

# Plasti-Fab Design Manual

## Pipe & Vessel Applications



Better building ideas from PFB 



## Pipe and Vessel Applications

Plasti-Fab PlastiSpan insulation is excellent for insulating cold environments, such as pipes and vessels containing cold liquids or gases at temperature from normal room temperature down to and including cryogenic temperatures - i.e., below -100°C (-150°F). Properly shaped insulation coverings efficiently control condensation and heat transfer. At cryogenic temperatures, extreme care is necessary to ensure that vapour barriers are complete and adequate. PlastiSpan insulation is not suitable for insulating environments which will be maintained at heat service temperatures greater than 70°C (160°F).

Insulation can be used to protect the contents of the pipe or vessel from the effects of a freezing exterior temperature. Examples of this application would be utility and sewer lines buried in an area where the ground temperature will be

below freezing or which are exposed to the weather for other reasons. Methods for accomplishing this are dealt with the Plasti-Fab brochure 'Utilities Insulation'.

Plasti-Fab fabricates PlastiSpan insulation for pipes and vessels to provide maximum thermal efficiency, maximum physical properties and maximum economy to suit the requirements of the application. PlastiSpan insulation is a lightweight insulation which is easy to handle, ship and install. Properties of PlastiSpan insulation board are provided on the last page of this brochure.

Pipe and vessel coverings are fabricated with a butt joint or an optional tongue and groove longitudinal joint. A factory applied foil jacketing can be supplied to most pipe coverings or to vessel coverings in order to provide a vapour barrier.

## Selection Considerations

### PlastiSpan Insulation Type 1

PlastiSpan insulation meeting the requirements of CAN/ULC-S701, Type 1 has the lowest density of all the plastic foams used for pipe and vessel coverings. It is the most economical foam insulation and provides best value a vapour barrier is to be used, PlastiSpan provides a very reasonably priced installation.

### PlastiSpan Insulation Type 2

PlastiSpan HD insulation meeting the requirements of CAN/ULC-S701, Type 2 is higher in density than PlastiSpan insulation, Type 1. Its physical, thermal, and water vapour permeance are also higher, yet it remains economical.

For both types, the vapour barrier may be omitted if the ambient temperature is below 21 °C (70 °F) at all times and the differential between the pipe surface and the ambient atmosphere is less than 17 °C (30 °F).

### Thickness Selection – Pipe Covering

The basic design criteria for selecting insulation thickness on pipes handling cold liquids or gases is the amount required to prevent condensation on the surface of the pipe covering.

This is due to the volume and velocity of the contents of the pipe, which provides an almost unlimited capacity to absorb heat.

The following relationship was used:

$$q = \frac{t_a - t_d}{R_s} = \frac{t_a - t_o}{R_i} \quad t_o = \frac{t_d - R_i \cdot (t_a - t_d)}{R_s} \quad L = \frac{d_o}{2} \text{Log}_e \left( \frac{d_o}{d_i} \right)$$

WHERE:	SI VALUES	IMPERIAL VALUES
$q$ = heat flow at outer surface of insulation	$\frac{W}{m^2}$	$\frac{BTU}{ft^2 \cdot h}$
$t_a$ = ambient still air temperature	°C	°F
$t_d$ = dew point temperature	°C	°F
$t_o$ = pipe temperature	°C	°F
$R_s$ = surface thermal resistance	$\frac{0.94 \text{ m}^2 \cdot \text{°C}}{W \cdot m}$	$\frac{0.65 \text{ ft}^2 \cdot \text{hr} \cdot \text{°F}}{BTU \cdot \text{in}}$
$R_i$ = insulation thermal resistance	$\frac{L}{k}$	$\frac{L}{k}$
$L$ = equivalent thickness	metres	inches
$k$ = thermal conductivity	$\frac{W}{m \cdot \text{°C}}$	$\frac{BTU \cdot \text{in}}{\text{ft}^2 \cdot \text{hr} \cdot \text{°F}}$
$d_o$ = outer insulation diameter	metres	inches
$d_i$ = inner insulation diameter	metres	inches

## Single or Multi-Layer Covering

Multiple layer insulation with joints staggered between layers is recommended where the insulation thickness is over 76 mm (3") or where the operating temperatures are below -29° C (-21° F). It is possible to specify two-layer pipe coverings using two standard-dimension single layered pipe coverings. The two-layer covering with joints staggered offers a better insulation system where the operating temperatures are in the severe service range (i.e., below -29° C (-21° F)).

