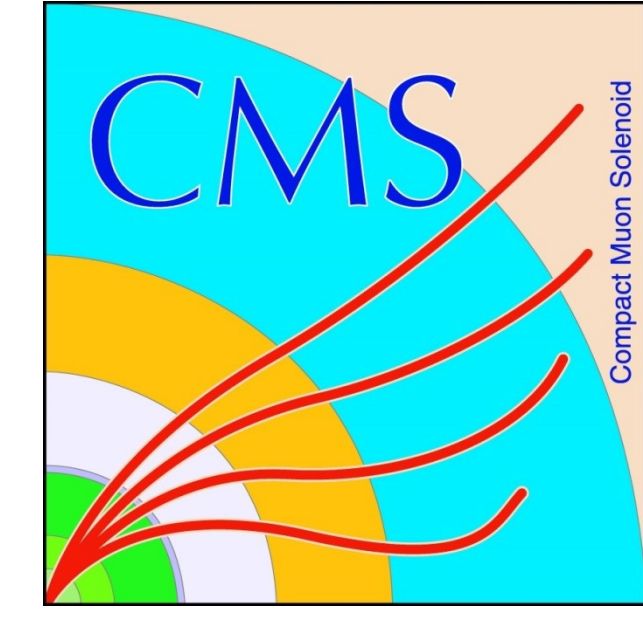


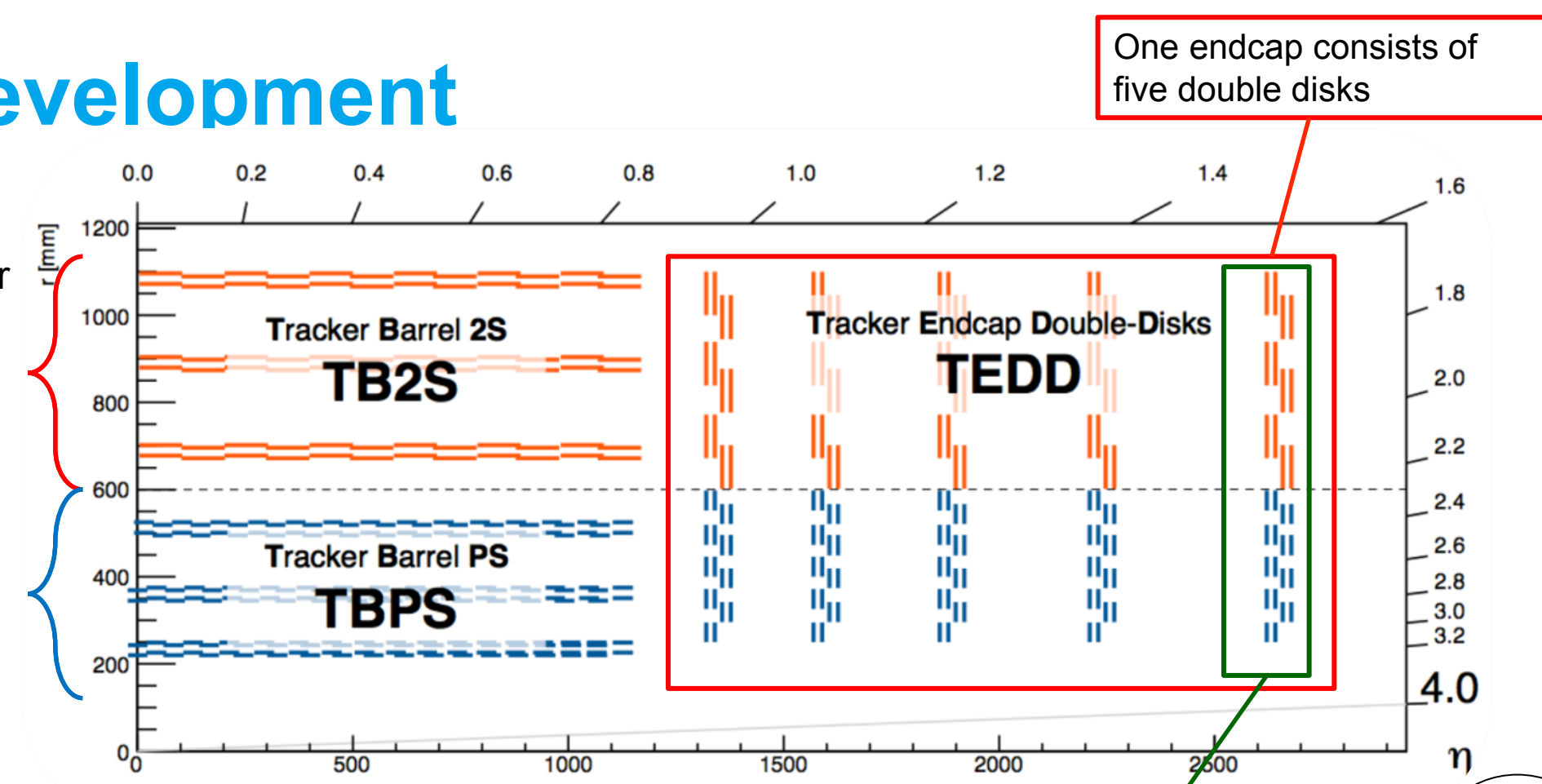
CMS Silicon Tracker Phase 2 Upgrade: TEDD Prototyping at DESY.



