PLAINTIFF'S EXHIBIT
DUP-104J

215

MATERIALS

MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATIONS

ISSUED OCT 1954
REVISED JAN 1965

SN 100 M
Page 1 of 13

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate-inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN30	See SN30	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the 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-ea canvas cover. Material should be specified "without 2-ea canvas" to avoid extra charge. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in canvased, molded, and sweat types.	*Calolite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a gray material with longitudinal corrosion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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.

REV. 1965 SUP. 6Y

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DUP 0990069

080894

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max.	400°F - 0.54 max 600°F - 0.63 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1½", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 20* Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

DUP 0990070

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954 | REVISED OCT 1965 | SN 100 M | Page 1 of 13

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2° or greater in drop test per ASTM C 487.		
Dimensions	See SN30	See SN30	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation. Molded mangoose fitting covers are available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Calsamp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		DUP 0990071
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal corrosion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curing marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "2" in the lower left-hand corner of the label will contain acceptable material.

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 igniting the use of this specification.

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1 1/2", also available in slab covering on special order ◊ Pipe covering only	Kaylo 20* Owens-Corning Corp	Calsbestos Pittsburgh Corning Corp	

DUP 0990072

d-E-37-C

113

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954 | REVISED OCT 1965 | SN 100 M | Page 1 of 13

Code -	102* ♦	102.1*
Material	Calcium silicate	Calcium silicate-inhibited
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers
Temperature Range	1200°F max	1200°F max
K Factor	500°F - 0.60 max	500°F - 0.60 max
Density	14 lb per cu ft max	14 lb per cu ft max
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.	
Dimensions	See SN3D	See SN3D
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ♦ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation. Molded two-piece fitting covers are available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc
	Kaylo Owens-Corning Corp	
	Thermobestos Johns-Manville Sales Corp	
	Calsmp Fiberboard Paper Products Corp	
	Careytemp † Philip Carey Mfg Co	
	Thermasil ** Baldwin-Ehret-Hill, Inc	

** Thermasil is a grey material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curing marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "2" in the lower left-hand corner of the label will contain acceptable materials.

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. 25

DUP 0990142

868187

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max.	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1 1/2", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 20* * Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

DUP 0990143

2-B-37-P

215

MATERIALS

MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICAT

ISSUED OCT 1954
REVISED JAN 1965

SN 100 M

Code	102* ♦	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the 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. ♦ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil*** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Carey temp † Philip Carey Mfg Co		
	*Thermasil*** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons ever labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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. 15

DU PONT

REV. OCT 1965 SUP. BY ____

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	1000°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and come 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1 1/2", also available in pipe covering on special order ◊ Pipe covering only	Kaylo 20* Owens-Corning Corp	Unibestos Pittsburgh Corning Corp	

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATIO

ISSUED OCT 1954

REVISED OCT 1965

SN 100 M

Page 1 of 13

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate-inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN30	See SN30	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are recognizable alternates unless noted on the Project Specifications. † Expanded Perlite insulation. Molded one-piece fitting covers are available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Calsimp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a gray material with longitudinal corrosion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curving marks. This material is recognizable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "3" in the lower left-hand corner of the label will contain recognizable material.

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.

SUPERSEDES SPEC. NO. 25

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DUP 0990255

R-1100

840288

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1 1/2", sizes available in sizes covering on special order ◊ Pipe covering only	*Kaylo 20* Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

d-E-37-P

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICAT

ISSUED OCT 1954

REVISED JAN 1965

SN 100 M

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 447.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that th 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-ea canvas cover. Material should be specified "without 2-ea canvas" to avoid extra charge. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and saver types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kevle Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a gray material with longitudinal corrosion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curing marks. This material is acceptable to Baldwin-Ehret-Hill insured contracts, nor is contracts over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" contains with a "B" in the lower left-hand corner of the label will contain acceptable material.

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. 20

REV. 0461 1965 SUP. BY

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848282

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
Material Description	Inorganic silices and asbestos fibers	Compressed fluffy amesite 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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation - dry	
Manufacturing Process		Formed and camp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1½", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 30* * Owens-Corning Corp	*Calsbestos* Pittsburgh Corning Corp	

d-E-37-C

113

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICA

ISSUED OCT 1954

REVISED OCT 1965

SN 100 M

Page 1 of 13

Code	102* ◊	102.1*	
Material*	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2° or greater in drop test per ASTM C 487.		
Dimensions	See SN30	See SN30	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are interchangeable elsewhere unless noted on the Process Specifications. † Expanded Perlite insulation. Molded mineral fiber fitting covers are available in serrated, molded, and sweet types.	*Calsilite* ◊ The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Calsimp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal corrugation marks on block and pipe covering. The ends and no more than one edge of blocks and the edges and ends of pipe covering will show curving marks. This material is acceptable in Baldwin-Ehret-Hill granted contracts, nor in cartons ever labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" corrugation or "S" in the lower left-hand corner of the label will contain acceptable material.

Vendors and manufacturers 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.

SUPERSEDES NO. 19

R-209

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DUP 0990344

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and cure 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1 1/2", also available in pipe covering on special order ◊ Pipe covering only	*Kaylo 20* * Owens-Corning Corp	*Calsbestos* Pittsburgh Corning Corp	

A-E-37-P

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICA-

ISSUED OCT 1954

REVISED JAN 1965

SN 100 M

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 447.		
Dimensions	See SN30	See SN30	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the 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-ply canvas cover. Material should be specified "without 2-ply canvas" to avoid extra charge. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Calsimp Fiberboard Paper Products Corp		
	Carrytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal corrosion marks on block and pipe coverings. The ends are no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehrenhill printed cartons, not in cartons over labeled with a Baldwin-Ehrenhill sticker. Armstrong "L-K" cartons with a "B" in the lower lefthand corner of the label will contain acceptable material.

