Lithium Hydride Absorber Program

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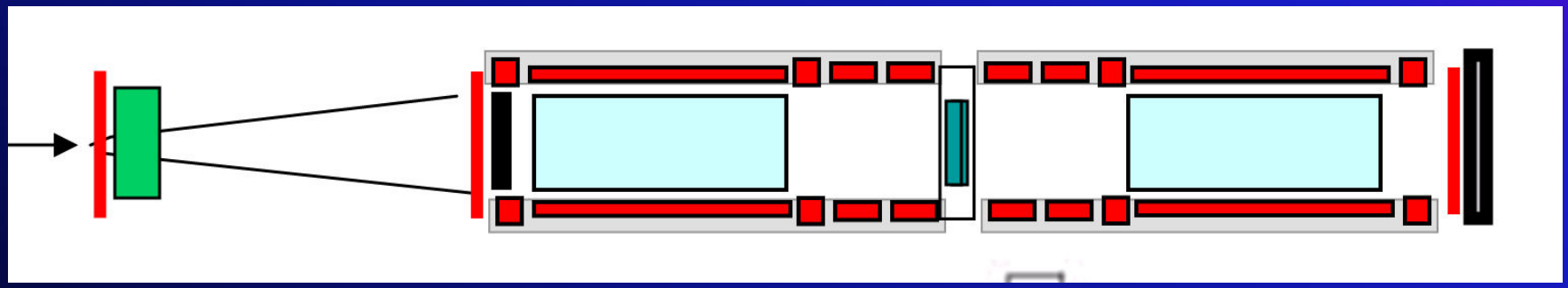
LiH Discs

We want to Procure:

- An instrumented LiH disc (30 cm diameter, 4 cm thick) for measuring thermal properties
- Two small (1.25" diameter X 0.25" thick) samples for radiation stability tests
- One or Two LiH discs (50 cm diameter, 6.5 cm thick)
  - For use in MICE Step III.1

