



## US ATLAS MEMORANDUM

**Date:** 23 February, 2002  
**To:** G. Favre, A. Fallou  
**From:** S. Kane  
**Subject:** Welding Parameters for the Liquid Argon Calorimeter End Cap Signal Feedthrough

Weld development testing was conducted on 21-22 February 2002 in Building 180 at CERN by Jaques Fattaz and myself. The testing was conducted using the Polysoude 204 power supply/cooling unit and the Astroarc K6000 welding head, currently in use for the installation of the ATLAS Liquid Argon Barrel Signal Feedthrough. The joint under development was for the installation of the ATLAS Liquid Argon End Cap Signal Feedthrough. This joint involves a square butt configuration for two 140mm diameter AISI Type 304L stainless steel pipes with a 2mm wall thickness. Test articles were fabricated to approximate the End Cap transition configuration.

Several test welds were conducted to arrive at a final program. The final program was then used to conduct weld tests in the ATLAS Liquid Argon End Cap Signal Feedthrough mock-up. The test articles were not very uniform in wall thickness or roundness, which is beneficial in weld development to test the ability of the program to handle off-nominal conditions. Back purging was accomplished by sealing the ends with aluminum tape and acrylic sheet. The following are the parameters for the final program.

Table 1  
End Cap Signal Feedthrough Weld Parameters

| <b>Parameter</b>     | <b>Value</b>                  |
|----------------------|-------------------------------|
| Pre-purge duration   | 30 seconds                    |
| Post-purge duration  | 30 seconds                    |
| Start Current        | <del>90</del> 80 amperes      |
| Start Time           | 5 seconds                     |
| High Pulse Current   | 105 amperes                   |
| High Pulse Duration  | 100 ms                        |
| Low Pulse Current    | 55 amperes                    |
| Low Pulse Duration   | 100 ms                        |
| Ramp down Initiation | 375 degrees                   |
| Ramp down Duration   | 10 seconds                    |
| Travel Speed         | 160%(program) =>118 mm/minute |

Table 2  
Electrode Configuration for End Cap Signal Feedthrough

| <b>Parameter</b>            | <b>Value</b>            |
|-----------------------------|-------------------------|
| Electrode Gap               | 1.5 mm                  |
| Electrode Length            | 30.0 mm                 |
| Electrode Tip Configuration | 30 degrees/0.75 mm flat |
| Electrode Alignment         | On gap                  |

Installation welding can be accomplished using an internal shield plug similar to the Barrel Cryostat. Parameters for modifying existing plugs includes lengthening to 230 mm overall length, and reducing the outside diameter of the plug to provide a 1.7 mm gap between the plug and the worst case inside diameter of the transition or Signal Feedthrough.

As always, I am indebted to you for providing a fine professional in Jaques Fattaz to assist in this important work.

cc:

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