Oskar Reichelt, Andreas Mussgiller, Thomas Eichhorn
3. Annual Matter and Technologies Meeting – 31 Jan. to 2 Feb. 2017

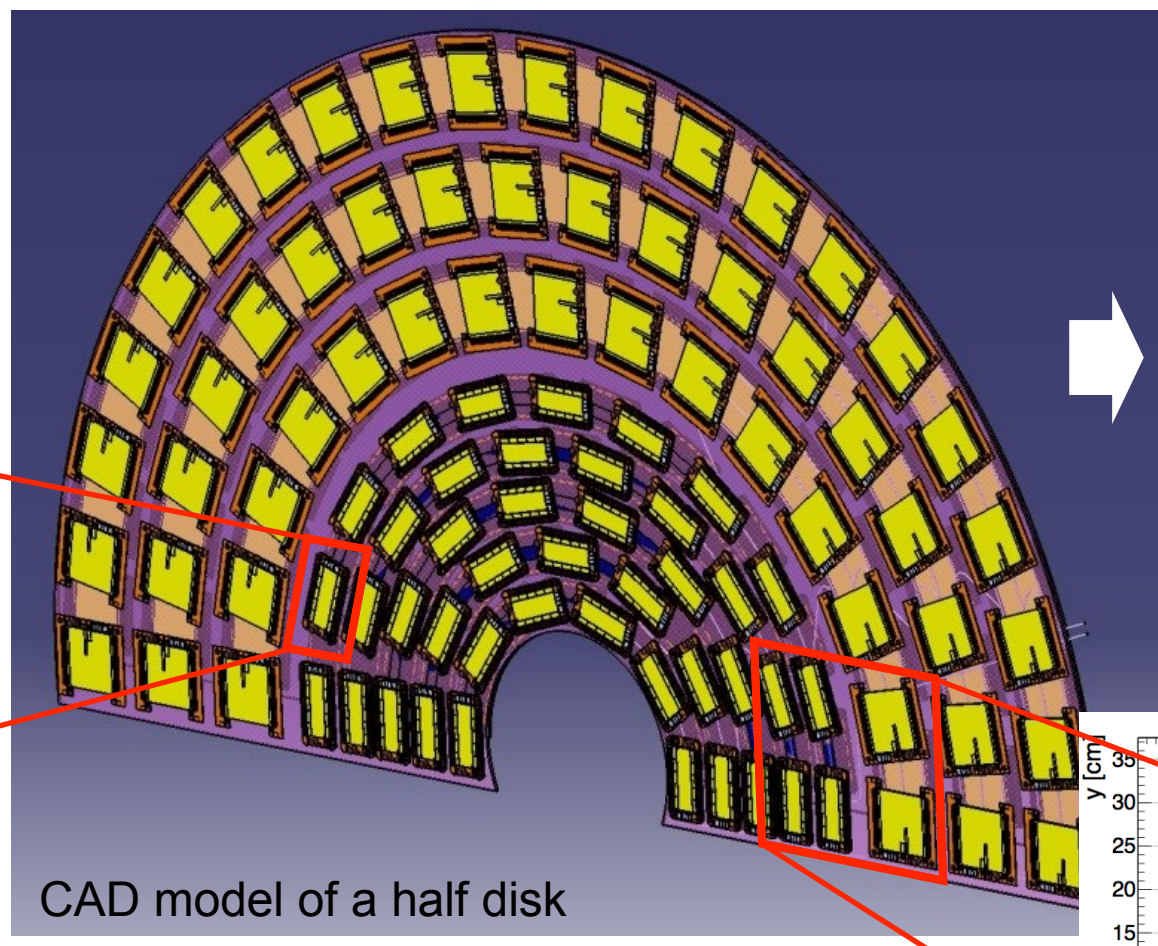
TEDD Prototype Development

- Two sensor types used in the CMS tracker
 - 2S module:** Sandwich of two strip sensors For radii > 60cm
 - PS module:** Sandwich of a pixel and a strip sensor For radii < 60cm



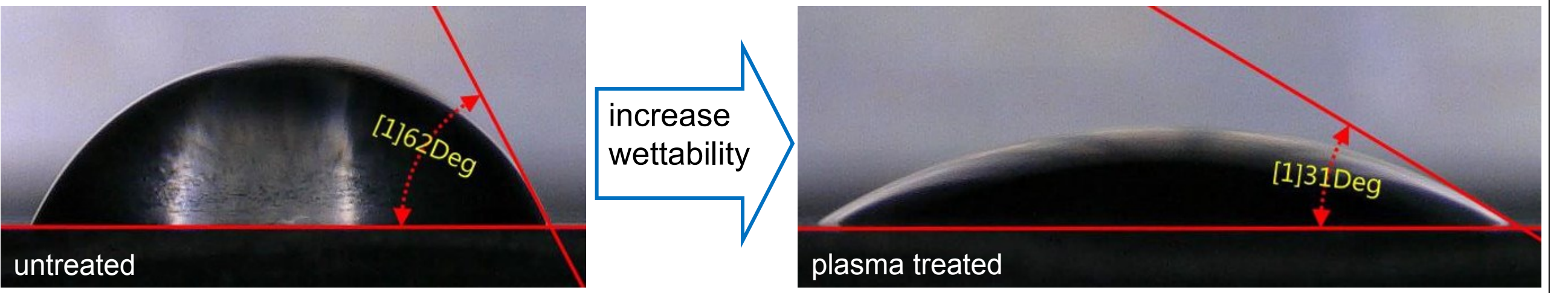
TEDD thermal mockup:

