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REV. NOV. 1978

THIS SPECIFICATION IS BASED PRESENTLY ON 6 x 6 AND 6 x 12 PIPES IN THE DIMENSIONS AND WEIGHTS SPECIFIED. IT IS INTENDED TO BE USED FOR THE DESIGN OF GAS PIPES. IT IS NOT INTENDED TO BE USED FOR THE DESIGN OF LIQUID PIPES.

NOTE

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

DATE	OCT 1964	SN 100 M
THIS PAGE REVISED	SEPT 1977	
STANDARD REAPPROVED	JULY 1977	

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Code	100	100.1	101
Material Description	CASHEM SHEET	CASHEM SHEET - ALUMINUM	CASHEM SHEET
Purpose	INSULATION FOR HOT SIDE AND EQUIPMENT	INSULATION FOR HOT SIDE AND EQUIPMENT	INSULATION FOR SIDE OF SUB-TEMPERATURE SIDE AND EQUIPMENT
Material Description	ADDRESS THE THERMAL PROPERTIES CASHEM SHEET INSULATED WITH HOT	ADDRESS THE THERMAL PROPERTIES CASHEM SHEET WITH INSULATOR FOR CHANGES SUB-CORROSION PROPERTIES AND INSULATED WITH HOT	CASHEM SHEET INSULATED AND INSULATED WITH INSULATOR
Surface of Use:			
On Unprotected Aluminum	No	No	No
In direct contact with insulating materials at or above 100°F	No	Yes	No
Recommended Temperature Range	1200°F max	1200°F max	100°F to 1000°F (300°F for cold side)
R Factor Btu (inches Rm) / (ft² · h · °F)	0.41 at 200°F mean 0.46 at 400°F mean 0.50 at 600°F mean	0.41 at 200°F mean 0.46 at 400°F mean 0.50 at 600°F mean	0.38 at 50°F mean 0.38 at 75°F mean 0.38 at 100°F mean
Moisture Resistance or Water Vapor Permeability	Good	Good	Good
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 9 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 3 in. Load Rate 0.10 per min	60 lb per sq in min at 5 percent compression	60 lb per sq in min at 5 percent compression	60 lb per sq in
Resistance to Handling Breakage	Good to fair	Good	Fair
Dimensions	See SN100	See SN100	See SN100
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials used under Code 100.1 are approved where Code 100 is specified. Aluminum must be protected per SN1A. Aluminum standards at or above 100°F must be protected per SN1A.	Recommended for use on aluminum standards per Aluminum must be protected per SN1A. For an aluminum to be used on aluminum standards, see SN100.10. Standard Type 204 standard with U-bend standards at 100°F, when in contact with the insulating material in the 60 lb per sq in test with 1.500 psi standard at 100°F in the test water, shall show no cracking at the end of 144 hours exposure. Passing the test in MIL-1-54244 specification does not qualify a material under Code 100.1.	Aluminum must be protected per SN1A. Aluminum standards at or above 100°F must be protected per SN1A.
Approved Materials and Vendors	Thermal 12 Jenbacher-Sachs Corp	Thermal 12, Type 1-4 Petersburg Corp	Thermal Petersburg Corrugated Corp
	Aluminum 100 Quincy-Corning Refractories Corp	Aluminum 100 (Type 1 and 2) Petersburg, Inc	
	Thermal 12, Type 1-4 Petersburg Corp	Aluminum 100 (Type 1 and 2) Petersburg Co	
	Thermal 12, Type 1-4 Petersburg Corp		
	Aluminum 100 (Type 1 and 2) Petersburg, Inc		
	Aluminum 100 (Type 1 and 2) Petersburg Co		

- Notes:
1. More than two-pass wiring covers are available in standard, medium, and heavy types. Advise the manufacturer of the brand of aluminum wiring covers to be used to ensure a proper fit.
 2. A portion of the recommended temperature range is 100°F.

