 30-36.

federal specification compliance

Fiberglas ... Insulation System ... the requirements ... Specifications ... AS1M C547.

291365

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 selection as insulation thickness for performance and economy.

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

Pipe Temp. / Temp. Diff. / IPS	200 / 120			300 / 220			400 / 320			450 / 370		
	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	105	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	82	132
2	1	24	94	1	45	105	1	73	122	1½	98	133
2½	1	28	94	1½	50	101	1½	74	113	1½	98	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	118	1½	148	121
5	1	50	95	1½	70	100	1½	114	115	1½	140	121
6	1	57	97	1¼	85	101	1½	128	115	2	125	110
7	1	62	96	1½	90	100	1¼	142	110	2	136	108
8	1	68	96	1½	100	101	2	125	107	2	164	111
9	1	80	97	1½	110	101	2	138	106	2	174	111
10	1¼	59	91	1½	110	101	2	146	106	2	180	111
11	1½	64	91	1½	120	101	2	158	106	2	194	111
12	1½	80	96	1½	149	109	2	171	106	2	209	113
14	1½	92	92	1¼	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	381	105

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

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PUB NO 1-IN-3853-C

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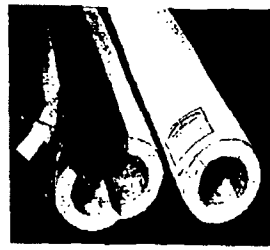
plumbing piping systems 1.8
mechanical piping systems 2.7
power and process piping systems 6.1
December, 1968

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 non-combustible 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

291367

performance data

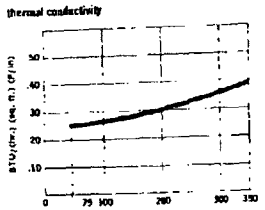
Insulation

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 only. ... of fittings on a piping system of ... 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 Fitting Tape and coated with another coating of O-CF 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

291365

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.

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.

Economic Thickness—Ambient Still Air At 90F

Pipe Surface Temperature 35 F (condition Ice Water)	PIPE SIZES												outdoor tubing optional size					
	½	1	1½	2½	4	6	8	10	12	14	16	20	⅝	¾	1	1½	2½	3½
80% RELATIVE HUMIDITY	½	1½	2	3	5	7	8	11	14	16	18	24	½	¾	1¼	2	3	4
Recommended Thickness (in.)	1½	1½	2	2	2	2½	2½	2½	2½	2½	2½	3	1½	1½	1½	1½	2	2
	1½	2	2	2	2½	2½	2½	2½	2½	2½	3	3	1½	1½	1½	2	2	2½
Heat Gain (Btu/ft/hr.)	5	6	7	8	10	17	15	17	21	21	24	32	3.8	3.8	5.0	6.1	6.8	8.5
	5	6	7	9	11	14	16	19	23	28	32	45	3.5	4.2	5.4	5.8	7.8	8.6
80% RELATIVE HUMIDITY																		
Recommended Thickness (in.)	½	½	1	1	1	1	1	1½	1½	1½	1½	1½	½	½	½	½	1	1
	½	1	1	1	1	1	1	1½	1½	1½	1½	1½	½	½	1	1	1	1
Heat Gain (Btu/ft/hr.)	6	6	9	12	16	24	29	26	32	39	43	70	4.3	5.3	6.9	8.8	11.1	14.0
	7	9	10	14	20	28	34	29	35	43	55	77	4.9	5.8	7.8	8.0	10.6	10.9

*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 press the joint. (3) press the lap in place at the center line, pressure sensitive adhesive will hold the entire end flush with the blunt edge of a hole (not pictured) or space with a 3" wide butt strip of the same Self Sealing vapor barrier material.

291369

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San Jose, California	297-9530
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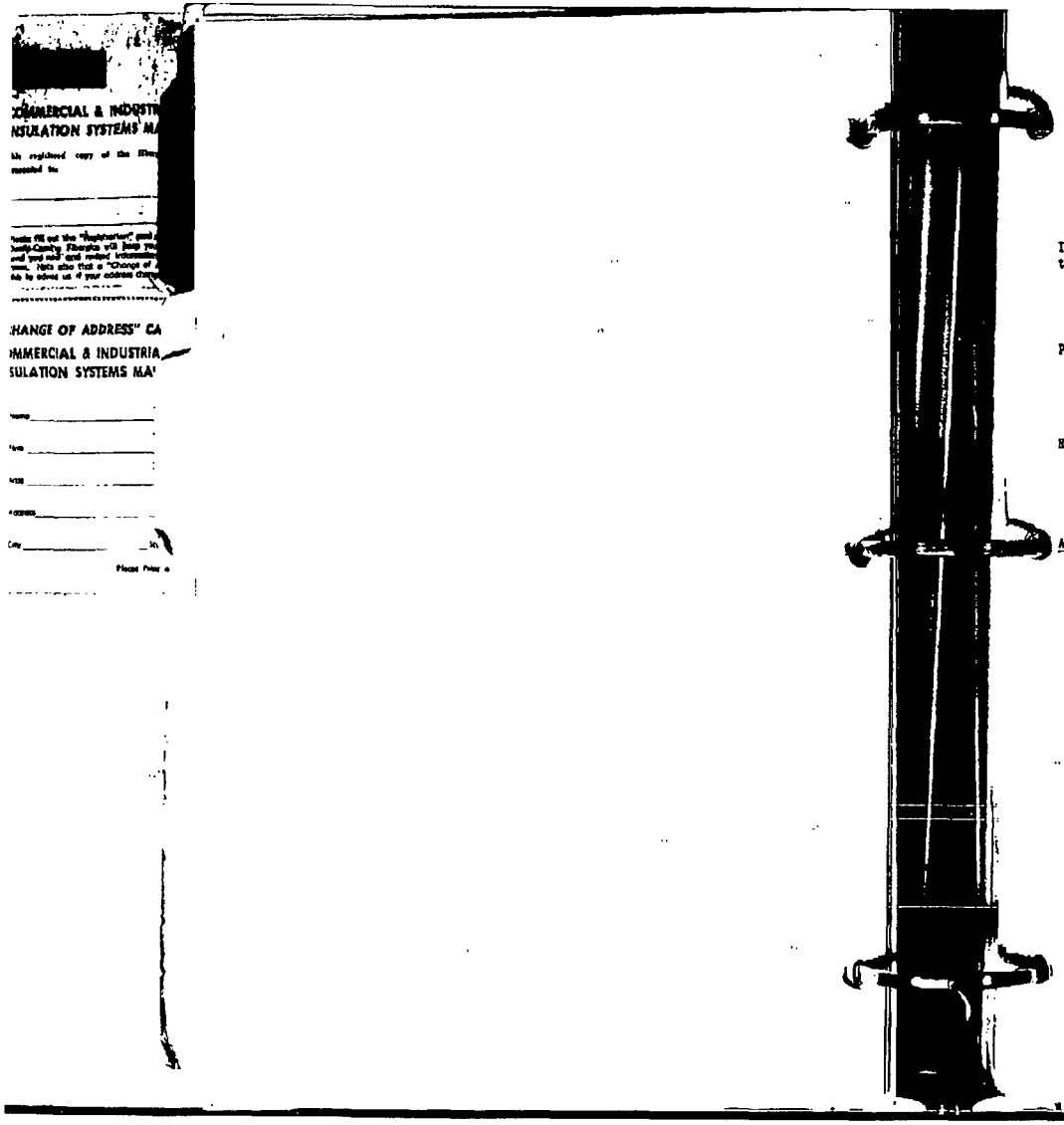

FIBERGLAS

Mechanical Piping Systems 2.5.1

Date 1-10-66

Revised 10-23-67

application specifications

REFRIGERANT SUCTION
CHILLED WATER (Primary & Secondary)
COOLING TOWER WATER

Insulate all Refrigerant Suction piping minus 20F to 35F with _____ inch nominal thick Fiberglas:

Heavy Density Sectional
One Piece

pipe insulation having a factory applied

Self Sealing Lap (SSL)
Fire Retardant (FRJ) Vapor Barrier Jacket.

NOTE: Insulation Thickness - Thickness to be selected from manufacturers literature based upon Pipe Temp and Ambient conditions. When thickness required exceeds 2", or when specified, Multiple layer insulations may be furnished. All Multiple Layer thicknesses are supplied with a Vapor Barrier Jacket on the inner layer.

APPLICATION

Straight Runs

Apply inner layer (if double layer is used) to pipe and seal vapor barrier laps and Butt Strips with vapor barrier lap adhesive.* The butt ends of the inner layer are to be sealed to the pipe with a thick coating of Vapor Seal Mastic* at 21 foot intervals and at each fitting. The outer layer is to be F/G P/C with FRJ-SSL. FRJ-SSL Butt Strips are to be used to seal all butt joints. Press hard on all SSL sealing surfaces. The butt ends of the insulation shall be sealed off to the inner layer vapor barrier jacket or the pipe at 21 foot intervals, and at every fitting.

NOTE: 1. In both cases mentioned above, contraction joints are to be constructed at 21 foot intervals at staggered butt joints (not those that are vapor sealed) by packing a 1" space with light density Aerocor compressed to 1/3 its original thickness.

Fittings

Fittings, valves, flanges, etc., shall be insulated with single or multiple layer applications of insulation as described above for straight runs of piping. On fittings mitered segments or pre-molded F/G fittings shall be wired in place. The vapor barrier shall consist of 1 mil aluminum foil wrapped tightly over insulation, with all laps sealed with Vapor Seal Mastic,* covered with 1/8 inch wet coat of Vapor Seal Mastic* into which Glass Fabric* is embedded.

* Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials.

FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION

The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

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A final 1/8 inch wet coat of Vapor Seal Mastic* shall then be applied. The entire Vapor Barrier at each flange, valve and fitting shall extend a minimum of 2" on to adjacent pipe.

FINISH

Straight Runs

A. Indoor - For concealed piping, leave as is. For exposed piping, apply 6 oz. canvas with lagging adhesive.* Allow to dry and paint.

Option - In areas where high abuse resistance is required, apply 16 mil embossed aluminum jacket banded in place with 3/4" x .015" aluminum bands. Jacket shall have at least a 2" overlap at both longitudinal and circumferential joints.

B. Outdoors - Apply 35, 45, 55 lbs. roofing felt with a 2" overlap at longitudinal and circumferential joints. All joints to be positioned to shed water. Wire jacket in place with 16 gauge copper annealed wire on 9" centers.

Option - In areas where appearance or abuse resistance are factors, apply a 16 mil embossed aluminum jacket with a 2" overlap at longitudinal and circumferential joints. Secure in place with 3/4" x .015" aluminum bands on 18 inch centers.

Fittings

A. Indoors - For concealed piping, leave as is. For exposed piping apply 6 oz. canvas with lagging adhesive.* Allow to dry and paint.

Option - In areas where high abuse resistance is required, apply a humped aluminum el and band in place. Where flanges or valves are involved, fabricate 16 mil aluminum to fit.

B. Outdoor - Coat with 1/8" thick wet coat of weatherproof mastic* extended over at least 2" on adjacent piping.

Option - Where abuse resistance is a factor, apply humped aluminum els or fabricated 16 mil aluminum and band in place.

NOTE: Where it is known that piping will be walked on or subject to continuous abuse care should be taken to provide the greatest protection possible to prevent damage to the vapor barrier jacket.

OWENS-CORNING FIBERGLAS CORPORATION

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General Offices, Toledo, Ohio 43601

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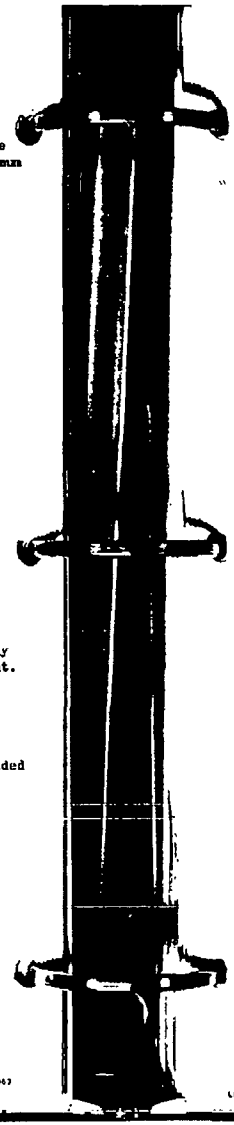
PUB. NO. 3-IN-3421-A

LITHO U.S.A. OCT. 1963



FIBERGLAS

Mechanical Piping Systems 2.S.2

Date 1-10-66

Revised _____

application specifications

REFRIGERANT SUCTION
CHILLED WATER (Primary & Secondary)
COOLING TOWER WATER
Bent Soft Copper Connections

Insulate all (Refrigerant Suction) Chilled Water - primary and secondary) (Bent Soft Copper) piping OF to 70F with _____ inch thick O.C. Flexible Tubing.

CONCEALED

Piping - On pipe or tubing not yet installed, Unslit Flexible Tubing shall be slipped over the full length of the piping or tubing leaving a sufficient amount of exposed piping for connections. After connections are made and tested, apply insulation over fittings so as to cover all piping completely. Slit insulation shall be used on systems which are to be insulated after installation. Seal all butt joints and slit insulations with OC-500 Adhesive.

Fittings - Flexible tubing shall be slipped over copper tubing fittings. Iron pipe or cast bronze fittings are to be sleeved (insulated) with a larger diameter of flexible tubing insulation nested over the covering on adjacent piping and adhered with OC-500 Adhesive.

EXPOSED AND OUTDOORS

Exposed piping may be finished (by others) with an approved Non-Bleeding Paint.

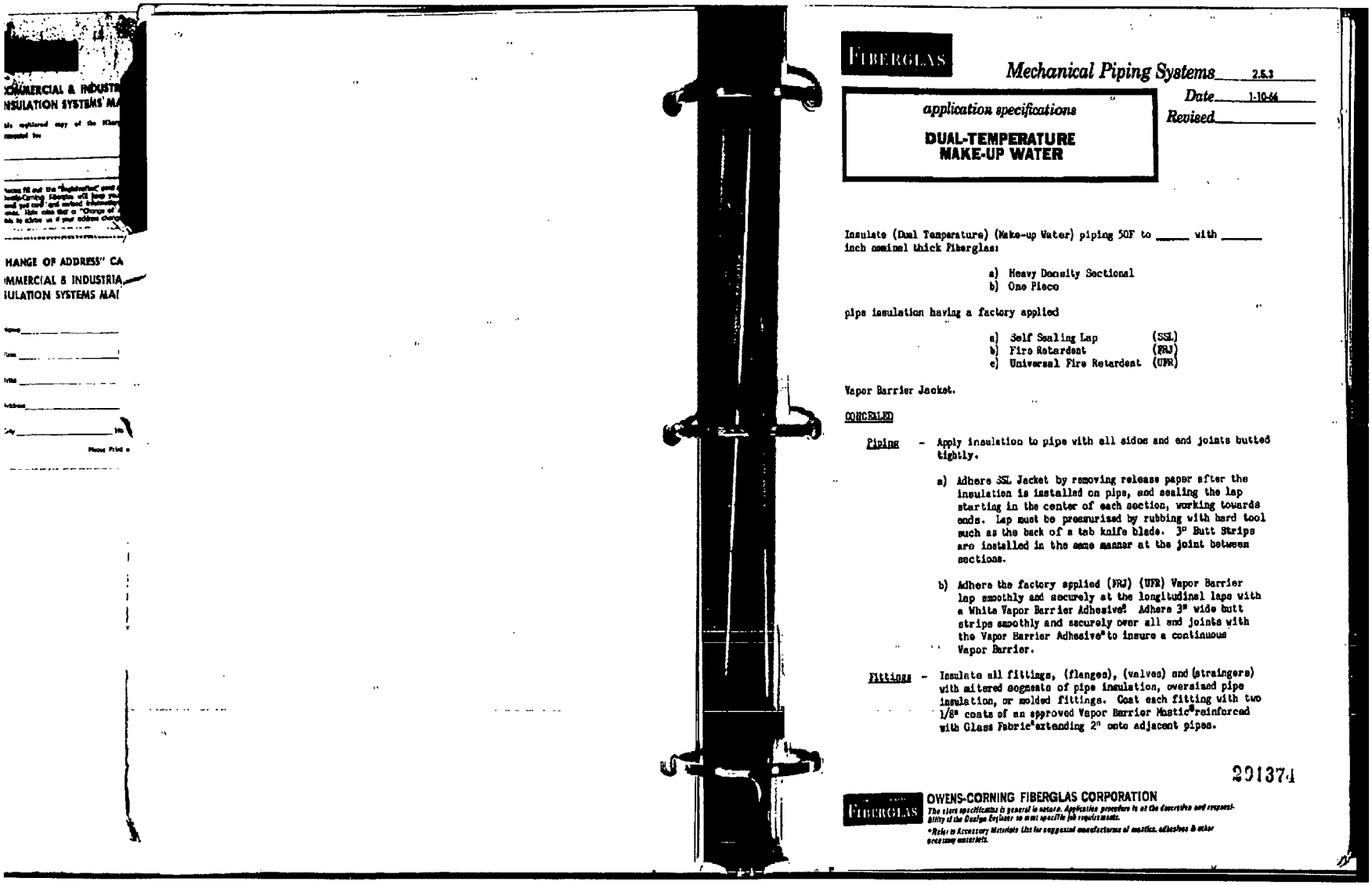
FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION 291373

The above specification is general in nature. Application procedure is at the description and responsibility of the Design Engineer to meet specific job requirements.

*Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives & other accessory materials.

LITHO U.S.A. JAN 1966

PUB. NO. 3-IN-3422



FIBERGLAS

Mechanical Piping Systems 2.5.3

Date 1-10-66

Revised

application specifications

DUAL-TEMPERATURE MAKE-UP WATER

Insulate (Dual Temperature) (Make-up Water) piping 50F to _____ with _____ inch nominal thick Fiberglas:

a) Heavy Density Sectional
b) One Piece

pipe insulation having a factory applied

a) Self Sealing Lap (SSL)
b) Fire Retardant (FRJ)
c) Universal Fire Retardant (UFR)

Vapor Barrier Jacket.

CONCEALED

Piping - Apply insulation to pipe with all sides and end joints butted tightly.

a) Adhere SSL Jacket by removing release paper after the insulation is installed on pipe, and sealing the lap starting in the center of each section, working towards ends. Lap must be pressurized by rubbing with hard tool such as the back of a tab knife blade. 3" Butt Strips are installed in the same manner at the joint between sections.

b) Adhere the factory applied (FRJ) (UFR) Vapor Barrier lap smoothly and securely at the longitudinal laps with a White Vapor Barrier Adhesive* Adhere 3" wide butt strips smoothly and securely over all end joints with the Vapor Barrier Adhesive* to insure a continuous Vapor Barrier.

Fittings - Insulate all fittings, (flanges), (valves) and (strainers) with mitered segments of pipe insulation, oversized pipe insulation, or molded fittings. Coat each fitting with two 1/8" coats of an approved Vapor Barrier Mastic* reinforced with Glass Fabric* extending 2" onto adjacent pipes.

