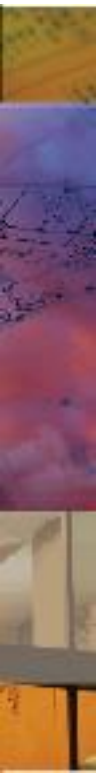
Marine Fire Wrap

Installation Instructions

A-30 Busbar Deck Penetration Seal

Reference(s)	MED018813CS, EC Type Examination (Module B)	(RINA)
	MED222913CS, EC Type Examination (Module B)	(RINA)
	164.138/EC0474	(United States Coast Guard, USCG)



The following procedure generally describes the materials and steps that are necessary to install the 3M Marine Fire Wrap System (MFW). Check the applicable Classification Society approval certificate for additional details.

NOTE: Consult each product's Safety Data Sheet for Exposure Controls / Personal Protection

Step 1 To achieve proper adhesion of the 3M™ Marine Fire Wrap (MFW) make sure the inner surface of the steel coaming and the surface of the busbar along the length which passes through the steel coaming (See Annex 2, Item 2) are clean from dust, grease and lubricants.

Remove from the specified surfaces all foreign matter and contaminants such as adhesives, grease, oil, dust, water, surface dirt, old sealant or loose paint by means of a clean-cloth and 3M™ Citrus Base Cleaner. Detergent or soap and water treatments are not allowed for this purpose.

Step 2 Prepare materials and tools as well as a work area as listed on Annex 3.

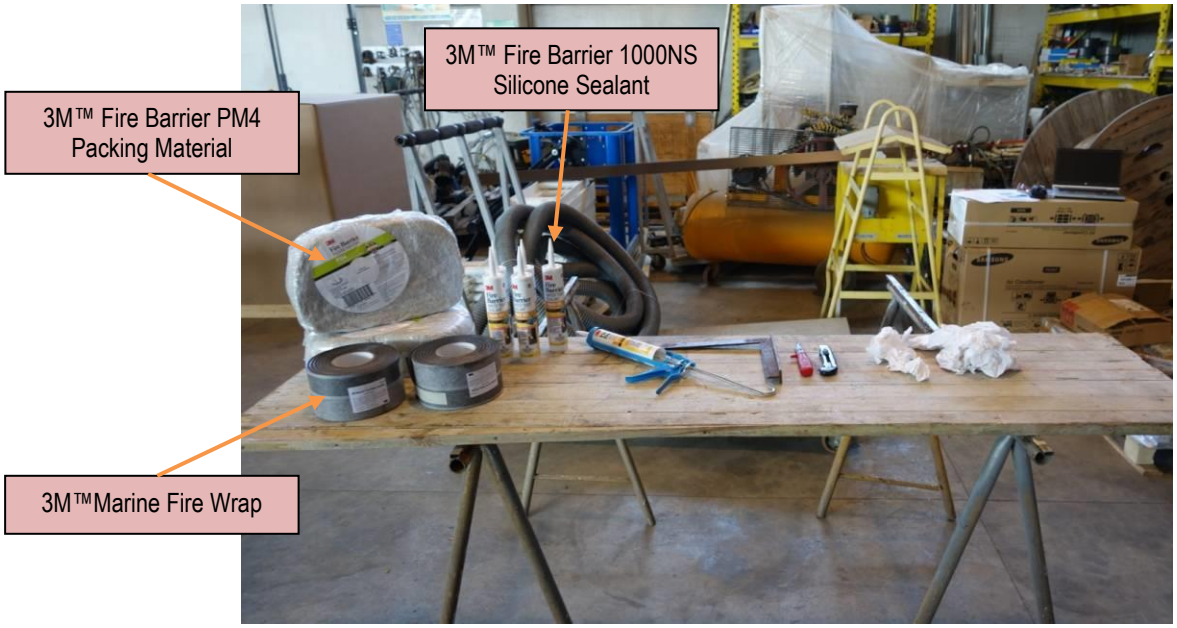


Figure 1

Step 3 Measure the inside part of the coaming length (perimeter), and cut a length of Marine Fire Wrap necessary to cover the whole inner perimeter and to allow 20 mm to 30 mm excess in order to ensure the absence of gaps when fitted (See also Figure 5)

Figure 2

Figure 3

Note: Even if the Marine Fire Wrap is bent or torn as shown in Figure 4, it can be used without loss of technical performance. Because it is an intumescent material it expands up to 25 times its initial volume and seals small voids.

Figure 4

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Step 4

One side of the Marine Fire Wrap (see Figure 2) is equipped with a self-adhesive strip that covers half of its width. The aim of this self-adhesive strip is to support the weight of the Marine Fire Wrap during its installation. For this reason the whole self-adhesive part of the Marine Fire Wrap surface is to be fitted in contact with the inner part of the steel coaming.