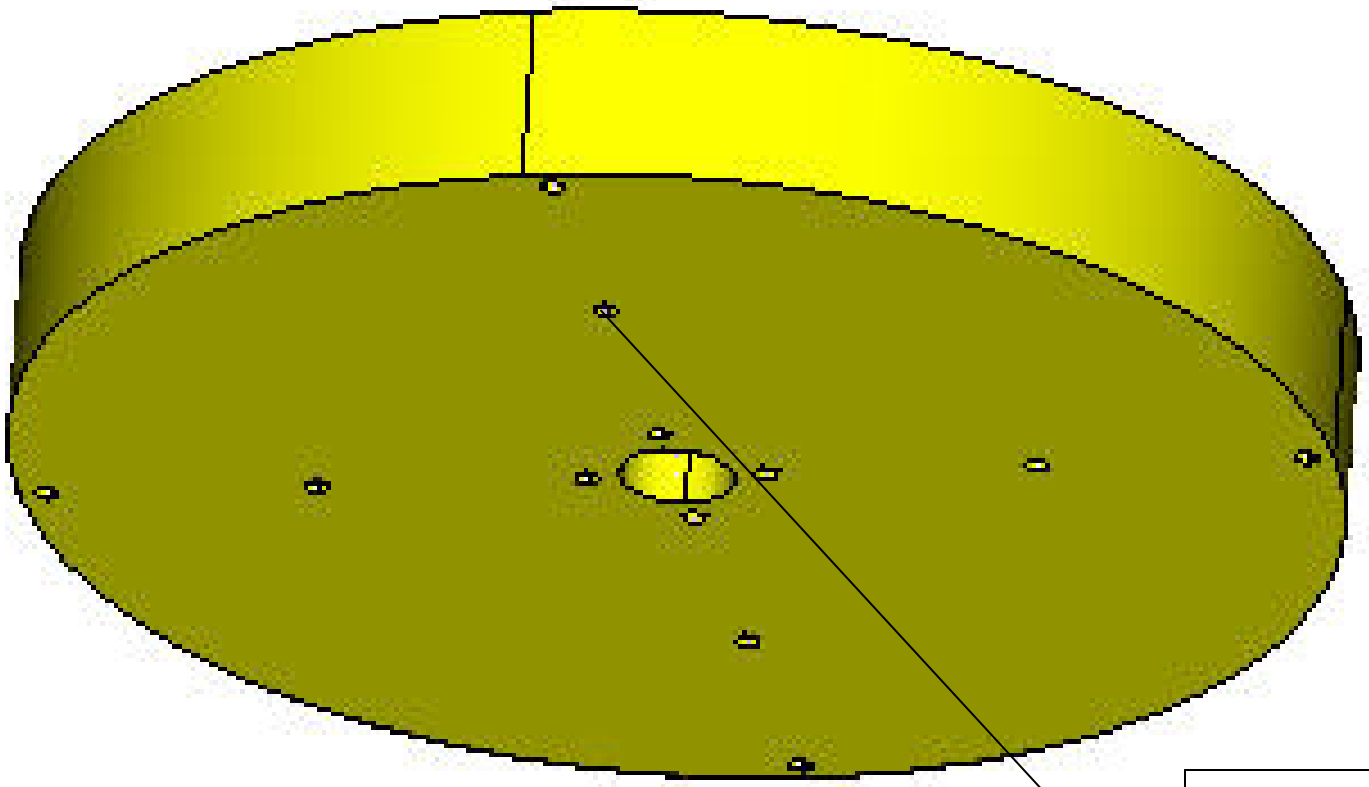
MICE Step III.1



Y12 National Security Complex

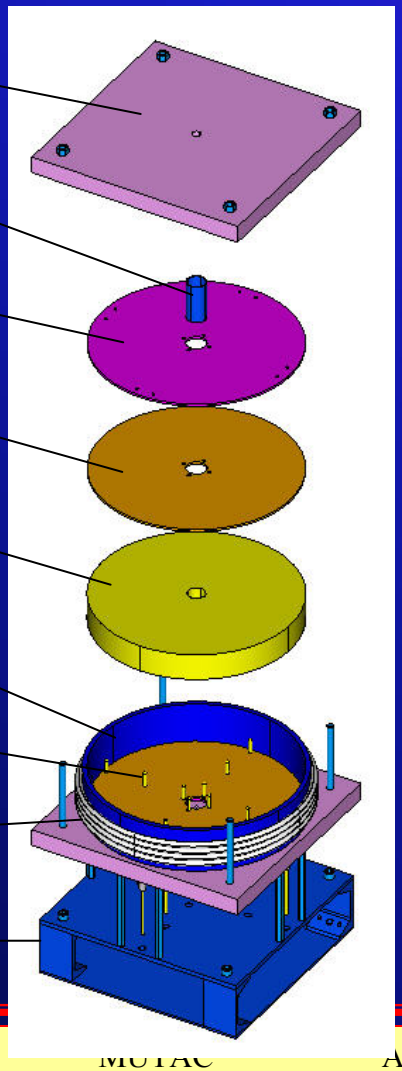
- Only 1 vendor was found that would cast LiH
  - After some reflection (and some input from Chemists from Argonne Lab), the vendor decided casting LiH was too dangerous (production of H_2 gas)
- Negotiating with Y12 to fabricate these discs.
  - We are also investigating if the UK equivalent (AWE, plc – Atomic Weapons Establishment) can help
- Produced by Hot Isostatic Pressing (150 °C, 30,000 psi)
  - Will use existing mold
- Final parts will be
  - Tested for Chemical composition and purity
  - Radio-graphed to ensure no voids
  - Machined to size
  - Dimensional inspection
  - Coated with epoxy completely