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FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION

The class specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

**Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other processing materials.*

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EXPOSED

All piping exposed in finished spaces and Mechanical Equipment Rooms shall be additionally finished with:

a) 6 oz. canvas smoothly pasted in place on piping and fitting with Lagging Adhesive[8] and sized with one brush coat of Lagging Adhesive.[8]

b) Pre-Sized Glass Cloth adhered to piping with Lagging Adhesive.[8] Fittings shall be covered with 6 oz. canvas saturated with Lagging Adhesive.[8]

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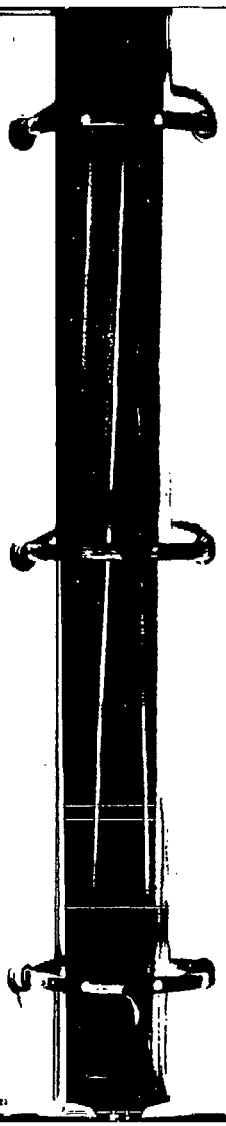

application specifications

HEATING HOT WATER · STEAM & CONDENSATE
HIGH TEMPERATURE HOT WATER
FUEL OIL PIPING

Insulate all (Heating Hot Water-supply and return) (Steam and Condensate) (High Temperature Hot Water) (Fuel Oil Piping) with Owens-Corning Fiberglas.

a) Heavy Density Sectional (450F maximum)
b) One Piece (400F maximum)
c) Kaylo (1200F maximum)

pipe insulation having a factory applied

a) Standard canvas
b) Pre-Sized Glass Cloth

jacket. Thickness of insulation shall be:

Syste

a) Heating Hot Water
b) L. P. Steam Condensate
c) M. P. Steam Condensate
d) High Temperature Hot Water
e) Fuel Oil Piping

CONCEALED

Piping - Apply insulation to clean dry pipe with side and end joints butted tightly. Seal lap of jacket (and Butt joint strips) with an approved Lagging Adhesive.[8]

Fittings - Insulate fittings (flanges and valves of (M.P. Steam Condensate) (or High Temperature H. W.) piping) with mitered pipe insulation, or F/G Pre-Molded fitting made smooth with insulating cement and jacket with 4 oz. canvas, saturated with an approved Lagging Adhesive.[8]

EXPOSED

Piping - All pipe insulation exposed in finished spaces or Mechanical Equipment Rooms shall be jacketed with:

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The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives & other accessory materials.

a) 6 oz. canvas with laps sealed with Lagging Adhesive* and brushed with Lagging Adhesive.*

b) Pre-Sized Glass Cloth, with laps and butt strips sealed with Lagging Adhesive.*

Fittings - Fittings shall have a 1/4" coat of OC-110 Insulating cement over insulation trowelled smooth and shall be jacketed with 6 oz. canvas saturated with Lagging Adhesive.*

OUTDOOR AND TUNNEL PIPING

Piping located outdoors and in tunnels shall be waterproofed with:

a) 45 lb. Glazed Roofing Felt, factory applied laps shall be oriented to shed water. Wire in place with 16 ga. annealed copper wire at 9" o. c. Install 4" butt joint strips and secure with two (2) wire ties.

b) Glas-Klad
c) Kaylo Klad

factory applied. Lock joint shall be oriented to shed water. Secure to piping with 1/2" wide Aluminum strapping with seals, at 18" o.c., one strap on each Butt Seal Strip.

Fittings - Insulate fittings with mitered pipe insulation or molded fittings and weatherproof with:

a) Two 1/8" wet coats of Breather Type Mastic* reinforced with Glass Fabric* extending 2" onto the adjacent insulation.

b) Pre-fabricated Aluminum Fitting Covers*, .016" thick secured with strappings, sheet metal screws or P and P Rivets.

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General Office, Toledo, Ohio 43601

291377

LITHO U.S.A. JUNE, 1967
PUB. NO. 5-IN-3424-A

OWENS-CORNING FIBERGLAS

Plumbing Systems	1.5.6
Mechanical Piping Systems	2.5.5
Power & Process Piping	5.5.5
Date	4-1-67
Revised	7-10-68

application specification
FIBERGLAS 25* : H-P
hot piping up to 450F

Figure 1
Apply Fiberglas Molded or Segmental Insulation to fittings equal in thickness to that of the insulation to be applied to adjoining pipe and securely fasten in place, using wire.

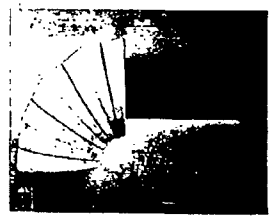

Figure 2
Apply pipe insulation and staple the longitudinal overlap using 5/16" coated staples† at 2" spacings. The stapler shall have a flaring attachment for better staple holding power. Butt adjoining sections firmly together.

†DUO-FAST or equal.



Figure 3
Apply butt-joint strips, making sure the coated or dull side is out. (The side imprinted with a trademark is the inside face of the cloth). Center the strip for a snug fit and fasten with two staples, one each approximately 1/2" from each edge.



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Plumbing Systems 1.5.7
Mechanical Piping Systems 2.5.6
Power & Process Piping 5.5.4
Date 7-10-68
Revised

application specification

FIBERGLAS 25* : C-P
cold piping system down to 35F

Figure 1
Apply Fiberglas Molded or Segmental Insulation to fittings equal in thickness to that of the insulation to be applied to adjoining pipe and securely fasten in place, using wire.

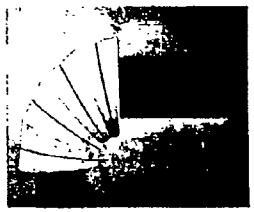

Figure 2
Apply pipe insulation and remove release paper from factory applied pressure sensitive adhesive strip on the longitudinal lap.



Figure 3
Seal longitudinal lap to the adjacent surface starting at the center of the section and working toward each edge. Rub hard with the back of a knife or a nylon sealing tool for proper seal.



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291380

Figure 4
Apply a skim coat of SC-30 Insulating Cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply a light coat of either OCF Fitting Mastic, Type H or Benjamin Foster Sealfas Mastic #30-36, U.L. labeled.



Figure 5
Wrap the fitting with Fiberglas Fitting Tape overlapping the preceeding layer by 1 to 2". Also overlap mastic and Fiberglas Fitting Tape by 2" on adjoining sections of pipe insulation.

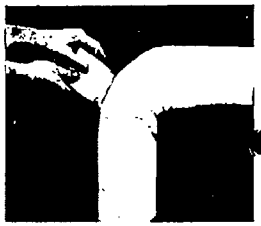

Figure 6
Apply a second coat of mastic over the Fiberglas Fitting Tape, working it into the mesh of the cloth — smooth the surface. Mastic shall be applied at a rate of not less than 40 sq. ft. per gallon (approximately 1/16" wet film thickness) for rated performance.



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Industrial Products
General Offices
Construction Materials Division, 717 Fifth Avenue, New York, New York 10022
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LITHO U.S.A. 8/68

Figure 4

Apply the pressure sensitive adhesive coated butt strips and rub down firmly using the back of a knife or a nylon sealing tool to obtain good bonding. Note: Minimum ambient application temperature for this adhesive is 35°F. Surfaces must be thoroughly dry and free from dust.

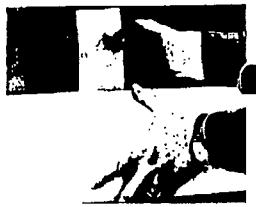


Figure 5

Apply a skim coat of SC-30 Insulating cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply OCF Fitting Mastic, Type C, U.L. labeled.



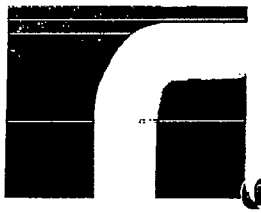
Figure 6

Wrap the fitting with Fiberglas Fitting Tape overlapping the preceeding layer by 1 to 2". Also overlap mastic and Fiberglas Fitting Tape by 2" on adjoining sections of pipe insulation.



Figure 7

Apply a second coat of OCF Fitting Mastic Type C over the Fiberglas Fitting Tape, working it into the mesh of the cloth -- smooth the surface. Mastic shall be applied at a rate of not less than 40 sq. ft. per gallon (approximately 1/16" wet film thickness) for rated performance.



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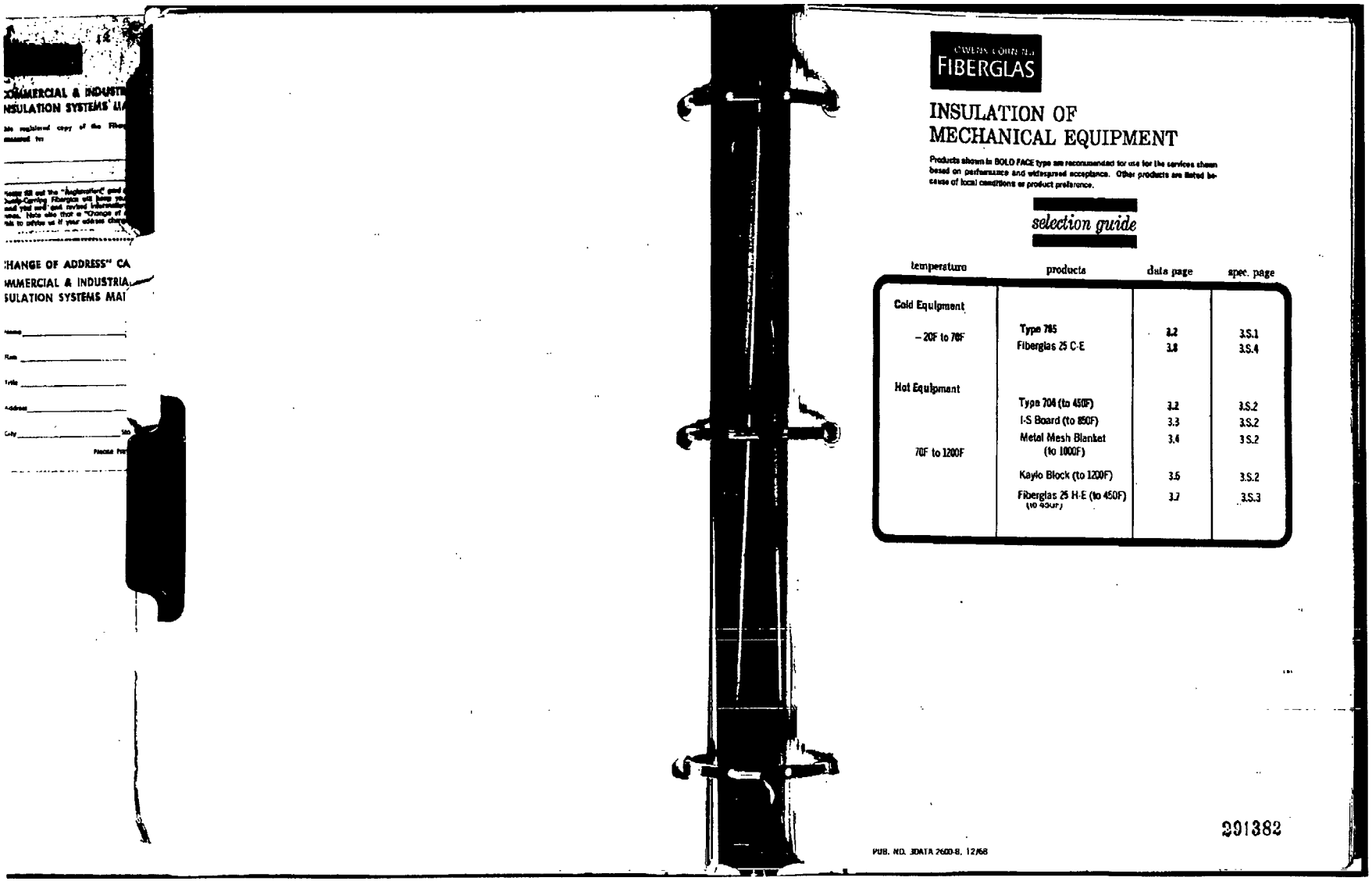

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FIBERGLAS

INSULATION OF MECHANICAL EQUIPMENT

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.

selection guide

temperature	products	data page	spec. page
Cold Equipment			
– 20F to 70F	**Type 705**	3.2	3.S.1
	Fiberglas 25 C-E	3.8	3.S.4
Hot Equipment			
70F to 1200F	**Type 704 (to 450F)**	3.2	3.S.2
	I-S Board (to 850F)	3.3	3.S.2
	Metal Mesh Blanket (to 1000F)	3.4	3.S.2
	Kaylo Block (to 1200F)	3.6	3.S.2
	Fiberglas 25 H-E (to 450F) (to 450F)	3.7	3.S.3

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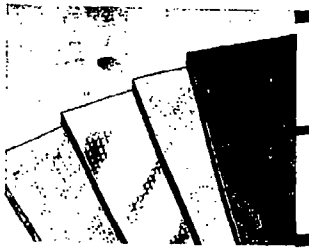
plumbing systems 1.6
mechanical equipment 3.3
air handling systems 4.4
power & process equipment 6.1
vessels & tanks 7.3
boilers & chimneys 8.8
January, 1960

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 minimum 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.

291383

performance characteristics

sound absorption coefficients (2" thick #6 mounting)

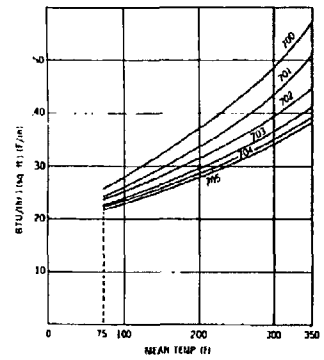
TYPE	125	250	500	1000	2000	4000	NRC
701	.34	.70	.96	.97	.86	.83	.87
702	.28	.77	.96	.98	.87	.87	.89
703	.32	.74	.97	.98	.87	.85	.89
704	.27	.79	.98	.99	.88	.86	.91
705	.48	.82	.97	.99	.90	.86	.92

size and density

Type	Density (pcf)	Thickness (in ½" increments)	Compressive Strength psi at 10% deformation	Standard Size	Therm. Cond. @ 75F Mean Temp.
700	1.08	1"—4"	31		0.260
701	1.58	1"—4"	4.51		0.242
702	2.25	1"—3"	9.51	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

Types 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 — Owens 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 — Thermo board insulations are normally impaled on welded pins on flat surfaces. They are cut in segments and bonded 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

(65F ambient air)

Surface Temp.	Type 701 RT	HL	ST	Type 703 RT	HL	ST	Type 704 RT	HL	ST
150	1½	11	87	1½	10	85	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 Difference	Recommended Thickness (inches)	Heat Gain Btu/ft²-hr	Permissible Relative Humidity
20	½	3.1	80%
25	½	4.4	83%
30	1	6.1	87%
35	1	7.1	88%
40	1½	5.7	90%
45	1½	6.3	89%
50	2	5.4	93%

specification compliance

HH-I-542, Type I	700
HH-I-542, Type II	701, 702, 703
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 I, Class 7.	700, 701, 702
HH-I-562, Type I, Class 2	705**, 704, 705
HH-I-563, Type II, Class D (900F***)	701, 702, 703
HH-I-564, Form I & II, Class A.	703**, 704, 705
Navy Bureau of Yards and Docks, 16Y1	703**, 704, 705
Corps of Engineers, C.E.—310.08, .11 thru .13	703**, 704, 705

**Type 705 is a specially produced for contracts with a certification of compliance to this above Federal Specification is required. Available also or listed for use on hot or cold equipment and for use on condensing equipment.

***Where 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-5310. 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.

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Pub. No. 3-IH-2873-X

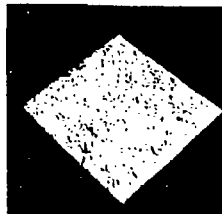
291386

Litho in U.S.A. Jan. 1969

OWENS-CORNING FIBERGLAS

mechanical equipment 3.2
power & process equipment 6.2
vessels & tanks 7.4
boilers & chimneys 8.1
April, 1968

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 stump or deteriorate in severe service conditions. The insulation easily passed the rugged Navy Test Mil-I-15475B, Paragraph 4.5.3 which requires vibration at 12 cps through an arc of .015" for 100 hours at 750 F, without setting.

*Trade mark O-C Fiberglas Corp

291387

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reason 68 and the "Registration" card
Insulation-Corning Fiberglas will keep you
send you next year revised Industrial
forms. Note also that a "Change of A
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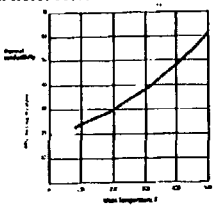
performance characteristics

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	63	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	122	82	129	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	95	138
5.0	25	95	30	99	35	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	78	128
6.0	21	93	25	96	30	98	36	102	42	105	48	109	56	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	33	100	39	104	45	107	51	111	58	115

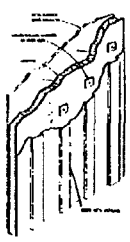
limitations

1 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-15478B (except for fusing temperature)
NH-I-563 (1) Type II, Class D
NH-I-562 (1nt amend. #2) Type I, Class 2
NH-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.

OWENS CORNING FIBERGLAS
OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial Construction Materials Division, 717 Fifth Avenue, New York, New York 10022
General Offices, Toledo, Ohio 43601

Pub. No. 1-UN-3361-D
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OWENS CORNING FIBERGLAS

Equipment Insulation



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, taps, 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. Low exceptionally low k factor of Fiberglas Metal Mesh blankets reduces heat 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 butted together



For a good indoor finish apply ¼" layer of O-C 110 Insulating Cement. Canvas is then applied with topping emulsion over the insulating cement.

*T.M. REG. OCF CORP

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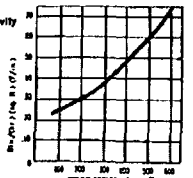
performance characteristics

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.

Thermal conductivity



sizes
width — 12" (nom.) 24" (max.)
length — 24" (plus) 1½" (max.)
thickness — 1" — 6" (½" increments)
form — blanket

facings
"Q"—Fiberglas blanket butted 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 ¾" 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 RT	COMMERCIAL HL	COMMERCIAL ST	POWER RT	POWER HL	POWER ST	PROCESS RT	PROCESS HL	PROCESS ST
200	1½	35	102	1.5	21	93	1.0	26	93
300	1.5	58	103	2.0	30	95	1.5	37	99
400	2.5	58	103	2.5	39	100	2.0	47	104
500				3.0	47	104	2.5	56	109
600				3.5	56	108	3.0	68	113
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	91	127	5.0	114	137

RT—recommended thickness—inches
HL—heat loss Btu/ft²/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 36 foot centers. (Blankets are available with ¾" metal rib (ATR) which provides an air space between the insulation and the hot surface for improved thermal performance.)

finishing methods
cement-on indoor finish (no basis 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 coat 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 I, 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 20.

OWENS CORNING FIBERGLAS
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Pub. No. 1—yr—5M-8

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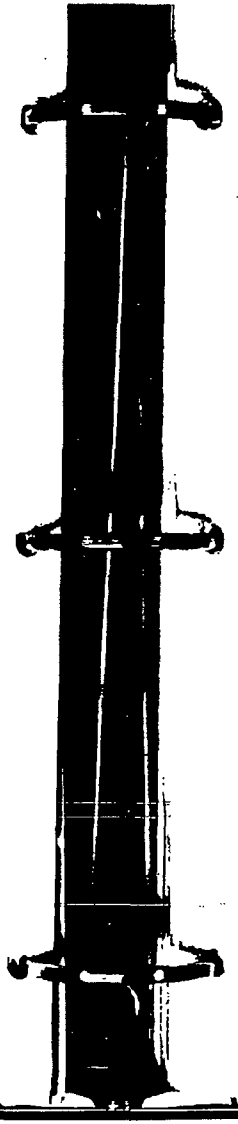
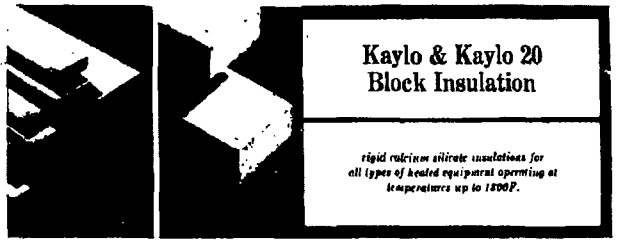


plumbing systems 1.6
mechanical equipment 3.6
power & process equipment 6.6
vessels & tanks 7.7
boilers & chimneys 8.3
January, 1969

OWENS CORNING FIBERGLAS

Equipment Insulation



Kaylo & Kaylo 20 Block Insulation

rigid calcium silicate insulations for all types of heated equipment operating at temperatures up to 1200F.

uses

Kaylo® 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 Block is white in color.

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

description

Kaylo 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.

benefits

high thermal efficiency both Kaylo and Kaylo 20 offer excellent thermal efficiency coupled with high strength. A low k of .40 for Kaylo 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 inhibiter 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.

