PLAINTIFF'S
*EXHIBIT*
DUP-625

91

MATERIALS

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

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

ISSUED OCT 1954
REVISED JUNE 1962

SN 100 M
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| Code | 101* | 102*♦ | 103 |
|---|---|---|---|
| Material | 85% Magnesia | Calcium silicate | Diatomaceous earth |
| Material Description | Hydrated basic magnesium carbonate 80% by weight minimum | Steole, cellular, calcined fire clay base | Diatomaceous earth, asbestos fiber, with bonding clay and cementing materials |
| Filler | Asbestos or glass fiber | | |
| Binder | Clay or other cementing materials 5% by weight | | |
| Temperature Range | 100°F to 500°F | 100°F to 1200°F | 500°F to 1800°F |
| K Factor | 200°F – 0.4, 500°F – 0.5 | 500°F – 0.54 max | 500°F – 0.77 max |
| Density | 11–14 lb per cu ft | 11 lb per cu ft | 24–27 lb per cu ft |
| Compressive Strength | | | |
| Manufacturing Process | Machine molded or extru. Pipe mach cut on diameter | Machine extruded. Pipe mach cut on diameter | Machine molded. Pipe mach cut on diameter |
| Resistance to Breakage in Handling | Block must average 3" or greater in drop test per ASTM C 487, tentative method of test for resistance to dropping of preformed block thermal insulation. | | |
| Dimensions | ASTM ** | ASTM ** | To Specification |
| Other Qualifications | | Good mechanical strength with low shrinkage | |

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

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|---|---|---|---|
| *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. | *85% Mag*<br>Philip Carey Mfg Co | *Celcilite*<br>The Ruberoid Co | *High Temp No. 19*<br>Philip Carey Mfg Co |
| | *Thermalite 85%*<br>Baldwin-Ehret-Hill, Inc | *Kaylo*<br>Owens-Corning Corp | *Endura Hi-Temp*<br>Baldwin-Ehret-Hill, Inc |
| | *85% Mag*<br>Johns-Manville Sales Corp | *Thermobestos*<br>Johns-Manville Sales Corp | *J/M Superex*<br>Johns-Manville Sales Corp |
| | | *Keytherm*<br>Keasbey & Mattison Co | *High Temp*<br>Keasbey & Mattison |
| **New Simplified Dimensional System sponsored by ASTM | *Featherweight*<br>Keasbey & Mattison Co | *Trialite*<br>Mundet Cork Corp | |
| ***Fiber Board Paper Products Corp | *85% Mag*<br>Mundet Cork Corp | *Caltemp*<br>Pabco Ind Ins Div*** | |
| ♦ Codes 104 and 106 are acceptable alternates unless noted on the Project Specifications. | *Precision-molded*<br>Pabco Ind Ins Div *** | *Careytemp*<br>Philip Carey Mfg Co | |
| | | | |

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

SUBCOMMITTEE NO. 25

DUP 0961026

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| Code | 104 | | 106 |
|---|---|---|---|
| Material | Inorganic silicates | | Asbestos and diatomaceous earth molded |
| Material Description | Inorganic silicas and asbestos fibers | | Compressed fluffy asbestos sprayed with sodium silicate and diatomaceous earth sprinkled on the asbestos mat. External finish consists of an integral refractory coating* |
| Filler | | | |
| Binder | | | |
| Temperature Range | 100°F to 1600°F** | | 200°F to 1200°F |
| K Factor | Block - 500°F - 0.58 max | | 500°F - 0.54 max |
| Density | Block - 14 lb per cu ft | | 18 lb per cu ft |
| Compressive Strength | 65 lb per sq in. min at 5% deformation | | 11 PSI at 5% 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. | | |
| Dimensions | | | |
| Other Qualifications | Good mechanical strength. Shrinkage less than 2% at 1600°F | | Formed on a mandrel to a predetermined wt. Pressed to obtain the desired density, and baked. |
| The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications. | | | |
| | | | *Unibestos* Union Asbestos & Rubber Co |
| | *Kaylo 20 Block* *** Owens-Corning Corp | | |
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* Available for field mixing to repair joints and seams.

