PLAINTIFF'S EXHIBIT
DUP-111

187

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	AUG 1983	Page 1 of *
STANDARD REAFFIRMED	AUG 1983	

Code	102	102.1
Material Designation	Calcium silicate	Calcium silicate - inhibited
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Asbestos free Note 5; reacted hydrous calcium silicate reinforced with fibers	Asbestos free Note 5; reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers
Suitable for Use: On unprotected aluminum	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes
Recommended Temperature Range	To 200°F max	To 200°F max
K Factor Btu/(hr)(ft²)(°F/in)	0.42 at 200°F mean 0.51 at 400°F mean 0.63 at 600°F mean	0.42 at 200°F mean 0.51 at 400°F mean 0.63 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor
Density	14 lb/ft³ max	14 lb/ft³ max
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	60 lb/in² min at 5 percent deformation	60 lb/in² min at 5 percent
Resistance to Handling Breakage	Fair to poor	Poor
Dimensions	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1 500 ppm chloride as NaCl in the test water shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
Approved Materials and Vendors	*Thermo-12* Manville Corp	*Super Caloroma, Type VA* Pabco Insulation Div Louisiana-Pacific Corp
	Kaylo-10AF Owens-Corning Fiberglas Corp	*Pemul* (Note 3) Pemrod SA
	Super Caloroma, Type V4 Pabco Insulation Div Louisiana-Pacific Corp	*Bexolite* (Notes 1, 2, and 3) Wessite Co
	Celotemp 1500 (Notes 1, 3, 4, and 6) Insul-Coustic Div Certeed Corp	*Kaylo-10AF* Owens-Corning Fiberglas Corp
	Pemul (Note 3) Pemrod SA	
	Bexolite (Notes 1, 2, and 3) Wessite Co	*Sproule S R 1200* (Notes 1, 2, 3, and 7) Sproule Mfg Co
	Sproule S R 1200 (Notes 2 and 7) Sproule Mfg Co	*Caretemp 1500* (Notes 4 and 6) Careytemp SA
	Caretemp 1500 (Notes 4 and 6) Careytemp SA	*Calsilite* Calsilite Insulation Products Dresser Industries Inc
	Calsilite Calsilite Insulation Products Dresser Industries Inc	

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ in OD; larger sizes are fabricated
4. Do not use in thermal/acoustical systems
5. Has been specified to be asbestos free since 1972.
6. Absorbs much less water. Water absorption resistance rapidly diminishes above 350°F
7. Absorbs much less water. Water absorption resistance rapidly diminishes above 500°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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SUBCOMMITTEE NO 25

DUPONT

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DUP 0991373

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PREFORMED BLOCK AND PIPE INSULATION

Code	182.3	111	
Material Designation	Perlite silicate – inhibited – water resistant	Cellular glass	
Purpose	Insulation for hot pipe and equipment particularly where moisture resistance is required at or below 500°F	Insulation for cold- or dual-temperature pipe and equipment	
Material Description	Asbestos free. Fiber-reinforced expanded perlite and sodium silicate	Cellular glass foamed and fused into unicellular form	
Suitable for Use: On unprotected aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	Yes	No	
Recommended Temperature Range	1100°F max	−200 to +100°F (300°F for dual temp)	
K Factor Btu/(h)(ft²)(°F/in)	0.42 at 200°F mean 0.52 at 400°F mean 0.64 at 600°F mean	0.33 at 50°F mean 0.35 at 75°F mean 0.36 at 100°F mean	
Moisture Resistance or Water Vapor Permeability	Good	Fair	
Density	14 lb/ft³ max	7 to 9 lb/ft³	
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	80 lb/in² min at 5 percent	50 lb/in²	
Resistance to Handling Breakage	Poor	Fair	
Dimensions	See SN30	See SN30	
Flame-Spread Rating	Does not burn	Does not burn	
Specifications, Qualifications, Limitations	Recommended for use on austenitic stainless steel. Protect aluminum per SN1A. Following 24 hours heating heat at 500°F, the material must pass the Du Pont 6-day test for chloride stress-corrosion cracking and must not absorb more than 5 percent moisture, by weight, after 3-minute immersion in ambient tap water	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendors' labels upon certification as to their identity			
Approved Materials and Vendors	*Sproule SR 1200* (see note) Sproule Mfg Co	*Foamglas* Pittsburgh Corning Corp	

Note: Molded two-piece fitting covers are available in screwed, welded, and sweat types.

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PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Code	112	112.1	112.6
Material Designation	Glass fiber	Glass fiber – high temperature	Glass fiberboard
Purpose	Insulation for moderate-temperature pipe and equipment	Insulation for high-temperature pipe	Block insulation for moderate-temperature equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections one-piece hinged, plain, without jacket	Pipe section insulation consisting of high-temperature resistant glass fibers with a high-temperature binder. Pipe sections are one piece hinged, plain without jacket	Glass fiber bonded board plain without covering
Suitable for Use: On unprotected aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	To 650°F	40 to 350°F
K Factor Btu (h)(ft²)(°F/in)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.23 at 100°F mean 0.36 at 300°F mean 0.48 at 460°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb/ft³ nominal	4 lb/ft³ nominal	3 lb/ft³ nominal
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Nonload bearing inserts required where pipe is supported outside insulation	Nonload bearing inserts required where pipe is supported outside insulation	Nonload bearing inserts required where pipe is supported outside insulation
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Pipe See SN30; to 4 in thickness	Standard block 24 in × 48 in Thickness: 1 in, 1½ in, 2 in
Flame-Spread Rating	25 or less	Does not burn	25 or less
Specifications, Qualifications, Limitations	Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7/8 lb/ft³ density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A	Poor resistance to abuse. Not recommended for preinsulation. May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESD). Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified consult vendor's catalogs and include on order. Nominal 4 lb/ft³ density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 400 Pipe Covering* Certain-Teed Corp	*650 Snap-On Fiberglass Pipe Insulation* (Note 2) Certain-Teed Corp	*IB 100* Certain-Teed Corp
	Micro-Lok 650 Manville Corp	*Heavy Density Fiberglas 25 Pipe Insulation* Owens-Corning Fiberglas Corp	*Spin-Glas No. 814* Manville Corp
	Pipe Covering – One Piece (Note 3) Owens-Corning Fiberglas Corp	*Micro-Lok 650 Pipe Insulation* Manville Corp	*Fiberglas, Type 701* Owens-Corning Fiberglas Corp
	Knauf Pipe Insulation, 650 (Note 2) Knauf Fiber Glass GmbH	*Knauf Pipe Insulation, 650* (Note 2) Knauf Fiber Glass GmbH	*Rigid Insulation Board, 3 lb* (Note 3) Knauf Fiber Glass GmbH

Notes:
1. Molded fitting covers only
2. Service temperature to 650°F
3. Service temperature to 650°F

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PREFORMED BLOCK AND PIPE INSULATION

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Code	114	114.1	114.2
Material Designation	Mineral wool - 1,800°F	Mineral wool - inhibited - 900°F	Mineral wool - 1,200°F
Purpose	Insulation for high-temperature pipe fittings and equipment	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Mineral wool with high-temperature binder	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped, sprayed, or brushed with sodium silicate to the equivalent of 100 ft^2/gal	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder
Suitable for Use: On unprotected aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,800°F max	900°F max (limited by sodium silicate)	1,200°F max
K Factor Btu/(hr)(ft^2)(°F/in)	0.40 at 200°F mean 0.80 at 600°F mean 1.00 at 1,000°F mean	0.36 at 200°F mean 0.45 at 400°F mean 0.80 at 800°F mean	0.36 at 200°F mean 0.45 at 400°F mean 0.80 at 800°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	15 to 19 lb/ft^3	11 to 19 lb/ft^3	10 to 19 lb/ft^3 min
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited material.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*FBX 1900 Block* Fibrex, Inc	*Epitherm-1200 Molded Pipe Insulation* Fibrex, Inc	*Epitherm-1200 Molded Pipe Insulation* Fibrex, Inc
	Wone Block (Block only) Keene Corp Industrial Insulation Div	*FBX 1300 Block* Fibrex, Inc	*FBX 1300 Block* Fibrex, Inc
	K-Fac PC (Block only) (Note 1) U. S. Gypsum Co	*FBX WF1200 Pipe Insulation* Fibrex, Inc	*FBX WF1200 Pipe Insulation* Fibrex, Inc
		K-Fac PC (see note) U. S. Gypsum Co	*K-Fac PC* (see note) (Block and Pipe Sections) U. S. Gypsum Co
	Fiberfrax Mineral Wool Board (Block only) Carborundum Co, The	*Series HWM 1200* Fitting Covers HAMFAB Corp	*Delta 10 Board* Rock Wool Mfg Co
	Hi-Blok (Block only) Holmes Insulations, Inc	*1212 Block* Holmes Insulations, Inc	*1212 Block* Holmes Insulations, Inc
		RXL 120 High Density Insulation (Block only) Rosui Co	*RXL 120 High Density Insulation* (Block only) Rosui Co

Note: Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

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PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Code	116	118	118 1
Material Designation	Flexible foamed plastic	Polyurethane foam - rigid	Polyisocyanurate foam - rigid
Purpose	Insulation for moderate-temperature and antisweat application pipe and equipment	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Preformed resilient closed-cell elastomer foam sheet and pipe insulation	Preformed rigid urethane foam block pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block pipe and fitting insulation manufactured with polyester or polyether resins flammability retarding agents specific catalysts and a fluorocarbon blowing agent
Suitable for Use: On unprotected aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	-40 to +180°F	-100 to +180°F	-100 to +300°F
K Factor Btu/(hr)(ft²)(°F/in)	0.28 at 75°F mean 0.29 at 90°F mean	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.16 at 100°F mean
Moisture Resistance or Water Vapor Permeability	0.15 Perm - inches	Fair	Fair
Density	6 lb/ft³ max	1.8 to 2.5 lb/ft³	1.8 to 2.5 lb/ft³
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Low	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation measured parallel to foam rise
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Sheet size 36 in x 48 in Sheet thickness: 1/8 in to 1 in Pipe covering: To 5 in IO and 6 ft long Pipe thickness: 3/8 in 1/2 in, 5/8 in	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 unclothed installations must meet flame-spread rating limitation given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced by 10 x 10 mesh glass cloth, 10 lb/100 yd² installations must meet flame-spread rating limitations given in SN1A	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon mastic 1/32 in dry thickness, reinforced with open-weave glass cloth installations must meet flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 in Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells, no voids having any dimension exceeding 1/4 in Heat Aging Test: Block 1 in square and 7 in long cut from near outer surface, on rests 6 in apart with 70 gm weight having 1 in square base in middle of span shall not distort block more than 1/16 in in one hour at 225°F Water absorption max 4 percent by volume into a 2 in x 2 in x 1 in skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps Austenitic stainless steel at or above 140°F must be protected per SN1A	Uniform cell structure with max 10 percent open cells, no voids having any dimension exceeding 1/4 in Important to positively identify Code 118 1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature Austenitic stainless steel at or above 140°F must be protected per SN1A
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Armaflex II* Armstrong World Industries		*Tremco CPR-9501-1* Upjohn Co CPR Div
	R-180-FS, tubing Rubatex Corp	*Tremco CPR-190-1* Upjohn Co. CPR Div	
	1800-FS, sheet Rubatex Corp		

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DUP 0991377

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PREFORMED BLOCK AND PIPE INSULATION

Code	118.2	130	131
Material Designation	Polyisocyanurate foam – rigid, 3 lb	Polystyrene foam	High-density calcium silicate board
Purpose	Insulation for cold- or dual-temperature sips and equipment	Insulation for cool pips and equipment	Use where high structural strength insulation is required
Material Description	Preformed rigid polyisocyanurate foam blocks, sheets, pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts and a fluorocarbon blowing agents	Preformed polystyrene foam sheets, pipe and fitting insulation cut from extruded polystyrene foam with a variety of plain and offset type joints, or it can be molded from expanded polystyrene beads to final shape with plain or offset joints	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate inert fillers, and reinforcing agents. Sanded on both sides
Suitable for Use: On unprotected aluminum	Yes	Yes	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	−100 to +375°F	−100 to +140°F	1 200°F max
K Factor Btu/(hr)(ft²)(°F/in)	0.16 at 50°F mean 0.17 at 75°F mean 0.17 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair for outdoor use	Poor, must be painted
Density	3.0 to 3.4 lb/ft³	1.5 lb/ft³ min	46 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to foam rise	Min 25 lb/in² at 5 percent deformation	1 000 psi at 5 percent deformation. Modulus of rupture 900 psi
Resistance to Handling Breakage	Good	Good	Very good
Dimensions	3 lb/ft³	See SN30	Thickness, in. 1/2, 3/4, 1, 1 1/4, 1 1/2, and 2
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic 1/32 in dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A	Installations must meet the flame-spread rating limitations given in SN1A.	Flame-spread rating is 0
Specifications, Qualifications, Limitations	Uniform cell structure with a max of 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.2 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 80 percent relative humidity for 15 days. Water absorption max 0.003 percent by volume after being subjected to 90°F, 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in × 2 in × 1 in slab-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at 1/2 in penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A
*The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Trymer CPR-450I-3* (Note 1) Upjohn Co, CPR Div	*Styrofoam-FR* (Note 2) Dow Chemical Co	*Versuse I* Manville Corp
		Vapor-Lock (Note 2) Insulgyne, Inc	
		Polystyrene Insulation Expanded (Note 2) Cypress of Florida, Inc	
		Permaspan (Note 2) Southeastern Foam Products Inc	

Notes:
1 Color brown
2 Must state "Minimum Density 1.5 lb/ft³" for all vendors.

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OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1964	102, 102.1
103	Diatomaceous earth	Feb 1964	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	106
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1964	
108	Corrugated asbestos paper	Feb 1964	
110	Vegetable cork	June 1966	111, 119, 120
111.1	Cellular glass	June 1966	111
111.2	Cellular glass	June 1966	111
111.3	Cellular glass	June 1966	111
112	Glass fiber	April 1956	Reinstated Sept 1968
112.01	Glass fiber	Sept 1968	112
112.02	Glass fiber	Oct 1968	112.01
112.11	Glass fiber	Sept 1968	112
112.12	Glass fiber	March 1969	112.11
112.16	Glass fiber	Sept 1968	112
112.17	Glass fiber	Sept 1968	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1968	112
112.23	Glass fiber	April 1963	
112.61	Glass fiberboard	Sept 1968	112.6
112.66	Glass fiberboard	Feb 1964	
112.71	Glass fiberboard	Sept 1968	112.6
112.81	Glass fiberboard	Sept 1968	112.6
113	Glass fiber - resorcine coated	April 1956	
115	Mineral wool - asphalt impregnated	April 1956	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam resilient	June 1963	
117.1	Urethane foam resilient	Dec 1980	
117.2	Urethane foam resilient	Feb 1980	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1980	
117.5	Urethane foam resilient	April 1980	
117.6	Urethane foam resilient	July 1963	
130	Asbestos board	Nov 1978	131

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PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

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Code	102	102.1
Material Designation	Calcium silicate	Calcium silicate – inhibited
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Asbestos free (Note 4), reacted hydrous calcium silicate reinforced with fibers	Asbestos free (Note 4), reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers
Metal Protection Required: Aluminum	Yes, per SN1A	Yes, per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes, per SN1A	No
Recommended Temperature Range	1,200°F max	1,200°F max
K Factor Btu/(h)(ft²)(°F/in)	0.42 at 200°F mean 0.51 at 400°F mean 0.63 at 600°F mean	0.42 at 200°F mean 0.51 at 400°F mean 0.63 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor
Density	14 lb/ft³ max	14 lb/ft³ max
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	60 lb/in² min at 5 percent deformation	60 lb/in² min at 5 percent
Resistance to Handling Breakage	Fair to poor	Poor
Dimensions	See SN3D	See SN3D
Flame-Spread Rating	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL – 1 – 24244 specification does not qualify a material under Code 102.1
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity		
Approved Materials and Vendors	*Thermo – 12* Manville	See Note 6
	Kaylo – 10AF Owens-Corning Fiberglas Corp	
	Super Caltemp, Type NA (Note 3) Pabco Insulation Div Louisiana-Pacific Corp	
	Pamsil (Note 2) Pamrod, SA	
	Wesolite (Notes 1, 2, and 3) Wesolite Co	
	Sproule WR 1200 (Notes 2 and 5) Sproule Mfg Co	

Notes:

1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ in OD; larger sizes are fabricated.
4. Has been specified to be asbestos free since 1973.
5. Absorbs much less water. Water absorption resistance rapidly diminishes above 500°F
6. Substitute Code 102 or 102.2 for Code 102.1. Protect metal under insulation per the applicable paint specifications and SN1A.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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DUP 0991380

SUBCOMMITTEE NO 25

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PREFORMED BLOCK AND PIPE INSULATION

Code	102.2	111	112.1
Material Designation	Perlite silicate – inhibited – water resistant	Cellular glass	Glass fiber – high temperature pipe insulation
Purpose	Insulation for hot pipe and equipment particularly where moisture resistance is required at, or below, 500°F	Insulation for cold- or dual-temperature pipe and equipment	Insulation for high-temperature pipe
Material Description	Asbestos free. Fiber-reinforced expanded perlite and sodium silicate	Cellular glass, foamed and fused into unicellular form	Pipe section insulation, consisting of high-temperature resistant glass fibers with a high-temperature binder. Pipe sections are one piece, hinged plain, without jacket
Metal Protection Required, Aluminum	Yes, per SN1A	Yes, per SN1A	Yes, per SN1A
Austenitic stainless steel at or above 35°F (2°C)	No	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	1100°F max	−200 to +100°F (300°F for dual temp)	To 850°F
K Factor Btu/(h)(ft²)(°F/in)	0.42 at 200°F mean 0.52 at 400°F mean 0.84 at 600°F mean	0.33 at 50°F mean 0.35 at 75°F mean 0.36 at 100°F mean	0.23 at 100°F mean 0.36 at 300°F mean 0.46 at 450°F mean
Moisture Resistance or Water Vapor Permeability	Good	Fair	Poor
Density	14 lb/ft³ max	7 to 9 lb/ft³	4 lb/ft³, nominal
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	60 lb/in² min at 5 percent	100 lb/in²	Nonlead bearing. Inserts required where pipe is supported outside insulation
Resistance to Handling Breakage	Poor	Fair	Good
Dimensions	See SN3D	See SN3D	Pipe. See SN3D, to 4 in thickness
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	Recommended for use on austenitic stainless steel. Following 24 hours soaking heat at 500°F, the material must pass the Du Pont 6-day test for chloride stress-corrosion cracking and must not absorb more than 5 percent moisture, by weight after 3-minute immersion in ambient tap water	Material to be fabricated with Hydrocal B-11 (U. S. Gypsum Co) adhesive	Poor resistance to abuse. Not recommended for preinsulation. May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESD). Available with factory-applied finishes and lap adhesives.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Sproule WR 1200* (see note) Sproule Mfg Co	*Foamglas H/T* Pittsburgh Corning Corp	*850 Snap-On Fiberglass Pipe Insulation* Certain-Teed Corp
			Fiberglas Pipe Covering Owens-Corning Fiberglas Corp
			Micro-Lok Pipe Insulation Manville
			Knauf Pipe Insulation Knauf Fiber Glass GmbH

Note: Molded two-piece fitting covers are available in screwed, welded, and sweat types

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DUPONT

DUP 0991381

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This Page Rev Dec 1984

PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Code	112.2	112.8	114
Material Designation	Glass fiber – high-temperature equipment insulation	Glass fiberboard	Mineral wool – 1 800°F
Purpose	Insulation for high-temperature equipment	Block insulation for moderate-temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Board insulation consisting of high-temperature resistant glass fibers with a high-temperature binder	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Metal Protection Required: Aluminum	Yes, per SN1A	Yes per SN1A	Yes per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes, per SN1A	Yes, per SN1A	Yes per SN1A
Recommended Temperature Range	To 850°F	40 to 350°F	1 800°F max
K Factor Btu/(h)(ft²)(°F/in)	0.25 at 100°F mean 0.38 at 300°F mean 0.55 at 450°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.40 at 200°F mean 0.60 at 600°F mean 1.00 at 1 200°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	3 lb/ft³ nominal	3 lb/ft³ nominal	15 to 19 lb/ft³
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 6.18 per min	Nonloadbearing	Nonloadbearing, inserts required where pipe is supported outside insulation	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Length: 8 to 10 ft Width: 24 or 48 in Thickness: 1 to 4 in. in 1/2 in. increments	Standard block: 24 in x 48 in Thickness: 1 in, 1 1/2 in, 2 in	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in
Flame-Spread Rating	Does not burn	25 or less	Does not burn
Specifications, Qualifications, Limitations	Poor resistance to abuse. Not recommended for pre-insulation. May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESD).	Available with factory-applied finishes. When specified, consult vendor's catalogs and include an allowance. Nominal 4 1/4 lb/ft³ density material is available and is recommended for fabrication involving considerable shaping and fitting.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors			
	1800 Series Spun-Glas Board Manville	*IB 300* Certain-Teed Corp	*FBX 1900 Block* Fibrex, Inc
	850°F Fiber Glass Insulation Board Certain-Teed Corp	*Spun-Glass No. 814* Manville	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Elevated Temperature Board Knauf Fiber Glass	*Type 703 Industrial Insulation Board* Owens-Corning Fiberglas Corp	*K – Fac PC* (Block only) (see note) U. S. Gypsum Co
	Insul-Quick Insulation Board, 850°F Owens-Corning Fiberglas Corp	*Rigid Insulation Board, 3 lb* Knauf Fiber Glass GmbH	*Fiberfrax Mineral Wool Board* (Block only) Carborundum Co. The
			Niblok (Block only) Harmes Insulations Inc

Note: Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0991382

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PREFORMED BLOCK AND PIPE INSULATION

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Code	114.1	114.2	116
Material Designation	Mineral wool – inhibited – 900°F	Mineral wool – 1,200°F	Flexible foamed plastic
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for moderate-temperature and antisweat application pipe and equipment
Material Description	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped, sprayed, or brushed with sodium silicate to the equivalent of 100 ft^2/gal	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder	Preformed, resilient, closed-cell elastomer foam sheet and pipe insulation
Metal Protection Required: Aluminum	Yes, per SN1A	Yes, per SN1A	No
Austenitic stainless steel at or above 35°F (2°C)	No	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	900°F max (limited by sodium silicate)	1,200°F max	−40 to +160°F
K Factor Btu/(h)(ft²)(°F/in)	0.36 at 200°F mean 0.45 at 400°F mean 0.60 at 600°F mean	0.36 at 200°F mean 0.45 at 400°F mean 0.60 at 600°F mean	0.28 at 75°F mean 0.29 at 80°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	0.15 Perm – inches
Density	11 to 19 lb/ft^3	10 to 19 lb/ft^3 min	6 lb/ft^3 max
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs	Sheet size: 36 in x 48 in Sheet thickness: 1/8 in to 1 in Pipe covering: To 5 in IO and 6 ft long Pipe thickness: 3/8 in, 1/2 in, 3/4 in
Flame-Spread Rating	Does not burn	Does not burn	Flame-spread rating per ASTM E 162 shall not exceed 75 uncoated. Installations must meet flame-spread rating limitation given in SN1A
Specifications, Qualifications, Limitations	Manufacturers do not market insulation. Consult Materials and Logistics Department for vendors who supply inhibited material.		A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 in
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Epaherm – 1200 Molded Pipe Insulation* Fibrex, Inc	*Epaherm – 1200 Molded Pipe Insulation* Fibrex, Inc	*Armaflex II* Armstrong World Industries
	FBX 1200 Block Fibrex, Inc	*FBX 1200 Block* Fibrex, Inc	*R – 180 – FS, tubing* Rubatex Corp
	FBX MF1200 Pipe Insulation Fibrex, Inc	*FBX MF1200 Pipe Insulation* Fibrex, Inc	*R – 1800 – FS, sheet* Rubatex Corp
	K – Fax PC (see note) U. S. Gypsum Co	*K – Fax PC* (see note) (Block and Pipe Sections) U. S. Gypsum Co	
	Codefit 1200/s Fitting Covers HAMFAB Corp	*Delta 10 Board* Rock Wool Mfg Co	
	1212 Block Holmes Insulations, Inc	*1212 Block* Holmes Insulations, Inc	
	RXL 120 High Density Insulation (Block only) Resil Co	*RXL 120 High Density Insulation* (Block only) Resil Co	
		Codefit 1200 Fitting Covers HAMFAB Corp	
		Lapinus 1200 Rockwool Lapinus	

Note: Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

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DUP 0991383

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This Page Rev Dec 1984

PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Code	118	118.1	118.2
Material Designation	Polyurethane foam – rigid	Polyisocyanurate foam – rigid	Polyisocyanurate foam – rigid 3 lb
Purpose	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Preformed rigid urethane foam block, pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, pipe, and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts, and a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, block, pipe and fitting insulation manufactured with polyester or polyether resins flammability retarding agents special catalysts and a fluorocarbon blowing agents
Metal Protection Required: Aluminum	No	No	No
Austenitic stainless steel at or above 38°F (2°C)	Yes, per SN1A	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	– 100 to + 180°F	– 100 to + 250°F (Notes 2 and 4)	– 100 to + 250°F (Notes 3 and 4)
K Factor Btu/(h)(ft²)(°F/in)	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.16 at 100°F mean	0.16 at 50°F mean 0.17 at 75°F mean 0.17 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair	Fair
Density	1.8 to 2.5 lb/ft³	1.8 to 2.5 lb/ft³	3.0 to 3.4 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise	Min 25 psi at 5 percent deformation, measured parallel to foam rise.
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced by 10 × 10 mesh glass cloth, 10 lb/100 yd² installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic, 1/32 in dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic 1/32 in dry thickness reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test: Block 1 in square and 7 in long cut from near outer surface, on rests 6 in apart with 70 gm weight having 1 in square base in middle of span shall not distort piece more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume after a 2 in × 2 in × 1 in skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature.	Uniform cell structure with a max of 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.2 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Trymer CPR – 188 – 2* Upjohn Co, CPR Div	*Trymer CPR – 9581 – 3* Upjohn Co, CPR Div	*Trymer CPR – 9581 – 3* (Note 1) Upjohn Co, CPR Div

Notes:
1. Color, brown.
2. May be used on surfaces to a maximum of 300°F for areas indoors with no external source of moisture.
3. May be used on surfaces to a maximum of 375°F for areas indoors with no external source of moisture.
4. Carbon steel and stainless steel piping and equipment installed outdoors or indoors exposed to an external source of moisture requires a protective coating under the insulation.

