



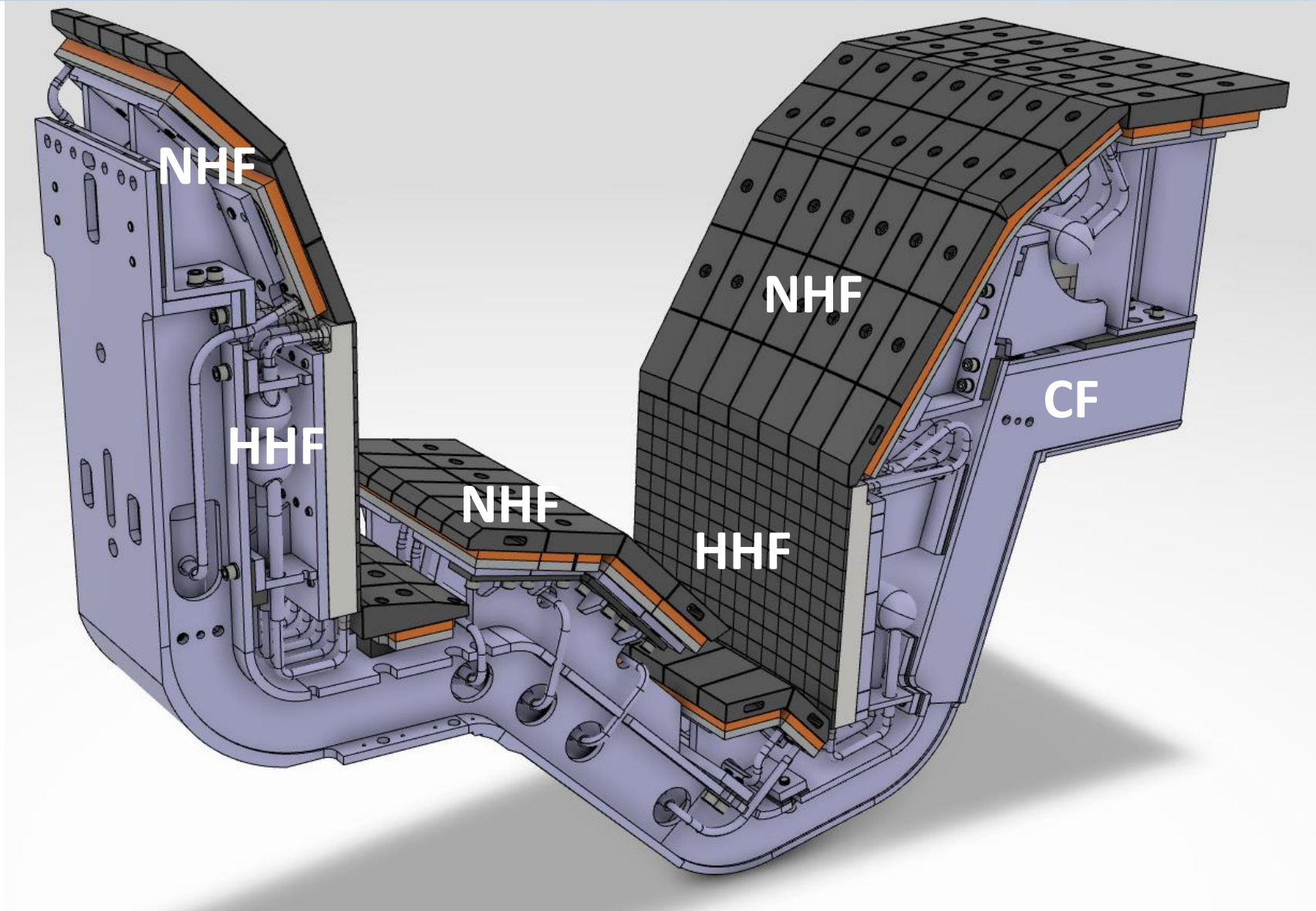
**FUSION  
FOR  
ENERGY**

## **Tungsten activities for JT-60SA ACD**

V. Tomarchio



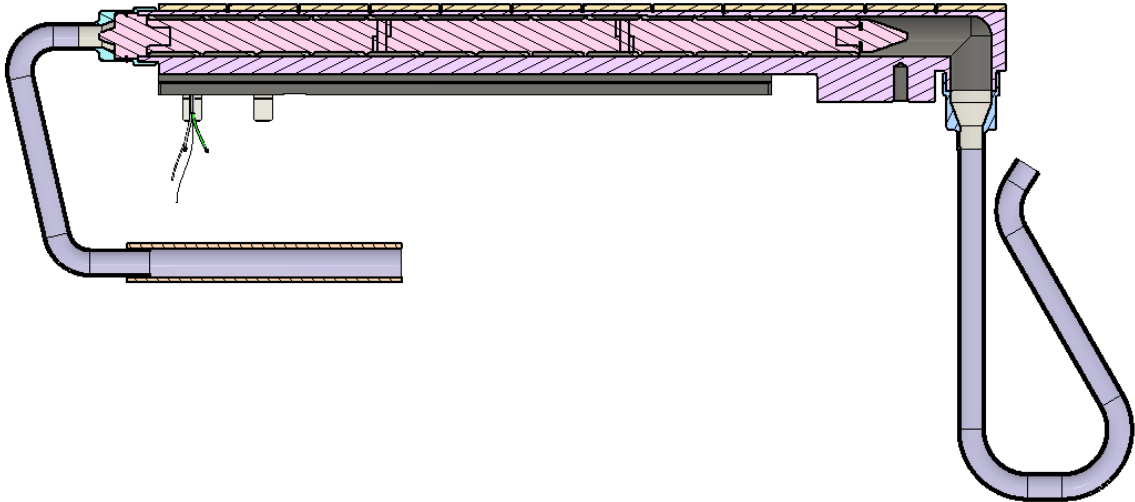
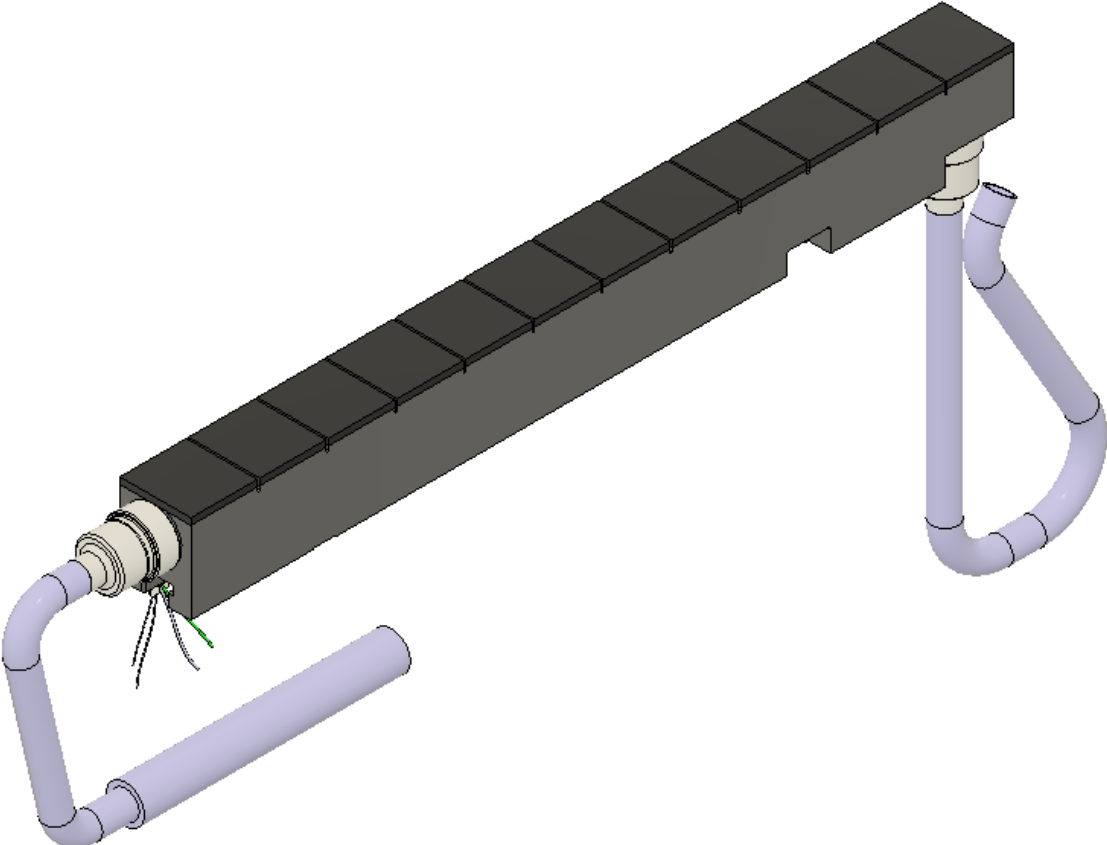
# Tungsten activities for JT-60SA ACD