For installation, remove backing tape from self-adhesive strip from the rear of Marine Fire Wrap and apply it on the inner surface of the steel coaming starting 10 mm below the top edge of the steel coaming along all its perimeter as shown in Figure 5 (this 10 mm gap will allow the 3M Fire Barrier Sealant to be bonded directly to the metal coaming as described in next steps). Any excess Marine Fire Wrap that protrudes below the bottom edge of the coaming is not to be removed.

Note: The most practical method to have a 'closed Marine Fire Wrap connection' is to adhere one side of the Marine Fire Wrap to the coaming, then where the excess length of the other end slightly overlaps the adhered part, cut through both parts in one operation. By following this procedure the two adjacent sides meet without having a gap. See Figure 5 for an example.

Figure 5

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Step 5

Similar to the procedure followed for wrapping the inner surface of the steel coaming with Marine Fire Wrap, the busbar outer surface is to be prepared as well. The wrapping of the busbar is carried out using pre-cut sections of Marine Fire Wrap of suitable dimensions, specific to the make and model of the busbar to be sealed. All edges of the busbar must be clad.

Table 1 specifies as an example the number and the relevant dimensions of the whole set of Marine Fire Wrap pre-cut sections necessary to cover the perimeter of EAE and Schneider brand busbars for the largest and smallest sizes of the series. A similar table can be built by the installer for other sizes and other makes in order to speed up the process and prepare in advance all the necessary pre-cut Marine Fire Wrap sections.

Side	N°	EAE Small (150 x 106)	EAE Large (150 x 161)	Side	N°	Schneider Small (140 x 104)	Schneider Large (140 x 164)
A	2	13 mm	118 mm	A	2	137 mm	137 mm
B	2	138 mm	138 mm	B	4	20 mm	20 mm
C	4	15 mm	15 mm	C	4	45 mm	45 mm
D	4	40 mm	40 mm	D	2	100 mm	160 mm
E	4	31 mm	31 mm				

The drawing in Figure 6 shows the position of each Marine Fire Wrap pre-cut section to be fitted around the busbar.

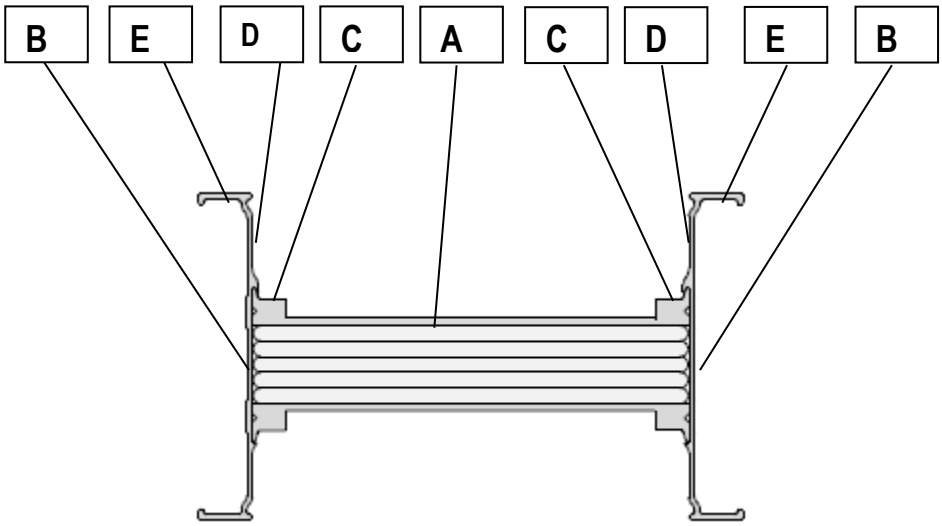

Figure 6

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Figure 7 shows the final result of the busbar wrapping.

