Cooling and mechanics

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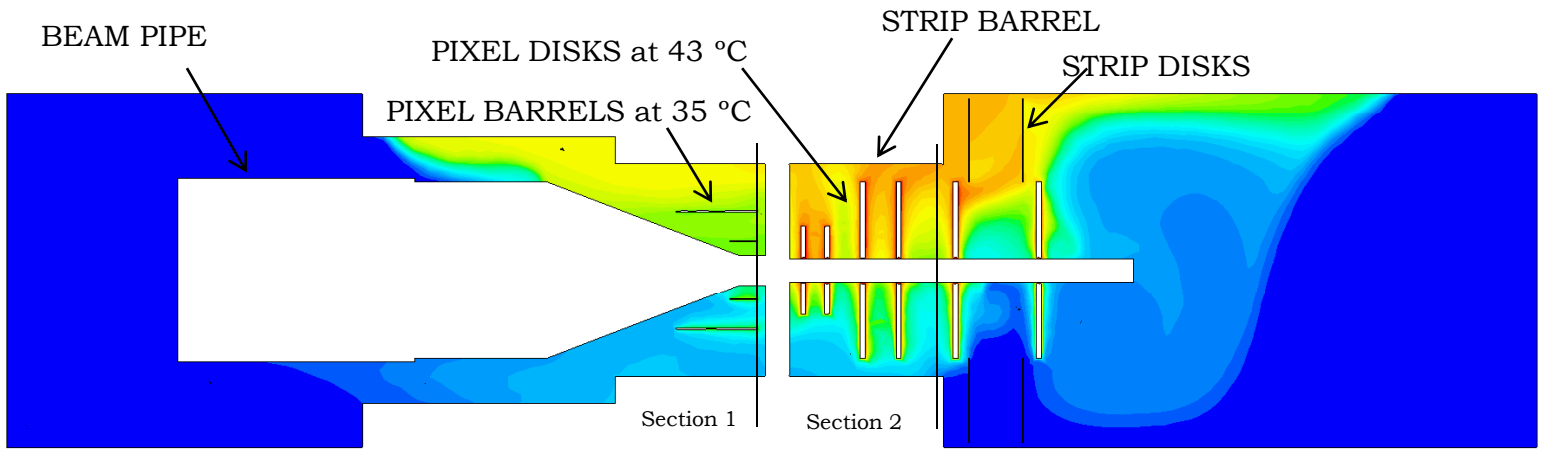
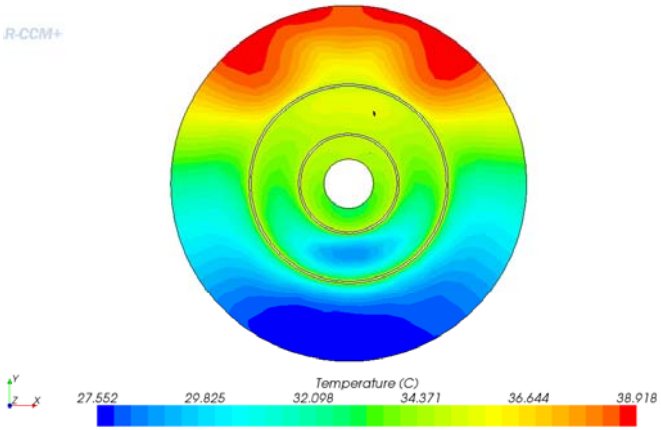
MVD: FLUIDODYNAMIC SIMULATIONS in PIXEL REGION
FREE CONVECTION

