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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	OCT 1954
		REVISED	OCT 1964
		SN 100 M Page 1 of 13	
Code		102*	
Material		Calcium silicate	
Material Description		Staple, cellular, calcined fire clay base	
Filler			
Binder			
Temperature Range		100°F to 1200°F	
K Factor		500°F — 0.54 max	
Density		11 lb per cu ft	
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process		Machine extruded. Pipe mach cut on diameter	
Resistance to Breakage in Handling	Block must average 3" or greater in drop test per ASTM C 487, tentative method of test for resistance to dropping of preformed block thermal insulation.		
Dimensions		ASTM **	
Other Qualifications		Good mechanical strength with low shrinkage	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
*Bands are supplied at extra cost. Order must state "without bands" if not required. For 11" IPS and larger there is an additional charge for 2-ss canvas cover. Material should be specified "without 2-ss canvas" to avoid extra charge. **New Simplified Dimensional System sponsored by ASTM ***Fiber Board Paper Products Corp †Codes 104 and 106 are acceptable alternatives unless noted on the Project Specifications. †Fittings available in screwed, welded, and sweet types.	CONFIDENTIAL	Calasilite	The Rubensid Co
		Keylite	Owens-Corning Corp
		Thermobestos	Johns-Manville Sales Corp
		Triasilite	Mundt Clark Corp
		Caltemp	Pabco Ind Ins Div***
		Caretemp†	Philip Carey Mfg Co
		Thermasil	Baldwin-Ehren-Hill, Inc
		Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions are to be made only on approval of the authority initiating the use of this specification. SUBCOMMITTEE NO. 22	

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SN 100 M		OCTOBER 1954	
Page 2		Rev Feb 1964	
MATERIAL SPECIFICATION - SERIES 100			
Code	104		106
Material	Inorganic silicates		Asbestos fiber and sodium silicate
Material Description	Inorganic silices and asbestos fibers		Compressed fluffy amosite asbestos fiber sprayed with sodium silicate to form a mat containing a minimum of 20% sodium silicate by weight. Asbestos mat is then sprinkled with diatomaceous earth to provide an integral refractory coating
Filler			
Binder			
Temperature Range	100°F to 1800°F		200°F to 1200°F
K Factor	Block - 500°F - 0.58 max		500°F - 0.54 max
Density	Block - 14 lb per cu ft		18 lb per cu ft
Compressive Strength	65 lb per sq in. min or 5% deformation		27 psi at 10% deformation - dry
Manufacturing Process			Formed and comp. on mandrel. Pipe mach cut on die
Resistance to Breakage in Handling	Block must average 3" or greater in drop test per ASTM C 487, tentative method of test for resistance to dropping of preformed block thermal insulation.		
Dimensions			
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F		Formed on a mandrel 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.			
* Min thickness available 1½", also available in pipe covering on special order. * Pipe covering only.			Unibestos Pittsburgh Corning Corp
	Keyle 20° Owens-Corning Corp		

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OCTOBER 1954			
MATERIAL SPECIFICATION - SERIES 100			
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SM 100 M			
Page 3			
Code	110	111	111.1
Material	Vegetable cork	Cellular glass	Cellular glass
Material Description	Vegetable cork, granulated and compressed into cork-board or molded forms, from material of vegetable origin for low and medium temperature insulation.	Cellular glass foamed and fused into unicellular form.	Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive.
Filler			
Binder	Natural resin in cork		
Temperature Range	-200°F to 100°F	-200°F to 100°F (+300°F for dual temp)	+35°F to +300°F
K Factor	100°F - 0.29 max	100°F - 0.43 max	100°F - 0.43 max
Density	9 - 11 lb per cu ft	10 - 11 lb per cu ft	9 lb per cu ft
Compressive Strength	15 lb per sq in. min	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation
Manufacturing Process	Machine comp. or molded. Baked at moderate temp		
Resistance to Breakage in Handling	Good		
Dimensions			
Other Qualifications	Pipe covering shall be coated on the outside with heavy mastic		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
CONFIDENTIAL	Cork Armstrong C&S Corp	Foamglas Pittsburgh Coming Corp	Foamglas Stay-Dry Pittsburgh Coming Corp
	Cork Mundt Cork Co		
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MATERIAL SPECIFICATION - SERIES 100