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

A-210

218

REV. MAY 1965 SUP. 6Y

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DUP 0990346

MATERIAL SPECIFICATION – SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block – 500°F – 0.58 max.	400°F – 0.54 max 600°F – 0.63 max	
Density	Block – 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation – dry	
Manufacturing Process		Formed and cemented 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-band specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1½", also available in pipe covering on special order ♦ Pipe covering only	Kaylo 20 * Owens-Corning Corp	L'asbestos Pittsburgh Corning Corp	

DU PONT

SUP. BY

DUP 0990347

888372

MATERIALS

MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

Issued OCT 1954
Revised OCT 1965

SN 100 M
Page 1 of 13

Code	102* ◊	102.1*
Material	Calcium silicate	Calcium silicate - inhibited
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers
Temperature Range	1200°F max	1200°F max
K Factor	500°F - 0.60 max	500°F - 0.60 max
Density	14 lb per cu ft max	14 lb per cu ft max
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.	
Dimensions	See SN3D	See SN3D
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure

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

	Calsilite The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc
	Kaylo Owens-Corning Corp	
	Thermobestos Johns-Manville Sales Corp	
	Caltemp Fiberboard Paper Products Corp	
	Careytemp † Philip Carey Mfg Co	
	Thermasil ** Baldwin-Ehret-Hill, Inc	

* 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.
◊ Codes 104 and 106 are asbestos alternates unless noted on the Project Specifications.
† Expanded Perlite insulation. Molded fiberglass fitting covers are available in screwed, welded, and sweat types.

** Thermasil is a grey material with longitudinal corrugation marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curing marks. This material is assembled in Baldwin-Ehret-Hill printed cartons, nor in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "2" in the lower left-hand corner of the label will contain acceptable material.

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. 15

DUP 0990428

R-257

MATERIAL SPECIFICATION - SERIES 100

OCTOBER 19[illegible]

Rev Jan 1965

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max.	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% † deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C. when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
*Minimum thickness available 1½", also available in pipe covering on special order †Pipe covering only	Kaylo 30* Owens-Corning Corp	Unibestos Pittsburgh Corning Corp	

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATIONS

ISSUED OCT 1954
REVISED JAN 1965

SN 100 M
Page 1 of 13

Code -	102* ◊	102.1*
Material	Calcium silicate	Calcium silicate - inhibited
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers
Temperature Range	1200°F max	1200°F max
K Factor	500°F - 0.60 max	500°F - 0.60 max
Density	14 lb per cu ft max	14 lb per cu ft max
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.	
Dimensions	See SN30	See SN30
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure

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

	Calmlite The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc
	Kaylo Owens-Corning Corp	
	Thermobestos Johns-Manville Sales Corp	
	Caltemp Fiberboard Paper Products Corp	
	Carrytemp † Philip Carey Mfg Co	
	Thermasil ** Baldwin-Ehret-Hill, Inc	

* 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-ply canvas cover. Material should be specified "without 2-ply canvas" to avoid extra charge.
◊ Codes 106 and 106 are acceptable alternates unless noted on the Project Specifications.
† Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.

** Thermasil is a grey material with longitudinal corrugation marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, nor in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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 imposing the use of this specification.

SUBCOMMITTEE NO. 28

R-258

648455

DUP 0990430

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REV. 0621 1965 SUP. BY

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
Material Description	Inorganic silices and asbestos fibers	Compressed fluffy amosite asbestos fiber sprayed with sodium silicate to form a mat containing a minimum of 20% sodium silicate by weight. Asbestos mat is then sprinkled with diatomaceous earth to provide an integral refractory coating	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max.	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C. when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1 1/2", else available in pipe covering on special order ◊ Pipe covering only	Kaylo 20* Owens-Corning Corp	Calsbestos Pittsburgh Corning Corp	

C-E-51-E

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954 | REVISED OCT 1965 | SN 100 M | Page 1 of 13

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate--inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

	Calsilite The Ruberoid Co	*Thermasil*** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Calsamp Fiberboard Paper Products Corp		
	Caretemp † Philip Carey Mfg Co		
	*Thermasil*** Baldwin-Ehret-Hill, Inc		

* Bands are supplied on curve cost. Order must state "without bands" if not required.
For 11" IPS and larger there is an additional charge for 2-ply canvas cover. Material should be specified "without 2-ply canvas" to avoid extra charges.
◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications.
† Expanded Perlite insulation. Molded two-piece fitting covers are available in screwed, welded, and sweat types.

** Thermasil is a grey material with longitudinal corrugation marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, nor in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "3" in the lower left-hand corner of the label will contain acceptable material.

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. 29

R-305

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DUP 0990513

848548

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ϕ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1 1/2", also available in slabs covering on special order ϕ Pipe covering only	Kaylo 20* Owens-Corning Corp	Unibestos Pittsburgh Corning Corp	

α-E-37-F

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MATERIALS

MATERIAL SPECIFICATION
SERIES 100
PREFORMED BLOCK AND PIPE

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATIONS

ISSUED OCT 1954
REVISED JAN 1965

SN 100 M
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Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2° or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that the 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-ea canvas cover. Material should be specified "without 2-ea canvas" to avoid extra charge. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calolite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Carytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal corrosion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show curing marks. This material is acceptable in Baldwin-Ehret-Hill painted cartons, not in cartons over labeled with a Baldwin-Ehret-Hill emblem. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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. 18

APPD

REV. 1965 SUP. 6Y

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R-306

848542

DUP 0990515

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the rest water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1 1/2", also available in pipe covering on special order ♦ Pipe covering only	Kaylo 20* Owens-Corning Corp	Unibestos Pittsburgh Corning Corp	

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954

REVISED JAN 1965

SN 100 M

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F - 0.60 max	500°F - 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, nor in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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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.