- 90mm x 160mm sector of half disk
 - Area of one PS module
 - One cooling line
 - Thermal test structure for cooling of one PS module



- One endcap consists of five double disks
- One double disk consists of four half disks
- TEDD prototype:**
 - 350mm x 400mm sector of a half disk
 - Area of PS and 2S module
 - Edge of a half disk
 - Two cooling pipes/ sectors
 - Optimized assembly sequence, design and material in second version
 - Assembly of second version is ongoing

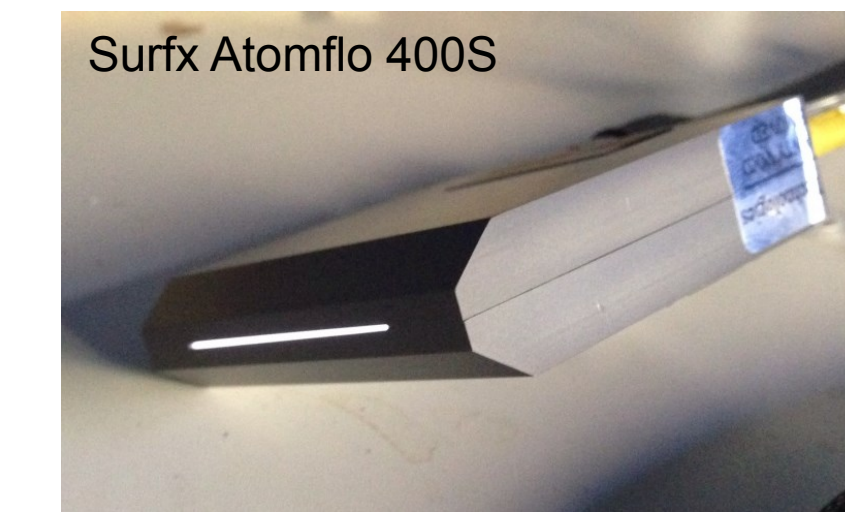
Plasma Cleaning of CFRP Surfaces



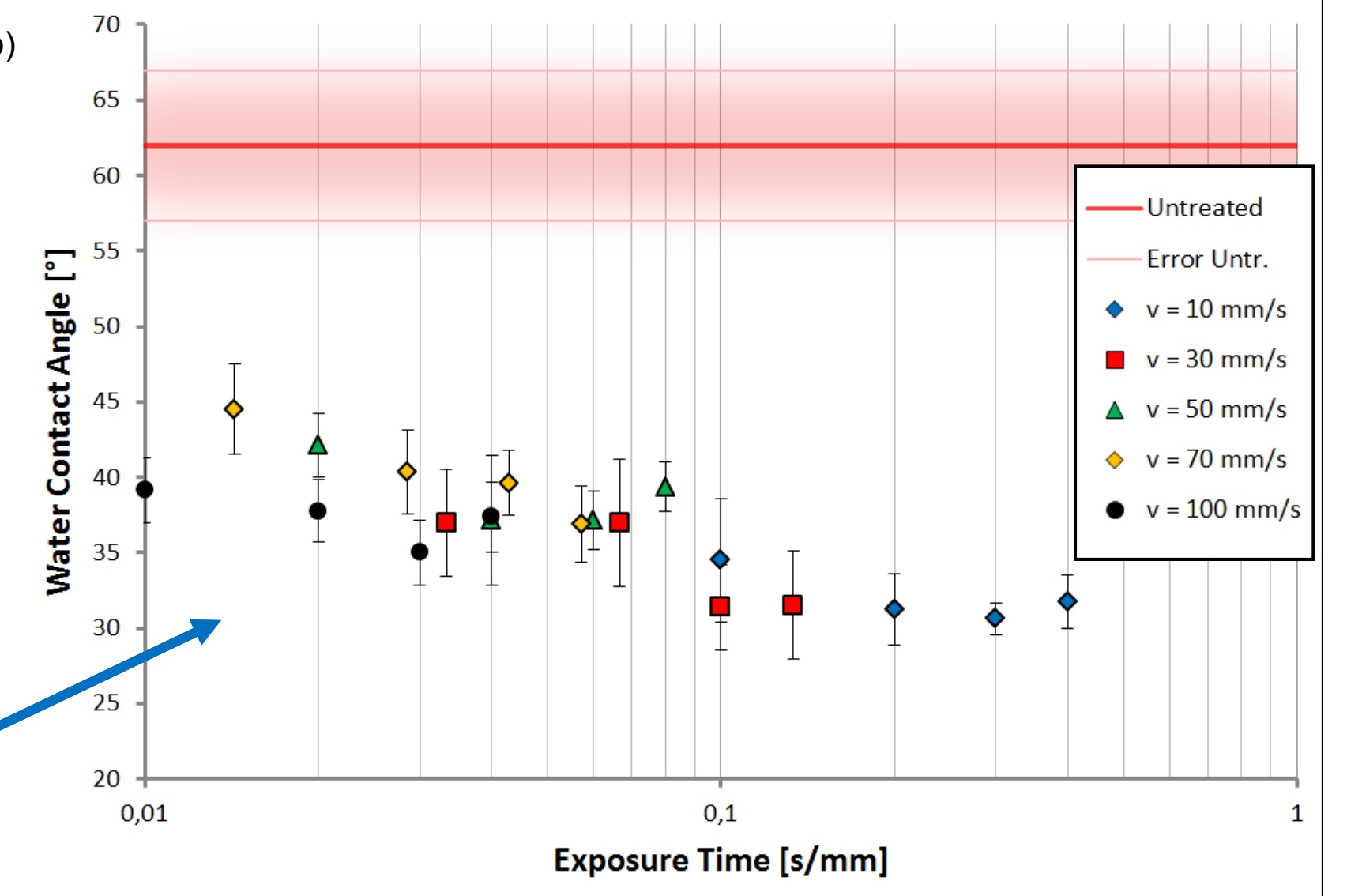
- Increase the wettability of a surface by plasma treating
 - Surface changes from hydrophobic to hydrophilic
 - Decrease surface energy: contact angle with a 6µl water drop
- Remove contaminations from surface
 - Increase adhesive strength of bonded assemblies
 - As precision cleaning (last cleaning step)