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Code	111.2	111.3	112
Material	Cellular glass	Cellular glass	Glass fiber
Material Description	Cellular glass foamed and fused into unicellular form. Factory applied jacket having 0.00035" aluminum foil outer jacket backed by kraft paper (60 lb per 3000 sq ft)	Cellular glass foamed and fused into unicellular form. Plain - without jacket.	See Codes 112.01 through 112.81.
Filler			
Binder			
Temperature Range	+35°F to +300°F	+35°F to +300°F	
K Factor			
Density	9 lb per cu ft	9 lb per cu ft	
Compressive Strength	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation	
Manufacturing Process			
Resistance to Breakage in Handling			
Dimensions			
Other Qualifications			
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
CONFIDENTIAL	Foamglas Stay-Dry Pittsburgh Corning Corp	Foamglas Stay-Dry Pittsburgh Corning Corp	



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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SM 100 M										
Rev. Feb 1964				Page 5										
Code	112.01	112.02												
Material	Glass fiber	See Code 112.01												
Material Description	Textile-type fine glass fiber pipe and fitting insulation, plain, with medium-temperature binder													
Filler														
Binder	Phenol-formaldehyde or Di-Cy													
Temperature Range	80°F to 350°F													
K Factor	100°F - 0.25													
Density	3" and 6" lb per cu ft													
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.													
Resistance to Breakage in Handling	Very good													
Other Qualifications	Specify whether for iron pipe or copper tubing													
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.														
• Fittings only as follows: For 125-lb cast iron screwed ends and tees <table border="1"> <thead> <tr> <th>Size</th> <th>Thickness</th> </tr> </thead> <tbody> <tr> <td>1/2 thru 4</td> <td>1/2, 1, 1 1/2</td> </tr> </tbody> </table> For butt-welding long-radius 90° and 45° elbows <table border="1"> <thead> <tr> <th>Size</th> <th>Thickness</th> </tr> </thead> <tbody> <tr> <td>2 thru 6</td> <td>1/2, 1</td> </tr> <tr> <td>2 thru 12</td> <td>1 1/2, 2</td> </tr> </tbody> </table> Available factory finished with Code 731 "Hypalon" mastic on request		Size	Thickness	1/2 thru 4	1/2, 1, 1 1/2	Size	Thickness	2 thru 6	1/2, 1	2 thru 12	1 1/2, 2	• Ultrafine Snap-on Gustin-Bacon Mfg Co • Mono-Kover Baldwin-Ehrat-Hill, Inc • Thermoglas Phillip Carey Mfg Co • Fiberglass Owens-Corning Corp • Armaglas PF Pipe Insul Armstrong C&S Corp • Micro-Lok Johns-Manville Sales Corp • FIT-111 Fibrous Glass Products, Inc, Hicksville, NY Greystead Ind Park, Mountsin Top, Pa. • Insul-Sure Insul-Coverie Corp Albany 78, NY • PPC Glass Fiber Pitts Plate Glass Co • Super/ins The Ruberoid Co		
Size	Thickness													
1/2 thru 4	1/2, 1, 1 1/2													
Size	Thickness													
2 thru 6	1/2, 1													
2 thru 12	1 1/2, 2													

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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
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Code	112.11	112.12		
Material	Glass fiber	See 112.11		
Material Description	Textile type fine glass fiber bonded pipe insulation with 45-lb factory-applied roofing felt finish. Code 701 asbestos felt must be used.			
Filler				
Binder	Phenol-formaldehyde or Di-Cy			
Temperature Range	80°F to 350°F			
K Factor	100°F - 0.25			
Density	3" and 6" 1b per cu ft			
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.			
Resistance to Breakage in Handling	Very good			
Dimensions				
Other Qualifications	Specify whether for iron pipe or copper tubing.			
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
* Order must specify finish noted under Material Description.	* Ultrafine Snap-on Gustin-Bacon Mfg Co			TWENTY ONE CENTS
	* Vene-Kover Baldwin-Ehret-Hill, Inc			
	* Thermoglas Philip Carey Mfg Co			
	* Fiberglass Owens-Corning Corp			
	* Armaglas PF Pipe Insu Armstrong C&S Corp			
	* Micro-Lot® Johns-Manville Sales Corp			
	* PPG Glass Fiber Pitts Plate Glass Co			
	* Superfine The Ruberoid Co			