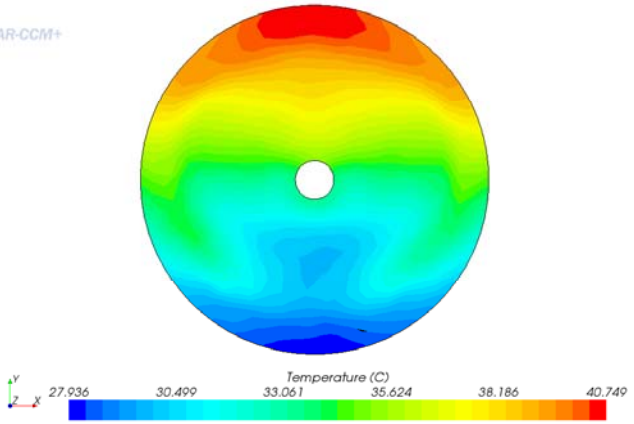
AMBIENT TEMPERATURE 25 °C



Section 1 at Z=-25 mm

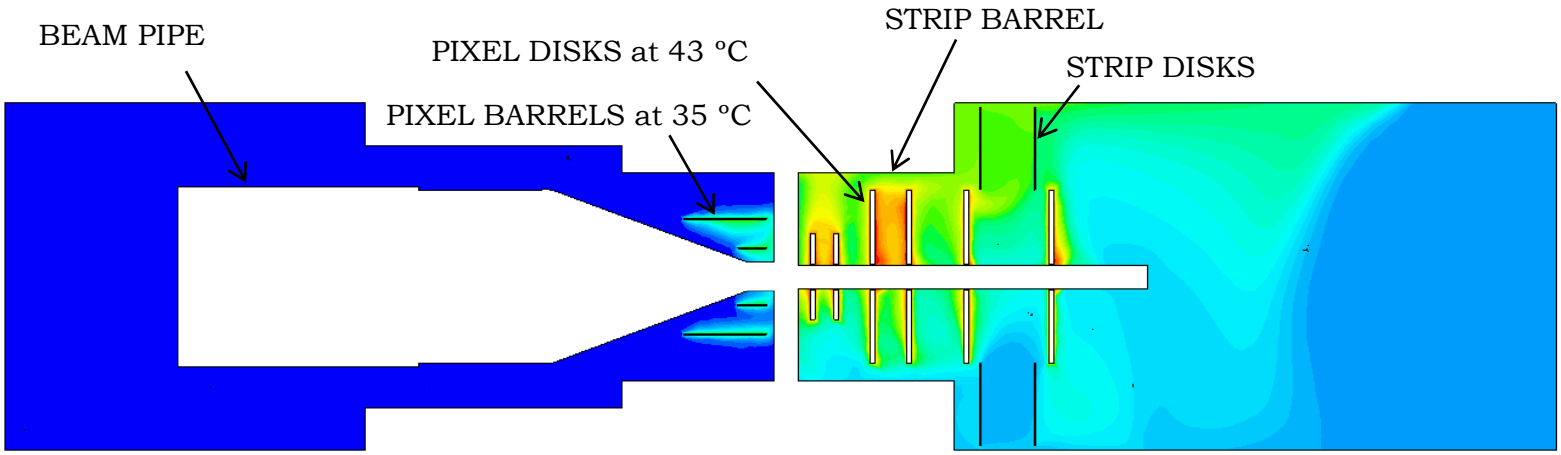


Section 2 at Z= +120 mm

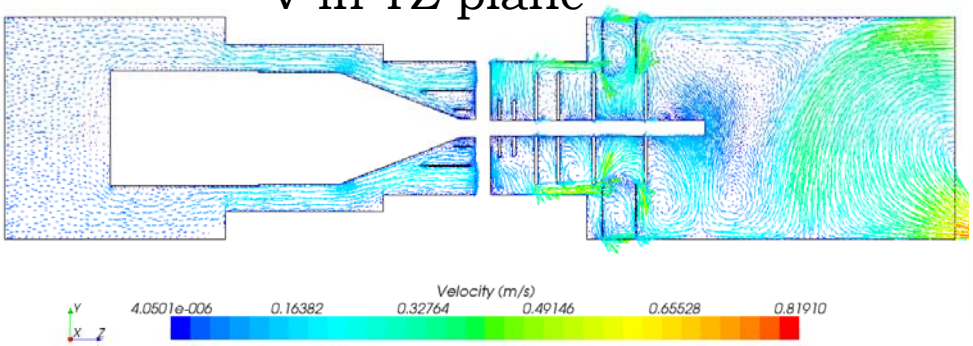


MVD: FLUIDODYNAMIC SIMULATIONS in PIXEL REGION
FORCED AIR (~10 m^3/h)