Overlap shear strength test will be done on bonded CFRP samples

Contact Angle Measurement

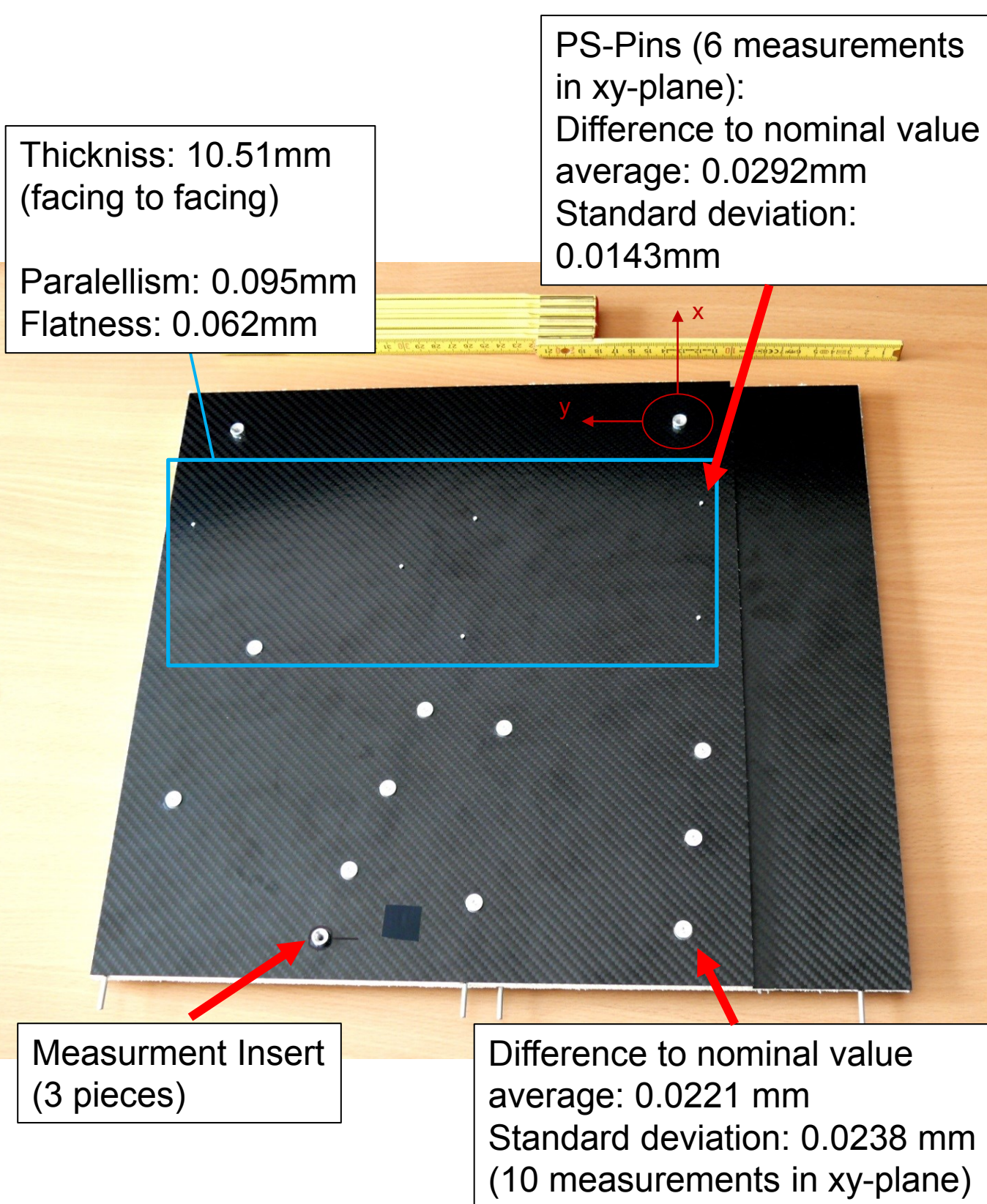


Contact angle of a 6µl water drop on treated CFRP surfaces with different scan speed compared to untreated samples

