

MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	OCT 1954
		REVISED	APRIL 1963
		SM 100 M Page 1 of 15	
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bent clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-in. curves cover. Material should be specified "without 2-in. curves" 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. *ittings available in sawn, voided, and steel type.	85% Mag Phillip Carey Mfg Co	Calcilite The Rubenoid Co	High Temp. No. 19 Phillip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermabestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Keytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricelite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Preformed-molded Pabco Ind Ins Div ***	Caretemp† Phillip Carey Mfg Co	

DUP 0990059

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.

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REV. 10/62

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Code	104	106
Material	Inorganic silicates	Asbestos and diatomaceous earth molded
Material Description	Inorganic silicas and asbestos fibers	Compressed fluffy asbestos covered with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler		
Binder		
Temperature Range	100°F to 1600°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 at 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.		
* Available for field mixing to repair joints and seams.		Unabasco Pittsburgh Corning Corp
** Max temp of Kayle 20 is 1800°F.	Kayle 20*** Owens-Corning Corp	
*** Min thickness available 1 1/2", also available in pipe covering on special order.		
* Pipe covering only.		
 DUP 0990060		

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	OCT 1954
		REVISED	JUNE 1963
		SN 100 M Page 1 of 13	
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-as canvas cover. Material should be specified "without 2-as canvas" to avoid extra charge. **New Simplified Dimensional System sponsored by ASTM ***Fibrex Board Paper Products Corp †Codes 104 and 106 are acceptable alternatives unless noted on the Product Specifications. ‡Fittings available in screwed, welded, and union types.	85% Mag Philip Carey Mfg Co	Calcilite The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehren-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehren-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	

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Case	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicas 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 1600°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 at 5% deformation	27 psi at 10%* deformation - dry
Manufacturing Process		Formed and cased 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.		
* Max temp of Kayle 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.		Unibestos Pittsburgh Corning Corp
	Kayle 20** Owens-Corning Corp	
DUP 0990062 		

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
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Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Steele, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with a clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-as canvas cover. Material should be specified "without 2-as 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 serrated, welded, and smooth types.	85% Mag Philis Carey Mfg Co	Calcilite The Rubensid Co	High Temp No. 19 Philis Carey Mfg Co
	Thermalite-85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermabestos Johns-Manville Sales Corp	J/M Superex Johns-Manville Sales Co
		Kaytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Fenchermosite Keesbey & Morrison Co-	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Calcump Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Philis Carey Mfg Co	
			DUP 0990063

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MATERIAL SPECIFICATION - SERIES 100			OCTOBER 1954
Page 2			Rev April 1963
Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth molded
Material Description	Inorganic silicas and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 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.			
* Available for field mixing to repair joints and seams. ** Max temp of Kaylo 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.			Unibestos Pittsburgh Corning Corp
	Kaylo 20***		
	Owens-Corning Corp		
			DUP 0990064

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M Page 1 of 13
		OCT 1954	
		REVISED JUNE 1943	
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with portland cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bonds are supplied at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-in canvas cover. Material should be specified "without 2-in 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. †† Finings available in screened, welded, and sheet types.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite-85% Baldwin-Ehrer-Hill, Inc	Kaylo Owens-Corning Corp	Endura Hi-Temp Baldwin-Ehrer-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermabestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Kaytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careysmpt Philip Carey Mfg Co	

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SM 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
Page 2				Rev April 1962
Code	104		106	
Material	Inorganic silicates		Asbestos and diatomaceous earth molded	
Material Description	Inorganic silices and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*	
Filler				
Binder				
Temperature Range	100°F to 1600°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 at 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.				
* Available for field mixing to repair joints and seams. ** Max temp of Kayle 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.			Unitasas Pittsburgh Corning Corp	
	Kayle 20***			
	Owens-Corning Corp			



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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M
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		REVISED JUNE 1963	
Code -	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bar clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. Pipemac 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 **	ASTM **	To Specification
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.			
*Bones are supplied at extra cost. Order must state "without bones" if not required. For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as 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. ‡Fltings available in screwed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calcisilite The Ruberoid Co	High Temp. No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehret-Hill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehret-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J W Superex Johns-Manville Sales Corp
		Keytherm Keesbey & Mottison Co	High Temp Keesbey & Mottison Co
	Featherweight Keesbey & Mottison Co	Tricalite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caretemp† Philip Carey Mfg Co	

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SH 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954	
Page 2				Rev. Sept. 1963	
Code		104.		106	
Material		Inorganic silicates		Asbestos fiber and sodium silicate molded	
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 1600°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 at 5% deformation		27 psi at 10% deformation - dry	
Manufacturing Process				Formed and came 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 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.					
* Max temp of Kaylo 20 is 1800°F. ** Min thickness available 1½", also available in pipe covering on special order. • Pipe covering only.				Unibestos Pittsburgh Corning Corp	
		Kaylo 20** Owens-Corning Corp			

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION - SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	OCT 1954
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Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bond clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.3	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bases are supplied at extra cost. Order must state "without bonds" if not required. For 11" 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. **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. ‡Finings available in screwed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calcisite The Rubenoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermabestos Johns-Manville Sales Corp	1/4 Superex Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Insulite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Pressure-molded Pabco Ind Ins Div ***	Careystamp† Philip Carey Mfg Co	

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SUBCOMMITTEE NO. 10

DUP 0990154

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SM 100 M		OCTOBER 1954	
Page 2		MATERIAL SPECIFICATION - SERIES 100	
		Rev April 1963	
Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth molded
Material Description	Inorganic silices and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 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.			
* Available for field mixing to repair joints and seams. ** Max temp of Kaylo 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.			Unasbestos Pittsburgh Corning Corp
	Kaylo 20*** Owens-Corning Corp		



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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	
		OCT 1954	SN 100 M
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Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-in canvas cover. Material should be specified "without 2-in 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 covered, voided, and sand type.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite-85% Baldwin-Ehrer-Mill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Mill, Inc
	85% Mag John-Manville Sales Corp	Thermobasas John-Manville Sales Corp	1/4 Superex John-Manville Sales Corp
		Keytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Calcemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caretemp Philip Carey Mfg Co	

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SUBCOMMITTEE NO. 30

A-164

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DUP 0990263

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Page 2

Rev Feb 1964

Code	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate
Material Description	Inorganic silicates 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 at 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 1 1/2", also available in pipe covering on special order. • Pipe covering only.		Asbestos Pittsburgh Corning Corp
	Rayle 20° Owens-Corning Corp	

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954	SN 100 M Page 1 of 13
		REVISED JUNE 1963	
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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 specified at extra cost. Order must state "without bands" if not required. For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as 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. ††Pinnings available in sawed, welded, and sand types.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Keylo Quens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J.V. Saperes Johns-Manville Sales Corp
		Keytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Triadite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	
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DUP 0990265

MATERIAL SPECIFICATION - SERIES 100			OCTOBER 1954
Page 2			Rev April 1943
Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth molded
Material Description	Inorganic silica and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 5% deformation		27 psi at 10% deformation - dry
Manufacturing Process			Formed and comp. on mandrel. Pipe mach out 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.			
* Available for field mixing to repair joints and seams. ** Max temp of Kayle 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. * Pipe covering only.			Unibestos Pittsburgh Corning Corp
	Kayle 20*** Owens-Corning Corp		



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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M Page 1 of 13
		OCT 1954	
		REVISED JUNE 1963	
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-oz canvas cover. Material should be specified "without 2-oz 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 street types.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Keytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Truelite Munder Clark Corp	
	85% Mag Munder Clark Corp	Calcemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careytemp† Philip Carey Mfg Co	

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DUP 0990267

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Page 2

Rev. Feb. 1964

Code	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate
Material Description	Inorganic silica 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 at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cured 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 1 1/2", also available in pipe covering on special order. * Pipe covering only.		Asbestos Pittsburgh Corning Corp
	Keyla 20" Owens-Corning Corp	

