

It has been noted that transitions between sections of different thickness are often the location of cracking in subsea insulation. This is especially true when the transition occurs sharply at or near a pour line between adjacent pours of insulation material.

To reduce the danger of cracking, two precautions are essential during application: (1) locate all pour lines away from changes in shape or contour; and (2) arrange for a radius or other form of graduated change between sections of different thickness or geometry. These precautions are illustrated in the sketches below:

Figure 1 shows a bad situation in which the pour line occurs at an abrupt transition between two diameters. Cracks will almost certainly form at the interface. It is extremely important to avoid this condition by applying one or more of the following corrective actions.

Figure 2 shows relocation of the pour line away from the highest stress point. The pour line should be at least 4.00" or no less than twice the thickness of the insulation, whichever is greater, away from the stress riser. If altering the geometry of the insulation is impossible, a partial remedy is to apply additional layers of fiberglass overwrap at the interface to form a radius or chamfer.

Figure 3 shows placement of an integrally cast radius at the interface. The contour should be of radius  $R = 2.00"$  or at least the thickness of the insulation, whichever is greater. Note that the pour line is also properly positioned. Figure 4 follows the same rule, but uses a chamfer to accomplish the transition. In many cases, a chamfer is easier to form than a radius.

Figure 5 shows an alternative geometry with an extended taper  $4R$ , or at least 8.00" long, between thick and thin sections. The pour line is located beyond the taper, or if possible, within the taper, as shown. Any of these transitions can be further enhanced by the application of fiberglass overwrap. Properly designed and executed, these simple rules will greatly reduce the chances of insulation cracking in service.