** Max temp of *Kaylo 20* is 1800°F

*** Min thickness available 1 1/2"

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

OCTOBER 1954
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| Code | 110 | 111 | 111.1 |
|---|---|---|---|
| Material | Vegetable cork | Cellular glass | Cellular glass |
| Material Description | Vegetable cork, granulated and compressed into cork-board or molded forms, from material of vegetable origin for low and medium temperature insulation. | Cellular glass foamed and fused into unicellular form. | Cellular glass foamed and fused into unicellular form. Factory-applied jacket having white kraft paper outer jacket (60 lb per 3000 sq ft) backed by 0.00035" aluminum foil with fire-resistant adhesive. |
| Filler | | | |
| Binder | Natural resin in cork | | |
| Temperature Range | -200°F to 100°F | -200°F to 100°F (-300°F for dual temp) | +35°F to +300°F |
| K Factor | 100°F - 0.29 max | 100°F - 0.43 max | 100°F - 0.43 max |
| Density | 9 - 11 lb per cu ft | 10 - 11 lb per cu ft | 9 lb per cu ft |
| Compressive Strength | 15 lb per sq in. min | 100 lb per sq in. min | 100 lb per sq in. min |
| Manufacturing Process | Machine comp or molded. Baked at moderate temp | | |
| Resistance to Breakage in Handling | Good | | |
| Dimensions | | | |
| Other Qualifications | Pipe covering shall be coated on the outside with heavy mastic | | |

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

| | | |
|---|---|---|
| *Cork* Armstrong CAS Core | *Foamglas* Pittsburgh Corning Corp | *Foamglas Stay-Dry* Pittsburgh Corning Corp |
| *Cork* Munder Cork Co | | |
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OCTOBER 1954
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MATERIAL SPECIFICATION - SERIES 100

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Page 4.1

| Code | 111.2 | 111.3 | 112 |
|---|---|---|---|
| Material | Cellular glass | Cellular glass | Glass fiber |
| Material Description | Cellular glass foamed and fused into unicellular form. Factory applied jacket having 0.00035" aluminum foil outer jacket backed by kraft paper (60 lb per 3000 sq ft) | Cellular glass foamed and fused into unicellular form. Plain - without jacket. | See Codes 112.01 through 112.81. |
| Filler | | | |
| Binder | | | |
| Temperature Range | +35°F to +300°F | +35°F to +300°F | |
| K Factor | | | |
| Density | 9 lb per cu ft | 9 lb per cu ft | |
| Compressive Strength | 100 lb per sq in. min | 100 lb per sq in. min | |
| Manufacturing Process | | | |
| Resistance to Breakage in Handling | | | |
| Dimensions | | | |
| Other Qualifications | | | |

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

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

* Pipecaps 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 |

| | | |
|---|---|---|
| *Ulrafine Snap-on<br>Guetin-Bacon Mfg Co | | |
| *Mono-Kover<br>Baldwin-Ehret-Hill, Inc | | |
| *Thermoglas<br>Phillip Carey Mfg Co | | |
| **Fiberglas<br>Owens-Corning Corp | | |
| **Armaglas PF Pipe Insn<br>Armstrong C&S Corp | | |
| *Micro-Lok<br>Johns-Manville Sales Corp | | |
| * PIT-rite<br>Fibrous Glass Products, Inc, Hicksville, NY<br>Greenwood Ind Park, Mountain Top, Pa. | | |
| *Insul-Sure<br>Insul-Coustic Corp<br>Nemoth 78, NY | | |
| * PPG Glass Fiber<br>Pitts Plate Glass Co | | |
| * Superfine<br>The Ruberoid Co | | |

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MATERIAL SPECIFICATION - SERIES 100



| Code | 112.11 | 112.12 | |
|---|---|---|---|
| Material | Glass fiber | See 112.11 | |
| Material Description | Textile type fine glass fiber bonded pipe insulation with 30-lb factory-applied asbestos† roofing felt finish on sizes 6" and smaller and 45-lb asbestos† felt on sizes above 6" outside diameter. | | |
| 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, 30-lb felt used up to 6" OD of insulation | | |

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.

