VOID

SHELL OIL COMPANY

ENGINEERING STANDARDS

MATERIAL AND EQUIPMENT STANDARD 5-2
INSULATION

AUGUST 1959

ABS-061224

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MATERIAL AND EQUIPMENT STANDARD

ABS-061225

INDEX (CONTINUED)

MATERIAL AND EQUIPMENT STANDARD

CHARTS APPENDED

5-2.1 GENERAL

5-2.1.1 SCOPE

This standard covers the selection of materials for the insulation of piping, vessels, exchangers, tanks, pumps, compressors, and turbines in hot and cold services. It is intended to establish a standard of quality applicable to all insulating materials.

5-2.1.2 MATERIAL REQUIREMENTS

.1 Reference to a particular material or equal shall serve only as a precise identification of the type and quality of the material required. Alternate materials will be considered. Sufficient engineering data for evaluation of alternate materials shall accompany proposals. Shell shall be the sole judge of the equality, design, workmanship, and suitability of materials offered on an alternate basis.

.2 All aluminum sheets and elbows used for final covering in hot services shall have an asphalt, polyethylene, or equal, protective barrier factory-applied to the under side when used with insulations which are chemically reactive with aluminum.

5-2.2 HOT SERVICE

5-2.2.1 PIPING

.1 INSULATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 1.

.2 FINAL COVERINGS

.1 Final covering for piping insulation inside office buildings shall be 8-ounce canvas saturated with Arobol Mfg. Co. Arobol, or equal.

.2 Final covering for straight piping insulation inside unit areas shall be flat aluminum sheets, 0.016 inch, utility grade, half hard, mill finished, in cut and machine rolled sections approximately 3 feet long. Final covering for welded elbow insulation inside unit areas shall be preformed aluminum elbows, Childers Mfg. Co., General Aluminum Supply Co., or equal.

.3 Final covering for straight piping insulation outside unit areas shall be asbestos-asphalt felt in cut and rolled sections approximately 3 feet long, Johns-Manville Corp., Double-Coated Flexstone, or equal. Final covering for welded elbow insulation outside unit areas shall be weather-proofing compound, Philip Carey Mfg. Co. Thermotex B, or equal.

.3 BANDINGS

.1 Banding shall not be applied on one-piece pipe insulation.

.2 Banding on insulation under aluminum final covering shall be:

.1 Piping 10 inches and smaller - 0.051 inch diameter, soft, type 18-8, stainless steel wire;

.2 Piping 12 inches through 16 inches - 0.064 inch diameter, soft, type 18-8, stainless steel wire;

.3 Piping 18 inches and larger - 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands and seals.

.3 Banding on insulation under asbestos-asphalt felt final covering and on asbestos-asphalt felt final covering shall be:

.1 Piping 10 inches and smaller - 0.064 inch diameter, galvanized, soft, iron wire;

.2 Piping 12 inches through 16 inches - 0.083 inch diameter, galvanized, soft, iron wire;

.3 Piping 18 inches and larger - 1/2 inch x 0.020 inch, soft, aluminum bands and aluminum seals.

.4 Banding on aluminum final covering shall be 1/2 inch x 0.020 inch, soft aluminum bands and aluminum seals.

.4 ACCESSORIES

.1 Glass fabric shall be Twinsburg - Miller Co. Glasfab, 20 x 20 mesh, asphalt treated, or equal.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.2.2 VESSELS

.1 INSULATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 1.

.2 FINAL COVERINGS

.1 Final covering for vertical vessel shell insulation shall be corrugated aluminum roofing sheets, 1-1/4 inches x 1/4 inch corrugations, 0.019 inch, standard grade, half hard, mill finished.

.2 Final covering for horizontal vessel shell insulation shall be flat aluminum sheets, 0.020 inch, utility grade, half hard, mill finished.

.3 Final covering for vessel head insulation shall be weatherproofing compound, Philip Carey Mfg. Co. Thermotex B, or equal.

.3 BANDINGS

.1 Banding on vessel shell insulation shall be:

.1 Vessels 8 feet O.D. and smaller - 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands.

.2 Vessels larger than 8 feet O.D. - 3/4 inch x 0.020 inch, soft, type 18-8, stainless steel bands with A. J. Gerrard and Co. Expand-R-Strap, Techalloy Co. Breather Spring, or equal, expansion sections and stainless steel seals.