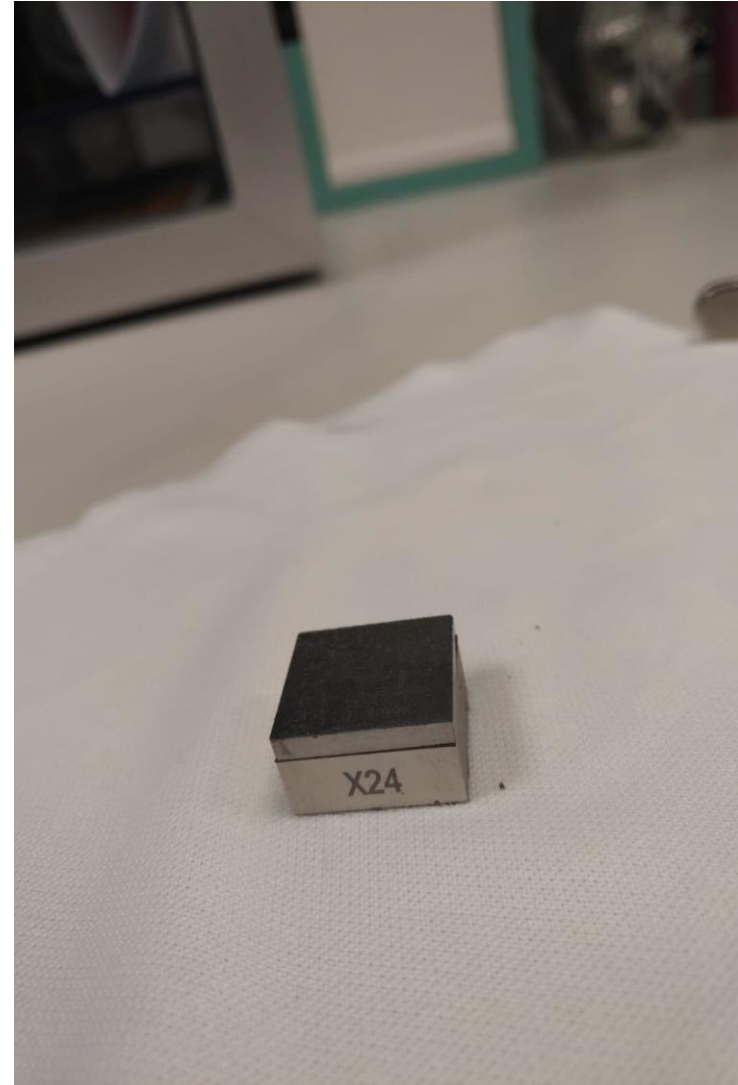
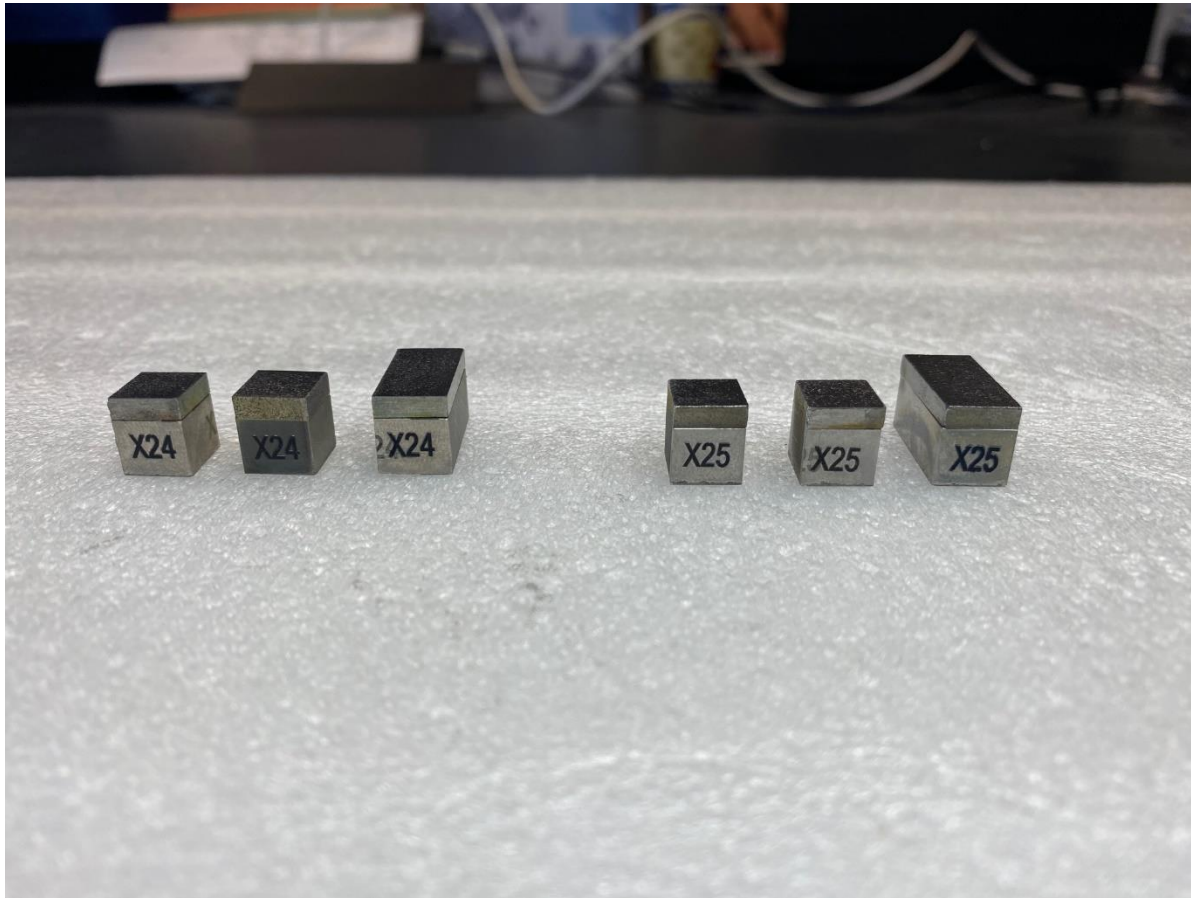
The JT-60SA ACD will be procured using **four separate procedures**:

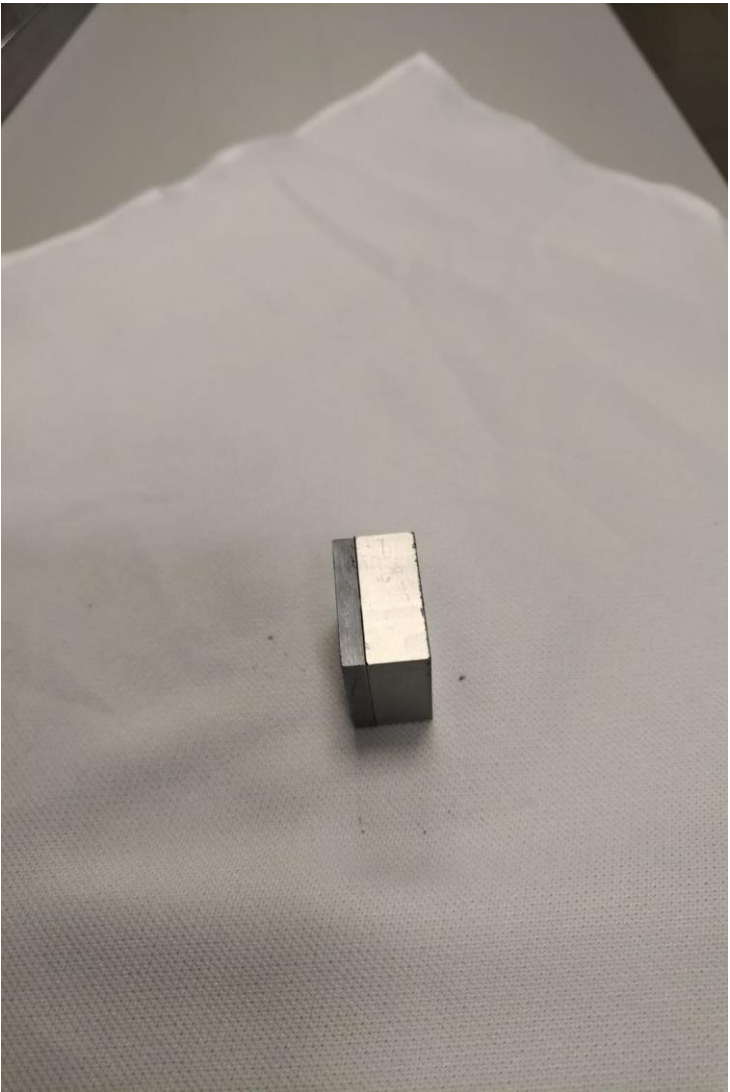
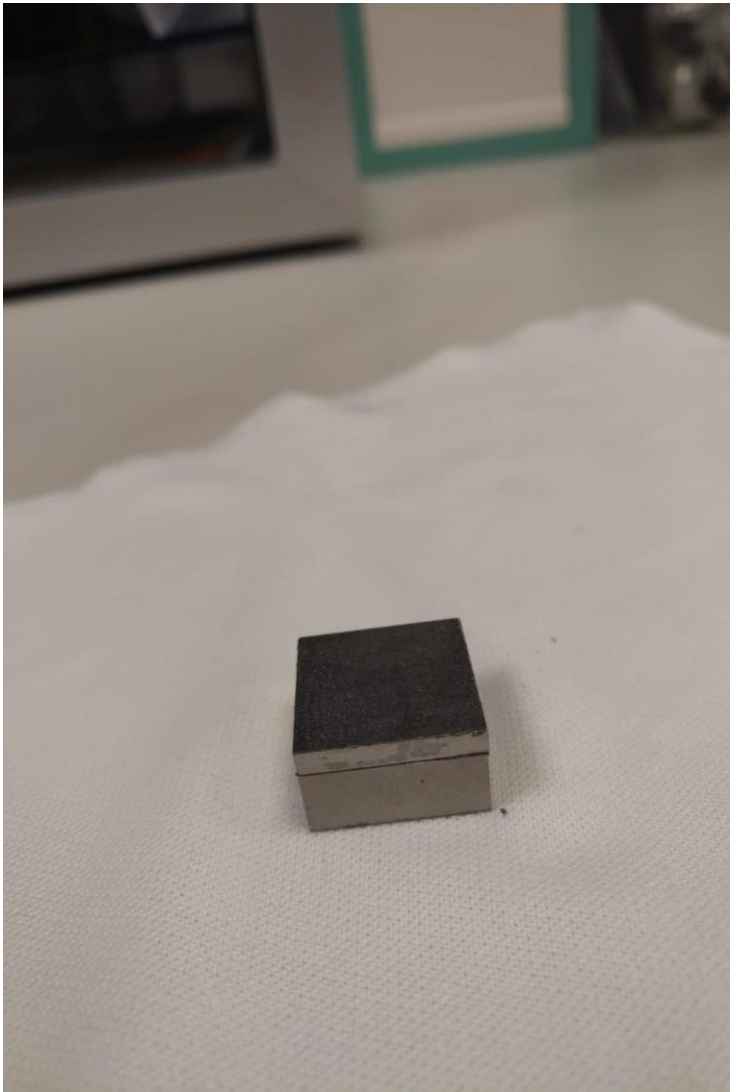
- **F4E-OPE-1149**: procurement of the **High Heat Flux elements (in force)**
- **F4E-OPE-1165**: procurement of the **Normal Heat Flux Elements (in force)**
- **F4E-OPE-1166**: procurement of the **Cassette Frames and main water pipes (in force)**
- **F4E-OPE-1405**: final **integration and testing** of the ACD units of JT-60SA **(in preparation)**