## Thickness Selection – Vessel Covering

Where liquids or gases are to be stored in vessels for periods of time the heat gain or loss of the vessel is the criteria which will determine the insulation thickness. Heat gain is particularly critical, since it can cost up to ten times more in terms of capital equipment and operating costs to restore a low temperature system to equilibrium than it does for a high temperature system.

Large vessels are often insulated to reduce the heat gain of the contents over a period of time. If the specific heat of the contents is known, the following tables of heat gain through the vessel walls would allow calculation of the residence time for the contents to reach a given temperature or the capacity of cooling equipment required to keep contents at a certain temperature.

### Heat Gain

SI VALUES ( Watts / m <sup>2</sup> )		TEMPERATURE DIFFERENTIAL				
INSULATION TYPE	INSULATION THICKNESS	1° C	25° C	50° C	57° C	100° C
PlastiSpan Insulation	25 mm	1.45	36.3	72.5	108.8	145
	40 mm	.94	23.5	47.0	70.5	94
	50 mm	.71	17.8	35.5	53.3	71
	75 mm	.51	12.8	25.5	38.3	51
	100 mm	.38	9.5	19.0	28.5	38
PlastiSpan HD Insulation	25 mm	1.37	34.3	68.5	102.8	137
	40 mm	.87	21.8	43.5	65.3	87
	50 mm	.70	17.5	35.0	52.5	70
	75 mm	.47	11.8	23.5	35.3	47
	100 mm	.35	8.8	17.5	26.3	35

IMPERIAL VALUES ( BTUs / ft <sup>2</sup> • hr )		TEMPERATURE DIFFERENTIAL			
INSULATION TYPE	INSULATION THICKNESS	1° F	50° F	100° F	150° F
PlastiSpan Insulation	1"	.258	12.9	25.8	38.7
	1.5"	.175	8.8	17.5	26.3
	2"	.132	6.6	13.2	19.8
	3"	.089	4.5	8.9	13.4
	4"	.067	3.4	6.7	10.1
PlastiSpan HD Insulation	1"	.240	12.0	24.0	36.0
	1.5"	.162	8.1	16.2	24.3
	2"	.122	6.1	12.2	18.3
	3"	.082	4.1	8.2	12.3
	4"	.062	3.1	6.2	9.3

Temperature Differential is between average air temperature and average temperature of contents. Table considers only thermal resistance of insulation and surface thermal resistance with 15 mph (24 km/h) wind. Vessel wall and jacketing are both assumed to be metal (no thermal resistance). Vessels are assumed to be indoors or under a sun screen. If the vessel is exposed to the sun, the direct heat load of the sun must be considered. See ASHRAE Handbook of Fundamentals.

## Vapour Barrier Jacketing Selection

PlastiSpan pipe and vessel coverings are almost always covered with metal jacketing. This jacketing does not have sealed joints and a vapour barrier is usually required under the metal jacket. This may be supplied as a factory applied foil jacket, a field applied foil jacket, or a field applied vapour barrier mastic. Selection depends on the degree of vapour barrier required and the field installation conditions to be expected. When a laminated foil is used as a vapour barrier it is installed with the foil side against the pipe covering and the kraft paper side against the metal jacketing.

### Plasti-Fab Jacketing FB 126 ASJ

Permanently Fire Retardant Vapour Barrier Jacketing. 0.0007 aluminum foil, flame resistant adhesive, fibreglass 6 x 6 reinforcing, white chemically treated permanent fire retardant non-bleachable 45 lb. kraft paper.

### Physical Properties

PROPERTY	TEST METHOD	SI VALUES	IMPERIAL VALUES
Tensile Strength	ASTM D 828 – Machine Direction	346 kPa	50 psi
	– Cross Direction	346 kPa	50 psi
Puncture Beach	ASTM D 781-44T	346 kPa	50 psi
Water Vapour Permeance	ASTM E96-53T(A) (100 in <sup>2</sup> /24 hrs)	$\frac{0.3 \cdot \text{ng}}{\text{Pa} \cdot \text{s} \cdot \text{m}}$	0.1 grains
Delamination	ASTM 774-63T (Mullen Burst Test) Oven aged 120°F, 95% R.H. - None	482 kPa	70 psi