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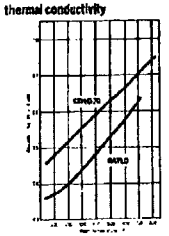
performance characteristics

	KAYLO	KAYLO 20
density:	11 pcf approx.	12 pcf approx.
flexural strength: (ASTM C 203)	over 50 lb/sq. in.	90 lb/sq. in.
compressive strength: (ASTM C 165) at 5% deformation	125 psi	130 psi
resistance to abrasion: (conventional temperature test — loss in weight before breaks)	after 30 minutes 10% after 20 minutes 20%	
dimensional stability:	linear shrinkage after heating for 24 hours in muffle at 1200 F.—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.

for hot piping, the tabulated thicknesses are optimum thicknesses calculated on an "Economic"* basis for heat conservation under average operating conditions and assure adequate temperature control. Other conditions may warrant the use of other thicknesses.

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

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

ET—economic thickness HL—heat loss ST—surface temperature BTU/hr/lin ft/unit

	250 F		300 F		400 F		500 F		600 F		700 F		800 F		900 F		1000 F		1100 F		1200 F	
WALL	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	101	72	124	199	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	83	130	94	138	109	146

*calculated

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

Operating Temp. F	Power ET	Power HL	Power ST	Process ET	Process HL	Process 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

MIH 1-523c 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 and Kaylo 20 insulation sizes are available, Kaylo and Kaylo 20 beveled lags may be used to insulate piping. Lags beveled to fit pipes from 18" to 36" in diameter are available in thicknesses of 1½", 2", 2½", 3". Lags are 36" long and 3" wide.

application recommendations

Kaylo 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.

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OWENS CORNING FIBERGLAS

plumbing piping systems 1.9
mechanical equipment 8.3
air handling systems 4.23
December, 1968

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.

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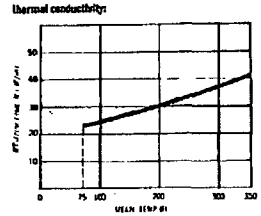
performance characteristics

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 & 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 ½" 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 ells 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. 6370) is approved for use.

recommended thickness—heated equipment

(80F ambient still air)

Operating temp.	RT	HL	ST
250F	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).

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LITHO IN U.S.A., DEC. 1968

OWENS-CORNING FIBERGLAS

mechanical equipment 3.8
air handling systems 4.13
December, 1968

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.

291395

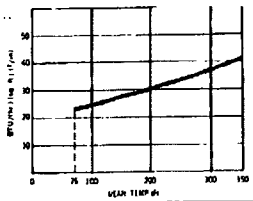
performance characteristics

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 building 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 ½" 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 ells 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. 6370) 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/Hr-Sq Ft	Permissible Relative Humidity
20	½	5.1	90%
25	½	6.4	89%
30	1	6.1	83%
35	1	7.1	84%
40	1½	5.7	85%
45	1½	6.3	85%
50	2	5.4	90%

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PUB. NO. 1-IN-4377-B

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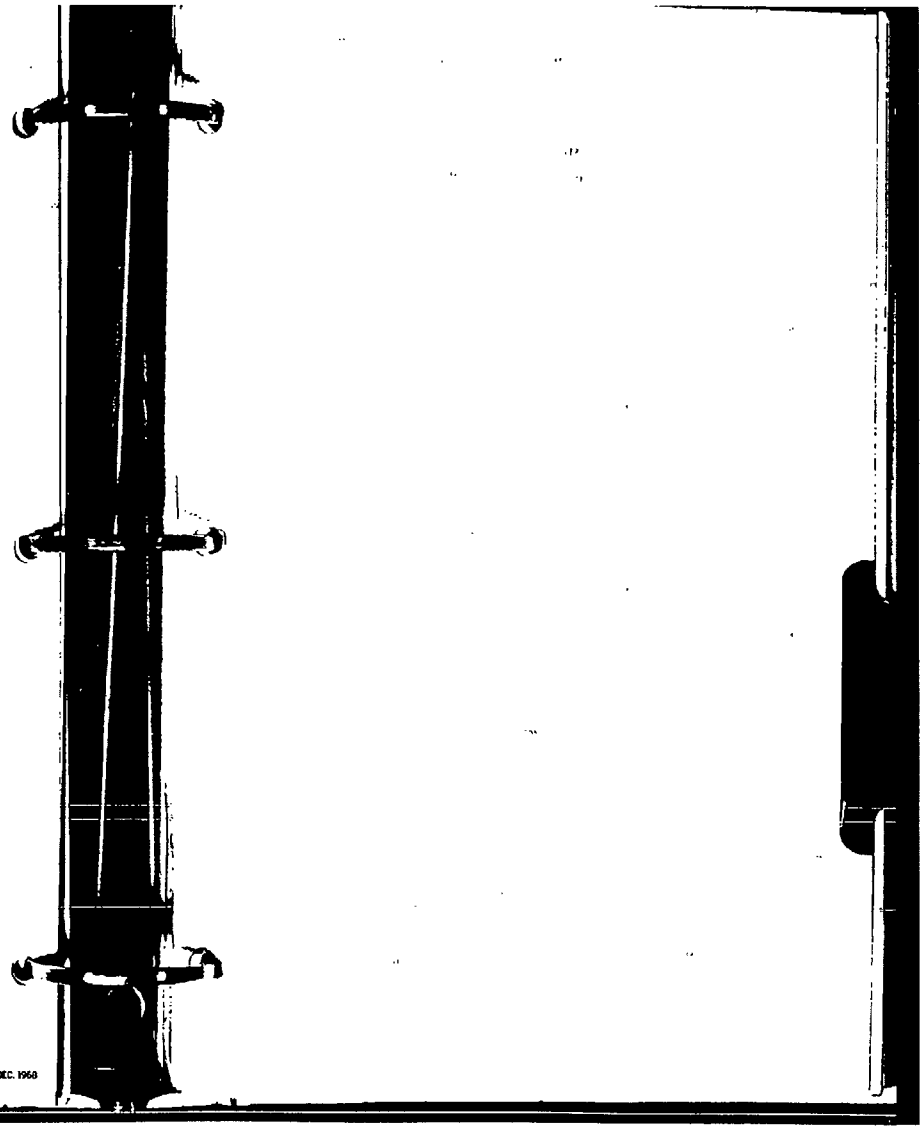

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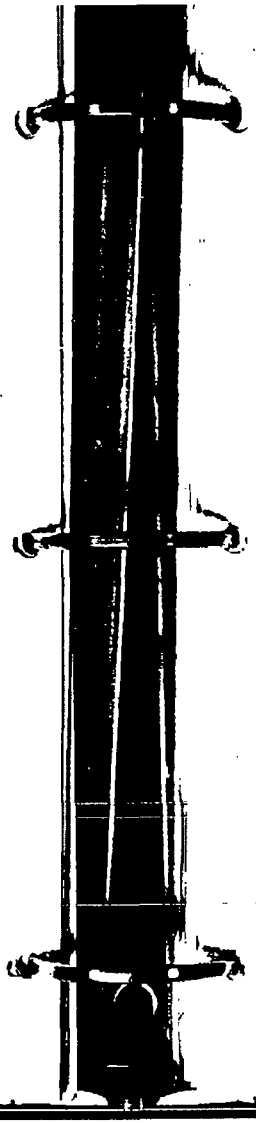

FIBERGLAS

Mechanical Equipment 3.5.1

Date 1-10-66

Revised

application specifications

COLD EQUIPMENT

Insulate all cold equipment (Chillers)(Heat Exchangers) minus 20F to 70F with _____ inch thick Fiberglas:

PF - 617
Type 705

Where insulation is specified in thickness greater than 2" it shall be installed in multiple layer application and each layer shall be separately vapor sealed.

Insulation of removable heads, manhole covers and other access points shall be fabricated in such a manner that it is readily removable without damage to the insulation. These removable units shall have a vapor proof cover fabricated to allow it to be sealed to equipment Vapor Barrier.

ROUND EQUIPMENT

Insulation shall be cut or mitered where necessary to fit the shape and contour of the equipment, and banded in place with 3/4" x 0.015 inch thick galvanized steel bands on 18" centers. Point up all joints with OC-110 Insulating Cement.

FLAT OR IRREGULAR EQUIPMENT

Insulation shall be cut to fit the shape and contour of the equipment. All voids between equipment surface and insulation shall be packed with light density Fiberglas. Impale insulation over welded pins on 12 inch centers and secure in place with speed washers.

HARD SURFACE

Cover insulation with 1" galvanized hexagonal wire mesh secured to bands or welded pins. Lace edges of wire mesh. Apply 1/2" thickness of OC-110 insulating cement in two coats.

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FIBERGLAS **OWENS-CORNING FIBERGLAS CORPORATION**

The above specifications is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements

**Refer to necessary Materials list for suggested manufacturers of mastics, adhesives & other necessary materials.*

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VAPOR BARRIER

Each layer of insulation shall be vapor sealed to provide a complete air tight envelope. Vapor Barrier shall consist of one layer of Ludlow Foil Barrier paper smoothly adhered to the insulation or cement surface with Vapor Barrier Lap Adhesive.* Lap all joints a minimum of 3" and seal with Vapor Barrier Lap Adhesive.*

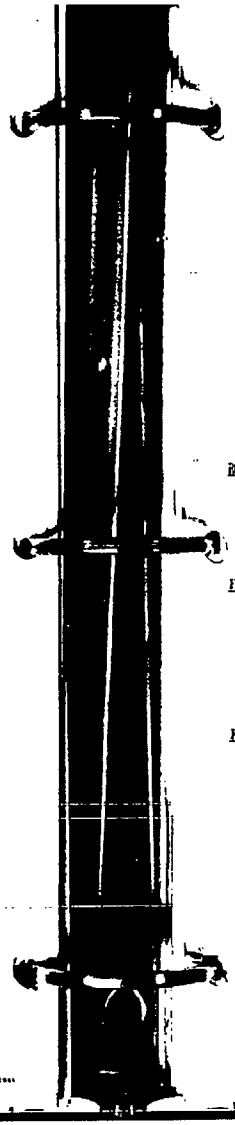
FINISH

Over exterior Vapor Barrier apply:

a) 6 oz. Canvas Jacket, adhered with Lagging Adhesive* and brushed with one coat of Lagging Adhesive.*

b) Pre-Sized Glass Cloth adhered with Lagging Adhesive.*

c) Sheet Aluminum, .016" thick, fabricated to the shape of the equipment, mechanically fastened in place. Fasteners shall not penetrate the Vapor Barrier.



FIBERGLAS

Mechanical Equipment 3.5.2
Date 1-10-66
Revised

application specifications

HOT EQUIPMENT

Insulate all (Boilers), (Breechings), (Hot Tanks), (and other Hot Equipment) not factory insulated with _____inch thick Fiberglas.

a)	PF 615	to 450°F
b)	I-S Board	to 850° F Maximum
c)	Metal Mesh Blankets	to 1000° F
d)	High Temperature Block	to 1000° F
e)	Kaylo Block	to 1200° F

Breechings shall be covered with V-rib metal lath or road mesh to provide an air space, or shall be insulated with Style ATRH-Metal Mesh Blanket. Expansion joints shall be fabricated at 16' intervals.

ROUND EQUIPMENT

Insulation shall be cut or mitered where necessary to fit the shape and contour of the equipment, and banded in place with 3/4" x 0.015 inch thick galvanized steel bands on 18" centers. Point up all joints with OC-110 Insulating Cement.

FLAT OR IRREGULAR EQUIPMENT

Insulation shall be cut to fit the shape and contour of the equipment. All voids between equipment surface and insulation shall be packed with light density Fiberglas. Impale Fiberglas insulation over welded pins on 12 inch centers and secure in place with speed washers. Kaylo block shall be secured to equipment with 16 ga. galvanized wire or 1/2" galvanized strapping at not more than 18" oc.

FINISH

(a) Cover insulation with 1" galvanized hexagonal wire mesh secured to bands or welded pins. Lace edges of wire mesh. Apply 1/2" thickness of OC-110 insulating cement in two coats. Over cement, when dry apply:

1. 6 oz. canvas jacket, adhered with Lagging Adhesive* and brushed with one coat of Lagging Adhesive* or

2. Pre-Sized Glass Cloth adhered with Lagging Ahesive*.

(b) Sheet Aluminum, .016" thick, fabricated to the shape of the equipment, mechanically fastened in place with bands, sheet metal screws or pop units.

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FIBERGLAS

Plumbing Systems 1.5.8
Mechanical Equipment 3.5.3
Air Handling Systems 4.5.10
Date 4-1-67
Revised 7-10-68

application specifications

FIBERGLAS 25* : H-E

hot equipment up to 450F

Figure 1 — Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type H (Pressure Sensitive, U.L. labeled)



Figure 2

Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers.

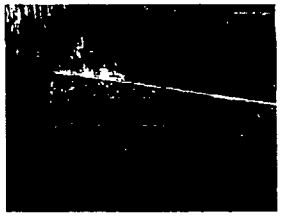

Figure 3

Cut Fiberglas 25 Insulation to dimension and impale on pins. Apply pressure on facing in the area of the pin penetration. For elbows, cut pie-shaped pieces for top and bottom. Make sure insulation fits tightly at the seams before impaling.



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

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Figure 4

Groove Fiberglas 25 board to curved surfaces and fabricate flanges. The board should be scored with a grooving tool, saw or knife to half the board thickness, and the material removed from the slot. Flanges should not overlap the top and bottom boards. All wool shall be scraped from the flanges before sealing.

The smaller the radius of the board, the smaller the space between cuts



Figure 5

Install side pieces making sure the edge of the insulation is flush with the top and bottom board surfaces.

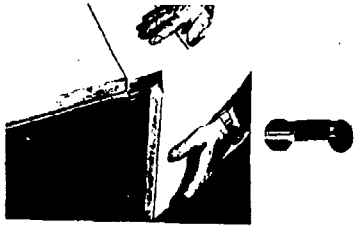

Figure 6

Cut pins to length as required and apply pre-finished fastener caps. Pins should protrude ½" to 5/8" above the surface of the insulation. If more than 5/8" shows, cut it off to the correct length before applying the cap. This will assure a tight fit of insulation to the surface.

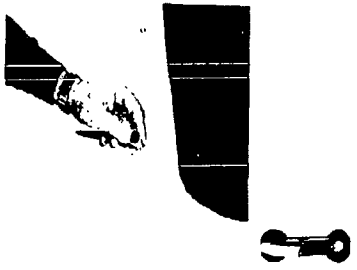

Figure 7

Apply OCF Joint Sealing Tape Type H to all transverse and logitudinal seams after insuring you have a dry dust-free surface. Use the nylon sealing tool to apply pressure to the joint and make a good bond. Do not remove all the release paper from the tape but rather gradually pull it back as required. This keeps dust, etc. from fouling the adhesive surface. Make sure the tape is properly aligned with the seam before it is sealed down.



Figure 8

Use nylon sealing tool on all taped joints. This will result in a good bond and reduce air pocket and "fish-mouths." For a superior bond, use a 300F iron on the tape.



Figure 9

Insulating the throat of an elbow: Prepare a Fiberglas 25 board of correct dimensions for the throat and fabricate the top and bottom flanges. Next, use a grooving tool, knife or saw and groove the board facing side up. Cut at least half way through the insulation.

Slit sections may also be used as an alternate to the one-piece method described above.



Figure 10
Complete insulating the throat. Impale insulation, cut pins to correct length, install caps, and strip the top and bottom flaps.



Figure 11
Where curved surfaces are encountered and the joint sealing tape must be notched to conform to the curvature, cut an additional length of tape to half width and apply over the notched tape surface. This will yield a neater finished appearance and improve adhesion in these areas.



Figure 12
Completed insulation of rectangular duct.



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OWENS-CORNING FIBERGLAS

Air Handling Systems 4.S.11
Mechanical Equipment 3.S.4
Date 7-10-68
Revised

FIBERGLAS 25* : C-E

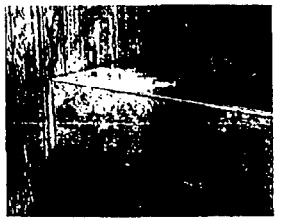
cold equipment system down to 35F

Figure 1 — Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type C (Pressure Sensitive, U.L. labeled)
H. OCF Fitting Mastic, Type C (U.L. labeled)



Figure 2
Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers.



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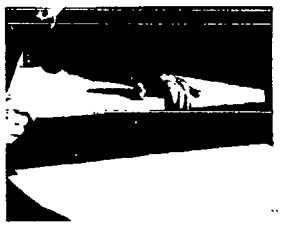

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Figure 10
Complete ir
pins to con
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The smaller the radius of the board, the smaller the space between cuts.



Figure 7
Apply OCF Joint Sealing Tape, Type C, to all transverse and longitudinal seams after insuring you have a dry, dust free surface. Use the nylon sealing tool to apply pressure to the joint and make a good bond. Do not remove all the release paper from the tape but rather gradually pull it back as required. This keeps dust, etc. from fouling the adhesive surface. Make sure the tape is properly aligned with the seam before it is seated down.



Figure 11
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Figure 5
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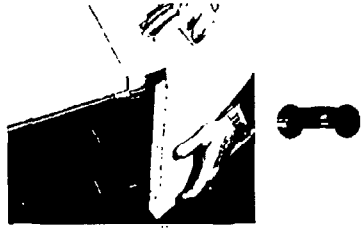

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Figure 12
Completed

Figure 6
Cut pins to length as required and apply pre-finished fastener caps. Pins should protrude ½" to ⅝" above the surface of the insulation. If more than ⅝" shows, cut it off to the correct length before applying the cap. This will assure a tight fit of insulation to the surface. Apply OCF Fitting Mastic Type C about the size of a pea to the inside of the fastener cap before installation to form a vapor seal.

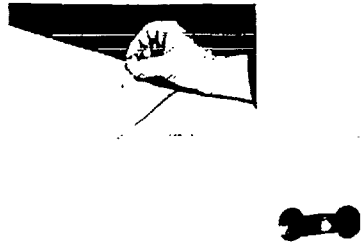

Figure 9
Insulating the throat of an elbow. Prepare a Fiberglas 25 board of correct dimensions for the throat and fabricate the top and bottom flanges. Next, use a grooving tool, knife or saw and groove the board facing side up. Cut at least half way through the insulation.

Slit sections may also be used as an alternate to the one-piece method described above.



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Figure 10

Complete insulating the throat. Impale insulation, cut pins to correct length, install caps and strip the top and bottom flaps.



Figure 11

Where curved surfaces are encountered and the Joint Sealing Tape must be notched to conform to the curvature, cut an additional length of tape to half width and apply over the notched tape surface. This will yield a neater finished appearance and improve adhesion in these areas.



Figure 12

Completed insulation of rectangular duct.