REV. ____ SUP. BY ____

090770

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Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1½", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 20** Owens-Corning Cera	*Unibestos* Pittsburgh Corning Cera	

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OCTOBER 1954
Rev Feb 1964

MATERIAL SPECIFICATION - SERIES 100

SN 100 M
Page 3

Code	110	111	111.1
Material	Vegetable cork	Cellular glass	Cellular glass
Material Description	Vegetable cork, granulated and compressed into cork-board or molded forms, from material of vegetable origin for low and medium temperature insulation.	Cellular glass foamed and fused into unicellular form.	Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive.
Filler			
Binder	Natural resin in cork		
Temperature Range	-200°F to 100°F	-200°F to 100°F (+300°F for dual temp.)	+35°F to +300°F
K Factor	100°F - 0.29 max	100°F - 0.43 max	100°F - 0.43 max
Density	9 - 11 lb per cu ft	10 - 11 lb per cu ft	9 lb per cu ft
Compressive Strength	15 lb per sq in. min	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation
Manufacturing Process	Machine comp. or molded. Baked at moderate temp		
Resistance to Breakage in Handling	Good		
Dimensions			
Other Qualifications	Pipe covering shall be coated on the outside with heavy mastic		

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

	Cork Armstrong C&S Corp	*Foamglas* Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp
	Cork Mundet Cork Co		

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

REV. JUN 1966

DUP 0991187

090773

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 ells and tees

Size	Thickness
1/2 thru 4	1/2, 1, 1 1/2

For butt-welding long-radius 90° and 45° ells

Size	Thickness
2 thru 6	1/2, 1
2 thru 12	1 1/2, 2

Available factory finished with Code 731 "Hypalon" mastic on request

* *Ultrafine Snap-on*
Gustin-Bacon Mfg Co

* *Mono-Kover*
Baldwin-Ehret-Hill, Inc

* *Thermoglas*
Philip Carey Mfg Co

** *Fiberglas*
Owens-Corning Corp

** *Armaglas PF Pipe Insn*
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-Coustic Corp
Maspeth 78, NY

* *PPG Glass Fiber*
Pitts Plate Glass Co

* *Superfine*
The Ruberoid Co

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		
	*Vono-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	Micro-Lok Johns-Manville Sales Corp		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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-Ehret-Hill, Inc	*Vono-Kover Baldwin-Ehret-Hill, Inc
	*Thermaglas Philip Carey Mfg Co	*Thermaglas Philip Carey Mfg Co
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp
	**Armaglas PF Pipe Insu Armstrong C&S Corp	**Armaglas 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

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 ap 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-Hill, Inc
	Fiberglas (Type A and Type B) Owens-Corning Corp
	Armaglas 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

Code	112.61		
Material	Glass fiber		
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		
Filler			
Binder	Phenol-formaldehyde		
Temperature Range	40°F to 350°F		
K Factor	100°F – 0.25 to 0.30		
Density	6 and 9 lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3". PF617 (9-lb density), 1/2" through 2 1/4".		

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

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

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Rev April 1963

MATERIAL SPECIFICATION – SERIES 100

Code	112.71		112.81
Material	Glass fiber		Glass fiber
Material Description	Bonded board insulation formed from fibrous glass or mineral fibers, with asphalt and kraft paper vapor-barrier finish.		Bonded acoustical board formed from fibrous glass or mineral fibers with a thin neoprene compound on one surface.
Filler			
Binder	Phenol-formaldehyde		Phenol-formaldehyde
Temperature Range	40°F to 150°F		40°F to 150°F
K Factor	100°F – 0.26		100°F – 0.26
Density	3 and 6 lb per cu ft		6 lb per cu ft
Compressive Strength			
Manufacturing Process	Machine molded		Machine molded
Resistance to Breakage 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
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		*Armaglas Coated Duct Insu* Armstrong C&S Corp
	Spintex No. 414VS Johns-Manville Sales Corp		*Coated Duct Insulation* Baldwin-Ehret-Hill, Inc
	E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc		
	*Fiberglass Board** Gustin-Bacon Mfg Co		

Code		114	
Material		Mineral wool (Block only)	
Material Description		Mineral slag wool	
Filler			
Binder		High temp binder	
Temperature Range		500°F to 1700°F	
K Factor		500°F – 0.45 max	
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	
Resistance to Breakage in Handling		Good	
Dimensions			
Other Qualifications			

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

	PV Supertemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	
	Armatemp Armstrong C&S Corp	
	M W Block M. H. Detrick Co	

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REV. SUP. BY

DUP 0991194

090780

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Code	118
Material	Urethane Foam, Rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent
Temperature Range	-270°F to +150°F
K Factor	0.17 max at 75°F
Density	1.7 to 2.5 lb per cu ft
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions
Manufacturing Process	Molded or cut from molded billet
Resistance to Breakage in Handling	Excellent
Dimensional Tolerances	Inside Diameter (In.)

Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD	IPS OD + 1/16
7 - 12	IPS OD	IPS OD + 1/8
14 and up	IPS OD + 1/16	IPS OD + 3/16

Outside Diameter (In.)

Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
7 - 12	IPS OD - 1/8	IPS OD
14 and up	IPS OD - 1/16	IPS OD + 1/16

All other dimensions to be ± 1/16" including straightness and squareness

Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225°F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 2% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days

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

U-200 Unarco Industries
Zerocel NB200 National Gypsum

DUP 0991195

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	

DUP 0991196

090782

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

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Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a gray material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower lefthand corner of the label will contain acceptable material.

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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DUPONT

DUP 0991197

090783

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MATERIAL SPECIFICATION - SERIES 100

Rev Jan 1965

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ◊ deformation - dry	
Manufacturing Process		Formed and comp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1½", also available in pipe covering on special order ◊ Pipe covering only	*Kaylo 20** Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

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DUP 0991198

090784

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MATERIAL SPECIFICATION - SERIES 100

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Code	110	111	111.1
Material	Vegetable cork	Cellular glass	Cellular glass
Material Description	Vegetable cork, granulated and compressed into corkboard or molded forms, from material of vegetable origin for low and medium temperature insulation.	Cellular glass foamed and fused into unicellular form.	Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive.
Filler			
Binder	Natural resin in cork		
Temperature Range	-200°F to 100°F	-200°F to 100°F (+300°F for dual temp)	+35°F to +300°F
K Factor	100°F - 0.29 max	100°F - 0.43 max	100°F - 0.43 max
Density	9 - 11 lb per cu ft	10 - 11 lb per cu ft	9 lb per cu ft
Compressive Strength	15 lb per sq in. min	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation
Manufacturing Process	Machine comp or molded. Baked at moderate temp		
Resistance to Breakage in Handling	Good		
Dimensions			
Other Qualifications	Pipe covering shall be coated on the outside with heavy mastic		