U.L.I. FIRE HAZARD RATING	KRAFT EXPOSED	FOIL EXPOSED
Flame Spread	20	5
Fuel Contributed	0	0
Smoke Developed	35	5

## Application – Pipe Covering

### Single Layer Pipe Covering

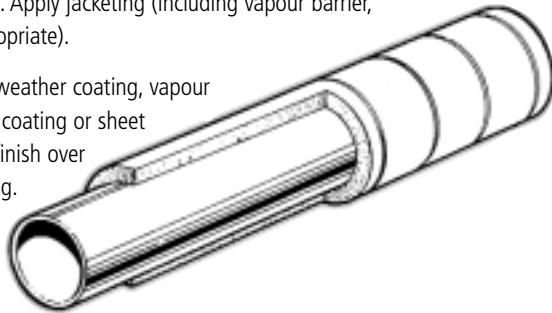
Apply a continuous bead of joint sealer at the bottom of the outer edge of the tongue of the longitudinal joint and to the face of the end joint.

If a butt joint covering is used instead of tongue and groove covering, apply a continuous bead of joint sealer to the face of the longitudinal joint.

Apply half sections of covering, staggering each half section half a length with respect to the opposite section and with longitudinal joints on sides. Where pipe covering is more than two-segment, stagger each segment relative to the adjacent segment.

Band or tape insulation 50 mm (2") from each end joint. Install further bands or tapes between on maximum 300 mm (12") centres. Apply jacketing (including vapour barrier, if appropriate).

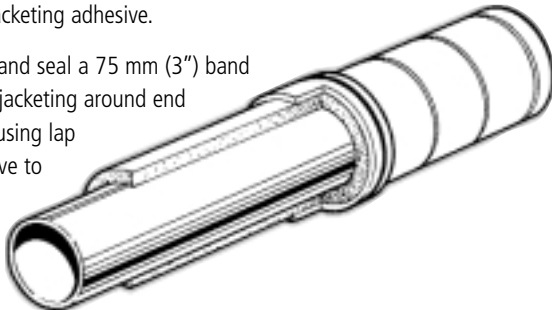
Apply weather coating, vapour barrier coating or sheet metal finish over covering.



### Single Layer Pipe Covering with Factory Applied Foil Jacketing

Apply covering to pipe with longitudinal joints on top and bottom and end joints butted firmly together. Seal overlaps of foil jacketing with jacketing adhesive.

Apply and seal a 75 mm (3") band of foil jacketing around end joints using lap adhesive to bond.



### Multiple Layer Pipe Covering

Apply half sections of the first layer of pipe covering, staggering each half section of half length with respect to the opposite section and with longitudinal joints on the sides. Do not use joint sealer.

Secure first layer with pressure sensitive tape.

Apply further layers as required, staggering both longitudinal and end joints with respect to those of the first layer, and tape in place.

### Non-Jacketed Coverings

On the outer layer of pipe covering, apply a continuous bead of joint sealer at the bottom of the outer side of the tongue of the longitudinal joint and the face of the end joint. Do not apply joint sealer on jacketed coverings.

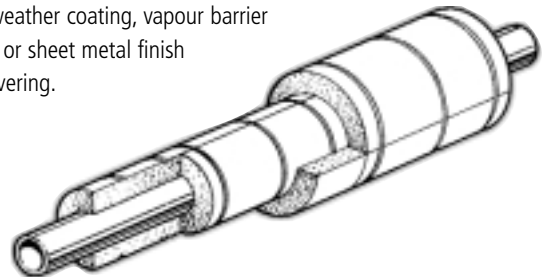
### Jacketed Covering – No Joint Sealer

If a butt joint covering is used instead of tongue and groove covering, apply a continuous bead of joint sealer to the face of the longitudinal joint and the face of the end joint.

Apply sections of outer layer covering, staggering each section half a length with respect to the opposite section, and with longitudinal and end joints staggered with respect to those of the underlying layer.

Band or tape insulation 50 mm (2") from each end joint. Install further bands or tapes on maximum 300 mm (12") centres. Apply jacketing (including vapour barrier if appropriate).

Apply weather coating, vapour barrier coating or sheet metal finish over covering.