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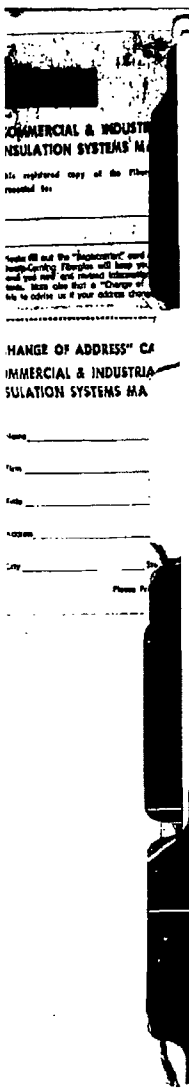

OWENS CORNING

FIBERGLAS

INSULATION OF AIR HANDLING SYSTEMS

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.

selection guide

system	temp. range	products	data page	spec. page
Exposed Ducts				
Air conditioning				
Fresh Air Intakes		**Industrial Duct System (HD)**	**4.1**	**4.S.1**
Plenums and Casings	up to 250F	**Type 704, Faced**	**4.4**	**4.S.2**
(Rectangular)		**Fiberglas 25 C-E**	**4.13**	**4.S.11**
(Round)		**Round Duct Systems**	**4.1**	**4.S.3**
		Faced Duct Wrap, Type IV (FRK)	**4.2**	**4.S.4**
Heating and Ventilation				
Ducts	up to 250F	**Type 704**	**4.4**	**4.S.5**
Plenums and Casings		**Fiberglas 25 H-E**	**4.12**	**4.S.10**
(Rectangular)				
(Round)		**Plain Duct Wrap, Type 75**	**4.2**	**4.S.6**
		Pink Duct Wrap	**4.15**	**4.S.6**
Concealed Ducts				
Air Conditioning		**Industrial Duct System (HD)**	**4.1**	**4.S.1**
(Rectangular)	up to 250F	**Faced 703**	**4.4**	**4.S.2**
		Faced Duct Wrap Type IV (FRK)	**4.2**	**4.S.4**
(Round)	up to 250F	**Round Duct System**	**4.10**	**4.S.3**
		Faced Duct Wrap, Type IV (FRK)	**4.2**	**4.S.4**
Heating and Air Cond.				
(Round Flexible Sys.)	up to 250F	**Flexible Duct System**	**4.9**	**4.S.9**
Heating and Ventilation				
(Rectangular & Round)	up to 250F	**Plain Duct Wrap, Type 75**	**4.2**	**4.S.6**
		Pink Duct Wrap	**4.15**	**4.S.6**
Acoustical Lining				
Ducts and Plenums	up to 250F	**Industrial Duct System (HD)**	**4.1**	**4.S.1**
(Rectangular)		**Aeroflex Duct Liner**	**4.6**	**4.S.7**
		Duct Liner Board	**4.7**	**4.S.7**
		Black Aeroflex Duct Liner	**4.14**	**4.S.7**
(Round)		**Round Duct System**	**4.1**	**4.S.3**
Outdoor Ducts				
Air Conditioning	up to 250F	**Type 705, Faced**	**4.4**	**4.S.8**
Heating and Ventilating		**Aeroflex Duct Liner**	**4.6**	**4.S.7**
		Black Aeroflex Duct Liner	**4.14**	**4.S.7**

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PUB. NO. 4DATA 2600 C. 12/68

air handling systems 4.1
March, 1968

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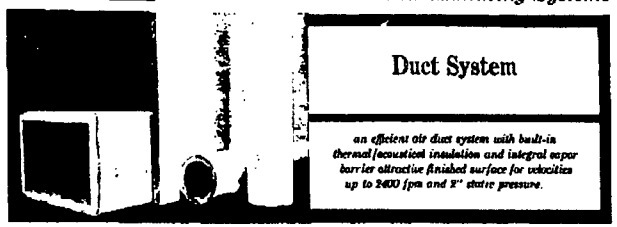
Air Handling Systems



Duct System

an efficient air duct system with built-in thermal/acoustical insulation and integral vapor barrier attractive finished surface for velocities up to 2400 fpm and 2" static pressure.

uses

Fiberglas* Duct System is used in heating, cooling or dual-temperature service in all types of Standard Duty (SD) and Heavy Duty (HD) high performance installations operating at velocities up to 2400 fpm and 2" static pressure. There are two specially engineered board products, from which rectangular ducts are fabricated, to meet sure and static pressure requirements comparable to various gauges of sheet metal. The Heavy Duty Board (HD) is used for large main trunks and plenums where 20 or 22 gauge sheet metal would have been required. The Standard Duty (SD) board is recommended for complete small installations and as runouts for larger systems where 24, 26 and 28 gauge metal would have been required. This means two types of board will cover the requirements of 5 gauges of sheet metal. This simplifies design of a Fiberglas Duct System.

description

Fiberglas Duct System is manufactured from resin bonded fiberous glass in rigid boards for fabrication of rectangular ducts, and in pre-molded round sections ready to be installed. The boards and round sections are furnished with an integral factory-applied vapor barrier which also serves as the surface finish. The vapor barrier on the boards is reinforced with strong Fiberglas fibers for strength at the joints and corners. A Fiberglas Duct System is an efficient air handling system with built-in thermal and acoustical insulation to assure maximum performance without noise.

limitations—Fiberglas Duct System should not be used above recommended velocities, pressures, or air temperatures. It also should not be used in or under concrete slabs or outside without additional reinforcement and weatherproofing.

benefits

4 in one product— Fiberglas Duct System offers four performance features: 1) It delivers air efficiently without any air loss through the seams or joints. 2) The built-in thermal insulation with assured thickness protects against heat loss or gain for lower cost performance. 3) The tough flame-retardant vapor barrier eliminates sweating from condensation, assures fire safety and resists damage. 4) The built-in acoustical insulation absorbs all unwanted noise.

fast, one-stop installation— saves 2 application steps. No separate application of metal, insulation, and finish. Installed by one crew which is off the job faster. This contributes to earlier occupancy.

installs quietly, operates quietly— no banging noise. Ideal where a system is being installed in offices or stores without disturbing occupants. No expansion and contraction noise, popping, drumming. No transmission of equipment or air rush noise. NRC of .80 absorbs most noise in a few feet of length. This means a quieter system. **FIBERGLAS DUCT SYSTEM CONVEYS AIR, NOT NOISE.**

no water-stained ceilings from condensation dripping. Fiberglas Duct System is uniform in thickness. No sweating at the corners as with wrapped metal ducts. Vapor barrier is uniform. Joints are sealed to guard against faulty application of external vapor barriers. No condensation at section joints caused by gaps between duct liner.

less inspection time—inspect once. No need to check liner, then installation later. No question about liner density or attachment adhesives and mechanical fasteners. No return trip to check exterior insulation jobs to make sure they are installed in accordance with the specifications.

fire-safe— Fiberglas Duct System material has passed two fire tests to qualify as Class 1 Air Ducts by UL 181 as required by NFPA, No. 90A.

A research program was conducted by Factory Mutual Research Corporation to evaluate the possible fire hazard of Fiberglas Duct Systems. This program included heating heat and flames from a severe exposure fire through an operating air duct system.

It was concluded that use of Fiberglas Duct System adds no appreciable fire hazard to buildings, that spread of fire through such ducts should not occur or is a remote possibility and is dependent on other features and details of the construction.

saves space— Fiberglas Duct System can be installed closer to walls and ceilings than metal ducts because there is no need to allow space for installing insulation or for driving joint locks.

efficient air delivery— The interior surface of Fiberglas Duct System has an air friction coefficient equal to knee sheet metal duct. The smooth surface offers very little resistance to air flow.

no air leakage— Fiberglas Duct System is tight. No loss of cooling or heating air. No over-designing to accommodate air loss.

performance proven— Fiberglas Duct Systems have been operating since 1956 in all types of service conditions. Over 100,000 000 sq. ft. have been installed and are performing satisfactorily.

*T.M. REG. OCF CORP.

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performance characteristics

moisture absorption:

...eight at 120F. 95% R.H. The fibers ... by moisture; will not support or ...ment or fungus growth.

odors

Glass fibers are odorless and will not absorb odors ... steam.

temperature limit:

...mum service air temperature

vapor transmission:

Heavy Duty Board has a 0.00 perm rating. Standard Duty Board is rated at .02 perms. Round ducts have a .10 perm rating.

noise absorption:

A highly efficient sound absorber. Fan and equipment noises are absorbed completely. No drumming or vibrating.

Type	Thickness	NRC*
Fiberglas Standard Duty (SD)	1"	70-75
Fiberglas Heavy Duty (HD)	1"	70-80

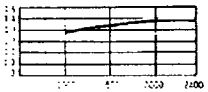
*Noise Reduction Coefficient spec design

maximum velocity:

...fpm. Acceptable for most requirements. Tested to 5000 fpm without any trace of fiber erosion.

air friction coefficient:

Friction coefficient comparison factor at 1500 fpm is 1.3. Airflow resistance is the same as lined metal duct. The curve below guides friction correction factors to be used in ASHRAE chart for friction of air in straight ducts of galvanized sheet metal.*



UL class 1 air duct:

National Fire Protection Association standard NFPA No. 90A for air conditioning and ventilating systems requires air ducts to be Class 1 by UL 181. The UL 181 tests not only set stringent requirements on fire safety, but, on ruggedness as well. Puncture and impact tests resulted in absolutely no perforation or visible signs of inner or outer surface damage. Flame spread and smoke developed were negligible as compared to Untreated Red Oak as 100.

	Class 1 Requirement	Fiberglas Duct System
Flame Spread	25	20
Smoke Developed	50	20
Fuel Contributed	50 max	10 max

maximum size and static pressures:

The Fiberglas Duct System boards products Standard Duty and Heavy Duty are engineered to meet a variety of duct requirements based on ductwork with ... The Heavy Duty Board ... retain ... 20 or 22 gage metal. ... The Standard Duty (SD) ... 24 or 26 gage metal ... Standard ... 22 or 24 gage ... for larger systems ... 20 or 22 gage metal ...

... shown on the inside back cover.

Maximum duct size dimensions shown in the table below are for unreinforced duct boards, 1" thick. Sizes greater than those shown for Standard Duty duct Boards can be achieved by reinforcement or by specifying Heavy Duty Board. Sizes greater than those shown for Heavy Duty Board require sheet metal reinforcement.

Fiberglas Duct System Boards are also available in ... and 2" thicknesses which increases the maximum sizes available. Contact your nearest Owens-... representative for complete data on these ...

Maximum Allowable Inside Duct Dimensions—Unreinforced and Reinforced*

Duct Material	Max. Static Pressure in W.G.	Unreinforced Supply	Unreinforced Return	Reinforced 48" OC Supply	Reinforced 48" OC Return	Reinforced 24" OC Supply	Reinforced 24" OC Return
Standard Duty SD							

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impact test

The same Duct System test section used in the Static Load test is then subjected to a 20 lb. sand bag drop test. The vertical inside dimension should not decrease more than 15%. All joints and seams should not crack. Fiberglas Duct System showed no effect of damage from this test.



erosion resistance

This tests to determine the ability of the duct fibers to resist air erosion or delamination. The same duct sections used in the Static Load and Impact Tests is used in this test with the addition of an elbow fabricated from Duct System Materials. The whole assembly is subjected to 2½ times the maximum velocity rating of the system. In the case of Fiberglas Duct System, this would be 2,400 x 2.5 = 6,000 fpm. A collection chamber is provided to collect any eroded material. The test is then run for 4 hrs. No sign of eroded fibers or delamination is to occur. Fiberglas Duct System showed no macroscopic particles (visible to the eye), no erosion or evidence of cracking, flaking, peeling or delamination.



rupture and leakage

This test subjects the duct to 4 times the rated air pressure for a period of one hour. Duct sections used in the Static Load and Impact Tests are subjected to this test. Fiberglas Duct System was tested at static pressure of 8" water gage without failure.

The same samples used in the Rupture Test are subjected to static pressure of .50" water gage for 1 hour. The air loss at the end of the test cannot be more than 20 times the volume of the sample. This is an easy test for Fiberglas Duct System to pass because Fiberglas Duct System does not leak air.



collapse

A collapse test is required to assure satisfactory service on the return side of the system. This test is the reverse of the previous test with a 2" water gage vacuum imposed for 1 hour. Deformation cannot exceed 20% at any time during the test.



corrosion, mold growth & humidity

Fiberglas showed no [illegible] of spores, mold growth or [illegible] subjected to a saturated [illegible] atmosphere for a period of [illegible] hours.



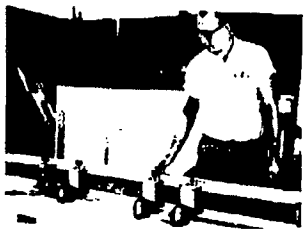
291413

fabrication

automatic machine

Fiberglas Rectangular Duct Sections are fabricated by automatic flat-board grooving machines. The Fiberglas Duct Fabricating Machine cuts three accurate "V" cuts and the end joint, male and female slip lap, in one operation. The result is uniform sections perfectly matched for even, straight, duct runs. Interiors are smooth and unbroken for minimum air flow resistance. Erection is faster since sections fit exactly.

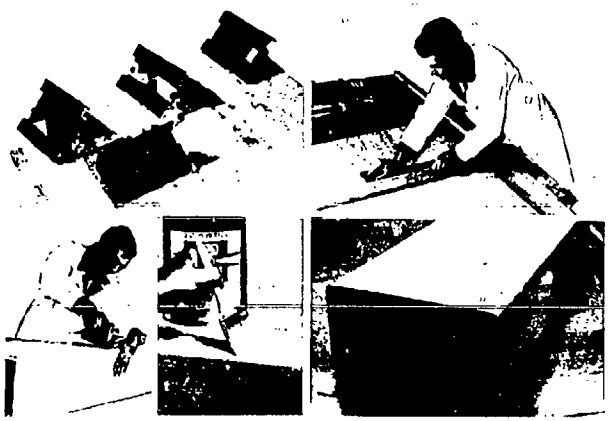
Ducts are fabricated quickly, ready for taping. The addition of power driven staplers make duct fabrication a highly automated process.





hand tools

Ducts and fittings are also fabricated using simple hand tools, bench and T square. The tools perform the job of cutting the "V" folding grooves and end joints. An ordinary knife, template, and standard sheet metal parts are used to fabricate fittings. The hand tools allow greater flexibility at the job site because construction changes can be compensated for without time-consuming trips back to the shop.



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taping systems

[illegible] system and one type for [illegible] System. They are per[illegible] and a choice is of [illegible] tractors because of pref[illegible] job conditions. All have [illegible] accelerated weathering [illegible] to assure continuous per[illegible]

	Description	Benefits
[illegible]	[illegible] glass tape applied [illegible] in two coats [illegible] joints	Very strong Fiberglas reinforced joint. Vapor seal mastic chemically bonds to vapor barrier surface. Tape conforms to severe bends or curvatures without crinkling.
Standard Duty (SD) only	[illegible] only may be sealed and [illegible] layer of solvent base Duct [illegible] applied by brush, spray, or [illegible] layer of special impregnated cloth tape is "pressurized" on top of [illegible]	Excellent for straight duct sections. The tape can be applied on the job up to 30 days after the duct adhesive is brushed on in the shop.
Rigid Round	Special impregnated cloth tape with pressure sensitive bonding agent	Tape is compatible with vapor barrier surface. Used to seal end joints and fittings.

sizes, forms and recommended use

Fiberglas Duct System is manufactured in large flat boards, for fabrication of rectangular ducts, and pre-molded round sections ready for assembly. The boards and round sections are complete with factory applied vapor barriers which also serve as a surface finish.

The [illegible] Duct System [illegible] Duty, are engineered to meet a variety of [illegible] duct size, static pressure [illegible] used for [illegible] 20 or 22 gage [illegible] and [illegible] required.

sizes

Rectangular	Thickness	Width	Length
Standard Duty (SD)	1"	48"	96" & 120"
	1½"	48"	96" & 120"
	2"	48"	120"
Heavy Duty (HD)	1"	48"	96" & 120"
	1½"	48"	120"

Round	Wall Thickness	Inside Diameter	Length
Rigid Round	¾"	4", 5", 6", 7", 8", 9"	6 ft
	1"	10", 12", 14", 16", 18"	6 ft

reinforcement

The Maximum [illegible] shows size and static [illegible] the "Maximum [illegible] sheet metal. Reinforce[illegible] 2" x 1" x 2" tee as show[illegible]

Supply	Return
[illegible]	[illegible]

[illegible]

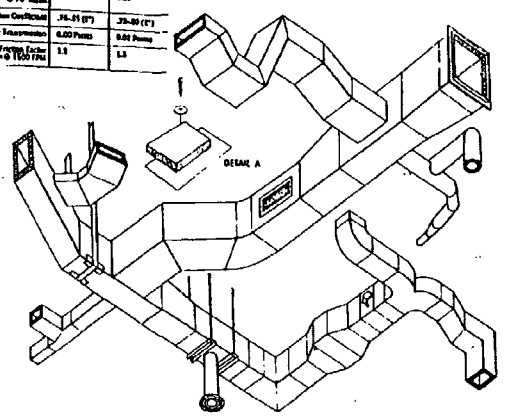
It is [illegible] that the System [illegible] 6 foot [illegible] The suspens[illegible] saddle type [illegible] and [illegible] to prevent indenting. Provide [illegible]

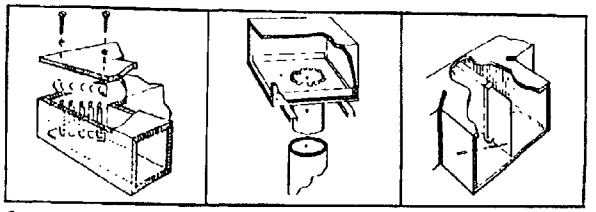


291[illegible]

design and installation guide

DESIGN CRITERIA	H.D.	S.D.
Velocity	2400 FPM	2400 FPM
Static Pressure	2.0" w.g.	2.0" w.g.
U. L. Approval	Class I Air Duct	Class I Air Duct
Thermal Conductivity @ 75° mean	0.22	0.23
Noise Reduction Coefficient	.75-.85 (1")	.75-.80 (1")
Vapor Transmission	0.00 Perms	0.02 Perms
Friction Factor Correction @ 1500 FPM	1.1	1.3





1 90° DUCT WITH TURNING VANE — A four foot section of duct is mitered at a 45° angle and one of the pieces is rotated 180°. A standard sheet metal turning vane is inserted between the two sections. The sheet metal turning vane is attached to the duct as per detail "A", the two pieces of the duct are now placed together using detail "A" to adhere the other half of the duct to the sheet metal turning vane. Mastic and reinforcing fabric are applied along the mitered cut and over screws and washers as per standard instructions.

2 BOTTOM DIFFUSER CONNECTOR — A round hole is cut into the bottom of the duct. The diameter of this hole (A) is equivalent to the inside diameter of the round duct. (B) A sheet metal "shoe" the width of the duct interior (C) with round opening the same size and having 1" high sides is pre-placed in the bottom of the duct. A sheet metal duct (D) with 1" metal dovetails, or tabs, is inserted through the duct and sheet metal "shoe". Slide round Fiberglas Duct (B) over the sheet metal duct. The diffuser is attached directly to the sheet metal duct with sheet metal screws. The Fiberglas Duct must be supported by hangers under the sheet metal shoe or by wires attached to the diffuser.

3 SPLITTER-DAMPER TEE SECTION — The "tee" section is constructed with turning vanes. A standard splitter damper is inserted with the rod being attached to the same sheet metal bearing surfaces. The sheet metal bearing surfaces are attached to the duct as per detail "A". The adjusting rod passes through the duct and the [illegible] of the splitter rod is attached to [illegible] the duct by using a sheet [illegible] surface in back of this [illegible] metal is secured to [illegible]

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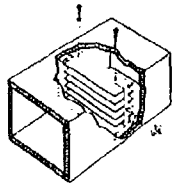
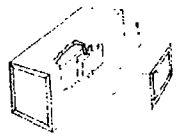


4 [illegible] this opening are equivalent to the inside dimensions of the take-off. The scoop is inserted into the Fiberglas Duct adhering to the side and bottom of the Fiberglas Duct as per detail "A".

5 SIDE GRILLE ATTACHMENT — An opening is cut into the side of the duct; dimensions of this opening are equivalent to the inside dimensions of the grille. A sheet metal channel is fitted into the periphery of the duct opening securing the corner of the channel by means of spot welding or using a sheet metal screw. The grille is placed over this opening adhering the grille to the sheet metal channel by means of two sheet metal screws.

6 DAMPER — A sheet metal duct, having dimensions equal to the inside dimensions of the Fiberglas Duct, will act as the housing for a standard sheet metal damper. The sheet metal damper is inserted in the sheet metal duct with the adjusting rod passing through the metal and the Fiberglas Duct. The damper control is attached to the side of the duct as per detail "A".



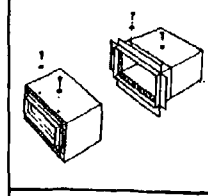


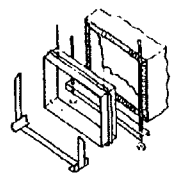


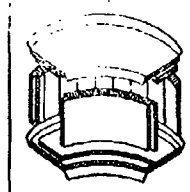
10 SIDE TAKE-OFF [illegible] metal collar is fit [illegible] to the dimension [illegible] The collar is inserted through a hole in the [illegible] of the duct. Developed tabs (1") are used to secure the collar to the duct with two cut external tabs. A duct is then placed over the collar and secured as per detail "A".