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DUP 0991384

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SN 100 M

Page 6

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev Dec 1984

Code	118.3	120	131
Material Designation	Polyisocyanurate foam – rigid, foil faced	Polystyrene foam	High-density calcium silicate board
Purpose	Insulation for cold- or dual-temperature equipment	Insulation for cool pipe and equipment	Use where high structural strength insulation is required
Material Description	Preformed rigid polyisocyanurate foam sheet insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts, and a fluorocarbon blowing agent. The two major surfaces faced with 1-mil aluminum foil	Preformed polystyrene foam block, pipe and fitting insulation cut from extruded polystyrene foam with a variety of plain and offset type joints, or it can be molded from expanded polystyrene beads to final shape with plain or offset joints	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate, inert fillers and reinforcing agents. Sanded on both sides
Metal Protection Required: Aluminum	Yes, per SN1A	No	Yes, per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes, per SN1A	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	−100°F to +250°F	−100 to +140°F	1,200°F max
K Factor Btu/(h)(ft²)(°F/in)	0.13 at 50°F mean (includes the foil) 0.14 at 75°F mean 0.15 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair for outdoor use	Poor, must be painted
Density	1.8 to 2.5 lb/ft³	1.5 lb/ft³ min	46 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Min 12 psi at 5 percent deformation, measured parallel to foam rise	Min 25 lb/in² at 5 percent deformation	1,000 psi at 5 percent deformation. Modulus of rupture 900 psi
Resistance to Handling Breakage	Good	Good	Very good
Dimensions	See SN3D	See SN3D	Thickness, in, 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 with both foil faces in place. Installations must meet flame-spread rating limitations given in SN1A.	Installations must meet the flame-spread rating limitations given in SN1A	Flame-spread rating is 0
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in.	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 80 percent relative humidity for 15 days. Water absorption max 0.003 percent by volume after being subjected to 90°F, 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in × 2 in × 1 in skin-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps	Self-tapping screw holding strength at 1/2 in penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Thermax Sheathing* The Celotex Corp	*Styrofoam – FR* (see note) Dow Chemical Co	*Marinite I* Manville
		Vapor-Lock (see note) Insulpyne, Inc	*Super Marinatemp* Pabco Insulation Div Louisiana-Pacific Corp
		Polystyrene Insulation Expanded (see note) Dyplast of Florida, Inc	
		Permaspan (see note) Southeastern Foam Products, Inc	

Note: Must state "Minimum Density 1.5 lb/ft³" for all vendors.

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OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1984	102, 102.1
103	Diatomaceous earth	Feb 1984	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	105
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1984	
109	Corrugated asbestos preshrunk	Feb 1984	
110	Vegetable cork	June 1986	111, 118, 120
111.1	Cellular glass	June 1986	111
111.2	Cellular glass	June 1986	111
111.3	Cellular glass	June 1986	111
112	Glass fiber	April 1956	Reinstated Sept 1988
112	Glass fiber	Dec 1984	
112.01	Glass fiber	Sept 1988	112
112.02	Glass fiber	Oct 1956	112.01
112.11	Glass fiber	Sept 1988	112
112.12	Glass fiber	March 1986	112.11
112.16	Glass fiber	Sept 1988	112
112.17	Glass fiber	Sept 1988	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1988	112
112.23	Glass fiber	April 1953	
112.61	Glass fiberboard	Sept 1988	112.6
112.66	Glass fiberboard	Feb 1984	
112.71	Glass fiberboard	Sept 1988	112.6
112.81	Glass fiberboard	Sept 1988	112.6
113	Glass fiber - neoprene coated	April 1956	
115	Mineral wool - asphalt impregnated	April 1956	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam resilient	June 1983	
117.1	Urethane foam resilient	Dec 1980	
117.2	Urethane foam resilient	Feb 1980	
117.3	Urethane foam resilient	June 1983	
117.4	Urethane foam resilient	Feb 1980	
117.5	Urethane foam resilient	April 1980	
117.6	Urethane foam resilient	July 1983	
130	Asbestos board	Nov 1978	131

DUP 0991386

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REV. 1/77

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

PREFORMED BLOCK AND PIPE INSULATION

ISSUED OCT 1954
THIS PAGE REVISED JULY 1975
STANDARD REAFFIRMED JULY 1975

SN 100 M

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into intercellular form.
Recommended Temperature Range	1200 F max		−200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.25 at 50 F 0.27 at 75 F 0.29 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SN13D		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, cover the latter with Code 709, fibered asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, cover the latter with Code 709, fibered asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont-wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Therm-o-12 Johns-Manville Sales Corp	*Super Caltemp, Type HA*** Fiberboard Corp	
	Kaylo – 10AP Owens – Corning	*Pamsil*** Pamrod, Inc	
	*Super Caltemp, Type HA*** Fiberboard Corp		
	*Caretemp 1500*** Celotex Corp		
	*Pamsil*** Pamrod, Inc		

* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1

** Molded one-piece fitting covers are available in screwed, welded, and cement types

† A perlite-silicate, recommended temp limit of 1100 F.

DUP 0990104

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority instituting the use of this specification.

SUBCOMMITTEE NO. 23

SUPERSEDES

840129

Code	112	112.6	114
*Material	Glass fiber	Glass fiberboard	Mineral wool
Material Description	Glass fiber, bonded insulation for pipe and fittings. Pipe sections, one piece, hinged. Plain, without jacket.	Glass fiber bonded board, plain, without covering.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.
Binder	Thermosetting resin		
Recommended Temperature Range	40 F to 375 F		1800 F max
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.23 at 100 F 0.27 at 200 F 0.33 at 300 F	0.24 at 100 F 0.30 at 200 F 0.37 at 300 F	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean
Density	Nominal 4 lb per cu ft	Nominal 3 lb per cu ft	15 to 19 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Nonload bearing. Inserts required where pipe is supported by insulation.	Nonload bearing	10 lb per sq in. min at 10% deformation
Dimensions	See SN30	Standard is 24" x 48" in thicknesses 1", 1 1/2", 2"	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature.
Qualifications and Limitations	Not recommended for pre-insulation because it is easily damaged in handling. Has poor resistance to abuse. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendors' catalogs and include on order. Available as molded fittings as noted below †. For field fabrication of fittings, it is recommended that glass fiber insulation with nominal 7 1/4 lb per cu ft density be used. Molded fittings will be lower cost in most cases and are preferred. Do not use on austenitic stainless steel or on above 140 F or unprotected aluminum.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/2 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Not recommended for use on austenitic stainless steel or on above 140 F or unprotected aluminum.	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, cover the latter with Code 709, Fiberized Asphalt Cutback (300 F temperature limit).

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

† Molded fitting covers only

†† Also available as pipe fitting covers

†† Manufacturer does not inhibit insulation. Contact Energy and Materials Devr, Equipment Div (Purchasing) for vendors who supply inhibited material

Snap-on Pipe Covering Corrosion-proof Sr. Gobain Insulation Corp	*K-230-J* Corrosion-proof Sr. Gobain Insulation Corp	*"Pyr" Superlamp* (block only) Eagle-Picher Industries
Micro-Lok Johns-Manville Sales Corp	*No. 814 Spin-Glas* Johns-Manville Sales Corp	*Nonc-Block* (block only) Keene Corp
1-Piece Pipe Covering Owens-Corning Corp	*Type 703* Owens-Corning Corp	*K-Fac* †† †† (block and pipe sections) U. S. Gypsum
†† *Insul-Sure* Insul-Caustic Div, Birmo Prod	*Type S Rigid Board* Pittsburgh Plate Glass Co	

DUP 0990105

R-160

040138

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED JULY 1975
STANDARD REAFFIRMED JULY 1975

SN 100 M

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		−200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SN10D		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Therm-o-12 Johns-Manville Sales Corp	*Super Calsemp, Type NA* ** Fiberboard Corp	
	Kaylo – 10AF Owens – Corning	*Pemsil* ** Pemrod, Inc	
	Super Calsemp, Type NA ** Fiberboard Corp		
	Caresilemp 1500 ** Celotex Corp		
	Pemsil ** Pemrod, Inc		

* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1

** Molded two-piece fitting covers are available in screwed, welded, and sweat types

† A portland-silicate, recommended temp limit of 1100 F.

DUP 0990118

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

DUPONT

REV. 1-77

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048143

PREFORMED BLOCK AND PIPE INSULATION

Code	112	112.6	114
Material	Glass fiber	Glass fiberboard	Mineral wool
Material Description	Glass fiber, bonded insulation for pipe and fittings. Pipe sections, one piece, hinged. Plain, without jacket.	Glass fiber bonded board, plain, without covering.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.
Binder	Thermosetting resin		
Recommended Temperature Range	40 F to 375 F		1800 F max
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.23 at 100 F 0.27 at 200 F 0.33 at 300 F	0.24 at 100 F 0.30 at 200 F 0.37 at 300 F	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean
Density	Nominal 4 lb per cu ft	Nominal 3 lb per cu ft	15 to 19 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Nonload bearing. Inserts required where pipe is supported by insulation.	Nonload bearing	10 lb per sq in. min at 10% deformation
Dimensions	See SN30	Standard is 24" x 48" in thicknesses 1", 1½", 2"	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature.
Qualifications and Limitations	Not recommended for pre-insulation because it is easily damaged in handling. Has poor resistance to abuse. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendors' catalogs and include on order. Available as molded fittings as noted below †. For field fabrication of fittings, it is recommended that glass fiber insulation with nominal 7¼ lb per cu ft density be used. Molded fittings will be lower cost in most cases and are preferred. Do not use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Not recommended for use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, cover the latter with Code 709, Fibered Asphalt Cutback (300 F temperature limit).

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

† Molded fitting covers only

†† Also available as pipe fitting covers

†† Manufacturer does not inhibit insulation. Contact Energy and Materials Dept, Equipment Div (Purchasing) for vendors who supply inhibited material

Snapon Pipe Covering Certain-teed St. Gobain Insulation Corp	*K-230-J* Certain-teed St. Gobain Insulation Corp	*"PV" Supertemp* (block only) Eagle-Picher Industries
Micro-Lok Johns-Manville Sales Corp	*No. 814 Spin-Glas* Johns-Manville Sales Corp	*Mono-Block* (block only) Keene Corp
1-Piece Pipe Covering Owens-Corning Corp	*Type 703* Owens-Corning Corp	*K-Fee* †† †† (block and pipe sections) U. S. Gypsum
†† *Insul-Sure* Insul-Coustic Div, Birmo Prod	*Type S Rigid Board* Pittsburgh Plate Glass Co	

DUP 0990119

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REV. 127

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED JULY 1975
STANDARD REAFFIRMED JULY 1975

SN 100 M

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		−200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions Qualifications and Limitations	See SN30 Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, cover the latter with Code 709, fibered asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, cover the latter with Code 709, fibered asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Thermo-12 Johns-Manville Sales Corp	*Super Caltemp, Type HA* ** Fiberboard Corp	
	Kaylo – 10AF Owens – Corning	*Pamsil* ◊ ** Pamsil, Inc	
	Super Caltemp, Type HA ** Fiberboard Corp		
	Caretemp 1500 ** Celotex Corp		
	Pamsil ◊ ** Pamsil, Inc		

* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1

** Molded removable fitting covers are available in serrated, welded, and sewed types

◊ A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

SUBCOMMITTEE NO. 25

R-148

040256

DUP 0990231

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.28 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 18 lb per cu ft
Compressive Strength Specimen 8 in. × 8 in. × 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. × 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in. × 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order 3 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Snap-On 510 Pipe Covering Certain-Teed Corp	IB 880 Certain-Teed Corp	PC Superlamp (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	Spin-Glass No. 814 Johns-Manville Sales Corp	Mono Block (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - Use Plate Owens-Corning Fiberglas Corp	Fibermount, Type 703 Owens-Corning Fiberglas Corp	A-For PC (Block only) (Note 2) U. S. Gypsum
	Insul-Sam (Note 1) Birma Products, Insul-Caustic Div		N. T. Block (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990232

848257

159

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954
THIS PAGE REVISED	JULY 1975
STANDARD REAFFIRMED	JULY 1975

SN 100 M

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		−200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SN3D		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, apart the latter with Code 709, fibrated asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, apart the latter with Code 709, fibrated asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Therma-12 Johns-Manville Sales Corp	*Super Caltemp, Type NA* ** Fiberboard Corp	
	Kaylo – 10AF Owens – Corning	*Pamsil* † ** Pemrod, Inc	
	Super Caltemp, Type NA ** Fiberboard Corp		
	Caroytemp 1500 ** Celotex Corp		
	Pamsil † ** Pemrod, Inc		

* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1

** Molded two-piece fitting covers are available in screwed, welded, and sweat types

† A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

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REV. 1/77

R-197

DUP 0990320

PIPE INSULATION

Code	112	112.6	114
Material	Glass fiber	Glass fiberboard	Mineral wool
Material Description	Glass fiber, bonded insulation for pipe and fittings. Pipe sections, one piece, hinged. Plain, without jacket.	Glass fiber bonded board, plain, without covering.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.
Binder	Thermosetting resin		
Recommended Temperature Range	40 F to 375 F		1800 F max
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.23 at 100 F 0.27 at 200 F 0.33 at 300 F	0.24 at 100 F 0.30 at 200 F 0.37 at 300 F	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean
Density	Nominal 4 lb per cu ft	Nominal 3 lb per cu ft	15 to 19 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Nonload bearing. Inserts required where pipe is supported by insulation.	Nonload bearing	10 lb per sq in. min at 10% deformation
Dimensions	See SN3D	Standard is 24" x 48" in thicknesses 1", 1 1/2", 2"	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature.
Qualifications and Limitations	Not recommended for pre-insulation because it is easily damaged in handling. Has poor resistance to abuse. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendors' catalogs and include on order. Available as molded fittings as noted below †. For field fabrication of fittings, it is recommended that glass fiber insulation with nominal 7 1/4 lb per cu ft density be used. Molded fittings will be lower cost in most cases and are preferred. Do not use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Not recommended for use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, coat the latter with Code 709, Fibrated Asphalt Cutback (300 F temperature limit).

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

† Molded fitting covers only †† Also available as pipe fitting covers †† Manufacturer does not inhibit insulation. Contact Energy and Materials Dept, Equipment Div (Purchasing) for vendors who supply inhibited material	*Snap-on Pipe Covering* Certain-teed St. Gobain Insulation Corp	*K-230-J* Certain-teed St. Gobain Insulation Corp	*"PV" Supertemp* (block only) Eagle-Picher Industries
	Micro-Lok Johns-Manville Sales Corp	*No. 814 Spin-Glas* Johns-Manville Sales Corp	*Mono-Block* (block only) Keene Corp
	1-Piece Pipe Covering Owens-Corning Corp	*Type 703* Owens-Corning Corp	*K-Fac* †† †† (block and pipe sections) U. S. Gypsum
	†† *Insul-Sure* Insul-Coustic Div, Birma Prod	*Type S Rigid Board* Pittsburgh Plate Glass Co	

DUP 0990321

948346

1.9

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	JULY 1975	
STANDARD REAFFIRMED	JULY 1975	Page 1 of 6

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		+200 F to +100 F (+300 F for dual temp
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions Qualifications and Limitations	See SN3D Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Therma-12 Johns-Manville Sales Corp	*Super Cattemp, Type NA* ** Fiberboard Corp	
	Kaylo – 10AF Owens – Corning	*Pamsil* ‡ ** Pamrod, Inc	
	Super Cattemp, Type NA ** Fiberboard Corp		
	Careytemp 1500 ** Celotex Corp		
	Pamsil ‡ ** Pamrod, Inc		

* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1

** Molded two-piece fitting covers are available in screwed, welded, and sweat types

‡ A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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REV. 77

DUP 0990404

R-245

048429

Code	112	112A	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1200°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	800°F max
K Factor Btu (hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nominal bearing unless required where pipe is supported outside insulation	Nominal bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SH30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard boxes: 18 to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied fasteners and lap adhesive. When specified, consult vendor's catalog and indicate on order 3/4 lb per cu ft density recommended for hot fabricated fittings. Molded fittings are generally lower in cost and are preferred over hand fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied fasteners. When specified, consult vendor's catalogs and indicate on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving complicated shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Insegrafic 970 Pipe Covering Certain-Teed Corp	18 HH Certain-Teed Corp	PT Insulmax (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	Spin-Glas No. 814 Johns-Manville Sales Corp	Mono Block (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - Uni-Flex Owens-Corning Fiberglas Corp	Fiberboard, Type 705 Owens-Corning Fiberglas Corp	A-Fax For PT (Block only) (Note 2) U. S. Gypsum
	Isomax-Low (Note 1) Manville Products, Insul-Coustic Div		N. T. Block (Block only) Penn-Eight Industries, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990405

159

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED JULY 1975
STANDARD REAFFIRMED JULY 1975

SN 100 M
Page 1 of 6

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate - inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		-200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min. at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SN30		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, coat the latter with Code 709, fibered asphalt outback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, coat the latter with Code 709, fibered asphalt outback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil - Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil - Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
	Therm-o-12 Johns-Manville Sales Corp	*Super Caltemp, Type NA* ** Fiberboard Corp	
	Kaylo - 10AF Owens - Corning	*Pamsil* ** Pamsil, Inc	
	Super Caltemp, Type NA ** Fiberboard Corp		
	Carrytemp 1500 ** Colorex Corp		
	Pamsil ** Pamsil, Inc		
** Molded two-piece fitting covers are available in serrated, welded, and sewn types			

* A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the legal authority governing the use of this specification.

SUBCOMMITTEE NO. 25

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REV. 1-77

DUP 0990489

R-293

846516

Code	112	112.6	114
Material	Glass fiber	Glass fiberboard	Mineral wool
Material Description	Glass fiber, bonded insulation for pipe and fittings. Pipe sections, one piece, hinged. Plain, without jacket.	Glass fiber bonded board, plain, without covering.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.
Binder	Thermosetting resin		
Recommended Temperature Range	40 F to 375 F		1800 F max
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.23 at 100 F 0.27 at 200 F 0.33 at 300 F	0.24 at 100 F 0.30 at 200 F 0.37 at 300 F	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean
Density	Nominal 4 lb per cu ft	Nominal 3 lb per cu ft	15 to 19 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Nonload bearing. Inserts required where pipe is supported by insulation.	Nonload bearing	10 lb per sq in. min at 10% deformation
Dimensions	See SN30	Standard is 24" x 48" in thicknesses 1", 1 1/2", 2"	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature.
Qualifications and Limitations	Not recommended for pre-insulation because it is easily damaged in handling. Has poor resistance to abuse. Specify whether for pipe or tubing on order. Available with factory-applied finishes and low adhesives. When specified, consult vendors' catalogs and include on order. Available as molded fittings as noted below †. For field fabrication of fittings, it is recommended that glass fiber insulation with nominal 7 1/4 lb per cu ft density be used. Molded fittings will be lower cost in most cases and are preferred. Do not use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Not recommended for use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, coat the latter with Code 709, Fibrated Asphalt Cutback (300 F temperature limit).
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
† Molded fitting covers only †† Also available as pipe fitting covers †† Manufacturer does not inhibit insulation. Contract Energy and Materials Dept, Equipment Div (Purchasing) for vendors who supply inhibited material	*Snap-on Pipe Covering* Corning-owned St. Gobain Insulation Corp	*K-230-J* Corning-owned St. Gobain Insulation Corp	*"PV" Supersamp* (block only) Eagle-Picher Industries
	Micro-Lok Johns-Manville Sales Corp	*No. 814 Spun-Glas* Johns-Manville Sales Corp	*Mono-Block* (block only) Keene Corp
	1-Piece Pipe Covering Owens-Corning Corp	*Type 703* Owens-Corning Corp	*K-Pac* †† †† (block and pipe sections) U. S. Gypsum
	†† *Insul-Sure* Insul-Coustic Div, Birmo Prod	*Type S Rigid Board* Pittsburgh Plate Glass Co	

DUP 09304 90

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED JULY 1975
STANDARD REAFFIRMED JULY 1975

SN 100 M

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate – inhibited*	Cellular glass
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into unicellular form.
Recommended Temperature Range	1200 F max		−200 F to +100 F (+300 F for dual temp)
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.35 at 50 F 0.37 at 75 F 0.39 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SN3D		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel at or above 140 F, see SN102D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). All materials listed under Code 102.1 are approved where Code 102 is specified.	Recommended for use on austenitic stainless steel. For an alternate to purchased inhibited calcium silicate, see SN102.1D. Where used on aluminum, coat the latter with Code 709, fibrated asphalt cutback (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure.	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" IPS and larger, there is an additional charge for 2-oz canvas cover. Material should be specified "without 2-oz canvas" to avoid extra charge	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Thermasil – Asbestos Free* Ind Insul Div, Keene Corp	*Foamglas* Pittsburgh Corning Corp
* Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	*Therme-12* Johns-Manville Sales Corp	*Super Caltemp, Type NA* ** Fiberboard Corp	
** Molded two-piece fitting covers are available in screwed, welded, and sweat types	*Kaylo – 10AF* Owens – Corning	*Pamsil* ** Pamrod, Inc	
	Super Caltemp, Type NA ** Fiberboard Corp		
	Careytemp 1500 ** Celotex Corp		
	Pamsil ** Pamrod, Inc		

† A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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SUBCOMMITTEE NO. 25

DUPONT

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REV. 117

DUP 0991336

PREFORMED BLOCK AND PIPE INSULATION

Code	112	112.6	114
Material	Glass fiber	Glass fiberboard	Mineral wool
Material Description	Glass fiber, bonded insulation for pipe and fittings. Pipe sections, one piece, hinged. Plain, without jacket.	Glass fiber bonded board, plain, without covering.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.
Binder	Thermosetting resin		
Recommended Temperature Range	40 F to 375 F		1800 F max
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.23 at 100 F 0.27 at 200 F 0.33 at 300 F	0.24 at 100 F 0.30 at 200 F 0.37 at 300 F	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean
Density	Nominal 4 lb per cu ft	Nominal 3 lb per cu ft	15 to 19 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Nonload bearing. Inserts required where pipe is supported by insulation.	Nonload bearing	10 lb per sq in. min at 10% deformation
Dimensions	See SN3D	Standard is 24" x 48" in thicknesses 1", 1 1/2", 2"	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature.
Qualifications and Limitations	Not recommended for pre-insulation because it is easily damaged in handling. Has poor resistance to abuse. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendors' catalogs and include on order. Available as molded fittings as noted below ◊. For field fabrication of fittings, it is recommended that glass fiber insulation with nominal 7 1/4 lb per cu ft density be used. Molded fittings will be lower cost in most cases and are preferred. Do not use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Not recommended for use on austenitic stainless steel at or above 140 F or unprotected aluminum.	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, coat the latter with Code 709, Fibered Asphalt Cutback (300 F temperature limit).

