LIQUID HYDROGEN ABSORBER

FLOW TEST PLAN

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26 September 2001

The purpose of the test is to verify the current design ability to remove the thermal deposition of the beam on the absorber hardware and the hydrogen.

Three (3) test modes are considered, each requires it's own configuration as follows:

1- one absorber assembly with two transparent plastic windows

This absorber will be filled with water at room temperature and the pattern of flow will be photographed by circulating the water from inlet to outlet using a luminous die injected at the inlet of the absorber.

2- the next assembly will use one transparent plastic and one-aluminum window.

The intent in this configuration is to study the pattern of flow generated by a heat source intensified at the center of the absorber. Infrared pictures will be taken on both forced and convective flow tests.

3- two aluminum windows on this absorber assembly will be pressure and flow tested at the operating cryogenic temperatures (17-19 K).

This test will demonstrate performance of the absorber within the cryo system, operating on a test mode with extreme pressure and temperature variations considered for safety. The temperature source will be other than beam on the initial test and will be immersed in a solenoid magnetic field. Later will be exposed to the beam when available.

Status and requirements:

Mode 1 is at final stage of construction; first test is expected by the 4th week on October.

Mode 2 will use the same manifold and one window used on 1, the aluminum window will be fabricated within the test 1 period, other equipment for this test can be procured and delivered also within this period, so test 2 will follow shortly after 1.

For mode 3 we will change the absorber configuration to one that latter will be inserted in the existing solenoid magnet which will be relocated from lab "G" to the new LINAC enclosure area. For this absorber we need:

a) **To fabricate, a new manifold for 11cm radius chamber, planed at the IIT shops.**

b) **Seven (7) absorber windows, 5 of which shall be broken to satisfy the ASME and Fermi safety requirement, to be requested from the University of Mississippi.**

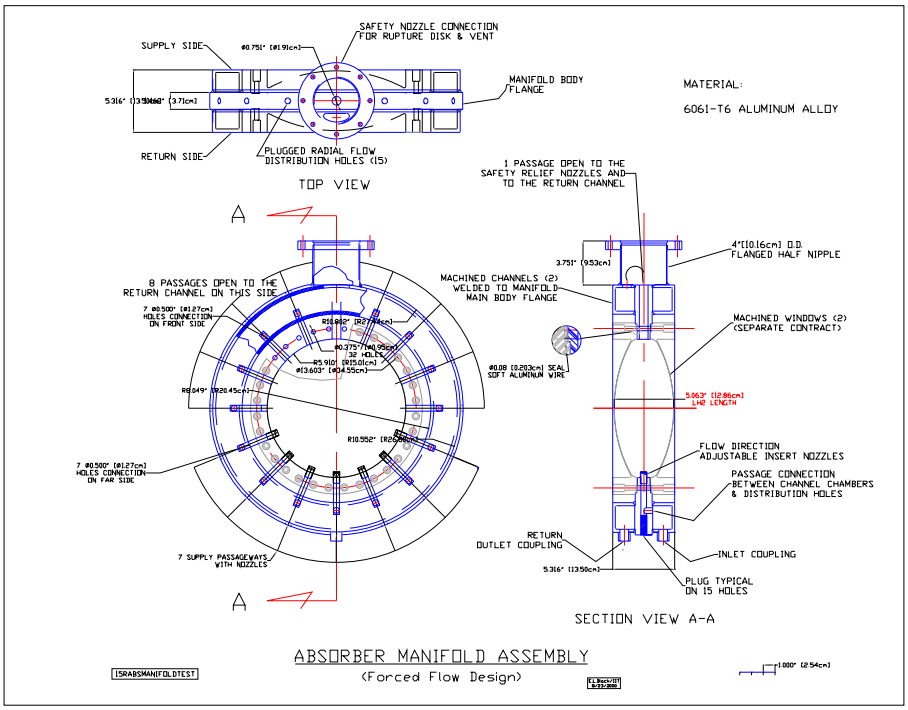
c) **A vacuum chamber surrounding the absorber but small to be inserted in the solenoid magnet and containing also an integrated heat exchanger.**

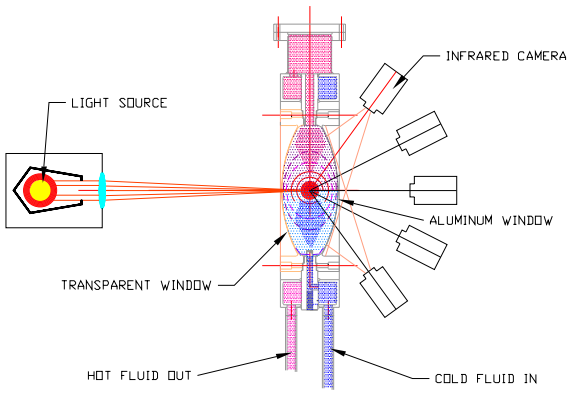
d) **Some temporary support for testing the absorber outside the solenoid without the beam,**

e) **The cryogenic heat exchanger on "c" using the existing CalTech turbine-pump and the**

f) **Fermi helium system and utilities, electric power, vacuum pumps, cryogenic gases, and a temporary closure of the new area.**

Next or parallel to this effort will install the magnets required to extract the beam to the new area up to the existing shielding, modify the shielding to permit a diagonal crossing and start the installation beyond the shielding in the new area. At this point the phase II construction may start for the experimental hall with full power beam facility.





MANIFOLD FLOW STUDY