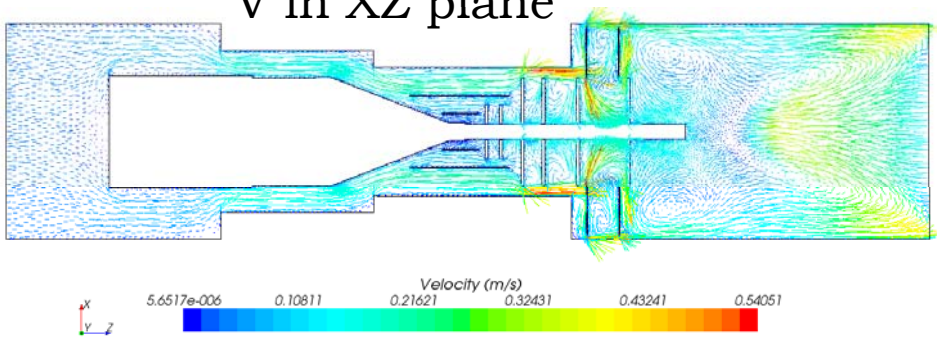
AMBIENT TEMPERATURE 25 °C



V in YZ plane



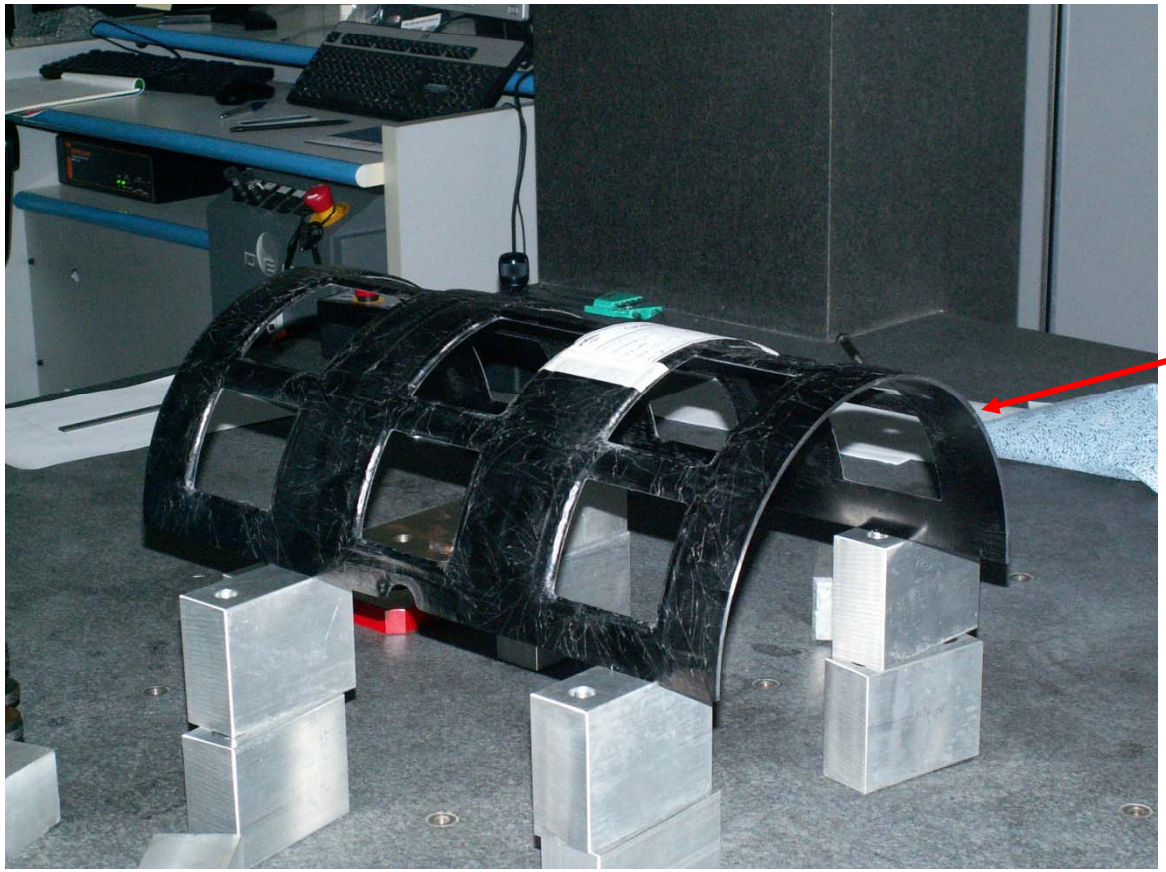
V in XZ plane



MVD - HALF SUPPORT FRAME – PROTOTYPE