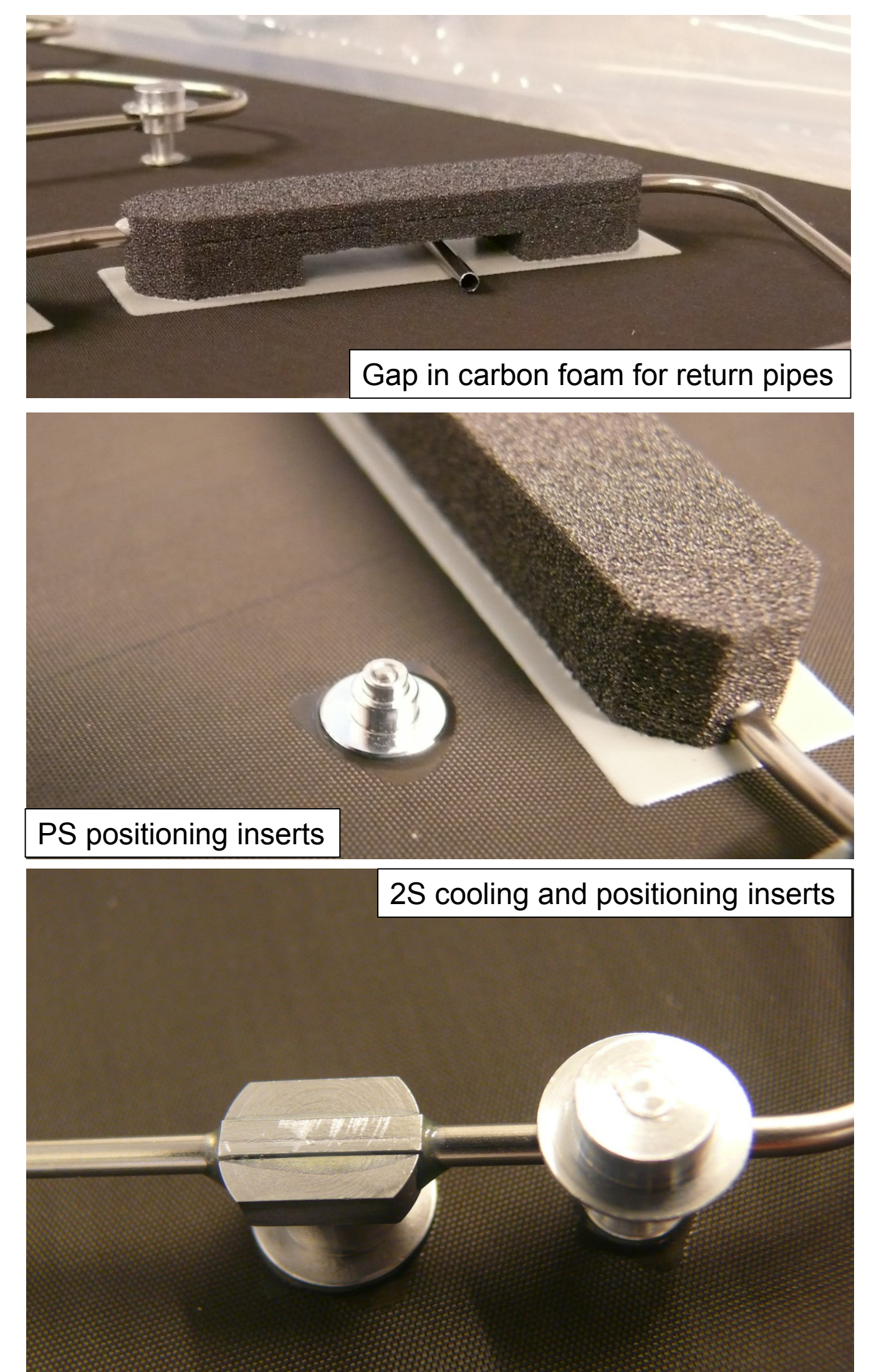