Figure 7

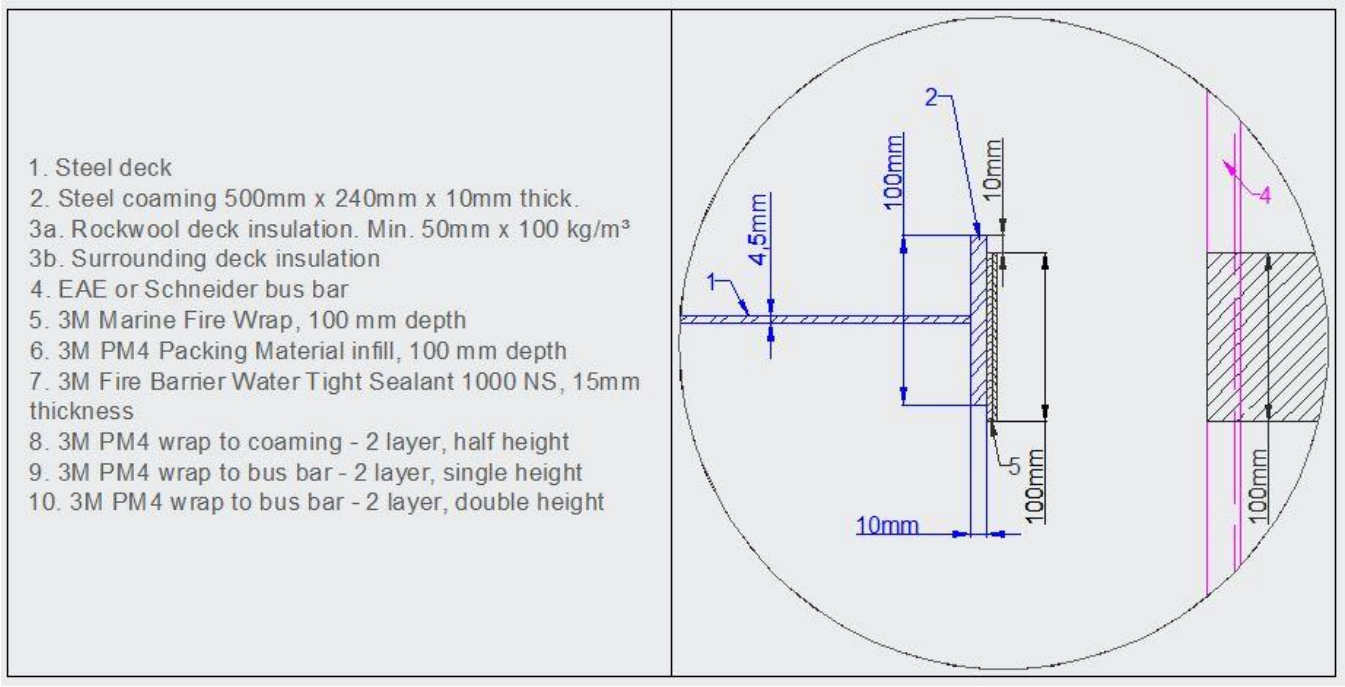

Figure 8

(Note: Not all items in the index above are intially depicted, but as these installation instruction progress all of the items are eventually depicted)

Step 6 Prepare a sufficient length of 100 mm depth 3M™ PM4 Fire Barrier Packing Material (See Annex 2, Item 6) to overlap it on itself (zigzag pattern) in order to compress it to 50% of its original volume. Insert it in between the inner surface of the steel coaming and the external surface of the busbar (both wrapped with Marine Fire Wrap). Repeat this operation until the entire annular space is filled as shown in Figure 9. These operations are to be carried out taking care not to dislodge Marine Fire Wrap.

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Figure 9

At the end of the PM4 Fire Barrier Packing Material (PM4) installation, its top surface is to be flush with the top edge of the Marine Fire Wrap (i.e. the PM4 top surface is to be 10 mm below the top edge of the steel coaming).