General survey: dimension & shape → problem due to shrinking

Next step: mold reworked



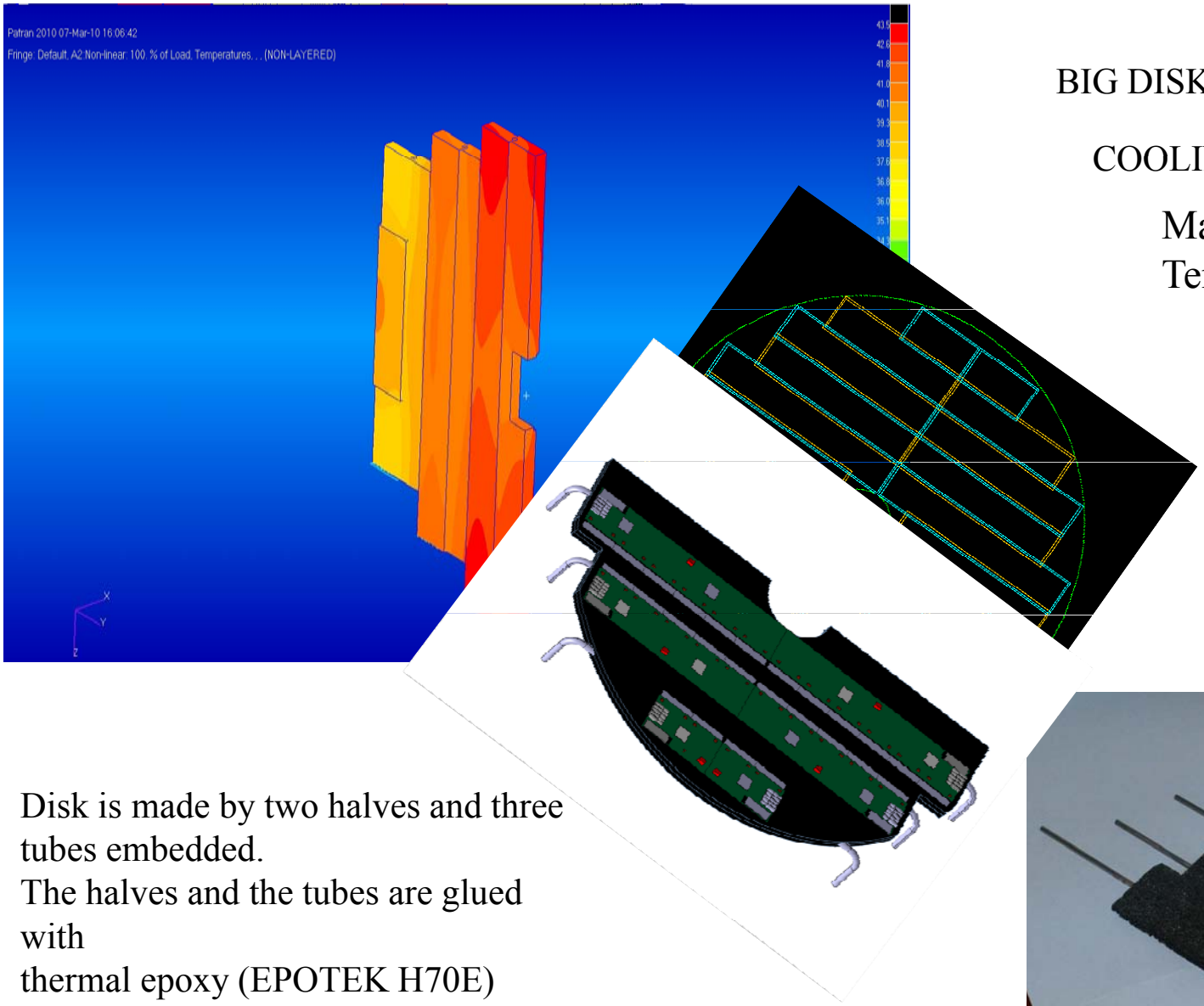
expected value R= 137mm
measured value R= 135.75