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

	110	111	111.1
	Cork Armstrong C&S Corp	*Foamglas* Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp
	Cork Mundet Cork Co		

JUN 1966

DUP 0991199

761

090785

MATERIAL SPECIFICATION – SERIES 100

124

Code	111.2	111.3	112
Material	Cellular glass	Cellular glass	Glass fiber
Material Description	Cellular glass foamed and fused into unicellular form. Factory applied jacket having 0.00035" aluminum foil outer jacket backed by kraft paper (60 lb per 3000 sq ft)	Cellular glass foamed and fused into unicellular form. Plain – without jacket.	See Codes 112.01 through 112.81.
Filler			
Binder			
Temperature Range	+35°F to +300°F	+35°F to +300°F	
K Factor			
Density	9 lb per cu ft	9 lb per cu ft	
Compressive Strength	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation	
Manufacturing Process			
Resistance to Breakage in Handling			
Dimensions			
Other Qualifications			

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

Foamglas Stay-Dry Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp	

REV. JUN 1966

DUP 0991200

090786

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 ells and tees

Size	Thickness
1/2 thru 4	1/2, 1, 1 1/2

For butt-welding long-radius 90° and 45° ells

Size	Thickness
2 thru 8	1/2, 1
2 thru 12	1 1/2, 2

Available factory finished with Code 731 "Hypalon" mastic on request

*Ultrafine Snap-on Gustin-Bacon Mfg Co		
*Mono-Kover Baldwin-Ehret-Hill, Inc		
*Thermoglas Philip Carey Mfg Co		
**Fiberglas Owens-Corning Corp		
**Armaglas PF Pipe Insn 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-Coustic Corp Mesopath 78, NY		
* PPG Glass Fiber Pitts Plate Glass Co		
* Superfine The Ruberoid Co		

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		
	*Vono-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	Micro-Lok Johns-Manville Sales Corp		
	*PPC Glass Fiber Pitts Plate Glass Co		
	* Superfine The Ruberoid Co		

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-Ehret-Hill, Inc	*Vono-Kover Baldwin-Ehret-Hill, Inc
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp
	**Armaglas PF Pipe Insu Armstrong C&S Corp	**Armaglas 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

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 creped 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 - 0.23, 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-Hill, Inc	
Fiberglas (Type A and Type B) Owens-Corning Corp	
Armaglas 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	

Code	112.61		
Material	Glass fiber		
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		
Filler			
Binder	Phenol-formaldehyde		
Temperature Range	40°F to 350°F		
K Factor	100°F – 0.25 to 0.30		
Density	6 and 9 lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3". PF617 (9-lb density), 1/2" through 2 1/4".		

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

	Fiberglas PF615 or 617 Insulation Owens-Corning Corp		
	Armaglas PF Insulation Armstrong C&S Corp		
	Spintex No. 614 or 615 Johns-Manville Sales Corp		
	E-Z Ply Duct Insulation Baldwin-Ehret-Hill, Inc		

SN 100 M

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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

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
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		*Armaglas Coated Duct Insu* Armstrong C&S Corp
	Spintex No. 414VS Johns-Manville Sales Corp		*Coated Duct Insulation* Baldwin-Ehret-Hill, Inc
	E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc		
	*Fiberglass Board** Gustin-Bacon Mfg Co		

DUP 0991206

090792

Code		114	
Material		Mineral wool (Block only)	
Material Description		Mineral slag wool	
Filler			
Binder		High temp binder	
Temperature Range		500°F to 1700°F	
K Factor		500°F - 0.45 max	
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	
Resistance to Breakage in Handling		Good	
Dimensions			
Other Qualifications			

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

	PV Supertemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	
	Armatemp Armstrong C&S Corp	
	M W Block M. H. Detrick Co	
	769	

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REV. [illegible] SUP. BY

DUP 0991207

090793

Code	118		
Material	Urethane Foam, Rigid		
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent		
Temperature Range	-270°F to +150°F		
K Factor	0.17 max at 75°F		
Density	1.7 to 2.5 lb per cu ft		
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions		
Manufacturing Process	Molded or cut from molded billet		
Resistance to Breakage in Handling	Excellent		
Dimensional Tolerances	Inside Diameter (In.)		
	Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
	1/2 - 6	IPS OD	IPS OD + 1/16
	7 - 12	IPS OD	IPS OD + 1/8
	14 and up	IPS OD + 1/16	IPS OD + 3/16
	Outside Diameter (In.)		
	Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
	1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
	7 - 12	IPS OD - 1/8	IPS OD
	14 and up	IPS OD - 1/16	IPS OD + 1/16
	All other dimensions to be ± 1/16" including straightness and squareness		
Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225°F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 2% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	U-200 Unarco Industries		
	Zerocel NB200 National Gypsum		
	Zerofoam Johns-Manville Sales Corp		
	Thurane FR Dow Chemical Co		
	770		

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		

DUP 0991209

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954

REVISED JAN 1965

SN 100 M

Code	102* ◊	102.1*
Material	Calcium silicate	Calcium silicate - inhibited
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers
Temperature Range	1200°F max	1200°F max
K Factor	500°F – 0.60 max	500°F – 0.60 max
Density	14 lb per cu ft max	14 lb per cu ft max
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.	
Dimensions	See SN3D	See SN3D
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation with fittings available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc
	Kaylo Owens-Corning Corp	
	Thermobestos Johns-Manville Sales Corp	
	Caltemp Fiberboard Paper Products Corp	
	Careytemp † Philip Carey Mfg Co	
	Thermasil ** Baldwin-Ehret-Hill, Inc	

** Thermasil is a gray material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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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.