11 ROUNDED SIDE TAKE-OFF — A round elbow is joined to a straight duct. A metal channel is placed [illegible] this leading edge [illegible] The metal nose [illegible] to sheet metal [illegible]

12 ROUND DUCT CONNECTOR — Cut a slit into the sheet metal connector at 120° angle by means of "snips". Raise tabs slightly so that the connector can be screwed into the round duct.



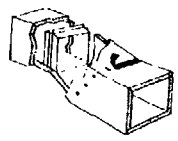


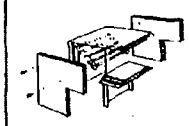


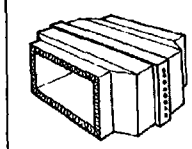
7 REINFORCEMENTS — On extreme large sizes of ducts, metal reinforcements are used as stiffeners. The amount and placement of reinforcements are dependent upon static pressure (see table on on page 2).

8 HANGERS — Because of Fiberglas Duct System's light weight, lighter hangers may be used. Perforated straps with a sheet metal vee inserted at the bottom corners; a channel section with threaded rods; wires connected to a toe collar reinforcement, are some of the types of hangers that may be used. Standard saddle type duct hangers, as used with sheet metal are satisfactory.

9 90° ROUNDED ELBOW — This fitting is accomplished by four separate pieces. The heel must be vee notched on the inside to permit bending. The throat is made by slitting partially through the insulation to permit bending. The throat should then receive a thin brush coat of mastic. Elbow is assembled by means of staples, mastic and reinforcing fabric.







13 OFFSET — An offset can be constructed by an angular cut through a straight section of the duct. The angular cuts are equal to ½ of the angle required at each joint. The sections may be joined together with the aid of a metal collar. The duct is attached to the metal collar per detail "A". As an alternate method the sections may be joined utilizing sheet metal clips, mastic and reinforcing tape.

14 FOUR-PIECE 90° ELBOW WITH TURNING VANE — The "cheeks", "throat", and "heel" are all of separate pieces. The heel and throat can be accomplished by removing a vee section and bending to a 90° angle. All four pieces are assembled by means of staples, mastic and reinforcing tape. The throat should then receive a thin brush coat of mastic. See illustration #3 for [illegible] vane assembly.

15 HEATING COIL — A transformation duct is required if heating equipment (air temp. maximum 250°) is larger than duct work. The slope of the transformation piece on the up-stream side of the equipment must be limited to 30° and on the down-stream side, the slope should not be [illegible] than 45°. Each [illegible] is made from [illegible]

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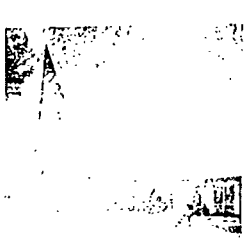
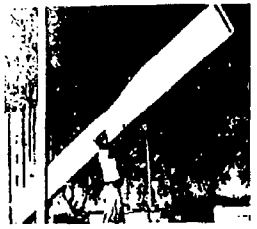
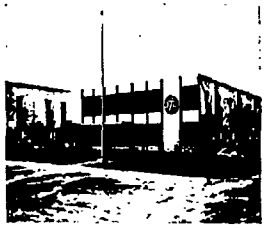
over 100,000,000 sq. ft. in service





16" section is handled with ease



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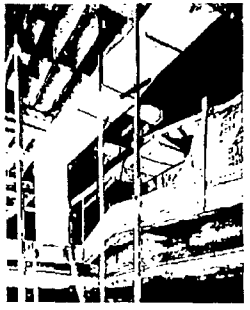


Motor Inn, Orlando



Luderio Labs



Pace College remodernization, New York City

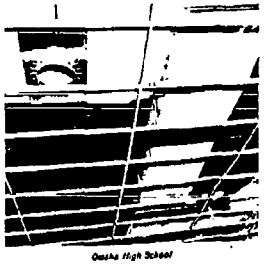


Penn Power Co.

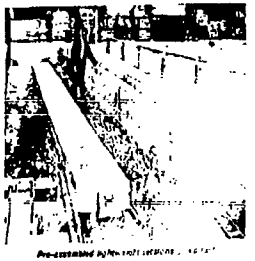




Jacksonville Public Library



Omaha High School



Pre-assembled lightweight sections

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OWENS-CORNING FIBERGLAS CORPORATION
Industrial and Commercial [redacted] Materials Division
717 Fifth Avenue, New York [redacted] 22 • General Offices, Toledo, Ohio 43601

Pub. No. [redacted]

Printed in U.S.A. March, 1968

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OWENS CORNING FIBERGLAS

air handling systems 4.3
March, 1968

Duct Insulation





Duct Wrap Insulations

a complete line of plain and faced duct insulation for concealed and exposed hot, cold, or dual-temperature air handling systems

[redacted] *uses*

There is a Fiberglas Duct Wrap insulation for every duct insulation requirement — hot, cold or dual-temperature, exposed or concealed. The variety of facings permit selection of a product based on: economic consideration, the degree of fire safety required, toughness and appearance desired. Refer to the selection Chart on the next page for products available and their recommended usage

[redacted] *description*

Fiberglas* Duct Wrap Insulations are highly efficient lightweight inorganic blankets of fine glass fiber available plain, or faced with a choice of factory-applied vapor barrier facings. Owens-Corning Fiberglas has developed a technique for combining the facings with the insulation as it is manufactured. This technological development assures uniform quality of the finished product. The facing is firmly bonded and inspected continuously during manufacture.

[redacted] *benefits*

low operating costs — low k factor of .28 at 75F mean temperature and full-thick resilience means less heat loss or gain. Systems operate more efficiently. Air is delivered at design temperatures.

no water-stained ceilings — vapor barrier facings have low perm ratings to stop moisture vapor from condensing on the cold duct surface.

an insulation to fit every job — hot, cold, dual-temperature, exposed or concealed, tailored to economic and performance requirements.

damage resistant — Fiberglas Duct Wrap insulations are tough and resilient. They resist damage in shipment and after they are installed. Most of the vapor barrier facings are reinforced with strong glass fibers to resist puncture and tearing during installation.

*T.M. Reg. OCF Corp.

291421

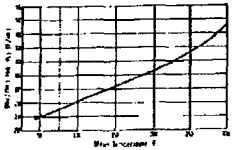
performance characteristics

moisture absorption: less than 0.2% by volume, 96 hrs. at 120F and 95% R.H.

bacteria and fungus resistance: does not breed nor sustain bacteria or fungus.

odor: essentially odorless

thermal conductivity:



selection chart

The following chart lists the service requirements and recommended product for each requirement. Note: in some instances there are more than one product shown. The one in Bold Faced Type is the Recommended Product. The alternative product is shown because of existing specifications calling for specific insulations by name and number. These alternative products are also listed because of local "preference" or an established "use" pattern. Note that in areas of high abuse, such as exposed ducts in high traffic areas or equipment rooms it is recommended that the ducts be lined with Owens-Corning Fiberglas Aeroflex Duct Liner or the ducts may be insulated with Fiberglas Rigid Board Insulation.

recommended thickness

Owens-Corning Fiberglas recommends a full 2" thickness for protection against excessive heat loss or gain. This thickness is based on the fact that flexible blanket insulations are compressed during installation which effects their thermal performance characteristics. In some cases, this can cause sweating on the vapor barrier of cooling ducts if the insulation is compressed too tightly. The products shown in bold faced type are designed to provide the maximum performance with the smallest total cost. When they are installed on sound ducts their applied thickness is normally a full 1½" and 1½" thick on rectangular ducts. Other thicknesses are available as shown, however, the 2" thick insulation is recommended. This is sufficient to prevent condensation on the vapor barrier of insulated cooled ducts operating at service conditions of 90% RH at ambient temperatures of 110F.

sizes, thicknesses, widths

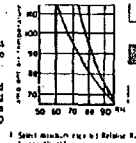
Fiberglas Duct Insulations are available in a variety of widths and thicknesses to meet the requirements for the temperature and humidity conditions normally encountered in air handling systems. All faced insulations have a 2" overlapping flange on one edge of the roll to seal the circumferential joints of the insulation.

SEATING	PRODUCTS	DESCRIPTION	FLAME SPREAD CHARACTERISTICS Current	FIRE SELECT	THICKNESSES	ROLL WIDTHS	LENGTH
Exposed Duct in Duct (Round and Rectangular)	"Foil Duct Wrap Type IA	Unfaced blanket of fine glass fibers	0/50	UL Listed Flame Spread 25 Smoke Developed 50	1" 1½" 2"	20" & 48" 24" & 48" 16" & 48"	200' 100 50
Concealed or Exposed Ductwork and Air Conditioning Duct (Round and Rectangular)	Foil Duct Wrap Type IV (FRK)	Fiberglas scrim reinforced foil kraft laminate with a low permeability flexible vapor barrier	0/5	UL Listed Flame Spread 25 Smoke Developed 50	1" 1½" 2"	48" 48" 48"	100 100' 50
Alternate "Foil Duct Wrap Type IB (FRK)" Foil		2 mil reinforced foil kraft laminate	0/0	UL Listed Flame Spread 25 Smoke Developed 0	1" 1½" 2"	48" 48" 48"	100' 100 50

*Similar to PF25

condensation control

To determine thickness to prevent condensation at various ambient temperature and humidity (Based on compressed thickness of installed material on 60°F duct covering @ 1200 FPM).



1 Select minimum thickness for Relative Humidity (RH) or lower value, p-1

2 Where semi-rigid board or [illegible] is specified maximum thickness shall be 1½"

3 Only for the [illegible] with Fiberglas Duct Wrap under the jacket [illegible]

specification compliance

Fiberglas Duct Insulations meet the requirements of the following Federal Specifications:

HH-I-[illegible] Type I
HH-I-[illegible] Form B Type V
HH-I-[illegible] Form B Type IV
HH-I-[illegible] Type I & II Cl. 2

application recommendations

hot air ducts — Fiberglas Duct Wrap insulations are normally applied with the reinforced flange on 3" wide strips on roughly 12" centers. The joints are butted and the longitudinal joint overlapped and stapled with a flare type staple.

cooling or dual-temperature ducts — Foil faced Fiberglas Duct Wrap insulation is applied with the reinforced flange on the [illegible] The joints are butted and the 3" overlapping vapor barrier flap and a 3" [illegible] are bonded [illegible] The overlapping flaps are stapled with flare type staples at [illegible] and pressure sensitive tape or glass tape applied with mastic.

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Industrial Insulation Construction Materials Division, 717 Fifth Avenue, New York, New York 10022

General Offices: [illegible]

PUB. NO. [illegible]-B

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LITHO U.S.A. MARCH, 1968

plumbing systems 1.5
mechanical equipment 8.2
air handling systems 4.4
power & process equipment 8.1
vessels & tanks 7.2
boilers & chimneys 6.5
January, 1969

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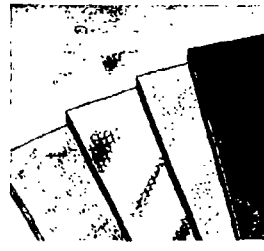
Equipment Insulation



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 minimum 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.

and 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 beautiful character istics 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 aluminum faced 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.

291423

performance characteristics

sound absorption coefficients (2" thick #6 mounting)

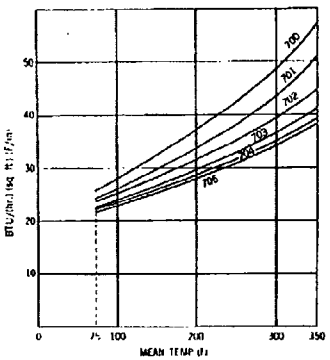
TYPE	125	250	500	1000	2000	4000	NRC
701	.34	.70	.96	.97	.86	.83	.87
702	.28	.77	.96	.98	.87	.87	.89
703	.32	.74	.97	.98	.87	.85	.89
704	.27	.79	.98	.99	.88	.86	.91
705	.48	.82	.97	.99	.90	.86	.92

size and density

Type	Density (pcf)	Thickness (in ½" increments)	Compressive Strength (psi 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 condenses 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)	self-faced (703, 704, 705)
flame spread	10-20	25	15-20
fuel contributed	10-15	15	20-25
smoke developed	0-20	0	0

(compared to untreated Red Oak as 100)

application recommendations

Type 700, 701, 702 — Lightweight unfaced flexible insulations in blanket form for use on vessels having irregular surfaces where the external 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

(60F ambient air)

Surface	Type 701			Type 703			Type 704		
Temp.	RT	HL	ST	RT	HL	ST	RT	HL	ST
100	1½	11	87	1½	10	86	1½	10	86
250	2	28	95	2	27	93	2	26	92
350	2	39	99	2½	31	99	2½	30	98
450	3½	43	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 Difference	Recommended Thickness (inches)	Heat Gain Btu/ft-hr	Permissible Relative Humidity
20	½	5.1	99%
25	½	6.1	81%
30	1	5.1	89%
35	1	7.1	88%
40	1½	5.7	90%
45	1½	6.3	87%
50	2	5.4	90%

specification compliance

HH-I-542, Type I	700
HH-I-542, Type II	701, 702, 703
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 I, Class J.	700, 701, 702
HH-I-562, Type I, Class 2.	703**, 704, 705
HH-I-563, Type II, Class D. (SDS***)	701, 702, 703
HH-I-564, Form I & II, Class A.	703**, 704, 705
Navy Bureau of Yards and Docks, 16-YI	703**, 704, 705
Corps of Engineers, C.E. - 301.08, .11 thru .17	703**, 704, 705

**Type 703 is specially prepared for contracts where certification of compliance to the above format Specifications is required. Consult plant of Fiberglas for use to be used under these and other conditions of thickness.

***Sheets required for space 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 250 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-31B. 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.

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Industrial and Commercial Construction Materials Division, 717 Fifth Avenue, New York, New York 10022, General Offices, Toledo, Ohio 43601

Pub No 1-IN-2873-K

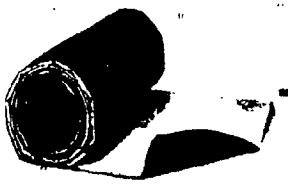
291426

Litho in U.S.A. Jan 1969

OWENS CORNING FIBERGLAS

air handling systems 1.6
August, 1967

Duct Liner



Aeroflex Duct Liner

a long glass fiber thermal and acoustical insulation with unusual toughness and high sound absorption

uses

Fiberglas® Aeroflex® Duct Liner is designed for use as an Acoustical and/or thermal insulation for heating and cooling ducts operating at velocities up to 6000 fpm. It has been tested at velocities up to 8000 fpm without surface erosion. Temperature limit is 180F.

description

Aeroflex is manufactured specifically to be a duct liner. The strongly bonded long glass fibers make this product extremely tough to resist damage during fabrication and after it is in service. Aeroflex is semi rigid and resilient. The surface, facing the air stream, is coated with a black fire-resistant coating to bind the surface fibers tightly to avoid any loose fibers, and provide a smoother air flow surface.

benefits

absorbs unwanted sound—Fiberglas Aeroflex is an extremely efficient acoustical insulation having a high NRC of .75 to .85 (1", 3 pcf). The liner is especially efficient in absorbing low and middle frequency sounds which are the most irritating and difficult to eliminate.

resists damage—Aeroflex is tough yet resilient. It resists damage during and after installation because of the long glass fiber construction.

fire safe—Meets the stringent Fire Hazard Classification NFPA 90A standards.

easy inspection—the black surface coating on Aeroflex shows any damage immediately.

protects against sweating—the high thermal efficiency of Aeroflex protects against condensation on the metal surface of cooling ducts and reduces heat loss or gain to a minimum.

minimum joints—Aeroflex is normally applied by brake forming with the metal. This eliminates three corner joints.

291427

performance characteristics

fire hazard classification: Meets the requirements of NFPA 90A standards as determined by Underwriters' Laboratory method, NFPA No. 225—ASTM E-84-507. Flame spread—under 25; smoke developed—under 50.

surface air friction: air friction coefficient of 0.025 as tested by Ohio State University.

odor: Essentially odorless.

Inorganic: Will not rot, corrode metals or support vermin.

thermal conductivity: k of .25 at 75F mean temperature (1.5 pcf).

sound absorption coefficients:

Type	Density pcf	Thickness	NRC*
150	1½	½"	.55-.65
		1"	.70-.80
200	2	½"	.55-.65
		1"	.70-.80
300	3	½"	.60-.70
		1"	.75-.85

*Noise Reduction Coefficiency—No 6 Mounting

specification compliance

Meets the requirements of MIL-I-00545, Type I, Class A and Mil I 22023B, Class 4, 5, 6

application recommendations

For Air Velocities up to 1500 fpm the liner is adhered to the duct using a 50% coverage of fire-resistant adhesive. When the duct width exceeds 12" or the height 24", the liner is additionally secured with mechanical fastenings on maximum 18" centers on the top and on the sides

For velocities from 1501 to 4000 fpm the above recommendations apply, but before installing the liner, coat and point the edges with a fire resistant coating where the insulation butts together

For high velocities from 4001 to 6000 fpm, attach the liner with welded pins on 12" centers and 50% coverage of fire resistant adhesive. Coat all edges with a heavy coat of fire resistant mastic.

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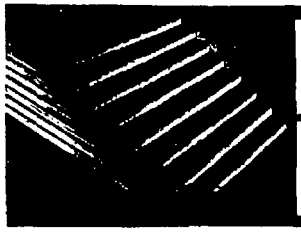
Duct Insulation



Duct Liner Board

a highly efficient acoustical and thermal insulation board for lining sheet metal ducts.

uses

Fiberglas Duct Liner Board is designed primarily as an acoustical insulation to absorb air conditioning equipment and blower noises in metal ducts and plenums operating velocities up to 4000 fpm. It is also an excellent thermal insulation which eliminates the necessity of insulating ducts on the exterior to conserve heat or prevent condensation.

description

Fiberglas® Duct Liner Board is manufactured in semi-rigid board form from fine glass fibers firmly bonded with a thermosetting resin. It is *coated one side with a* fire resistant black coating to resist any tendency of surface fiber to blow off in the air stream.

benefits

assures a quiet operating system—exceptional acoustical efficiency absorbs air-conditioning equipment and blower noises in the plenum and in the duct run.

lower operating costs—high *thermal efficiency re*duces heat loss or gain which increases operating efficiency and lowers costs.

no *moisture-stained ceilings*—metal ducts lined with a sufficient thickness of *Fiberglas Duct Liner Boards* do not sweat. The metal acts as a vaper barrier and the insulation keeps the surface of the metal below the dew point.

low air friction loss—the smooth coated surface of the board does not impede the flow of air. The system operates with a minimum of air loss due to roughness.

no drumming—the semi-rigid boards add stiffness to the sheet metal duct sections, reducing drumming and transmission of noise.

uniform thickness—the factory controlled uniform thickness of Fiberglas Duct Liner Board means the insulation value remains constant. No compression at the corners, no irregular joints to impede air flow.

*T.M. Reg. OCF Corp

physical properties

density: 3 lbs. per cu. ft.

odor: essentially odorless

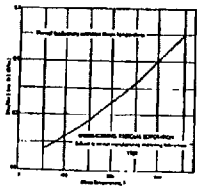
friction coefficient: 0.023 (average)

sizes: width; 24", 36", 48"
length; 48", 72" (lengths to 96" on made-to-order basis)
thickness; 1", 1½", 2"

fire hazard classification:
Flame Spread 25 max
Smoke Developed 50 max

maximum velocity: 4000 fpm

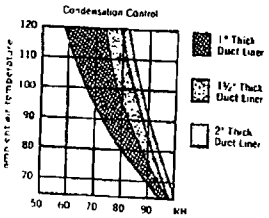
thermal conductivity:



federal specification compliance

HH-I-00545 Type II, Class A

thickness to prevent condensation



Example: If the % RH is 70 and ambient air temperature is 100 F (dry bulb) the thickness recommended is 1".

noise reduction coefficient (NRC spec. range)

1" 70-80
1½" 75-85
2" 80-90

surface air friction

air friction factor of 0.023 (average)

absolute roughness of 0.0013

application recommendations

for velocities up to 1500 fpm the liner is adhered to all surfaces of the duct (coated side faces air stream) with a 50% coverage of fire resistant insulation bonding adhesive. The adhesive is to completely cover the metal at the upstream end of each section. Top and bottom pieces are to lap side pieces. If the duct width exceeds 12" or height 24" further secure the liner with mechanical fasteners on 18" centers.

for velocities from 1500 to 4000 fpm the insulation liner is installed as above but it is necessary to point all joints and butter the ends of the liner where the duct sections fit together with a fire resistant breather mastic.