† Asbestos felt must be Code 701

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

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DUP 0961032

| 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"[ad] lb per cu ft | 3" and 6"[ad] lb per cu ft | |
| Compressive Strength | Compressive strength and resilience are very low. Inserts are required here pipe is supported by the insulation. Has poor resistance to abuse. | Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse. | |
| Resistance to Breakage in Handling | Very good | Very good | |
| Dimensions | | | |
| Other Qualifications | Specify whether for iron pipe or copper tubing | Specify whether for iron pipe or copper tubing | |
| The following materials have proven satisfactory in field tests and proof has been furnished by the manufacturers that their product meets the above specifications. | | | |
| CONFIDENTIAL | [a]*Ultrafine Snap-on* Gustin-Bacon Mfg Co | [a]*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 | |
| | [ad]*Fiberglas* Owens-Corning Corp | [ad]*Fiberglas* Owens-Corning Corp | |
| | [ad]*Armaglas PF Pipe Insn* Armstrong C&S Corp | [ad]*Armaglas PF Pipe Insn* Armstrong C&S Corp | |
| | *Micro-Lok* Johns-Manville Sales Corp | *Micro-Lok* Johns-Manville Sales Corp | |
| | *PPG Glass Fiber* Pitts Plate Glass Co | *PPG Glass Fiber* Pitts Plate Glass Co | |
| | *Superfine* The Ruberoid Co | *Superfine* The Ruberoid Co | |
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DU 041226

# MATERIAL SPECIFICATION - SERIES 100



| Code | 112.21 | 112.22 | 112.23 |
|---|---|---|---|
| Material | | Glass fiber | Glass fiber |
| Material Description | | Textile type fine glass fiber bonded pipe insulation with white factory-applied aluminum laminate vapor-barrier finish per Code 723.1. | Textile type fine glass fiber bonded pipe insulation with factory-applied 60 lb per 3000 sq ft white bleached kraft paper, laminated to 0.0007" aluminum foil with fire-retardant adhesive (moisture-vapor transmission rate shall not exceed 0.015 perms - wet cup test) and reinforced with glass fiber mesh ½" X ½". |
| Filler | | | |
| Binder | | Phenolformaldehyde or Di-Cy | Phenol-formaldehyde |
| Temperature Range | | 40°F to 200°F | 100°F to 250°F |
| K Factor | | 100°F - 0.25 | 100°F - 0.25 |
| Density | | 3" and 6" lb per cu ft | 3 lb per cu ft min |
| 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 | | | ½ and ¾ thick 3 ft sections |
| Other Qualifications | | Specify whether for iron pipe or copper tubing. Weather protection is required for outside service. | Low cost insulation for limited services such as hot water. |

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

| | | |
|---|---|---|
| | *Ulrafine Snap-on<br>Gustin-Bacon Mfg Co | *Flame-Retardant Jacket (FRJ)<br>Owens-Corning Corp |
| | *Mono-Kover<br>Baldwin-Ehret-Hill, Inc | |
| | *Thermogiass<br>Philip Carey Mfg Co | |
| | **Fiberglas<br>Owens-Corning Corp | |
| | **Armaglas PF Pipe Insn<br>Armstrong C&S Corp | |
| | *Micro-Lok<br>Johns-Manville Sales Corp | |
| | * PPG Glass Fiber<br>Pittsburgh Plate Glass Co | |
| | * Superfine<br>The Ruberoid Co | |
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DUP 0961034

DU 041227

| Code | 112.61 | | 112.66 |
|---|---|---|---|
| Material | Glass fiber | | Glass fiber |
| Material Description | Plain semi-rigid board, formed from fibrous glass or mineral fibers. | | Short, coarse steam-blown glass fibers preformed into semirigid board, sanded on one side and cut into lagging sizes for ease of application to curved surfaces. |
| Filler | | | |
| Binder | Phenol-formaldehyde | | Phenol-formaldehyde |
| Temperature Range | 40°F to 350°F | | 40°F to 350°F |
| K Factor | 100°F – 0.25 to 0.30 | | 100°F – 0.25 |
| Density | 6 and 9 lb per cu ft | | 9 lb per cu ft |
| Compressive Strength | Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistance to abuse. | | Compressive strength and resilience are very low. Inserts are required where pipe is supported by the insulation. Has poor resistence to abuse. |
| Resistance to Breakage in Handling | Very good | | Very good |
| Dimensions | Std 24" x 48"<br>Thickness PF615 (6-lb density) 1/2" through 3".<br>PF617 (9-lb density), 1/2" through 2 1/4". | | Length – 36"<br>Width – 6" or 12"<br>Thickness – 3/4", 1", 1 1/4", 1 1/2", and 2". |