898796

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1½", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 20** Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

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OCTOBER 1954 — MATERIAL SPECIFICATION – SERIES 100 — SN 100 M

Rev Feb 1964

Code	110	111	111.1
Material	Vegetable cork	Cellular glass	Cellular glass
Material Description	Vegetable cork, granulated and compressed into cork-board or molded forms, from material of vegetable origin for low and medium temperature insulation.	Cellular glass foamed and fused into unicellular form.	Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive.
Filler			
Binder	Natural resin in cork		
Temperature Range	–200°F to 100°F	–200°F to 100°F (+300°F for dual temp.)	+35°F to +300°F
K Factor	100°F – 0.29 max	100°F – 0.43 max	100°F – 0.43 max
Density	9 – 11 lb per cu ft	10 – 11 lb per cu ft	9 lb per cu ft
Compressive Strength	15 lb per sq in. min	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation
Manufacturing Process	Machine comp or molded. Baked at moderate temp		
Resistance to Breakage in Handling	Good		
Dimensions			
Other Qualifications	Pipe covering shall be coated on the outside with heavy mastic		

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

	Cork Armstrong C&S Corp	*Foamglas* Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp
	Cork Mundet Cork Co		
		774	

JUN 1966

DUP 0991212

090798

MATERIAL SPECIFICATION – SERIES 100

Code	111.2	111.3	112
Material	Cellular glass	Cellular glass	Glass fiber
Material Description	Cellular glass foamed and fused into unicellular form. Factory applied jacket having 0.00035" aluminum foil outer jacket backed by kraft paper (60 lb per 3000 sq ft)	Cellular glass foamed and fused into unicellular form. Plain – without jacket.	See Codes 112.01 through 112.81.
Filler			
Binder			
Temperature Range	+35°F to +300°F	+35°F to +300°F	
K Factor			
Density	9 lb per cu ft	9 lb per cu ft	
Compressive Strength	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation	
Manufacturing Process			
Resistance to Breakage in Handling			
Dimensions			
Other Qualifications			

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

Foamglas Stay-Dry Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp	

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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 ells and tees — Size: 1/2 thru 6 / 8; Thickness: 1/2, 1, 1 1/2 / 1 only. For butt-welding long-radius 90° and 45° ells — Size: 2 thru 6 / 2 thru 12; Thickness: 1/2, 1 / 1 1/2, 2. Available factory finished with Code 731 "Hypalon" mastic on request	*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 Insn Armstrong C&S Corp		
	*Micro-Lok Johns-Manville Sales Corp		
	*Insul-Sure Insul-Coustic Corp Maspeth 78, NY		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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REV. SEP 1967 SUP. BY

DUP 0991214

090800

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		
	*Vane-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	Micro-Lok Johns-Manville Sales Corp		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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-Ehret-Hill, Inc	*Mono-Kover Baldwin-Ehret-Hill, Inc	
	*Thermaglas Philip Carey Mfg Co	*Thermaglas Philip Carey Mfg Co	
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp	
	**Armaglas PF Pipe Insu Armstrong C&S Corp	**Armaglas 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	

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 1/6". Finish includes lap 2", ± 1/16", long and butt strips 4", ± 1/16", 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-Hill, Inc	
Fiberglas (Type A and Type B) Owens-Corning Corp	
Armaglas 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	

Code	112.61		
Material	Glass fiber		
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		
Filler			
Binder	Phenol-formaldehyde		
Temperature Range	40°F to 350°F		
K Factor	100°F - 0.25 to 0.30		
Density	6 and 9 lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3". PF617 (9-lb density), 1/2" through 2 1/4".		

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

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

SN 100 M

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MATERIAL SPECIFICATION – SERIES 100

OCTOBER 1954

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
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		*Armaglas Coated Duct Insu* Armstrong C&S Corp
	Spintex No. 414VS Johns-Manville Sales Corp		*Coated Duct Insulation* Baldwin-Ehret-Hill, Inc
	E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc		
	*Fiberglass Board** Gustin-Bacon Mfg Co		

Code		114	
Material		Mineral wool (Block only)	
Material Description		Mineral slag wool	
Filler			
Binder		High temp binder	
Temperature Range		500°F to 1700°F	
K Factor		500°F - 0.45 max	
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	
Resistance to Breakage in Handling		Good	
Dimensions			
Other Qualifications			

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

	PV Supertemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	
	Armatemp Armstrong C&S Corp	
	M F Block M. H. Detrick Co	

Code	118
Material	Urethane Foam, Rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent
Temperature Range	-270°F to +150°F
K Factor	0.17 max at 75°F
Density	1.7 to 2.5 lb per cu ft
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions
Manufacturing Process	Molded or cut from molded billet
Resistance to Breakage in Handling	Excellent
Dimensional Tolerances	Inside Diameter (In.)

Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD	IPS OD + 1/16
7 - 12	IPS OD	IPS OD + 1/8
14 and up	IPS OD + 1/16	IPS OD + 3/16

Outside Diameter (In.)

Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
7 - 12	IPS OD - 1/8	IPS OD
14 and up	IPS OD - 1/16	IPS OD + 1/16

All other dimensions to be ± 1/16" including straightness and squareness

Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225°F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 2% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days

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

	U-200 Unarco Industries
	Zerocel NB200 National Gypsum
	Zerofoam Johns-Manville Sales Corp
	Thurane FR Dow Chemical Co

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 $\pm 1/16"$ 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 $2" \times 2" \times 1"$ 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		

DUP 0991222

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MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
REVISED OCT 1965

SN 100 M
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Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation. Molded two-piece fitting covers are available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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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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DUP 0991223

090809

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. at 10% ♦ deformation - dry	
Manufacturing Process		Formed and camp 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

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

* Minimum thickness available 1 1/2", also available in pipe covering on special order ♦ Pipe covering only	*Kaylo 20** Owens-Corning Corp	*Unibestos* Pittsburgh Corning Corp	