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291430

air handling systems 4.9
September, 1967

Duct Systems



U.L. Class I Air Duct Rated Flexible Duct

a flexible insulated duct for use in low velocity heating or air conditioning

uses

description

Owens-Corning Fiberglas Flexible Duct is recommended for use as a complete air duct or connector on supply and return air lines in residential, industrial and commercial heating, air conditioning and ventilating systems. In addition, it can be used on runouts to registers, diffusers and mixing boxes. The flexible feature allows it to conform to gradual bends necessary when connecting air ducts to diffusers or when routing air ducts through spaces with many obstructions.

Fiberglas Flexible Duct is a light weight duct formed with a resilient core insulated with Fiberglas Flexible Insulation, and jacketed with a tough noncombustible *(product qualifies as Class I Air Duct by UL 181 as required by NFPA No. 90A as an air duct or connector)* vapor barrier jacket. Each section is furnished with locking male and female sheet metal end rings. It has an interior surface of glass fiber scrim cloth.

benefits

ease of installation—Flexibility of product permits weaving around obstructions and bending for elbows. Eliminates expense of purchasing or fabricating fittings. Allows relocation of movable diffusers with minimum of effort. Metal end rings solve alignment problems.

quiet installation and operation Nature of duct allows quiet installation without noisy interruptions to occupants When installed, Flexible Duct System absorbs noise generated by mechanical equipment and air movement

faster return on owners investment—Earlier building occupancy due to faster installation.

economical operation—Insulated system reduces heat loss or gain and helps maintain air temperature.

durable- Both ends of product have sheet metal fittings for positive metal to metal connections. The male end has locking tabs to facilitate installation. Both vapor barrier and insulation are continuous.

odorless Will not cause odor.

291431

performance characteristics

thermal conductance (C) @ 75°F mean temperature ..... .25

maximum interior air temperature ..... 250°F

minimum interior air temperature ..... 0°F

maximum air velocity ..... 2400 FPM

UL rating *(qualifies and is labeled Class 1 Air Duct as required by NFPA No. 90A as an air duct or connector)*

	Outside Surface	Inside Surface
Flame Spread	25	15
Fuel Contributed	0	0
Smoke Developed	45	20

maximum static air pressure ..... 1½ inch water gauge

maximum negative air pressure ..... ½ inch water gauge

vapor transmission rating ..... 1.0 perm

duct dimensions

DIAMETERS	LENGTH	WALL THICKNESS
4" - 10" in 1" increments 12" - 18" in 2" increments	Nominal 6' - all diameters	Nominal 1" — all diameters

connectors—The male and female ends of a Fiberglas Flexible Duct have galvanized sheet metal sleeves attached. Male end has locking tabs which firmly attach the two section together. Connectors are sized to fit standard metal fittings.

bending radii—Maximum installed radius of O.C.F. Flexible Duct—

4" - 12" diameter ..... a uniform 180° bend in a 6' length of duct

12" - 18" diameter ..... a uniform 90° bend in a 6' length of duct

installation methods — Refer to current Owens-Corning Fiberglas installation and cutting instructions. Most recent issue of Publication Number 3-MS-3765.

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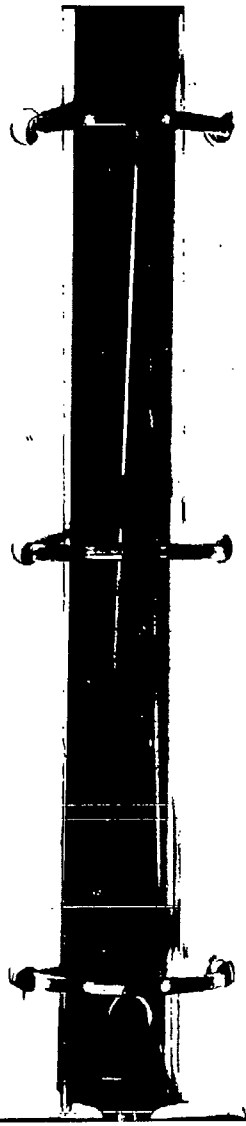
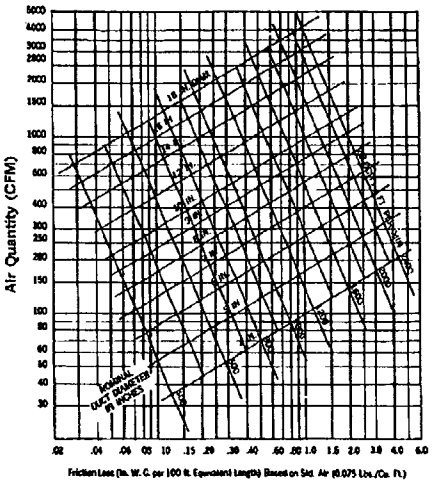
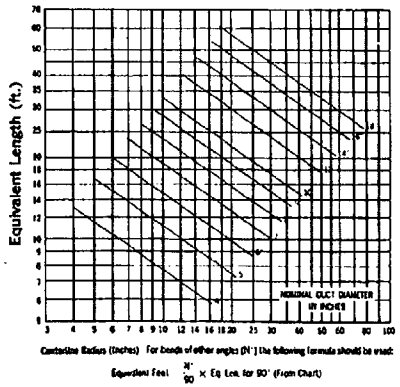


Friction Loss of Air in Straight Duct



Friction Loss of 90° Turns in Equivalent Ft. of Straight Duct



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Normal Octave Band Attenuation of Straight Sections of Fiberglas Flexible Duct
(Data smoothed from ⅓ octave insertion loss measurements)

Diameter in	Length ft	Attenuation db in octave band 125	250	500	1000	2000	4000
4	3	23	26	29	31	41	41
	6	35	40	47	49	56	64
	9	48	56	60	62	67	70+
	12	46	52	65	68	70+	70+
5	3	21	24	26	26	33	33
	6	34	37	39	40	46	36
	9	39	45	49	50	55	47
	12	44	50	53	55	59	60
8	3	19	22	23	22	28	15
	6	32	34	34	35	40	24
	9	38	42	42	44	48	31
	12	43	47	46	48	54	40
10	3	17	20	18	20	26	11
	6	30	31	30	31	36	17
	9	37	39	38	39	43	23
	12	42	44	43	43	46	29
12	3	15	18	17	16	14	9
	6	28	28	28	28	30	13
	9	36	36	35	36	40	18
	12	41	41	38	39	47	22
14	3	13	16	16	17	11	7
	6	26	25	26	26	22	11
	9	35	33	32	33	29	14
	12	40	38	35	36	35	18
16	3	11	14	15	16	9	7
	6	24	22	24	24	17	11
	9	34	30	30	31	23	14
	12	39	35	33	34	28	18
18	3	9	12	14	15	7	7
	6	22	19	22	23	13	11
	9	33	30	28	29	18	14
	12	38	35	31	32	22	18

Note: Due to the lightness of Fiberglas Flexible Duct it should not be used in excessively noisey air systems unless the main supply Ducts are constructed of Rigid Round or Rectangular Fiberglas Duct System or sheet metal Ducts are lined with Acoustical Insulation. In this situation fan noises are substantially reduced before reaching the flexible connector.

SUGGESTED SPECIFICATION

Fiberglas Flexible Duct as manufactured by Owens-Corning FIBERGLAS Corporation shall be installed in sizes and locations where indicated on drawings. It shall be installed on all connections to: (air diffusing troffer lights), (ceiling pan type outlets), (single ceiling diffusers), (perimeter under-window units), (air outlets from mixing boxes on low pressure side of high pressure system).

Fiberglas Flexible Duct is a light weight duct formed with a resilient core insulated with Fiberglas Flexible Insulation, and jacketed with a tough noncombustible *(product shall bear UL Class 1 Air Duct label as tested under UL 181 and required by NFPA 90A as an air duct or connector)* vapor barrier jacket. Each section is furnished with locking male and female sheet metal end rings. It has an interior surface of glass fiber scrim cloth.

Fiberglas Flexible Duct shall be installed in accordance with the installation instructions of the manufacturer as shown in the most recent issue of Publication Number 3-MS-3116.

OWENS/CORNING FIBERGLAS
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Pub. No. 3-MS-3113 E

291434

Litho in U.S.A., Sept. 1967

FIBERGLAS

air handling systems 4.10
October, 1968

Air handling systems



Rigid Round Duct System

self insulating, fire safe, air duct for heating & cooling systems

uses

Owens-Corning Fiberglas® Rigid Round Duct System is used as an air duct for heating, ventilating and air conditioning systems operating at temperatures up to 250f and static pressures up to 2". It is usually used in conjunction with Fiberglas Rectangular Duct System for runouts and dropouts at diffuser openings.

description

Fiberglas Rigid Round Duct is manufactured from extremely fine glass fibers tightly bonded together into precision molded 6' long sections. The exterior surface is a tough, smooth, noncombustible vapor barrier jacket. Ends are factory molded, male and female, to assure tight, strong joints and faster assembly.

benefits

4 In 1 Performance -performs four basic requirements of an air handling system: (1) Conveys air efficiently, (2) Built-in thermal insulation to deliver air at design temperatures (3) absorbs air duct borne noise (4) Integral vapor barrier and finished surface finish

Lower Operating Costs - exceptional thermal efficiency and uniform wall thickness is 15 to 20% more efficient than metal ducts wrapped with flexible insulation. All joints are completely sealed to eliminate air loss.

Quiet Operation absorbs unwanted equipment noise in only a few feet. No transmitted noise. No banging, popping or cracking.

Fire Safe - meets all requirements of rugged NFPA 90 A and 90 B (UL 181) Class 1 Air Duct tests for resistance to fire and mechanical damage

No Water-Stained Ceilings integral vapor barrier and taped joints eliminates moisture condensation and drippage which can occur with uninsulated metal ducts

Quiet Installation - no banging, ideal for remodeling work where noise is objectionable.

Efficient Air Delivery – smooth interior surface is impervious to mold, no excessive loss due to friction

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performance characteristics

Thickness (nominal)	1 inch
Density (nominal)	3.35 to 4.5 pcf
Air Velocity (maximum)	2000 fpm*
Service Temperature (maximum)	250 F
Internal Pressure (maximum)	2" water*

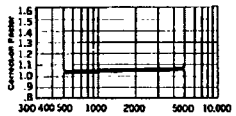
Fiberglas preformed duct has been tested at 2½ times the recommended velocities and at 4 times the recommended internal pressure

Thermal Conductivity

Mean Temperature, F	50	75	100
k	.22	.23	.24

Conductivity, Btu—in. per sq. ft.-F/hr

Air Friction Correction Factor



Velocity—FPM
Roughness (e): 0.00065

Air Friction Correction Factor to be applied to ASHRAE Guide friction loss for straight galvanized metal ducts. Applies to duct sizes from 8" to 40" hydraulic diameter with an accuracy of plus (+) or minus (-) 5%.

Sound Attenuation

Table shows duct sound attenuation in decibles per foot based on actual laboratory tests.

Round Duct	Frequencies (cycles per second)					
I.D. Size (in.)	125	250	500	1000	2000	4000
8	0.3	1.3	3.2	7.8	14.4	18.9
10	0.2	1.1	2.5	6.9	12.2	16.0
14	0.1	0.9	1.5	3.2	4.3	8.6

Underwriters' Laboratories Fire Hazard Classification

This duct meets the Fire Hazard Classification requirements of NFPA 90 A and 90 B Standards when tested in accordance with U.L. 181 procedures, and is rated as Class I

	Exterior Surface	Interior Surface
Flame Spread	15	15
Fuel Contributed	20	25
Smoke Developed	0	0

Standard Sizes and Packaging

8' lengths. Factory molded male and female joints

Duct Size I.D. (inches)	Sections per Ctn.	Approx Wgt. Lbs. per Ctn.
6	9	43
7	9	47
8	9	53
9	9	58
10	4	31
12	4	35
14	4	40
16	2	25

Field Fabrication of End Joints

This simple, foot-proof cutting tool* makes neat, accurate "slip-joint" ends on shortened lengths of duct and fittings

*Patents pending.





For male ends, cut around the outside surface



For female ends, cut around the inside surface. Remove strip



Remove strip. It's just half the wall thickness



Slip ends together and tape

Installation and Fabrication Recommendations

All 6 foot sections of preformed Fiberglas Rigid Round Duct System have a factory molded, integral male fitting on one end and a female fitting on the other. The ends of two strong sections are simply slipped together to form a strong, snug joint. The connection is smooth, inside and outside, and full insulation thickness at the joint is maintained. No sheet metal connectors, fasteners or adhesives are required.

End joints are reinforced and sealed with a single wrap of 2-inch wide Fiberglas Duct Tape, Type R-SJ. This is a special, self-adhering tape that matches the duct jacket.

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Industrial and Commercial Construction Materials Division 717 Fifth Avenue, New York, New York 10022
General Offices, Toledo, Ohio 43601

PUB. NO. 1-[illegible]

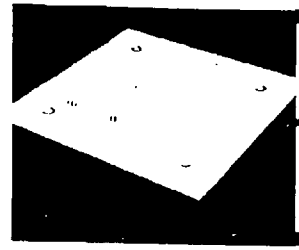
291436

LITHOGRAPHED U.S.A. 14/48

OWENS CORNING FIBERGLAS

plumbing piping systems 1.9
mechanical equipment 3.7
air handling systems 4.18
December, 1968

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.

291437

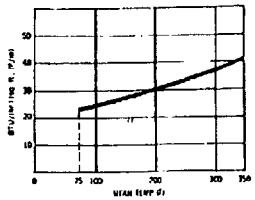
performance characteristics

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

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 at overlaps and application conforms 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 ½" 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. Pressure tape by rubbing hard with a plastic sealing tool.

Ductwork ells and other sharp radius bends require pre-scoring 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.	BT	HL	ST
150F	1	15	87
250F	1½	79	98
350F	2	29	801
450F	2	61	917

BT — recommended economic thickness inches
HL — heat loss (Btu/hr sf)
ST — surface temperature (F).

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PUB. NO. 1-IN-3854-D

LITHO IN U.S.A. DEC. 1968

OWENS CORNING FIBERGLAS

mechanical equipment 3.8
air handling systems 4.23
December, 1968

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 −150 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.

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291439

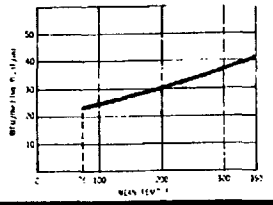
performance characteristics

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 building 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 requires the use of O-CF Type C Joint Sealing Tape for seams.

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 ½" 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 Difference	Recommended Thickness (Inches)	Heat Gain Btu/Hr-Sq Ft	Permissible Relative Humidity
20	½	5.7	90%
25	½	6.4	87%
30	1	6.1	89%
35	1	7.1	86%
45	1½	5.7	90%
45	1½	6.3	85%
50	2	5.4	90%

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OWENS-CORNING FIBERGLAS

air handling systems 6.10
October, 1968

Duct Liner



Black Aeroflex Duct Liner

a long glass fiber thermal and acoustical insulation with unusual toughness and high sound absorption

uses

Fiberglas ® Aeroflex ® Duct Liner is designed for use as an Acoustical and/or thermal insulation for heating and cooling ducts operating at velocities up to 6000 fpm. It has been tested at velocities up to 8000 fpm without surface erosion. Temperature limit is 180F.

description

All black Aeroflex is manufactured specifically to be a duct liner. The strongly bonded long glass fibers make this product extremely tough to resist damage during fabrication and after it is in service. Aeroflex is semi-rigid and resilient. The surface, facing the air stream, is coated with a black fire-resistant coating to bind the surface fibers tightly to avoid any loose fibers, and provide a smoother air flow surface.

benefits

absorbs unwanted sound—Fiberglas Aeroflex is an extremely efficient acoustical insulation having a high NRC of .55 to .75 (1". 3 pcf) The liner is especially efficient in absorbing low and middle frequency sounds which are the most irritating and difficult to attenuate.

resists damage—Aeroflex is tough yet resilient. It resists damage during and after installation because of the long glass fiber construction and black surface coating.

fire safe—Meets the stringent Fire Hazard Classification NFPA 90A standards.

protects against sweating the high thermal efficiency of Aeroflex protects against condensation on the metal surface of cooling ducts and reduces heat loss or gain to a minimum.

minimum joints—Aeroflex is normally applied by brake forming with the metal. This eliminates three corner joints

291441

performance characteristics

fire hazard classification: Meets the requirements of NFPA 90A standards as determined by Underwriters' Laboratory method, NFPA No. 225—ASTM E-84-50T. Flame spread—under 25; smoke developed—under 50.

surface air friction: air friction coefficient of 0.025 as tested by Ohio State University.

odor: Essentially odorless.

inorganic: Will not rot, corrode metals or support vermin.

thermal conductivity: k of .25 at 75F mean temperature (1.5 pcf).

sound absorption coefficients:

Type	Density pcf	Thickness	NRC*
150	1½	½"	.55-.65
		1"	.70-.80
200	2	½"	.55-.65
		1"	.70-.80
300	3	½"	.60-.70
		1"	.75-.85

*Noise Reduction Coefficiency—No 6 Mounting

specification compliance

Meets the requirements of HH-I-00545, Type I, Class A and Mil-I-22078, Class 4, 5, 6

application recommendations

For Air Velocities up to 1500 fpm the liner is adhered to the duct using a 90% coverage of fire resistant adhesive. When the duct width exceeds 12" or the hanger 24", the liner is additionally secured with mechanical fastenings on maximum 16" centers on the top and on the sides.

For velocities from 1500 to 4000 fpm the above recommendations apply, but before installing the liner, coat and paint the edges with a fire resistant coating where the insulation butts together.

For high velocities from 4000 to 6000 fpm, attach the liner with welded pins on 12" centers and 90% coverage of fire resistant adhesive. Coat all edges with a heavy coat of fire resistant mastic.

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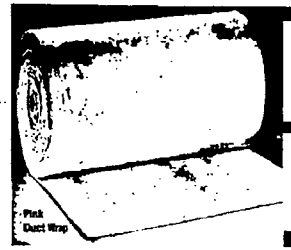
OWENS-CORNING FIBERGLAS

air handling systems 4.18
October, 1968

Duct Insulation



Pink Duct Wrap Insulation (unfaced)

for external application on all hot air ducts not requiring a facing for appearance or painting.

uses

Fiberglas Pink Duct Wrap is especially designed to insulate exteriors of both concealed and exposed round hot air ducts. Fiberglas unfaced Duct Insulation also can be effectively used to insulate concealed, retangular hot air ducts.

Its unique combination of flexibility, light weight, high insulation efficiency and moisture resistance makes it a highly desirable all-purpose duct insulation.

description

Fiberglas "Pink Duct Wrap", a highly thermal efficient insulating blanket of fine inorganic glass fibers, offers versatility, economy and flexibility as an exterior insulation for a variety of ducts operating up to 250F. The average low "k" at 75F varies with density ranging from 0.22 to 0.29. Its light weight, flexibility and toughness make this insulation an easy and time-saving material for workmen to apply even in limited space. Densities range from ½ lb. to 3 lb./cu. ft.

benefits

low operating cost — low k factor of .26 at 75F mean temperature (type 75 P). Full-thick resilience means less heat loss. Systems operate more efficiently. Air is delivered at design temperature.

all purpose insulation—ideally suited for all hot ducts not requiring a facing for appearance or surface finish. Tailored primarily for economical insulation of concealed hot air ducts; rectangular or round.

tough and resilient—Fiberglas Duct Wrap Insulation is tough and resilient. It resists damage in shipment, installation and after it is installed.

*T.M. Reg. OCF Corp.

291443

performance characteristics

moisture adsorption: less than 0.2% by volume, 96 hrs. at 120F and 95% R.H.

bacteria and fungus resistance: does not breed nor sustain bacteria or fungus.

odor: essentially odorless.