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

| | | |
|---|---|---|
| *Fiberglas PF615 or 617 Insulation*<br>Owens-Corning Corp | | *Fiberglas Block Insulation*<br>Owens-Corning Corp |
| | | *Armaglas Block Insulation*<br>Armstrong C&S Corp |
| *Armatemp Span Wool Duct – Plain*<br>Armstrong C&S Corp | | |
| | | |
| *Spintex No. 614 or 615*<br>Johns-Manville Sales Corp | | |
| *Spundust*<br>Baldwin-Ehret-Hill, Inc | | |
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MATERIAL SPECIFICATION - SERIES 100

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| 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 | 6 lb per cu ft | | 6 lb per cu ft |
| Compressive Strength | | | |
| Manufacturing Process | Machine molded | | Machine molded |
| Resistance to Breakage n Handling | Very good | | Very good |
| Dimensions | 24" x 48" boards<br>3/4" to 2" thickness | | 24" x 48" boards<br>3/8" to 2" thickness |
| Other Qualifications | | | Neoprene coating on side of board exposed to air flow |

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

| | | | |
|---|---|---|---|
| | *Fiberglas Vapor Seal Duct Insn* Owens-Corning Corp | | *Fiberglas Coated Duct Insn* Owens-Corning Corp |
| | *Armaseamp Spun Wool Duct - Faced VB* Armstrong C&S Corp | | *Armaseamp Spun Wool Duct - Coated* Armstrong C&S Corp |
| | *Spinsex No. 414VS* Johns-Manville Sales Corp | | *Coated Duct Insulation* Baldwin-Ehret-Hill, Inc |
| | *Spandset* Baldwin-Ehret-Hill, Inc | | |
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DU 041229

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

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

| | | |
|---|---|---|
| | *PV Supertemp*<br>Eagle-Picher | *Rock Cork*<br>Johns-Manville Sales Corp |
| | *Nema-Block*<br>Baldwin-Ehret-Hill, Inc | *Mineral Wool Board*<br>Armstrong C&S Corp |
| | *Armatemp*<br>Armstrong C&S Corp | *Koldboard*<br>Baldwin-Ehret-Hill, Inc |
| | *M W Block*<br>M. H. Detrick Co | |
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DU 041230

MATERIAL SPECIFICATION – SERIES 100



9132

| Code | 116 | 117 | |
|---|---|---|---|
| Material | | Urethane Foam Resilient | |
| Material Description | | See Codes 117.1 through 117.5. | |
| Filler | | | |
| Binder | | | |
| Temperature Range | | | |
| K Factor | | | |
| Density | | | |
| Compressive Strength | | | |
| Manufacturing Process | | | |
| Resistance to Breakage in Handling | | | |
| Dimensions | | | |
| Other Qualifications | | | |

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

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DUP 0961038

117

| Code | 117.1 | 117.2 | |
|---|---|---|---|
| Material | Urethane Foam Resilient | Urethane Foam Resilient | |
| Material Description | Preformed resilient urethane snap-on foam pipe insulation manufactured with Du Pont "Hylene" and polyester or polyether resins | Preformed resilient urethane snap-on foam pipe insulation manufactured with Du Pont "Hylene" and polyester or polyether resins and kraft aluminum factory-applied vapor-barrier jacket incorporating a fire-snuff adhesive | |
| Filler | | | |
| Binder | | | |
| Recommended Service Temperature Range | 45°F to 150°F | 45°F to 150°F | |
| K Factor | 0.27 max at 75°F | 0.27 max at 75°F | |
| Density | 2 to 4 lb per cu ft | 2 to 4 lb per cu ft | |
| Compressive Strength | Min 0.25 psi at 25% deformation measured parallel to the direction in which the foam rose during manufacture | | |
| Manufacturing Process | Molded and stabilized dimensionally | Molded and stabilized dimensionally | |
| Resistance to Breakage in Handling | Excellent | Excellent | |
| Dimensions | $+\frac{1}{16}'' - 0''$ on insulation ID, all others to be accurate to $\pm\frac{1}{16}''$ | | |
| Other Qualifications | Uniform cell structure. No voids with any dimension exceeding 1/8 | Uniform cell structure. No voids with any dimension exceeding 1/8 | |