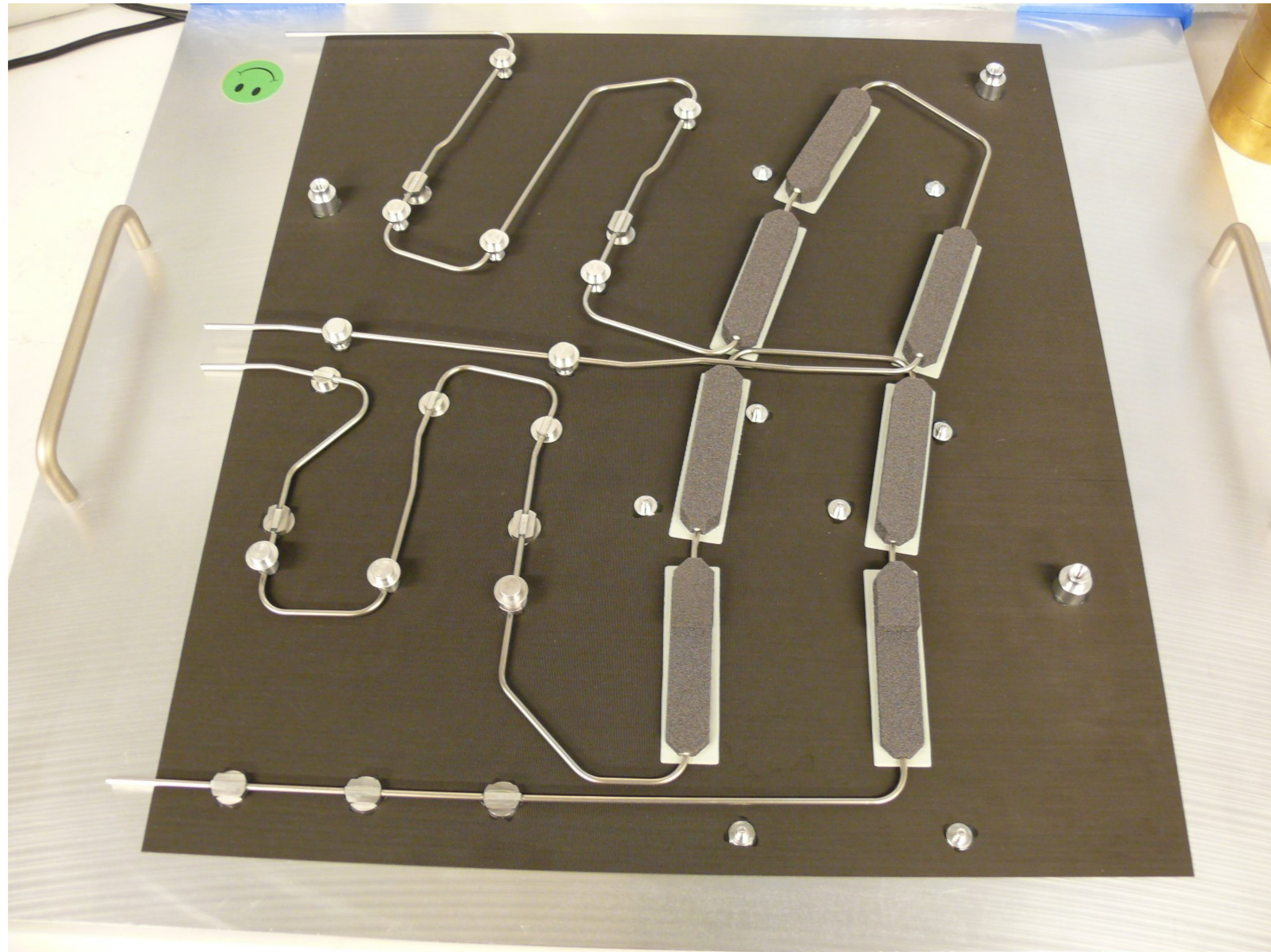


