PLAINTIFF'S EXHIBIT DUP-617

CONFIDENTIAL

REV. APR 1957 SUP. BY

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954

REVISED JULY 1956

SN 100 M

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	500°F – 0.55 max.	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			
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	Good	Good	Good
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.	*85% Mag.* Philip Carey Mfg. Co.	*Calcilite* The Ruberoid Co.	*High Temp. No. 19* Philip Carey Mfg. Co.
	Thermalite 85% Ehret Mag. Mfg. Co., Inc.	*Kaylo* Owens-Illinois Glass Co.	*Enduro Hi-Temp* Ehret Mag. Mfg. Co., Inc.
	85% Mag. Johns-Manville Sales Corp.	*Caltherm* Pabco Products, Inc.	*J/M Superex* Johns-Manville Sales Corp.
		Thermobestos Johns-Manville Sales Corp.	*High Temp.* Keasby & Mattison Co.
	Featherweight Keasby & Mattison Co.	*Kaytherm* Keasby & Mattison Co.	
	85% Mag. Mundet Cork Corp.	*Tricalite* Mundet Cork Corp.	
** New Simplified Dimensional System sponsored by ASTM	*Precision-molded* Pabco Products, Inc.		

DUP 0960673

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 28

DU 040865

MATERIAL SPECIFICATION – SERIES 100

Code		105	106
Material		Asbestos molded	Asbestos and diatomaceous earth molded
Material Description		Compressed fluffy asbestos sprayed with sodium silicate	Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat
Filler			
Binder			
Temperature Range		100°F to 700°F	700°F to 1000°F
K Factor		500°F – 0.56 max.	500°F – 0.58 max.
Density		14 lbs. per cu. ft.	14 lbs. per cu. ft.
Compressive Strength			
Manufacturing Process		Formed and comp. on mandril. Pipe mach. cut on die.	Formed and comp. on mandril. Pipe mach. cut on die.
Resistance to Breakage in Handling		Good	Good
Dimensions			
Other Qualifications		Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.	Formed on a mandril to a predetermined wt. Pressed to obtain the desired density, and baked.

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

	Unibestos 750 Union Asbestos & Rubber Co.	*Unibestos 1200* Union Asbestos & Rubber Co.
	Armabestos A7 Armstrong Cork Co.	*Armabestos A12* Armstrong Cork Co.

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REV.

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DUP 0960674

DU 040866

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115

OCTOBER 1954
Rev. April 1956

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 thick.		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	*Asbestos Sponge* Johns-Manville Sales Corp.		*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* Keasby & Mattison Co.
	Sponge Felt Ehret Mag. Mfg. Co., Inc.		*B-H Aircell* Baldwin-Hill Co.
	Sponge Felt Std. Asbestos Mfg. Co.		

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DUP 0960675

DU 040867

MATERIAL SPECIFICATION – SERIES 100

Code	110	111	112
Material	Vegetable cork	Cellular glass	Glass fiber
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.	See codes 112.01 through 112.81
Filler			
Binder	Natural resin in cork		
Temperature Range	–200°F to 100°F	–200°F to 100°F (+300°F for duct temp.)	
K Factor	100°F – 0.29 max.	100°F – 0.43 max.	
Density		10 – 11 lb. per cu. ft.	
Compressive Strength	15 lb. per sq. in. min.	35 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 Cork Co.	*Foamglas* Pittsburgh Corning Corp.	
Cork Mundet Cork Co.		

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DUP 0960676

DU 040868

219

OCTOBER 1954
Rev. Sept.-1956

MATERIAL SPECIFICATION - SERIES 100

SN 100 M
Page 5

Code	112.01	112.02	
Material	Glass fiber	Glass fiber	
Material Description	Textile type fine glass fiber pipe insulation, plain, with medium-temperature binder.	Textile type fine glass fiber pipe insulation, plain, with high-temperature binder.	
Filler			
Binder	*Phenol-formaldehyde or **Di-Cy	Di-Cy	
Temperature Range	80°F to 350°F	80°F to 350°F	
K Factor	100°F - 0.25	100°F - 0.25	
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			
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.	*Fiberglas PF Pipe Insu. Owens-Corning Corp.	
*Monocover Baldwin-Hill	*Armaglas PF Pipe Insu. Armstrong Cork Co.	
*Thermoglas Philip Cary Mfg. Co.		
**Fiberglas PF Pipe Insu. Owens-Corning Corp.		
**Armaglas PF Pipe Insu. Armstrong Cork Co.		