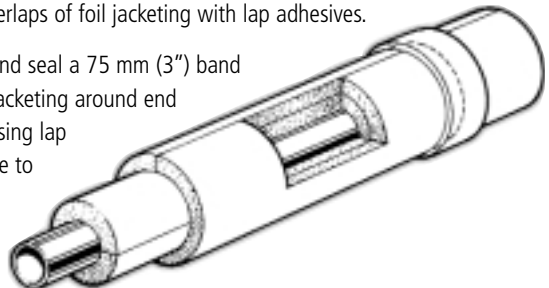
### Multiple Layer Pipe Covering with Factory Applied Foil Jacketing (Outer Layer Only)

Apply first layer of covering (no jacketing) to pipe with longitudinal joints of sides and end joints butted firmly together.

Secure the first layer with pressure sensitive tape.

Apply further layers as required, staggering both longitudinal and end joints staggered with respect to those of the inner layer. Seal overlaps of foil jacketing with lap adhesives.

Apply and seal a 75 mm (3") band of foil jacketing around end joints using lap adhesive to bond.



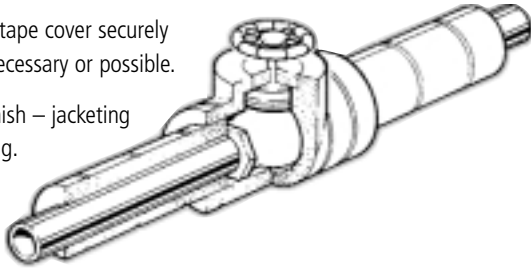
## Fitting and Valve Covering

Fitting and valve insulation is normally single layer, even if the pipe covering is multiple layer. Choose factory fabricated fitting and valve covering where possible. Where a suitable covering is not available, fabricate pipe covering or box the fitting or valve.

Apply a continuous bead of joint sealer to one face of all joints. Fit covering, making sure a vapour seal is obtained at all joints.

Band or tape cover securely where necessary or possible.

Apply finish – jacketing or coating.



## Flange Covering

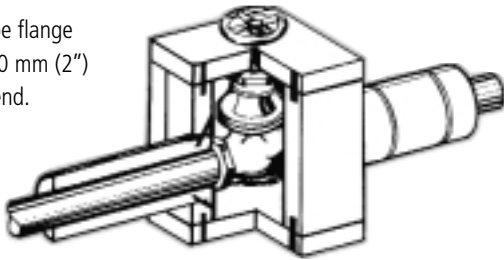
Insulate flanges by covering with pipe covering with an inner diameter equal to the outer of the pipe covering.

Lap the flange cover a minimum of 75 mm (3") over the pipe covering.

Apply a continuous bead of joint sealer to one face of all joints. Fit covering, making sure a vapour seal is obtained at all joints.

Band or tape flange coverings 50 mm (2") from each end.

Apply finish – jacketing or coating.



## Insulation at Pipe Hangers

Where possible, select clevis-type hangers large enough to fit over the insulation.

Use a support plate under hangers to keep the foam insulation from crushing. The support plate should be sufficiently large to prevent the loading on the foam being greater than one-third of its compressive strength.

Coat the face of the support plate against the insulation with a full spread of adhesive when installing.

An alternative to the support plate is to use a high density high compressive strength insulation under the pipe at the clevis support as the bottom segment of the pipe covering.

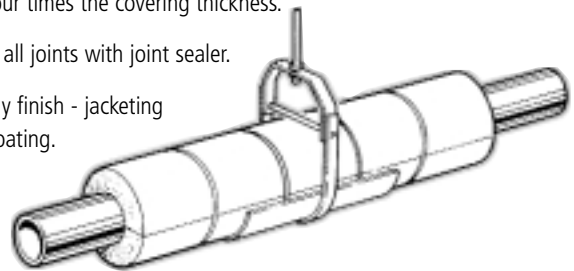
Where the hanger selected does not provide clearance for the insulation and pipe remains in contact with the hanger, cut the pipe covering to fit as closely as possible to the hanger.

Apply an additional layer of insulation to the hanger, so that there is at least as thick a layer of insulation over the hanger as there is over the pipe.

Insulate the hanger rod up from the covering a minimum distance of four times the covering thickness.

Seal all joints with joint sealer.

Apply finish - jacketing or coating.