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

† Molded fitting covers only
†† Also available as pipe fitting covers
◊◊ Manufacturer does not inhibit insulation. Contact Energy and Materials Dept, Equipment Div (Purchasing) for vendors who supply inhibited material

Snap-on Pipe Covering Certain-teed St. Gobain Insulation Corp	*K-230-3* Certain-teed St. Gobain Insulation Corp	*"PV" Supersamp* (block only) Eagle-Picher Industries
Micro-Lok Johns-Manville Sales Corp	*No. 814 Spin-Glas* Johns-Manville Sales Corp	*Mono-Block* (block only) Keene Corp
1-Piece Pipe Covering Owens-Corning Corp	*Type 703* Owens-Corning Corp	*K-Fac* †† ◊◊ (block and pipe sections) U. S. Gypsum
†◊ *Insul-Sure* Insul-Coustic Div, Birma Prod	*Type S Rigid Board* Pittsburgh Plate Glass Co	

899

DUP 0991337
090923

Code	114.1	114.2	116
Material	Mineral wool – inhibited	Mineral wool	Flexible foamed plastic
Material Description	Mineral slag wool, with high-temperature binder. Block and pipe section insulation. Dipped, brushed, or sprayed with Sodium Silicate, Code 802.1, to the equivalent of 100 sq ft per gallon.	Mineral slag wool, with high-temperature binder. Block and pipe section insulation.	Preformed, resilient, closed cell elastomer foam sheet and pipe (to 4-inch) insulation.
Recommended Temperature Range	900 F max – limited by sodium silicate	1200 F max	−40 to 180 F
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.36 at 200 F mean 0.51 at 600 F mean 0.76 at 1000 F mean		0.28 at 75 F 0.29 at 90 F
Density	11 to 19 lb per cu ft	10 to 11 lb per cu ft	6.0 lb per cu ft (max)
Water Vapor Permeability (Wet Cup)			0.15 perm-inches
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10 per min	5 lb per sq in. min at 10% deformation		
Dimensions	Standard block sizes up to 24" x 36", 1" to 4" thickness. Standard pipe sizes, see vendor's literature		Sheet size is 36" x 48" in thicknesses 1/8" to 1". Pipe and tubing to 5" ID and 6' long in thicknesses 3/8", 1/2" and 3/4".
Qualifications and Limitations	Satisfactory for use on austenitic stainless steel to 900 F. Where used on aluminum, coat the latter with Code 709, Fibrated Asphalt Cutback (300 F temperature limit).	Not recommended for use on unprotected austenitic stainless steel at or above 140 F, or unprotected aluminum. Where used on aluminum, coat the latter with Code 709, Fibrated Asphalt Cutback (300 F temperature limit).	Flame spread rating per ASTM E 162 shall not exceed 75 uncoated. A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8-inch. Not recommended for use on austenitic stainless steel at or above 140 F. Installations must meet flame-spread rating limitations given in SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

(1) *FR/Armaflex* pipe covering is identified with inked blue lines. *FR/Armaflex* sheet material is identified with inked white lines.	*K-Fac, Inhibited* † ♦ (block and pipe sections)	*N-1200 Block* MF Pipe Insulation ††	*FR/Armaflex* Armstrong Cork Company[1]
† Also available as pipe fitting covers	*Epitherm-1200* ♦ (pipe sections) Eagle-Picher Industry	*Epitherm-1200 Pipe Insulation* Eagle-Picher Industries	
♦ Manufacturer does not inhibit insulation. Contact Energy and Materials Dept, Equipment Div (Purchasing) for vendors who supply inhibited material	*N-1200 Block* ♦ MF Pipe Insulation ♦ †† Forty-Eight Insulations		
†† Pipe insulation in 2 ft lengths only			

REV. JUL 1975

DUP 0991338

DUPONT

090924

PREFORMED BLOCK AND PIPE INSULATION

Code	118	118.1
Material	Polyurethane foam, rigid	Polyisocyanurate foam, rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, pipe, and fitting insulation manufactured with polyester or polyether resins, flammability-retarding agents, special catalysts and a fluorocarbon blowing agent
Recommended Temperature Range	−100 to +180 F	−100 to +300 F
K Factor, Max Btu/(hr)(sq ft)(°F/in.)	0.15 at 50 F 0.15 at 75 F 0.16 at 100 F	0.15 at 50 F mean 0.16 at 75 F mean 0.16 at 100 F mean
Density	1.8 to 2.5 lb per cu ft	
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 psi at 5% deformation, measured parallel to the direction in which the foam rose during manufacture or min 20 psi at 5% deformation in all directions	Min 25 psi at 5% deformation, measured parallel to foam rise
Dimensions	See SN3D. All dimensions to be ±1/16" including straightness and squareness.	
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225 F. Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic 1/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 4% by volume into a 2" x 2" x 1" skin-free piece, immersed in water just under the surface for 5 days and then wiped with a wet cloth and weighed, with no delay between steps. Not to be used in contact with unprotected austenitic stainless steel at or above 140 F. Installations must meet flame-spread rating limitations given in SN1A.	Uniform cell structure with a max of 10% open cell. No voids having any dimensions exceeding 1/4". Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic 1/32" dry thickness reinforced with open-weave glass cloth. Do not use in contact with unprotected austenitic stainless steel at or above 140 F. Installations must meet flame-spread rating limitations given in SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Pipe insulation sections only, 4 ft standard length with factory-applied vapor barrier jacket. For physical properties, see manufacturer's technical data sheet	*Type 24 Urethane* Owens-Corning Corp	*Trymer CPR 9565* The Upjohn Co
	Thurane Dow Chemical Co	
	U-Thane 200 The Upjohn Co	
	Armaloft ♦ Armstrong Cork Co	
	Isonate CPR 436 System Dyplast of Florida Inc	

DUP 0991339
090925

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 4" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 psi Shear parallel – 320 psi
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. See SN2D for flame-spread rating limitations. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
◊ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ◊ Dow Chemical Co	*Marnaite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	
	Expanded Polystyrene Insulation Min Density 1.5 lb/ft³ Dyplast of Florida Inc	

DUP 0931340

090926

PREFORMED BLOCK AND PIPE INSULATION

OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1964	102, 102.1
103	Diatomaceous earth	Feb 1964	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	106
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1964	
109	Corrugated asbestos preshrunk	Feb 1964	
110	Vegetable cork	Jun 1966	111, 118, 120
111.1	Cellular glass	Jun 1966	111
111.2	Cellular glass	Jun 1966	111
111.3	Cellular glass	Jun 1966	111
112	Glass fiber	Apr 1956	Reinstated Sept 1969
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1956	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	Mar 1959	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	Apr 1963	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1964	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber – neoprene coated	Apr 1956	
115	Mineral wool – asphalt impregnated	Apr 1956	
116	Flexible foamed plastic	Jun 1962	Reinstated May 1973
117	Urethane foam resilient	Jun 1963	
117.1	Urethane foam resilient	Dec 1960	
117.2	Urethane foam resilient	Feb 1960	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1960	
117.5	Urethane foam resilient	Apr 1960	
117.6	Urethane foam resilient	July 1963	

DUPONT

REV. JUL 1977

DUP 0991341

090927

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PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	NOV 1978	Page 1 of 8
STANDARD REAFFIRMED	NOV 1978	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	−200 to +100°F (200°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.52 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.52 at 600°F mean	0.25 at 50°F mean 0.25 at 75°F mean 0.29 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	50 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,000 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Cotemp, Type NA* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-10AF Owens-Corning Fiberglas Corp	*Pomrol* (Notes 1, 2, and 3) Pomrol, Inc	
	Super Cotemp, Type NA Fiberboard Corp	*Wesolite* (Notes 1, 2, and 3) Wesolite Co	
	Cotemp 1500 (Notes 1, 2, and 4) Carlisle Corp	*Kaylo-10AF* Owens-Corning Fiberglas Corp	
	Pomrol (Notes 1, 2, and 3) Pomrol, Inc		
	Wesolite (Notes 1, 2, and 3) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in sectored, welded, and direct types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A pomrol-silicate.
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/abrasive systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

R-183

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REV. SEP 1979

DUP 0990303

848328

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Code	104	105	106
Material	Diatomaceous silicas	Asbestos molded	Asbestos and diatomaceous earth molded
Material Description	Diatomaceous silicas and asbestos fibers	Compressed fluffy asbestos sprayed with sodium silicate	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat
Filler			
Binder			
Temperature Range	500°F. to 1500°F.	100°F. to 700°F.	700°F. to 1000°F.
K Factor	1000°F. - 0.77 max.	500°F. - 0.56 max.	500°F. - 0.58 max.
Density	20-24 lb. per cu. ft.	14 lbs. per cu. ft.	14 lbs. per cu. ft.
Compressive Strength			
Manufacturing Process	Machine extruded. Pipe mach. cut on diameter.	Formed and comp. on mandril. Pipe mach. cut on diam.	Formed and comp. on mandril. Pipe mach. cut on diam.
Resistance to breakage in handling	Good	Good	Good
Dimensions	To Specification		
Other Qualifications		Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.	Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Tempcheck Philip Carey Mfg. Co.	*Unibestos 750* Union Asbestos & Rubber Co.	*Unibestos 1200* Union Asbestos & Rubber Co.

Vendors and merchandise designations are given to describe the materials and may not include all acceptable products; however, no substitutions are to be made without the written approval of the authority governing the use of this Specification.

DUP 0990304

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED NOV 1978
STANDARD REAFFIRMED NOV 1978

SN 100 M

Code	100	100.1	111
Material Designation	Calcium silicate	Calcium silicate - reinforced	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold or cold-temperature pipe and equipment
Material Description	Asbestos fiber, reacted hydrous calcium silicate reinforced with fibers	Asbestos fiber, reacted hydrous calcium silicate with additives for corrosion inhibition, sizing and reinforced with fibers	Cellular glass blocked and faced and unfaced form
Suitable for use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-297 to +100°F (200°F for thick walls)
K Factor Btu/hr/sq ft/°F/in.)	0.41 @ 200°F mean 0.46 @ 400°F mean 0.55 @ 600°F mean	0.41 @ 200°F mean 0.46 @ 400°F mean 0.55 @ 600°F mean	0.25 @ 50°F mean 0.33 @ 75°F mean 0.39 @ 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 4 in. x 4 in. x 2 in. Load Rate 0.10 per min	50 lb per sq in. min @ 5 percent deformation	50 lb per sq in. min @ 5 percent deformation	30 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Poor
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 100.1 are approved where Code 100 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For all chlorides in purchased insulation material, see SN100.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Ca Pint test (see 1,000 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in ASTM-C-795-80 specification does not qualify a material under Code 100.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and great has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials are considered under other vendor's listed upon consideration as to their capacity.

Approved Materials and Vendors			
	Thermo-12 Johns-Manville Sales Corp	Super Caltemp, Type 4A Pittsburgh Corn	Foamglas Pittsburgh Corning Corp
	Kaylo-10A/F Owens-Corning Fiberglas Corp	Pumice (Grade 1, 2, and 3) Pumice, Inc	
	Super Caltemp, Type 4A Pittsburgh Corn	Wyodon (Grade 1, 2, and 3) Wyodon Co	
	Caltemp 1,200 (Grade 1, 2, and 4) Calsil Corp	Kaylo-10A/F Owens-Corning Fiberglas Corp	
	Pumice (Grade 1, 2, and 3) Pumice, Inc		
	Wyodon (Grade 1, 2, and 3) Wyodon Co		

Notes
1. Molded fire-clay fitting covers are available in cellular, molded, and sewed types. Advise the thickness of the grade of insulation which covers is to be used to ensure a proper fit.
2. A combination.
3. Pieces of molded fire-clay fitting covers are available in sizes up to 12" thick. CO2 larger sizes are fabricated.
4. Do not use in chlorine/chloramine systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority administering the use of this specification.

SUPERSEDES NO. 55

R-232

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REV. SEP 1979

DUP 0990390

848413

Code	1[illegible]	1[illegible]	1[illegible]
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, flinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.70 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing, inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Carlisle-Tood Corp	*IB 300* Carlisle-Tood Corp	*PV Supertemp* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp	*K-Fat PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Save (Note 1) Blanc Products, Insul-Coustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV

DUP 0990391

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275

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatom silica, and inorganic bi Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 70 Shear parallel - 32
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/ 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use w base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp

REV. MAY 1973

DUP 0990392

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OCTOBER 1954
This Page Rev Aug 1972

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diato silica, and inorganic b Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face 420 psi Shear normal to face - 7[illegible] Shear parallel - 3[illegible]
Dimensions	SH3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3. 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use w base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Varmite 36 (Type 4)* Johns-Manville Sales Corp
		Fyrcor Owens-Corning Corp

DUP 0990393

J-B-38E

848418

OCTOBER 1954 — MATERIAL SPECIFICATION – SERIES 100 — SM
This Page Rev Feb 1972 — PREFORMED BLOCK AND PIPE — P.

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and strip lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu (hr) (sq ft) [°F /in.]	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 70 Shear parallel – 32
Dimensions	SM30. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 3 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded beam sides, may be used unpainted for interior use. When painted, use water base or epoxy coatings.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

◊ Available in the form of pipe and fitting insulation from fabricators.	Styrofoam FR ◊ Dow Chemical Co	Marinite 36 (Type 1) Johns-Manville Sales Corp
		Pyrex Owens-Corning Corp

DUP 6990394

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848419

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - block, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and skip lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Fiberglass reinforced. Weatherresistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to +140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.3 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate= 14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 220 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	±1/16" -0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/4". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.		
* Available in the form of pipe and fitting insulation from fabricators.	Type A: Styrofoam FR * Dow Chemical Co	Marinite 36 (Type A) Johns-Manville Sales Corp
	Type B: Vapor - Lock MMM Div, Insolar Products Co	Unarco Board 36 Chemtest Div Unarco Industries, Inc

REV. JUL 1970 SUP. BY

Supersedes R-230

1 of 2

DUP 0990395

848428

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - blocks, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weatherresistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to + 140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate- 14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	±1/16" -0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/64". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.02% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

* Available in the form of pipe and fitting insulation from fabricators.		
	Type A: Styrofoam FR* Dow Chemical Co	Marinite 36 (Type 4) Johns-Manville Sales Corp
	Type B: Vapor - Lock MMM Div, Insulsr Products Co	Unarco Board 36 Chemseal Div Unarco Industries, Inc

R-237

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DUP 0990396

REV. NOV 1978

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev July 1977

Code	130	131	
Material Designation	Asbestos board	High-temperature calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers, diatomaceous silica, and inorganic binder. Sanded on both sides	Asbestos-free inorganic high-density structural insulation board containing of calcium silicate, inert fibers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Uninsulated Aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	200°F max	1200°F max	
K Factor Btu·(in)/(sq ft)(°F)(hr)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.61 at 200°F mean 0.62 at 400°F mean 0.67 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair. Must be painted for outdoor use	
Density	36 lb per cu ft	46 lb per cu ft	
Compressive Strength Specimen 4 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, minimum 14 000 psi Tensile parallel to face 430 psi Shear normal to face 700 psi Shear parallel to face 320 psi	1,000 psi at 5 percent deformation Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size, ft: 2 3'2, or 4 × 8 and 4 × 10 Thickness, in.: ½, ¾, ⅞, 1, 1¼, 1½, 2, and 4	Sheet size, ft: 4 × 8 standard Thickness, in.: ½, ¾, ⅞, 1, 1¼, 1½, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SH1A. Austenitic stainless steel at or above 140°F must be protected per SH1A.	Self-tapping screw holding strength at ½ in penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SH1A. Austenitic stainless steel at or above 140°F must be protected per SH1A.	
Approved Materials and Vendors	Manville 25 (Type A) Johns-Manville Sales Corp	Manville 1V Johns-Manville Sales Corp	

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SEE FOR LATEST ☐ IN EVIDENCE
JUN 25 1981
JOSEPH J. HECHT
DUP 0990397

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 p Shear parallel - 320 p
Dimensions	SN2D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No dimensional or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" thickness piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. See SN2D for flame-spread rating limitations. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
◊ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ◊ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	VaporLock Insulfoam Corp	
	Expanded Polystyrene Insulation Min Density 1.5 lb/ft³ Dyplast of Florida Inc	

DUP 0690398

L-B-38A

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatom silica, and inorganic b. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face 420 psi Shear normal to face - 7[illegible] Shear parallel - 3[illegible]
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/ 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.02% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use w base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that th products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 1T4.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	VapoLock Insuldyne Corp	

REV. JUL 1975

DUP 0990399

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This Page Rev May 1972

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

SN 10

Page

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatoms silica, and inorganic bind Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 480 psi Shear normal to face - 700 Shear parallel - 320
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/8, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 174.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marmite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	

REV. JUN 1974

DUP 0990400

J-B-38C

848425

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	NOV 1978	
STANDARD REAFFIRMED	NOV 1978	Page 1 of 8

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	−200 to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.25 at 50°F mean 0.25 at 75°F mean 0.29 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 4 in. × 4 in. × 2 in. Load Rate 0.10 per min	50 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,000 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Coloring, Type NA* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-104F Owens-Corning Fiberglas Corp	*Pomrad* (Notes 1, 2, and 3) Pomrad, Inc	
	Super Coloring, Type NA Fiberboard Corp	*Wessilite* (Notes 1, 2, and 3) Wessilite Co	
	Coloring 1200 (Notes 1, 2, and 4) Celotex Corp	*Kaylo-104F* Owens-Corning Fiberglas Corp	
	Pomrad (Notes 1, 2, and 3) Pomrad, Inc		
	Wessilite (Notes 1, 2, and 3) Wessilite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A partite-silicate.
3. Reduced or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 22

REV. SEP 1979

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DUP 0990474

848499

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Code	104	105	106
Material	Diatomaceous silicas	Asbestos molded	Asbestos and diatomaceous earth molded
Material Description	Diatomaceous silicas and asbestos fibers	Compressed fluffy asbestos sprayed with sodium silicate	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat
Filler			
Binder			
Temperature Range	500°F. to 1500°F.	100°F. to 700°F.	700°F. to 1000°F.
K Factor	1000°F. - 0.77 max.	500°F. - 0.56 max.	500°F. - 0.58 max.
Density	20-24 lb. per cu. ft.	14 lbs. per cu. ft.	14 lbs. per cu. ft.
Compressive Strength			
Manufacturing Process	Machine extruded. Pipe mach. cut on diameter.	Formed and comp. on mandril. Pipe mach. cut on diam.	Formed and comp. on mandril. Pipe mach. cut on diam.
Resistance to breakage in handling	Good	Good	Good
Dimensions	To Specification		
Other Qualifications		Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.	Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Tempchest Philip Carey Mfg. Co.	*Lasbestos 750* Union Asbestos & Rubber Co.	*Unasbestos 1200* Union Asbestos & Rubber Co.

Vendors and merchandise designations are given to describe the materials and may not include all acceptable products; however, no substitutions are to be made without the written approval of the authority requiring the use of this Specification.

DUP 0990475

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REV. SEP 1979

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	NOV 1976	Page 1 of 6
STANDARD REAFFIRMED	NOV 1976	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	−200 to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 600°F mean	0.36 at 50°F mean 0.38 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	50 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN3D	See SN3D	See SN3D
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-band specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-1-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Coltemp, Type NA* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-10AF Owens-Corning Fiberglas Corp	*Pamsil* (Notes 1, 2, and 3) Pamrod, Inc	
	Super Coltemp, Type NA Fiberboard Corp	*Wesolite* (Notes 1, 2, and 3) Wesolite Co	
	Celotemp 1500 (Notes 1, 3, and 4) Celotex Corp	*Kaylo-10AF* Owens-Corning Fiberglas Corp	
	Pamsil (Notes 1, 2, and 3) Pamrod, Inc		
	Wesolite (Notes 1, 2, and 3) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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SUBCOMMITTEE NO. 28

DUPONT

DUP 0991354

090940

PREFORMED BLOCK AND PIPE INSULATION

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 500°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 38 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 300* Certain-Teed Corp	*PV Supertempt* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp	*K-Fac PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Caustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

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DUP 0991355
090941

OCTOBER 1984 — SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

Page 3

Code	114.1	114.2	116
Material Designation	Mineral wool – inhibited – 800°F	Mineral wool – 1,200°F	Flexible foamed plastic
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for moisture vapor-sture and antisweat application pipe and equipment
Material Description	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped sprayed, or brushed with sodium silicate to the equivalent of 100 sq ft per gallon	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder	Preformed resilient closed-cell elastomer foam sheet and pipe insulation
Suitable for Use: On Unprotected Aluminum	No	No	Yes
In direct contact with austenitic stainless steel at or above 140°F	Yes	No	No
Recommended Temperature Range	800°F max (limited by sodium silicate)	1,200°F max	−40 to +180°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.38 at 200°F mean 0.61 at 600°F mean 0.76 at 1,000°F mean	0.38 at 200°F mean 0.61 at 600°F mean 0.76 at 1,000°F mean	0.28 at 75°F mean 0.29 at 90°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	0.15 Perm – inches
Density	11 to 16 lb per cu ft	10 to 15 lb per cu ft	6 lb per cu ft max
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in. × 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs	Standard block: Up to 24 in. × 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs	Sheet size: 36 in. × 48 in. Sheet thickness: 1/8 in. to 1 in. Pipe covering: To 8 in. ID and 6 ft long Pipe thickness: 1/8 in., 1/2 in., 3/4 in.
Flame-Spread Rating	Does not burn	Does not burn	Flame-spread rating per ASTM E 162 shall not exceed 75 unbacked installations must meet flame-spread rating limitation given in SN1A.
Specifications, Qualifications, Limitations	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited material.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 in. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors			
	Epaterm–1200 (Block and Pipe Sections) Eagle-Picher Sales Corp	*Block N–1200* Forty-Eight Insulations, Inc	*Armaflex/FR* (Note 3) Armstrong Cork Co
	Block N–1200 Forty-Eight Insulations, Inc	*MF Pipe Insulation* (Note 1) Forty-Eight Insulations, Inc	*R–180–FS, tubing* (Note 4) Rubatex Corp
	MF Pipe Insulation (Note 1) Forty-Eight Insulations, Inc	*Epaterm–1200* (Block and Pipe Sections) Eagle-Picher Sales Corp	*1800–FS, sheet* (Note 4) Rubatex Corp
	K–Fac PC (Note 2) U. S. Gypsum	*K–Fac PC* (Note 2) (Block and Pipe Sections) U. S. Gypsum	

Notes:
1. Pipe insulation in 3-ft lengths only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
3. Fire-retardant pipe covering is identified with inked blue lines. Fire-retardant sheet material is identified with inked white lines.
4. Rubatex Corp produces only the low flame-spread grade.