Figure 10

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Figure 11

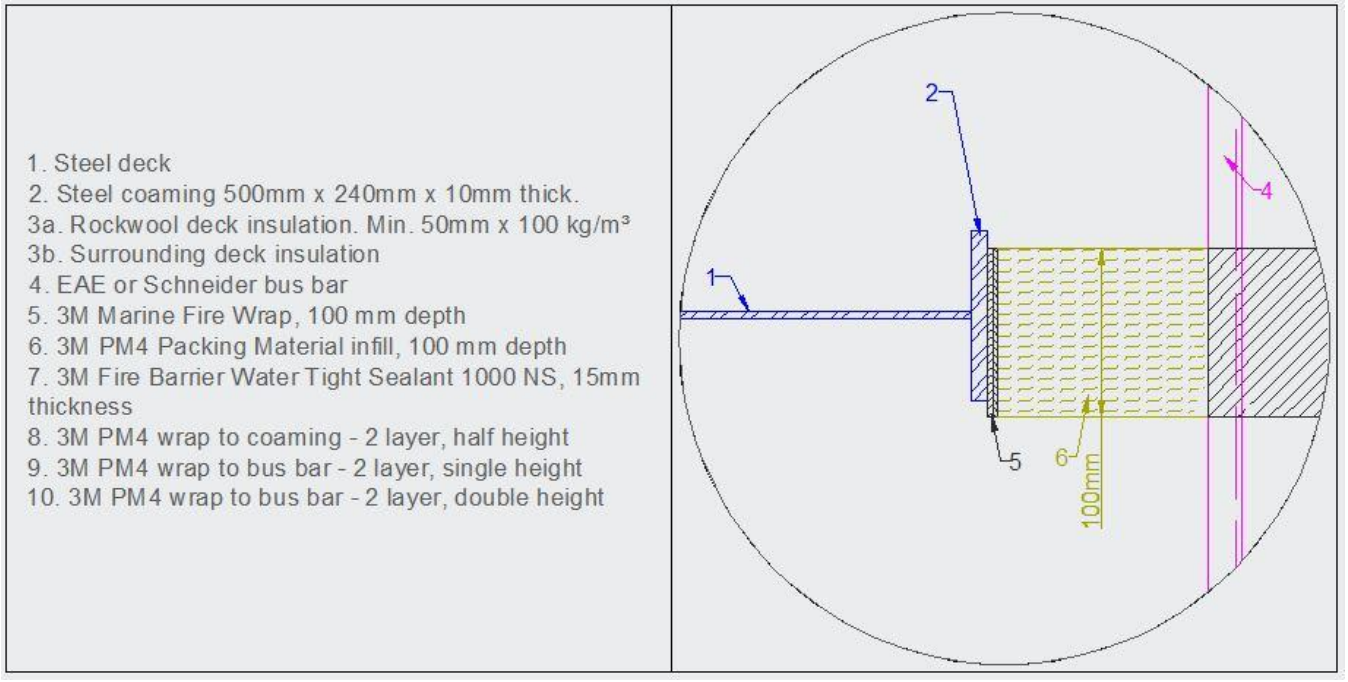

Figure 12

Step 7 Apply a minimum 15 mm thickness of 3M™ Fire Barrier Sealant 1000 NS (See Annex 2, Item 7) to the top surface of the PM4 (See Annex 2, Item 6), taking care to fully cover the whole PM4 top surface and extending the application onto the coaming to cover its top edge (minimum thickness of 5 mm as shown in Figure 17).

Figure 13

Step 8 Within 5 minutes from sealant application, use a spatula or trowel (or a simple tool of suitable length as shown in Figure 14 and 15) to smooth the surface of the sealant to give an adequate finishing level as shown in Figure 16.

Figure 14

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Figure 15

The usage of the spatula is suitable to make the visual appearance optimal, but it does not have any influence on the final resistance to fire performance. Visual imperfections do not need further finishing provided the minimum 15mm sealant depth it met.

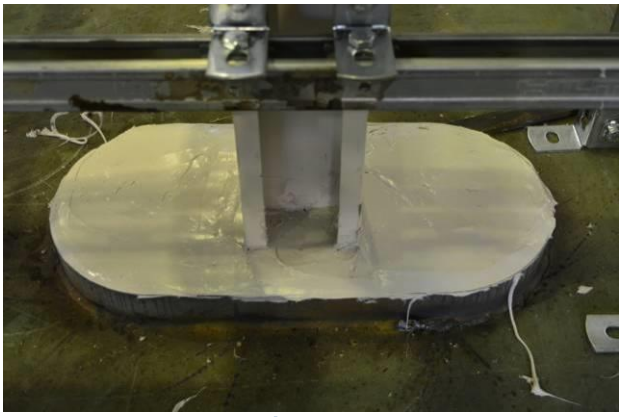

Figure 16

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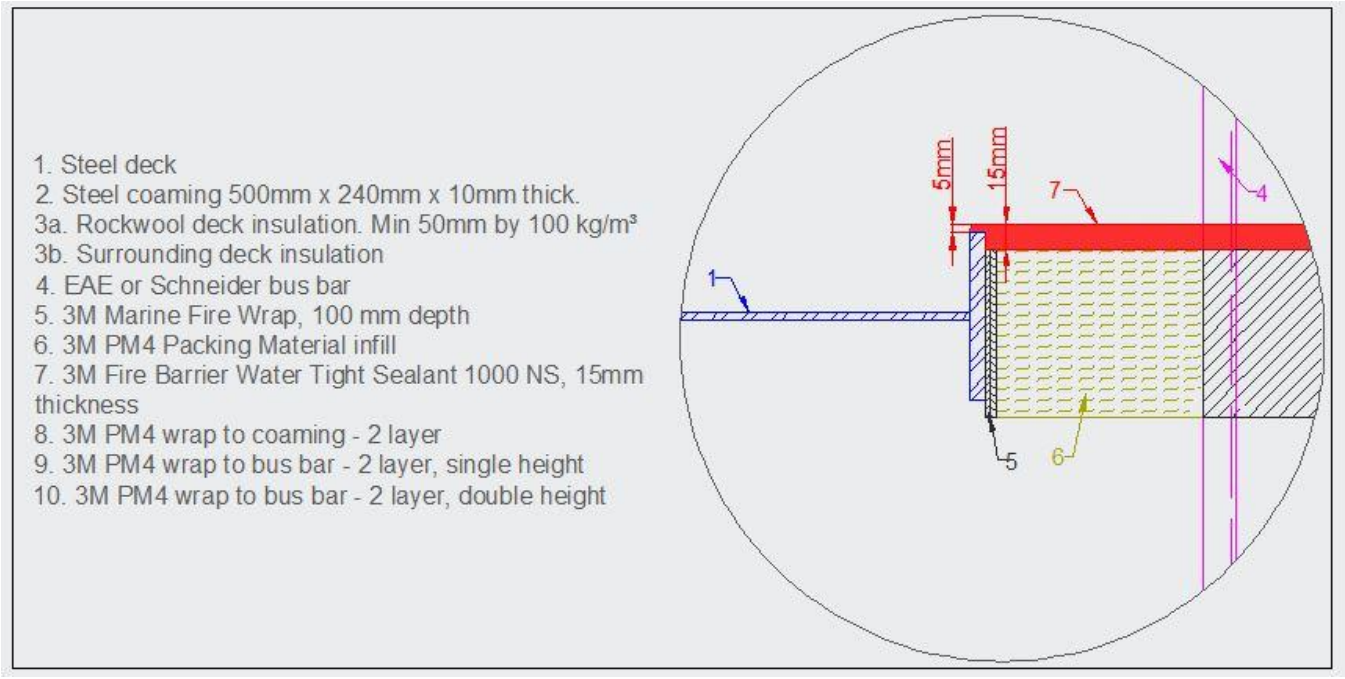