Underwriters rating:
Flame spread 25
Fuel contributed 50
Smoke developed 50

(compared with untreated Red Oak as 100)

thermal conductivity (@ 75°F mean)

type	density	Btu/Hr sq. ft. (Deg. F/in)
50P	½ Pcf	.29
75P	¾ Pcf	.26
100P	1 Pcf	.25
150P	1½ Pcf	.23
200P	2 Pcf	.22
250P	2½ Pcf	.22
300P	3 Pcf	.22

recommended thickness:

Owens-Corning Fiberglas recommends a full 2" thickness for protection against excessive heat loss or gain. This is because flexible blanket insulations may be compressed during installation. This effects the thermal performance.

sizes:

width—24", 36", 48", 72"
length—50'-100', depending upon thickness and type
thickness—½"-4"—depending on density
form—roll

limitations:

Fiberglas Flexible Duct Insulation should not be used on duct systems subject to temperatures in excess of 250F. It should not be exposed to weathering or mechanical abuse without proper protections. It should not be used on the inside of ducts. All values given are subject to normal manufacturing and testing tolerances.

specification compliance:

HH-I 558a Form B Class 6
Mil-I 22023B type II
HH-I 542 type I

application recommendations:

Hot Air Ducts—pink Fiberglas Duct Wrap insulation is normally applied with fire resistant adhesives in 3" wide strips on roughly 12" centers. End joints are butted and the longitudinal joint overlapped and stapled with a flare-door staple.

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Pub. No. 1-M9-4462

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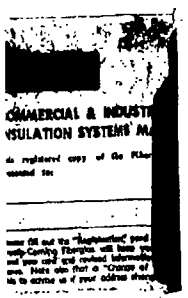

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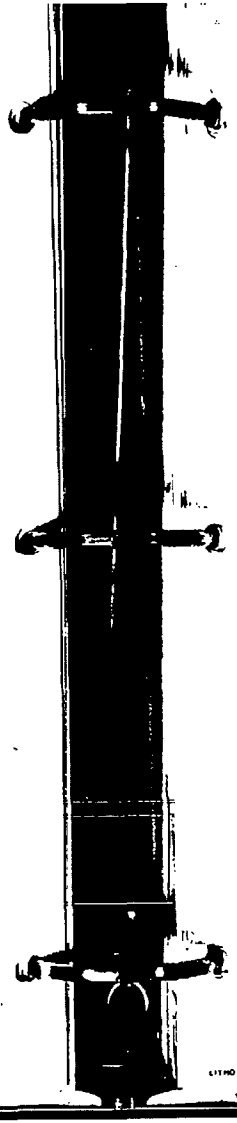


FIBERGLAS

Air Handling Systems 4.5.1

Date 1-10-66

Revised 10-12-67

application specifications

RECTANGULAR HEATING & COOLING DUCT SYSTEMS

INDUSTRIAL RECTANGULAR DUCT SYSTEM TO 250 F.

EXPOSED AND CONCEALED RECTANGULAR DUCT

The contractor shall furnish and install Owens-Corning Fiberglas Industrial Rectangular Duct System Type HD in (1), (1-1/2), inch thicknesses. The Duct System (Type 90A) shall have Underwriters' Laboratories Inc. Class 1 Air Duct listing and shall be so labeled. The product shall be made of glass fibers with a glass strand reinforced flame retardant vapor barrier on the exterior surface.

The Duct System shall have a thermal conductivity of 0.23 at 75° mean temperature with a noise reduction coefficient of 0.70 for mounting No. 6.

All Duct System joints shall be stapled with flare door staples 2" O.C. and a final layer of Owens-Corning Fiberglas Duct System Class I Rated mastic and glass reinforcing tape. A layer of this tape system is required on all longitudinal and transverse joints.

Duct work shall be supported at all turns and transitions, and at not more than 6 foot centers on straight runs as necessary to maintain true alignment. Hangers shall be 3/4" x No. 24 gauge straps with 90° metal corner pads, 1" x 1" x 4" at bottom corners, or trapeze type with a 1" x 2" x No. 24 gauge angle cross support under duct. Transformation and bends to avoid obstructions must be approved by the engineer. Protect duct work from damage during and after erection until final inspection.

All fabrication and installation shall conform to Owens-Corning FIBERGLAS Pub. No. 1-MS-3417 or latest revision. Reinforcement of Duct System with 22 ga. tees shall be in accordance with duct size and static pressure as shown on page two of 1-MS-3417 dated August 1966 (or later publication).

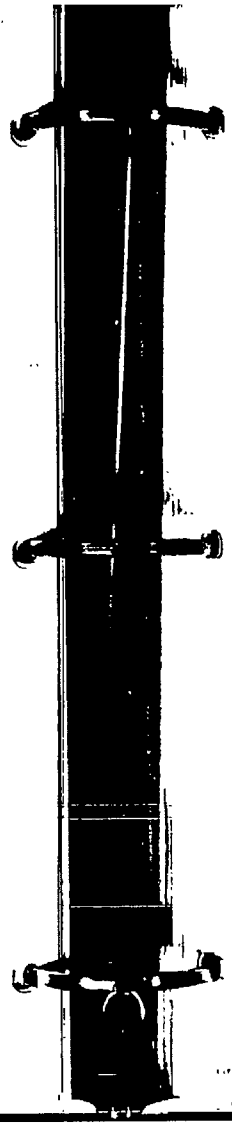
*Refer to Accessory Materials list for approved manufacturers of mastic, adhesives & other accessory materials

FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION 291445

The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

LITHO U.S.A. OCT. 1967

PUB. NO. 5-MS-3431-A



FIBERGLAS

Air Handling Systems 4.5.2

Date 1-10-44

Revised

application specifications

RECTANGULAR COOLING DUCT INSULATION

Insulate all exposed (Air Conditioning Ducts, supply and return) Fresh Air Intakes) (Sheet Metal Plenums and Casings) in finished rooms and Mechanical Equipment rooms (and all concealed rectangular Air Conditioning ducts) with _____ inch thick Fiberglas.

a) Vapor Seal Duct, Type FF
b) Type 704 (FF)
c) Type 703 (FF) --- (concealed locations only)

having a minimum compressive strength of _____ psf. at 10% deformation. Insulation with .0025" Aluminum Foil Facing shall have been tested in accordance with ASTM E-84 and shall have flame spread rating of 25 maximum and smoke developed rating of 50 maximum.

Insulation shall be cut to fit between standing seams and stiffeners and shall be secured to duct work by impaling over Mechanical Fasteners* at the rate of one per 2 sq. ft. All joints shall be tightly butted. Tape all joints and cover all pin penetrations with 4" wide x .0025" Foil Tape adhered with Lap Seal Adhesive*, to provide a complete vapor barrier envelope.

FINISH

In exposed locations secure metal corner beads to all exterior edges of insulated duct and cover with:

a) 6 oz. Canvas adhered with Lagging Adhesive* and brushed with one coat of Lagging Adhesive*.
b) Pre-Sized Glass Cloth adhered with Lagging Adhesive*

[illegible] accessory materials.

FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION

The above specification is general in nature. Application procedure is as the description and responsibility of the Design Engineer to meet specific job requirements.

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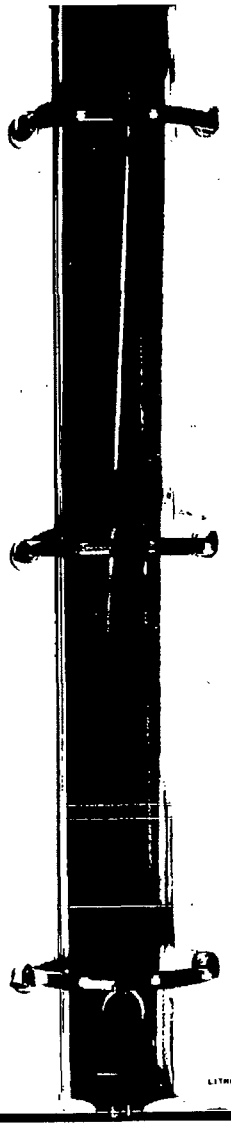

FIBERGLAS

Air Handling Systems 4.5.3

Date 1-10-66

Revised 5-18-67

application specifications

ROUND HEATING & COOLING DUCT SYSTEMS

INDUSTRIAL CONSTRUCTION

EXPOSED AND CONCEALED RIGID ROUND DUCT SYSTEM

The contractor shall furnish and install Owens-Corning Fiberglas Rigid Round Duct in 1 inch thick (sizes 4, 5, 6, 7, 8, 9 and 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 or 30 inches). The round duct shall have Underwriter Laboratories, Inc. Class 1 Air Duct listing and shall be so labeled. The product shall be made of glass fiber with a flame retardant vapor barrier on the exterior surface.

The Round Duct System shall have a thermal conductivity of .23 at 75° mean temperature with a noise reduction coefficient of 0.75 for mounting No. 6.

All Round Ducts shall be assembled with standard sheet metal accessories as recommended by the manufacturer and all joints shall be taped with a 2" wide pressure sensitive tape supplied by the duct manufacturer. The tape shall be centered over the joint and end lapped at least 3".

Round Duct work shall be supported at all turns and transitions and straight runs at a maximum of 6 feet on center where building framing does not provide such support. Support shall be a 3/4 inch metal strap suspended from the roof or framing.

All fabrication and installation shall be in accordance with the Owens-Corning Fiberglas Application Manual.

FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION

The above specification is general in nature. Application procedures is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other necessary materials.

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LITHO U.S.A., MAY 1967

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FIBERGLAS

Air Handling Systems 4.5.4

Date 1-10-66

Revised 6-1-67

application specifications

ROUND COOLING DUCT INSULATION

Insulate all (indoor) (outdoor) (circular Air Conditioning ducts exposed in finished rooms and mechanical equipment rooms) (circular Air Conditioning Ducts in concealed locations) with inch thick Fiberglas Faced Duct Wrap Type IV with factory applied flame retardant Foil-Reinforced Kraft Facing (FRK).

Insulation shall be wrapped tightly on the duct work with all joints butted. Secure insulation with flare type staples. Vapor seal joints with glasfabric and brush coat of indoor vapor barrier finish mastic* or vapor barrier lap adhesive* and pressure sensitive tape.

FINISH

Concealed Ducts: No further treatment required.

Exposed Ducts:

1. Indoor

   A. Wrap Insulation with rosin sized paper or asbestos Paper and cover with six ounce canvas adhered with lagging adhesive. Finish with one coat of the same Lagging Adhesive.

2. Outdoor

   Cover Insulation with 35 or 45 pound roofing felt or corrugated aluminum jacket. A minimum density of insulation of one pound per cubic foot is required. Jacket shall be lapped and weather sealed and banded on 12" centers with 1/2" x .015 aluminum bands.

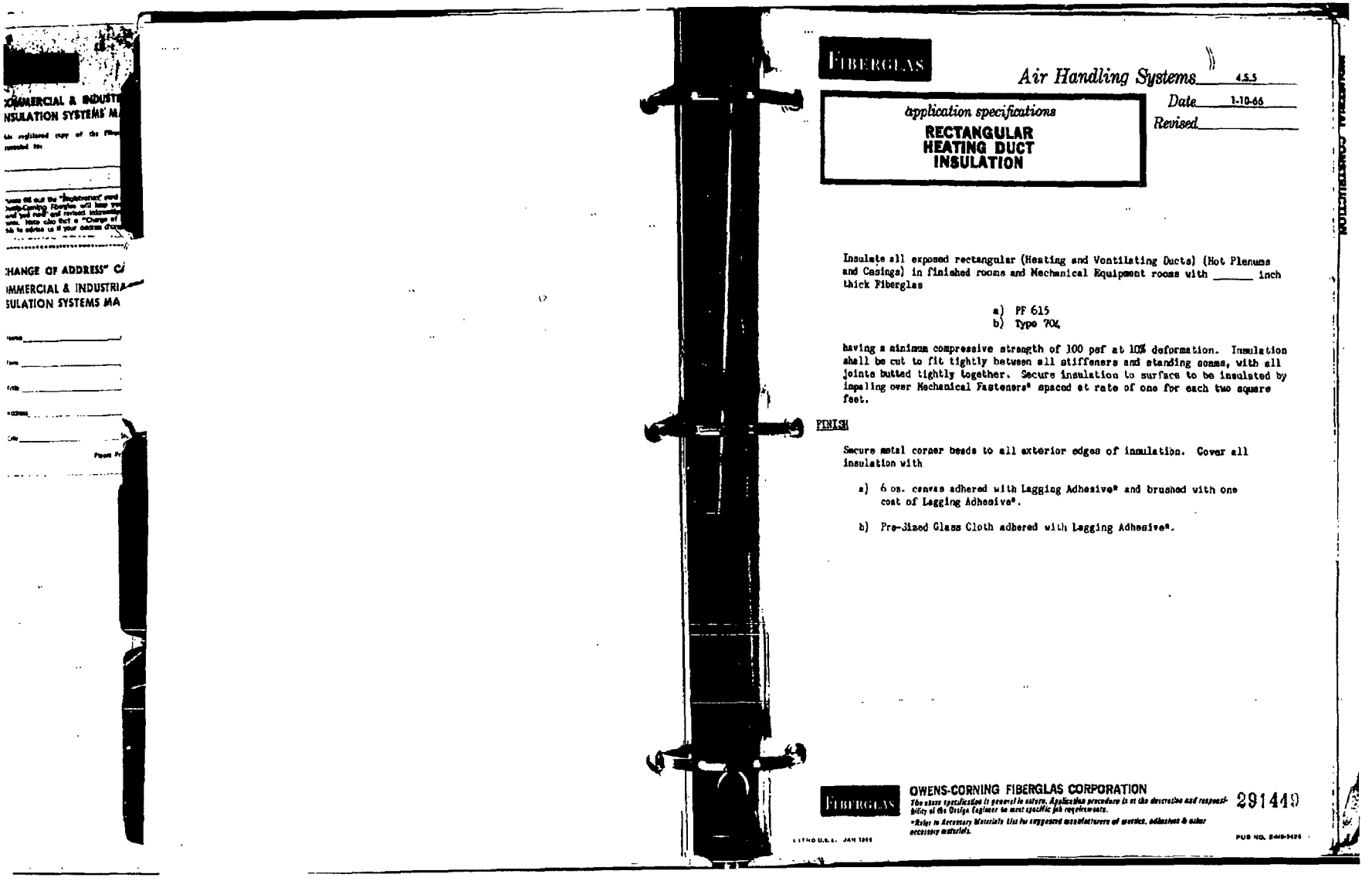
FIBERGLAS OWENS-CORNING FIBERGLAS CORPORATION

291418

The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

**Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials*

LITHO U.S.A. 6/67



FIBERGLAS

Air Handling Systems 4.5.5

Date 1-10-66

Revised

application specifications

RECTANGULAR HEATING DUCT INSULATION

Insulate all exposed rectangular (Heating and Ventilating Ducts) (Hot Plenums and Casings) in finished rooms and Mechanical Equipment rooms with _____ inch thick Fiberglas

a) PF 615
b) Type 70*

having a minimum compressive strength of 100 psf at 10% deformation. Insulation shall be cut to fit tightly between all stiffeners and standing seams, with all joints butted tightly together. Secure insulation to surface to be insulated by impaling over Mechanical Fasteners* spaced at rate of one for each two square feet.

FINISH

Secure metal corner beads to all exterior edges of insulation. Cover all insulation with

a) 6 oz. canvas adhered with Lagging Adhesive* and brushed with one coat of Lagging Adhesive*.

b) Pre-Sized Glass Cloth adhered with Lagging Adhesive*.

FIBERGLAS

OWENS-CORNING FIBERGLAS CORPORATION

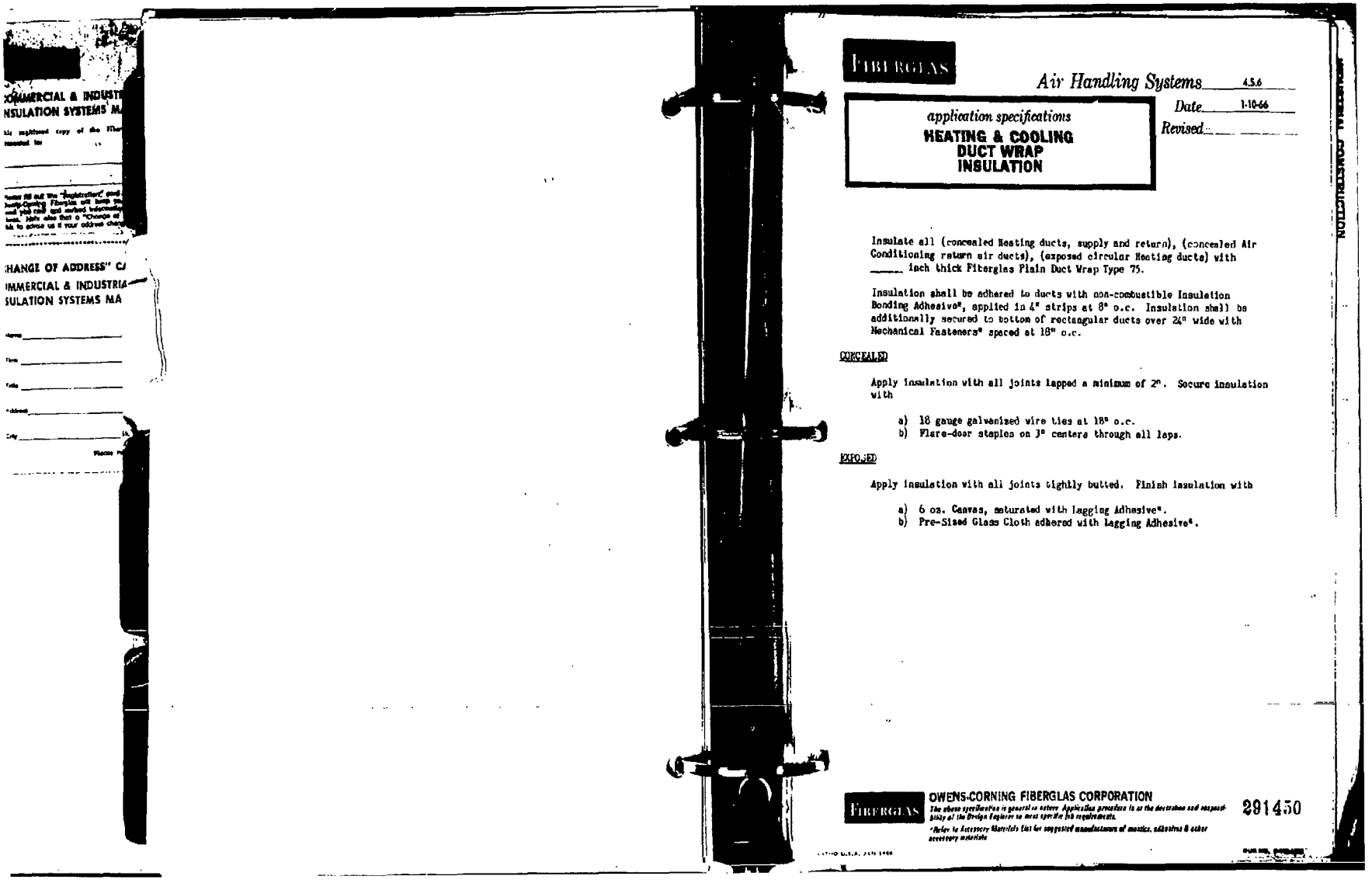
The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

*Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials.

291419

LITHO U.S.A. JAN 1966

PUB NO. 5405-5426



FIBERGLAS

Air Handling Systems 4.5.6

Date 1-10-66

Revised

application specifications

HEATING & COOLING DUCT WRAP INSULATION

Insulate all (concealed Heating ducts, supply and return), (concealed Air Conditioning return air ducts), (exposed circular Heating ducts) with _____ inch thick Fiberglas Plain Duct Wrap Type 75.

Insulation shall be adhered to ducts with non-combustible Insulation Bonding Adhesive*, applied in 4" strips at 8" o.c. Insulation shall be additionally secured to bottom of rectangular ducts over 24" wide with Mechanical Fasteners* spaced at 18" o.c.

CONCEALED

Apply insulation with all joints lapped a minimum of 2". Secure insulation with

a) 18 gauge galvanized wire ties at 18" o.c.
b) Flare-door staples on 3" centers through all laps.