DUPONT

REV. SEP 1989

DUP 0991356

090942

PREFORMED BLOCK AND PIPE INSULATION

Code	118	118.1	120
Material Designation	Polyurethane foam - rigid	Polyisocyanurate foam - rigid	Polystyrene foam
Purpose	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment	Insulation for cool pipe and equipment
Material Description	Preformed rigid urethane foam block, pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts and a fluorocarbon blowing agent	Preformed polystyrene foam block, pipe and fitting insulation cut from extruded polystyrene styrene foam with a variety of plain and offset type joints, or it can be molded from expanded polystyrene beads to final shape with plain or offset joints
Suitable for Use: On Unprotected Aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	-100 to +180°F	-100 to +300°F	-100 to +140°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.16 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair	Fair
Density	1.5 to 2.5 lb per cu ft	1.5 to 2.5 lb per cu ft	1.5 lb per cu ft min
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise	Min 25 lb per sq in. at 5 percent deformation
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.	Installations must meet the flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test Block 1 in. square and 7 in. long cut from near outer surface, on faces 6 in. apart with 70 gm weight having 1 in. square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in. x 2 in. x 1 in. skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps. Attacked by methyl ethyl ketone and alcohol (see SN118D). Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 80 percent relative humidity for 15 days. Water absorption max 0.03 percent by volume after being subjected to 80°F, 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in. x 2 in. x 1 in. skin-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps. Austenitic stainless steel at or above 140°F must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Unithane - Type 200* Owens-Corning Fiberglas Corp	*Trymer CPR - 9645* CPR Div Upjohn Co	*Styrofoam-FR* (Note 2) Dow Chemical Co
	U-Thane 199 Upjohn Co		*Vapor-Lock* (Note 2) Insulgyne Corp
	Armaflex (Note 1) Armstrong Cork Co		*Polystyrene Insulation Expanded* (Note 2) Dyplast of Florida, Inc
	Isocon CPR 436 System Dyplast of Florida, Inc		*Permaspan* (Note 2) Southeastern Foam Products Inc

Notes:
1. Pipe sections only, standard 4-ft length with factory-applied vapor barrier jacket. See manufacturer's literature for technical data and physical properties.
2. Must state "Minimum Density 1.5 lb/ft³" for all vendors.

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DUP 0991357
090943

OCTOBER 1954

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PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Page 8

Code	121		
Material Designation	High-density calcium silicate board		
Purpose	Use where high structural strength insulation is required		
Material Description	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides		
Suitable for Use: On Unprotected Aluminum	No		
In direct contact with austenitic stainless steel at or above 140°F	No		
Recommended Temperature Range	1,200°F max		
K Factor Btu/(ft²)(sq in)(hr)(°F/in.)	0.81 @ 200°F mean 0.82 @ 400°F mean 0.87 @ 600°F mean		
Moisture Resistance or Water Vapor Permeability	Fair, must be painted for outdoor use		
Density	46 lb per cu ft		
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	1,000 psi @ 5 percent deformation Modulus of rupture 600 psi		
Resistance to Handling Breakage	Very good		
Dimensions	Sheet size, R 4 × 8 standard Thickness, in., 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2		
Flame-Spread Rating	Flame-spread rating of 0		
Specifications, Qualifications, Limitations	Self-tapping screw holding strength at 1/2 in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.		
This following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Manufax XL* Johns-Manville Sales Corp		

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DUPONT

DUP 0991358

090944

REV. SEP 1979

OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1984	102, 102.1
103	Diatomaceous earth	Feb 1984	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	105
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1984	
109	Corrugated asbestos preformed	Feb 1984	
110	Vegetable cork	June 1988	111, 116, 120
111.1	Cellular glass	June 1988	111
111.2	Cellular glass	June 1988	111
111.3	Cellular glass	June 1988	111
112	Glass fiber	April 1988	Reinstated Sept 1988
112.01	Glass fiber	Sept 1988	112
112.02	Glass fiber	Oct 1988	112.01
112.11	Glass fiber	Sept 1988	112
112.12	Glass fiber	March 1988	112.11
112.16	Glass fiber	Sept 1988	112
112.17	Glass fiber	Sept 1988	112
112.21	Glass fiber	Jan 1981	
112.22	Glass fiber	Sept 1988	112
112.23	Glass fiber	April 1983	
112.61	Glass fiberboard	Sept 1988	112.6
112.66	Glass fiberboard	Feb 1984	
112.71	Glass fiberboard	Sept 1988	112.6
112.81	Glass fiberboard	Sept 1988	112.6
113	Glass fiber - neoprene coated	April 1988	
115	Mineral wool - asphalt impregnated	April 1988	
116	Flexible foamed plastic	June 1982	Reinstated May 1973
117	Urethane foam resilient	June 1983	
117.1	Urethane foam resilient	Dec 1988	
117.2	Urethane foam resilient	Feb 1988	
117.3	Urethane foam resilient	June 1983	
117.4	Urethane foam resilient	Feb 1988	
117.5	Urethane foam resilient	April 1988	
117.6	Urethane foam resilient	July 1983	
130	Asbestos board	Nov 1978	131

REV. APR 1981

DUP 099359

090945

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	NOV 1975	Page 1 of 8
STANDARD REAFFIRMED	NOV 1975	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, reamed and fused into unicellular form
Suitable for User On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-200 to +100°F (200°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.52 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.52 at 600°F mean	0.38 at 50°F mean 0.38 at 75°F mean 0.38 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	50 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24544 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Colormp, Type NA* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-104F Owens-Corning Fiberglas Corp	*Pamel* (Notes 1, 2, and 3) Pamel, Inc	
	Super Colormp, Type NA Fiberboard Corp	*Wesolite* (Notes 1, 2, and 3) Wesolite Co	
	Colormp 1500 (Notes 1, 2, and 4) Celotex Corp	*Kaylo-104F* Owens-Corning Fiberglas Corp	
	Pamel (Notes 1, 2, and 3) Pamel, Inc		
	Wesolite (Notes 1, 2, and 3) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in sectored, welded, and direct types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perma-silicate.
3. Rolled or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

R-228

048586

DUP 0990559

REV. SEP 1979

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Code	112	113.6	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,200°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,200°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 300°F mean 0.33 at 500°F mean	0.24 at 100°F mean 0.28 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Deflection 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nominal bearing. Inserts required where pipe is supported outside insulation	Nominal bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SH30	Standard sizes: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard sizes: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and indicate on order. 7½ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SH1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and indicate on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SH1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SH1A.

The following materials have proven satisfactory in field tests and great has been furnished by the manufacturers that their products meet the above specifications. These manufacturers materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors			
	Snap-On 500 Pipe Covering Certain-Teed Corp	*IB 300* Certain-Teed Corp	*PV Supermax* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glas No. 814* Johns-Manville Sales Corp	*Vono Block* (Block only) Keene Corp Insulating Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberglas, Type 703* Owens-Corning Fiberglas Corp	*K-Flex PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Sloan Products, Insul-Coustic Div		*M. P. Block* (Block only) Pabco-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the grade of aluminum alloy covers to be used to ensure a proper fit.

DUP 0990560

848587

275

REV. MAY 1973

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and shiplap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 ; Shear parallel – 320 ;
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp

DUP 0990561

R-329

L-B-38L

848588

97

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam stock, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatoma silica, and inorganic bin Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN30. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4 1, 1 1/2, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 e 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 3 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use wat base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
♦ Available in the form of fitting covers (see Code 114.1) from fabricators	Styrofoam FR ♦ Dow Chemical Co	Marinite 36 (Type 1) Johns-Manville Sales Corp
		Fyrcor Owens-Corning Corp

DUP 0990562

R-330

DUPONT

1-R-33F

848589

87

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam blocks, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu (hr) (sq ft) (°F /in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
♦ Available in the form of pipe and fitting insulation from fabricators.	Styrofoam FR ♦ Dow Chemical Co	Marinite 36 (Type 4) Johns-Manville Sales Corp
		Pyrogel Owens-Corning Corp

DUP 0900563

R-331

/ R 33 E

848598

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

454

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - block, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to +140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate-14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
[illegible]nsional Tolerances	±1/16" -0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/16". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.02% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.		
* Available in the form of pipe and fitting insulation from fabricators.	Type A: Styrofoam FR* Dow Chemical Co	Marinite 36 (Type A) Johns-Manville Sales Corp
	Type B: Vapor - Lock [illegible] Div, Insular Products Co	Unarco Board 36 Chemkast Div Unarco Industries, Inc

REV. JUL 1970 SUP. BY _____

DUP 09905564

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - block, pipe and fitting-insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and shiplap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to + 140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate- 14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	$\pm 1/16"$ -0" on insulation ID, all other dimensions to be $\pm 1/16"$ including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/4". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 98% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Max resistance to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
* Available in the form of pipe and fitting insulation from fabricators.	Type A: *Styrofoam FR** Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
	Type B: *Vapor - Lock* MMM Div, Insular Products Co	*Unarco Board 36* Chemboard Div Unarco Industries, Inc

DUP 0990565

R-333

040592

197

REV. NOV 1978

PREFORMED BLOCK AND PIPE INSULATION

SN 100

This Page Rev July 1977

Page

Code	130	131	
Material Designation	Asbestos board	High-density calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers, diatomaceous silica, and inorganic binder. Sanded on both sides	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	1 200°F max	1 200°F max	
K Factor Btu/(hr)(sq ft)(°F/in.)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair, must be painted for outdoor use	
Density	38 lb per cu ft	40 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, ultimate 14 000 psi Tensile parallel to face 430 psi Shear normal to face 700 psi Shear parallel to face 330 psi	1,000 psi at 5 percent deformation. Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size, ft: 3, 3 1/2, or 4 × 6 and 4 × 10 Thickness, in., 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2, and 4	Sheet size, ft: 4 × 8 standard Thickness, in., 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at 1/2 in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	
Approved Materials and Vendors	Monitor III (Type A) Johns-Manville Sales Corp	Monitor VI Johns-Manville Sales Corp	

Witness Mr. J. Burkhart-38
☒ FOR IDENT ☐ IN EVIDENCE
JUN 25 1981
R-334 JOSEPH J. HECHT

DUP 0990566

040597

Code	120	138
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 ps Shear parallel – 320 ps
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. See SN2D for flame-spread rating limitations. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
† Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* † Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	Vapor-Lock Insulfoam Corp	
	Expanded Polystyrene Insulation Min Density 1.5 lb/ft³ Dyplast of Florida Inc	

DUP 0990597

R-335 L-B-38A

040594

MATERIAL SPECIFICATION – SERIES 100
PREFORMED BLOCK AND PIPE

REV. JUL 1975

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap-butt joints.	Asbestos fibers, diatoms silica, and inorganic binc Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 a 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use wet base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that thei products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 1T4.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	VapoLock Insuldyne Corp	

R-336

J-B-38 B

DUP 0990568

848595

MATERIAL SPECIFICATION –
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 490 psi Shear normal to face – 700 psi Shear parallel – 320 psi
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 7/1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 1T4.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marmite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	

REV. JUN 1974

DUP 0990569

R-337

J-B-38C

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REV. SEP 1979

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	NOV 1978	Page 1 of 6
STANDARD REAFFIRMED	NOV 1978	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-200 to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.58 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.58 at 600°F mean	0.35 at 50°F mean 0.38 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	50 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors			
	Therma-12 Johns-Manville Sales Corp	*Super Caltemp, Type NA* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-104F Owens-Corning Fiberglas Corp	*Pamsil* (Notes 1, 2, and 3) Pamrod, Inc	
	Super Caltemp, Type NA Fiberboard Corp	*Wesolite* (Notes 1, 2, and 3) Wesolite Co	
	Caltemp 1500 (Notes 1, 2, and 4) Celotex Corp	*Kaylo-104F* Owens-Corning Fiberglas Corp	
	Pamsil (Notes 1, 2, and 3) Pamrod, Inc		
	Wesolite (Notes 1, 2, and 3) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in sprowed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate.
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

DUP 0990112 048137

Code	112	112.5	116
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.35 at 200°F mean 0.51 at 600°F mean 0.75 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 300* Certain-Teed Corp	*PV Supertemps* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 702* Owens-Corning Fiberglas Corp	*K-Fax PC* (Block only) (Note 2) U. S. Gypsum
	Insur-Sure (Note 1) Birmo Products, Insul-Caustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 09901 3

REV. SEP 1970

048138

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1964
THIS PAGE REVISED SEPT 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M

Code	16E	16E.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold or sub-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chlorine stress-corrosion cracking, and reinforced with fibers	Cellular glass, blocks and fluted and universal form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to -100°F (300°F for dual temp)
K Factor Btu·(in)/(sq ft)(°F)(hr)	0.41 at 200°F mean 0.46 at 400°F mean 0.58 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.58 at 600°F mean	0.28 at 50°F mean 0.33 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 3 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	30 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 16E.1 are approved where Code 16E is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. Per an alternate to pre-greased stainless material, see SN16E.1B. Stressed Type 304 stainless steel U-bend specimens at 150°C, when in contact with wet insulating material in the 2% Rule were test with 1,000 ppm chlorine as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 qualification does not qualify a material under Code 16E.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Super Caltemp, Type 1-4 Pittsburgh Corning Corp	Foamglas Pittsburg Corning Corp
	Kaylo 10/S Owens-Corning Fiberglas Corp	Pittsco Blocks 1 and 2 Pittsco, Inc	
	Super Caltemp, Type 1-4 Pittsburgh Corning Corp	Kaylo Blocks 1 and 2 Owens-Corning Fiberglas Corp	
	Caltemp (Also Grade 1) Calsil Corp		
	Pittsco Blocks 1 and 2 Pittsco, Inc		
	Kaylo Blocks 1 and 2 Owens-Corning Fiberglas Corp		

NOTES:
1. Molded mineral-fiber pipe covers are available in sectional, wrapped, and blanket types. Advise the manufacturer of the grade of aluminum jacket covers to be used to ensure a proper fit.
2. A service-limiting recommended temperature limit of 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

DUP 0990108

448133

REV. NOV 1978

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Case	112	112.A	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.75 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 500* Certain-Teed Corp	*PI Supremum* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 600 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglass Corp	*Fibrotherm, Type 700* Owens-Corning Fiberglass Corp	*K-Fur PI* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Sirma Products, Insul-Caustic Div		*N. T. Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV. NOV 1978

DUP 0990109

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195

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED SEPT 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – asbestos	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold or dual-temperature pipe and equipment
Material Description	Asbestos fiber reacted hydrous calcium silicate reinforced with fibers	Asbestos fiber reacted hydrous calcium silicate with Aribter for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into uniform cellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1200°F max	1200°F max	200° to +100°F (300°F for dual temp)
K Factor Btu (hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 600°F mean	0.28 at 50°F mean 0.28 at 75°F mean 0.28 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14–18 pcf	14–18 pcf	7–8.5 pcf
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 psi min	60–8 psi at min at 5 percent deformation	50 lb per sq in min at 5 percent deformation	50 lb per sq in
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased insulated materials see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont weir test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type V-4* Fiberglas Corp	*Foamglas* Pittsburg Corning Corp
	Aeroflex (Note 1) Owens-Corning Fiberglas Corp	*Pittmol* (Notes 1 and 2) Pittsburg Ins	
	Super Caltemp, Type V-4 Fiberglas Corp	*Micrometallic* (Notes 1 and 2) Wessinc Co	
	Calsilox Flex (Note 1) Celotex Corp		
	Pittmol (Notes 1 and 2) Pittsburg Ins		
	Micrometallic (Notes 1 and 2) Wessinc Co		

Notes:

1 Metallic two-piece fitting covers are available in serrated, welded, and sealed types. Advise the fabricator of the brand of aluminum sheet covers to be used to ensure a proper fit.

2 A perlite-silicate recommended temperature limit 1100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

DU PONT

SUBCOMMITTEE NO. 23

REV. NOV 1978

NOTE — [illegible]

DUP 0990114

048139

PREFORMED BLOCK AND PIPE INSULATION

OCTOBER 1954

This Page Rev July 1977

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1 800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1 800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1 000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Nonlead bearing inserts required where pipe is supported outside insulation	Nonlead bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. × 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: up to 24 in. × 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 500* Certain-Teed Corp	*PI Superheat* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 813* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 700* Owens-Corning Fiberglass Corp	*K-For PT* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Coustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990115

REV. NOV 1978

048148

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	JULY 1977	Page 1 of 5
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free reacted hydrous calcium silicate reinforced with fibers	Asbestos free reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-200° to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.28 at 50°F mean 0.28 at 75°F mean 0.28 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor.	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type VI* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-(01) Owens-Corning Fiberglass Corp	*Pomrod* (Notes 1 and 2) Pomrod, Inc	
	Super Caltemp, Type VI Fiberboard Corp	*Weaslite* (Notes 1 and 2) Weaslite Co	
	Celotex 1981 (Note 1) Celotex Corp		
	Pomrod (Notes 1 and 2) Pomrod, Inc		
	Weaslite (Notes 1 and 2) Weaslite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

DUPONT

R-1-1

848741

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DUP 0990116

SEP 1977 1977

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev July 1977

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 380°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.38 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 800°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. × 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in × 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*TB 800* Certain-Teed Corp	*PV Supertemp* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberhaust, Type 701* Owens-Corning Fiberglas Corp	*K-Fer PV* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Coustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990117

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REV NOV 1978

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PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	SEPT 1977	
STANDARD REAFFIRMED	JULY 1977	Page 1 of 6

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate + inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual temperature pipe and equ
Material Description	Asbestos free reacted hydrous calcium silicate reinforced with fibers	Asbestos free reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.35 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type V4* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylon (M4) Owens-Corning Fiberglass Corp	*Pemrod* (Notes 1 and 2) Pemrod, Inc	
	Super Caltemp, Type V4 Fiberboard Corp	*Wesplite* (Notes 1 and 2) Wesplite Co	
	Celotex (M4) (Note 1) Celotex Corp		
	Pemrod (Notes 1 and 2) Pemrod, Inc		
	Wesplite (Notes 1 and 2) Wesplite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate, recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

DU PONT

D-146

848253

DUP 0990228

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1964
THIS PAGE REVISED JULY 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M

Grade	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - reinforced	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or cold-temperature pipe and equipment
Material Description	Asbestos fiber, residual hydrous calcium silicate reinforced with fibers	Asbestos fiber, residual hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, bonded and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-297° to +100°F (300°F for dust seal)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 @ 200°F mean 0.46 @ 400°F mean 0.59 @ 600°F mean	0.41 @ 200°F mean 0.46 @ 400°F mean 0.59 @ 600°F mean	0.28 @ 50°F mean 0.33 @ 75°F mean 0.39 @ 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength: Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	65 lb per sq in min at 5 percent deformation	65 lb per sq in min at 5 percent deformation	50 lb per sq in.
Resistance to Abrading Breakage	Poor to fair	Poor	Fair
Combustibility	See SN100	See SN100	See SN100
Alkali-Aerosol Acting			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to plain-shielded insulated materials, see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 1000°C, when in contact with this insulating material in the Ca Rate mesh size with 1,000 ppm chlorides as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24094 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Super Caltemp, Type V-1 Fibrex Corp	Foamglas Pittsburg Corning Corp
	Kaylo-Hi-12 Owens-Corning Fiberglass Corp	Pittsco 1200 (Note 1) Pittsco, Inc	
	Super Caltemp, Type V-1 Fibrex Corp	Temp-Mat (Note 1) Wallace Co	
	Caltemp 1200 (Note 1) Calsilox Corp		
	Pittsco (Note 1 and 2) Pittsco, Inc		
	Temp-Mat (Note 1 and 2) Wallace Co		

Notes:
1. Maximum hot-service rating depends on temperature, exposure, and service factors. Advise the fabricator of the intent of aluminum cladding so he can select a proper fit.
2. A paper-backed, recommended temperature max 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 35

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SEP 1977

DUP 0990229

R-147

848254

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 100* Certain-Teed Corp	*PI Supermetal* (Block only) Eagle-Picher Sales Corp
	Wire-Lok 600 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - Use Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 701* Owens-Corning Fiberglas Corp	*A-For PI* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Coustic Div		*N. T. Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV NOV 1970

DUP 0990230

048255

195

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	SEPT 1977	Page 1 of 6
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking, and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to -100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.35 at 75°F mean 0.29 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	60 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-band specimens at 100°C, when in contact with this insulating material in the Du Pont test test with 1,000 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Super Caltemp, Type V4 Fiberboard Corp	Foamglas Pittsburg Corning Corp
	Kaylon-104F Owens-Corning Fiberglass Corp	Pemrod (Notes 1 and 2) Pemrod, Inc	
	Super Caltemp, Type V4 Fiberboard Corp	Kendon (Notes 1 and 2) Weeplite Co	
	Celotemp 1304 (Note 1) Celotex Corp		
	Pemrod (Notes 1 and 2) Pemrod, Inc		
	Kendon (Notes 1 and 2) Weeplite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate, recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

R-184

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REV NOV 1978

DUP 0990305

048338

Code	112	112.5	116
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.28 at 200°F mean 0.37 at 300°F mean	0.35 at 200°F mean 0.51 at 600°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 8 in. x 8 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 300 Pipe Covering* Certain-Teed Corp	*IB 300* Certain-Teed Corp	*PV Supertemps* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp	*K-Fox PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Ethna Products, Insul-Coustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

RFV

DUP 0990306

040331

MATERIAL SPECIFICATION – SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description*	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatom silica, and inorganic bi[illegible] Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 70[illegible] Shear parallel – 32[illegible]
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/[illegible] 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 [illegible] 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.02% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use we[illegible] base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the[illegible] products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp

REV. MAY 1973

DUP 0990307

R-185

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848332

MATERIAL SPECIFICATION - SERIES 100 SM
PREFORMED BLOCK AND PIPE

This Page Rev Aug 1972

Code	128	129
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 70 Shear parallel - 32
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 x 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" thickness piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use no base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

◊ Available in the form of fitting covers (see Code 116.1) from fabricators	*Styrofoam FR* ◊ Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
		Fyrcor Owens-Corning Corp

DUP 0990308

R-186

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040333

87

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam blocks, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatom. silica, and inorganic bin Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, max Btu (hr) (sq ft) (°F /in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 70 Shear parallel - 32
Dimensions	SNJD. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 x 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. — Not resistant to solvents other than alcohol.	Sanded bark sides, may be used unpainted for interior use. When painted, use wa base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

◊ Available in the form of pipe and fitting insulation from fabricators.	*Styrofoam FR* ◊ Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
		Fyrtex Owens-Corning Corp

DUP 0990309

R-187 LR 33 E

048334

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - block, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Plasma-sprayed zoning O. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to +140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.88 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate-14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 220 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	±1/16" -0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1-1/4, 1-1/2, 2 and 4 Sheet size, ft - 3, 3-1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/8". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 50% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 98 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.		
* Available in the form of pipe and fitting insulation from fabricators.	Type A: Styrofoam FR* Dow Chemical Co	Marinite 36 (Type A) Johns-Manville Sales Corp
	Type B: Vapor - Lock MMM Div, Insulac Products Co	Unarco Board 36 Chamberlain Div Unarco Industries, Inc

REV. JUL 1970 SUP. BY _____

DUP 0990310

048335

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - block, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to +140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate-14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	±1/16" -0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/64". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Max resistance to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