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MATERIALS

**MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE**

**THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION**

ISSUED

OCT 1954

REVISED

APRIL 1963

SN 100 M

Page 1 of 15

Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bar clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.3	500°F - 0.34 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-as canvas cover. Material should be specified "without 2-as 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 serrated, welded, and sweat types.	85% Mag. Philip Carey Mfg Co	Calcisite The Rubenoid Co	High Temp. No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrer-Mill, Inc	Raylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Mill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobasins Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Raytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Tricalite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Calcomp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caraytemp† Philip Carey Mfg Co	

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DOCUMENT NO. 10



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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Page 2

Rev. Sept. 1963

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Code	104	104
Material	Inorganic silicates	Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicates 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 1600°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 at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cured 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.		
* Max temp of Keylo 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.		Unabestos Pittsburgh Corning Corp
	Keylo 20** Owens-Corning Corp	

REV. 1963
SUP BY

DUP 0990270

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**MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE**

**THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION**

ISSUED

OCT 1954

REVISED

APRIL 1963

SN 100 M

Page 1 of 15

Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. Pipe 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 **	ASTM **	To Specification
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 specified at extra cost. Order must state "without bands" if not required. For 11" IPS and larger there is an additional charge for 2-as convex cover. Material should be specified "without 2-as convex" 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 sawed, welded, and steam types.	85% Mag Philip Carey Mfg Co	Calcisilite The Ruberoid Co	High Temp. No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superex Johns-Manville Sales Corp
		Raychem Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Tricellic Munder Clark Corp	
	85% Mag Munder Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careyscomp† Philip Carey Mfg Co	

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954 REVISED JUNE 1963	SN 100 M Page 1 of 13
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 3% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
R Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 3% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. Pipe 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 **	ASTM **	To Specification
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. Grease must state "without bands" if not required. For 11" IPS and larger there is an additional charge for 2-in. canvas cover. Material should be specified "without 2-in. canvas" to avoid extra charge. **New Simplified Classification 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 grooved, welded, and flange types.	85% Mag Philip Carey Mfg Co	Calcilite The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite-85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag John-Manville Sales Corp	Thermobestos John-Manville Sales Corp	J/M Superex John-Manville Sales Corp
		Kaytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Thermalite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Calcilite Pabco Ind Ins Div ***	
	Pressure-molded Pabco Ind Ins Div ***	Caroytemp† Philip Carey Mfg Co	
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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Page 2

Rev April 1962

Code	104	106
Material	Inorganic silicates	Asbestos and diatomaceous earth molded
Material Description	Inorganic silicates and asbestos fibers	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler		
Binder		
Temperature Range	100°F to 1600°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 at 5% deformation	27 psi at 18% 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.		
* Available for field mixing to repair joints and seams.	Unabasco Pittsburgh Corning Corp	
** Max temp of Kaylo 20 is 1800°F.	Kaylo 20*** Owens-Corning Corp	
*** Min thickness available 1 1/2", also available in pipe covering on special order.		
* Pipe covering only.		



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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Rev. Sept. 1943

Code	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicas 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 1600°F*	200°F to 1200°F
K Factor	Block - 500°F - 0.58 max	300°F - 0.54 max
Density	Block - 14 lb per cu ft	18 lb per cu ft
Compressive Strength	65 lb per sq in. min at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cased 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.		
* Max temp of Keylo 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.		Unabestos Pittsburgh Carning Corp
	Keylo 20** Owens-Corning Corp	

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M Page 1 of 13
		OCT 1954	
		REVISED JUNE 1963	
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-in. canvas cover. Material should be specified "without 2-in. 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. †Plumbings available in covered, molded, and sweat types.	85% Mag Phillips Carey Mfg Co	Calcilite The Rubensoid Co	High Temp. No. 19 Phillips Carey Mfg Co
	Thermalite 85% Baldwin-Ehren-Hill, Inc	Kaylo Quincy-Corning Corp	Enduro Hi-Temp Baldwin-Ehren-Hill, Inc
	85% Mag John-Manville Sales Corp	Thermobestos John-Manville Sales Corp	J. M. Superes John-Manville Sales Corp
		Kaychem Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Truselite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Phillips Carey Mfg Co	
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.			
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R-214

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DUP 0990354

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15

MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1964	SN 100 M Page 1 of 15
		REVISED APRIL 1963	
Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with be clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-lb canvas cover. Material should be specified "without 2-lb canvas" to avoid extra charge. **New Standard Dimensional System sponsored by ASTM ***Fiber Board Paper Products Corp. *Codes 104 and 106 are acceptable alternatives unless noted on the Product Specifications. †Fittings available in serrated, welded, and smooth types.	85% Mag Philip Carey Mfg Co	Calcilite The Rubberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	1/4 Supermax Johns-Manville Sales Corp
		Raychem Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Fasthewright Keesbey & Morrison Co	Truelite Mundt Cart Corp	
	85% Mag Mundt Cart Corp	Calcamp Pabco Ind Ins Div ***	
	Precession-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	
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 maintaining the use of this Specification.			

STANDARD SPEC. NO. 15

R-215

DUP 0990356

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954	SN 100 M
		REVISED APRIL 1963	Page 1 of 15
Code	101*	102**	103
Material -	85% Magnesite	Calcium silicate	Diatomaceous
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. Pipe 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 **	ASTM **	To Specification
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.			
*Bonds are supplied at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-in. canvas cover. Material should be specified "without 2-in. 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. ‡ Findings available in serrated, beveled, and sweat types.	85% Mag Philip Carey Mfg Co	Calcilite Thy Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Mill, Inc	Raylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Mill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superex Johns-Manville Sales Corp
		Raytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Trualite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caretemp† Philip Carey Mfg Co	
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.			
SUSCUM-11-22 NO. 28			

DUP 0990357

040302

6-E-375

103

MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	
		OCT 1954	SM 100 M
		REVISED JUNE 1963	Page 1 of 13
Code	101*	102**	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
Other Qualifications		Good mechanical strength with low shrinkage	
The following materials have proven satisfactory in field tests and credit 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-as canvas cover. Material should be specified "without 2-as 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 Product Specifications. ‡Fittings available in screwed, welded, and flange types.	85% Mag Philip Carey Mfg Co	Calcisite The Rubenoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite-25% Baldwin-Ehrst-Hill, Inc	Keylo Quincy-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Keytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Fraserweights Keesbey & Morrison Co	Trualite Munder Cork Corp	
	85% Mag Munder Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	

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UNSCANNED NO. 10

R-261

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DUP 0990436

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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1964

Page 2

Rev. Feb. 1964

100

Code	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate
Material Description	Inorganic silicates and asbestos fibers	Compressed fluffy 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. at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cured on mandrel. Pipe mech 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 1 1/2", also available in pipe covering on special order. * Pipe covering only.		Asbestos Pittsburgh Corning Corp
	Kayle 20° Owens-Corning Corp	

DUP 0990437

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954	SN 100 M
		REVISED JUNE 1963	Page 1 of 13
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber with or clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°C
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.34 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification.
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-oz canvas cover. Material should be specified "without 2-oz 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. ‡ Plittings available in screwed, welded, and flanged types.	85% Mag Philo Carey Mfg Co	Calcisite The Rubenoid Co	High Temp No. 19 Philo Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J. W. Superes Johns-Manville Sales Corp
		Keytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Fraserweight Keesbey & Mattison Co	Thermalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp Philo Carey Mfg Co	
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.			
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NOTE

R-262

DUP 0990438

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Code	104	106
Material	Inorganic silicates	Asbestos and diatomaceous earth matted
Material Description	Inorganic silica and asbestos fibers	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler		
Binder		
Temperature Range	100°F to 1600°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 at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and came 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.		
* Available for field mixing to repair joints and seams. ** Max temp of Keylo 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. * Pipe covering only.		Unibestos Pittsburgh Corning Corp
	Keylo 20*** Owens-Corning Corp	



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DUP 0990439

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954 REVISED APRIL 1963	SN 100 M Page 1 of 15
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber, with clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bonds are suggested at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-in canvas cover. Material should be specified "without 2-in 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 Product Specifications. ‡ Findings available in sawed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	1/4 Sugar Johns-Manville Sales Corp
		Keytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Fraserweight Keesbey & Mattison Co	Truelite Munder Cork Corp	
	85% Mag Munder Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	
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.			
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10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1222-1223-1224-1225-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2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2

MATERIAL SPECIFICATION - SERIES 100

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Code	104	106
Material	Inorganic silicates	Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicates 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 1600°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 at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cured 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.		
* Max temp of Kayle 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.		Unabeslas Pittsburgh Corning Corp
	Kayle 20** Owens-Corning Corp	

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954	SN 100 M Page 1 of 15
		REVISED APRIL 1963	
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bonding clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-as canvas cover. Material should be specified "without 2-as 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 Product Specifications. ‡Fittings available in screwed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calasilite The Rubenoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Munder Cork Corp	
	85% Mag Munder Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careysmpt Philip Carey Mfg Co	

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.