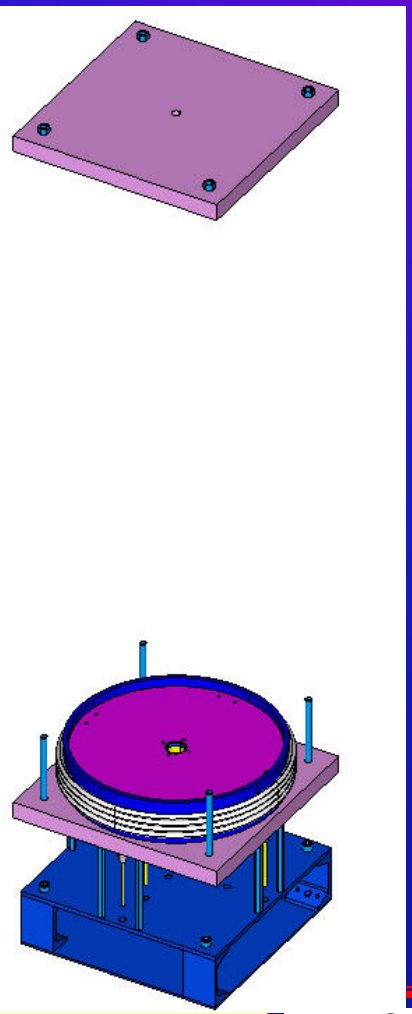
Instrumental Disc



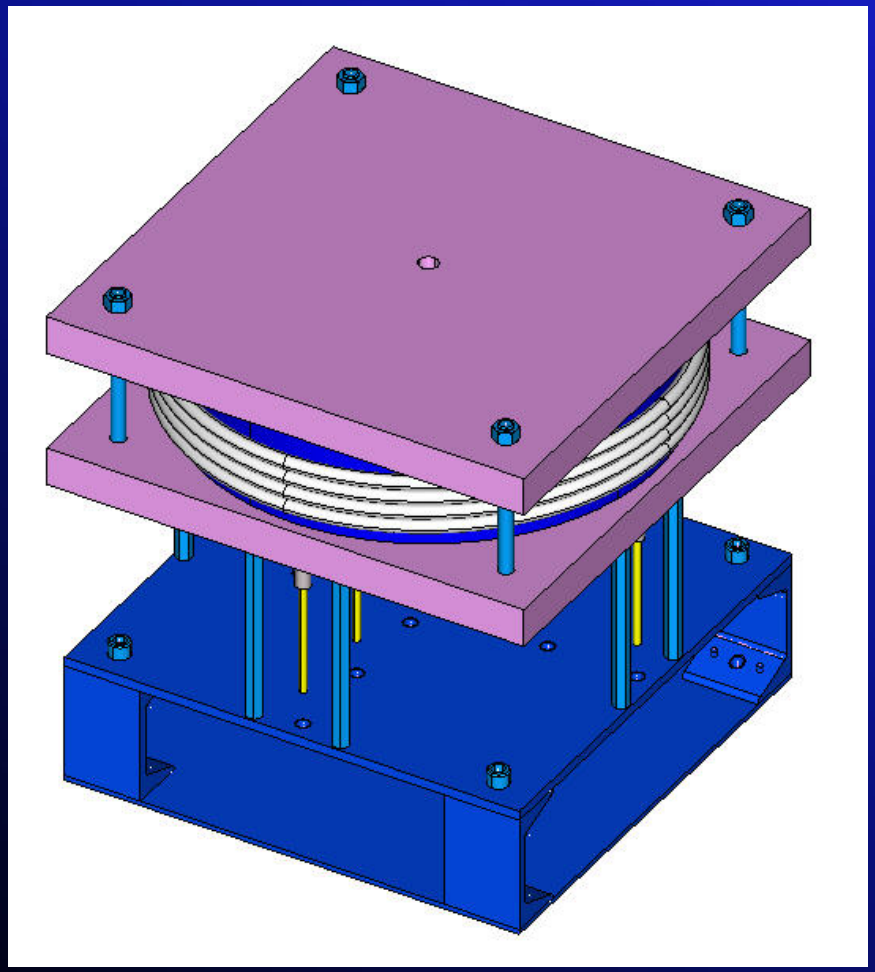
The Set Up of the Thermal Test

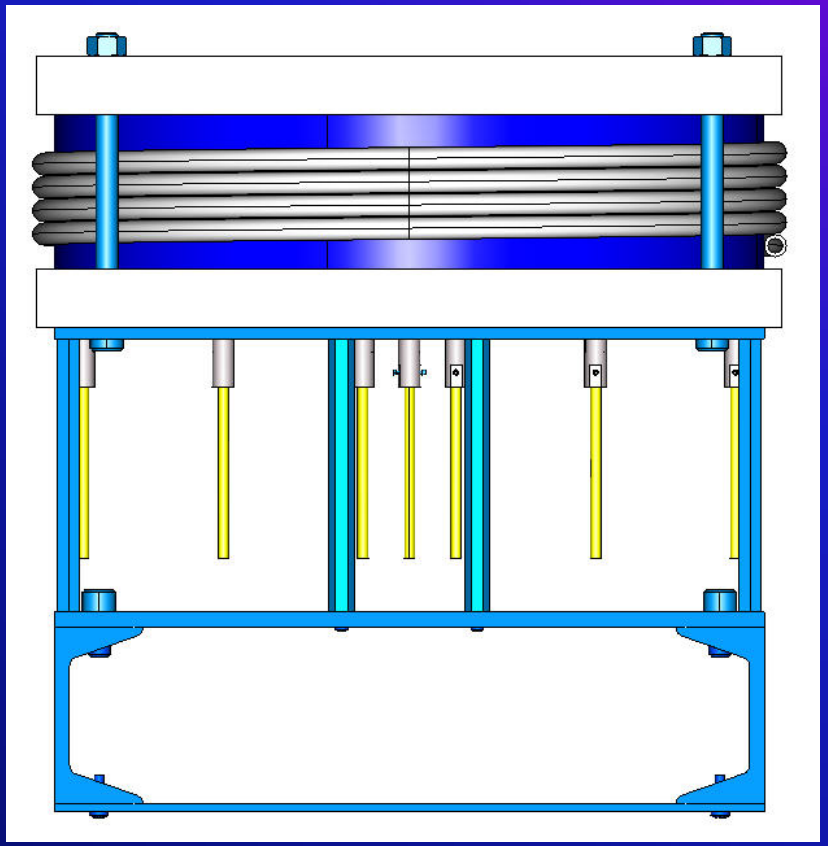
- Foam board & gasket
- 1” copper tube with heaters
- High temp glass ceramic
- High temp low k gasket
- Machined LiH disc
- 12” dia steel ring
- Thermocouples X12
- Flexible cooling tube
- Stainless steel base structure