- **HHF activities**
  - Design of tungsten HHF elements (done)
  - R&D on tungsten to TZM joint (done → going to be tested soon)
- **NHF activities**
  - Design of tungsten NHF elements (ongoing)
- **Engineering activities**
  - Global and detail thermal analyses (ongoing)
  - Global EM analyses (done)
  - Global mechanical analyses (waiting for input)

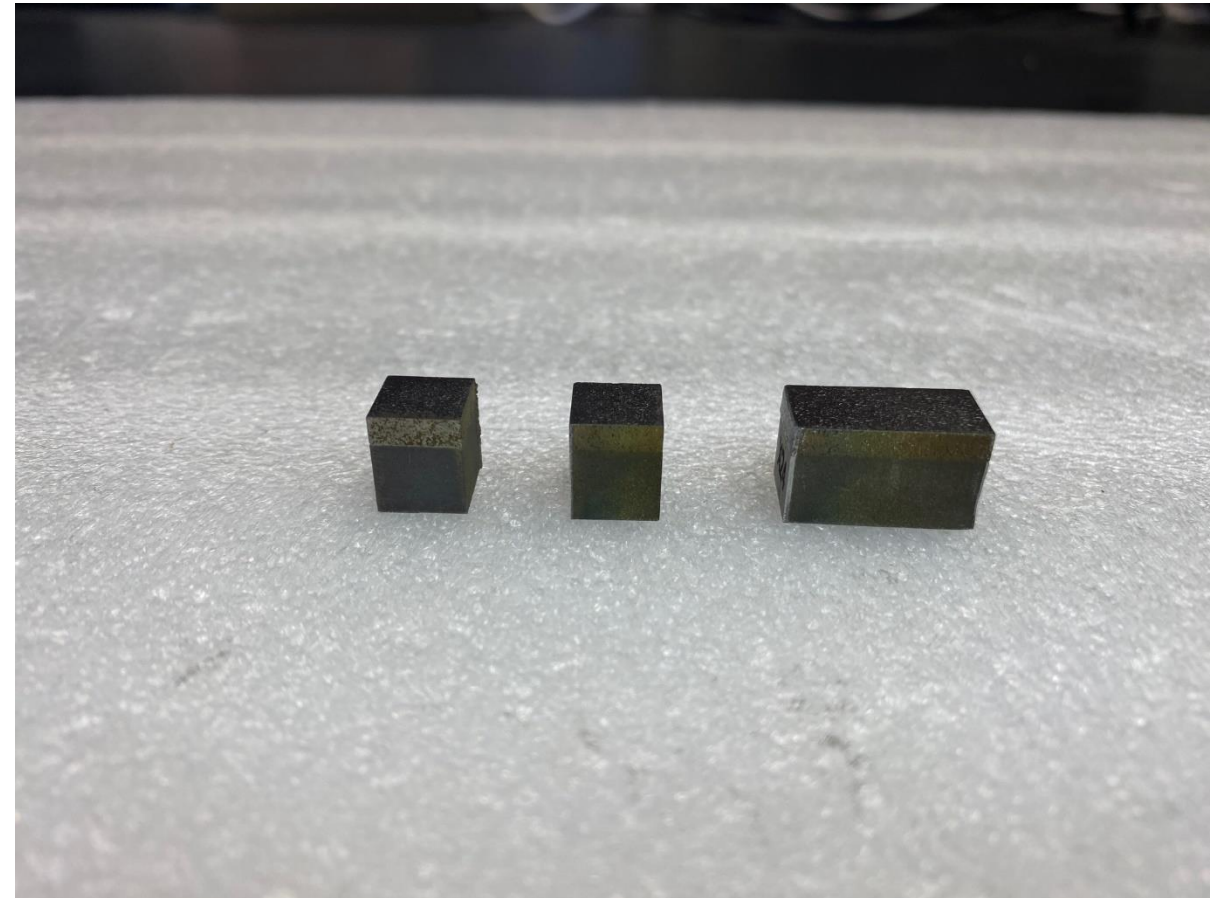
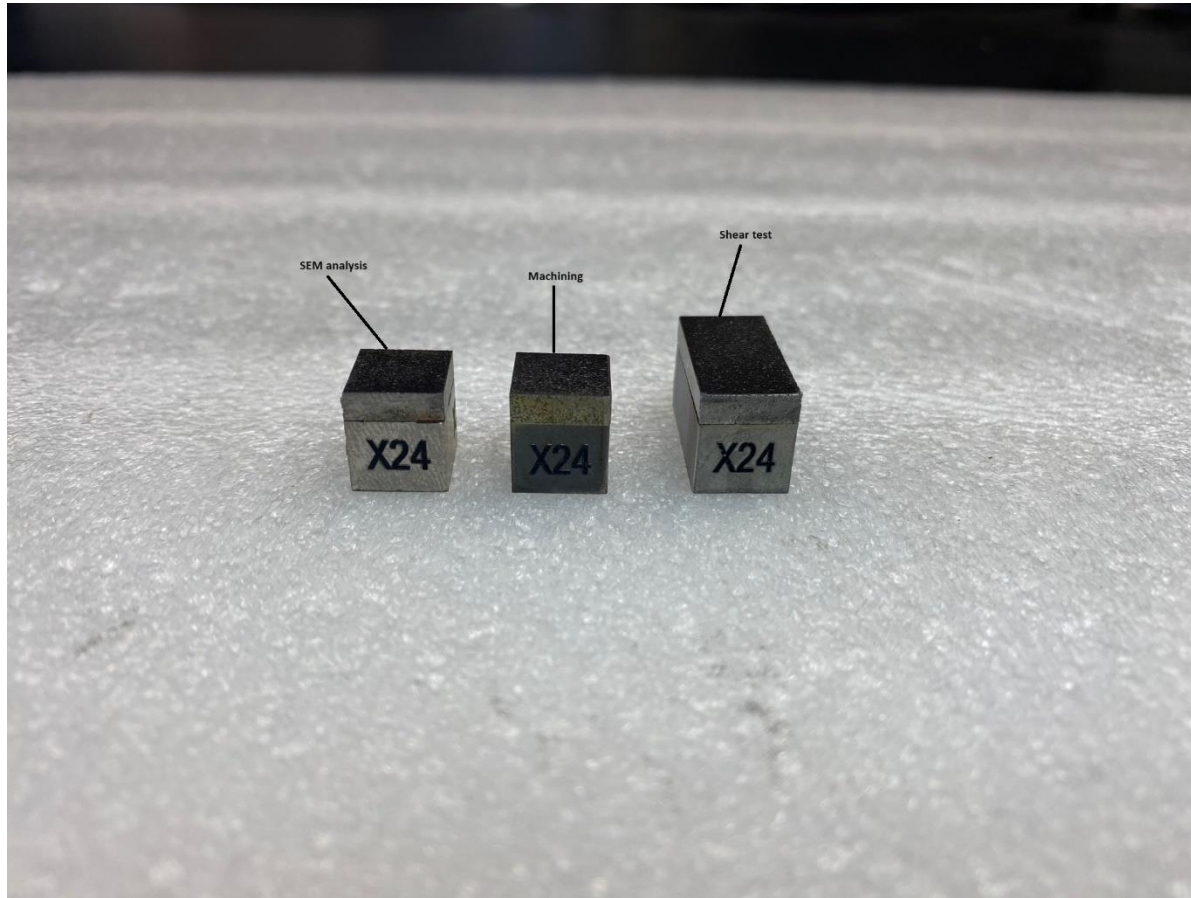