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SN 100 M		OCTOBER 1954	
Page 2		MATERIAL SPECIFICATION - SERIES 100	
		Rev April 1963	
Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth matted
Material Description	Inorganic silicas and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 5% deformation		27 psi at 10% deformation - dry
Manufacturing Process			Formed and cured 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.			
* Available for field mixing to repair joints and seams.			Unasbestos Pittsburgh Corning Corp
** Max temp of Kaylo 20 is 1800°F.	Kaylo 20*** Owens-Corning Corp		
*** Min thickness available 1 1/2", also available in pipe covering on special order.			
* Pipe covering only.			
		650	



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OCTOBER 1954

Rev Sept 1961

MATERIAL SPECIFICATION - SERIES 100

SN 100 M

Page 3

Code	107	108	109
Material	Asbestos sponge		Corrugated asbestos preshrunk
Material Description	Asbestos sheets separated by finely ground sponged material banded with adhesive strips.		Alternate layers of plain and corrugated asbestos sheets. Outer covering asbestos felt.
Filler			
Binder			
Temperature Range	100°F to 700°F		100°F to 400°F
K Factor	500°F - 0.60 max		200°F - 0.58 max
Density	30 lb max		
Compressive Strength			
Manufacturing Process	Laminated - 38 to 42 layers per in. of thickness		3-ply laminate
Resistance to Breakage in Handling	Very good		Good
Dimensions	To Specification		
Other Qualifications	Must be a flexible product		Preshrunk
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
• Aircell -4-ply Excel -6-ply Cavocel-8-ply			Preshrunk Asbestocel Johns-Manville Sales Corp
	Asbestos Sponge Philip Carey Mfg Co		Aircell • Philip Carey Mfg Co
	Sponge Felt The Rubensid Co		K & M - Aircell Kearsbey & Morrison Co
	Sponge Felt Baldwin-Ehrst-Hill, Inc		B-H Aircell Baldwin-Ehrst-Hill, Inc
	Sponge Felt Smith and Kansier Corp		

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SM 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
Page 4				Rev. Sept. 1961
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	100 lb per sq in. min	100 lb per sq in. min	
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.				
	Cork Armstrong C&S Corp	Foamglas Pittsburgh Corning Corp	Foamglas Stov-Dry Pittsburgh Corning Corp	
	Cork Mundet Cork Co			

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev. April 1960				Page 4.1
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	100 lb per sq in. min	100 lb per sq in. min		
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.				
	Foamglas Stay-Dry Pittsburgh Corning Corp	Foamglas Stay-Dry Pittsburgh Corning Corp		

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MATERIAL SPECIFICATION - SERIES 100

SM 100 M

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" 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		
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 Size Thickness 1/2 thru 4 1/2, 1, 1 1/2 For butt-welding long-radius 90° and 45° elbows 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-Ehrer-Hill, Inc		
	* Thermoglas Philip Carey Mfg Co		
	* Fiberglass Owens-Corning Corp		
	* Armoglas PF Pipe Insul Armstrong C&S Corp		
	* Micro-Lok Johns-Manville Sales Corp		
	* FIT-rite Fibrous Glass Products, Inc, Hicksville, NY Crestwood Ind Park, Mountain Top, Pa.		
	* Insul-Sure Insul-Coverie Corp Maspeth 78, NY		
	* PPG Glass Fiber Pitts Plate Glass Co		
	* Superins The Ruberoid Co		

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SN 100 M		OCTOBER 1954	
Page 6		Rev April 1963	
MATERIAL SPECIFICATION - SERIES 100			
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		
	* Mono-Kover Baldwin-Ehrst-Hill, Inc		
	* Thermoglas Philip Carey Mfg Co		
	* Fiberglas Owens-Corning Corp		
	* Armaglas PF Pipe Insu Armstrong C&S Corp		
	* Micro-Lul 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		SN 100 M
Rev March 1962				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				
Binder	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.				
	*Ultrafine Snap-on Gustin-Bacon Mfg Co	*Ultrafine Snap-on Gustin-Bacon Mfg Co		
	*Vono-Kover Baldwin-Ehrer-Hill, Inc	*Vono-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 Insu Armstrong C&S Corp	**Armoglas PF Pipe Insu 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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SM 100 M		OCTOBER 1954
Page 8		Rev April 1963
MATERIAL SPECIFICATION - SERIES 100		
Code	112.22	
Material	Glass fiber	
Material Description	Preformed pipe covering composed of glass fibers banded 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 1/8". Finish includes lap 2", 1/4", long and butt strips 4", 1/4", wide. Paper to be craped 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 cu ft min Type B - 6 lb per cu 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.		
	Ultrafine Snap-on (Type A) Gustin-Bacon Mfg Co	
	Mono-Kover (Type A) Baldwin-Ehren-Mill, Inc	
	Fiberglas (Type A and Type B) Owens-Corning Corp	
	Armoglas PF Pipe Insulation (Type A and Type B) Armstrong C&S Corp	
	Micro-Lok (Type A) Johns-Manville Sales Corp	
	PPG Glass Fiber (Type A) Pittsburgh Plate Glass Co	
	Superfloc (Type A) The Ruberoid Co	
	Thermoglas (Type A) Philip Carey Mfg Co	

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SM 100 M
Rev April 1963				Page 9
Code	112.61		112.66	
Material	Glass fiber		Glass fiber	
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		Short, coarse steam-blown glass fibers preformed in semi-rigid board, sandec on one side and cut into lagging sizes for ease of application to curved surfaces.	
Filler				
Binder	Phenol-formaldehyde		Phenol-formaldehyde	
Temperature Range	40°F to 350°F		40°F to 350°F	
K Factor	100°F - 0.25 to 0.30		100°F - 0.25	
Density	6 and 9 lb per cu ft		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.		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	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3" PF617 (9-lb density), 1/2" through 2 1/4".		Length - 36" Width - 6" or 12" Thickness - 3/4", 1", 1 1/4", 1 1/2", and 2".	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
	Fiberglas PF615 or 617 Insulation Owens-Corning Corp		Fiberglas Block Insulat. Owens-Corning Corp	
	Armoglas PF Insulation Armstrong C&S Corp		Armoglas Block Insulation Armstrong C&S Corp	
	Spintex No. 414 or 415 Johns-Manville Sales Corp			
	E-Z Ply Duct Insulation Baldwin-Ehret-Mill, Inc			
				DUP 0991096

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SM 100 M		OCTOBER 1954	
MATERIAL SPECIFICATION - SERIES 100		Rev April 1963	
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 in Handling	Very good		Very good
Dimensions	24" x 48" boards 3/4" to 2" thickness		24" x 48" boards 5/8" 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.			
* 3-lb density. High-density outer layers.	Fiberglas Vapor Seal Duct Insu Owens-Corning Corp		Fiberglas 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. 614VS 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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MATERIAL SPECIFICATION - SERIES 100

SM 100 M

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Code	113	114	115
Material	See Code 112.81	Mineral wool (Black only)	Mineral wool - asphalt impregnated (black only)
Material Description		Mineral slag wool	Mineral wool fibers homogeneously impregnated with an asphalt binder.
Filler			
Binder		High temp binder	Asphalt
Temperature Range		500°F to 1700°F	-200°F to 100°F
K Factor		500°F - 0.45 max	100°F - 0.34 max
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	Machine molded
Resistance to Breakage in Handling		Good	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.