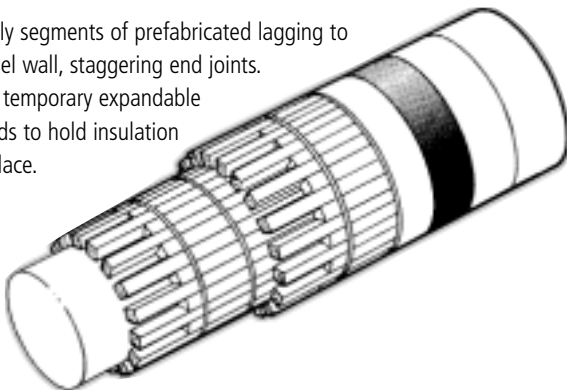


## Application – Vessel Insulation

### Round Vessel Wall Insulation

Apply segments of prefabricated lagging to vessel wall, staggering end joints.

Use temporary expandable bands to hold insulation in place.



Apply additional layers in similar manner staggering all joints with those of the underlying layer and staggering all end joints with each other.

Apply a continuous bead of joint sealer on all longitudinal and end joints on the outer layer of insulation.

Apply permanent bands on 300 mm (12") centres.

Apply finish - jacketing or coating.

## Round Vessel End Insulation

Extend wall insulation beyond the end of the vessel a distance equal to the insulation thickness.

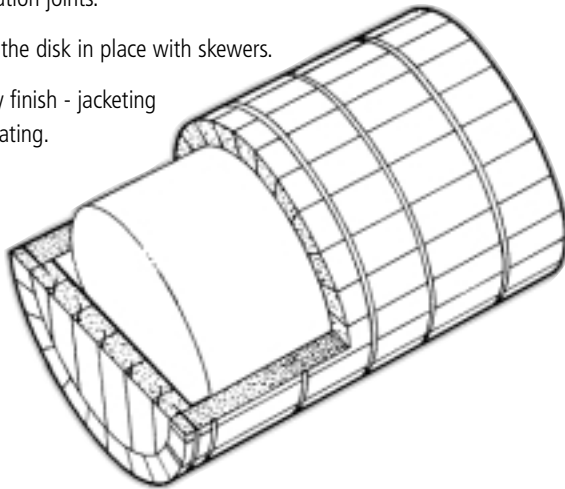
Fit insulation disk into the opening. Cut the disk from one piece of insulation or fabricate it from a number of pieces, using adhesive and skewers.

If the end of the vessel is dished, fill the void between the vessel end and the insulation with loose fill insulation.

Run a continuous bead of joint sealer along the face of all insulation joints.

Hold the disk in place with skewers.

Apply finish - jacketing or coating.

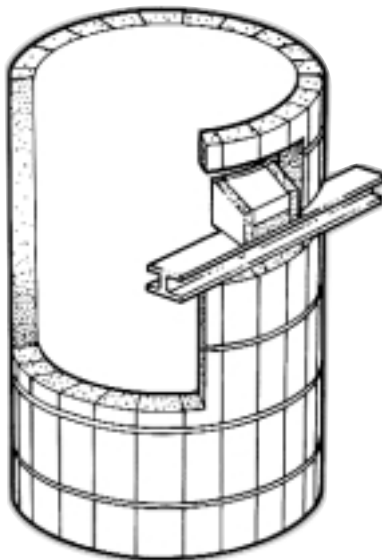


## Vessel Support Insulation

### Vessel Supported on Insulated Pads

Set lugs on high compressive strength insulation pads. The load of filled vessel over the area of the support must not exceed one third the compressive strength of the insulation.

Apply insulation the same thickness as vessel insulation to the sides of the lugs with adhesive completely covering the support lugs.

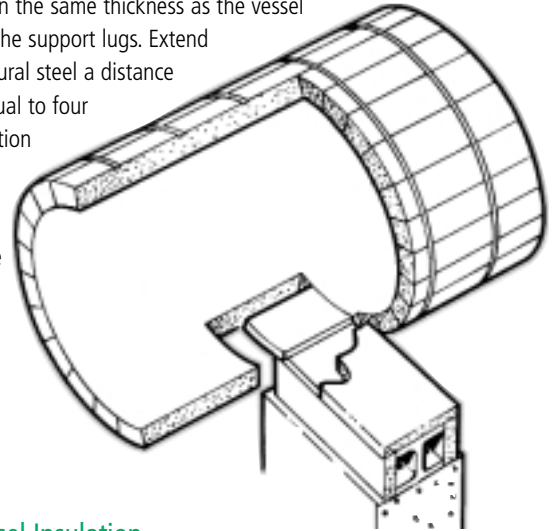


## Vessels Supported Directly on Structural Steel

Extend insulation the same thickness as the vessel insulation over the support lugs. Extend along the structural steel a distance from the lug equal to four times the insulation thickness.