* Available in the form of pipe and fitting insulation from fabricators.		
	*Type A: Styrofoam FR** Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
	Type B: Vapor - Lock MMM Div, Insular Products Co	*Unarco Board 36* Chemkast Div Unarco Industries, Inc

R-189

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DUP 0990311

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev July 1977

Page

REV. NOV 1978

Code	136	131	
Material Designation	Asbestos board	High-density calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers, diatomaceous silica, and inorganic binder. Sanded on both sides	Asbestos-free, fireproof, high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	No	No	
At direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	1 200°F max	1 200°F max	
K Factor Btu/(hr)(sq ft)(°F/in.)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair, must be painted for outdoor use	
Density	35 lb per cu ft	45 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, ultimate 14 000 psi Tensile parallel to face 430 psi Shear normal to face 700 psi Shear parallel to face 330 psi	1,000 psi at 5 percent deformation. Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size, ft: 3, 3 1/2, or 4 × 8 and 4 × 10 Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2, and 4	Sheet size, ft: 4 × 8 standard Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at 1/2 in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	
Approved Materials and Vendors	Vendor 1b (Type A) Johns-Manville Sales Corp	Vendor 1d Johns-Manville Sales Corp	

Witness: J. Burkhart-38
SUPPORT IDENT ☐ IN EVIDENCE
JUN 25 1981
JOSEPH J. HECHT

R-190

DUP 0990312

848337

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 p Shear parallel - 320 p
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/2, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 16
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No dimensional or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 13 days. Water absorption max 0.83% by volume after being subjected to 90 F, 90% relative humidity for 13 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 3 days, then wiped with a wet cloth and weighed, with no delay between steps. See SN2D for flame-spread rating limitations. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

◊ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ◊ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insulfyme Corp	
	Expanded Polystyrene Insulation Min Density 1.5 lb/ft³ Dyplast of Florida Inc	

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DUP 0990313

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REV. JUL 1975

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatom silica, and inorganic bi Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 70 Shear parallel - 32
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/ 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use wa base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 1T4.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	

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J-B-38B

048339

DUP 0990314

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and shiplap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Plasma-sprayed coating G. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F /in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 p Shear parallel - 320 p
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 3 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 174.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insulcrete Corp	

REV. JUN 1974

DUP 0990315

R-193

J-B-38C

848348

9-6-57 A

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	SEPT 1977	Page 1 of 6
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to +100°F (200°F for dual temp)
K Factor Btu/(ft²)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.50 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.50 at 600°F mean	0.35 at 30°F mean 0.35 at 75°F mean 0.35 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	30 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont test test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Super Cabrera, Type V4 Fiberboard Corp	Foamglass Pittsburg Corning Corp
	Kaylo-1947 Owens-Corning Fiberglass Corp	Pomrod (Notes 1 and 2) Pomrod, Inc	
	Super Cabrera, Type V4 Fiberboard Corp	Kaylo (Notes 1 and 2) Westline Co	
	Cabrera (Not Note 1) Cabrera Corp		
	Pomrod (Notes 1 and 2) Pomrod, Inc		
	Kaylo (Notes 1 and 2) Westline Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate, recommended temperature limit 1,100°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 28

R-195

REV NOV 1978

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DUP 0990316

Code	112	112.6	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Snap-On 500 Pipe Covering Certain-Teed Corp	IB 500 Certain-Teed Corp	PI Supermetal (Block only) Eagle-Picher Sales Corp
	Micro-Lok 600 Johns-Manville Sales Corp	Spin-Glas No. 814 Johns-Manville Sales Corp	Mono Block (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - Use Flow Owens-Corning Fiberglas Corp	Fiberboard, Type 700 Owens-Corning Fiberglas Corp	A-For PI (Block only) (Note 2) U. S. Gypsum
	Insul-Spre (Note 1) Birma Products, Insul-Coustic Div		N. T. Block (Block only) Petty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV. NOV 1978

DUP 0990317

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1984
THIS PAGE REVISED JULY 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M

Class	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - reinforced	Cellular glass
Purpose	Insulation for hot pipes and equipment	Insulation for hot pipes and equipment	Insulation for cold or hot temperature pipes and equipment
Material Description	Asbestos and Portland hydraulic cement binder reinforced with fibers	Asbestos free, Portland hydraulic cement binder and reinforced for improved stress-compression properties and reinforced with fibers	Cellular glass, thermal and sound and waterproof form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-300° to +1000°F (300°F for cold temp)
K Factor Btu/(in/hr ft²°F/in.)	0.41 @ 200°F mean 0.48 @ 400°F mean 0.60 @ 600°F mean	0.41 @ 200°F mean 0.48 @ 400°F mean 0.60 @ 600°F mean	0.35 @ 50°F mean 0.38 @ 75°F mean 0.38 @ 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor.	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Standard 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	60 lb per sq in min @ 5 percent deformation	60 lb per sq in min @ 5 percent deformation	30 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See 3400	See 3400	See 3400
Plastic-Aggregate Asbestos			
Specifications, Qualifications, Limitations	All materials listed under Class 102.1 are approved where Class 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchase reference material, see SN102.10. Stainless Type 304 austenitic steel U-bolted specimens at 1000°C, when in contact with this insulating material at the Oil Point were used with 1,200 ppm chlorides as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Class 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Kaylo Calsitherm, Type V-1 Resistoflex Corp	Foamglas Pittsburg Corning Corp
	Kaylo 10/10 Owens-Corning Fiberglass Corp	Pittsco Inc	
	Kaylo Calsitherm, Type V-1 Resistoflex Corp	Thermo-Rock 1 and 2 Thermo Co	
	Calsitherm 1,200 Grade 1) Calsitherm Corp		
	Pittsco Grades 1 and 2 Pittsco, Inc		
	Thermo-Rock 1 and 2 Thermo Co		

NOTES:
1. Various hard-molded fitting covers are available in asbestos, calcium, and mineral types. Advise the Engineer of the types of fitting covers to be used to comply with Spec 44.
2. A density-controlled, high-temperature calcium silicate 1,100°F

Vendors and merchandise designations are given to describe materials and are not to include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

SUBCOMMITTEE NO. 28

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SEP 1977

DUP 0990318

R-196

848343

This Page Rev July 19[illegible]

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.3[illegible] at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.3[illegible] at 300°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for pipe insulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Sang-On Still Pipe Covering Certain-Teed Corp	IB [illegible] Certain-Teed Corp	PT Supertrust (Block only) Eagle-Picher Sales Corp
	Wire-Lok 650 Johns-Manville Sales Corp	Spin-Glass No. 814 Johns-Manville Sales Corp	Mono Block (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - Use Pipe Owens-Corning Fiberglas Corp	Filmboard, Type 702 Owens-Corning Fiberglas Corp	N. For PT. (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Coustic Div		N. T. Block (Block only) Perry-Sight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990319

048344

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	SEPT 1977	Page 1 of 5
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free reacted hydrous calcium silicate reinforced with fibers	Asbestos free reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to -100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.38 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN3D	See SN3D	See SN3D
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type V4* Fiberboard Corp	*Fomaglas* Pittsburg Corning Corp
	Kaylo-104F Owens-Corning Fiberglass Corp	*Pamrod* (Notes 1 and 2) Pamrod, Inc	
	Super Caltemp, Type V4 Fiberboard Corp	*Weselite* (Notes 1 and 2) Weselite Co	
	Celotex 1500 (Note 1) Celotex Corp		
	Pamrod (Notes 1 and 2) Pamrod, Inc		
	Weselite (Notes 1 and 2) Weselite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate, recommended temperature limit 1,100°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

R-243

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REV NOV 1978

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DUP 0990401

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1964	SN 100 M
THIS PAGE REVISED	JULY 1977	Page 1 of 5
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-200° to +100°F (200°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.38 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor.	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, which in contact with this insulating material in the Du Pont test test with 1,300 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Super Cellular, Type VI Fibreboard Corp	Foamglas Pittsburg Corning Corp
	Kaylo-10 Owens-Corning Fiberglass Corp	Pinkoil (Notes 1 and 2) Pinkoil, Inc	
	Super Cellular, Type VI Fibreboard Corp	Wheelite (Notes 1 and 2) Wheelite Co	
	Cellular 1200 (Note 1) Celotex Corp		
	Pinkoil (Notes 1 and 2) Pinkoil, Inc		
	Wheelite (Notes 1 and 2) Wheelite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and bevel types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

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SEP 1977

DUP 0990402

R-244

040427

Code	112	112.8	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool + 900°F
Purpose	Insulation for moderate temperature pipe and equipment	Glass insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, flanged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 @ 100°F mean 0.27 @ 200°F mean 0.33 @ 300°F mean	0.24 @ 100°F mean 0.30 @ 200°F mean 0.37 @ 300°F mean	0.36 @ 200°F mean 0.81 @ 600°F mean 0.78 @ 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19.5 per cu ft
Compressive Strength Deflection 6 in. x 6 in. x 2 in. Load Rate 0.16 per min	Nominal bearing inserts required where pipe is supported outside insulation	Nominal bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SKSC	Standard sheet: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard sheet: up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for premolding. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesive. When specified, consult vendor's catalog and indicate on order. 7½ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be processed per SN1A. Austenitic stainless steel at or above 140°F must be processed per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalog and indicate on order. Nominal 4½ lb per cu ft density material is available and is recommended for fabrication involving contoured/cut shaping and fitting. Aluminum must be processed per SN1A. Austenitic stainless steel at or above 140°F must be processed per SN1A.	Aluminum must be processed per SN1A. Austenitic stainless steel at or above 140°F must be processed per SN1A.
Approved Materials and Vendors	Insul-Glas 800 Pipe Covering Certain-Teed Corp	15 sbi Certain-Teed Corp	P1 Insulmesh (Glass cloth) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	Spin-Glas No. 814 Johns-Manville Sales Corp	Vono Blank (Glass cloth) Kaylo Corp Industrial Insulation Div
	Pipe Covering - Use Para Owens-Corning Fiberglas Corp	Fiberglas, Type 701 Owens-Corning Fiberglas Corp	A-Fab HT (Glass cloth) (Note 2) U. S. Gypsum
	Temp-Mat (Note 1) Manville Products, Insul-Coustic Div		H. T. Blank (Glass cloth) Perry-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990403 REV. NOV 1970

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REV NOV 1978

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	SEPT 1977	Page 1 of 6
STANDARD REAFFIRMED	JULY 1977	

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	200° to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.35 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Cellular, Type V4* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylon (04) Owens-Corning Fiberglass Corp	*Pemrod* (Notes 1 and 2) Pemrod, Inc	
	Super Cellular, Type V4 Fiberboard Corp	*Wesolite* (Notes 1 and 2) Wesolite Co	
	Celotex 13M (Note 1) Celotex Corp		
	Pemrod (Notes 1 and 2) Pemrod, Inc		
	Wesolite (Notes 1 and 2) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate, recommended temperature limit 1,100°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 25

DUPONT

D-281

DUP 0990476

040581

Code	112	112.4	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.32 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.35 at 200°F mean 0.51 at 600°F mean 0.75 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	18 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 300 Pipe Covering* Carbon-Tood Corp	*IB 300* Carbon-Tood Corp	*PV Supertemp* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 600 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp	*K-Fox PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birtco Products, Insul-Caustic Div		*H. T. Block* (Block only) Forty-Eight Insulations, Inc
			Fiberfrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV

DUP 0990477

275

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 s Shear parallel - 320 s
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp

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97

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam blocks, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN30. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type 1)* Johns-Manville Sales Corp
		Fyrecor Owens-Corning Corp

DUP 0990479

R-283

DUPONT

L-R-33F

848584

87

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and shiplap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, max Btu (hr) (sq ft) (°F /in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.3 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", loss rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" saw-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of pipe and fitting insulation from fabricators.	Styrofoam FR ♦ Dow Chemical Co	Marinite 36 (Type 4) Johns-Manville Sales Corp
		Fyrcor Owens-Corning Corp

DUP 0990480

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848585

MATERIAL SPECIFICATION – SERIES 100
PREFORMED BLOCK AND PIPE

454

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A – block, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B – pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	−100 F to −140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate—14,000 psi Tensile – 420 psi Shear normal to face – 700 psi Shear parallel – 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN3D	
Dimensional Tolerances	±1/16" –0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/4". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.		
* Available in the form of pipe and fitting insulation from fabricators.	*Type A: Styrofoam FR** Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	Type B: Vapor – Lock MMM Div, Insular Products Co	*Unarco Board 36* Chambest Div Unarco Industries, Inc

REV. JUL 1970 SUP. BY

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DUP 0990481

848586

MATERIAL SPECIFICATION - SERIES 100
PREFORMED BLOCK AND PIPE

Code	120	130
Material	Polystyrene foam:	Asbestos board
Material Description	Preformed polystyrene foam: Type A - blocks, pipe and fitting insulation cut from extruded polystyrene foam. Pipe insulation available with a variety of different joint designs. Type B - pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue and groove side wall joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant
Filler		Asbestos fiber
Binder		Inorganic
Temperature Range	-100 F to + 140 F	1200 F max
K Factor Btu/(hr) (sq ft) (°F/in.)	0.26 max at 75 F mean	0.80 max at 500 F mean
Density	1.8 lb per cu ft minimum	36 lb per cu ft
Compressive Strength	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate- 14,000 psi Tensile - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Resistance to Breakage in Handling	Excellent	Good
Dimensions	See SN30	
Dimensional Tolerances	$\pm 1/16" - 0"$ on insulation ID, all other dimensions to be $\pm 1/16"$ including straightness and squareness	Thickness, in. - 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Other Qualifications	Uniform cell structure with max 10% open cells for Type A. No voids having any dimensions exceeding 1/4". No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
* Available in the form of pipe and fitting insulation from fabricators.	*Type A: Styrofoam FR** Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
	Type B: Vapor - Lock MMM Div, Insular Products Co	*Unarco Board 36* Chembest Div Unarco Industries, Inc

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DUP 0990482

REV. NOV 1978

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev July 1977

Code	130	131	
Material Designation	Asbestos board	High-density calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers, diatomaceous silica, and inorganic binder. Sanded on both sides	Asbestos-free inorganic high-density structural insulation board consisting of calcium silicate inert fillers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	1 200°F max	1 200°F max	
K Factor Btu/(hr)(sq ft)(°F/in.)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.81 at 200°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair. must be painted for outdoor use	
Density	36 lb per cu ft	46 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, ultimate 1 000 psi Tensile parallel to face 420 psi Shear normal to face 700 psi Shear parallel to face 350 psi	1 200 psi at 5 percent deformation. Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size, ft: 2, 3 1/2, or 4 × 8 and 4 × 10 Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2, and 4	Sheet size, ft: 4 × 8 standard Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at 1/2 in penetration 120 lb pull. May be used unpainted for interior use when painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	
Approved Materials and Vendors	Thermo-12 (Type A) Johns-Manville Sales Corp	Thermo-12 Johns-Manville Sales Corp	

L. Burkhart-DP
FOR IDENT ☐ IN EVIDENCE
JUN 25 1981
JOSEPH J. HECHT
R-287
DUP 0990483
848588

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 psi Shear parallel - 320 psi
Dimensions	SN2D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. See SN2D for flame-spread rating limitations. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
◊ Available in the form of fitting covers (see Code 114.1) from fabricators	*Styrofoam FR* ◊ Dow Chemical Co	*Marinite 36 (Type A)* Johns-Manville Sales Corp
	Vapor-Lock Insulfyne Corp	
	Expanded Polystyrene Insulation Min Density 1.5 lb/ft³ Gypleat of Florida Inc	

DUP 0990484

R-288

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040589

REV. JUL 1975

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomac silica, and inorganic bind Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	– 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate – 14,000 psi Tensile parallel to face – 420 psi Shear normal to face – 700 Shear parallel – 320
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. – 1/2, 3/4 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft – 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use wat base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 1T4.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marinite 36 (Type 4)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	

R-289

J-B-38B

DUP 0990485

040518

Code	120	130
Material	Polystyrene foam	Asbestos board
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam (pipe insulation available with a variety of different joint designs), or pipe and fitting insulation molded to final shape from expanded polystyrene beads with tongue-and-groove side longitudinal joints and ship lap butt joints.	Asbestos fibers, diatomaceous silica, and inorganic binder. Flame-spread rating 0. Weather-resistant.
Recommended Temperature Range	- 100 F to + 140 F	1200 max
K Factor, Max Btu/(hr) (sq ft) (°F/in.)	0.24 at 50 F 0.26 at 75 F 0.28 at 100 F	0.77 at 200 F 0.79 at 400 F 0.81 at 600 F
Density	1.5 lb per cu ft minimum	36 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2", load rate 0.10" per min	Min 25 lb per sq in. at 5% deformation	Compressive, ultimate - 14,000 psi Tensile parallel to face - 420 psi Shear normal to face - 700 ps Shear parallel - 320 ps
Dimensions	SN3D. All dimensions to be ± 1/16" including straightness and squareness	Thickness, in. - 1/2, 3/4, 7, 1, 1 1/4, 1 1/2, 2 and 4 Sheet size, ft - 3, 3 1/2 or 4 x 8 and 4 x 10
Qualifications and Limitations	Uniform cell structure with max 10% open cells. No distortion or volume change, or loss of compressive strength after exposure at 140 F and 80% relative humidity for 15 days. Water absorption max 0.03% by volume after being subjected to 90 F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days, then wiped with a wet cloth and weighed, with no delay between steps. Not resistant to solvents other than alcohol.	Sanded both sides, may be used unpainted for interior use. When painted, use water base or epoxy coating.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

♦ Available in the form of fitting covers (see Code 174.1) from fabricators	*Styrofoam FR* ♦ Dow Chemical Co	*Marmite 36 (Type A)* Johns-Manville Sales Corp
	Vapo-Lock Insuldyne Corp	

REV. JUN 1974

R-290

J-B-38C

048511

DUP 0990486

PREFORMED BLOCK AND PIPE INSULATION

This Page Rev July 19--

Class	11B	11B-A	11C
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1 800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu (hr)(sq ft)(°F/in.)	0.25 @ 100°F mean 0.27 @ 200°F mean 0.35 @ 300°F mean	0.24 @ 100°F mean 0.30 @ 200°F mean 0.37 @ 300°F mean	0.38 @ 200°F mean 0.51 @ 600°F mean 0.76 @ 1 000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 3 in. Load Rate 0.10 per min	Nominal bearing inserts required where pipe is supported outside insulation	Nominal bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SP-58	Standard sizes: 24 in. x 48 in. Thicknesses: 1 in., 1 1/2 in., 2 in.	Standard sizes: up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for premolding. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/2 lb per cu ft density recommended for field-fabricated fittings. Molded fittings are generally lower in cost and are preferred over field-fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/2 lb per cu ft density material is available and is recommended for fabrication involving contour/size shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Thermo-Ply 300 Pipe Covering Certain-Teed Corp	18 000 Certain-Teed Corp	Pi- Insulation (Blank only) Eagle-Picher Sales Corp
	Thermo-Lok 650 Johns-Manville Sales Corp	Thermo-Glass No. 814 Johns-Manville Sales Corp	Vesta Blank (Blank only) Keene Corp Industrial Insulation Div
	Pipe Covering - Use Plans Owens-Corning Fiberglas Corp	Fiberglas, Type 703 Owens-Corning Fiberglas Corp	A-Fax IV (Blank only) (Note 2) U. S. Gypsum
	Temp-Rite (Note 1) Elmes Products, Insul-Coustics Div		N. T. Blank (Blank only) Perry-Dyke Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

REV. NOV 1970
DUP 09904187

Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.3[illegible] at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.3[illegible] at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block, 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	Snap-On Slit Pipe Covering Certain-Teed Corp	IB [illegible] Certain-Teed Corp	PI Superwrap (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	Spin-Glass No. 814 Johns-Manville Sales Corp	Vono Blanc (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	Fibermaster, Type 703 Owens-Corning Fiberglas Corp	A-Fer Pl. (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Caustic Div		N. T. Block (Block only) Forty-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990488

040515

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MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954
THIS PAGE REVISED	JULY 1977
STANDARD REAFFIRMED	JULY 1977

SN 100 M

Page 1 of 5

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate - inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free reacted hydrous calcium silicate reinforced with fibers	Asbestos free reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	-200° to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.35 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor.	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in.-min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type VI* Fiberboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo-1010 Owens-Corning Fiberglass Corp	*Pamsil* (Notes 1 and 2) Pamrod, Inc	
	Super Caltemp, Type VI Fiberboard Corp	*Wesolite* (Notes 1 and 2) Wesolite Co	
	Celotemp 1500 (Note 1) Celotex Corp		
	Pamsil (Notes 1 and 2) Pamrod, Inc		
	Wesolite (Notes 1 and 2) Wesolite Co		

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

904

SUBCOMMITTEE NO. 25

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REV. AUG SEP 1977 1977

DUP 0991342

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SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

OCTOBER 1954

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Code	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1 800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece hinged plain without jacket	Glass fiber bonded board plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1 800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.16 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. × 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block. Up to 24 in × 36 in. Thickness: 1 in. to 4 in
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 800* Certain-Teed Corp	*PV Supertemp* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glas No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 704* Owens-Corning Fiberglass Corp	*X-Fur Pf* (Block only) (Note 2) U S Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Caustic Div		*H T. Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1 Molded fitting covers only
2 Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

REV. NOV 1978

DUP 0991343

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REV. NOV 1978

OCTOBER 1954

This Page Rev July 1977

PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Page 3

Code	114 1	114 2	116
Material Designation	Mineral wool – inhibited – 900°F	Mineral wool – 1,200°F	Flexible foamed plastic
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for moderate temperature and antisweat application pipe and equipment
Material Description	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped, sprayed, or brushed with sodium silicate to the equivalent of 100 sq ft per gallon	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder	Preformed resilient closed-cell elastomer foam sheet and pipe insulation
Suitable for Use: On Unprotected Aluminum	No	No	Yes
In direct contact with austenitic stainless steel at or above 140°F	Yes	No	No
Recommended Temperature Range	900°F max (limited by sodium silicate)	1,200°F max	−40° to +180°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean	0.28 at 75°F mean 0.29 at 90°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	0.15 Perm – inches
Density	11 to 19 lb per cu ft	10 to 19 lb per cu ft	6 lb per cu ft max
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in. × 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs	Standard block: Up to 24 in. × 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs	Sheet size: 36 in. × 48 in. Sheet thickness: 1/8 in. to 1 in. Pipe covering: To 5 in. ID and 6 ft long Pipe thickness: 3/8 in., 1/2 in., 3/4 in.
Flame-Spread Rating			Flame-spread rating per ASTM E 162 shall not exceed 75 uncoated. Installations must meet flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited material.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 inch. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Sales Corp	*Block N-1200* Forty-Eight Insulations, Inc	*Armaflex/FR* Armstrong Cork Co*
	Block N-1200 Forty-Eight Insulations, Inc	*MF Pipe Insulation* (Note 1) Forty-Eight Insulations, Inc	*R-1800-FS tubing* Rubatex Corp**
	MF Pipe Insulation (Note 1) Forty-Eight Insulations, Inc	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Sales Corp	*R-1800-FS sheet* Rubatex Corp**
	A-Fur Pt (Note 2) U. S. Gypsum	*A-Fur Pt* (Note 2) (Block and Pipe Sections) U. S. Gypsum	

Notes:
1. Pipe insulation in 2-ft lengths only
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

* Fire-retardant pipe covering is identified with inked blue lines. Fire-retardant sheet material is identified with inked white lines.
** Rubatex Corp produces only the low flame-spread grade.