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REV. SUP. BY

DUP 0960677

DU 040869

SN 100 M
Page 6

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954
Rev. Sept. 1956

220

Code	112.11	112.12	
Material	Glass fiber	Glass fiber	
Material Description	Textile type fine glass fiber bonded pipe insulation with 30-lb. factory-applied roofing felt finish. Sizes 6" OD insulation and below.	Textile type fine glass fiber bonded pipe insulation with 45-lb. factory-applied roofing felt finish. Sizes over 6" OD insulation.	
Filler			
Binder	*Phenol-formaldehyde or **Di-Cy	*Phenol-formaldehyde or **Di-Cy	
Temperature Range	80°F to 350°F	80°F to 350°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			
Manufacturing Process	Machine molded	Machine molded	
Resistance to Breakage in Handling	Very good	Very good	
Dimensions			
Other Qualifications	Specify whether for iron pipe or copper tubing 30 lb. felt used up to 6" OD of insulation	Specify whether for iron pipe or copper tubing 45 lb. felt used where OD of insulation is 6" or greater	
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.	
	*Monocover Baldwin-Hill	*Monocover Baldwin-Hill	
	*Thermoglas Philip Carey Mfg. Co.	*Thermoglas Philip Carey Mfg. Co.	
	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	
	**Armaglas PF Pipe Insu. Armstrong Cork Co.	**Armaglas PF Pipe Insu. Armstrong Cork Co.	

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REV. [illegible] SUP. 61

DUP 0960678

DU 040870

119

OCTOSER 1954
Rev. April 1956

MATERIAL SPECIFICATION - SERIES 100

SM 100 M
Page 7

Code	112.16	112.17	
Material	Glass fiber	Glass fiber	
Material Description	Textile type fine glass fiber bonded pipe insulation with 4-oz. factory-applied canvas finish.	Textile type fine glass fiber bonded pipe insulation with 8-oz. factory-applied canvas finish.	
Filler			
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			
Manufacturing Process	Machine molded	Machine molded	
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.	
	*Monocover Baldwin-Hill	*Monocover Baldwin-Hill	
	*Thermoglas Philip Carey Mfg. Co.	*Thermoglas Philip Carey Mfg. Co.	
	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	
	**Armaglas PF Pipe Insu. Armstrong Cork Co.	**Armaglas PF Pipe Insu. Armstrong Cork Co.	

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DUP 0960679

DU 040871

MATERIAL SPECIFICATION – SERIES 100

120

Code	112.21	112.22	
Material	Glass fiber	Glass fiber	
Material Description	Textile type fine glass fiber bonded pipe insulation with black factory-applied aluminum laminate vapor-barrier finish.	Textile type fine glass fiber bonded pipe insulation with white factory-applied aluminum laminate vapor-barrier finish.	
Filler			
Binder	*Phenol-formaldehyde or **Di-Cy	*Phenol-formaldehyde or **Di-Cy	
Temperature Range	40°F to 200°F	40°F to 200°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			
Manufacturing Process	Machine molded	Machine molded	
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.	
	*Monocover Baldwin-Hill	*Monocover Baldwin-Hill	
	*Thermoglas Philip Carey Mfg. Co.	*Thermoglas Philip Carey Mfg. Co.	
	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	**Fiberglas PF Pipe Insu. Owens-Corning Corp.	
	**Armaglas PF Pipe Insu. Armstrong Cork Co.	**Armaglas PF Pipe Insu. Armstrong Cork Co.	