.2 Banding on vessel head insulation shall be 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands anchored with lacing wire hair pins to 1/2 inch nut blanks welded to heads.

.3 Banding on vessel shell final covering shall be:

.1 Vessels 8 feet O.D. and smaller - 3/4 inch x 0.025 inch, soft, aluminum bands with aluminum seals.

.2 Vessels larger than 8 feet O.D. - 3/4 inch x 0.020 inch, soft, type 18-8, stainless steel bands with A. J. Gerrard and Co. Expand-R-Strap, Techalloy Co. Breather Spring, or equal, expansion sections and stainless steel seals.

.4 ACCESSORIES

.1 Wire mesh shall be 1 inch hex mesh of 0.032 inch diameter, 3 twist, soft, type 18-8, stainless steel wire.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.2.3 EXCHANGERS

.1 INSULATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 1.

.2 FINAL COVERINGS

.1 Final covering for exchanger shell and channel insulation shall be flat aluminum sheets, 0.020 inch, utility grade, half hard, mill finished, in cut and machine rolled sections approximately 3 feet long.

.2 Final covering for exchanger shell head and channel head insulation shall be weatherproofing compound, Philip Carey Mfg. Co. Thermotex B, or equal.

.3 BANDINGS

.1 Banding on exchanger shell and channel insulation shall be 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands with stainless steel seals.

.2 Banding on exchanger shell and channel final covering shall be 3/4 inch x 0.025 inch, soft, aluminum bands with aluminum seals.

.4 ACCESSORIES

.1 Wire mesh shall be 1 inch hex mesh of 0.032 inch diameter, 3 twist, soft, type 18-8, stainless steel wire.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.2.4 TANKS

.1 INSULATION AND COATINGS MATERIALS

Insulations and coatings shall be in accord with the appended Chart No. 1.

.2 FINAL COVERINGS AND BANDING

.1 Tanks 12 feet O.D. and smaller.- Final covering and banding for tank insulation shall be in accord with section 5-2.2.2 for hot service vessels.

.2 Tanks larger than 12 feet O.D. - Final covering for tank insulation shall be flat asbestos-cement sheets, 4 feet x 8 feet x 3/16 inch thick, Johns-Manville Corp. Asbestocite, or equal.

.3 ACCESSORIES

.1 Tanks 12 feet O.D. and smaller - Accessories shall be in accord with section 5-2.2.2. for hot service vessels.

.2 Tanks larger than 12 feet O.D. - Accessories shall be in accord with appended drawing No. B-1235.

5-2.2.5 PUMPS, COMPRESSORS AND TURBINES

.1 INSULATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 1.

.2 FINAL COVERINGS

Final covering for insulation shall be weatherproofing compound, Philip Carey Mfg. Co. Thermotex B, or equal.

.3 ACCESSORIES

.1 Wire mesh shall be 1 inch hex mesh of 0.032 inch diameter, 3 twist, soft, type 18-8, stainless steel wire.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.3 COLD SERVICE

5-2.3.1 PIPING

.1 INSULATION AND COATING MATERIALS

Insulation and coatings shall be in accord with appended Chart No. 2.

.2 FINAL COVERINGS

.1 Final coverings for piping insulation inside office buildings shall be 8-ounce canvas saturated with Arobol Mfg. Co. Arobol, or equal.

.2 Final covering for straight piping insulation inside unit areas shall be flat aluminum sheets, 0.016 inch, utility grade, half hard, mill finished, in cut and machine rolled sections approximately 3 feet long.

.3 Final covering for straight piping insulation outside unit areas shall be asbestos-asphalt felt in cut and rolled sections approximately 3 feet long, Johns-Manville Corp. Double Coated Flexstone, or equal.

.4 Final covering for welded elbow insulation inside unit areas shall be pre-formed aluminum elbows, Childers Mfg. Co., General Aluminum Supply Co., or equal.

.5 Final covering for welded elbows outside unit areas shall be weather-proofing compound, Pittsburgh Corning Corp. Pittcote 300, or equal.