Figure 17

Step 9 Before proceeding with the next steps, allow time for the silicone to cure. The curing time depends on the humidity and temperature of the environment, it is 24 hours at least or until the sealant is tack-free.

Step 10 Tightly wrap two layers of single-height PM4 to the busbar directly below seal as shown in Figure 18. Secure the PM4 with two separate wraps of minimum 0.8 mm thickness steel wire (or equivalent metal tie). Infill the void between the PM4 wrap and the external surface of the busbar with PM4 following the same procedure of step 6.

Figure 18

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Twice in height, tightly wrap two layers of PM4 to the busbar directly above the seal as shown in Figure 19. Secure each wrap with two separate wraps of minimum 0.8 mm thickness steel wire (or equivalent metal tie). Infill the void between the PM4 wrap and the external surface of the busbar with PM4 following the same procedure of step 6.

Figure 19

Step 11 Clad the external steel coaming surface on the top side of the deck penetration with a single layer of PM4, folded in half to give double thickness, and secured with a single wrap of minimum 0.8 mm thickness steel wire as indicated in Figure 20 and Figure 21.

Figure 20

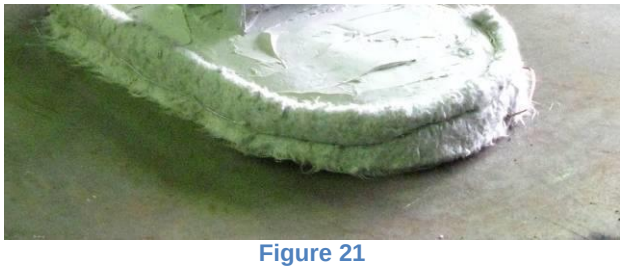

Figure 21

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1. Steel deck
2. Steel coaming 500mm x 240mm x 10mm thick.
3a. Rockwool deck insulation. Min. 50mm x 100 kg/m³
3b. Surrounding deck insulation
4. EAE or Schneider bus bar
5. 3M Marine Fire Wrap, 100 mm depth
6. 3M PM4 Packing Material infill, 100 mm depth
7. 3M Fire Barrier Water Tight Sealant 1000 NS, 15mm thickness
8. 3M PM4 wrap to coaming - 2 layer, half height
9. 3M PM4 wrap to bus bar - 2 layer, single height
10. 3M PM4 wrap to bus bar - 2 layer, double height