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OCTOBER 1954			
MATERIAL SPECIFICATION - SERIES 100			
Rev. March 1962			
SN 100 M			
Page 7			
Code	112.16	112.17	
Material	Glass fiber	Glass fiber	
Material Description	Textile type fine glass fiber bonded pipe insulation with 4-oz factory-applied canvas finish.	Textile type fine glass fiber bonded pipe insulation with 8-oz factory-applied canvas finish.	
Filler			
Blender	Phenol-formaldehyde or Di-Cy	Phenol-formaldehyde or Di-Cy	
Temperature Range	80°F to 300°F	80°F to 300°F	
K Factor	100°F - 0.25	100°F - 0.25	
Density	3" and 6" lb per cu ft	3" and 6" lb per cu ft	
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.	
Resistance to Breakage in Handling	Very good	Very good	
Dimensions			
Other Qualifications	Specify whether for iron pipe or copper tubing	Specify whether for iron pipe or copper tubing	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
CONFIDENTIAL	*Ultrafine Snap-on Gustin-Bacon Mfg Co	*Ultrafine Snap-on Gustin-Bacon Mfg Co	
	*Mono-Kover Baldwin-Ehrer-Hill, Inc	*Mono-Kover Baldwin-Ehrer-Hill, Inc	
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co	
	*Fiberglas Owens-Corning Corp	*Fiberglas Owens-Corning Corp	
	*Armoglas PF Pipe Ins Armstrong C&S Corp	*Armoglas PF Pipe Ins Armstrong C&S Corp	
	*Micro-Lok Johns-Manville Sales Corp	*Micro-Lok Johns-Manville Sales Corp	
	*PPG Glass Fiber Pitts Plate Glass Co	*PPG Glass Fiber Pitts Plate Glass Co	
	*Superfine The Ruberoid Co	*Superfine The Ruberoid Co	



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SN 100 M		OCTOBER 1954	
Page 8		MATERIAL SPECIFICATION - SERIES 100	
Code		112.22	
Material		Glass fiber	
Material Description		Preformed pipe covering composed of glass fibers bonded together by inert thermosetting resin with factory-applied 35-lb minimum per 3000 sq ft white bleached kraft paper, laminated to 0.0007" aluminum foil by fire-retardant adhesive (moisture vapor transmission rate shall not exceed 0.015 perms - wet cup test) and reinforced by glass threads in both directions, maximum spacing 1/4". Finish includes lap 2", ± 1/4", long and butt strips 4", ± 1/4", wide. Paper to be creased or embossed sufficiently to conceal wrinkles without requiring excessive lap adhesive to make a tight seal. Type A - one-piece Type B - two-piece	
Filler			
Binder		Phenol-formaldehyde or Di-Cy	
Temperature Range		40°F to 250°F	
K Factor		100°F - 0.25, 250°F - 0.33	
Density		Type A - 3 lb per sq ft min Type B - 6 lb per sq ft min	
Compressive Strength*		Compressive strength and resilience are very low. Inserts are required where pipe is supported by insulation. Type B has more resistance to abuse than Type A.	
Resistance to Breakage in Handling		Very good	
Dimensions		3-ft sections Type A - 1/2", 3/4", 1", 1 1/2", 2", 2 1/2", and 3" thick Type B - 1/2", 1", 1 1/2", 2", and 2 1/2" thick	
Other Qualifications		Specify whether for iron pipe or copper tubing. Weather protection is required for outside service.	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
CONFIDENTIAL	Ultraflex Snap-on (Type A)		
	Gustin-Seaton Mfg Co		
	Mene-Kover (Type A)		
	Baldwin-Ehrst-Hill, Inc		
	Fiberglass (Type A and Type B)		
	Quana-Corning Corp		
	Armoglas PP Pipe Insulation (Type A and Type B)		
	Armstrong C&S Corp		
	Micro-Lok (Type A)		
	Johnstonville Sales Corp		
PPG Glass Fiber (Type A)			
Pittsburgh Plate Glass Co			
Superflex (Type A)			
The Rubenoid Co.			
Thermoglas (Type A)			
Phillip Carey Mfg Co			