.3 BANDINGS

.1 Banding on insulation under aluminum final covering shall be:

.1 Piping 10 inches and smaller - 0.051 inch diameter, soft, type 18-8, stainless steel wire;

.2 Piping 12 inches through 16 inches - 0.064 inch diameter, soft, type 18-8, stainless steel wire.

.3 Piping 18 inches and larger - 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands with stainless steel seals.

.2 Banding on insulation under asbestos-asphalt felt final covering and on asbestos-asphalt felt final covering shall be:

.1 Piping 10 inches and smaller - 0.064 inch diameter, galvanized, soft, iron wire;

.2 Piping 12 inches through 16 inches - 0.083 inch diameter, galvanized, soft, iron wire.

.3 Piping 18 inches and larger - 1/2 inch x 0.020 inch, soft, aluminum bands and aluminum seals.

.3 Banding on aluminum final covering shall be 1/2 inch x 0.020 inch, soft, aluminum bands and aluminum seals.

.4 ACCESSORIES

.1 Glass fabric shall be Twinsburg-Miller Co. Glasfab, 20 x 20 mesh, asphalt treated, or equal.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.3.2 VESSELS

.1 INSULATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 2.

2. FINAL COVERINGS

.1 Final covering for vertical vessel shell insulation shall be corrugated aluminum roofing sheets, 1-1/4 inches x 1/4 inch corrugations, 0.019 inch, standard grade, half hard, mill finished.

.2 Final covering for horizontal vessel shell insulation shall be flat aluminum sheets, 0.020 inch, utility grade, half hard, mill finished.

.3 Final covering for vessel head insulation shall be weatherproofing compound, Pittsburgh Corning Corp. Pittcote 300, or equal.

.3 BANDINGS

.1 Banding on vessel shell insulation shall be:

.1 Vessels 8 feet O.D. and smaller - 1/2 x 0.015 inch, soft, type 18-8, stainless steel bands with stainless steel seals;

.2 Vessels larger than 8 feet O.D. - 3/4 inch x 0.020 inch, soft, type 18-8, stainless steel bands with stainless steel seals.

.2 Banding on vessel head insulation shall be 1/2 inch x 0.015 inch soft, type 18-8, stainless steel bands anchored with lacing wire hair pins to 1/2 nut blanks welded to heads.

.3 Banding on vessel shell final covering shall be 3/4 inch x 0.025 inch, soft, aluminum bands with aluminum seals.

.4 ACCESSORIES

.1 Glass fabric shall be Twinsburg-Miller Co. Glasfab, 20 x 20 mesh, asphalt treated, or equal.

.2 Lacing wire shall be 0.051 inch diameter, soft, type 18-8, stainless steel wire.

5-2.3.3 EXCHANGERS

.1 INSUUATION AND COATING MATERIALS

Insulations and coatings shall be in accord with appended Chart No. 2.

.2 FINAL COVERINGS

.1 Final covering for exchanger shell and channel insulation shall be flat aluminum sheets, 0.020 inch, utility grade, half hard, mill finished, in cut and machine rolled sections approximately 3 feet long.

.2 Final covering for exchanger shell head and channel head insulation shall be weatherproofing compound, Pittsburgh Corning Corp. Pittcote 300, or equal.

.3 BANDINGS

.1 Banding on exchanger shell and channel insulation shall be 1/2 inch x 0.015 inch, soft, type 18-8, stainless steel bands with stainless steel seals.

.2 Banding on exchanger shell and channel final covering shall be 3/4 inch x 0.025 inch, soft, aluminum bands with aluminum seals.

.4 ACCESSORIES

.1 Glass fabric shall be Twinsburg-Miller Co. Glasfab 20 x 20 mesh, asphalt treated, or equal.

5-2.3.4 PUMPS AND COMPRESSORS

.1 INSULATION AND COATING MATERIALS

Insulation and coatings shall be in accord with appended Chart No. 2.

.2 FINAL COVERINGS

Final covering for insulation shall be weatherproofing compound, Pittsburgh Corning Corp. Pittcote 300, or equal.

.3 ACCESSORIES

Glass fabric shall be Twinsburg-Miller Co. Glasfab, 20 x 20 mesh, asphalt treated, or equal.