	PV Supertemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	Mineral Wool Board Armstrong C&S Corp
	Armastemp Armstrong C&S Corp	Koldboard Baldwin-Ehret-Hill, Inc
	M W Block M. H. Derrick Co	

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SN 100 M		OCTOBER 1954	
		MATERIAL SPECIFICATION - SERIES 100	
Page 12		Rev June 1962	
Code	116	117	
Material		Urethane Foam Resilient	
Material Description		See Codes 117.1 through 117.5.	
Filler			
Binder			
Temperature Range			
K Factor			
Density			
Compressive Strength			
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.			
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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954	
Page 14		Rev. Nov 1962			
Code		117.6		118	
Material		Urethane Foam Resilient		Urethane Foam Rigid	
Material Description		Preformed resilient urethane foam pipe and fitting insulation manufactured from polyether resin and Du Pont "Hylone" and factory-applied jacket consisting of glass scrim bonded between 1 mil aluminum foil and 1 mil "Taslar"		Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with Du Pont "Hylone" and polyester or polyether resins	
Filler					
Binder					
Recommended Service Temperature Range		45°F to 150°F		-100°F to +150°F	
K Factor		0.27 max at 75°F		0.17 max at 75°F	
Density		2 to 4 lb per cu ft		1 1/2 to 4 lb per cu ft	
Compressive Strength		Min 20 lb per sq in. at 10% deformation, measured parallel to the direction in which the foam rose during manufacture			
Manufacturing Process		Molded and stabilized dimensionally		Molded or cut from molded billet	
Resistance to Breakage in Handling		Excellent		Excellent	
Dimensions		±1/16" - 0" on insulation ID, all others to be accurate to ±1/16"		±1/16" - 0" on insulation ID, all other dimensions to be ±1/16" including straightness and squariness	
Other Qualifications		Uniform cell structure. No voids with any dimension exceeding 1/8"		Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Moist aging tests max 3.3% volume change; humid aging test max 3% volume change and max 20% compressive strength change in accordance with MIL-P-21929 (SHIP3). Nonburning in accordance with ASTM D 1692. 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.					
* Pipe covering only ** Block only		Flexfoam Delaware Ins Co		U-200 Union Asbestos & Rubber Co	

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OCTOBER 1954

MATERIAL SPECIFICATION - SERIES 100

SM 100 M

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Code	120		
Material	Polystyrene		
Material Description	Preformed rigid cellular polystyrene block, pipe, and fitting insulation.		
Filler			
Binder			
Recommended Service Temperature Range	-100°F to +160°F		
K Factor	0.29 max at 75°F		
Density	1.7 to 2.3		
Compressive Strength	Min 20 lb per sq in. at 10% deformation		
Manufacturing Process	Cut from molded logs		
Resistance to Breakage in Handling	Excellent		
Dimensions	+1/16" -0" on insulation ID, 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". No distortion or volume change, or loss of compressive strength after exposure to 160°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.		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Styrofoam 33		
	MMM Co, Houston, Texas		
	Styrofoam 33		
	Tufflite Plastics, Inc		

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954	SN 100 M Page 1 of 13
		REVISED JUNE 1963	
Code	101*	102**	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber, with bonding clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bonds are supplied at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as 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 Product Specifications. ††Fittings available in screwed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calcisilite The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrst-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrst-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J M Superex Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careytemp† Philip Carey Mfg Co	
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. 38



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SM 100 M		OCTOBER 1954	
Page 2		MATERIAL SPECIFICATION - SERIES 100	
		Rev April 1963	
Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth molded
Material Description	Inorganic silicas and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 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 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.			
* Available for field mixing to repair joints and seams. ** Max temp of Kaylo 20 is 1800°F. *** Min thickness available 1½", also available in pipe covering on special order. • Pipe covering only.			Unibestos Pittsburgh Corning Corp
	Kaylo 20*** Owens-Corning Corp		

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MATERIAL SPECIFICATION - SERIES 100

SN 100 M

Page 3

Code	107	108	109
Material	Asbestos sponge		Corrugated asbestos preshrunk
Material Description	Asbestos sheets separated by finely ground sponged material bonded with adhesive strips.		Alternate layers of plain and corrugated asbestos sheets. Outer covering asbestos felt.
Filler			
Binder			
Temperature Range	100°F to 700°F		100°F to 400°F
K Factor	500°F - 0.60 max		200°F - 0.58 max
Density	30 lb max		
Compressive Strength			
Manufacturing Process	Laminated - 38 to 42 layers per in. of thickness		3-ply laminate
Resistance to Breakage in Handling	Very good		Good
Dimensions	To Specification		
Other Qualifications	Must be a flexible product		Preshrunk
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
• Aircell -4-ply Excel -6-ply Cavocel-8-ply			Preshrunk Asbestocel Johns-Manville Sales Corp
	Asbestos Sponge Philip Carey Mfg Co		Aircell Philip Carey Mfg Co
	Sponge Felt The Ruberoid Co		K & M - Aircell Keasbey & Mattison Co
	Sponge Felt Baldwin-Ehret-Hill, Inc		B-H Aircell Baldwin-Ehret-Hill, Inc
	Sponge Felt Smith and Kanzler Corp		

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SN 100 M		OCTOBER 1954	
Page 4		Rev Sept 1961	
MATERIAL SPECIFICATION - SERIES 100			
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	100 lb per sq in. min	100 lb per sq in. min
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.			
	Cork Armstrong CAS Cork	Foamglas Pittsburgh Corning Corp	Foamglas Stav-Dry Pittsburgh Corning Corp
	Cork Munder Cork Co		



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OCTOBER 1954

MATERIAL SPECIFICATION - SERIES 100

SM 100 M

Rev April 1960

Page 4.1

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	10 lb per sq in. min	100 lb per sq in. min	
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.			
	Foamglas Stay-Dry Pittsburgh Corning Corp	Foamglas Stay-Dry Pittsburgh Corning Corp	

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OCTOBER 1954				SM 100 M
Rev June 1962				Page 5
MATERIAL SPECIFICATION - SERIES 100				
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 Size Thickness 1/2 thru 4 1/2, 1, 1 1/2 For butt-welding long-radius 90° and 45° elbows Size Thickness 2 thru 6 1/2, 1 2 thru 12 1 1/2, 2	* Ultrafine Snap-on			
	Gustin-Bacon Mfg Co			
	* Mono-Kovar			
	Baldwin-Ehrst-Hill, Inc			
	* Thermaglas			
	Philip Carey Mfg Co			
	* Fiberglass			
	Owens-Corning Corp			
	* Armaglas PF Pipe Insu			
	Armstrong C&S Corp			
	* Micro-Lok			
	Johns-Manville Sales Corp			
	* FIT-116			
	Fibrous Glass Products, Inc, Michaville, NY			
	Greenwood Ind Park, Mountain Top, Pa.			
	* Insul-Sure			
	Insul-Coastal Corp			
	Messers 78, NY			
	* PPG Glass Fiber			
	Pima Plate Glass Co			
	* Superfume			
	The Ruberoid Co			