DUP 0991344

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PREFORMED BLOCK AND PIPE INSULATION

Code	118	118.1	129
Material Designation	Polyurethane foam - rigid	Polyisocyanurate foam - rigid	Polystyrene foam
Purpose	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment	Insulation for cool pipe and equipment
Material Description	Preformed rigid urethane foam blocks pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam blocks pipe and fitting insulation manufactured with polyester or polyether resins. Flammability retarding agents special catalysts and a fluorocarbon blowing agent	Preformed polystyrene foam blocks pipe and fitting insulation cut from extruded polystyrene foam with a variety of plain and offset type joints or molded from expanded polystyrene beads to final shape with plain or offset joints
Suitable for Use: On Unprotected Aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	-100° to +180°F	-100° to +300°F	-100° to +140°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.18 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair	Fair
Density	1.8 to 2.5 lb per cu ft	1.8 to 2.5 lb per cu ft	1.5 lb per cu ft min
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise	Min 25 lb per sq in at 5 percent deformation
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Installations must meet flame-spread rating limitations given in SN1A	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.	Installations must meet the flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test: Blocks 1 in. square and 7 in. long cut from near outer surface, on faces 6 in. apart with 70 gm weight. Rising 1 in. square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in. x 2 in. x 1 in. skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps. Attacked by methyl ethyl ketone and alcohol (see SN118D). Austenitic stainless steel at or above 140°F must be protected per SN1A	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 90 percent relative humidity for 15 days. Water absorption max 0.03 percent by volume after being subjected to 90°F 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in. x 2 in. x 1 in. skin-free piece immersed in water just below the surface for five days, then wiped with a wet cloth and weighed with no delay between steps
Approved Materials and Vendors	[illegible] - Type 281 Owens-Corning Fiberglas Corp	[illegible] CPR Div Upjohn Co	[illegible] Dow Chemical Co
	[illegible] - Type 281 Upjohn Co		[illegible] Insulsyne Corp
	[illegible] (Note 1) Armstrong Cork Co		[illegible] Dyplast of Florida Inc
	[illegible] Dyplast of Florida, Inc		[illegible] Southeastern Foam Products, Inc Must state Minimum Density 1.5 lb/ft³ for all vendors

Note:
1. Pipe sections only, standard 4-ft length with factory-applied vapor barrier jacket. See manufacturer's literature for technical data and physical properties.

REV. NOV 1978
DUP 0991345
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OCTOBER 1954 | PREFORMED BLOCK AND PIPE INSULATION | SN 100 M
This Page Rev July 1977 | Page 5

REV. NOV 1978

Code	130	131	
Material Designation	Asbestos board	High-density calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers diatomaceous silica and inorganic binder. Sanded on both sides	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate inert fillers and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	1 200°F max	1 200°F max	
K Factor Btu (hr)(sq ft)(°F/in.)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair must be painted for outdoor use	
Density	36 lb per cu ft	46 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, ultimate 14 000 psi Tensile parallel to face 420 psi Shear normal to face 700 psi Shear parallel to face 320 psi	1 000 psi at 5 percent deformation. Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size ft: 3, 3½, or 4 × 8 and 4 × 10 Thickness, in: ½, ¾, ⅞, 1, 1¼, 1½, 2, and 4	Sheet size ft: 4 × 8 standard Thickness, in.: ½, ¾, ⅞, 1, 1¼, 1½, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A	Self-tapping screw holding strength at ½ in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A	
Approved Materials and Vendors	Marinite 36 (Type A) Johns-Manville Sales Corp	Marinite 37 Johns-Manville Sales Corp	

DUP 0991346

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090932

PREFORMED BLOCK AND PIPE INSULATION

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OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1964	102, 102.1
103	Diatomaceous earth	Feb 1964	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	106
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1964	
109	Corrugated asbestos preshrunk	Feb 1964	
110	Vegetable cork	Jun 1966	111, 118, 120
111.1	Cellular glass	Jun 1966	111
111.2	Cellular glass	Jun 1966	111
111.3	Cellular glass	Jun 1966	111
112	Glass fiber	Apr 1956	Reinstated Sept 1969
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1956	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	Mar 1959	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	Apr 1963	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1964	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber – neoprene coated	Apr 1956	
115	Mineral wool – asphalt impregnated	Apr 1956	
116	Flexible foamed plastic	Jun 1962	Reinstated May 1973
117	Urethane foam resilient	Jun 1963	
117.1	Urethane foam resilient	Dec 1960	
117.2	Urethane foam resilient	Feb 1960	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1960	
117.5	Urethane foam resilient	Apr 1960	
117.6	Urethane foam resilient	July 1963	

REV. JUL 1977

DUP 0991347

090933

195

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED SEPT 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M
Page 1 of 6

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold or dual-temperature pipe and equipment
Material Description	Asbestos free reacted hydrous calcium silicate reinforced with fibers	Asbestos free reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into unicellular form
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	250° to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.59 at 600°F mean	0.35 at 50°F mean 0.38 at 75°F mean 0.38 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load 1/10 to 0.10 per min	60 lb per sq in. min at 5 percent deformation	50 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chlorides as NaCl in the test water shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Calsteam, Type VI* Fibreboard Corp	*Foamglas* Pittsburg Corning Corp
	Kaylo (HA) Owens-Corning Fiberglass Corp	*Pomrod* (Notes 1 and 2) Pomrod, Inc	
	Super Calsteam, Type VI Fibreboard Corp	*Wesalite* (Notes 1 and 2) Wesalite Co	
	Calsteam 1200 (Note 1) Celotex Corp		
	Pomrod (Notes 1 and 2) Pomrod, Inc		
	Wesalite (Notes 1 and 2) Wesalite Co		

Notes
1 Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the grade of aluminum elbow covers to be used to ensure a proper fit.
2 A perlite-silicate recommended temperature limit 1,100°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority interpreting the use of this specification.

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DUPONT

SUBCOMMITTEE NO. 28

REV. NOV 1978

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DUP 0991348

090934

PREFORMED BLOCK AND PIPE INSULATION

OCTOBER 1954

This Page Rev July 1977

Code	112	112.6	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1 800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece hinged, plain without jacket	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1 800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1 000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	Standard block: 24 in. × 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard block: Up to 24 in. × [illegible] in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7 1/4 lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4 1/4 lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*IB 800* Certain-Teed Corp	*PV Supertempt* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 705* Owens-Corning Fiberglass Corp	*K-Fur PC* (Block only) (Note 2) U S Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Caustic Div		*H T Block* (Block only) Forty-Eight Insulations, Inc

Notes:
1 Molded fitting covers only
2 Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

REV. NOV 1978

DUP 0991349

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OCTOBER 1954 — SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

REV. NOV 1978

Code	116.1	116.2	116
Material Designation	Mineral wool – inhibited – 900°F	Mineral wool – 1,200°F	Flexible foamed plastic
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for moderate temperature and antisweat application pipe and equipment
Material Description	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and sized, sprayed, or brushed with sodium silicate to the equivalent of 100 sq ft per gallon	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder	Preformed resilient closed-cell elastomer foam sheet and pipe insulation
Suitable for Use: On Unprotected Aluminum	No	No	Yes
In direct contact with austenitic stainless steel at or above 140°F	Yes	No	No
Recommended Temperature Range	900°F max (limited by sodium silicate)	1,200°F max	−40° to +180°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.38 at 200°F mean 0.51 at 600°F mean 0.78 at 1,000°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.78 at 1,000°F mean	0.28 at 75°F mean 0.29 at 90°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	0.15 Perm – inches
Density	11 to 19 lb per cu ft	10 to 19 lb per cu ft	6 lb per cu ft max
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in × 36 in Thickness: 1 in. to 4 in Pipe sizes. See vendor's catalogs	Standard block: Up to 24 in × 36 in Thickness: 1 in. to 4 in Pipe sizes. See vendor's catalogs	Sheet size 36 in × 48 in Sheet thickness $\frac{1}{8}$ in. to 1 in Pipe covering To 5 in. ID and 6 ft long Pipe thickness $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{3}{4}$ in.
Flame-Spread Rating			Flame-spread rating per ASTM E 162 shall not exceed 75 unclothed installations must meet flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited materials.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding $\frac{1}{8}$ inch. Austenitic stainless steel at or above 140°F must be protected per SN1A
Approved Materials and Vendors	*Fiberglas*–*Type 475* (Block and Pipe Sections) Eagle-Picher Sales Corp	*Nonpareil* 8–*Type 475* Forty-Eight Insulations, Inc	*Armaflex* AP Armstrong Cork Co.*
	Nonpareil 8–*Type 475* Forty-Eight Insulations, Inc	*Nonpareil* 8 Pipe Insulation (Note 1) Forty-Eight Insulations, Inc	*K-Flex* (Note 1) Rubatex Corp**
	Nonpareil 8 Pipe Insulation (Note 1) Forty-Eight Insulations, Inc	*Fiberglas*–*Type 475* (Block and Pipe Sections) Eagle-Picher Sales Corp	*K-Flex* (Note 1) Rubatex Corp**
	Asbestos M (Note 2) U. S. Gypsum	*Asbestos* M (Note 2) (Block and Pipe Sections) U. S. Gypsum	

Notes:
1. Pipe insulation in 2-ft lengths only
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

* Fire-retardant pipe covering is identified with inked blue lines. Fire-retardant sheet material is identified with inked white lines.
** Rubatex Corp produces only the low flame-spread grade

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DUP 0991350

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SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

OCTOBER 1954

This Page Rev July 1977

Code	118	118.1	120
Material Designation	Polyurethane foam - rigid	Polyisocyanurate foam - rigid	Polystyrene foam
Purpose	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment	Insulation for cool pipe and equipment
Material Description	Preformed rigid urethane foam block pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents special catalysts and a fluorocarbon blowing agent	Preformed polystyrene foam block pipe and fitting insulation cut from extruded polystyrene foam with a variety of plain and offset type joints or molded from expanded polystyrene beads to final shape with plain or offset joints
Suitable for Use: On Unprotected Aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	-100° to +180°F	-100° to +300°F	-100° to +140°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.18 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair	Fair
Density	1.8 to 2.5 lb per cu ft	1.8 to 2.5 lb per cu ft	1.5 lb per cu ft min
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise	Min 25 lb per sq in at 5 percent deformation
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced by 10 × 10 mesh glass cloth 10 lb per 100 sq yd. Installations must meet flame-spread rating limitations given in SN1A	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.	Installations must meet the flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test: Block 1 in. square and 7 in. long cut from near outer surface, on rests 6 in. apart with 70 gm weight having 1 in. square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in. × 2 in. × 1 in. skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps. Attacked by methyl ethyl ketone and alcohol (see SN118D). Austenitic stainless steel at or above 140°F must be protected per SN1A	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 80 percent relative humidity for 15 days. Water absorption max 0.03 percent by volume after being subjected to 90°F 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in. × 2 in. × 1 in. skin-free piece immersed in water just below the surface for five days, then wiped with a wet cloth and weighed with no delay between steps
Approved Materials and Vendors	*Urethane - Type 240* Owens-Corning Fiberglas Corp	*Trymer CPR-[illegible]* CPR Div Upjohn Co	*Styrofoam-FR* Dow Chemical Co
	C-Thane [illegible] Upjohn Co		*Vapor-Lock* Insuldyne Corp
	Armalok (Note 1) Armstrong Cork Co		*Polystyrene Insulation Expanded* Dyplast of Florida, Inc
	Dahlite CPR 400 System Dyplast of Florida, Inc		*Permaspan* Southeastern Foam Products, Inc Must state Minimum Density 1.5 lb/ft³ for all vendors

Note

* Pipe sections only standard 4-ft length with factory-applied vapor barrier jacket. See manufacturer's literature for technical data and physical properties

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REV. NOV 1978

DUP 0991351

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OCTOBER 1954 SN 100 M
This Page Rev July 1977 Page 5

PREFORMED BLOCK AND PIPE INSULATION

Code	130	131	
Material Designation	Asbestos board	High-density calcium silicate board	
Purpose	Use where high structural strength insulation is required	Use where high structural strength insulation is required	
Material Description	Weather-resistant board consisting of asbestos fibers, diatomaceous silica, and inorganic binder. Sanded on both sides	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	No	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	1 200°F max	1 200°F max	
K Factor Btu/(hr)(sq ft)(°F/in.)	0.77 at 200°F mean 0.79 at 400°F mean 0.81 at 600°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair, must be painted for outdoor use	
Density	36 lb per cu ft	46 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Compressive, ultimate 14 000 psi Tensile parallel to face 420 psi Shear normal to face 700 psi Shear parallel to face 320 psi	1 000 psi at 5 percent deformation. Modulus of rupture 900 psi	
Resistance to Handling Breakage	Very good	Very good	
Dimensions	Sheet size, ft: 3, 3 1/2, or 4 × 8 and 4 × 10 Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2, and 4	Sheet size, ft: 4 × 8 standard Thickness, in.: 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2	
Flame-Spread Rating	Flame-spread rating is 0	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	May be used unpainted for interior use. When painted, use water base or epoxy coating. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A	Self-tapping screw holding strength at 1/2 in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	
Approved Materials and Vendors	Marinite M (Type A) Johns-Manville Sales Corp	Marinite M Johns-Manville Sales Corp	

REV. NOV 1978

DUP 0991352

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DUPONT

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PREFORMED BLOCK AND PIPE INSULATION

OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1964	102, 102.1
103	Diatomaceous earth	Feb 1964	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	106
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1964	
109	Corrugated asbestos preshrunk	Feb 1964	
110	Vegetable cork	June 1966	111, 118, 120
111.1	Cellular glass	June 1966	111
111.2	Cellular glass	June 1966	111
111.3	Cellular glass	June 1966	111 .
112	Glass fiber	April 1956	Reinstated Sept 1969
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1956	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	March 1959	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	April 1963	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1964	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber – neoprene coated	April 1956	
115	Mineral wool – asphalt impregnated	April 1956	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam resilient	June 1963	
117.1	Urethane foam resilient	Dec 1960	
117.2	Urethane foam resilient	Feb 1960	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1960	
117.5	Urethane foam resilient	April 1960	
117.6	Urethane foam resilient	July 1963	

DUP 0991353 REV. NOV 1978

090939

MATERIALS

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1964
THIS PAGE REVISED NOV 1978
STANDARD REAFFIRMED NOV 1978

SN 100 M

REV. SEP 1979

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold or sub-ambient pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass, foamed and fused into monolithic form
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	−296 to +100°F (538°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 @ 200°F mean 0.48 @ 400°F mean 0.55 @ 600°F mean	0.41 @ 200°F mean 0.48 @ 400°F mean 0.55 @ 600°F mean	0.26 @ 25°F mean 0.33 @ 75°F mean 0.39 @ 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Deflection 5 in. x 5 in. x 2 in. Load Rate 0.10 per min	80 lb per sq in. min at 5 percent deformation	80 lb per sq in. min at 5 percent deformation	30 lb per sq in.
Resistance to Handling Stresses	Fair to good	Poor	Poor
Dimensions	See SN100	See SN100	See SN100
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All thicknesses listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steels at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to particulate inhibited material, see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 135°C, which in contact with this insulating material in the Go Point wick test using 1,000 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in this specification does not qualify a material under Code 102.1	Aluminum must be protected per SN1A. Austenitic stainless steels at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and have been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials are also acceptable under other vendor's labels when certification as to their identity

Approved Materials and Vendors			
	Thermo-12 Johns-Manville Sales Corp	*Super Cal-o-lite, Type NA* Pittsburgh Corning Corp	*Foamglas* Pittsburgh Corning Corp
	Kaylo-10&F Owens-Corning Fiberglas Corp	*Pumal* (Grades 1, 2, and 3) Pumal, Inc	
	Super Cal-o-lite, Type NA Pittsburgh Corning Corp	*Foamglas* (Grades 1, 2, and 3) Wheaton Co	
	Cal-o-lite 1200 (Grades 1, 2, and 4) Cabot Corp	*Kaylo-10&F* Owens-Corning Fiberglas Corp	
	Pumal (Grades 1, 2, and 3) Pumal, Inc		
	Foamglas (Grades 1, 2, and 3) Wheaton Co		

Notes

1. Molded hard-block filling covers are available in cylindrical, conical, and curved types. Advise the manufacturer of the grade of aluminum sheet covers to be used to ensure a proper fit.
2. A combination.
3. Sheets or molded hard-block filling covers are available in sizes up to 12" thick. Greater sizes are fabricated.
4. Do not use in chemical/petrochemical systems.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

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DUP 0990110

Class	112	112.5	114
Material Designation	Glass fiber	Glass fiberboard	Mineral wool - 1,800°F
Purpose	Insulation for moderate temperature pipe and equipment	Block insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Glass fiber bonded board, plain, without covering	Mineral wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	40 to 300°F	1,800°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.28 at 200°F mean 0.37 at 300°F mean	0.35 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing, inserts required where pipe is supported outside insulation	Nonload bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard block: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	25 or less	25 or less	Does not burn
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 300 Pipe Covering* Certain-Teed Corp	*IS 300* Certain-Teed Corp	*PV Supertemps* (Block only) Eagle-Picher Sales Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Spin-Glass No. 814* Johns-Manville Sales Corp	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Fiberboard, Type 705* Owens-Corning Fiberglas Corp	*K-Fas PC* (Block only) (Note 2) U. S. Gypsum
	Insul-Sure (Note 1) Birma Products, Insul-Coustic Div		*H. T. Block* (Block only) Perry-Sight Insulations, Inc
			Fibrefrax Mineral Wool Board (Block Only) Carborundum

Notes:
1. Molded fitting covers only.
2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990111

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SEP 1977

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1964
THIS PAGE REVISED JULY 1977
STANDARD REAFFIRMED JULY 1977

SN 100 M

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – hydrous	Calcium silicate
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or cold-temperature pipe and equipment
Material Description	Asbestos free, reacted hydrous calcium silicate reinforced with fibers	Asbestos free, reacted hydrous calcium silicate with inhibitor for stainless steels-corrosion cracking and reinforced with fibers	Calcium silicate, hydrous and fibers with proprietary resin
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,200°F max	1,200°F max	+200° to +100°F (200°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 @ 200°F mean 0.48 @ 400°F mean 0.58 @ 600°F mean	0.41 @ 200°F mean 0.48 @ 400°F mean 0.58 @ 600°F mean	0.35 @ 50°F mean 0.36 @ 75°F mean 0.39 @ 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor.	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	65 lb per sq in. min @ 5 percent deformation	50 lb per sq in. min @ 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Poor to fair	Poor	Fair
Dimensions	See SN100	See SN100	See SN100
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to pure-grade reinforced materials, see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 150°C, when in contact with this insulating material in the Du Pont weld test with 1,000 ppm chlorides as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A. DUP 0990106
Approved Materials and Vendors	Thermo-12 Johns-Manville Sales Corp	Vapor Cal, Type V-1 Pittsburgh Corning Corp	Foamglas Pittsburgh Corning Corp
	Kaylo 10 SF Owens-Corning Fiberglass Corp	Percal Grades 1 and 2I Perlco, Inc	
	Vapor Cal, Type V-1 Pittsburgh Corning Corp	Expanded Grades 1 and 2I Wheaton Co	
	(Calcium Silicate Grade 1) Certain-Teed Corp		
	Percal Grades 1 and 2I Perlco, Inc		
	Expanded Grades 1 and 2I Wheaton Co		

Notes:
1. Mitered two-piece fitting covers are available in asbestos, modified, and mineral fibers. Advise the fabricator of the grade of aluminum jacket covers to be used to ensure a proper fit.
2. A calcium-silicate, recommended temperature limit 1,100°F

Vendors and merchandise designations are given to describe materials and do not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

SUBCOMMITTEE NO. 28

DUP 0990106

Class	112	112.5	114
Material Description	Glass fiber	Glass fiber	Mineral wool - [illegible]°F
Purpose	Insulation for moderate temperature pipe and equipment	Blanket insulation for moderate temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Designation	Glass fiber, thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, flanges, plain, without jacket	Glass fiber bonded blanket, plain, without covering	Mineral wool very high-temperature binder
Suitable for Use On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40° to 375°F	40° to 350°F	1,200°F max
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean	0.38 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	3 lb per cu ft, nominal	15 to 19 lb per cu ft
Compressive Strength Recovery 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nominal bearing where loads required where pipe is supported outside insulation	Nominal bearing	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SP-58	Standard sizes: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.	Standard sizes: up to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating	—		
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for pressurization. Specify whether for pipe or tubing on order. Available with factory-applied fittings and tab adhesive. When specified, consult vendor's catalog and indicate on order. 1¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally used in size and are preferred over field fabricated fittings. Aluminum must be protected per SP-1A. Austenitic stainless steel at or above 140°F must be protected per SP-1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and indicate on order. Nominal 4½ lb per cu ft density material is available and is recommended for fabricating insulating connections, shaping and fitting. Aluminum must be protected per SP-1A. Austenitic stainless steel at or above 140°F must be protected per SP-1A.	Aluminum must be protected per SP-1A. Austenitic stainless steel at or above 140°F must be protected per SP-1A.
Approved Materials and Vendors	Vimpel-Fit 350 Pipe Covering Certain-Teed Corp	18 500 Certain-Teed Corp	Pi' Insulmax (Black only) Lapp-Pipher Sales Corp
Vimpel-Lok 450 Johns-Manville Sales Corp	Vimpel-Lok No. 814 Johns-Manville Sales Corp	Vapor Mark (Black only) Keene Corp Industrial Insulation Div
Pipe Covering - Unit Pipe Owens-Corning Fiberglas Corp	Fiberglas, Type 705 Owens-Corning Fiberglas Corp	A/Vor Pi' (Black only) Class 23 U. S. Gypsum
Insulation (Class 1) Ebing Products, Insul-Corrugated Div		M. T. Mark (Black only) Perry-Eight Insulations, Inc

Notes:
1. Molded fitting covers only.
2. Also available as glass fabric covers. Advise the manufacturer of the brand of aluminum elbow covers to be used to ensure a proper fit.

DUP 0990107

221

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
THIS PAGE REVISED SEPT 1979
STANDARD REAFFIRMED SEPT 1979

SN 100 M

Page 1 of 6

Code	102	102.1	111
Material Designation	Calcium silicate	Calcium silicate – inhibited	Cellular glass
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Asbestos free (Note 5), reacted hydrous calcium silicate reinforced with fibers	Asbestos free (Note 5), reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers	Cellular glass foamed and fused into unicellular form
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1 200°F max	1 200°F max	−200 to +100°F (300°F for dual temp)
K Factor Btu/(hr)(sq ft)(°F/in.)	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 800°F mean	0.41 at 200°F mean 0.48 at 400°F mean 0.58 at 800°F mean	0.33 at 50°F mean 0.35 at 75°F mean 0.39 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Fair
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	60 lb per sq in. min at 5 percent deformation	60 lb per sq in. min at 5 percent deformation	50 lb per sq in.
Resistance to Handling Breakage	Fair to poor	Poor	Fair
Dimensions	See SN30	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to purchased inhibited material, see SN102.10. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1.	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors			
	Thermo-12 Johns-Manville Sales Corp	*Super Calsmp. Type YA* Louisiana-Pacific Corp	*Foamglas* Pittsburgh Corning Corp
	Kaylo-10AF Owens-Corning Fiberglas Corp	*Pamsil* (Notes 1, 2, and 3) Pamrod, Inc	
	Super Calsmp. Type YA Louisiana-Pacific Corp	*Brasilia* (Notes 1, 2, and 3) Wessels Co	
	Calsmp 1500 (Notes 1, 3, 4, and 6) Celotex Corp	*Kaylo-10AF* Owens-Corning Fiberglas Corp	
	Pamsil (Notes 1, 2, and 3) Pamrod, Inc	*Sprouse T 1200* (Notes 1, 2, and 3)	
	Brasilia (Notes 1, 2, and 3) Wessels Co	*Sprouse BR 1200* (Notes 1, 2, 3, and 7)	
	Sprouse T 1200 (Notes 1, 2, and 3) Sprouse Mfg Co		
	Sprouse BR 1200 (Notes 1, 2, 3, and 7) Sprouse Mfg Co		

Notes:

1. Molded two-piece fitting covers are available in serrated, welded, and sewed types. Advise the fabricator of the brand of aluminum sheet covers to be used to ensure a proper fit.
2. A perlite-silicate.
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ inch OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.
5. Has been specified to be asbestos free since 1973.
6. Absorbs much less water. Water absorption resistance rapidly diminishes above 350°F.
7. Absorbs much less water. Water absorption resistance rapidly diminishes above 500°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority initiating the use of this specification.