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

See SN100.1-100.10, 101, 102

12-243

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DUP 0990401

MATERIALS

THERMAL INSULATION
STANDARD ENGINEERING SPECIFICATION

PREFORMED BLOCK AND
PIPE INSULATION

ISSUED OCT 1964
THIS PAGE REVISED JULY 1977
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SN 100 M

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CLASS	100	100.1	100.2
Material Description	Cellular Glass	Cellular Glass - Faced	Cellular Glass
Purpose	Insulation for hot and cold equipment	Insulation for hot and cold equipment	Insulation for cold and hot equipment
Material Description	Asbestos free, cellular glass, minimum density 120 lb/cu ft	Asbestos free, cellular glass, minimum density 120 lb/cu ft	Asbestos free, cellular glass, minimum density 120 lb/cu ft
Surface of Job	On Uninsulated Equipment	No	No
Is direct contact with equipment surfaces allowed at or above 140°F?	No	No	No
Recommended Temperature Range	-200°F to 400°F	-200°F to 400°F	-200°F to 1000°F (300°F for acid service)
Factor Shrinkage (in %)	0.41 at 200°F max 0.46 at 400°F max 0.50 at 600°F max	0.41 at 200°F max 0.46 at 400°F max 0.50 at 600°F max	0.35 at 200°F max 0.38 at 400°F max 0.42 at 600°F max
Moisture Resistance or Water Vapor Permeability	Good	Good	Good
Density	14 lb per cu ft max	14 lb per cu ft max	7 to 14 lb per cu ft
Compressive Strength Specimen 6 in. x 6 in. x 2 in. Load Rate 0.10 psi/min	60 lb per sq in. min at 5 percent deformation	60 lb per sq in. min at 5 percent deformation	30 lb per sq in.
Resistance to Flaming Spread	Good	Good	Good
Chemicals	See SN40	See SN40	See SN40
Flame-Spread Rating			
Specifications, Qualifications, Limitations	All materials used under Code 100.1 are approved where Code 100.1 is specified. Approval must be provided per SN1A. Approved materials must be of above 140°F must be approved per SN1A.	Approved for use on equipment surfaces only. Must meet the provisions per SN1A. For an approval to be obtained, minimum density, see SN100.10. Specimens Type 2B, minimum and maximum thickness at 100°F, when in contact with the insulating material in the Cu Pan test with 1.500 psi chloride in NaCl in the test water, shall show no cracking at the end of the 168 hour exposure. Passing the test in this 168-hour exposure shall not qualify a material under Code 100.1.	Approval must be provided per SN1A. Approved materials must be of above 140°F must be approved per SN1A.
Approved Materials and Vendors	Thermal 12 Jenbacher Sales Corp Acme 1015 Globe-Corning Refractories Corp Thermal 12, Type 11 Refractory Corp Corning 120 (Type 1) Corning Corp Fisher 1200 1 and 2 Fisher, Inc Fisher 1200 1 and 2 Fisher Co	Thermal 12, Type 11 Refractory Corp Fisher 1200 1 and 2 Fisher, Inc Fisher 1200 1 and 2 Fisher Co	Thermal 1200 Refractory Corp

- Notes:
1. Unless two-phase testing covers are specified in contracts, orders, and other types, agree the responsibility of the origin of equipment design covers to be used to ensure a proper fit.
 2. A service-bureau, recommended temperature range 100°F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority retaining the use of this specification.