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SM 100 M		OCTOBER 1954	
MATERIAL SPECIFICATION - SERIES 100			
Page 6		Rev April 1963	
Code	112.11	112.12	
Material	Glass fiber	See 112.11	
Material Description	Textile type fine glass fiber banded 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" 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			
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		
	* Mono-Kover Baldwin-Ehret-Hill, Inc		
	* Thermaglas Philip Carey Mfg Co		
	* Fiberglas Owens-Corning Corp		
	* Armaglas PF Pipe Insu Armstrong C&S Corp		
	* Micro-Lol 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		SN 100 M
Rev March 1962				Page 7
Code	112.16	112.17		
Material	Glass fiber	Glass fiber		
Material Description	Textile type fine glass fiber banded pipe insulation with 4-oz factory-applied canvas finish.	Textile type fine glass fiber banded pipe insulation with 8-oz factory-applied canvas finish.		
Filler				
Binder	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.				
	*Ultrafine Snap-on Gustin-Bacon Mfg Co	*Ultrafine Snap-on Gustin-Bacon Mfg Co		
	*Yeno-Kover Baldwin-Ehret-Hill, Inc	*Yeno-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co		
	*Fiberglas Owens-Corning Corp	*Fiberglas Owens-Corning Corp		
	*Armoglas PF Pipe Insu Armstrong C&S Corp	*Armoglas PF Pipe Insu 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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SM 100 M		OCTOBER 1954
Page 8		Rev April 1963
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", 3 1/4", long and butt strips 4", 3 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 cu ft min Type B - 6 lb per cu 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.		
	Ultrafine Snap-on (Type A) Quatin-Bacon Mfg Co	
	None-Kover (Type A) Baldwin-Ehren-Mill, Inc	
	Fiberglas (Type A and Type B) Owens-Corning Corp	
	Armoglas PF Pipe Insulation (Type A and Type B) Armstrong C&S Corp	
	Micro-Lok (Type A) Johns-Manville Sales Corp	
	PPG Glass Fiber (Type A) Pittsburgh Plate Glass Co	
	Superfine (Type A) The Ruberoid Co	
	Thermoglas (Type A) Philip Carey Mfg Co	

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OCTOBER 1954

MATERIAL SPECIFICATION - SERIES 100

SM 100 M

Rev April 1963

Page 2

Code	112.61	112.66
Material	Glass fiber	Glass fiber
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.	Short, coarse stream-blown glass fibers preformed in semi-rigid board, sanded on one side and cut into logging sizes for ease of application to curved surfaces.
Filler		
Binder	Phenol-formaldehyde	Phenol-formaldehyde
Temperature Range	40°F to 350°F	40°F to 350°F
K Factor	100°F - 0.25 to 0.30	100°F - 0.25
Density	6 and 9 lb per cu ft	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.	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	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3" PF617 (9-lb density), 1/2" through 2 1/4".	Length - 36" Width - 6" or 12" Thickness - 3/4", 1", 1 1/4", 1 1/2", and 2".

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.

	Fiberglas PF615 or 617 Insulation Owens-Corning Corp	Fiberglas Block Insulat. Owens-Corning Corp
	Armoglas PF Insulation Armstrong C&S Corp	Armoglas Block Insulation Armstrong C&S Corp
	Spintex No. 414 or 415 Johns-Manville Sales Corp	
	E-Z Ply Duct Insulation Baldwin-Ehret-Mill, Inc	

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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
Type 10				Rev April 1963
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 in Handling	Very good		Very good	
Dimensions	24" x 48" boards 3/4" to 2" thickness		24" x 48" boards 5/8" 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.				
* 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-Ehrst-Hill, Inc	
	E-Z Ply Duct Insu Baldwin-Ehrst-Hill, Inc			
	Fiberglass Board* Gustin-Bacon Mfg Co			



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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SM 100 M
Rev Nov 1962				Page 11
Code	113	114	115	
Material	See Code 112.81	Mineral wool (Black only)	Mineral wool - asphalt impregnated (black only)	
Material Description		Mineral slag wool	Mineral wool fibers homogeneously impregnated with an asphalt binder.	
Filler				
Binder		High temp binder	Asphalt	
Temperature Range		500°F to 1700°F	-200°F to 100°F	
K Factor		500°F - 0.45 max	100°F - 0.34 max	
Density		19.2 lb per cu ft		
Compressive Strength		12 lb per sq in.		
Manufacturing Process		Machine molded	Machine molded	
Resistance to Breakage in Handling		Good	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.				
		PV Supertemp Eagle-Picher		
		Mono-Block Baldwin-Ehret-Hill, Inc	Mineral Wool Board Armstrong C&S Corp	
		Armasemp Armstrong C&S Corp	Koldboard Baldwin-Ehret-Hill, Inc	
		M W Block M. H. Detrick Co		
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SN 100 M		OCTOBER 1954
Page 12		Rev June 1963
MATERIAL SPECIFICATION - SERIES 100		
Code	118	
Material	Urethane Foam Rigid	
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with Du Pont "Hylone" and polyester or polyether resins	
Filler		
Binder		
Temperature Range	-100°F to +150°F	
K Factor	0.17 max at 75°F	
Density	1 1/2 to 4 lb per cu ft	
Compressive Strength	Min 20 lb per sq in. at 10% deformation, measured parallel to the direction in which the foam rose during manufacture	
Manufacturing Process	Molded or cut from molded billets	
Resistance to Breakage in Handling	Excellent	
Dimensions	+ 1/16" - 0" on insulation ID, 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 1/8". Moist aging tests max 3.5% volume change; humid aging test max 5% volume change and max 20% compressive strength change in accordance with MIL-P-21929 (SHIPS). Nonburning in accordance with ASTM D 1692. 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.		
* Pipe covering only	U-200	
** Block only	Union Asbestos & Rubber Co	
	Zeroverl	
	National Gypsum	
	Thermal FR	
	Dow Chemical	

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OCTOBER 1954			
MATERIAL SPECIFICATION - SERIES 100			
Rev June 1963			
Page 13			
Code	120		
Material	Polystyrene		
Material Description	Preformed rigid cellular polystyrene block, pipe, and fitting insulation.		
Filler			
Binder			
Temperature Range	-100°F to +160°F		
K Factor	0.29 max at 75°F		
Density	1.7 to 2.3		
Compressive Strength	Min 20 lb per sq in. at 10% deformation		
Manufacturing Process	Cut from molded logs		
Resistance to Breakage in Handling	Excellent		
Dimensions	+ 1/16" - 0" on insulation ID, 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". No distortion or volume change, or loss of compressive strength after exposure at 160°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.		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Styrofoam 33		
	MMM Co, Houston, Texas		
	Styrofoam 33		
	Tufflite Plastics, Inc		

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M Page 1 of 13
		OCT 1954	
		REVISED JUNE 1963	
Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth asbestos fiber with bonding clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bonds are supplied at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as 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 sweat types.	85% Mag Philip Carey Mfg Co	Calasilite The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrer-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superex Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Mundat Cork Corp	
	85% Mag Mundat Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careytemp† Philip Carey Mfg Co	

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.



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MATERIAL SPECIFICATION - SERIES 100

Page 2

Rev April 1963

Code	104		106
Material	Inorganic silicates		Asbestos and diatomaceous earth molded
Material Description	Inorganic silices and asbestos fibers		Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler			
Binder			
Temperature Range	100°F to 1600°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 at 5% deformation		27 psi at 10% deformation - dry
Manufacturing Process			Formed and cased 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 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.			
* Available for field mixing to repair joints and seams. ** Max temp of Kaylo 20 is 1800°F. *** Min thickness available 1 1/2", also available in pipe covering on special order. * Pipe covering only.			Unibestos Pittsburgh Corning Corp
	Kaylo 20*** Owens-Corning Corp		

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev. Sept 1961				Page 3
Code	107	108	109	
Material	Asbestos sponge		Corrugated asbestos preshrunk	
Material Description	Asbestos sheets separated by finely ground sponged material bonded with adhesive strips.		Alternate layers of plain and corrugated asbestos sheets. Outer covering asbestos felt.	
Filler				
Binder				
Temperature Range	100°F to 700°F		100°F to 400°F	
K Factor	500°F - 0.60 max		200°F - 0.58 max	
Density	30 lb max			
Compressive Strength				
Manufacturing Process	Laminated - 38 to 42 layers per in. of thickness		3-ply laminate	
Resistance to Breakage in Handling	Very good		Good	
Dimensions	To Specification			
Other Qualifications	Must be a flexible product		Preshrunk	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
* Aircell -4-ply Excel -6-ply Caucel-8-ply			Preshrunk Asbestocel	
			Johns-Manville Sales Corp	
	Asbestos Sponge		Aircell *	
	Philip Carey Mfg Co		Philip Carey Mfg Co	
	Sponge Felt		K & M - Aircell	
	The Ruberoid Co		Keasbey & Mattison Co	
	Sponge Felt		B-H Aircell	
Baldwin-Ehret-Hill, Inc		Baldwin-Ehret-Hill, Inc		
Sponge Felt				
Smith and Kensler Corp				