Quality Control of TEDD Prototype Inserts

- 3D coordinates received by measurement arm
- First version of endcap prototype

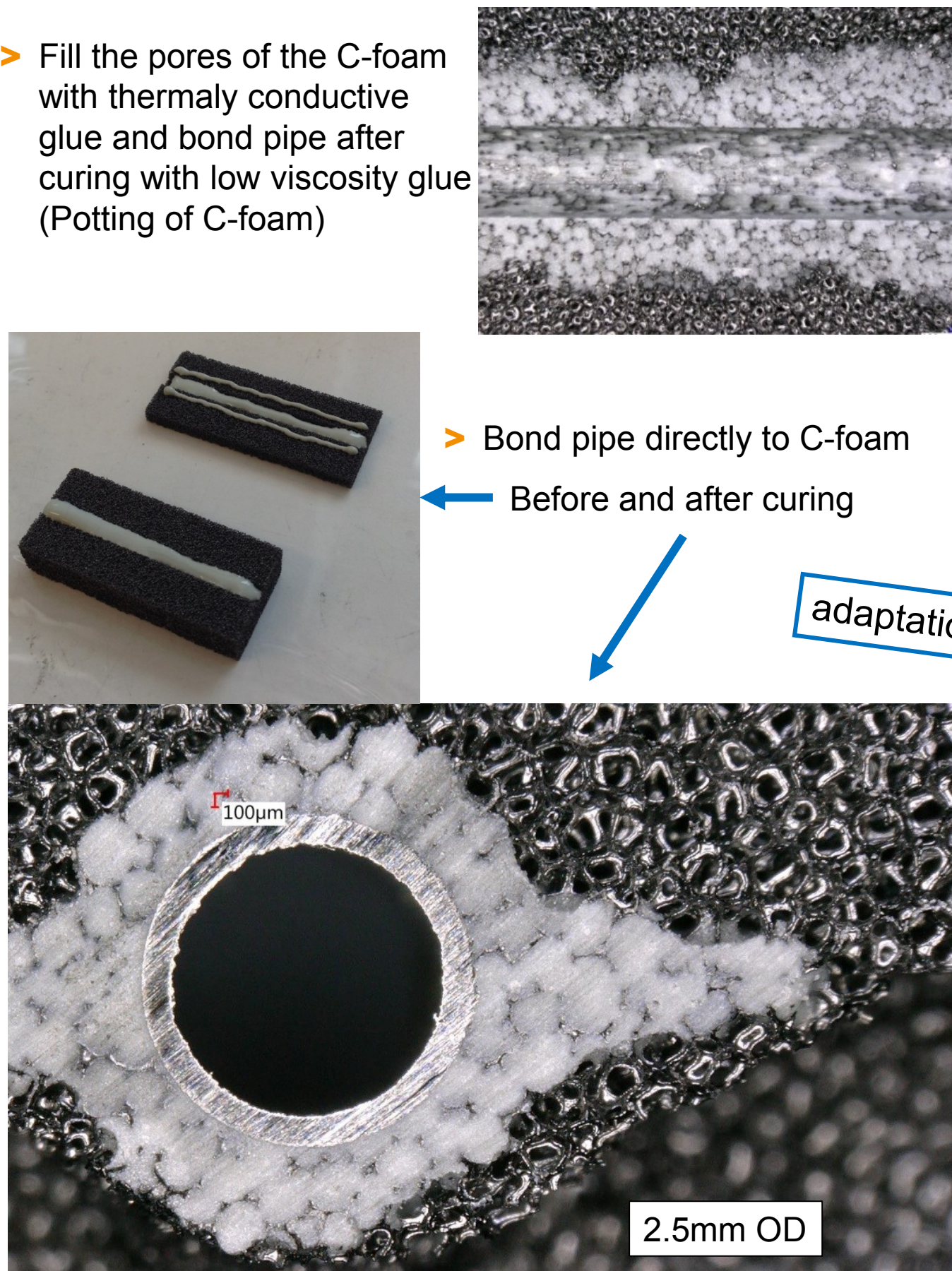


TEDD Prototype

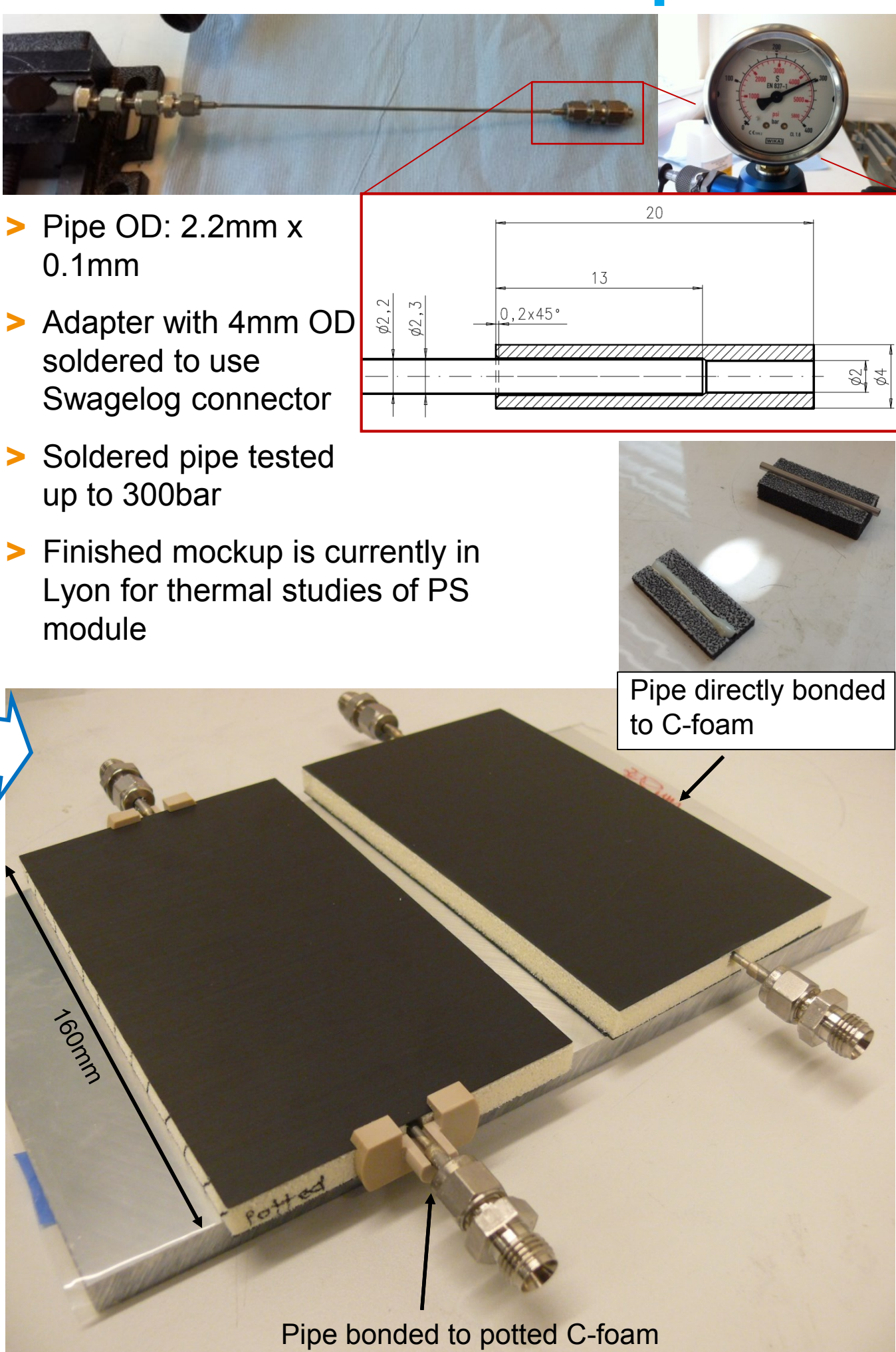