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

| | | |
|---|---|---|
| *Flexfoam* Delaware Ins Co | *Flexfoam* Delaware Ins Co | |
| *Thermax* Am. Cellular Products, Inc | | |
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# MATERIAL SPECIFICATION - SERIES 100

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| Code | 117.6 | 118 | |
|---|---|---|---|
| Material | Urethane Foam Resilient | Urethane Foam Rigid | |
| Material Description | Preformed resilient urethane foam pipe and fitting insulation manufactured from polyether resin and Du Pont "Hylene" and factory-applied jacket consisting of glass skrim bonded between 1 mil aluminum foil and 1 mil "Tedlar" | Preformed rigid urethane foam block, pipe, and fitting insulation manufactured with Du Pont "Hylene" and polyester or polyether resins | |
| Filler | | | |
| Binder | | | |
| Recommended Service Temperature Range | 45°F to 150°F | -100°F to +150°F | |
| K Factor | 0.27 max at 75°F | 0.17 max at 75°F | |
| Density | 2 to 4 lb per cu ft | 1½ to 4 lb per cu ft | |
| Compressive Strength | Min 30 lb per sq in. at 10% deformation, measured parallel to the direction in which the foam rose during manufacture | | |
| Manufacturing Process | Molded and stabilized dimensionally | Molded or cut from molded billet | |
| Resistance to Breakage & Handling | Excellent | Excellent | |
| Dimensions | +1/16" - 0" on insulation ID, all others to be accurate to ±1/16" | +1/16" - 0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness | |
| Other Qualifications | Uniform cell structure. No voids with any dimension exceeding 3/8" | Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". Heat aging tests max 3.5% volume change; humid aging test max 3% volume change and max 20% compressive strength change in accordance with MIL-P-21929 (SHIPS). Nonburning in accordance with ASTM D 1692. Water absorption max 2% by volume into a 2" x 2" x 1" skinless piece immersed in water just under the surface for 5 days | |

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

| * Pipe covering only<br>** Block only | | | |
|---|---|---|---|
| | *Flexifoam*<br>Delaware Ins Co | *U-200*<br>Union Asbestos & Rubber Co | |
| | | *Gem Foam**<br>Baldwin-Ehret-Hill Co | |
| | | *Esp Plastic Q4195.2* **<br>The Dow Chemical Co | |
| | | *Foam***<br>Pittsburgh Corning Corp | |
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MATERIAL SPECIFICATION – SERIES 100

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| Code | 120 | | |
|---|---|---|---|
| Material | Polystyrene | | |
| Material Description | Preformed rigid cellular polystyrene block, pipe, and fitting insulation. | | |
| Filler | | | |
| Binder | | | |
| Recommended Service Temperature Range | 100°F to +160°F | | |
| K Factor | 0.29 max at 75°F | | |
| Density | 1.7 to 2.3 | | |
| Compressive Strength | Min 20 lb per sq in. at 10% deformation | | |
| Manufacturing Process | Cut from molded [illegible] | | |
| Resistance to Breakage in Handling | Excellent | | |
| Dimensions | +1/16"–0" on insulation ID, all other dimensions to be ±1/16" including straightness and squareness | | |
| Other Qualifications | Uniform cell structure with max 10% open cells. No voids having any dimensions exceeding 1/4". No distortion or volume change, or loss of compressive strength after exposure to 160° F and 80% relative humidity for 15 days. Water absorption max 0.02% by volume after being subjected to 90° F, 90% relative humidity for 15 days and max 4% by volume into a 2" x 2" x 1" skin-free piece immersed in water just under the surface for 5 days. | | |

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

| | | | |
|---|---|---|---|
| CONFIDENTIAL | *Styrofoam 33*<br>Dow Chemical Co | | |
| | *Tuf-Lite*<br>Tuf-Lite Plastics, Inc | | |
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