SN 100M-100-00



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DU 046221

FLEXIBLE BLOCK AND PIPE INSULATION

This Page Rev JUN 1977

Case	112	112.5	114
Material Description	Class 100	Class 100/1000	Moisture Resistant - 1000
Purpose	Insulation for moderate ambient temperatures and equipment	Block insulation for moderate temperature equipment	Insulation for high temperature pipe fittings and equipment
Material Description	Class 100 noncompressible foam-encased insulation of pipe and fittings. Pipe sections, end-fittings, hangers, pipe, without cover	Class 100/1000 noncompressible foam-encased insulation of pipe, without covering	Moisture resistant high temperature cover
Available in Joints:			
On Unprotected Aluminum	No	No	No
In direct contact with equipment: No moisture seal at or above 140°F	No	No	No
Recommended Temperature Range:	40° to 275°F	40° to 260°F	1,000°F max
Factor			
See (Table 112.5)	0.23 at 100°F mean 2.27 at 200°F mean 0.23 at 300°F mean	0.24 at 100°F mean 0.26 at 200°F mean 0.27 at 300°F mean	0.28 at 200°F mean 0.31 at 300°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Good	Good	Good
Density	4 lb per cu ft. nominal	3 lb per cu ft. nominal	15 lb 10 lb per cu ft
Compressive Strength	Minimum bearing strength required where pipe is supported exceeds maximum	Minimum bearing	Low
Resistance to Handling Stresses	Good	Good	Good
Dimensions	See 112.5	Standard sizes: 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard sizes: 18 in. x 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame Spread Rating			
Specifications, Qualifications, Limitations	Every shipment is handled. For resistance to abuse, has recommended for protection. Specify whether for pipe or fitting on order. Available with factory-applied finish and lag approved. When specified, contact vendor's catalog and include on order. 1/4 lb per cu ft. density recommended for field installation. Minimum ranges are generally used in cold and are preferred over field installation. Minimum must be provided per 112.5. Additional moisture seal at or above 140°F must be provided per 112.5.	Available with factory-applied finish. When specified, contact vendor's catalog and include on order. Minimum 1/4 lb per cu ft. density material is available and is recommended for resistance to handling stresses. Shipping and fitting. Minimum must be provided per 112.5. Additional moisture seal at or above 140°F must be provided per 112.5.	Minimum must be provided per 112.5. Additional moisture seal at or above 140°F must be provided per 112.5.
Approved Materials and Vendors	Temp-Lo 100 Pipe Covering Corona-Temp Core Temp-Lo 100 Japane-Morimoto Sales Corp Pipe Covering - Use Pipe Corona-Covering Fiberglass Core Temp-Lo 100 (1) Boring Products, Inc. - Corona Co	18 in. Corona-Temp Core Temp-Lo 100 Japane-Morimoto Sales Corp Fiberglass, Type 181 Corona-Covering Fiberglass Core	P1 Temp-Lo 100 (Black only) Epoxy-Pipe Seal Core Temp-Lo 100 (Black only) Epoxy Core Temp-Lo 100 (Black only) Epoxy Core Temp-Lo 100 (Black only) Epoxy Core Temp-Lo 100 (Black only) Epoxy Core
Notes:	1. Minimum bearing strength only. 2. Also available in pipe fitting covers. Advise the fabricator of the brand of aluminum alloy covers to be used to ensure a proper fit.		

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 REV. NOV 1976


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DU 046222

PREFORMED BLOCK AND PIPE INSULATION

THERMAL INSULATION STANDARD ENGINEERING SPECIFICATION

ADOPTED	OCT 1954	SN 100 M
THIS PAGE REVISED	JULY 1975	Page 1 of 6
STANDARD REPLACES	JULY 1975	

Code	102	102.1	111
Material	Calcium silicate	Calcium silicate - inhibited*	Cellular glass
Material Description	Reconstituted hydrous calcium silicate reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Reconstituted hydrous calcium silicate with inhibitor for chloride stress corrosion cracking and reinforced with mineral fibers. All vendor's materials listed below are asbestos free.	Cellular glass, foamed and fused into uncellular form.
Recommended Temperature Range	1200 F max		-200 F to +100 F (+300 F for dual core)
K Factor, max Btu/(hr)(sq ft)(°F/in.)	0.38 at 200 F, 0.46 at 400 F, and 0.57 at 600 F		0.25 at 50 F 0.27 at 75 F 0.29 at 100 F
Density	14 lb per cu ft max		7 to 9 lb per cu ft
Compressive Strength Specimen size 6" x 6" x 2"; load rate 0.10" per min	60 lb per sq in. min at 5% deformation	50 lb per sq in. min at 5% deformation	50 lb per sq in.
Dimensions	See SM330		
Qualifications and Limitations	Not recommended for use on austenitic stainless steel or on above 140 F. See SM102D. Where used on aluminum, cover the latter with Code 709, fibrous asphalt mastic (300 F temp limit). All materials listed under Code 102.1 are covered where Code 102 is specified.	Recommended for use on austenitic stainless steel. For on aluminum is purchased inhibited calcium silicate, see SM102.1D. Where used on aluminum, cover the latter with Code 709, fibrous asphalt mastic (300 F temp limit). Stressed Type 304 stainless steel U-bend specimens at 100 C, when in contact with the insulating material in the Du Pont test rack with 1500 ppm chloride or NaCl in the test water, shall show no cracking or 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 products meet the above specifications. These manufacturers' materials also are acceptable under other vendor's labels upon certification as to their identity.