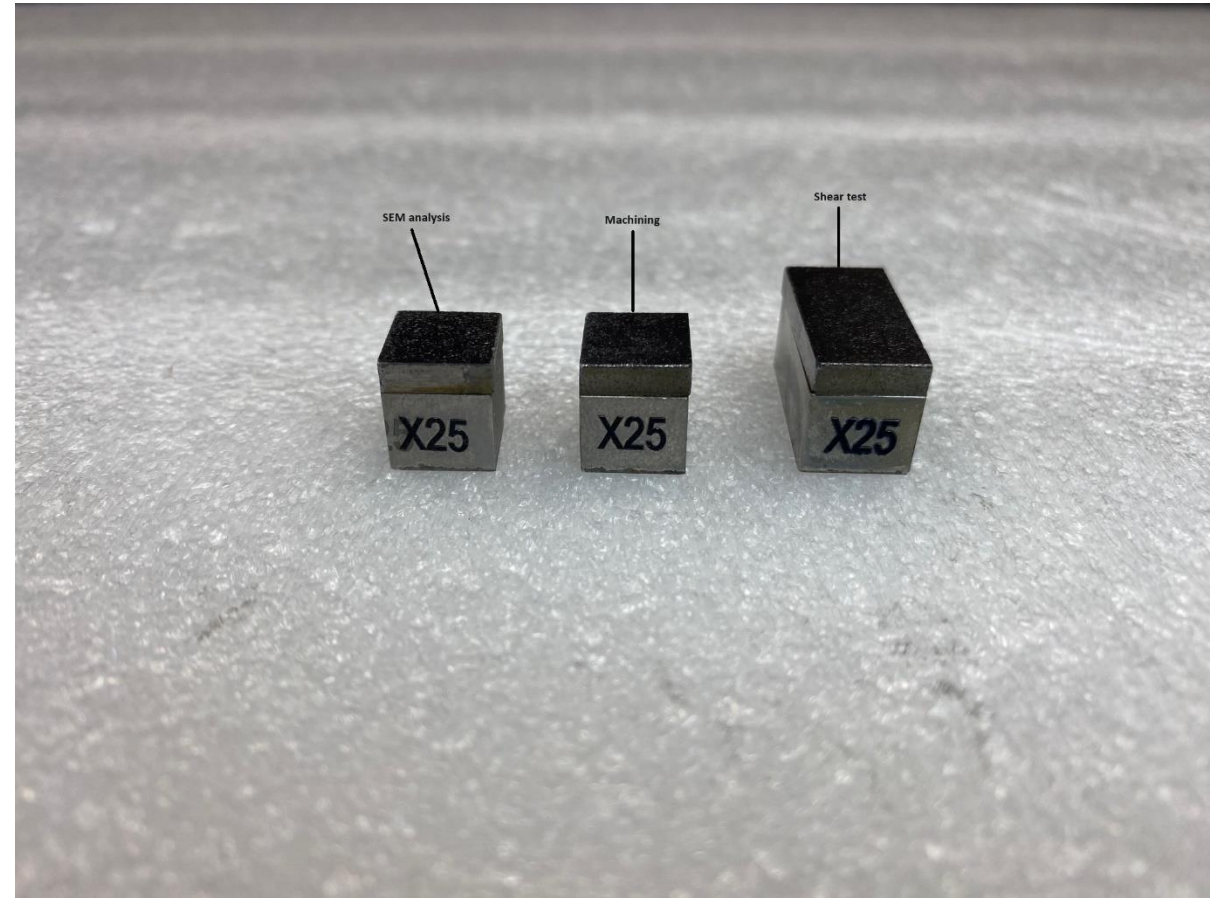




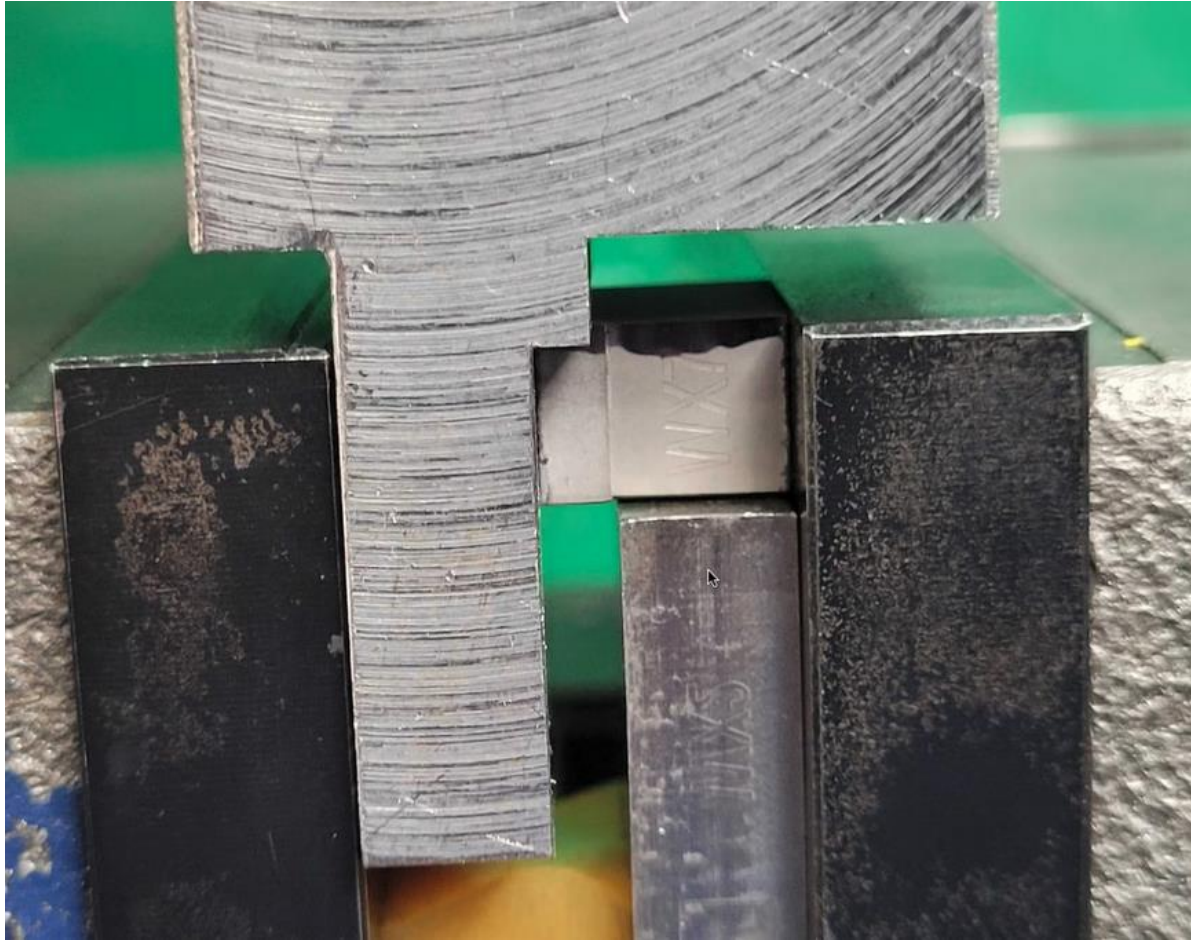




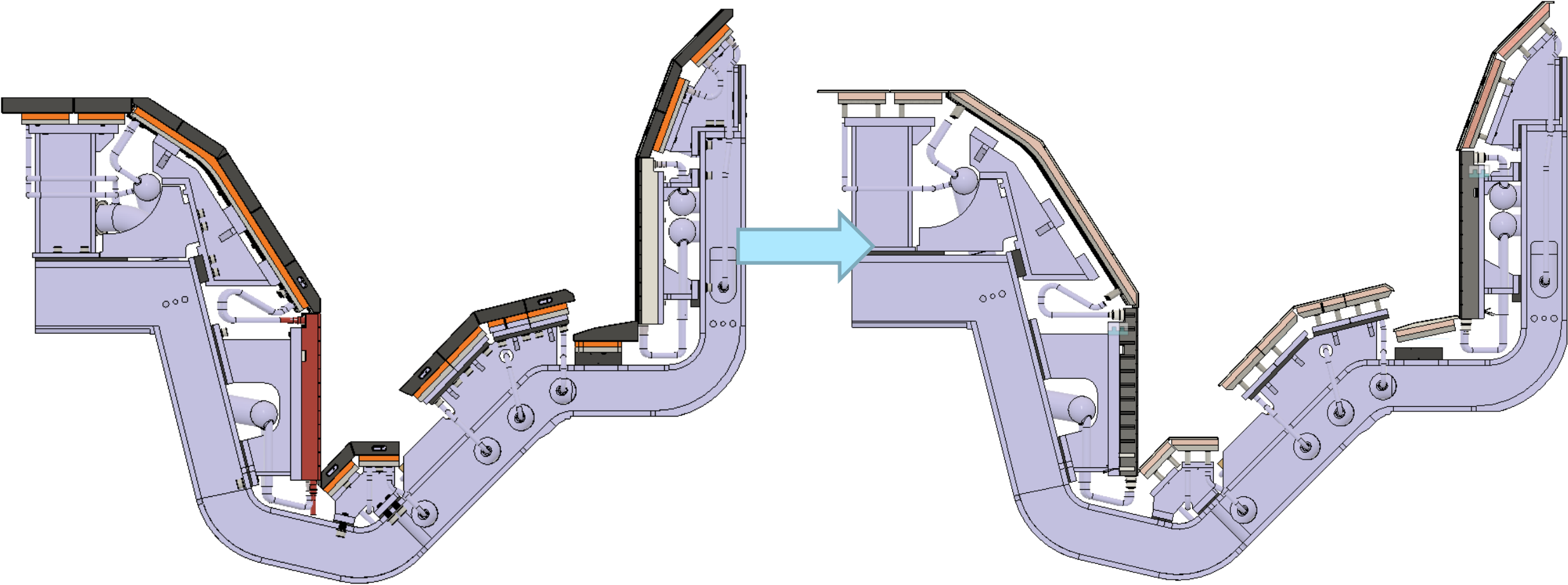


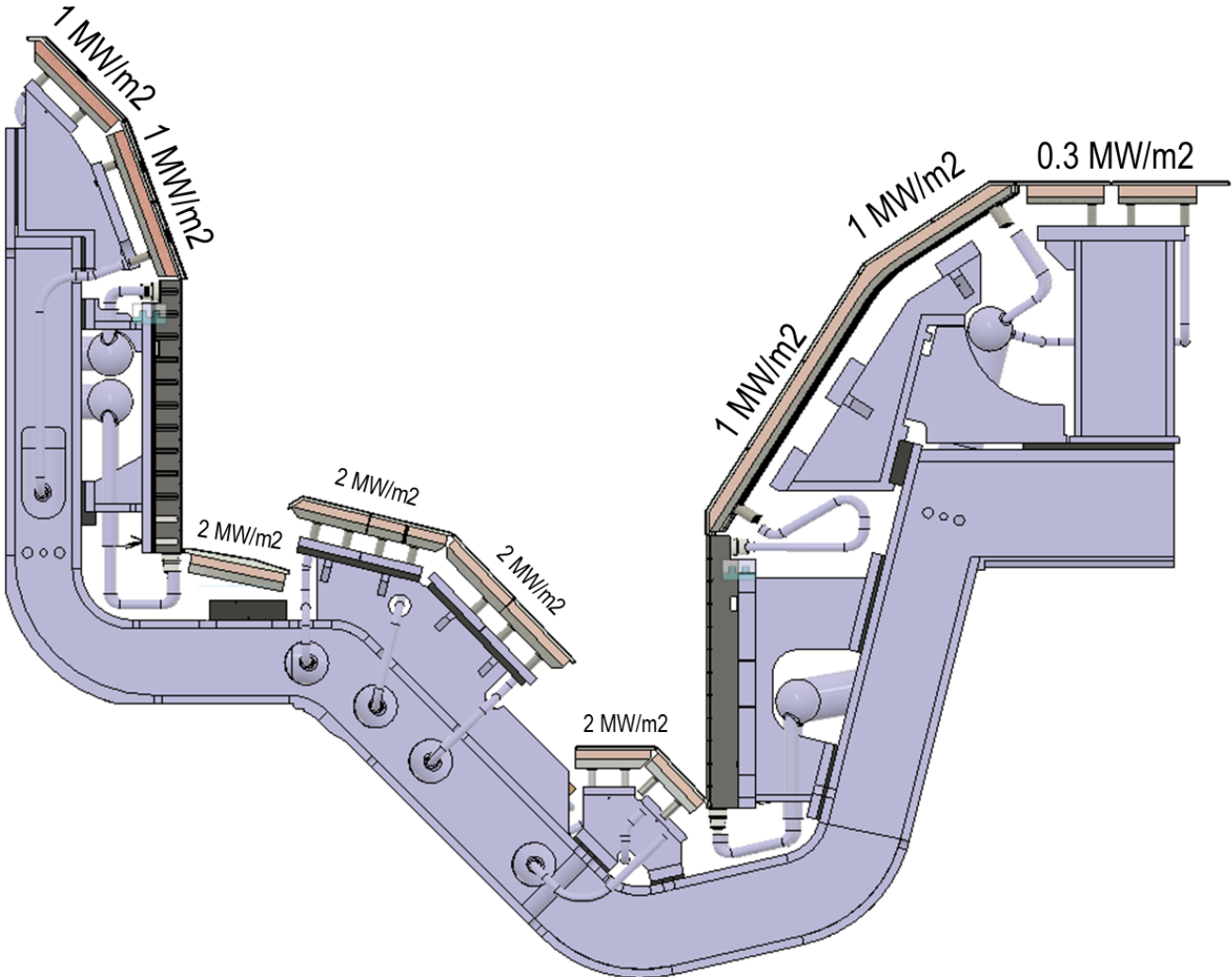