Spot bond the insulation to the support with adhesive.

Finish to match vessel covering.



## Flat Wall Vessel Insulation

Install stud welds or Stic-clips 1" longer than thickness of first layer of insulation on vessel walls on 300 mm (12") centres each way.

Apply first layer of insulation by impaling insulation over the stud or Stic-clips and driving 25 mm (1") square clips snug against insulation.

Clip off stud close to clip.

Apply second and succeeding layers of insulation, using a full spread of adhesive. Stagger all joints between layers and secure additionally with treated wood skewers, two per square foot (22 per m<sup>2</sup>), driven in at an angle of 30° to the perpendicular. Length of skewer should equal to the thickness of insulation layers.

Apply finish - jacketing or coating.

## Vessel Floor Insulation

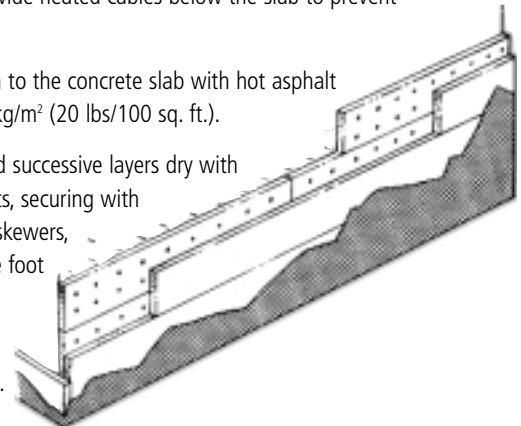
Ensure that insulation which is to support the vessel has sufficient compressive strength to support the imposed load.

If the concrete slab supporting the load is over 37 m<sup>2</sup> (400 sq. ft.) and the tank contents will be below freezing, frost heaving may occur. Provide heated cables below the slab to prevent frost heaving.

Mop insulation to the concrete slab with hot asphalt at a rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq. ft.).

Lay second and successive layers dry with staggered joints, securing with treated wood skewers, one per square foot (11 per m<sup>2</sup>).

Place vessel over insulation.



## Specification

### Part 1 – General

(See Note 1)

#### Related Work Specified Elsewhere

(See Note 2)

#### Qualifications

Insulation shall be installed by mechanics skilled in this work in strict accordance with manufacturer's printed instructions.

#### Submittals

Submit samples and manufacturer's literature for approval before ordering materials and proceeding with the work.

#### Delivery, Storage, and Handling

Deliver and store materials undamaged in original cartons. Protect plastic foam insulation from prolonged exposure to sunlight (over four summer days). Store under light coloured tarpaulins. If surface becomes yellow and degraded, broom surface back to original colour.

#### Protection

Provide adequate protection of materials and work of this trade from damage by weather and other causes.

Protect work of other trades from damage resulting from work of this trade. Make good such damage at own expense to satisfaction of owner's representative.

### Part 2 – Products

#### Materials

##### Insulation – Pipe Covering

(See Note 3)

PlastiSpan expanded polystyrene insulation pipe covering manufactured by Plasti-Fab Ltd., conforming to CAN/CGSB 51.20M87 Type 1; .... thickness (specify); together with tees, elbows, valves, flanges, and other covers as required for a complete insulation.

PlastiSpan HD expanded polystyrene insulation pipe covering manufactured by Plasti-Fab Ltd., conforming to CAN/CGSB 51.20M87 Type 2; .... thickness (specify); together with tees, elbows, valves, flanges, and other covers as required for a complete insulation.

##### Insulation – Vessel Covering

(See Note 3)

(Segments) (Boards) prefabricated from

1. PlastiSpan expanded polystyrene insulation pipe covering manufactured by Plasti-Fab Ltd., conforming to CAN/CGSB 51.20M87 Type 1; .... thickness (specify).

2. PlastiSpan HD expanded polystyrene insulation pipe covering manufactured by Plasti-Fab Ltd., conforming to CAN/CGSB 51.20M87 Type 2; .... thickness (specify).

