

PVC Conduits for Cable Penetrations

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Introduction

The reader is referred to the first paper I wrote about this subject: "Cable Penetrations of the Deck", SNO-STR-? Now Monenco's engineers have revised their design for the cable feed-throughs for the deck (Drawing Number 17-702-H-6447 Sh.3, Rev.C). What we are concerned with here is the change in the PVC conduits, each containing seven RG59 cables. The conduits have been made smaller and are based on a mass-produced PVC plumbing accessory (which Beaver Lumber sells for 79c each). This change will allow greater packing of cables, greater ease of manufacture and higher strength (there is an internal rib onto which the epoxy can key).

Prototypes

Prototypes of the conduit and cables were constructed using two different plumbing fixtures. One as shown in the drawing (43mm OD with a 50mm lip, 38mm long), and a smaller one (about 30mm OD, plus a 40mm lip). Each was evaluated for ease of construction, ruggedness and flexibility, and tested for vacuum tightness.

In each case the cables were initially fixed in place by a small amount of 5 minute epoxy, then the conduit was filled with Scotch-Weld 3M 2216 with a 1.5 hour working time and a 24 hour curing time. Rubber spacers were used at both ends as before.

Filling the shorter conduits is *much* easier than the earlier 6" models.

Tests

In each case the conduit was tested for vacuum tightness.

The prototypes which passed this test showed no leakage at the level of 10^{-5} l s^{-1} under vacuum. Hence 1400 of them under an overpressure of 1/10 atmosphere, would leak at a rate of 10^{-3} l s^{-1} or less.

During the filling period the cables will hang on the conduits with a weight of approximately 12kg (Willmott) for several months. Each prototype was tested by hanging 25kg (as per Brewer's suggestion) on the cables for periods of several days. No adverse effects were noted.

Firestop

I used some Thermalastic 83E (the cheapest of the three options recommended by Monenco) to model the proposed arrangement for sealing the finger plates and conduits. This firestop is water based, takes a long time to set (weeks?) and proved impossible to pull even the weakest of vacuums on. I therefore conclude that it doesn't make a good gas seal. A little five-minute epoxy around the lip on the conduit worked much better.