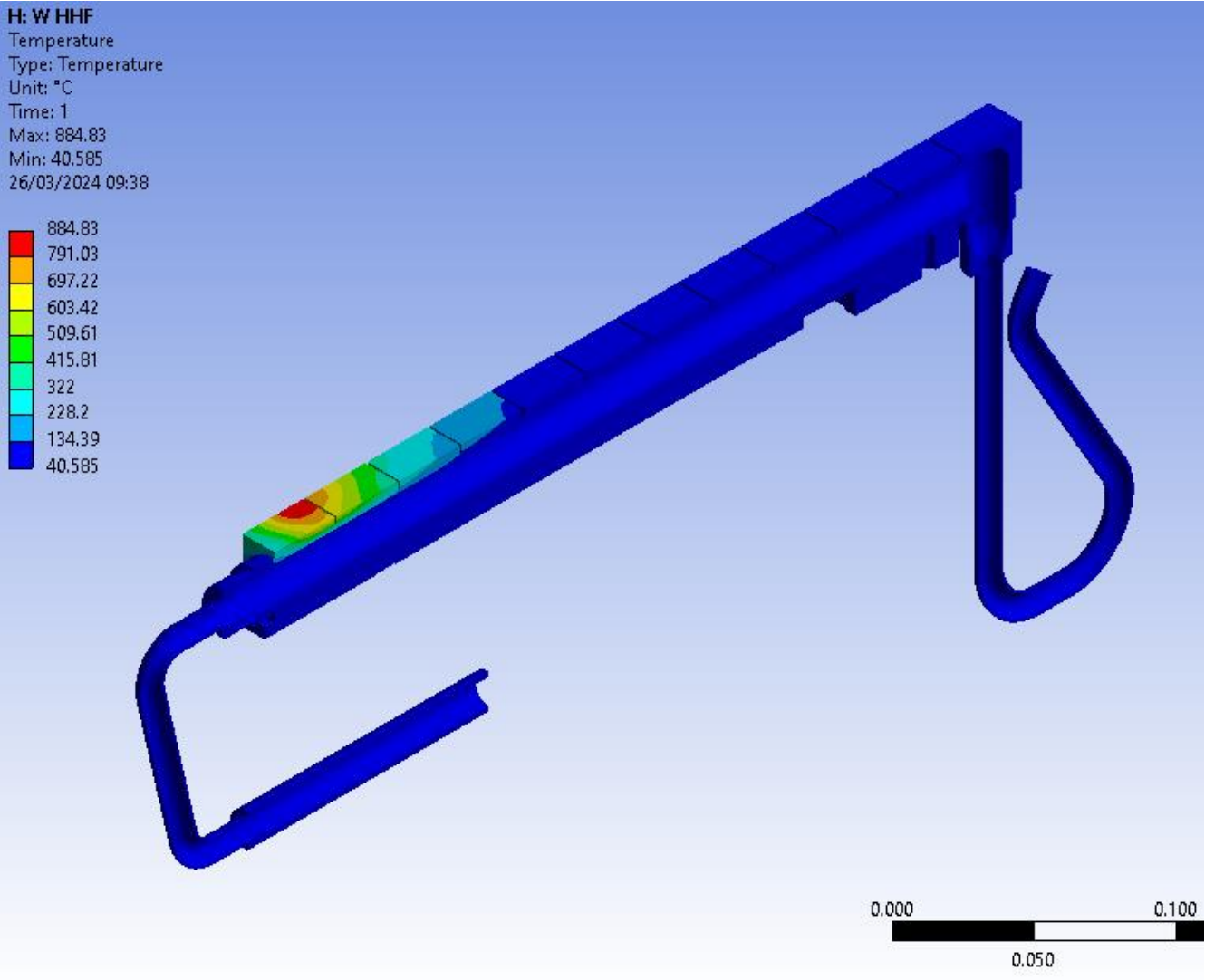


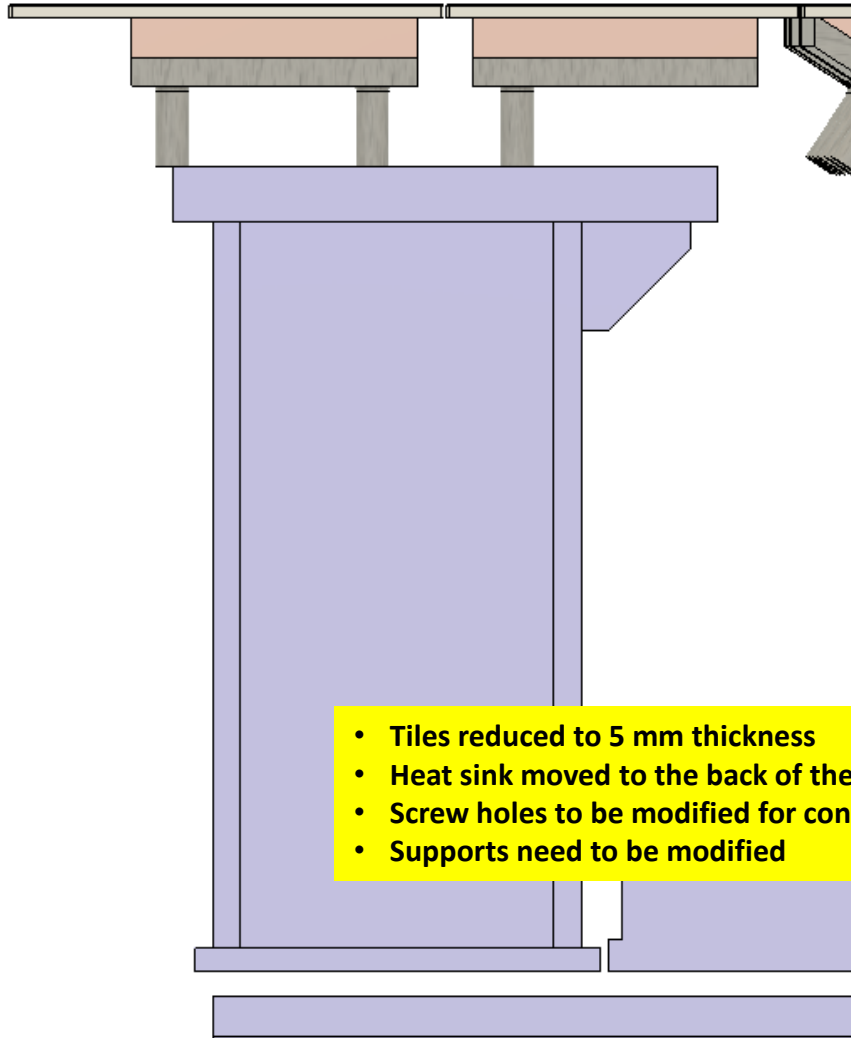


- **Direct or Ti-interlayer diffusion bonding**
- **220 – 230 MPa shear strength**