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OCTOBER 1954 — MATERIAL SPECIFICATION – SERIES 100 — SN 100 M

Rev Feb 1964 — Page 3

Code	110	111	111.1
Material	Vegetable cork	Cellular glass	Cellular glass
Material Description	Vegetable cork, granulated and compressed into cork-board or molded forms, from material of vegetable origin for low and medium temperature insulation.	Cellular glass foamed and fused into unicellular form.	Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive.
Filler			
Binder	Natural resin in cork		
Temperature Range	–200°F to 100°F	–200°F to 100°F (+300°F for dual temp.)	+35°F to +300°F
K Factor	100°F – 0.29 max	100°F – 0.43 max	100°F – 0.43 max
Density	9 – 11 lb per cu ft	10 – 11 lb per cu ft	9 lb per cu ft
Compressive Strength	15 lb per sq in. min	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation
Manufacturing Process	Machine comp or molded. Baked at moderate temp		
Resistance to Breakage in Handling	Good		
Dimensions			
Other Qualifications	Pipe covering shall be coated on the outside with heavy mastic		

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

	Cork Armstrong C&S Corp	*Foamglas* Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp
	Cork Mundet Cork Co		
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DUP 0991225

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SN 100 M

OCTOBER 1954

Page 4

MATERIAL SPECIFICATION - SERIES 100

Rev Feb 1964

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Code	111.2	111.3	112
Material	Cellular glass	Cellular glass	Glass fiber
Material Description	Cellular glass foamed and fused into unicellular form. Factory applied jacket having 0.00035" aluminum foil outer jacket backed by kraft paper (60 lb per 3000 sq ft)	Cellular glass foamed and fused into unicellular form. Plain - without jacket.	See Codes 112.01 through 112.81.
Filler			
Binder			
Temperature Range	+35°F to +300°F	+35°F to +300°F	
K Factor			
Density	9 lb per cu ft	9 lb per cu ft	
Compressive Strength	30 lb per sq in. min at 5 percent deformation	30 lb per sq in. min at 5 percent deformation	
Manufacturing Process			
Resistance to Breakage in Handling			
Dimensions			
Other Qualifications			

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

	Foamglas Stay-Dry Pittsburgh Corning Corp	*Foamglas Stay-Dry* Pittsburgh Corning Corp	

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OCTOBER 1954 — SN 100 M

Rev March 1965 — MATERIAL SPECIFICATION - SERIES 100 — Page 5

Code	112.01	112.02	
Material	Glass fiber	See Code 112.01	
Material Description	Textile-type fine glass fiber pipe and fitting insulation, plain, with medium-temperature binder		
Filler			
Binder	Phenol-formaldehyde or Di-Cy		
Temperature Range	80°F to 350°F		
K Factor	100°F - 0.25		
Density	3* and 6** lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Other Qualifications	Specify whether for iron pipe or copper tubing		

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

* Fittings only as follows: For 125-lb cast iron screwed ells and tees Size — Thickness 1/2 thru 6 — 1/2, 1, 1 1/2 8 — 1 only For butt-welding long-radius 90° and 45° ells Size — Thickness 2 thru 6 — 1/2, 1 2 thru 12 — 1 1/2, 2 Available factory finished with Code 731 "Hypalon" mastic on request	*Ultrafine Snap-on Gustin-Bacon Mfg Co		
	*Nano-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	*Micro-Lok Johns-Manville Sales Corp		
	)Insul-Sure Insul-Caustic Corp Maspeth 78, NY		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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DUP 0991227

090813

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-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	Micro-Lok Johns-Manville Sales Corp		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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-Ehret-Hill, Inc	*Vono-Kover Baldwin-Ehret-Hill, Inc
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp
	**Armaglas PF Pipe Insu Armstrong C&S Corp	**Armaglas 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

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) Gustin-Bacon Mfg Co	
	Mono-Kover (Type A) Baldwin-Ehret-Hill, Inc	
	Fiberglas (Type A and Type B) Owens-Corning Corp	
	Armaglas 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	

Code	112.61		
Material	Glass fiber		
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		
Filler			
Binder	Phenol-formaldehyde		
Temperature Range	40°F to 350°F		
K Factor	100°F - 0.25 to 0.30		
Density	6 and 9 lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3", PF617 (9-lb density), 1/2" through 2 1/4".		

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

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

SN 100 M

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MATERIAL SPECIFICATION - SERIES 100

OCTOBER 1954

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
...stance 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
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		*Armaglas Coated Duct Insu* Armstrong C&S Corp
	Spintex No. 414VS Johns-Manville Sales Corp		*Coated Duct Insulation* Baldwin-Ehret-Hill, Inc
	E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc		
	*Fiberglass Board** Gustin-Bacon Mfg Co		

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Code		114	
Material		Mineral wool (Black only)	
Material Description		Mineral slag wool	
Filler			
Binder		High temp binder	
Temperature Range		500°F to 1700°F	
K Factor		500°F – 0.45 max	
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	
Resistance to Breakage in Handling		Good	
Dimensions			
Other Qualifications			

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

	PV Supersemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	
	Armasemp Armstrong C&S Corp	
	M W Block M. H. Detrick Co	
	795	

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DUP 091233

Code	118
Material	Urethane Foam, Rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent
Temperature Range	-270°F to +150°F
K Factor	0.17 max at 75°F
Density	1.7 to 2.5 lb per cu ft
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions
Manufacturing Process	Molded or cut from molded billet
Resistance to Breakage in Handling	Excellent
Dimensional Tolerances	Inside Diameter (In.)

Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD	IPS OD + 1/16
7 - 12	IPS OD	IPS OD + 1/8
14 and up	IPS OD + 1/16	IPS OD + 3/16

Outside Diameter (In.)

Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
7 - 12	IPS OD - 1/8	IPS OD
14 and up	IPS OD - 1/16	IPS OD + 1/16

All other dimensions to be ± 1/16" including straightness and squareness

Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225°F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days and then wiped with a wet cloth and weighed, with no delay between steps.