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SM 100 M		OCTOBER 1954	
Page 4		Rev Sept 1961	
MATERIAL SPECIFICATION - SERIES 100			
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	100 lb per sq in. min	100 lb per sq in. min
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.			
	Cork Armstrong CAS Corp	Foamglas Pittsburgh Corning Corp	Foamglas Stev-Dry Pittsburgh Corning Corp
	Cork Mundet Cork Co		

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SM 100 M
Rev April 1960				Page 4.1
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	100 lb per sq in. min	100 lb per sq in. min		
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.				
	Foamglas Stay-Dry Pittsburgh Corning Corp	Foamglas Stay-Dry Pittsburgh Corning Corp		

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MATERIAL SPECIFICATION - SERIES 100

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SM 100 M		OCTOBER 1954	
Page 6		Rev April 1963	
MATERIAL SPECIFICATION - SERIES 100			
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" 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			
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		
	* Mono-Kover Baldwin-Ehrst-Hill, Inc		
	* Thermoglas Philip Carey Mfg Co		
	** Fiberglas Owens-Corning Corp		
	** Armaglas PF Pipe Insu Armstrong C&S Corp		
	* Micro-Lol.® 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		SN 100 M
Rev. March 1962				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				
Binder	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.				
	*Ultrafine Snap-on Gustin-Bacon Mfg Co	*Ultrafine Snap-on Gustin-Bacon Mfg Co		
	*Yone-Kover Baldwin-Ehret-Hill, Inc	*Yone-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co		
	*Fiberglas Owens-Corning Corp	*Fiberglas Owens-Corning Corp		
	*Armoglas PF Pipe Insu Armstrong C&S Corp	*Armoglas PF Pipe Insu 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		Rev April 1963
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 1000 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", 3/4", long and butt strips 4", 3/4", 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 cu ft min Type B - 6 lb per cu 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.		
	Ultrafine Snap-on (Type A) Gustin-Bacon Mfg Co Mono-Kover (Type A) Baldwin-Ehret-Mill, Inc Fiberglas (Type A and Type B) Owens-Corning Corp Armoglas PF Pipe Insulation (Type A and Type B) Armstrong C&S Corp Micro-Lok (Type A) Johns-Manville Sales Corp PPG Glass Fiber (Type A) Pittsburgh Plate Glass Co Superfine (Type A) The Rubenoid Co Thermoglas (Type A) Philip Carey Mfg Co	

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OCTOBER 1954

MATERIAL SPECIFICATION - SERIES 100

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Code	112.61	112.66
Material	Glass fiber	Glass fiber
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.	Short, coarse steam-blow glass fibers preformed in semi-rigid boards, sanded one side and cut into lagging sizes for ease of application to curved surfaces.
Filler		
Binder	Phenol-formaldehyde	Phenol-formaldehyde
Temperature Range	40°F to 350°F	40°F to 350°F
K Factor	100°F - 0.25 to 0.30	100°F - 0.25
Density	6 and 9 lb per cu ft	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.	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	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3", PF617 (9-lb density), 1/2" through 2 1/4".	Length - 36" Width - 6" or 12" Thickness - 3/4", 1", 1 1/4", 1 1/2", and 2".

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.

	Fiberglas PF615 or 617 Insulation Owens-Corning Corp	Fiberglas Block Insulat. Owens-Corning Corp
	Armoglas PF Insulation Armstrong C&S Corp	Armoglas Block Insulation Armstrong C&S Corp
	Spintex No. 414 or 415 Johns-Manville Sales Corp	
	E-Z Ply Duct Insulation Baldwin-Ehrer-Hill, Inc	
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SN 100 M		OCTOBER 1954	
MATERIAL SPECIFICATION - SERIES 100		Rev April 1963	
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 in 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.			
* 3-lb density. High-density outer layers.	Fiberglas Vapor Seal Duct Insu Owens-Corning Corp		Fiberglas Coated Duct Insu Owens-Corning Corp
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		Armaglas Coated Duct Insu Armstrong C&S Corp
	Spintex No. 414 VS 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 1954		MATERIAL SPECIFICATION - SERIES 100		SM 100 M
Rev Nov 1962				Page 17
Code	112	114	115	
Material	See Code 112.81	Mineral wool (Black only)	Mineral wool - asphalt impregnated (black only)	
Material Description		Mineral slag wool	Mineral wool fibers homogeneously impregnated with an asphalt binder.	
Filler				
Binder		High temp binder	Asphalt	
Temperature Range		500°F to 1700°F	-200°F to 100°F	
K Factor		500°F - 0.45 max	100°F - 0.34 max	
Density		19.2 lb per cu ft		
Compressive Strength		12 lb per sq in.		
Manufacturing Process		Machine molded	Machine molded	
Resistance to Breakage in Handling		Good	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.				
		PV Supertemp Eagle-Picher		
		Mono-Block Baldwin-Ehrer-Hill, Inc	Mineral Wool Board Armstrong C&S Corp	
		Armatemp Armstrong C&S Corp	Koldboard Baldwin-Ehrer-Hill, Inc	
		M V Block M. H. Detrick Co		

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SN 100 M		OCTOBER 1954	
Page 12		Rev July 1963	
MATERIAL SPECIFICATION - SERIES 100			
Code	118 *		
Material	Urethane Foam Rigid		
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with Du Pont "Hylene" and polyester or polyether resins		
Filler			
Binder			
Temperature Range	-100°F to +150°F		
K Factor	0.17 max at 75°F		
Density	1 1/2 to 4 lb per cu ft		
Compressive Strength	Min 20 lb per sq in. at 10% deformation, measured parallel to the direction in which the foam rose during manufacture		
Manufacturing Process	Molded or cut from molded billet		
Resistance to Breakage in Handling	Excellent		
Dimensions	+ 1/16" - 0" on insulation ID, 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 1/8". Moist aging tests max 3.5% volume change; humid aging test max 5% volume change and max 20% compressive strength change in accordance with MIL-P-21929 (SHIPS). Nonburning in accordance with ASTM D 1692. 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.			
* Vendors listed are rigid urethane foam billet manufacturers	U-200		
	Union Asbestos & Rubber Co		
	Zerocel		
	National Gypsum		
	Thurane FR		
	Dow Chemical		

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MATERIAL SPECIFICATION - SERIES 100

SM 100 M

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Code	120		
Material	Polystyrene		
Material Description	Preformed rigid cellular polystyrene block, pipe, and fitting insulation.		
Filler			
Binder			
Temperature Range	-100°F to +160°F		
K Factor	0.29 max at 75°F		
Density	1.7 to 2.3		
Compressive Strength	Min 20 lb per sq in. at 10% deformation		
Manufacturing Process	Cut from molded logs		
Resistance to Breakage in Handling	Excellent		
Dimensions	+ 1/16" - 0" on insulation ID, 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". No distortion or volume change, or loss of compressive strength after exposure at 160°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.		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Styrofoam 33		
	MMM Co, Houston, Texas		
	Styrofoam 33		
	Tufflite Plastics, Inc		

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MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED	SN 100 M Page 1 of 13
		OCT 1954	
		REVISED JUNE 1963	
Code	101*	102**	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Staple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with bonding clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.			
*Bonds are supplied at extra cost. Order must state "without bonds" if not required. For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as 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 sweat types.	85% Mag Philip Carey Mfg Co	Calasilite The Rubenoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrer-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J M Superex Johns-Manville Sales Corp
		Kaytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Mundt Clark Corp	
	85% Mag Mundt Clark Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Careytemp† Philip Carey Mfg Co	
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.			