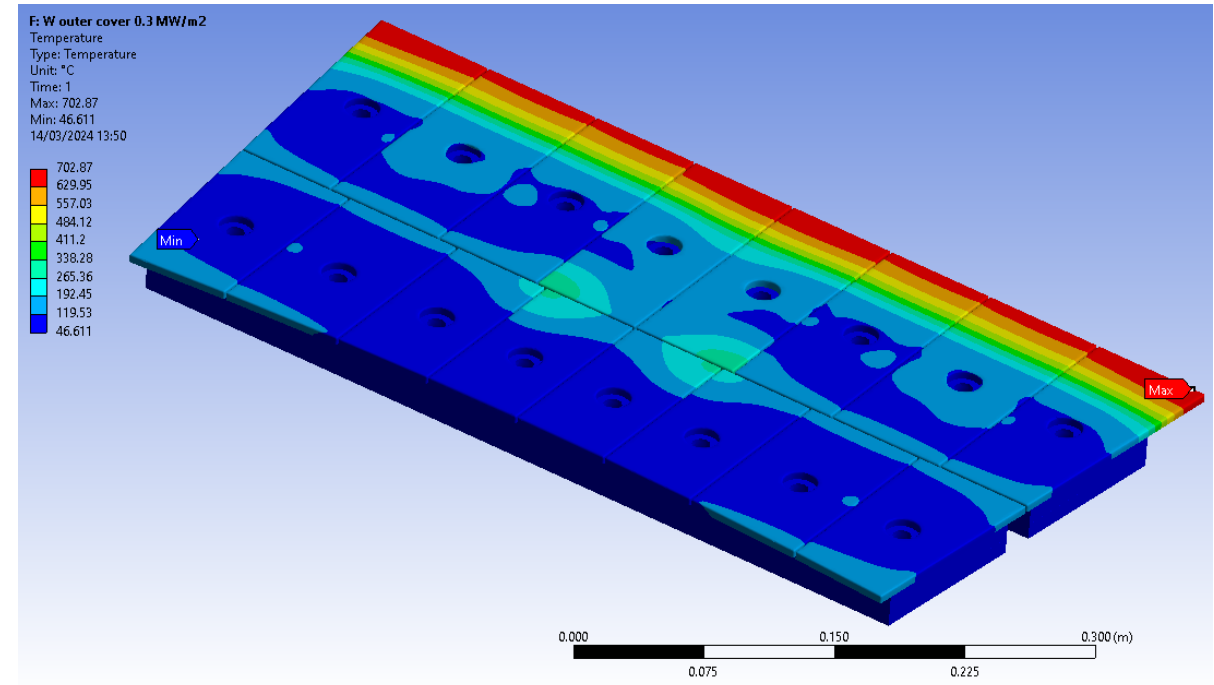








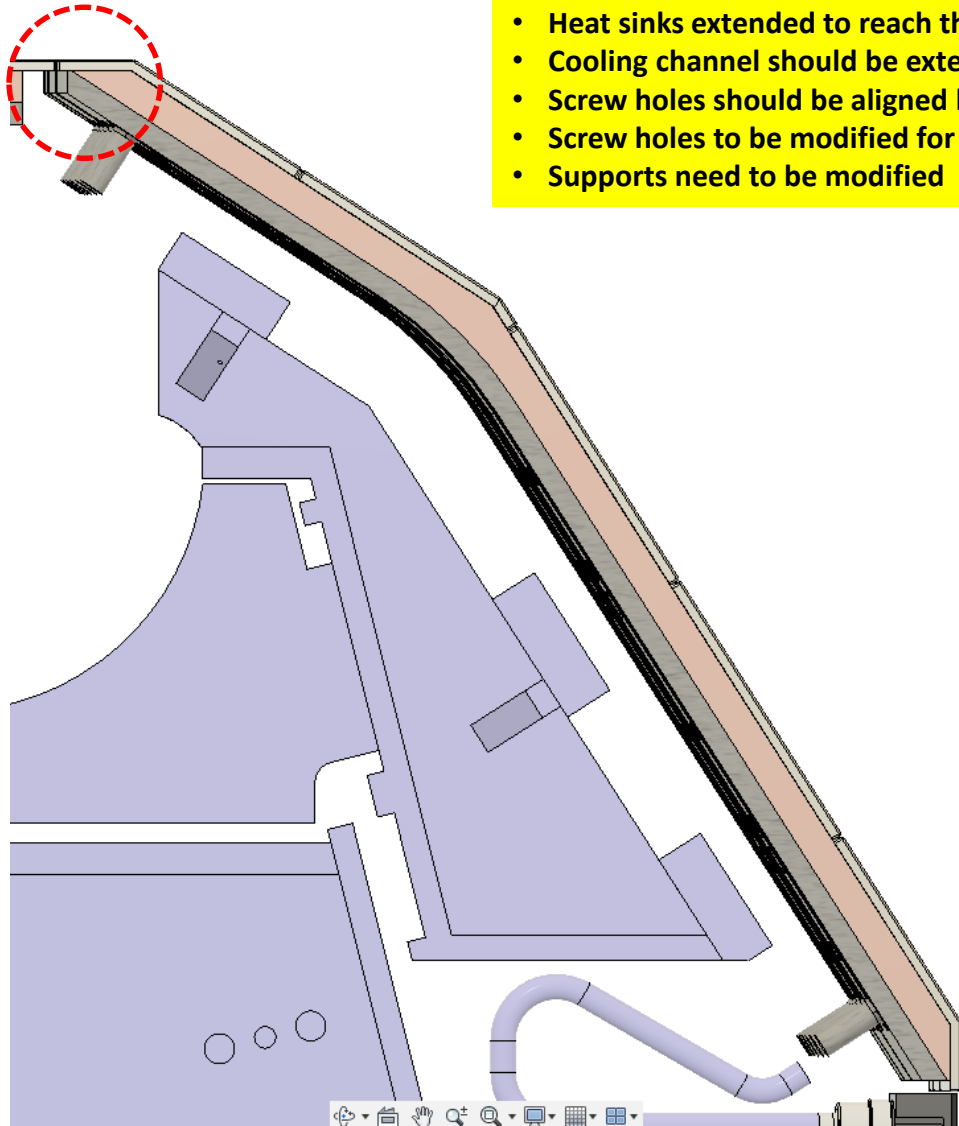
- Tiles reduced to 5 mm thickness
- Heat sink moved to the back of the tiles
- Screw holes to be modified for conical heads
- Supports need to be modified





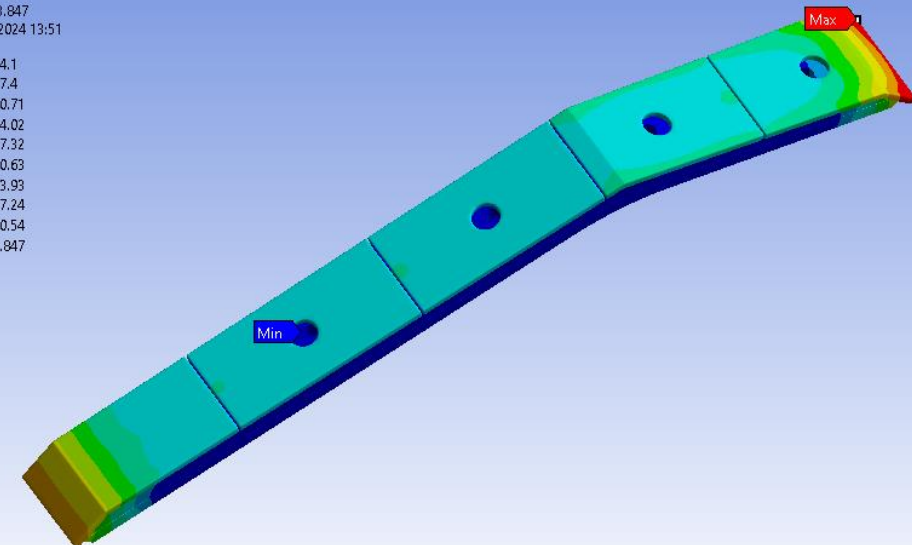
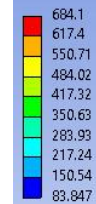
# NHF activities - Outer baffle

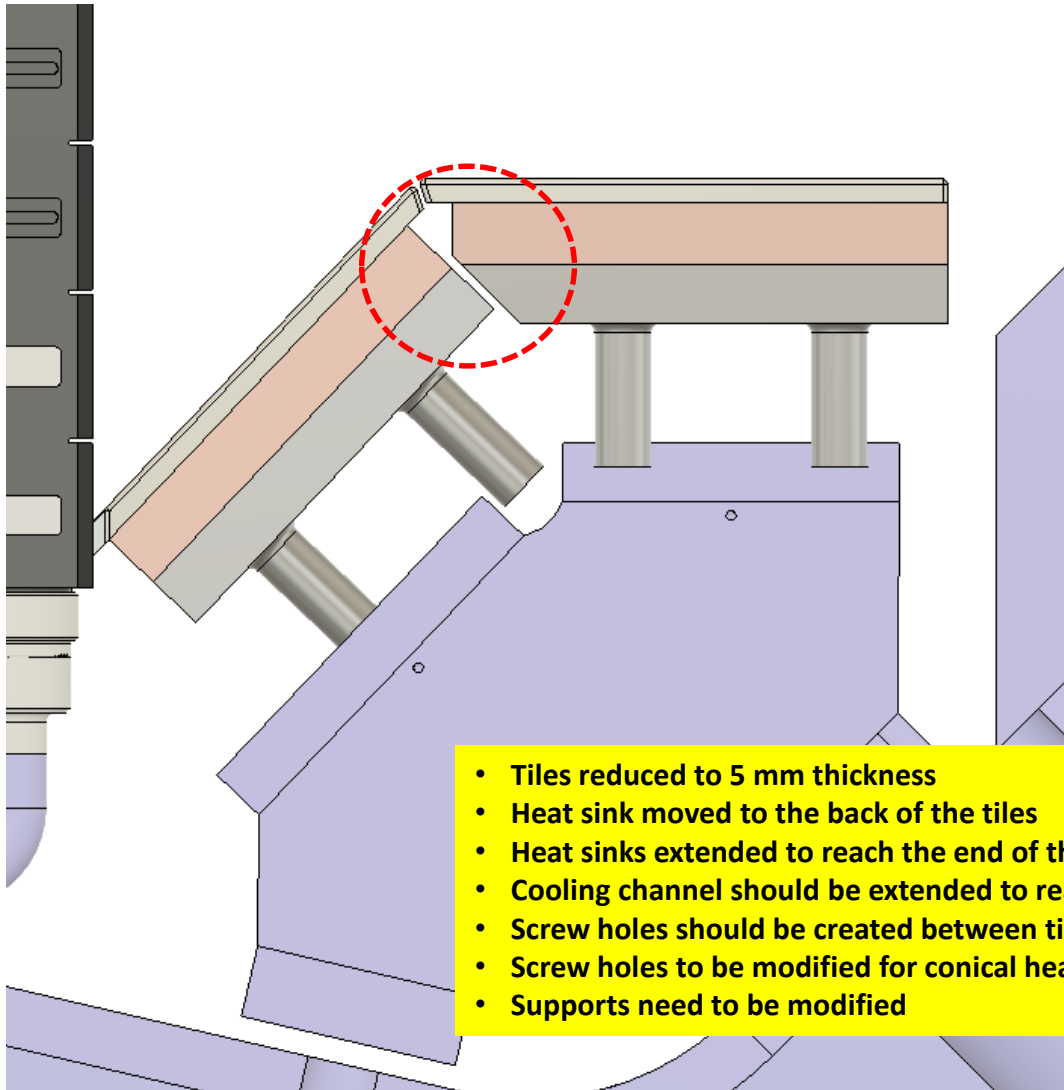
- Tiles reduced to 5 mm thickness
- Heat sink moved to the back of the tiles
- Heat sinks extended to reach the end of the tiles
- Cooling channel should be extended to reach closer to the extremity of the heat sink
- Screw holes should be aligned between tiles and heat sink
- Screw holes to be modified for conical heads
- Supports need to be modified