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 only as two-piece sectional fittings for 90-degree elbows and tees.	*U-200* Unarco Industries
	Zerocel NB 200 National Gypsum
	Thurane FR Dow Chemical Co
	Foamthane FR ♦ Pittsburgh-Corning

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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 or 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, then wiped with a wet cloth and weighed, with no delay between steps		

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 as two-piece sectional fittings for 90-degree elbows and tees	*Styrofoam Blue** MMM Co, Houston Texas		
	*Styrofoam Blue** Unicell Products, Inc		
	*Styrofoam Blue** Styro Fabricators, Inc		
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DUP 0991235

090821

MATERIALS

MATERIAL SPECIFICATION SERIES 100 PREFORMED BLOCK AND PIPE

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954

REVISED OCT 1965

SN 100 M

Code	102* ◊	102.1*	
Material	Calcium silicate	Calcium silicate - inhibited	
Material Description	Reacted hydrous calcium silicate reinforced with mineral fibers	Reacted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers	
Temperature Range	1200°F max	1200°F max	
K Factor	500°F – 0.60 max	500°F – 0.60 max	
Density	14 lb per cu ft max	14 lb per cu ft max	
Compressive Strength	60 lb per sq in. min at 5% deformation	60 lb per sq in. min at 5% deformation	
Manufacturing Process	Pan molded, precision molded, or filter press molded	Precision molded	
Resistance to Breakage in Handling	Block must average 2" or greater in drop test per ASTM C 487.		
Dimensions	See SN3D	See SN3D	
Other Qualifications		Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	

The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their 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. ◊ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. † Expanded Perlite insulation. Molded two-piece fitting covers are available in screwed, welded, and sweat types.	*Calsilite* The Ruberoid Co	*Thermasil* ** Baldwin-Ehret-Hill, Inc	
	Kaylo Owens-Corning Corp		
	Thermobestos Johns-Manville Sales Corp		
	Caltemp Fiberboard Paper Products Corp		
	Careytemp † Philip Carey Mfg Co		
	Thermasil ** Baldwin-Ehret-Hill, Inc		

** Thermasil is a grey material with longitudinal extrusion marks on block and pipe covering. The ends and no more than one edge of block and the edges and ends of pipe covering will show cutting marks. This material is acceptable in Baldwin-Ehret-Hill printed cartons, not in cartons over labeled with a Baldwin-Ehret-Hill sticker. Armstrong "L-K" cartons with a "B" in the lower left-hand corner of the label will contain acceptable material.

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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.

090822

MATERIAL SPECIFICATION - SERIES 100

Code	104	106	
Material	Inorganic silicates	Asbestos fiber and sodium silicate	
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	
Temperature Range	100°F to 1800°F	1200°F max	
K Factor	Block - 500°F - 0.58 max.	400°F - 0.54 max 600°F - 0.65 max	
Density	Block - 14 lb per cu ft	20 lb per cu ft max	
Compressive Strength	65 lb per sq in. min at 5% deformation	27 lb per sq in. 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.		
Other Qualifications	Good mechanical strength. Shrinkage less than 2% at 1600°F	Formed on a mandrel to a predetermined weight. Pressed to obtain the desired density, and baked. Stressed Type 304 stainless steel U-bend specimens at 100°C, when in contact with this insulating material in the Du Pont wick test with 1500 ppm chloride as NaCl in the test water, shall show no cracking at the end of 144 hours exposure	
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
* Minimum thickness available 1 1/2", else available in pipe covering on special order ◊ Pipe covering only	Kaylo 20* Owens-Corning Corp	Unibestos Pittsburgh Corning Corp	

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OCTOBER 1954 Rev June 1966	MATERIAL SPECIFICATION - SERIES 100		SN 100 M Page 1
Code	110	111	111.1
Material	See Codes 111, 118, or 120	Cellular glass	See Code 111
Material Description		Cellular glass foamed and fused into unicellular form	
Filler			
Binder			
Temperature Range		-200 F to 100 F (+300 F for dual temp)	
K Factor		100 F -0.43 max	
Density		10 - 11 lb per cu ft	
Compressive Strength		30 lb per sq in. min at 5 percent deformation	
Manufacturing Process			
Resistance to Breakage in Handling			
Dimensions			
Other Qualifications			

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

		Foamglas Pittsburgh Corning Corp	
		800	

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SN 100 M

OCTOBER 1954

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MATERIAL SPECIFICATION - SERIES 100

Rev June 1966

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Code	111.2	111.3	112
Material	See Code 111	See Code 111	Glass fiber
Material Description			See Codes 112.01 through 112.81
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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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 ells and tees

Size	Thickness
1/2 thru 6	1/2, 1, 1 1/2
8	1 only

For butt-welding long-radius 90° and 45° ells

Size	Thickness
2 thru 6	1/2, 1
2 thru 12	1 1/2, 2

Available factory finished with Code 731 "Hypalon" mastic on request

*Ultrafine Snap-on Gustin-Bacon Mfg Co		
*Mono-Kover Baldwin-Ehret-Hill, Inc		
*Thermoglas Philip Carey Mfg Co		
**Fiberglas Owens-Corning Corp		
**Armaglas PF Pipe Insn Armstrong C&S Corp		
*Micro-Lok Johns-Manville Sales Corp		
*Insul-Sure Insul-Caustic Corp Massapth 78, NY		
*PPG Glass Fiber Pitts Plate Glass Co		
*Superfine The Ruberoid Co		

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DUP 0991240

090826

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		
	*Vono-Kover Baldwin-Ehret-Hill, Inc		
	*Thermoglas Philip Carey Mfg Co		
	**Fiberglas Owens-Corning Corp		
	**Armaglas PF Pipe Insu Armstrong C&S Corp		
	Ultra-Lok Johns-Manville Sales Corp		
	*PPG Glass Fiber Pitts Plate Glass Co		
	*Superfine The Ruberoid Co		

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	
	*Mono-Kover Baldwin-Ehret-Hill, Inc	*Mono-Kover Baldwin-Ehret-Hill, Inc	
	*Thermoglas Philip Carey Mfg Co	*Thermoglas Philip Carey Mfg Co	
	**Fiberglas Owens-Corning Corp	**Fiberglas Owens-Corning Corp	
	**Armaglas PF Pipe Insu Armstrong C&S Corp	**Armaglas 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	