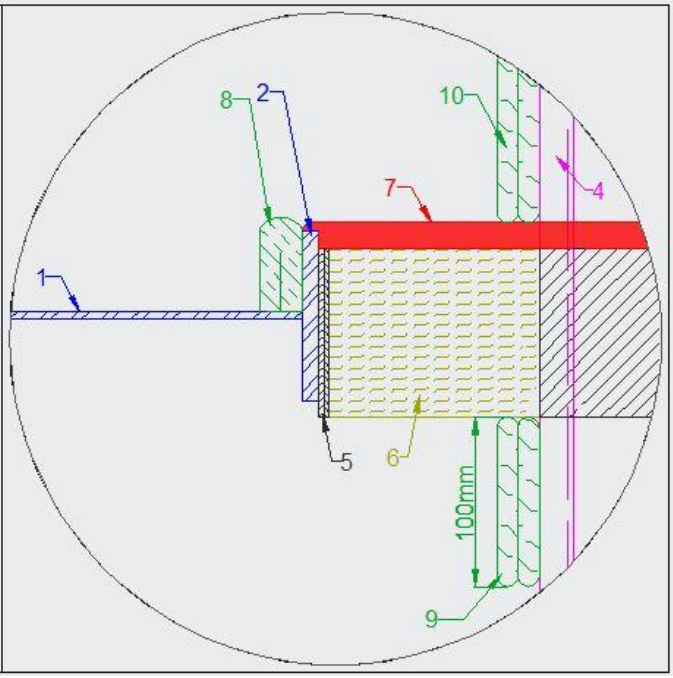

Figure 22

Step 12

Apply an additional insulation collar of Rockwool™ mineral wool with a nominal density of 100 kg/m³ and a thickness of 50 mm (See Annex 2, Item 3a & Annex 4) around the steel coaming at the underside of the deck. Use mineral wool boards. Pre-cut the mineral wool board in a size of 700 mm x 440 mm as shown in Figure 23.

Cut out the outside of the coaming. Since the busbar is already installed cut the piece in two, to allow mounting it around the collar.

Figure 23

Make on the bottom of the deck, a square chalk pinstripe around the coaming. Add 50 mm to the length and width of the coaming. Weld 10 pins on the bottom of the deck evenly spaced, starting at the 4 corners, one in between the short side and two in between the long side as shown in Figure 24.

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Push the mineral wool part through the pins and use a security disk to fix the mineral board insulation.

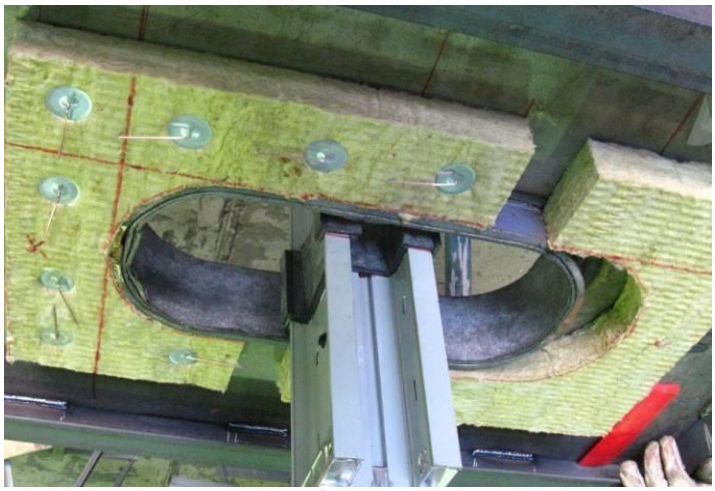

Figure 24

The Rockwool™ mineral wool applied around the coaming should abut the adjacent deck insulation. See Figure 25.

Figure 25

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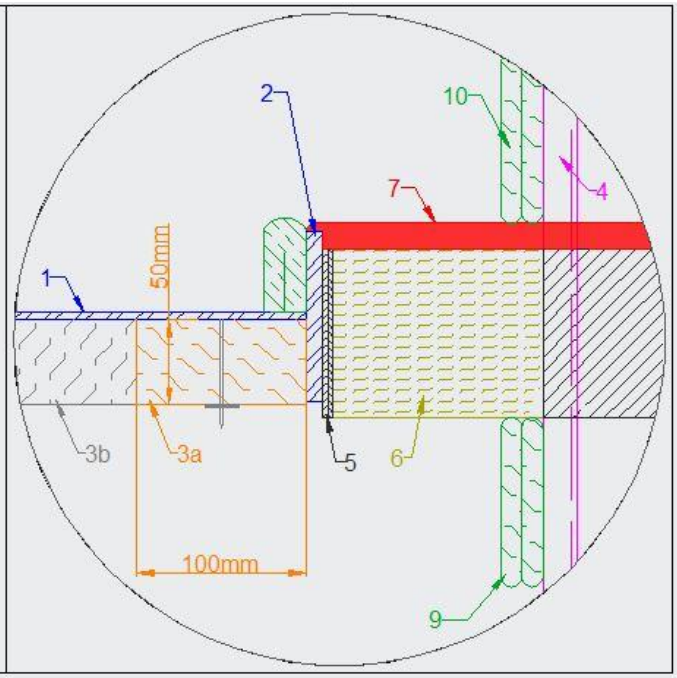

Figure 26

Important note:

The time necessary for a sufficient curing of the sealant is two days in the worst condition (areas exposed to rain and/or flooding). In these cases, the penetration is to be provisionally covered for the above mentioned period of time.