SUBCOMMITTEE NO. 28

DUPONT

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PREFORMED BLOCK AND PIPE INSULATION

Code	112	112.1	112.6
Material Designation	Glass fiber	Glass fiber – high temperature	Glass fiberboard
Purpose	Insulation for moderate-temperature pipe and equipment	Insulation for high-temperature pipe	Glass insulation for moderate-temperature equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece, hinged, plain, without jacket	Pipe section insulation, consisting of high-temperature resistant glass fibers with a high-temperature binder. Pipe sections are one piece, hinged, plain, without jacket	Glass fiber bonded board, plain without covering
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	To 650°F	40 to 350°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.23 at 100°F mean 0.30 at 300°F mean 0.46 at 460°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	4 lb per cu ft, nominal	5 lb per cu ft, nominal	3 lb per cu ft, nominal
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Nonload bearing. Inserts required where pipe is supported outside outside insulation	Low	Nonload bearing
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Pipe: See SN30; to 4 in. thickness	Standard block: 24 in. x 48 in. Thickness: 1 in., 1½ in., 2 in.
Flame-Spread Rating	25 or less	Does not burn	25 or less
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for premoulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives. When specified, consult vendor's catalog and include on order. 7¼ lb per cu ft density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Poor resistance to abuse. Not recommended for premoulation. May be used in thermal/acoustical insulation systems (consult acoustical consultants in SN3D). Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified, consult vendor's catalogs and include on order. Nominal 4¼ lb per cu ft density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are obtainable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*850 Snap-On Fiberglass Pipe Insulation* (Note 2) Certain-Teed Corp	*IB 300* Certain-Teed Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Heavy Density Fiberglas 25 Pipe Insulation* Owens-Corning Fiberglas Corp	*Spun-Glass Ye. 814* Johns-Manville Sales Corp
	Pipe Covering – One Piece Owens-Corning Fiberglas Corp	*Micro-Lok 650 Pipe Insulation* Johns-Manville Sales Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp

Notes:
1. Molded fitting covers only.
2. Service temperature to 850°F

DUP 0991361
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This Page Rev Sept 1979

PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Page 3

Code	116	116.1	116.2
Material Designation	Mineral wool - 1,800°F	Mineral wool - irrigated - 900°F	Mineral wool - 1,200°F
Purpose	Insulation for high-temperature pipe fittings and equipment	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Mineral wool with high-temperature binder	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped, sprayed or brushed with sodium silicate to the equivalent of 100 sq ft per gallon	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1,800°F max	900°F max (limited by sodium silicate)	1,200°F max
K Factor Btu(in)/(sq ft)(°F/hr.)	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean	0.36 at 200°F mean 0.51 at 600°F mean 0.76 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	15 to 19 lb per cu ft	11 to 19 lb per cu ft	10 to 19 lb per cu ft
Compressive Strength: Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard blocks: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in.	Standard blocks: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs	Standard blocks: Up to 24 in. x 36 in. Thickness: 1 in. to 4 in. Pipe sizes: See vendor's catalogs
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited materials.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*PF Supermag* (Block only) Eagle-Picher Industries, Inc	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Industries, Inc	*Block N-1200* Forty-Eight Insulations, Inc
	Vono Block (Block only) Keene Corp Industrial Insulation Div	*Block N-1200* Forty-Eight Insulations, Inc	*MF Pipe Insulation* (Note 2) Forty-Eight Insulations, Inc
	K-Fax PC (Block only) (Note 1) U. S. Gypsum Co	*MF Pipe Insulation* (Note 2) Forty-Eight Insulations, Inc	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Industries, Inc
	H. T Block (Block only) Forty-Eight Insulations, Inc	*K-Fax PC* (Note 1) U. S. Gypsum Co	*K-Fax PC* (Note 1) (Block and Pipe Sections) U. S. Gypsum Co
	Fiberfrax Mineral Wool Board (Block only) Carborundum Co, The		*Hillboard-1212* (Block only) Holmes Insulation Limited

Notes:
1. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. Pipe insulation in 2-ft lengths only.

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DUP 0991362

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PREFORMED BLOCK AND PIPE INSULATION

Code	116	118	118.1
Material Designation	Flexible foamed plastic	Polyurethane foam – rigid	Polyisocyanurate foam – rigid
Purpose	Insulation for moderate-temperature and antisweat application pipe and equipment	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Preformed, resilient, closed-cell elastomer foam sheet and pipe insulation	Preformed rigid urethane foam block, pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts and a fluorocarbon blowing agent
Suitable for Use: On Unprotected Aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	−40 to +180°F	−100 to +180°F	−100 to +200°F
K Factor Btu/(hr)(sq ft)(°F/in.)	0.28 at 75°F mean 0.28 at 50°F mean	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.16 at 100°F mean
Moisture Resistance or Water Vapor Permeability	0.15 Perm – inches	Fair	Fair
Density	6 lb per cu ft max	1.8 to 2.5 lb per cu ft	1.8 to 2.5 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Low	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Sheet size: 36 in. x 48 in. Sheet thickness: 1/8 in. to 1 in. Pipe covering: To 5 in. ID and 6 ft long Pipe thickness: 3/8 in., 1/2 in., 3/4 in.	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 uncoated. Installations must meet flame-spread rating limitation given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in. dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.
Specifications, Qualifications, Limitations	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 in. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test: Block 1 in. square and 7 in. long cut from near outer surface, on rests 6 in. apart with 70 gm weight having 1 in. square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in. x 2 in. x 1 in. skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps. Attacked by methyl ethyl ketone and alcohol (see SN118D). Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Arma/lex/FR* (Note 1) Armstrong Cork Co	*Urethane – Type 240* Owens-Corning Fiberglas Corp	*Trymer CPR-9545* Upjohn Co. CPR Div
	R-180-FS, tubing (Note 2) Rubatex Corp	*U-Thane 190* Upjohn Co. CPR Div	
	1800-FS, sheet (Note 2) Rubatex Corp	*Armatek* (Note 3) Armstrong Cork Co	
		Isonate CPR 436 System Dyplast of Florida, Inc	

Notes:

1. Fire-retardant pipe covering is identified with inked blue lines. Fire-retardant sheet material is identified with inked white lines.
2. Rubatex Corp produces only the low flame-spread grade.
3. Pipe sections only, standard 4-ft length with factory-applied vapor barrier jacket. See manufacturer's literature for technical data and physical properties.

REV. APR 1981

PREFORMED BLOCK AND PIPE INSULATION

Code	130	131	
Material Designation	Polystyrene foam	High-density calcium silicate board	
Purpose	Insulation for cast pipe and equipment	Use where high structural strength insulation is required	
Material Description	Preformed polystyrene foam block, pipe, and fitting insulation cut from extruded polystyrene foam with a variety of stem and offset type joints, or it can be molded from expanded polystyrene beads to final shape with stem or offset joints	Asbestos-free, fireproof, high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	Yes	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	−100 to +140°F	1,200°F max	
K Factor Btu/(hr)(sq ft)(°F/in.)	0.24 at 50°F mean 0.26 at 75°F mean 0.28 at 100°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Fair, must be painted for outdoor use	
Density	1.5 lb per cu ft min	46 lb per cu ft	
Compressive Strength Specimen 6 in. × 6 in. × 2 in. Load Rate 0.10 per min	Min 25 lb per sq in. at 5 percent deformation	1,000 psi at 5 percent deformation. Modulus of rupture 600 psi	
Resistance to Harvesting Breakage	Good	Very good	
Dimensions	See SN30	Sheet size, ft: 4 × 8 standard Thickness, in., 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2	
Flame-Spread Rating	Installations must meet the flame-spread rating limitations given in SN1A.	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 68 percent relative humidity for 15 days. Water absorption max 0.003 percent by volume after being subjected to 60°F, 98 percent relative humidity for 15 days and max 4 percent by volume into a 2 in. × 2 in. × 1 in. cast-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at 1/2 in. penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	

REV. APR 1981

This following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

Approved Materials and Vendors	*Styrofoam-FR* (Note 1) Dow Chemical Co	*Marinsul I* Johns-Manville Sales Corp	
	Vapor-Lock (Note 1) Insulsyns, Inc		
	Polystyrene Insulation Expanded (Note 1) Dystrat of Florida, Inc		
	Permaspan (Note 1) Southeastern Foam Products, Inc		

Notes:
1 Must state "Minimum Density 1.5 lb/ft³" for all vendors.

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DUP 0991364

090950

OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1984	102, 102.1
103	Diatomaceous earth	Feb 1984	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos mineral	Dec 1968	108
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1984	
108	Corrugated asbestos paper	Feb 1984	
110	Vegetable cork	June 1968	111, 116, 120
111.1	Cellular glass	June 1968	111
111.2	Cellular glass	June 1968	111
111.3	Cellular glass	June 1968	111
112	Glass fiber	April 1968	Reinstated Sept 1969
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1968	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	March 1969	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1981	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	April 1983	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1984	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber - neoprene coated	April 1968	
115	Mineral wool - asphalt impregnated	April 1968	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam insulation	June 1963	
117.1	Urethane foam insulation	Dec 1968	
117.2	Urethane foam insulation	Feb 1969	
117.3	Urethane foam insulation	June 1963	
117.4	Urethane foam insulation	Feb 1969	
117.5	Urethane foam insulation	April 1968	
117.6	Urethane foam insulation	July 1963	
130	Asbestos board	Nov 1978	131

REV. APR 1981

927

DUP 0991365

090951

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	APRIL 1981	
STANDARD REAFFIRMED	APRIL 1981	Page 1 of 7

Code	102	102.1
Material Designation	Calcium silicate	Calcium silicate - inhibited
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Asbestos free (Note 5) reacted hydrous calcium silicate reinforced with fibers	Asbestos free (Note 5) reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers
Suitable for Use: On Unprotected Aluminum	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes
Recommended Temperature Range	1 200°F max	1 200°F max
K Factor Btu/(h)(ft²)(°F/in)	0 41 @ 200°F mean 0 48 @ 400°F mean 0 56 @ 600°F mean	0 41 @ 200°F mean 0 48 @ 400°F mean 0 59 @ 600°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor
Density	14 lb/ft³ max	14 lb/ft³ max
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	80 lb/in² min @ 5 percent deformation	80 lb/in² min @ 5 percent
Resistance to Handling Breakage	Fair to poor	Poor
Dimensions	See SN30	See SN30
Flame-Spread Rating	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Recommended for use on austenitic stainless steel. Aluminum must be protected per SN1A. For an alternate to procedure inhibited material see SN102.1D. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1 500 ppm chloride as NaCl in the test water shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-I-24244 specification does not qualify a material under Code 102.1
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.		
Approved Materials and Vendors	*Thermo-12* Johns-Manville Sales Corp	*Super Caltemp, Type 1A* Pabco Insulation Div Louisiana-Pacific Corp
	Kaylo-104F Owens-Corning Fiberglas Corp	*Pamrol* (Notes 1, 2, and 3) Pamrol, Inc
	Super Caltemp, Type 1A Pabco Insulation Div Louisiana-Pacific Corp	*Weaklite* (Notes 1, 2, and 3) Weaklite Co
	Caltemp 1500 (Notes 1, 3, 4, and 6) Calaire Corp	*Kaylo-104F* Owens-Corning Fiberglas Corp
	Pamrol (Notes 1, 2, and 3) Pamrol, Inc	*Sproule T 1200* (Notes 1, 2, and 3) Sproule Mfg Co
	Weaklite (Notes 1, 2, and 3) Weaklite Co	*Sproule SK 1200* (Notes 1, 2, 3, and 7) Sproule Mfg Co
	Sproule T 1201 (Notes 1, 2, and 3) Sproule Mfg Co	
	Sproule SK 1201 (Notes 1, 2, 3, and 7) Sproule Mfg Co	
	Caltemp 1500 (Notes 1, 3, 4, and 6) Calaire Corp	*Calsilite* Calsilite Insulation Products Dresser Industries, Inc
	Calsilite Calsilite Insulation Products Dresser Industries, Inc	

Notes:
1. Molded two-piece fitting covers are available in screwed, welded, and sweat types. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. A perlite-silicate.
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ in OD; larger sizes are fabricated.
4. Do not use in thermal/acoustical systems.
5. Has been specified to be asbestos free since 1971.
6. Absorbs much less water. Water absorption resistance rapidly diminishes above 350°F.
7. Absorbs much less water. Water absorption resistance rapidly diminishes above 500°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

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DUP 0991366

SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

This Page Rev April 1981

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Code	111		
Material Designation	Cellular glass		
Purpose	Insulation for cold- or dual-temperature pipe and equipment		
Material Description	Cellular glass, foamed and fused into unicellular form		
Suitable for Use: On Unprotected Aluminum	No		
In direct contact with austenitic stainless steel at or above 140°F	No		
Recommended Temperature Range	-200 to +100°F (300°F for dual temp)		
K Factor Btu/(h)(ft²)(°F/in)	0.35 at 50°F mean 0.38 at 75°F mean 0.39 at 100°F mean		
Moisture Resistance or Water Vapor Permeability	Fair		
Density	7 to 9 lb/ft³		
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 psi min	50 lb/in²		
Resistance to Handling Breakage	Fair		
Dimensions	See SN30		
Flame-Spread Rating	Does not burn		
Specifications, Qualifications, Limitations	Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	Foamglas Pittsburgh Corning Corp		

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REV. AUG 1981

DUP 0991367

090953

Code	112	112.1	112.6
Material Designation	Glass fiber	Glass fiber - high temperature	Glass fiberboard
Purpose	Insulation for moderate-temperature pipe and equipment	Insulation for high-temperature pipe	Block insulation for moderate-temperature equipment
Material Description	Glass fiber thermosetting resin-bonded insulation for pipe and fittings. Pipe sections, one-piece hinged, plain, without jacket	Pipe section insulation consisting of high-temperature resistant glass fibers with a high-temperature binder. Pipe sections are one piece, hinged, plain without jacket	Glass fiber bonded board plain without covering
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	40 to 375°F	To 650°F	40 to 350°F
K Factor Btu/(h)(ft²)(°F/in)	0.23 at 100°F mean 0.27 at 200°F mean 0.33 at 300°F mean	0.23 at 100°F mean 0.26 at 200°F mean 0.46 at 400°F mean	0.24 at 100°F mean 0.30 at 200°F mean 0.37 at 300°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	6 lb/ft³ nominal	5 lb/ft³ nominal	3 lb/ft³ nominal
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Nonlead bearing inserts required where pipe is supported outside insulation	Low	Nonlead bearing
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN30	Pipe: See SN30; to 4 in thickness	Standard piece: 24 in x 48 in Thickness: 1 in, 1½ in, 2 in
Flame-Spread Rating	25 or less	Does not burn	25 or less
Specifications, Qualifications, Limitations	Easily damaged in handling. Poor resistance to abuse. Not recommended for preinsulation. Specify whether for pipe or tubing on order. Available with factory-applied finishes and lap adhesives when specified; consult vendor's catalog and include on order. 7¼ lb/ft³ density recommended for field fabricated fittings. Molded fittings are generally lower in cost and are preferred over field fabricated fittings. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Poor resistance to abuse. Not recommended for preinsulation. May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESO). Aluminum must be protected per SN1A. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Available with factory-applied finishes. When specified consult vendor's catalogs and include on order. Nominal 4½ lb/ft³ density material is available and is recommended for fabrication involving considerable shaping and fitting. Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Snap-On 500 Pipe Covering* Certain-Teed Corp	*650 Snap-On Fiberglass Pipe Insulation* (Note 2) Certain-Teed Corp	*IB 300* Certain-Teed Corp
	Micro-Lok 650 Johns-Manville Sales Corp	*Heavy Density Fiberglas 25 Pipe Insulation* Owens-Corning Fiberglas Corp	*Spin-Glas No. 814* Johns-Manville Sales Corp
	Pipe Covering - One Piece Owens-Corning Fiberglas Corp	*Micro-Lok 550 Pipe Insulation* Johns-Manville Sales Corp	*Fiberboard, Type 703* Owens-Corning Fiberglas Corp
	Standard Fiberglass Pipe Covering Knauf Fiber Glass GmbH		*Rigid Insulation Board, 3 lb* Knauf Fiber Glass GmbH

Notes:
1. Molded fitting covers only.
2. Service temperature to 850°F.

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REV. AUG 1983

DUP 0991368

090954

PREFORMED BLOCK AND PIPE INSULATION

Code	114	114.1	114.2
Material Designation	Mineral wool - 1 800°F	Mineral wool - inhibited - 900°F	Mineral wool - 1 200°F
Purpose	Insulation for high-temperature pipe fittings and equipment	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Mineral wool with high-temperature binder	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped, sprayed, or brushed with sodium silicate to the equivalent of 100 ft^2/gal	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder
Suitable for Use: On Unprotected Aluminum	No	No	No
In direct contact with austenitic stainless steel at or above 140°F	No	Yes	No
Recommended Temperature Range	1 800°F max	900°F max (limited by sodium silicate)	1,200°F max
K Factor Btu·(ft)/(ft^2)(°F/in)	0 40 at 200°F mean 0 80 at 600°F mean 1 00 at 1,000°F mean	0 38 at 200°F mean 0 45 at 400°F mean 0 60 at 600°F mean	0 38 at 200°F mean 0 45 at 400°F mean 0 60 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	15 to 19 lb/ft^3	11 to 19 lb/ft^3	10 to 19 lb/ft^3 min
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard block: Up to 24 in × 36 in Thickness: 1 in to 4 in	Standard block: Up to 24 in × 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs	Standard block: Up to 24 in × 36 in Thickness: 1 in to 4 in Pipe sizes: See vendor's catalogs
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	Aluminum must be protected per SN1A. Manufacturers do not inhibit insulation. Consult Energy and Materials Department for vendors who supply inhibited material.	Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*PS Superwrap* (Block only) Eagle-Picher Industries, Inc	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Industries, Inc	*Block Y-1200* Forty-Eight Insulations, Inc
	Vono Block (Block only) Keene Corp Industrial Insulation Div	*Block Y-1200* Forty-Eight Insulations, Inc	*MF Pipe Insulation* (Note 2) Forty-Eight Insulations, Inc
	K-Fac PC (Block only) (Note 1) U. S. Gypsum Co	*MF Pipe Insulation* (Note 2) Forty-Eight Insulations, Inc	*Epitherm-1200* (Block and Pipe Sections) Eagle-Picher Industries, Inc
	H. T Block (Block only) Forty-Eight Insulations, Inc	*K-Fac PC* (Note 1) U. S. Gypsum Co	*K-Fac PC* (Note 1) (Block and Pipe Sections) U S Gypsum Co
	Fiberfrax Mineral Wool Board (Block only) Carborundum Co, The	*Series HWF 1200* Fitting Covers HAMFAB Corp	*Delta 10 Board* Rock Wool Mfg Co
	Hilblok (Block only) Holmes Insulations Inc	*1212 Blok* Holmes Insulations, Inc	*1212 Blok* Holmes Insulations, Inc

Notes:
1. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit.
2. Pipe insulation in 2-ft lengths only.

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090955

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PREFORMED BLOCK AND PIPE INSULATION

SN 100 M

Page 5

Code	116	118	118.1
Material Designation	Flexible foamed plastic	Polyurethane foam – rigid	Polyisocyanurate foam – rigid
Purpose	Insulation for moderate-temperature and antisweat application pipe and equipment	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Preformed, resilient, closed-cell elastomer foam sheet and pipe insulation	Preformed rigid urethane foam block, pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block, pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts and a fluorocarbon blowing agent
Suitable for Use: On Unprotected Aluminum	Yes	Yes	Yes
In direct contact with austenitic stainless steel at or above 140°F	No	No	No
Recommended Temperature Range	−40 to +180°F	−100 to +180°F	−100 to +200°F
K Factor Btu/(h)(ft²)(°F/in)	0.28 at 75°F mean 0.28 at 50°F mean	0.15 at 50°F mean 0.15 at 75°F mean, 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.18 at 100°F mean
Moisture Resistance or Water Vapor Permeability	0.15 Perm – inches	Fair	Fair
Density	6 lb/ft³ max	1.8 to 2.5 lb/ft³	1.8 to 2.5 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Low	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation, measured parallel to foam rise
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Sheet size 36 in × 48 in Sheet thickness: 1/8 in to 1 in Pipe covering: To 5 in ID and 6 ft long Pipe thickness: 3/8 in, 1/2 in, 3/4 in	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 uncoated. Installations must meet flame-spread rating limitation given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced by 10 × 10 mesh glass cloth, 10 lb/100 yd². Installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced with open-weave glass cloth. Installations must meet flame-spread rating limitations given in SN1A.
Specifications, Qualifications, Limitations	A protective coating is recommended for outdoor use only. Uniform cell structure with no voids having any dimension exceeding 1/8 in. Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test: Block 1 in square and 7 in long cut from near outer surface, on rests 6 in apart with 70 gm weight having 1 in square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in × 2 in × 1 in skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps. Attacked by methyl ethyl ketone and alcohol (see SN118D). Austenitic stainless steel at or above 140°F must be protected per SN1A.	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature. Austenitic stainless steel at or above 140°F must be protected per SN1A.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.			
Approved Materials and Vendors	*Armaflex II* (Note 1) Armstrong Cork Co	*Urethane – Type 240* Owens-Corning Fiberglas Corp	*Trymer CPR-9501* Upjohn Co. CPR Div
	R-180-FS, tubing (Note 2) Rubatex Corp	*L-Thane 190* Upjohn Co. CPR Div	*Type 250 Rigid Foam* Owens-Corning Fiberglas Corp
	1800-FS, sheet (Note 2) Rubatex Corp	*Armaflex II* (Note 3) Armstrong Cork Co	
		Isonate CPR 436 System Dyplast of Florida, Inc	

Notes:
1. Fire-retardant pipe covering is identified with inked blue lines. Fire-retardant sheet material is identified with inked white lines.
2. Rubatex Corp produces only the low flame-spread grade.
3. Pipe sections only, standard 4-ft length with factory-applied vapor barrier jacket. See manufacturer's literature for technical data and physical properties.

REV AUG 1983

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DUPONT

DUP 0991370

090956

PREFORMED BLOCK AND PIPE INSULATION

270

Code	130	131	
Material Designation	Polystyrene foam	High-density calcium silicate board	
Purpose	Insulation for cool pipe and equipment	Use where high structural strength insulation is required	
Material Description	Preformed polystyrene foam block, pipe, and lining insulation cut from extruded polystyrene foam with a variety of plain and offset type joints, or it can be molded from expanded polystyrene beads to final shape with plain or offset joints	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate inert fillers, and reinforcing agents Sanded on both sides	
Suitable for Use: On Unprotected Aluminum	Yes	No	
In direct contact with austenitic stainless steel at or above 140°F	No	No	
Recommended Temperature Range	-100 to +140°F	1 200°F max	
K Factor Btu/(hr)(ft²)(°F/in)	0 24 at 50°F mean 0 26 at 75°F mean 0 28 at 100°F mean	0 81 at 350°F mean 0 82 at 400°F mean 0 87 at 600°F mean	
Moisture Resistance or Water Vapor Permeability	Fair	Poor, must be painted for outdoor use	
Density	1 5 lb/ft³ min	46 lb/ft³	
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Min 25 lb/in² at 5 percent deformation	1 000 psi at 5 percent deformation Modulus of rupture 900 psi	
Resistance to Handling Breakage	Good	Very good	
Dimensions	See SN30	Sheet size, ft: 4 x 8 standard Thickness, in. ½, ¾, ⅞, 1, 1¼, 1½, and 2	
Flame-Spread Rating	Installations must meet the flame-spread rating limitations given in SN1A.	Flame-spread rating is 0	
Specifications, Qualifications, Limitations	Not resistant to solvents other than alcohol Uniform cell structure with max 10 percent open cells No distortion, volume change, or loss of compressive strength after exposure at 140°F and 50 percent relative humidity for 15 days. Water absorption max 0 003 percent by volume after being subjected to 90°F 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in x 2 in x 1 in skin-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps Austenitic stainless steel at or above 140°F must be protected per SN1A.	Self-tapping screw holding strength at ½ in penetration 120 lb pull May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only Austenitic stainless steel at or above 140°F and aluminum must be protected per SN1A.	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Styrofoam-FR* (Note 1) Dow Chemical Co	*Marinite I* Johns-Manville Sales Corp	
	Tuper-Lock (Note 1) Insulgyne, Inc		
	Polystyrene Insulation Expanded (Note 1) Dyplast of Florida, Inc		
	Permaspan (Note 1) Southeastern Foam Products, Inc		

Note:
1 Must state "Minimum Density 1 5 lb/ft³" for all vendors.