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SM 100 M		OCTOBER 1954	
Page 2		Rev. Sept. 1963	
MATERIAL SPECIFICATION - SERIES 100			
Code	104		106
Material	Inorganic silicates		Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicas 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 1600°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 at 5% deformation		27 psi at 10%* deformation - dry
Manufacturing Process			Formed and comp. on mandrel. Pipe mech cut on dia
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.			
* Max temp of Kaylo 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.			Unabestos Pittsburgh Corning Corp
	Kaylo 20** Owens-Corning Corp		

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev Sept 1961				Page 3
Code	107	108	109	
Material	Asbestos sponge		Corrugated asbestos preshrunk	
Material Description	Asbestos sheets separated by finely ground sponged material bonded with adhesive strips.		Alternate layers of plain and corrugated asbestos sheets. Outer covering asbestos felt.	
Filler				
Binder				
Temperature Range	100°F to 700°F		100°F to 400°F	
K Factor	500°F - 0.60 max		200°F - 0.58 max	
Density	30 lb max			
Compressive Strength				
Manufacturing Process	Laminated - 38 to 42 layers per in. of thickness		3-ply laminate	
Resistance to Breakage in Handling	Very good		Good	
Dimensions	To Specification			
Other Qualifications	Must be a flexible product		Preshrunk	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.				
* Airecell -4-ply Excel -6-ply Cavocel-3-ply			Preshrunk Asbestocel	
	Asbestos Sponge		Airecell *	
	Philip Carey Mfg Co		Philip Carey Mfg Co	
	Sponge Felt		K & M - Airecell	
	The Ruberoid Co		Keasbey & Mattison Co	
	Sponge Felt		B-H Airecell	
	Baldwin-Ehret-Hill, Inc		Baldwin-Ehret-Hill, Inc	
Sponge Felt				
Smith and Kanzler Corp				

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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
Page 4				Rev. Sept. 1961
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	100 lb per sq in. min	100 lb per sq in. min	
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.				
	Cork Armstrong CAS Corp	Foamglas Pittsburgh Corning Corp	Foamglas Star-Dry Pittsburgh Corning Corp	
	Cork Munder Cork Co			



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MATERIAL SPECIFICATION - SERIES 100

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OCTOBER 1954				SN 100 M
Rev. June 1962				Page 5
MATERIAL SPECIFICATION - SERIES 100				
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 Size Thickness 1/2 thru 4 1/2, 1, 1 1/2 For butt-welding long-radius 90° and 45° elbows 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-Ehrer-Mill, Inc			
	* Thermoglas			
	Phillip Carey Mfg Co			
	* Fiberglass			
	Owens-Corning Corp			
	* Armaglas PF Pipe Insul			
	Armstrong C&S Corp			
	* Micro-Lok			
	Johns-Menville Sales Corp			
	* FIT-rise			
	Fibrous Glass Products, Inc, Hicksville, NY			
	Crestwood Ind Park, Mountair Top, Pa.			
	* Insul-Sure			
	Insul-Coustic Corp			
	* PPG Glass Fiber			
	Pine Plains Glass Co			
	* Superfins			
	The Ruberoid Co			

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SN 100 M		MATERIAL SPECIFICATION - SERIES 100		OCTOBER 1954
Page 6				Rev April 1963
Code	112.11	112.12		
Material	Glass fiber	See 112.11		
Material Description	Textile type fine glass fiber banded 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" 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				
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			
	* Mono-Kover Baldwin-Ehrer-Hill, Inc			
	* Thermaglas Philip Carey Mfg Co			
	* Fiberglas Owens-Corning Corp			
	* Armaglas PF Pipe Insu Armstrong C&S Corp			
	* Micro-Lol Johns-Manville Sales Corp			
	* PPC Glass Fiber Pitts Plate Glass Co			
	* Superfine The Ruberoid Co			

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev March 1962				Page 7
Code	112.16	112.17		
Material	Glass fiber	Glass fiber		
Material Description	Textile type fine glass fiber banded pipe insulation with 4-oz factory-applied canvas finish.	Textile type fine glass fiber banded pipe insulation with 8-oz factory-applied canvas finish.		
Filler				
Binder	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.				
	*Ultrafine Snap-on Gustin-Bacon Mfg Co	*Ultrafine Snap-on Gustin-Bacon Mfg Co		
	*Mono-Kover Baldwin-Ehrst-Hill, Inc	*Mono-Kover Baldwin-Ehrst-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp		
	**Armoglas PF Pipe Insu Armstrong C&S Corp	**Armoglas PF Pipe Insu Armstrong C&S Corp		
	*Micro-Lok Johns-Manville Sales Corp	*Micro-Lok Johns-Manville Sales Corp		
	*PPG Glass Fiber Pima Plate Glass Co	*PPG Glass Fiber Pima Plate Glass Co		
	*Superfine The Ruberoid Co	*Superfine The Ruberoid Co		

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SM 100 M		OCTOBER 1954	
Page 2		Rev. April 1963	
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 cu ft min Type B - 6 lb per cu 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.			
	Ultrafine Snap-on (Type A) Guastin-Bacon Mfg Co		
	Mono-Kover (Type A) Baldwin-Ehren-Mill, Inc		
	Fiberglas (Type A and Type B) Quans-Corning Corp		
	Armoglas PF Pipe Insulation (Type A and Type B) Armstrong C&S Corp		
	Micro-Lok (Type A) Johns-Manville Sales Corp		
	PPG Glass Fiber (Type A) Pittsburgh Plate Glass Co		
	Superfine (Type A) The Ruberoid Co		
	Thermoglas (Type A) Philip Carey Mfg Co		

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OCTOBER 1954			
MATERIAL SPECIFICATION - SERIES 100			
Rev April 1963			
SN 100			
Page 1			
Code	112.61		112.66
Material	Glass fiber		Glass fiber
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		Short, coarse stream-bow glass fibers preformed - semirigid board, sanded one side and cut into lagging sizes for ease of application to curved surfaces.
Filler			
Binder	Phenol-formaldehyde		Phenol-formaldehyde
Temperature Range	40°F to 350°F		40°F to 350°F
K Factor	100°F - 0.25 to 0.30		100°F - 0.25
Density	6 and 9 lb per cu ft		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.		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	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3"; PF617 (9-lb density), 1/2" through 2 1/4".		Length - 36" Width - 6" or 12" Thickness - 3/4", 1", 1 1/4", 1 1/2", and 2".
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Fiberglas PF615 or 617 Insulation		Fiberglas Block Insulation
	Owens-Corning Corp		Owens-Corning Corp
	Armoglas PF Insulation		Armoglas Block Insulation
	Armstrong C&S Corp		Armstrong C&S Corp
	Spintex No. 614 or 615		
	Johns-Manville Sales Corp		
	E-Z Ply Duct Insulation		
	Baldwin-Ehret-Hill, Inc		
		702	

DUP 0991140

SN 100 M		OCTOBER 1954	
MATERIAL SPECIFICATION - SERIES 100		Rev April 1962	
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 in 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.			
* 3-lb density. High-density outer layers.	Fiberglas Vapor Seal Duct Insu Owens-Corning Corp		Fiberglas 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. 414 VS 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		
			703

DUP 0991141

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OCTOBER 1954		MATERIAL SPECIFICATION - SERIES 100		SN 100 M
Rev. Nov. 1962				Page 11
Code	112	114	115	
Material	See Code 112.81	Mineral wool (Block only)	Mineral wool - asphalt impregnated (block only)	
Material Description		Mineral slag wool	Mineral wool fibers homogeneously impregnated with an asphalt binder.	
Filler				
Binder		High temp binder	Asphalt	
Temperature Range		500°F to 1700°F	-200°F to 100°F	
K Factor		500°F - 0.45 max	100°F - 0.34 max	
Density		19.2 lb per cu ft		
Compressive Strength		12 lb per sq in.		
Manufacturing Process		Machine molded	Machine molded	
Resistance to Breakage in Handling		Good	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.				
		PV Supertemp Eagle-Picher		
		Non-Block Baldwin-Ehret-Hill, Inc	Mineral Wool Board Armstrong C&S Corp	
		Armstrong Armstrong C&S Corp	Koldboard Baldwin-Ehret-Hill, Inc	
		M W Block M. H. Derrick Co		