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Quality Control / Inspection

These are the primary aspect of an installation that the Quality Control department should focus on:

Cleanliness – The interior of the coaming has to be free of oil and particulate to ensure good bonding of the Marine Fire Wrap as well as good bonding of the Fire Barrier 1000 NS silicone sealant.

Positioning, Marine Fire Wrap – The top edge of the Marine Fire Wrap is to be recessed 10mm. This may vary +/- 3 mm. The reason this recess is important is so that the Fire Barrier 1000 NS silicone sealant can come into direct contact with the inside face of the steel coaming.

Positioning, PM4 Packing Material – Prior to installing the Fire Barrier 1000 NS, a check should be made to ensure that the top of the PM4 Packing Material within the coaming is recessed a consistent 10 mm (-0, +5 mm) from the top edge of the coaming. If the PM4 has any high spots they must be removed. By confirming that the PM4Packing Material is properly recessed helps guarantee that application of the Fire Barrier 1000 NS will achieve a consistent thickness across the whole area of the coaming.

Thickness, Fire Barrier 1000NS Silicone Sealant – If desired, a destructive test of the cured Fire Barrier 1000 NS can be done to verify that the overall 15mm thickness was installed. A small portion of the Fire Barrier 1000NS, approximately 25mm x 25mm can be removed with a sharp knife. Then the removed material can be measured to confirm that the thickness is at least 15 mm. The section where the test material was removed should be filled again with Fire Barrier 1000NS to the minimum 15mm thickness, and then tooled into place to ensure a good bond with the adjacent sealant.

Fastening, PM4 Packing Material wrapped around busbar – Once the PM4 Packing Material is wrapped around the top of the busbar and, check to be sure that the PM4 Packing Material is tightly compressed against the Fire Barrier 1000 NS. Once the PM4 Packing Material is wrapped around the bottom of the busbar and, check to be sure that the PM4 Packing Material is tightly compressed against the underside of the PM4 Packing material that is inside the coaming. Once the PM4 Packing Material is wrapped around outside of the coaming, check to be sure that the PM4 Packing Material is tightly compressed against the topside of the steel deck. At all locations, check to be sure that the tie-wires are intact and tight.

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Annex 2
Sketch of Typical Application

1. Steel deck
2. Steel coaming 500mm x 240mm x 10mm thick.
3a. Rockwool deck insulation. Min. 50mm x 100 kg/m³
3b. Surrounding deck insulation
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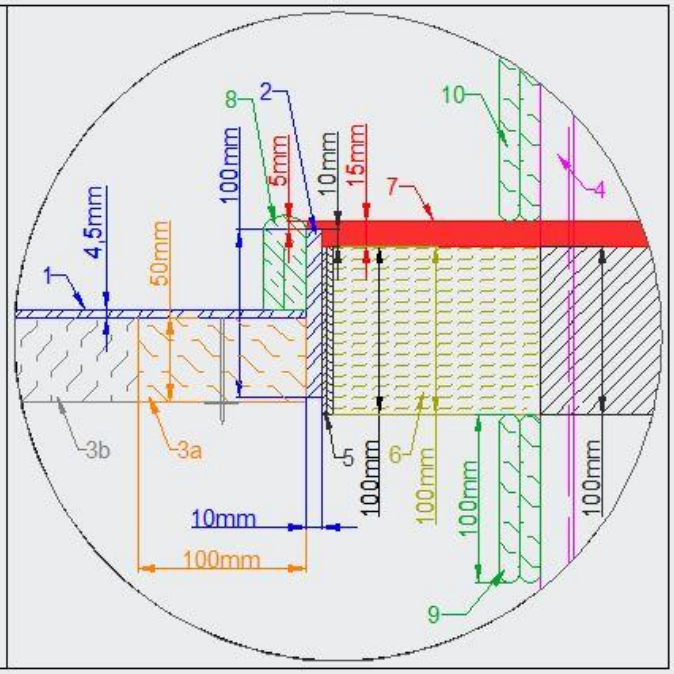