##### Joint Sealer

Plasti-Fab General Purpose Adhesive.

##### Vapour Barrier

(See Note 4)

##### Lap Adhesive

Swifts No. 7590 Lap Adhesive.

Armstrong No. 520 Lap Adhesive.

##### Bands or Tapes

Fibreglass reinforced pressure sensitive tape.

### Part 3 – Execution

#### General

Install (pipe covering) (vessel insulation) in strict accordance with insulation manufacturer's printed instructions.

#### Pipe Covering

##### Single Layer

Install pipe covering dry to pipe with all joints tightly butted and sealed with joint sealer.

Stagger each section half a length with respect to the opposite section.

##### Single Layer with Factory Applied Foil Jacketing

Install pipe covering dry to pipe with all joints tightly butted and sealed with joint sealer.

Seal overlaps of foil jacketing with lap adhesive.

Apply and seal a 75mm (3") band of foil jacketing around each end joint and bond with lap adhesive.

##### Multiple Layer

Install pipe covering dry to pipe with all joints tightly butted. Secure with pressure sensitive tape.

Stagger each section half a length with respect to the opposite section.

Apply further layers in similar manner, staggering all joints with respect to those underlying layers.

Install outer layer with all joints tightly butted and sealed with joint sealer.

##### Multiple Layer with Factory Applied Foil Jacketing

Install pipe covering dry to pipe with all joints tightly butted. Secure with pressure sensitive tape.

Apply further layers in similar manner, staggering all joints with respect to those underlying layers.

Install outer layer of foil jacketed pipe covering.

Seal overlaps of foil jacketing with lap adhesive.

## Specification (continued)

### **Banding or Taping (Not for Foil Jacketed Covering)**

Band or tape with outer layer of insulation 50 mm (2") from each end joint. Install further bands or tapes between on maximum 300 mm (12 ") centres.

### **Fitting and Valve Coverings**

Install factory fabricated fitting and valve coverings with all joints tightly butted and sealed. If a suitable covering is not available, box the fitting in with insulation board stock, as detailed.

### **Flange Covering**

Insulate flanges with pipe coverings as detailed, sealing all joints and banding 50 mm (2") from each end.

### **Pipe Hangers**

At clevis-type hangers, provide a support plate to distribute load on the insulation, as detailed. Alternatively, provide high density pipe covering under the pipe at the clevis support.

At hangers in direct contact with the pipe, butt the pipe covering as closely as possible to the hanger and provide additional insulation around the pipe at the hanger. Insulate the hanger rod up a minimum distance of four times the covering thickness. Seal all joints with joint sealer.

### **Vessel Insulation**

Install vessel insulation in strict accordance with insulation manufacturer's printed instructions.

### **Round Vessel Insulation**

Install prefabricated segments of insulation, staggering end joints and securing with temporary bands.

Apply additional layers in similar manner. Seal all joints of outer layer with joint sealer and secure with permanent bands on 300 mm (12") centres.

At ends install precut or prefabricated disk of insulation as detailed.

Fill the void space created by dished ends with loosefill insulation. Seal and skewer to hold in place.

### **Flat Vessel Insulation**

Before vessel is positioned on slab, install insulation over concrete support slab with hot asphalt applied at a rate of 20 lbs/100 ft<sup>2</sup>.

Lay additional layers dry with staggered joints, securing with a skewer.

Install first layer of insulation boards with clips on previously installed stud welds or patented fasteners. Clip off stud close to insulation.

Apply additional layers with a full spread of adhesive and additionally secure with skewers. Stagger all joints between layers.

### **Finish (Not Applicable to Jacketed Covering)**

Apply aluminum jacketing in strict accordance with jacketing manufacturer's instructions.

Apply two coats of a vapour barrier insulation coating recommended by coating manufacturer with open mesh glass fabric embedded between the first and second coats.

### **Clean Up**

Promptly, as the work proceeds and on completion, clean up and remove from the site all debris and surplus materials resulting from the work on this trade.