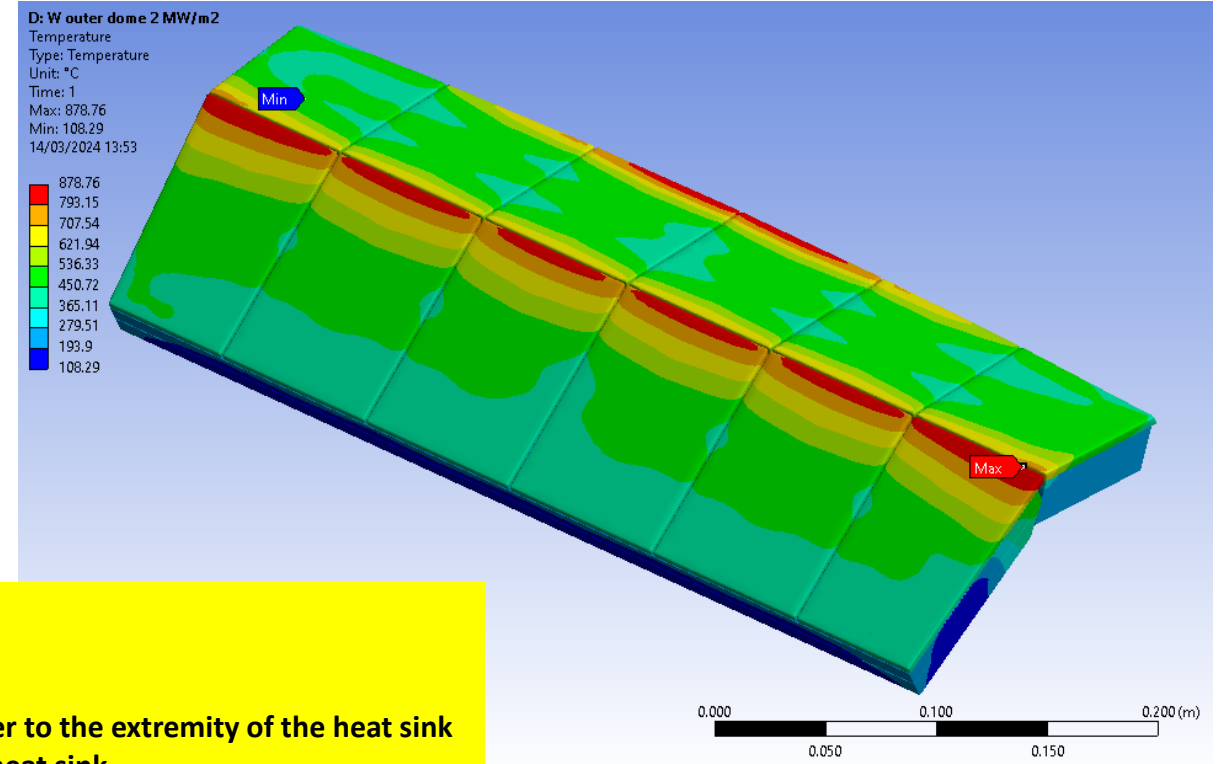
G: W outer baffle 1 MW/m2

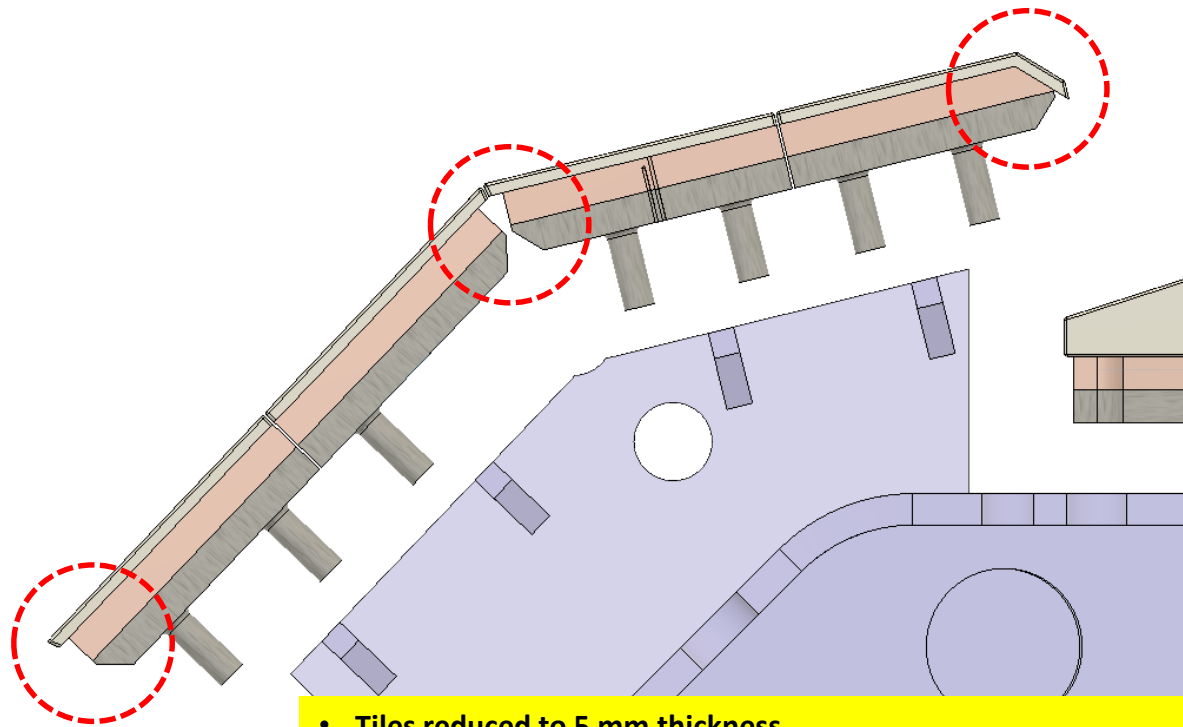
Temperature  
Type: Temperature  
Unit: °C  
Time: 1  
Max: 694.1  
Min: 83.847  
14/03/2024 13:51





- Tiles reduced to 5 mm thickness
- Heat sink moved to the back of the tiles
- Heat sinks extended to reach the end of the tiles
- Cooling channel should be extended to reach closer to the extremity of the heat sink
- Screw holes should be created between tiles and heat sink
- Screw holes to be modified for conical heads
- Supports need to be modified

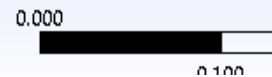
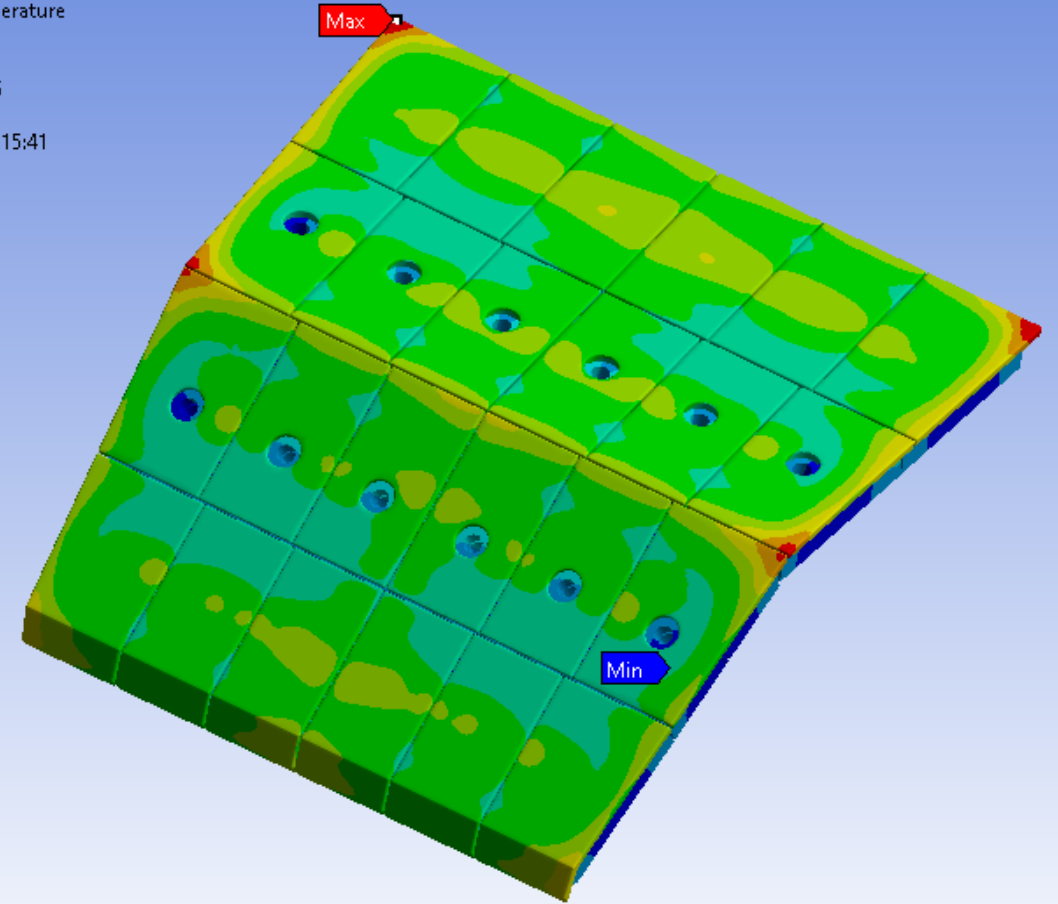
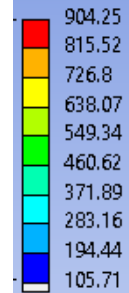


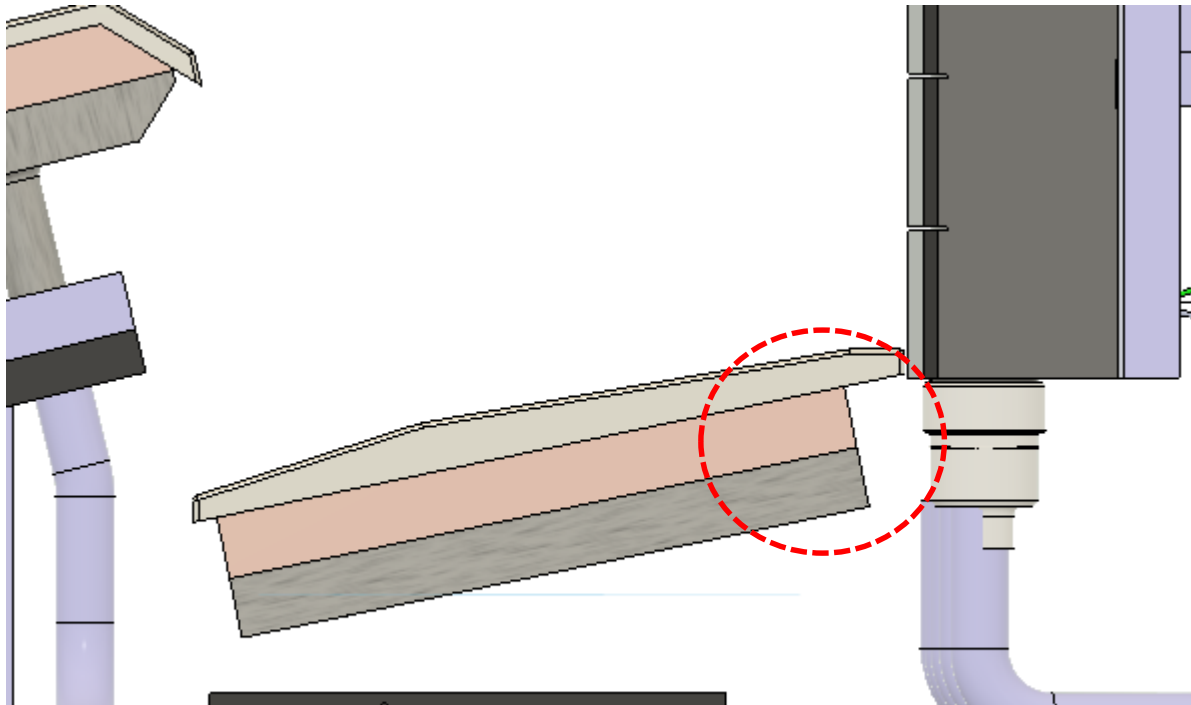


- Tiles reduced to 5 mm thickness
- Heat sink moved to the back of the tiles
- Heat sinks extended to reach the end of the tiles
- Cooling channel moved 10 mm closer to the extremity of the heat sink
- Screw holes should be created between tiles and heat sink
- Screw holes to be modified for conical heads
- Supports need to be modified