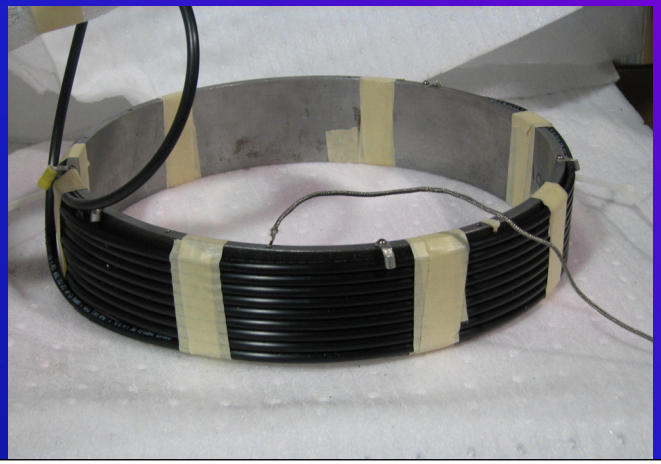
The Set Up Ready for the Thermal Test



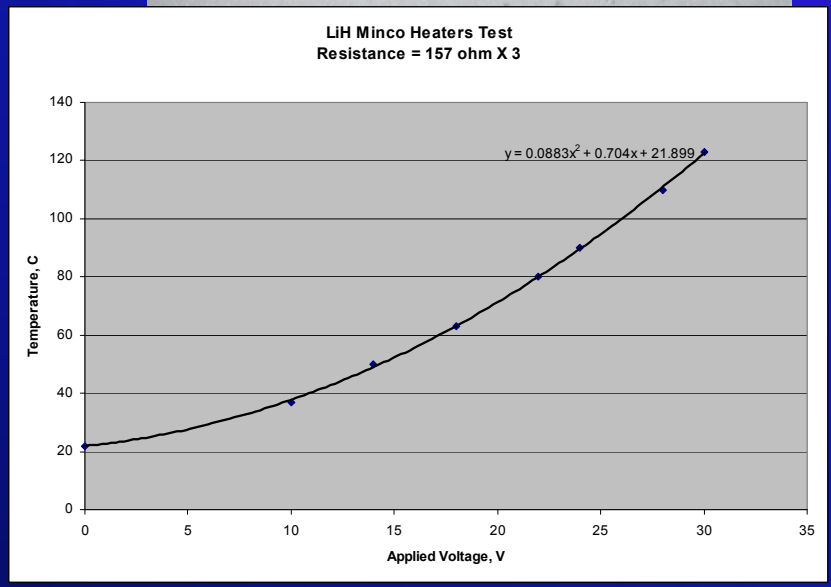


A Couple of Quick Checks

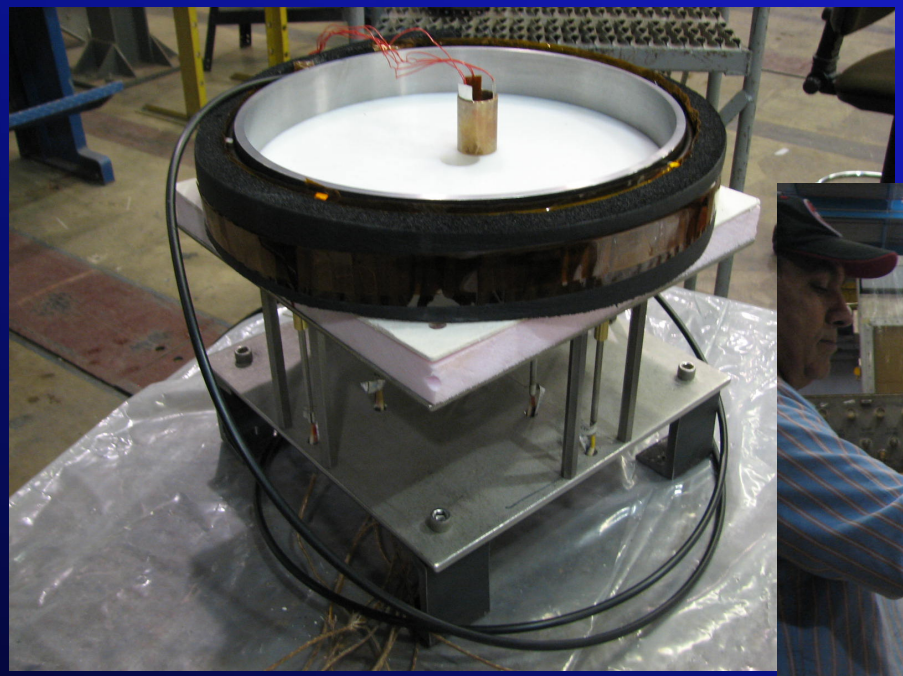
Heat Sink Check:
- A coil of Parflex flexible thermoplastic polyethylene tubing, (¼"OD, 0.04" wall) was wrapped around the steel ring;
- Chiller temperature was set at -10C;
- Steel ring temperature was at -1C.