Handling Tests on Thermal Bonds

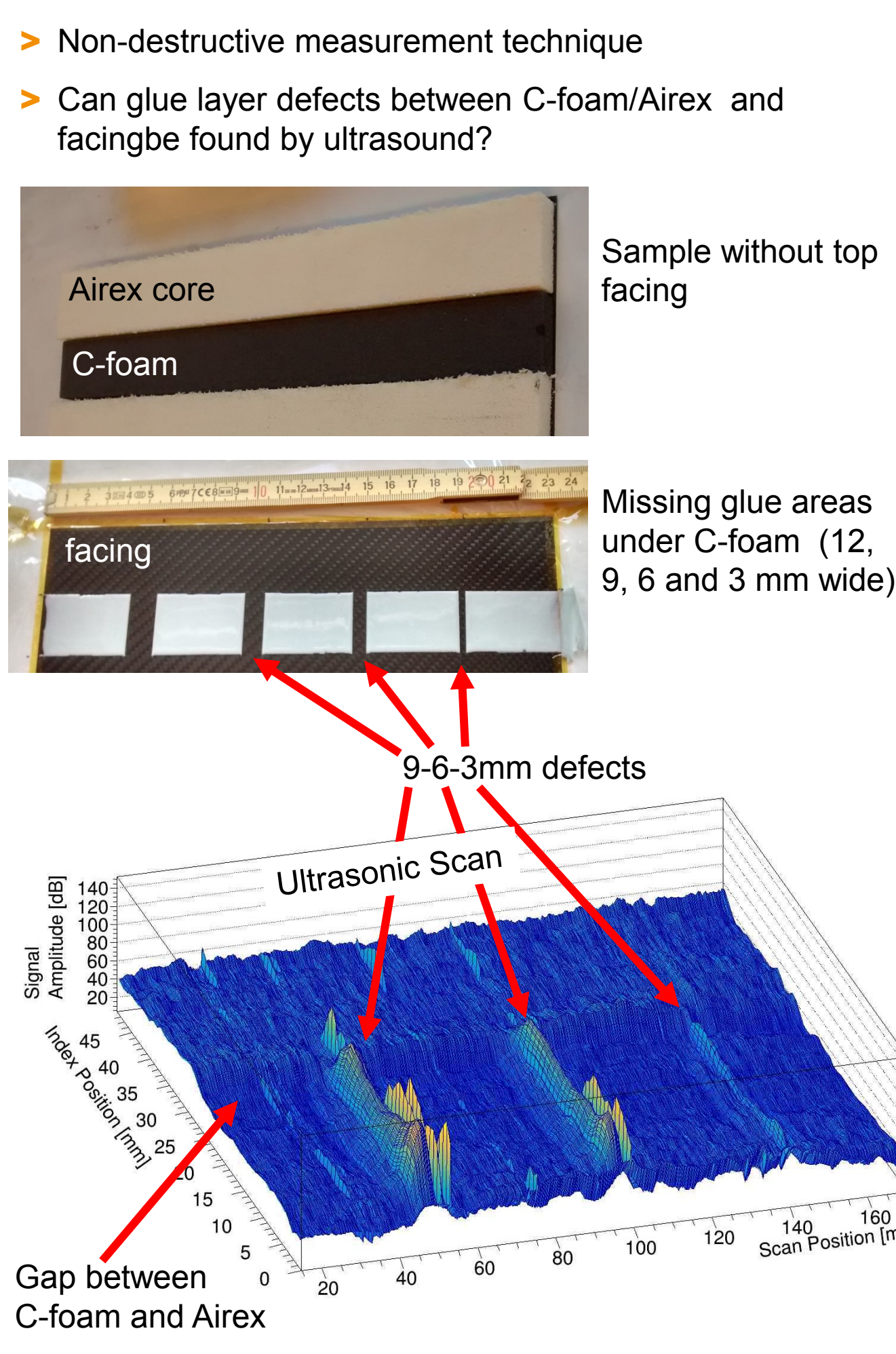
How to bond the cooling pipe to C-foam?



Thermal PS Mockup



Ultrasonic Analysis



Infrared Thermography of Endcap Prototype