## Specification Notes

1. This specification is basic and must be adapted to suit the requirements of individual projects. It is written in accordance with Construction Specifications Canada three-part section format and should be included in a separate section under Division 15 - Mechanical.
2. Insert list of other Divisions or other sections of this Division where related allied work is specified.
3. Delete items not required. See PlastiSpan Brochure 'A Complete Insulation System' for properties of each type of insulation, and page 1 of this brochure for other selection considerations. Pipe covering can also be supplied with factory applied foil jacketing.
4. If a vapour barrier is required (see Selection Considerations in this brochure) select and specify a factory applied foil jacket, a field applied foil jacket, or specify two coats of a vapour barrier insulation coating recommended by coating manufacturer, with open mesh glass fabric embedded between first and second coats.



**PlastiSpan Insulation Properties**

MATERIAL PROPERTIES	TEST METHOD	METRIC (SI) UNITS	CAN/ULC-S701			IMPERIAL UNITS	CAN/ULC-S701		
			TYPE 1	TYPE 2	TYPE 3		TYPE 1	TYPE 2	TYPE 3
Thermal Resistance <sup>1</sup> Minimum	ASTM C 518	$\frac{m^2 \cdot ^\circ C}{W}$	0.65	0.70	0.74	$\frac{ft^2 \cdot hr \cdot ^\circ F}{BTU}$	3.75	4.04	4.27
Compressive Resistance Minimum @ 10% Deformation	ASTM D 1621	kPa	70	110	140	psi	10	16	20
Flexural Strength Minimum	ASTM C 203 Procedure B	kPa	170	240	300	psi	25	35	44
Water Vapour Permeance <sup>2</sup> Maximum	ASTM E 96	$\frac{ng}{Pa \cdot s \cdot m^2}$	300	200	130	perms	5.2	3.5	2.3
Dimensional Stability Maximum	ASTM D 2126 7 days @ 70 ± 2° C	% linear change	1.5	1.5	1.5	% linear change	1.5	1.5	1.5
Water Absorption Maximum	ASTM D 2842	% by volume	6.0	4.0	2.0	% by volume	6.0	4.0	2.0
Limiting Oxygen Index <sup>3</sup> Minimum	ASTM D 2863	%	24	24	24	%	24	24	24

NOTES: 1. Thermal resistance measured at mean temperature of 24°C (75°F) for 25 mm (1 inch) thick material.  
 2. Values quoted are maximum for 25 mm (1 inch) thick material. Lower values will result for thicker materials.  
 3. PlastiSpan insulation board has a maximum Flame Spread Rating of 290 and a Smoke Developed Rating greater than 500 for minimum thickness of 25 mm classified in accordance with CAN/ULC-S102.2M.

**For more information on Plasti-Fab EPS Product Solutions, consult the following brochures:**

**Roof & Deck Insulation**

- Roof & Deck Insulation: Selection, Application & Specification
- Built Up Roofing
- Cathedral Ceilings
- Fire Rated Roof Assemblies
- Single Ply Roofing
- Sloped Roof Insulation
- Standing Seam Roofing

**Building Insulation**

**WALL INSULATION**

- Wall Insulation: Selection, Application & Specification
- Commercial / Industrial Applications
- Exterior Insulation Finish Systems
- Exterior Insulation Sheathing New or Retrofit Construction
- Interior Systems
- PlastiSpan M Insulation
- Precast Concrete Wall Panels
- Rain Screen (Cavity) Walls

**FLOOR INSULATION**

- Floor Insulation: Selection, Application & Specification
- Floor Insulation Systems
- Insulation for Radiant Floor Heating Systems
- Split Floor Slabs

**FOUNDATION INSULATION**

- Foundation Insulation: Selection, Application & Specification
- Exterior and Interior Foundation Walls
- Exterior Perimeter Foundation Insulation Systems
- Frost Protected Shallow Foundation
- GeoDrain Foundation Insulation Board

**ICE RINKS**

- Ice Rink Slab Insulation

**Concrete Formwork**

- Advantage ICF System
- Enermizer ICF System

**Mechanical Insulation**

- Cold Storage Applications
- Pipe and Vessel Insulation

**Roof & Wall Panels**

- PlastiSpan SIP System

**Buoyancy Systems**

- Buoyancy Systems: Selection, Application & Specification
- Floating Dock or Marina
- Floating Rafts

**Geotechnical Engineered Applications**

- Geotechnical Engineered Applications: Selection, Application & Specification
- GeoSpan Compressible Fill Material
- GeoSpec Lightweight Fill Material for Landscape Applications
- GeoSpec Lightweight Fill Material for Road Embankments
- GeoVoid Compressible Fill Material
- Utilities Insulation



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