HOT SERVICE - INSULATION AND COATING MATERIALS

TYPE OF INSULATION	MANUFACTURER/DESCRIPTION	PIPING	VESSELS	EXCHANGERS	PUMPS, COMPRESSORS, AND TURBINES	TANKS
BLOCK INSULATION	JOHNS-MANVILLE CORP. THERMOBESTOS, OWENS-CORNING FIBERGLAS CORP. KAYLO, PHILLIP CAREY CARRYTEMP, OR EQUAL	STRAIGHT SECTIONS LARGER THAN 24 INCHES O.D. AND HEADS			CASES - USED IN COMBINATION WITH MONOLITHIC INSULATION	SHELLS 12 FEET O.D. AND SMALLER
ONE PIECE INSULATION LIMITED TO 350°F	RUBEROID CO. IMPERIAL, GUSTIN-BACON MFG. CO. SNAP ON, OR EQUAL	STRAIGHT SECTIONS 24 INCHES O.D. AND SMALLER			NOZZLES	
SECTIONAL PIPE INSULATION	UNION ASBESTOS AND RUBBER CO. UNIBESTOS, JOHNS-MANVILLE CORP. THERMOBESTOS, PHILLIP CAREY CARRYTEMP, OR EQUAL	STRAIGHT SECTIONS 24 INCHES O.D. AND SMALLER			NOZZLES	
PREFORMED VALVE, FLANGE, AND FITTING INSULATION	UNION ASBESTOS AND RUBBER CO. UNIBESTOS, JOHNS-MANVILLE CORP. THERMOBESTOS, OR EQUAL	VALVES, FLANGES, AND FITTINGS 2 INCHES AND LARGER			AS REQUIRED	
MONOLITHIC INSULATION	EAGLE-PICHER CO. SUPER 66, OR EQUAL	VALVES, FLANGES, AND FITTINGS 1½ INCHES AND SMALLER	HEADS	HEADS	CASES - USED IN COMBINATION WITH BLOCK INSULATION	
MINERAL WOOL INSULATION	EAGLE-PICHER CO. H-2, OR EQUAL	AS REQUIRED				
GLASS FIBER INSULATION	GUSTIN-BACON MFG. CO. ULTRALITE, 4 FEET x 150 FEET x 1½ INCHES BLANKETS, OR EQUAL DENSITY SPECIFIED BY SHELL					SHELLS LARGER THAN 12 FEET O.D.
FINISHING CEMENT	EAGLE-PICHER CO. ONE COTE, OR EQUAL	AS REQUIRED				
SEALING COMPOUND	FLINTKOTE CO. PLASTIC CEMENT, OR EQUAL	AS REQUIRED				AS REQUIRED
WEATHERPROOFING COMPOUND	PHILIP CAREY MFG. CO. THERMOTEX B, OR EQUAL	AS REQUIRED				

COLD SERVICE - INSULATION AND COATING MATERIALS

TYPE OF INSULATION	MANUFACTURER/DESCRIPTION	PIPING	VESSELS	EXCHANGERS	PUMPS AND COMPRESSORS
BLOCK INSULATION	PITTSBURGH-CORNING CORP. FOAMGLAS, OR EQUAL	STRAIGHT SECTIONS LARGER THAN 24 INCHES O.D. AND HEADS			CASES
SECTIONAL PIPE INSULATION	PITTSBURGH-CORNING CORP. FOAMGLAS, OR EQUAL	STRAIGHT SECTIONS 24 INCHES O.D. AND SMALLER			NOZZLES
PREFORMED VALVE, FLANGE, AND FITTING INSULATION	PITTSBURGH-CORNING CORP. FOAMGLAS, OR EQUAL	AS REQUIRED			
MINERAL WOOL INSULATION	EAGLE-PICHER CO. H-2, OR EQUAL	AS REQUIRED			
SEALING COMPOUND	EAGLE-PICHER CO. STALASTIC, OR EQUAL	AS REQUIRED			
BORE COATING	PITTSBURGH CORNING CORP. ANTI-ABRASIVE COMPOUND 1A, OR EQUAL	AS REQUIRED			
JOINT ADHESIVE	PITTSBURGH CORNING CORP. PITTCOTE 300, OR EQUAL	AS REQUIRED			
WEATHERPROOFING COMPOUND	PITTSBURGH CORNING CORP. PITTCOTE 300, OR EQUAL	AS REQUIRED			