L = 460 mm
S = 4 mm

BIG DISK – THERMAL BEHAVIOR

COOLING FEM - RESULTS

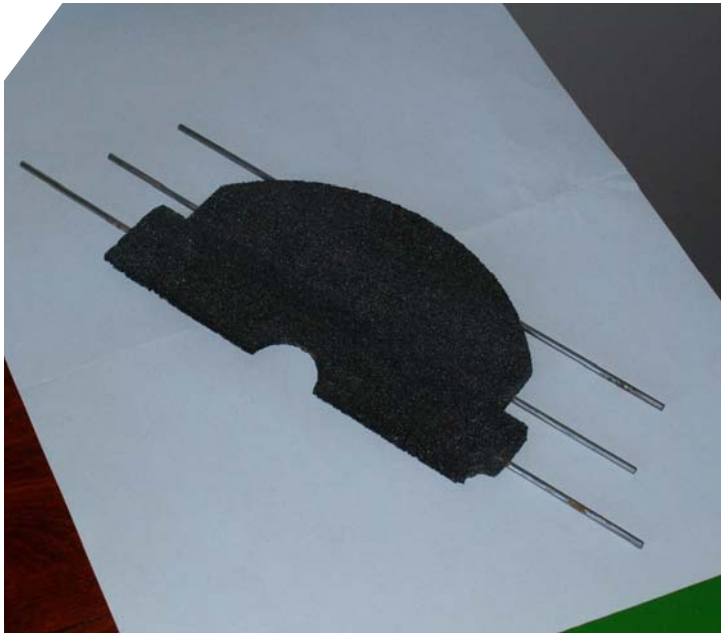
Max Temp.= 43.5 °C
Temp. uniformity ΔT ≈5 °C



Disk is made by two halves and three tubes embedded.
The halves and the tubes are glued with
thermal epoxy (EPOTEK H70E)

The surfaces are milling machined to final thickness (4 mm)

Planarity reached < 20 μm/m



FRAME MANUFACTURING

According to data from the simulation, a prototype of the frame is under construction:

sandwich structure

- 1 skin → 4 plies of carbon fibre M55J/LTM110 (0°, 45°, 90°, 135°)
- core → Rohacell 51IG
- 1 skin → 4 plies of carbon fibre M55J/LTM110 (0°, 45°, 90°, 135°)

Total thickness → 4mm

inner radius = 137 mm

outer radius = 141 mm

Length = 460 mm

Radiation Length $X_O \approx 0{,}4\%$

Tests to be done:

- General survey: dimension, shape.
- Displacement under static load.
- Long term dimensional stability.

EXPECTED DELIVERY → end of April