EXPOSED

Apply insulation with all joints tightly butted. Finish insulation with

a) 6 oz. Canvas, saturated with Lagging Adhesive*.
b) Pre-Sized Glass Cloth adhered with Lagging Adhesive*.

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The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

**Refer to Accessory Materials List for suggested manufacturers of mastics, adhesives & other accessory materials*

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OWENS-CORNING FIBERGLAS

Air Handling Systems 4.5.7

Date 1-10-66

Revised 11-1-67

application specifications

ACOUSTICAL LINING

Where indicated on the drawings, acoustically line all ducts plenums and casings with_____inch thick Fiberglas

a) Aeroflex Duct Liner
b) Duct Liner Board
c) Coated Duct

Adhere liner, with coated side toward air stream, to all interior sides of duct with a minimum 50% coverage of fire-resistant Insulation Bonding Adhesive*. Adhesive shall completely cover the sheet metal at each end of each section of duct work.

When duct width exceeds 12", or height exceeds 24" further secure the liner to these surfaces with mechanical fasteners (Gripnails*, welded pins, or stick clips) at 16" o.c.

VELOCITIES - 1500 TO 4000 FPM

Install as above but additionally, point all joints in liner and butter the edges of the liner where sections of duct work will be joined with fire-resistant Indoor Breather Mastic*.

VELOCITIES - 4000 TO 6000 FPM

Insulation shall be installed as above except that mechanical fasteners shall be spaced at 12" o.c. on all surfaces. Coat cap of fasteners with a brush coat of fire-resistive Lagging Adhesive*.

*Refer to Accessory Materials (-s) for suggested manufacturers of mastics, adhesives & other accessory materials

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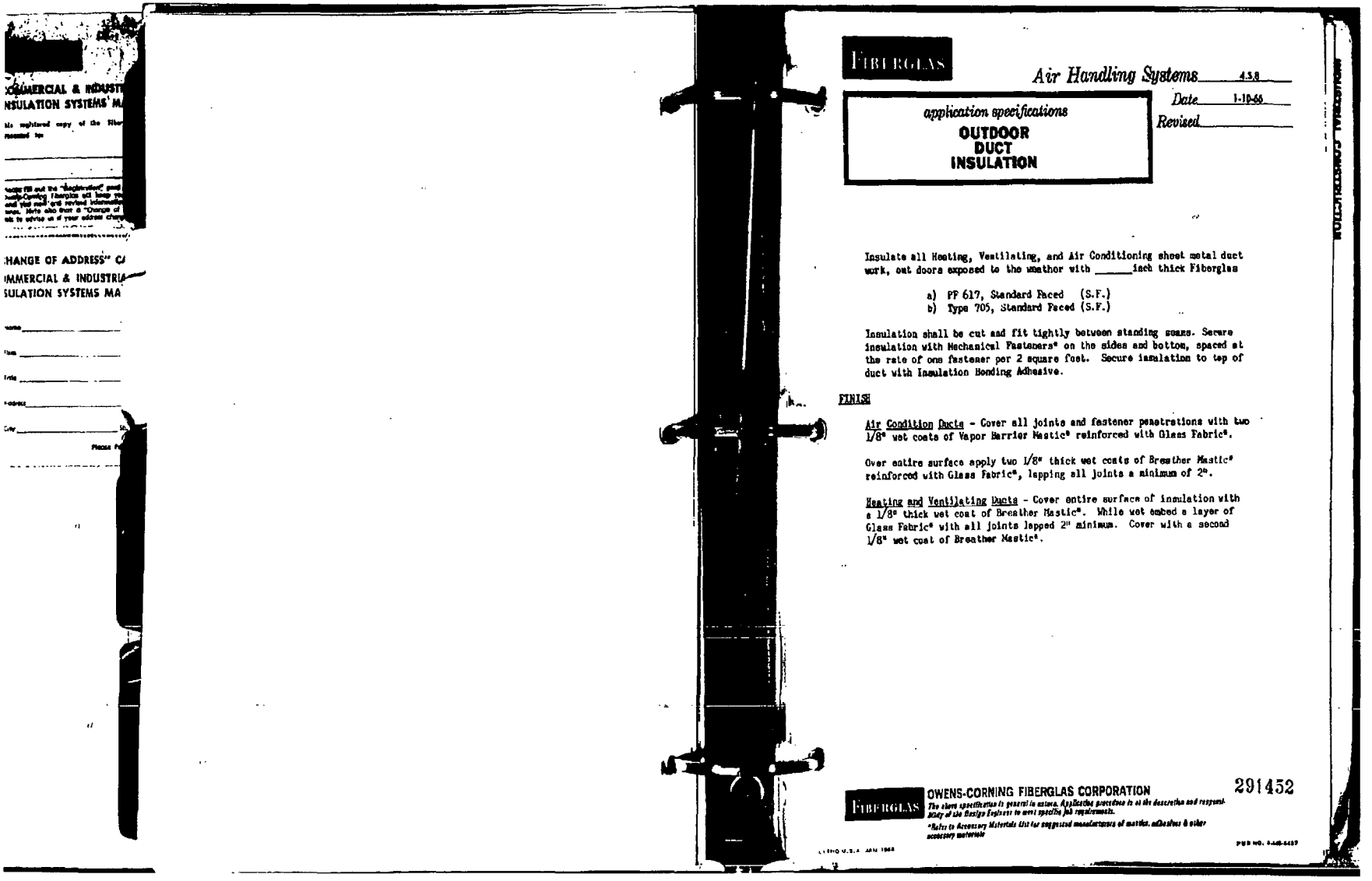
PUB. NO. B-MS-3458-A

INDUSTRIAL CONSTRUCTION



FIBERGLAS

Air Handling Systems 4.5.8

Date 1-10-66

Revised

application specifications

OUTDOOR DUCT INSULATION

Insulate all Heating, Ventilating, and Air Conditioning sheet metal duct work, out doors exposed to the weather with _____inch thick Fiberglas

a) PF 617, Standard Faced (S.F.)
b) Type 705, Standard Faced (S.F.)

Insulation shall be cut and fit tightly between standing seams. Secure insulation with Mechanical Fasteners* on the sides and bottom, spaced at the rate of one fastener per 2 square feet. Secure insulation to top of duct with Insulation Bonding Adhesive.

FINISH

Air Condition Ducts - Cover all joints and fastener penetrations with two 1/8" wet coats of Vapor Barrier Mastic* reinforced with Glass Fabric*.

Over entire surface apply two 1/8" thick wet coats of Breather Mastic* reinforced with Glass Fabric*, lapping all joints a minimum of 2".

Heating and Ventilating Ducts - Cover entire surface of insulation with a 1/8" thick wet coat of Breather Mastic*. While wet embed a layer of Glass Fabric* with all joints lapped 2" minimum. Cover with a second 1/8" wet coat of Breather Mastic*.

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291452

The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

*Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives & other accessory materials

PUB NO. 4-MS-6457

LITHO U.S.A. JAN 1966

INDUSTRIAL CONSTRUCTION

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Air Handling Systems 4.5.9

Date 1-20-67

Revised 8-8-67

application specifications

CONCEALED HEATING & AIR CONDITIONING FOR ROUND FLEXIBLE DUCT SYSTEMS

Installation Instructions For Fiberglas Flexible Duct

uses

[redacted]

Owens-Corning Fiberglas Flexible Duct is recommended for use as a complete air duct or connector on supply and return air lines in Residential, Industrial and Commercial heating, air conditioning and ventilating systems. In addition it can be used as runouts to registers, diffusers and mixing boxes. The flexible feature allows it to conform to gradual bends necessary when connecting air ducts to diffusers or when routing air ducts through spaces with many obstructions.

description

[redacted]

Fiberglas Flexible Duct is a light weight duct formed with a resilient core insulated with Fiberglas Flexible Insulation and jacketed with a tough non combustible (as defined by NFPA No. 101-1966) vapor barrier jacket. Each section is furnished with locking male and female sheet metal end rings. It has an interior surface of glass fiber scrim cloth.

Duct Sizes

DIAMETER	LENGTH	WALL THICKNESS
4-10" in 1" increments 12-18" in 2" increments	nominal 6'	1" nominal

Tools and Accessory Materials Required:

1. Wire cutters
2. Knife or scissors
3. Tape (OCF Type III Fiberglas Duct Tape)
4. Sheet Metal Strap hangers (½")
5. Sheet Metal Strapping 1½", or greater in width for saddles
6. Screw Drivers
7. #8 Sheet Metal Screws ⅜" long
8. Fiberglas Duct Wrap
9. ¼" Drill



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INDUSTRIAL CONSTRUCTION

A – *Connections For Straight Runs:*



1. Insert the crimped male end into the female end.



2. A mechanical lock is achieved by squeezing the two sections, lightly, but firmly until a "click" is heard as the locking tabs on the male end rings engage behind the female end ring.



3. Fold the jacket overlap on the male end of the duct over the female end of the connecting duct.



4. Secure and seal the joint with recommended two wraps of Fiberglas Duct Tape Type III

B – *Connection to Take-Offs:*



1. Place correct size sheet metal connection into side or top take-offs of Fiberglas or sheet metal duct. (Side take-offs can be used on top where bending radii of Flexible Duct permits.) In the case of top take-offs, it is recommended that Fiberglas Duct Insulation be used to insulate the top take-off.

2. Where top take-offs are used in close work as between floor joists or floors the section of Flexible Duct should be placed on take-off before Duct is put in place.



3. Insert female end over the metal connection.



4. Peel back jacket, Fiberglas insulation, draw 3 holes 120° apart thru sheet metal collar and take off and then tighten together with #8X¾" sheet metal screw.



5. Pull jacket and Fiberglas back over collar and adhere jacket to trunk or Duct insulation with two wraps of Fiberglas Duct Tape Type III to insure a positive vapor barrier seal.

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C – *Connection Into Sheet Metal Boots:*



1. Install boot and insulate with Fiberglas Duct Wrap.



2. Insert sheet metal male end of Flexible Duct into sheet metal boot.



3. Drill 3 holes 120° from each other, around sheet metal collar, and tighten collar together with #8¾" sheet metal screw.

4. Pull jacket and Fiberglas back over collar and adhere jacket to trunk or Duct insulation with two wraps of Fiberglas Duct Tape Type III to insure a positive vapor barrier seal (as shown in Fig. A-3 and A-4).

D – *Connection to Transitions, Tees and Reducers:*

Installation of Flexible Duct to Transition, tees and reducer fittings is done exactly as regular sheet metal Duct connections. Make sure all metal connections are insulated.

E – *Suspension of Flexible Duct:*

When an unsupported length of Duct exceeds three feet, it is necessary to support the Duct by attaching to the structural framing. Suspension may be made in one of the following ways:

1. 1½" galvanized iron saddles under Flexible Duct with sheet metal (see Fig. A-1 and A-3) or aluminum straps under saddles and up to structural framing for hangers.

2. a. Twist end of 18 gauge wire into loop (270°).
   b. Cut wire to desired length.
   c. Every sheet metal male end has a ⅛" hole ¾" in from outside end.
   d. Push galvanized wire through hole from inside of male end ring, puncture wool and vapor barrier.
   e. Pull wire up tight and seal vapor barrier around wire with Type III Duct Tape.
   f. Attach wire to structural framing when hanging duct.

F – *Precautions:*

1. Installation Location—Fiberglas Flexible Duct is not recommended for outdoor installations.
2. Vapor Barrier - If the vapor barrier jacket is accidentally punctured, repair the puncture by sealing with recommended tape.
3. Wire should not be used around vapor barrier to suspend Flexible Duct.
4. After installation—Blow out Duct Systems prior to occupancy to remove any cutting scraps and foreign matter remaining in the Ducts.
5. Do not install unless temperature is 20°F or above.
6. The vapor barrier jacket should not be used as the only means of support.
7. Vinyl film should not be adhered directly to uninsulated sheet metal.
8. Do not exceed design limitations of 1½" H_2O positive static pressure.
9. Do not exceed design limitations of 2500 FPM.
10. Do not exceed ½" H_2O negative static pressure.
11. Not to exceed 250°F air in duct.

G – *Bending Conditions:*

The following are the maximum recommended bending conditions for each diameter:

1. 4"-12" diameter Duct. A uniform 180° bend in a 6' section of duct.
2. Over 12" diameter Duct. A uniform 90° bend in a 6' section.

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INDUSTRIAL CONSTRUCTION
1.5.8
3.5.3
4.5.10
4-1-67
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The above specification is general in nature. Application procedure is at the discretion and responsibility of the Design Engineer to meet specific job requirements.

*Refer to Accessory Materials list for suggested manufacturers of mastics, adhesives and other accessory materials.

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PUB. NO. 3-US-3165-D

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LITHO U.S.A. AUGUST, 1967

FIBERGLAS

Plumbing Systems 1.S.8
Mechanical Equipment 3.S.3
Air Handling Systems 4.S.10
Date 4-1-67
Revised 7-10-68

application specifications

FIBERGLAS 25* : H-E

hot equipment up to 450F

Figure 1—Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type H (Pressure Sensitive, U.L. labeled)



Figure 2

Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers.

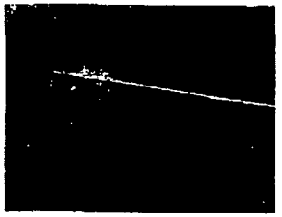

Figure 3

Cut Fiberglas 25 insulation to dimension and impale on pins. Apply pressure on facing in the area of the pin penetration. For elbows, cut pie-shaped pieces for top and bottom. Make sure insulation fits tightly at the seams before impaling.



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Figure 4

Groove Fiberglas 25 board for curved surfaces and fabricate flanges. The board should be scored with a grooving tool, saw or knife to half the board thickness, and the material removed from the slot. Flanges should not overlap the top and bottom boards. All wool shall be scraped from the flanges before sealing.

The smaller the radius of the board, the smaller the space between cuts.



Figure 5

Install side pieces making sure the edge of the insulation is flush with the top and bottom board surfaces.

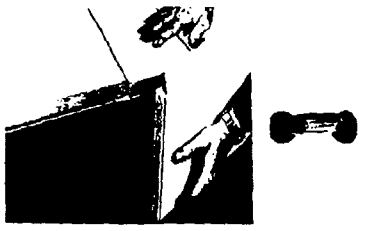


Figure 6

Cut pins to length as required and apply pre-finished fastener caps. Pins should protrude 1/16" to 1/8" above the surface of the insulation. If more than 1/8" shows, cut it off to the correct length before applying the cap. This will assure a tight fit of insulation to the surface.

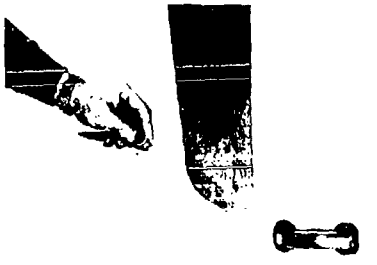


Figure 7

Apply OCF Joint Sealing Tape Type H to all transverse and longitudinal seams after insuring you have a dry dust-free surface. Use the nylon sealing tool to apply pressure to the joint and make a good bond. Do not remove all the release paper from the tape but rather gradually pull it back as required. This keeps dust, etc. from fouling the adhesive surface. Make sure the tape is properly aligned with the seam before it is sealed down.



Figure 8

Use nylon sealing tool on all taped joints. This will result in a good bond and reduce air pocket and "fish-mouths." For a superior bond, use a 300F iron on the tape.



Figure 9

Insulating the throat of an elbow. Prepare a Fiberglas 25 board of correct dimensions for the throat and fabricate the top and bottom flanges. Next, use a grooving tool, knife or saw and groove the board facing side up. Cut at least half way through the insulation.

Slit sections may also be used as an alternate to the one piece method described above.



Figure 10

Complete insulating the throat. Impale insulation, cut pins to correct length, install caps, and strip the top and bottom flaps.



Figure 11

Where curved surfaces are encountered and the joint sealing tape must be notched to conform to the curvature, cut an additional length of tape to half width and apply over the notched tape surface. This will yield a neater finished appearance and improve adhesion in these areas.

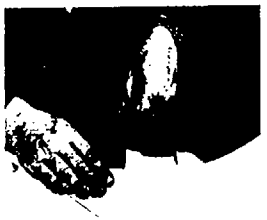
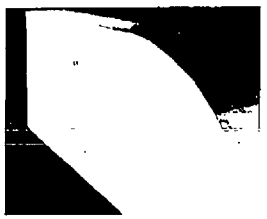


Figure 12

Completed insulation of rectangular duct.



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OWENS-CORNING FIBERGLAS

Air Handling Systems 4.S.11

Mechanical Equipment 3.S.4

Date 7-10-68

Revised

FIBERGLAS 25* : C-E

cold equipment system down to 35F

Figure 1 — Tools and accessory items:

A. Scissors
B. Nylon sealing tool
C. Stanley knife
D. Screw driver
E. End-cutting nippers
F. Pre-finished fastener caps
G. OCF Joint Sealing Tape, Type C (Pressure Sensitive, U.L. labeled)
H. OCF Fitting Mastic, Type C (U.L. labeled)



Figure 2

Attach pins to surface. Locate pins three inches in from each corner of the board. On surfaces where cross breaking is used for stiffening, additional pins may be required to hold the insulation tightly against the surface. For a neat job, keep pins in straight lines. Pins are to be on maximum 21 inch centers.



Figure 3

Cut Fiberglas 25 insulation to dimension and impale on pins. Apply pressure on facing in the area of the pin penetration. For elbows, cut pie-shaped pieces for top and bottom. Make sure insulation fits tightly at the seams before impaling.

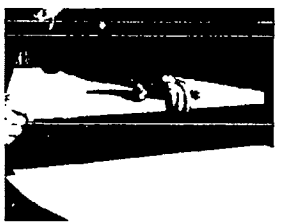

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Figure 4

Groove Fiberglas 25 board for curved surfaces and fabricate flanges. The board should be scored with a grooving tool, saw or knife to half the board thickness, and the material removed from the slot. Flanges should not overlap the top and bottom boards. All wool shall be scraped from the flanges before sealing

The smaller the radius of the board, the smaller the space between cuts.



Figure 5

Install side pieces making sure the edge of the insulation is flush with the top and bottom board surfaces.

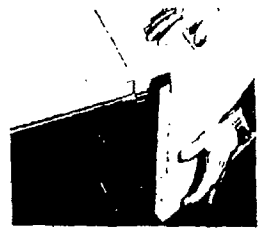

Figure 6

Cut pins to length as required and apply pre-finished fastener caps. Pins should protrude ⅛" to ¼" above the surface of the insulation. If more than ¼" shows, cut it off to the correct length before applying the cap. This will assure a tight fit of insulation to the surface. Apply OCF Fitting Mastic, Type C, about the size of a pea to the inside of the fastener cap before installation to form a vapor seal.



Figure 7

Apply OCF Joint Sealing Tape, Type C, to all transverse and longitudinal seams after insuring you have a dry, dust free surface. Use the nylon sealing tool to apply pressure to the joint and make a good bond. Do not remove all the release paper from the tape but rather gradually pull it back as required. This keeps dust, etc. from fouling the adhesive surface. Make sure the tape is properly aligned with the seam before it is sealed down.



Figure 8

Use nylon sealing tool on all taped joints. This will result in a good bond and reduce air pocket and "fish-mouths." For a superior bond, use a 300F iron on the tape.



Figure 9

Insulating the throat of an elbow. Prepare a Fiberglas 25 board of correct dimensions for the throat and fabricate the top and bottom flanges. Next, use a grooving tool, knife or saw and groove the board facing side up. Cut at least half way through the insulation.

Slit sections may also be used as an alternate to the one-piece method described above.



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Figure 10
Complete insulating the throat. Impale insulation, cut pins to correct length, install caps and strip the top and bottom flaps.



Figure 11
Where curved surfaces are encountered and the Joint Sealing Tape must be notched to conform to the curvature, cut an additional length of tape to half width and apply over the notched tape surface. This will yield a neater finished appearance and improve adhesion in these areas.



Figure 12
Completed insulation of rectangular duct.



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PUB. NO. 3-BN-031

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Commercial & Industrial Insulation Systems Manual

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Equipment
Air Handling
Industrial
Piping
Equipment
Vessels and tanks
Boilers and chimneys

B. Determine Temperature

C. Choose products from th
Guide Indexes

D. Refer to PRODUCT DAT
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