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REV. AUG 1981

DUP 0991371

090957

OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1964	102, 102.1
103	Diatomaceous earth	Feb 1964	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	106
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1964	
108	Corrugated asbestos paper	Feb 1964	
110	Vegetable cork	June 1966	111, 118, 120
111.1	Cellular glass	June 1966	111
111.2	Cellular glass	June 1966	111
111.3	Cellular glass	June 1966	111
112	Glass fiber	April 1966	Reinstated Sept 1969
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1966	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	March 1966	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	April 1963	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1964	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber - neoprene sealed	April 1966	
115	Mineral wool - asphalt impregnated	April 1966	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam resilient	June 1963	
117.1	Urethane foam resilient	Dec 1960	
117.2	Urethane foam resilient	Feb 1960	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1960	
117.5	Urethane foam resilient	April 1960	
117.6	Urethane foam resilient	July 1963	
130	Asbestos board	Nov 1976	131

REV. 1994

DUP 0991372

DUPONT

090958

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PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED	OCT 1954	SN 100 M
THIS PAGE REVISED	JAN 1986	
STANDARD REAFFIRMED	JAN 1986	Page 1 of 7

Code	102	102.1
Material Designation	Calcium silicate	Calcium silicate – inhibited
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment
Material Description	Asbestos free (Note 4) reacted hydrous calcium silicate reinforced with fibers	Asbestos free (Note 4) reacted hydrous calcium silicate with inhibitor for chloride stress-corrosion cracking and reinforced with fibers
Metal Protection Required: Aluminum	Yes per SN1A	Yes per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes, per SN1A	No
Recommended Temperature Range	1,200°F max	1,200°F max
K Factor Btu/(h)(ft²)(°F/in)	0.44 at 200°F mean 0.55 at 400°F mean 0.66 at 600°F mean	0.44 at 200°F mean 0.55 at 400°F mean 0.66 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor
Density	15 lb/ft³ max	15 lb/ft³ max
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	60 lb/in² min at 5 percent deformation	60 lb/in² min at 5 percent
Resistance to Handling Breakage	Fair to poor	Poor
Dimensions	See SN3D	See SN3D
Flame-Spread Rating	Does not burn	Does not burn
Specifications, Qualifications, Limitations	All materials listed under Code 102.1 are approved where Code 102 is specified	Recommended for use on austenitic stainless steel For an alternate to purchased inhibited material see SN102.1D Stressed Type 304 stainless steel U-bend specimens at 100°C when in contact with this insulating material in the Du Pont wick test with 1,500 ppm chloride as NaCl in the test water shall show no cracking at the end of 144 hours exposure Passing the test in MIL – 1 – 24244 specification does not qualify a material under Code 102.1
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers materials also are acceptable under other vendors labels upon certification as to their identity		
Approved Materials and Vendors	*Thermo – 12* Manville	See Note 6
	Kaylo – 10AF Owens-Corning Fiberglas Corp	
	Super Caltemp, Type NA (Note 3) Pabco Insulation Div Louisiana-Pacific Corp	
	Pamsil (Note 2) Pamrod, SA	
	Wesolite (Notes 1, 2, and 3) Wesolite Co	
	Sproule WR 1200 (Notes 2 and 5) Sproule Mfg Co	
	Calsilite Insulation Calsilite Corp	

Notes:

1. Molded two-piece fitting covers are available in screwed, welded, and sweat types Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit
2. A perlite-silicate
3. Routed or molded two-piece fitting covers are available in sizes up to 12¾ in OD, larger sizes are fabricated
4. Has been specified to be asbestos free since 1973
5. Absorbs much less water Water absorption resistance rapidly diminishes above 500°F.
6. Substitute Code 102 or 102.2 for Code 102.1 Protect metal under insulation per the applicable paint specifications and SN1A

DUP 0991387

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090973

PREFORMED BLOCK AND PIPE INSULATION

Code	182.2	111	112.1
Material Designation	Perlite silicate – inhibited – water resistant	Cellular glass	Glass fiber – high temperature pipe insulation
Purpose	Insulation for hot pipe and equipment particularly where moisture resistance is required at, or below, 500°F	Insulation for cold- or dual-temperature pipe and equipment	Insulation for high-temperature pipe
Material Description	Asbestos free Fiber-reinforced expanded perlite and sodium silicate	Cellular glass, foamed and fused to unicellular form	Pipe section insulation consisting of high-temperature resistant glass fibers with a high-temperature binder Pipe sections are one piece hinged plain without jacket
Metal Protection Required: Aluminum	Yes, per SN1A	Yes per SN1A	Yes per SN1A
Austenitic stainless steel at or above 35°F (2°C)	No	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	1100°F max	– 200 to + 250°F	To 850°F
K Factor Btu/(h)(ft²)(°F/in)	0 44 at 200°F mean 0 55 at 400°F mean 0 66 at 600°F mean	0 33 at 50°F mean 0 35 at 75°F mean 0 36 at 100°F mean	0.23 at 100°F mean 0 36 at 300°F mean 0 48 at 450°F mean
Moisture Resistance or Water Vapor Permeability	Good	Fair	Poor
Density	15 lb/ft³ max	7 to 8 lb/ft³	4 lb/ft³ nominal
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	60 lb/in² min at 5 percent	100 lb/in²	Nonload bearing Inserts required where pipe is supported outside insulation
Resistance to Handling Breakage	Poor	Fair	Good
Dimensions	See SN3D	See SN3D	Pipe See SN3D to 4 in thickness
Flame-Spread Rating	Does not burn	Does not burn	Does not burn
Specifications, Qualifications, Limitations	Recommended for use on austenitic stainless steel Following 24 hours soaking heat at 500°F, the material must pass the Du Pont 6-day test for chloride stress-corrosion cracking and must not absorb more than 5 percent moisture, by weight after 3-minute immersion in ambient tap water	Material to be fabricated with hot asphalt – Type III (U S Gypsum Co) adhesive	Poor resistance to abuse Not recommended for premsulation May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESD) Available with factory-applied finishes and lap adhesives.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers' materials also are acceptable under other vendors' labels upon certification as to their identity			
Approved Materials and Vendors	*Sprouse WR 1200* (see Note) Sprouse Mfg Co	*Foamglas* Pittsburgh Corning Corp	*850 Snap-On Fiberglass Pipe Insulation* CertainTeed Corp
			Fiberglas Pipe Covering Owens-Corning Fiberglas Corp
			Micro-Lok Pipe Insulation Manville
			Knauf Pipe Insulation Knauf Fiber Glass GmbH

Note: Molded two-piece fitting covers are available in screwed, welded, and sweat types

DUP 0991388

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PREFORMED BLOCK AND PIPE INSULATION

Code	112.2	112.6	114
Material Designation	Glass fiber – high-temperature equipment insulation	Glass fiberboard	Mineral wool – 1 800°F
Purpose	Insulation for high-temperature equipment	Block insulation for moderate-temperature equipment	Insulation for high-temperature pipe fittings and equipment
Material Description	Board insulation consisting of high-temperature resistant glass fibers with a high-temperature binder	Glass fiber bonded board, plain without covering	Mineral wool with high temperature binder
Metal Protection Required: Aluminum	Yes per SN1A	Yes per SN1A	Yes per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes per SN1A	Yes per SN1A	Yes per SN1A
Recommended Temperature Range	To 850°F	40 to 350°F	1 800°F max
K Factor Btu/(h)(ft²)(°F/in)	0 25 at 100°F mean 0 39 at 300°F mean 0 55 at 450°F mean	0 24 at 100°F mean 0 30 at 200°F mean 0 37 at 300°F mean	0 40 at 200°F mean 0 60 at 600°F mean 1 00 at 1 000°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	Poor
Density	3 lb/ft³ nominal	3 lb/ft³, nominal	15 to 19 lb/ft³
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Nonloadbearing	Nonloadbearing Inserts required where pipe is supported outside insulation	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Length: 8 to 10 ft Width 24 or 48 in Thickness 1 to 4 in in 1/2 in increments	Standard block: 24 in x 48 in Thickness 1 in, 1 1/2 in, 2 in	Standard block: Up to 24 in x 36 in Thickness: 1 in to 4 in
Flame-Spread Rating	Does not burn	25 or less	Does not burn
Specifications, Qualifications, Limitations	Poor resistance to abuse Not recommended for premsulation May be used in thermal/acoustical insulation systems (consult acoustical consultants in ESD)	Available with factory-applied finishes When specified, consult vendor s catalogs and include on order Nominal 4 1/4 lb/ft³ density material is available and is recommended for fabrication involving considerable shaping and fitting.	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers' materials also are acceptable under other vendor s labels upon certification as to their identity			
Approved Materials and Vendors	*1000 Series Spin-Glas Board* Manville	*IB 300* Certain-Teed Corp	*FBX 1000 Block* Fibrex, Inc
	850°F Fiber Glass Insulation Board CertainTeed Corp	*Spin-Glass No. 814* Manville	*Mono Block* (Block only) Keene Corp Industrial Insulation Div
	Elevated Temperature Board Knauf Fiber Glass	*Type 703 Industrial Insulation Board* Owens-Corning Fiberglas Corp	A – *For PC* (Block only) (see note) U S Gypsum Co
	Insul-Quick Insulation Board, 850°F Owens-Corning Fiberglas Corp	*Rigid Insulation Board, 3 lb* Knauf Fiber Glass GmbH	*Fiberfrax Mineral Wool Board* (Block only) Carborundum Co The
			Miblok (Block only) Holmes Insulations Inc

Note: Also available as pipe fitting covers Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

DUP 0991389

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090975

PREFORMED BLOCK AND PIPE INSULATION

Code	114.1	114.2	116
Material Designation	Mineral wool – inhibited – 900°F	Mineral wool – 1,200°F	Flexible foamed plastic
Purpose	Insulation for hot pipe and equipment	Insulation for hot pipe and equipment	Insulation for moderate-temperature and antisweat application pipe and equipment
Material Description	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder and dipped sprayed or brushed with sodium silicate to the equivalent of 100 ft^2/gal	Block and pipe section insulation consisting of mineral slag wool with high-temperature binder	Preformed resilient closed-cell elastomer foam sheet and pipe insulation
Metal Protection Required: Aluminum	Yes per SN1A	Yes per SN1A	No
Austenitic stainless steel at or above 35°F (2°C)	No	Yes per SN1A	Yes per SN1A
Recommended Temperature Range	900°F max (limited by sodium silicate)	1,200°F max	–40 to +180°F
K Factor Btu/(h)(ft^2)(°F/in)	0.36 at 200°F mean 0.45 at 400°F mean 0.60 at 600°F mean	0.36 at 200°F mean 0.45 at 400°F mean 0.60 at 600°F mean	0.28 at 75°F mean 0.29 at 90°F mean
Moisture Resistance or Water Vapor Permeability	Poor	Poor	0.15 Perm – inches
Density	11 to 19 lb/ft^3	10 to 19 lb/ft^3 min	6 lb/ft^3 max
Compressive Strength Specimen 6 in x 6 in x 2 in Load Rate 0.10 per min	Low	Low	Low
Resistance to Handling Breakage	Good	Good	Good
Dimensions	Standard Block Up to 24 in x 36 in Thickness 1 in to 4 in Pipe sizes See vendor's catalogs	Standard block Up to 24 in x 36 in Thickness 1 in to 4 in Pipe sizes See vendor's catalogs	Sheet size 36 in x 48 in Sheet thickness 1/8 in to 1 in Pipe covering To 5 in ID and 6 ft long Pipe thickness 3/8 in 1/2 in, 3/4 in
Flame-Spread Rating	Does not burn	Does not burn	Flame-spread rating per ASTM E 162 shall not exceed 75 uncoated installations must meet flame-spread rating limitation given in SN1A
Specifications, Qualifications, Limitations	Manufacturers do not inhibit insulation Consult Materials and Logistics Department for vendors who supply inhibited material		A protective coating is recommended for outdoor use only Uniform cell structure with no voids having any dimension exceeding 1/8 in

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications These manufacturers materials also are acceptable under other vendors labels upon certification as to their identity

Approved Materials and Vendors			
	FBX 1300 Block Fibrex, Inc	*FBX 1300 Block* Fibrex, Inc	*Armaflex II* Armstrong World Industries
	K – For PC (see note) U S Gypsum Co	*K – For PC* (see note) (Block and Pipe Sections) U S Gypsum Co	*R – 180 – FS, tubing* Rubatex Corp
	Cedafit 1200/a Fitting Covers HAMFAB Corp	*Delta 10 Board* Rock Wool Mfg Co	*R – 1800 – FS, sheet* Rubatex Corp
	1212 Block Holmes Insulations, Inc	*1212 Block* Holmes Insulations, Inc	
	RXL 120 High Density Insulation (Block only) Rozul Co	*RXL 120 High Density Insulation* (Block and Pipe Sections) Rozul Co	
		Cedafit 1200 Fitting Covers HAMFAB Corp	
		Lapinus 1200 Pipe Insulation Fibrex Inc	
		Perar 1600 Pipe Insulation Western Perlite Inc	

Note: Also available as pipe fitting covers Advise the fabricator of the brand of aluminum elbow covers to be used to ensure a proper fit

DUP 0991390

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Code	118	118.1	118.2
Material Designation	Polyurethane foam – rigid	Polyisocyanurate foam – rigid	Polyisocyanurate foam – rigid 3 lb
Purpose	Insulation for cold pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment	Insulation for cold- or dual-temperature pipe and equipment
Material Description	Preformed rigid urethane foam block pipe and fitting insulation manufactured with polyester or polyether resins with a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block pipe and fitting insulation manufactured with polyester or polyether resins, flammability retarding agents special catalysts, and a fluorocarbon blowing agent	Preformed rigid polyisocyanurate foam block block pipe and fitting insulation manufactured with polyester or polyether resins flammability retarding agents special catalysts and a fluorocarbon blowing agent
Metal Protection Required. Aluminum	No	No	No
Austenitic stainless steel at or above 35°F (2°C)	Yes per SN1A	Yes per SN1A	Yes per SN1A
Recommended Temperature Range	−100 to +180°F	−100 to +250°F (Notes 2 and 4)	−100 to +250°F (Notes 3 and 4)
K Factor Btu/(h)(ft²)(°F/in)	0.15 at 50°F mean 0.15 at 75°F mean 0.16 at 100°F mean	0.15 at 50°F mean 0.16 at 75°F mean 0.16 at 100°F mean	0.16 at 50°F mean 0.17 at 75°F mean 0.17 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair	Fair
Density	1.8 to 2.5 lb/ft³	1.8 to 2.5 lb/ft³	3.0 to 3.4 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Min 25 psi at 5 percent deformation measured parallel to direction in which foam rose during manufacture, or min 20 psi at 5 percent deformation in all directions	Min 25 psi at 5 percent deformation measured parallel to foam rise	Min 25 psi at 5 percent deformation measured parallel to foam rise
Resistance to Handling Breakage	Good	Good	Good
Dimensions	See SN3D	See SN3D	See SN3D
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with Hypalon® mastic, 1/32 in dry thickness, reinforced by 10 × 10 mesh glass cloth, 10 lb/100 yd² installations must meet flame-spread rating limitations given in SN1A	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic, 1/32 in dry thickness, reinforced with open-weave glass cloth installations must meet flame-spread rating limitations given in SN1A.	Flame-spread rating per ASTM E 162 shall not exceed 75 when coated with "Hypalon" mastic 1/32 in dry thickness, reinforced with open-weave glass cloth installations must meet flame-spread rating limitations given in SN1A
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Heat Aging Test Block 1 in square and 7 in long cut from near outer surface, on rests 6 in apart with 70 gm weight having 1 in square base in middle of span shall not distort block more than 1/16 in. in one hour at 225°F. Water absorption max 4 percent by volume into a 2 in × 2 in × 1 in skin-free piece immersed in water just under the surface for five days and then wiped with a wet cloth and weighed with no delay between steps	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.1 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature.	Uniform cell structure with a max of 10 percent open cells. No voids having any dimension exceeding 1/4 in. Important to positively identify Code 118.2 vs Code 118 because of high flammability of Code 118 unprotected and lower service temperature
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturer's that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendors' labels upon certification as to their identity.			
Approved Materials and Vendors		*Trymer CPR – 9501 – 2* Upjohn Co. CPR Div	*Trymer CPR – 9501 – 3* (Note 1) Upjohn Co. CPR Div
		ISO 3080 and ISO 2500 (Note 6) E R Carpenter Inc Carpenter Division	
		Insulex Pipe Insulation (Note 5) Insulex Corp	

Notes:

1. Color, brown
2. May be used on surfaces to a maximum of 300°F for areas indoors with no external source of moisture
3. May be used on surfaces to a maximum of 375°F for areas indoors with no external source of moisture
4. Carbon steel and stainless steel piping and equipment installed outdoors or indoors exposed to an external source of moisture requires a protective coating under the insulation
5. Available for pipe only. 2 inches thick for pipe through 6 inches and 1 1/2 inches thick for 8 inch pipe and larger. Has factory-applied ASJ finish
6. ISO 2500 – compressive strength maximum 22 psi

SN 100 M

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PREFORMED BLOCK AND PIPE INSULATION

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Code	118.3	120	131
Material Designation	Polyisocyanurate foam – rigid foil faced	Polystyrene foam	High-density calcium silicate board
Purpose	Insulation for cold- or dual-temperature equipment	Insulation for cool pipe and equipment	Use where high structural strength insulation is required
Material Description	Preformed rigid polyisocyanurate foam sheet insulation manufactured with polyester or polyether resins, flammability retarding agents, special catalysts and a fluorocarbon blowing agent. The two major surfaces faced with 1-mil aluminum foil	Preformed polystyrene foam block, pipe, and lining insulation cut from extruded polystyrene foam with a variety of plain and offset type joints, or it can be molded from expanded polystyrene beads to final shape with plain or offset joints	Asbestos-free fireproof high-density structural insulation board consisting of calcium silicate, inert fillers, and reinforcing agents. Sanded on both sides
Metal Protection Required: Aluminum	Yes, per SN1A	No	Yes, per SN1A
Austenitic stainless steel at or above 35°F (2°C)	Yes, per SN1A	Yes, per SN1A	Yes, per SN1A
Recommended Temperature Range	– 100°F to + 250°F	– 100 to + 140°F	1,200°F max
K Factor Btu/(h)(ft²)(°F/in)	0.13 at 50°F mean (includes 0.14 at 75°F mean the foil) 0.15 at 100°F mean	0.24 at 50°F mean 0.26 at 75°F mean 0.29 at 100°F mean	0.81 at 350°F mean 0.82 at 400°F mean 0.87 at 600°F mean
Moisture Resistance or Water Vapor Permeability	Fair	Fair for outdoor use	Poor, must be painted
Density	1.8 to 2.5 lb/ft³	1.5 lb/ft³ min	46 lb/ft³
Compressive Strength Specimen 6 in × 6 in × 2 in Load Rate 0.10 per min	Min 12 psi at 5 percent deformation, measured parallel to foam rise	Min 25 lb/in² at 5 percent deformation	1,000 psi at 5 percent deformation. Modulus of rupture 900 psi
Resistance to Handling Breakage	Good	Good	Very good
Dimensions	See SN3D	See SN3D	Thickness, in. 1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, and 2
Flame-Spread Rating	Flame-spread rating per ASTM E 162 shall not exceed 75 with both foil faces in place. Installations must meet flame-spread rating limitations given in SN1A	Installations must meet the flame-spread rating limitations given in SN1A	Flame-spread rating is 0
Specifications, Qualifications, Limitations	Uniform cell structure with max 10 percent open cells. No voids having any dimension exceeding 1/4 in	Not resistant to solvents other than alcohol. Uniform cell structure with max 10 percent open cells. No distortion, volume change, or loss of compressive strength after exposure at 140°F and 80 percent relative humidity for 15 days. Water absorption max 0.003 percent by volume after being subjected to 90°F, 90 percent relative humidity for 15 days and max 4 percent by volume into a 2 in × 2 in × 1 in skin-free piece immersed in water just below the surface for five days then wiped with a wet cloth and weighed with no delay between steps	Self-tapping screw holding strength at 1/2 in penetration 120 lb pull. May be used unpainted for interior use. When painted on the ambient side for hot service, use breathing-type water base paints only.
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity			
Approved Materials and Vendors	*Thermax Sheathing* The Celotex Corp	*Styrofoam* – SM (see note) Dow Chemical Co	*Marinite I* Manville
		Vapor-Lock (see note) Insuldyne, Inc	*Super Marinetemp* Pabco Insulation Div Louisiana-Pacific Corp
		Polystyrene Insulation Expanded (see note) Dyplast of Florida, Inc	
		Permaspan (see note) Southeastern Foam Products, Inc	

Note: Must state Minimum Density 1.5 lb/ft³ for all vendors

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OBSOLETE CODES

Code	Material	Date Canceled	Superseded by Code
101	85% Magnesia	Feb 1984	102, 102.1
103	Diatomaceous earth	Feb 1984	102, 102.1
104	Inorganic silicates	Oct 1972	
105	Asbestos molded	Dec 1956	108
106	Asbestos fiber and sodium silicate	Feb 1972	
107	Asbestos sponge	Feb 1984	
109	Corrugated asbestos preshrunk	Feb 1984	
110	Vegetable cork	June 1966	111, 118, 120
111.1	Cellular glass	June 1966	111
111.2	Cellular glass	June 1966	111
111.3	Cellular glass	June 1966	111
112	Glass fiber	April 1966	Reinstated Sept 1969
112	Glass fiber	Dec 1984	
112.01	Glass fiber	Sept 1969	112
112.02	Glass fiber	Oct 1956	112.01
112.11	Glass fiber	Sept 1969	112
112.12	Glass fiber	March 1969	112.11
112.16	Glass fiber	Sept 1969	112
112.17	Glass fiber	Sept 1969	112
112.21	Glass fiber	Jan 1961	
112.22	Glass fiber	Sept 1969	112
112.23	Glass fiber	April 1963	
112.61	Glass fiberboard	Sept 1969	112.6
112.66	Glass fiberboard	Feb 1984	
112.71	Glass fiberboard	Sept 1969	112.6
112.81	Glass fiberboard	Sept 1969	112.6
113	Glass fiber - neoprene coated	April 1966	
115	Mineral wool - asphalt impregnated	April 1966	
116	Flexible foamed plastic	June 1962	Reinstated May 1973
117	Urethane foam resilient	June 1963	
117.1	Urethane foam resilient	Dec 1980	
117.2	Urethane foam resilient	Feb 1980	
117.3	Urethane foam resilient	June 1963	
117.4	Urethane foam resilient	Feb 1980	
117.5	Urethane foam resilient	April 1980	
117.6	Urethane foam resilient	July 1963	
130	Asbestos board	Nov 1978	131

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