Heat Source Check:
- 3 kapton flex heaters with R=157 ohms were glued to the inside of the copper sleeve evenly;
- +123C was achieved on sleeve surface at applied voltage of 30V

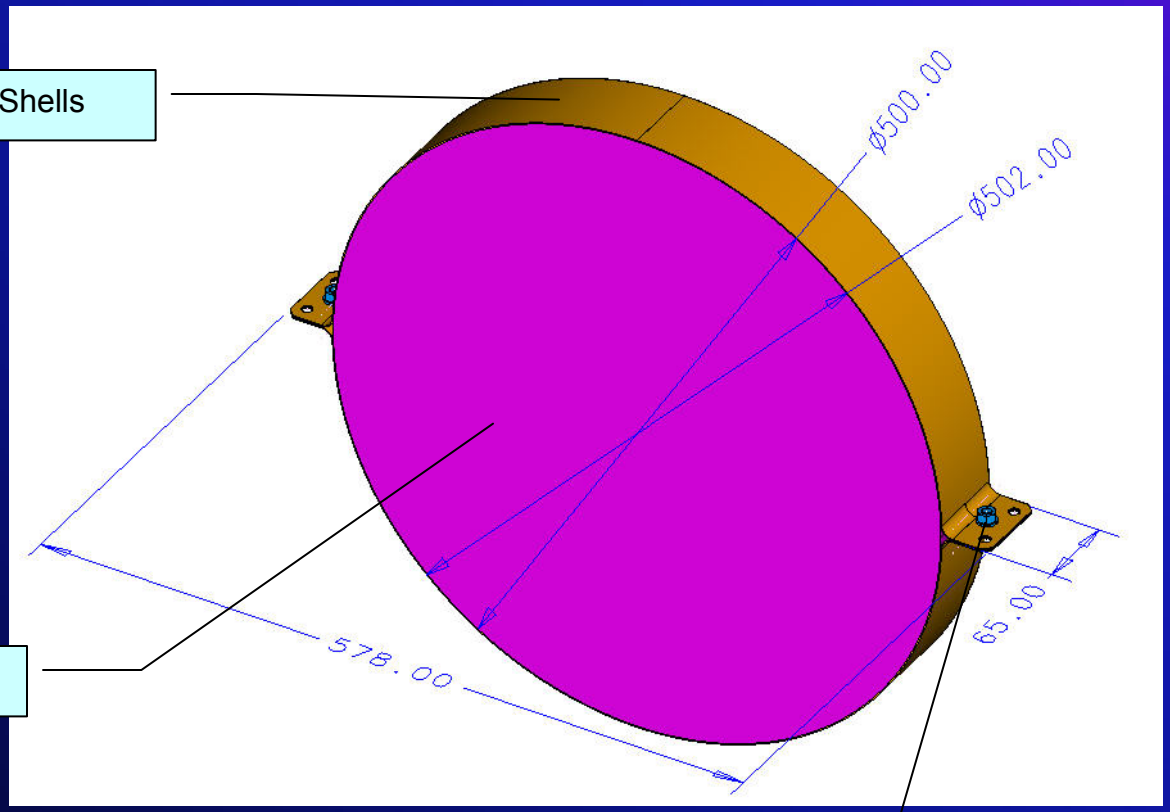


The Hardware Ready to take the Disc



The MICE Energy Absorber

Carbon-fiber Clamp Shells



LiH Disc (~ 10 kg)

The absorber is fastened by two M8 screws and nuts first.

Installation in MICE

This absorber is lowered down through the slot of the ss spool piece