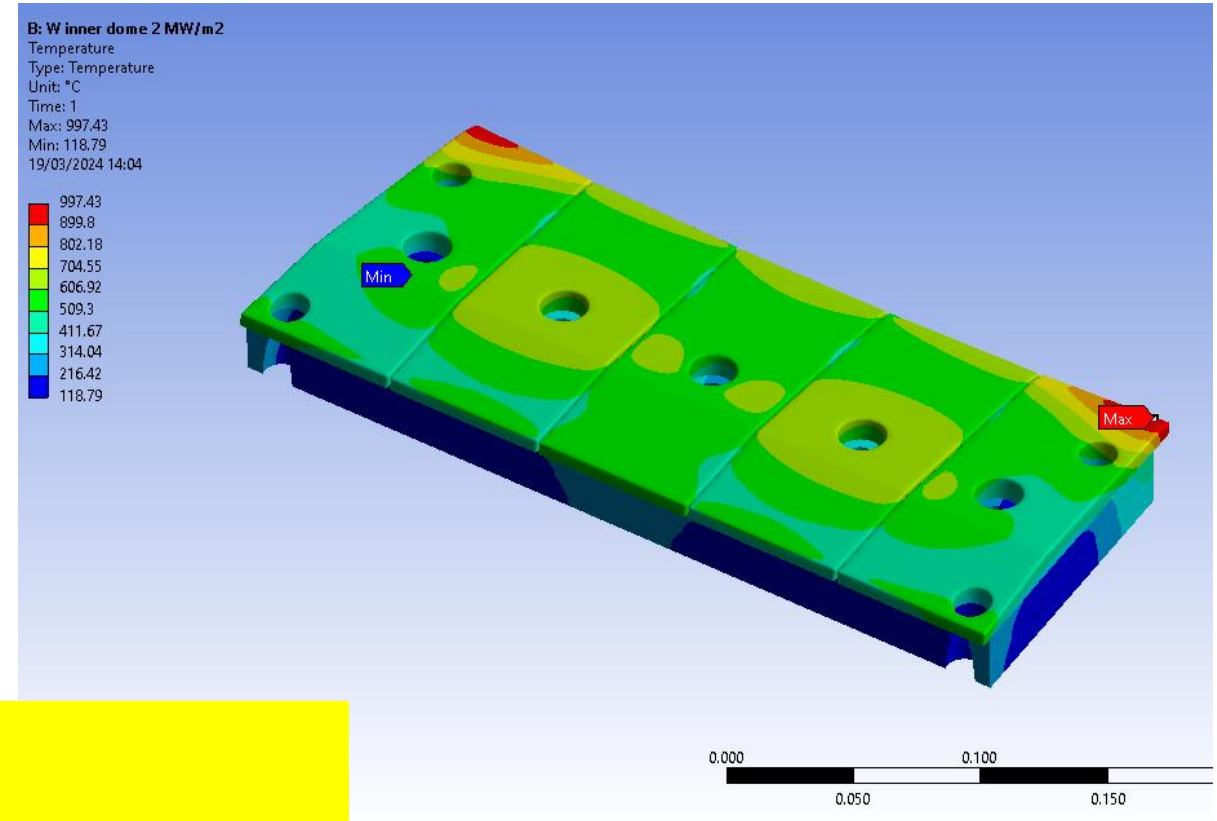
C: W center dome 2 MW/m2

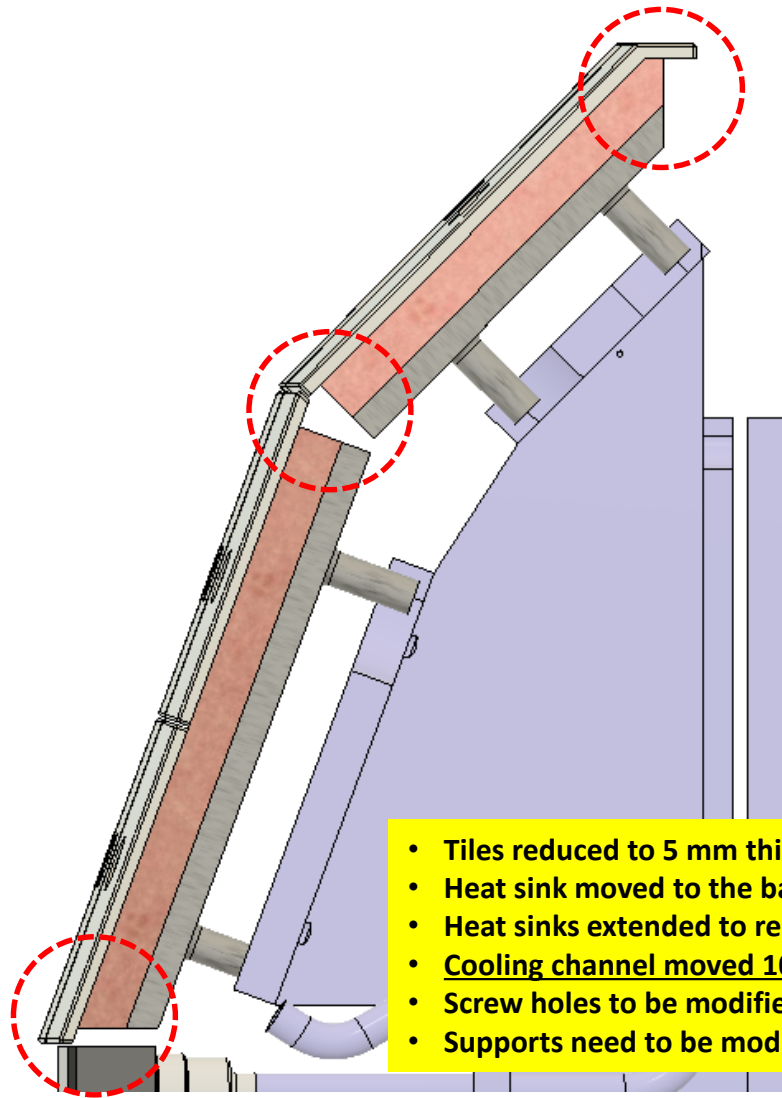
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- Tiles reduced to 5 mm thickness
- Heat sinks extended to reach the end of the tiles
- Heat sink inclined → intermediate piece needed
- Cooling channel should be extended to reach closer to the extremity of the heat sink
- Screw holes should be created between tiles and heat sink
- Screw holes to be modified for conical heads





- Tiles reduced to 5 mm thickness
- Heat sink moved to the back of the tiles
- Heat sinks extended to reach the end of the tiles
- Cooling channel moved 10 mm closer to the edge of the heat sink
- Screw holes to be modified for conical heads
- Supports need to be modified

E: W Inner Baffle 1 MW/m2

Temperature

Type: Temperature

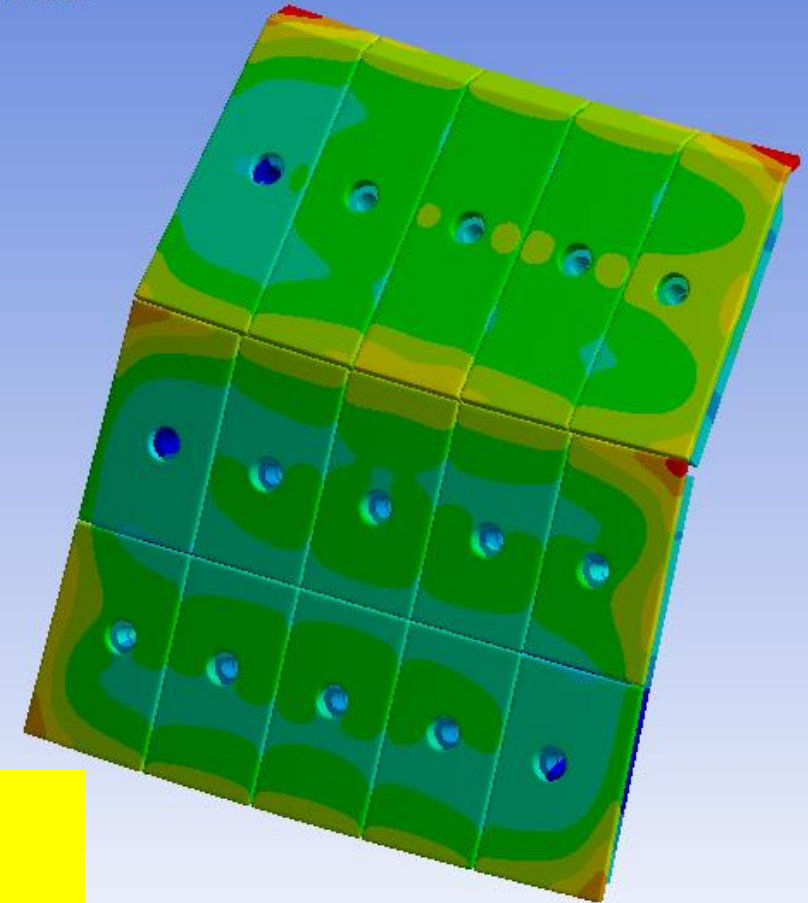
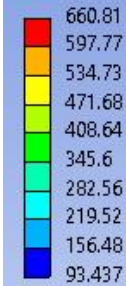
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20/03/2024 10:42



0.000

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