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SN 100 M		OCTOBER 1954
MATERIAL SPECIFICATION - SERIES 100		
Page 12	Rev July 1963	
Code	118 *	
Material	Urethane Foam Rigid	
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with Du Pont "Mylene" and polyester or polyether resins	
Filler		
Binder		
Temperature Range	-100°F to +150°F	
K Factor	0.17 max at 75°F	
Density	1 1/2 to 4 lb per cu ft	
Compressive Strength	Min 20 lb per sq in. at 10% deformation, measured parallel to the direction in which the foam rose during manufacture	
Manufacturing Process	Molded or cut from molded billet	
Resistance to Breakage in Handling	Excellent	
Dimensions	+ 1/16" - 0" on insulation ID, 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 1/8". Meet aging tests max 3.5% volume change; humid aging test max 5% volume change and max 20% compressive strength change in accordance with MIL-P-21929 (SHIPS). Nonburning in accordance with ASTM D 1692. 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.		
* Vendors listed are rigid urethane foam billet manufacturers	U-200	
	Union Asbestos & Rubber Co	
	Zerocel	
	National Gypsum	
	Thurane FR	
	Dow Chemical	

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OCTOBER 1954

MATERIAL SPECIFICATION - SERIES 100

SN 100 M

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Page 13

Code	120		
Material	Polystyrene		
Material Description	Preformed rigid cellular polystyrene block, pipe, and fitting insulation.		
Filler			
Binder			
Temperature Range	-100°F to +160°F		
K Factor	0.29 max at 75°F		
Density	1.7 to 2.3		
Compressive Strength	Min 20 lb per sq in. at 10% deformation		
Manufacturing Process	Cut from molded logs		
Resistance to Breakage in Handling	Excellent		
Dimensions	+1/16" - 0" on insulation ID, 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 1/8". No distortion or volume change, or loss of compressive strength after exposure at 160°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.		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Styrofoam 33		
	MMM Co, Houston, Texas		
	Styrofoam 33		
	Tufflite Plastics, Inc		

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BUT ANYONE WHO KNOWS THE COMPANY AND SOME OF ITS PRODUCTS WILL PROBABLY AGREE WITH US WHEN WE SAY THAT IT DOES NOT GET AVERAGE BUT AN ABOVE-AND-BEYOND THIS IS IMPROVED STILLS

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DUP 0990521

12-309

048548

Code	104	106
Material	Inorganic silicates	Asbestos and diatomaceous earth molded
Material Description	Inorganic silicates and asbestos fibers	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating*
Filler		
Binder		
Temperature Range	100°F to 1600°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 at 5% deformation	27 psi at 10% deformation - dry
Manufacturing Process		Formed and cased 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.		
* Available for field mixing to repair joints and seams.	Keyle 20*** Owens-Corning Corp	Unibestos Pittsburgh Corning Corp
** Max temp of Keyle 20 is 1800°F.		
*** Min thickness available 1 1/2", also available in pipe covering on special order.		
* Pipe covering only.		



MATERIALS		THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION	
MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE		ISSUED OCT 1954 REVISED JUNE 1963	SN 100 M Page 1 of 13
Code	101*	102*	103
Material -	85% Magnesite	Calcium silicate	Diatomaceous ear
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Steeple, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with or clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-in. canvas cover. Material should be specified "without 2-in. canvas" to avoid extra charge. **Non Standard 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 flange types.	85% Mag Philip Carey Mfg Co	Calcilite The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrer-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J.M. Saperes Johns-Manville Sales Corp
		Keytherm Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
	Featherweight Keesbey & Morrison Co	Triadite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Calcemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caretemp† Philip Carey Mfg Co	
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.			

SPECIFICATION NO. 13

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DUP 0990523

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MATERIAL SPECIFICATION - SERIES 100

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Code	104		106
Material	Inorganic silicates		Asbestos fiber and sodium silicate molded
Material Description	Inorganic silicas 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 1600°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 at 5% deformation		27 psi at 10% deformation - dry
Manufacturing Process			Formed and cured 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.			
* Max temp of Kayle 20 is 1800°F. ** Min thickness available 1 1/2", also available in pipe covering on special order. • Pipe covering only.			Unabestos Pittsburgh Corning Corp
	Kayle 20**		
	Owens-Corning Corp		

REV. SEC. 1963

DUP 0990524

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MATERIALS

**MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE**

**THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION**

ISSUED

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SN 100 M

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Code	101*	102*	103
Material	85% Magnesia	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with sand clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min or 5% deformation	
Manufacturing Process	Machine molded or extru. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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.

*Bonds are supplied at extra cost. Order must state "without bonds" if not required.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
For 11" IPS and larger there is an additional charge for 2-as canvas cover. Material should be specified "without 2-as canvas" to avoid extra charge.	Thermalite 85% Baldwin-Ehrer-Hill, Inc	Kaylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Hill, Inc
**New Simplified Dimensional System sponsored by ASTM	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	1/4 Superas Johns-Manville Sales Corp
***Fiber Board Paper Products Corp		Keychem Keesbey & Morrison Co	High Temp Keesbey & Morrison Co
*Codes 104 and 106 are acceptable alternatives unless noted on the Product Specifications.	Featherweight Keesbey & Morrison Co	Tricalite Mundt Clark Corp	
†Fittings available in screwed, welded, and steel types.	85% Mag Mundt Clark Corp	Calcamp Pabco Ind Ins Div ***	
	Pressure-molded Pabco Ind Ins Div ***	Coretemp† Philip Carey Mfg Co	

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.

SPECIFICATION NO. 15



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DUP 0990525

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NOTE -

MATERIALS

**MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE**

**THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION**

ISSUED

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SN 100 M

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Code	101*	102*	103
Material	85% Magnesite	Calcium silicate	Diatomaceous earth
Material Description	Hydrated basic magnesium carbonate 80% by weight minimum	Stable, cellular, calcined fire clay base	Diatomaceous earth, asbestos fiber, with or without clay and cementing materials
Filler	Asbestos or glass fiber		
Binder	Clay or other cementing materials 5% by weight		
Temperature Range	100°F to 500°F	100°F to 1200°F	500°F to 1800°F
K Factor	200°F - 0.4, 500°F - 0.5	500°F - 0.54 max	500°F - 0.77 max
Density	11-14 lb per cu ft	11 lb per cu ft	24-27 lb per cu ft
Compressive Strength		65 lb per sq in. min at 5% deformation	
Manufacturing Process	Machine molded or extruded. Pipe mach cut on diameter	Machine extruded. Pipe mach cut on diameter	Machine molded. 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 **	ASTM **	To Specification
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-in convex cover. Material should be specified "without 2-in convex" 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. ‡ Findings available in sawed, welded, and sweat types.	85% Mag Philip Carey Mfg Co	Calcisil The Ruberoid Co	High Temp No. 19 Philip Carey Mfg Co
	Thermalite 85% Baldwin-Ehrer-Hill, Inc	Keylo Owens-Corning Corp	Enduro Hi-Temp Baldwin-Ehrer-Hill, Inc
	85% Mag Johns-Manville Sales Corp	Thermobestos Johns-Manville Sales Corp	J/M Superes Johns-Manville Sales Corp
		Keytherm Keesbey & Mattison Co	High Temp Keesbey & Mattison Co
	Featherweight Keesbey & Mattison Co	Tricalite Mundt Cork Corp	
	85% Mag Mundt Cork Corp	Caltemp Pabco Ind Ins Div ***	
	Precision-molded Pabco Ind Ins Div ***	Caretemp† Philip Carey Mfg Co	

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