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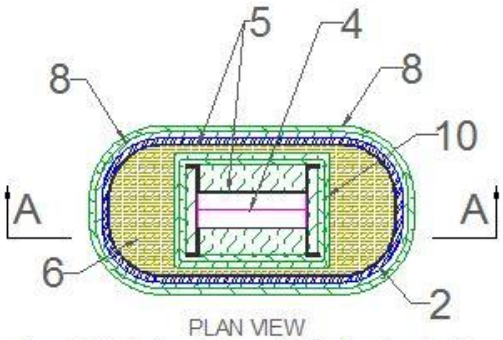
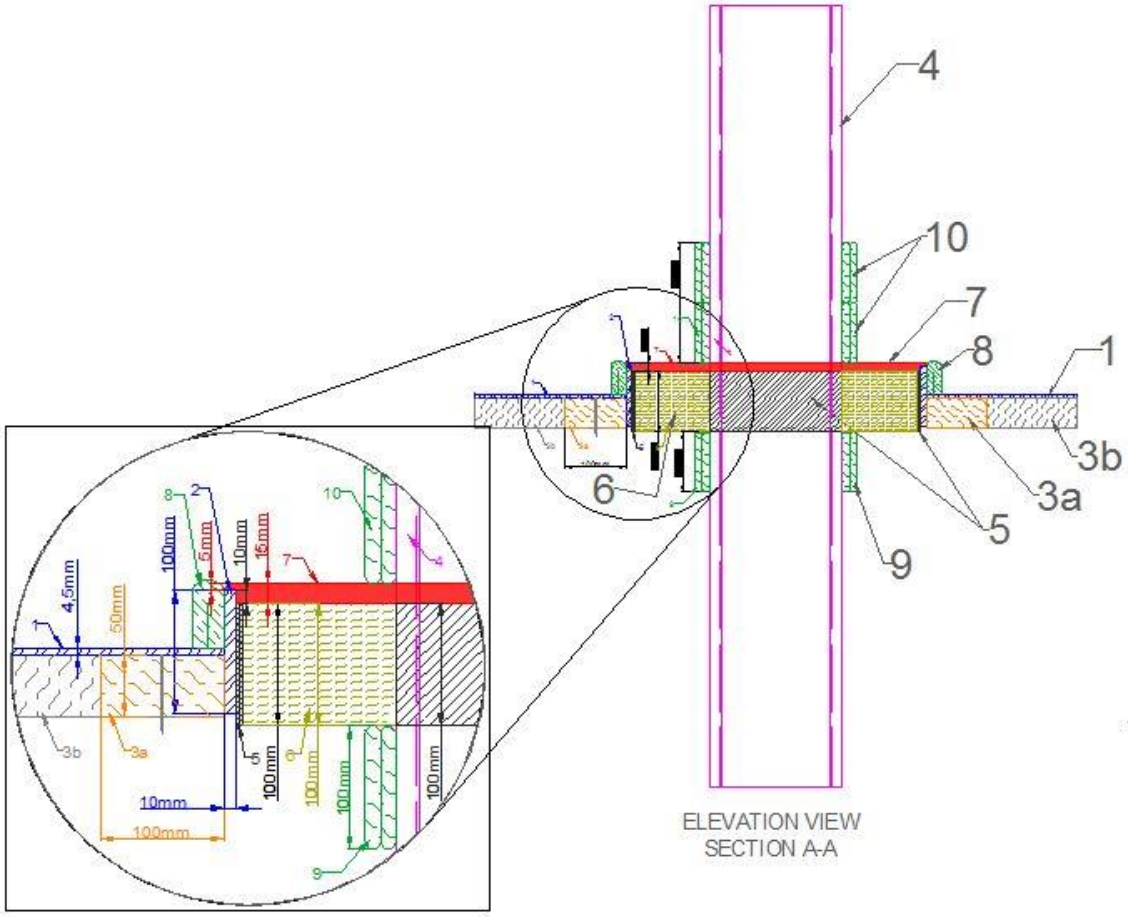


PLAN VIEW
(Item 7 'Sealant' not shown in this view for clarity)



ELEVATION VIEW
SECTION A-A

Project: A-30 seal installation	Drawn by: M.W.L.	Date: 11 July 2014
Title: Bus Bar Firestop	Dwg No.: A-30 Bus	Page 1 of 1
3M Fire Protection Products	Drawing not to scale	3M

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Annex 3
Recommended Installation Tools

Tool	Application
Measuring Tape	To measure length of Marine Fire Wrap (MFW) and Packing Material (PM4)
Knife	To cut the Marine Fire Wrap (MFW) and Packing Material (PM4)
Square	To cut the Marine Fire Wrap (MFW) straight
Hand Applicator Gun	To press out the sealant from the cartridges
Putty Knife	To evenly finish the sealant and get good bonding to the coaming
Cloth	To clean the inside of the coaming for better adhesion of the MFW and sealant

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Annex 4
Material Availability

3M Products	Unit	Per Case
3M™ Marine Fire Wrap	Roll	5
3M™ Fire Barrier Packing Material PM4	Roll	5
3M™ Fire Barrier Sealant 1000 NS, 310mL	Cartridge	12
3M™ Citrus Base Cleaner, 24 fluid ounces	Can	12
Deck Insulation	**Batt Size, mm**	
Mineral Wool, for coaming. Rockwool™ brand, minimum 100 kg/m^3 density	1200x600x50	
Mineral Wool, for deck. According to specific fire-rated deck design		

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