**Argon test cell
Coaxial Cable Feed Through
Connector Testing**

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APPROVED:

Coaxial Cable Feedthrough

Within each cryostat there will exist three Argon Monitoring Boxes. Located at different elevations these boxes are responsible for measuring the relative "quality" of the Argon as far as its ability to transfer electrons without recombination. Each box requires three miniature coaxial cables to provide a signal to the outside world.

These cables are shielded in groups of three. Each cryostat requires three of these grouped cables which must pass through some form of feedthrough located in the Instrumentation Box. For reasons of minimizing crosstalk and signal loss it is best to provide uninterrupted coaxial service between the receiving device and the monitor boxes.

In an attempt to provide such service Jerry Blazey obtained a connector whose manufacturer promised would provide uninterrupted coaxial service. Results of cold shock and leakage tests performed on this feedthrough comprise the remainder of this note. Under normal operating conditions this feedthrough would never reach temperatures as low as those used for these cold shock tests.

Coaxial Cable Feedthrough

Coaxial Cable Feedthrough Test Results

Initial leakage rate before testing

4 x 10E-9 std. cc He/sec.

Cold Shock:

-LN2 was poured onto the wires approximately one inch away from the epoxy. Eventually(90sec.) the epoxy did reach LN2 temperature.

Leakage Rate.

while cold 4 x 10E-9 std. cc He/sec.

warm-up:

20min. 3 x 10E-7 std. cc He/sec.

4hrs. 1 x 10E-6 std. cc He/sec.

18hrs. 3 x 10E-6 std. cc He/sec.

Wires emersed in LN2 6" from the epoxy-

initial 5 x 10E-6 std. cc He/sec.

cold:

0-10min. 3 x 10E-6 std. cc He/sec.

Gradual increase to 4 x 10E-6 std. cc He/sec.

LN2 3" from the epoxy-

initial 2.5 x 10E-6 std. cc He/sec.

0-15min. down to 2 x 10E-6 std. cc He/sec.

After the test the warm leakage rate was-

6 x 10E-6 std. cc He/sec.

The next morning-

6.6 x 10E-6 std. cc He/sec.

The wires were cooled again 6" from the epoxy and the following leakage rates were observed.

warm 6.6 x 10E-6 std. cc He/sec.

cold 4min. 3 x 10E-6 std. cc He/sec.

15min. 3.4 x 10E-6 std. cc He/sec.

warm-up 5min. 5 x 10E-6 std. cc He/sec.

15min. 5.6 x 10E-6 std. cc He/sec.

20min. 5.8 x 10E-6 std. cc He/sec.

35min. 6.8 x 10E-6 std. cc He/sec.

40min. 7.5 x 10E-6 std. cc He/sec.

55min. 7.1 x 10E-6 std. cc He/sec.

One week later -

2 x 10E-7 std. cc He/sec.

After welding-

5 x 10E-6 std. cc He/sec.

NOTE: Multiply values by .374 for std. cc air/sec.

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Next, the feedthrough was pressure tested to 1500psig with no obvious signs of leakage or physical damage. Following pressure testing we machined the feedthrough in half. The discernible details appear in the cartoon below.

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Conclusions

This feedthroughs leakage rate after cold cycling, although not perfect, was not horrible. This and the results from pressure testing leave no reason for this feedthrough not to be used in the instrumentation box.