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 creped 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-Hill, Inc	
Fiberglas (Type A and Type B) Owens-Corning Corp	
Armaglas 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	
Thermaglas (Type A) Philip Carey Mfg Co	

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Code	112.61		
Material	Glass fiber		
Material Description	Plain semi-rigid board, formed from fibrous glass or mineral fibers.		
Filler			
Binder	Phenol-formaldehyde		
Temperature Range	40°F to 350°F		
K Factor	100°F – 0.25 to 0.30		
Density	6 and 9 lb per cu ft		
Compressive Strength	Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse.		
Resistance to Breakage in Handling	Very good		
Dimensions	Std 24" x 48" Thickness PF615 (6-lb density) 1/2" through 3". PF617 (9-lb density), 1/2" through 2 1/4".		
The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications.			
	Fiberglas PF615 or 617 Insulation Owens-Corning Corp		
	Armaglas PF Insulation Armstrong C&S Corp		
	Spintex No. 414 or 415 Johns-Manville Sales Corp		
	E-Z Ply Duct Insulation Baldwin-Ehret-Hill, Inc		

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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
	Armaglas Vapor Seal Duct Insu Armstrong C&S Corp		*Armaglas Coated Duct Insu* Armstrong C&S Corp
	Spintex No. 414VS Johns-Manville Sales Corp		*Coated Duct Insulation* Baldwin-Ehret-Hill, Inc
	E-Z Ply Duct Insu Baldwin-Ehret-Hill, Inc		
	*Fiberglass Board** Gustin-Bacon Mfg Co		
			507

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Code		114	
Material		Mineral wool (Block only)	
Material Description		Mineral slag wool	
Filler			
Binder		High temp binder	
Temperature Range		500°F to 1700°F	
K Factor		500°F - 0.45 max	
Density		19.2 lb per cu ft	
Compressive Strength		12 lb per sq in.	
Manufacturing Process		Machine molded	
Resistance to Breakage in Handling		Good	
Dimensions			
Other Qualifications			

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

	PV Supertemp Eagle-Picher	
	Mono-Block Baldwin-Ehret-Hill, Inc	
	Armatemp Armstrong C&S Corp	
	M W Block M. H. Derrick Co	

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Code	118
Material	Urethane Foam, Rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent
Temperature Range	-270°F to +150°F
K Factor	0.17 max at 75°F
Density	1.7 to 2.5 lb per cu ft
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions
Manufacturing Process	Molded or cut from molded billet.
Resistance to Breakage in Handling	Excellent
Dimensional Tolerances	Inside Diameter (In.)

Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD	IPS OD + 1/16
7 - 12	IPS OD	IPS OD + 1/8
14 and up	IPS OD + 1/16	IPS OD + 3/16

Outside Diameter (In.)

Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
7 - 12	IPS OD - 1/8	IPS OD
14 and up	IPS OD - 1/16	IPS OD + 1/16

All other dimensions to be ± 1/16" including straightness and squareness

Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225°F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days and then wiped with a wet cloth and weighed, with no delay between steps.

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 only as two-piece sectional fittings for 90-degree elbows and tees.

U-200
Unarco Industries

Zerocel NB 200
National Gypsum

Thurane FR
Dow Chemical Co

Foamthane FR ♦
Pittsburgh-Corning

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 or 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, then wiped with a wet cloth and weighed, with no delay between steps		

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 as two-piece sectional fittings for 90-degree elbows and tees	*Styrofoam Blue** MMM Co, Houston Texas		
	*Styrofoam Blue** Unicell Products, Inc		
	*Styrofoam Blue** Styro Fabricators, Inc		

Code	118
Material	Urethane Foam, Rigid
Material Description	Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with polyester or polyether resins with fluorocarbon blowing agent
Temperature Range	-270 F to +150 F
K Factor	0.17 max at 75 F
Density	1.7 to 2.5 lb per cu ft
Compressive Strength	Min 30 psi at 6.6% deformation, measured parallel to the direction in which the foam rose during manufacture or min 24 psi at 6.6% deformation in all directions
Manufacturing Process	Molded or cut from molded billet
Resistance to Breakage in Handling	Excellent
Dimensional Tolerances	**Inside Diameter (In.)**

Pipe Size of Insulation ID (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD	IPS OD + 1/16
7 - 12	IPS OD	IPS OD + 1/8
14 and up	IPS OD + 1/16	IPS OD + 3/16

Outside Diameter (In.)

Pipe Size of Insulation OD (In.)	Minimum Diameter (In.)	Maximum Diameter (In.)
1/2 - 6	IPS OD - 1/8	IPS OD - 1/16
7 - 12	IPS OD - 1/8	IPS OD
14 and up	IPS OD - 1/16	IPS OD + 1/16

All other dimensions to be ± 1/16" including straightness and squareness

Other Qualifications	Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging test: Block 1" square by 7" long, cut from near outer surface, on rests 6" apart with 70 gm weight having 1" square base in middle of span shall not distort block more than 1/16" in 1 hour at 225 F. Flame-spread rating per ASTM E 162 shall not exceed 60 when coated with PVA mastic 3/32" dry thickness reinforced by 10 x 10 mesh glass cloth, 10 lb per 100 sq yd. Water absorption max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days and then wiped with a wet cloth and weighed, with no delay between steps.

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 only as two-piece sectional fittings for 90-degree elbows and tees ♦♦ Available only as molded fitting covers. (Do not use water-base adhesives or finish with these covers)	*U-200* Unarco Industries
	Zerocel NB 200 National Gypsum
	Thurane FR Dow Chemical Co
	Foamthane FR ♦ Pittsburgh-Corning
	Yellow Jack ♦♦ Toyad Corp

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 or 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, then wiped with a wet cloth and weighed, with no delay between steps		

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 as two-piece sectional fittings for 90-degree elbows and tees	*Styrofoam Blue* * MMM Co, Houston Texas		
	Styrofoam Blue * Unicell Products, Inc		
	Styrofoam Blue * Styro Fabricators, Inc		

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