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DU 040872

Code	112.61		112.66
Material	Glass fiber		Glass fiber
Material Description	Textile type fine glass fiber bonded board insulation.		Textile type fine glass fiber insulation cut to lagging sizes and sanded on one side to form insulation blocks.
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	2½ to 9 lb. per cu. ft.*		9 lb. per cu. ft.
Compressive Strength			
Manufacturing Process	Machine molded		Machine molded
Resistance to Breakage in Handling	Very good		Very good
Dimensions	Std. 24" x 48"		Length – 36" Width – 6" or 12"
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.

*Density must be specified.	*Fiberglas PF Insulation* Owens-Corning Corp.		*Fiberglas PF 600 Insulation* Owens-Corning Corp.
	Armaglas PF Insulation Armstrong Cork Co.		*Armaglas PF600 Insulation* Armstrong Cork Co.

CONFIDENTIAL

SN 100 M

Page 10

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

Rev. April 1956

168

Code	112.71		112.81
Material	Glass fiber		Glass fiber
Material Description	Textile type fine glass fiber bonded board insulation with asphalt and kraft paper vapor-barrier finish.		Textile type fine glass fiber bonded acoustical board with fire-resistant coating.
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	6 lb. per cu. ft.		6 lb. per cu. ft.
Compressive Strength			
Manufacturing Process	Machine molded		Machine molded
Resistance to Breakage Handling	Very good		Very good
Dimensions	24" x 48" boards 3/4" to 2" thickness		24" x 48" boards 5/8" to 2" thickness
Other Qualifications			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.

Fiberglas Vapor Seal Duct Insu. Owens-Corning Corp.		*Fiberglas Coated Duct Insu.* Owens-Corning Corp.
Armaglas Vapor Seal Duct Insu. Armstrong Cork Co.		*Armaglas Coated Duct Insu.* Armstrong Cork Co.

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DUP 0960682

DU 040874

207

OCTOBER 1954 — SN 100 M

Rev. June 1956 — MATERIAL SPECIFICATION - SERIES 100 — Page 11

Code	113	114	115
Material	Glass fiber – neoprene coated	Mineral wool (Block only)	Mineral wool – asphalt impregnated
Material Description	Glass fiber coated with factory-applied neoprene finish.	Mineral slag wool	Mineral wool fibers homogeneously impregnated with an asphalt binder.
Filler			
Binder	Phenolic resin	High temp. binder	Asphalt
Temperature Range	40°F to 175°F	500°F to 1700°F	-200°F to 100°F
K Factor	75°F – 0.24	500°F – 0.45 max.	100°F – 0.34 max.
Density	6 lbs.	19.2 lb. per cu. ft.	
Compressive Strength		12 lb. per sq. in.	
Manufacturing Process	Machine molded	Machine molded	Machine molded
Resistance to Breakage in Handling	Very good	Good	Good
Dimensions	Std. 2 ft. x 4 ft.		
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.

Fiberglas Owens-Corning Co.	*PV Supersemp* Eagle-Picher	*Rock Cork* Johns-Manville Sales Corp.
	Mono-Block Baldwin Hill Co.	*Mineral Wool Board* Armstrong Cork Co.
	Armasemp Armstrong Cork Co.	*Koldboard* Baldwin Hill Co.
	W W Block M. H. Detrick Co.	

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DUP 0960683

DU 040875

MATERIAL SPECIFICATION - SERIES 100

F38

Code			116
Material			Flexible foamed plastic
Material Description			Flexible aerated resin with a closed cellular structure. Pipe and tubing only.
Filler			
Binder			
Temperature Range			32°F to 200°F
K Factor			0.28 at 75°F
Density			
Compressive Strength			
Manufacturing Process			Medium molded
Resistance to breakage in handling			Nonbreakable
Dimensions			
Other Qualifications			Chemically inert and nontoxic

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

CONFIDENTIAL			*Armaflex* Armstrong Cork Co.

DUP 0960684

DU 040876