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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
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Code	112.61			
Material	Glass fiber			
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.			
Filler				
Binder	Phenol-formaldehyde			
Temperature Range	40°F to 350°F			
K Factor	100°F - 0.25 to 0.30			
Density	6 and 9 lb per cu ft			
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.			
Resistance to Breakage in Handling	Very good			
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3". PF617 (9-lb density), 1/2" through 2 1/4".			
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
CONFIDENTIAL	Fiberglas PF615 or 617 Insulation Owens-Corning Corp			
	Armoglas PF Insulation Armstrong C&S Corp			
	Spintex No. 616 or 615 Johns-Manville Sales Corp			
	E-2 Ply Duct Insulation Baldwin-Ehret-Hill, Inc			

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MATERIAL SPECIFICATION - SERIES 100			
Code	112.71		112.81
Material	Glass fiber		Glass fiber
Material Description	Bonded board insulation formed from fibrous glass or mineral fibers, with asphalt and kraft paper vapor-barrier finish.		Bonded acoustical board formed from fibrous glass or mineral fibers with a thin neoprene compound on one surface.
Filler			
Binder	Phenol-formaldehyde		Phenol-formaldehyde
Temperature Range	40°F to 150°F		40°F to 150°F
K Factor	100°F - 0.26		100°F - 0.26
Density	3 and 6 lb per cu ft		6 lb per cu ft
Compressive Strength			
Manufacturing Process	Machine molded		Machine molded
Resistance to Breakage Handling	Very good		Very good
Dimensions	24" x 48" boards 3/4" to 2" thickness		24" x 48" boards 3/8" to 2" thickness
Other Qualifications	Higher density material is more resistant to abuse		Neoprene coating on side of board exposed to air flow
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
CONFIDENTIAL	3-lb density. High-density outer layers.	Fiberglass Vapor Seal Duct Insu Owens-Corning Corp	Fiberglass Coated Duct Insu Owens-Corning Corp
		Armoglas Vapor Seal Duct Insu Armstrong C&S Corp	Armoglas Coated Duct Insu Armstrong C&S Corp
		Spintex No. 414VS Johns-Manville Sales Corp	Coated Duct Insulation Baldwin-Ehret-Hill, Inc
		E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc	
		Fiberglass Board* Gustin-Bacon Mfg Co	

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OCTOBER 1964		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev Aug 1964				Page 11
Code		114		
Material		Mineral wool (Black only)		
Material Description		Mineral slag wool		
Filler				
Binder		High temp binder		
Temperature Range		500°F to 1700°F		
K Factor		500°F - 0.45 max		
Density		19.2 lb per cu ft		
Compressive Strength		12 lb per sq in.		
Manufacturing Process		Machine molded		
Resistance to Breakage in Handling		Good		
Dimensions				
Other Qualifications				
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
CONFIDENTIAL		PV Supertemp Eagle-Picher		
		Mono-Block Baldwin-Ehret-Hill, Inc		
		Armatemp Armstrong C&S Corp		
		M V Block M. H. Detrick Co		
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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954	
Page 12				Rev Aug 1964	
Code		118			
Material		Urethane Foam, Rigid			
Material Description		Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent			
Temperature Range		-270°F to +150°F			
K Factor		0.17 max at 75°F			
Density		1.7 to 2.5 lb per cu ft			
Compressive Strength		Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions			
Manufacturing Process		Molded or cut from molded billet			
Resistance to Breakage in Handling		Excellent			
Dimensional Tolerances		Inside Diameter (In.)			
		Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)	
		1/2 - 6	IPS OD	IPS OD + 1/16	
		7 - 12	IPS OD	IPS OD + 1/8	
		14 and up	IPS OD + 1/16	IPS OD + 3/16	
		Outside Diameter (In.)			
		Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)	
		1/2 - 6	IPS OD - 1/8	IPS OD - 1/16	
7 - 12	IPS OD - 1/8	IPS OD			
14 and up	IPS OD - 1/16	IPS OD + 1/16			
		All other dimensions to be ± 1/16" including straightness and squareness			
Other Qualifications		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 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 2% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days			
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.					
CONFIDENTIAL		U-200 Unarco Industries			
		Zoroel NB200 National Gypsum			
DUP 096					
					

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