For 12" 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. * Peeling the rock in MIL-12434A specification does not qualify a material under Code 102.1 ** Matted two-piece fitting covers are available in covered, voided, and smooth types	Thermal - Asbestos Free Insul Insul G10, Krome Corp	Thermal - Asbestos Free Insul Insul G10, Krome Corp	Fomglas Pittsburgh Corning Corp
	Thermal-12 John-Manville Sales Corp	Super Lullamp, Type NA** Fiberglass Corp	
	Kayle - 184F Quinn - Corning	Pamul** Pamul, Inc	
	Super Lullamp, Type NA** Fiberglass Corp		
	Carvamp 1500** Colares Corp		
	Pamul** Pamul, Inc		

* A perlite-silicate, recommended temp limit of 1100 F.

Vendors and merchandise designations are given to describe materials and may not include all acceptable products. Substitutions by suppliers are to be made only on approval of the local authority governing the use of this specification.

Supplement 1 to AS 12 403



R-245

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DU 046223

DUP 0390404

REV. 1.7

THIS SPECIFICATION IS THE PROPERTY OF THE DU PONT DE NEMOURS AND COMPANY. THE REPRODUCTION OF THIS SPECIFICATION IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF THE COMPANY IS PROHIBITED.

Case	112	112A	112B
Material Description	Glass fiber	Glass fiber	Mineral wool
Particulate	Insulation for moderate temperatures and equipment	Block insulation for moderate temperature equipment	Insulation for high temperature pipe fittings and equipment
Material Description	Glass fiber, thermosetting resin-bonded, available for pipe and fittings. Pipe sections, end-caps, fittings, flange, without resin	Glass fiber bonded board, plain without covering	Mineral wool with high-temperature binder
Substrate for Joint: On Unreinforced Aluminum	No	No	No
In direct contact with molten metal: Maximum temp is of above 1400°F	No	No	No
Recommended Temperature Range	40° to 275°F	40° to 350°F	500°F max
Fl Factor Max (Wetted 100°F/ft)	0.22 at 100°F mean 0.27 at 200°F mean 0.28 at 250°F mean	0.24 at 100°F mean 0.26 at 200°F mean 0.27 at 250°F mean	0.28 at 200°F mean 0.31 at 300°F mean 0.78 at 1,000°F mean
Moisture Resistance or Water Vapor Permeability	Good	Good	Good
Density	4.10 per cu ft, nominal	3.0 per cu ft, nominal	15 to 18 lb per cu ft
Compressive Strength Standard 6 in. x 6 in. x 2 in. Load Rate 0.10 per min	Not tested; strength required where pipe is supported outside insulation	Not tested; strength required	Low
Resistance to Handling Abrasion	Good	Good	Good
Dimensions	See 9430	Standard sizes: 24 in. x 48 in. Thickness: 1 in., 1 1/2 in., 2 in.	Standard sizes: 18 to 24 in. x 36 in. Thickness: 1 in. to 4 in.
Flame-Spread Rating			
Specifications, Qualifications, Limitations	Easy to handle in handling. Pipe resistance is about 100 lb per sq ft. Specify whether for pipe or fitting or other. Available with factory-applied resin and 100 lb per sq ft. When specified, consult vendor's catalog and include on order "100 lb per sq ft factory recommended for flame retardant resin". Minimum flange are generally 100 lb in size and are provided with flame retardant resin. Aluminum must be protected per SNTA. Aluminum standard size is of above 1400°F must be protected per SNTA.	Available with factory-applied resin. When specified, consult vendor's catalog and include on order. Minimum 100 lb per sq ft factory recommended for insulation involving considerable shipping and fitting. Aluminum must be protected per SNTA. Aluminum standard size is of above 1400°F must be protected per SNTA.	Aluminum must be protected per SNTA. Aluminum standard size is of above 1400°F must be protected per SNTA.
Approved Materials and Vendors	Wegman 515 Plus Coating Celanese Corp Vulcan 400 Jenbacher Sales Corp Ply Coating - Use Ply Quincy-Corning Fiberglass Corp Insulation (Plate 1) Baker Products, Union-Carbide Co	18 200 Celanese Corp Vulcan 400 Jenbacher Sales Corp Fiberglass, Type 10 Quincy-Corning Fiberglass Corp	P1 (Baker only) Lynco-Plyco Sales Corp Vulcan 400 (Baker only) Kearney Corp Insulation (Plate 1) U. S. Gypsum N. T. Moore (Baker only) Perry-Globe Insulations, Inc
Notes:	1. Minimum flange covers only. 2. Also available as pipe fitting covers. Advise the fabricator of the brand of aluminum alloy covers to be used to ensure proper fit.		

DUP 0990405