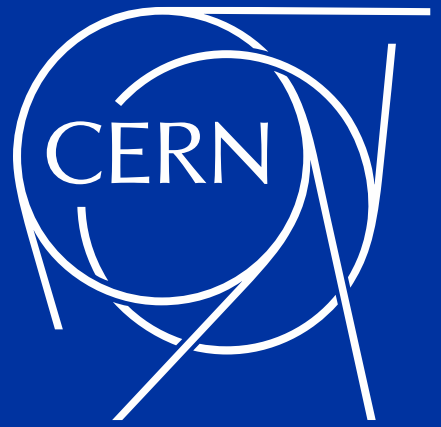

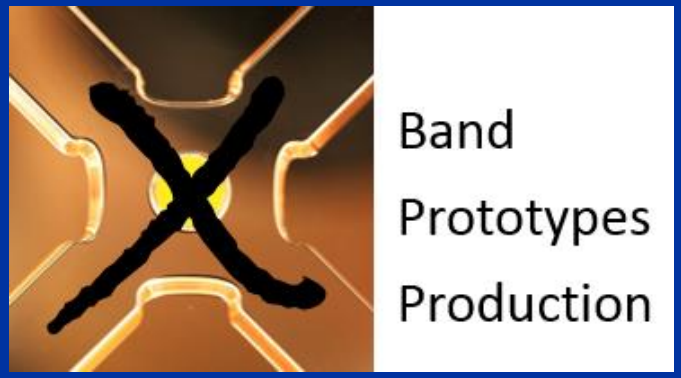

RF structure and component updates

CLIC Project Meeting #44

Pedro Morales

26/04/2023

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- **Halves TD26 structure**
- **SmartCell CLIC-G Structure**
  - Structure design
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  - Tooling
  - SiC study
  - Copper characterization

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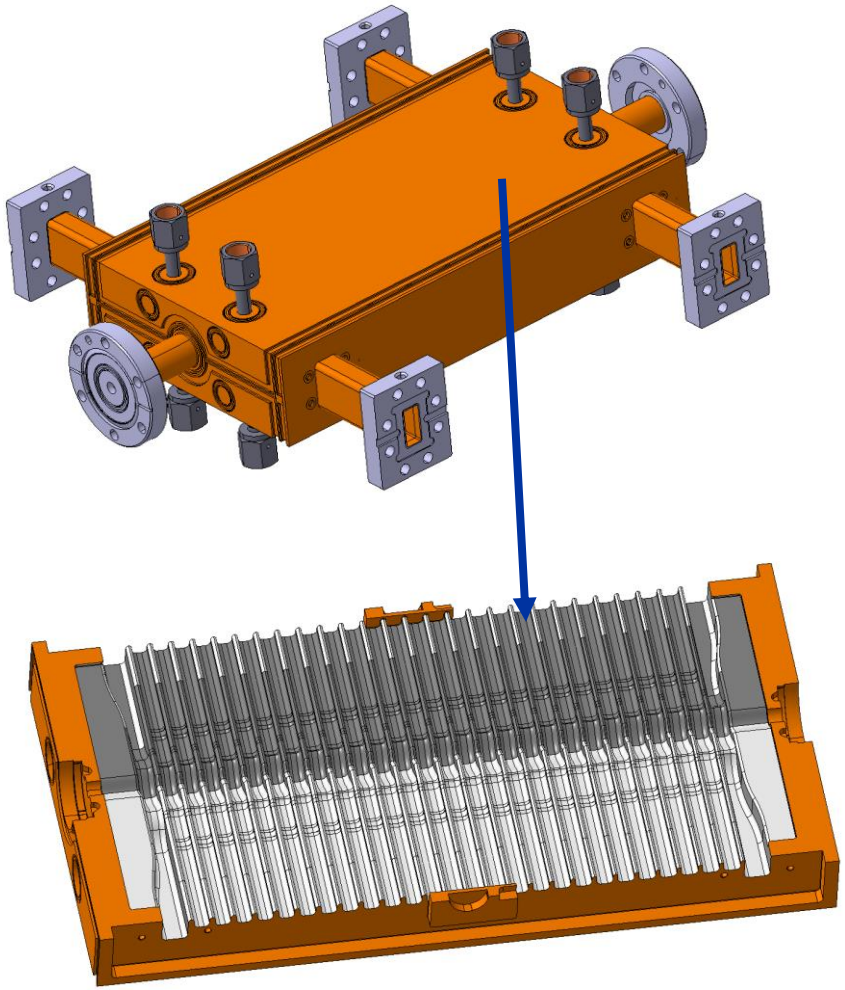
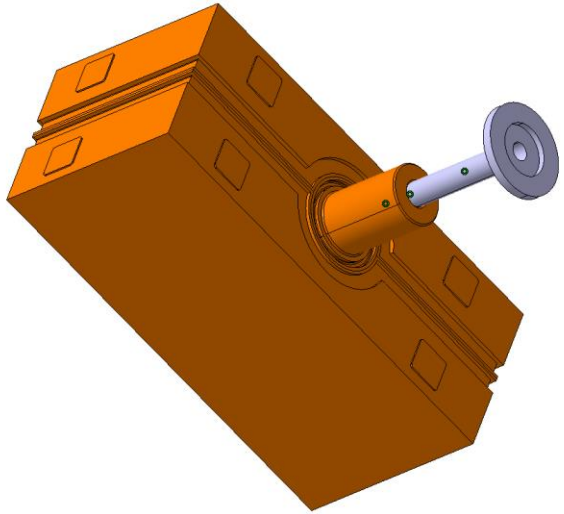
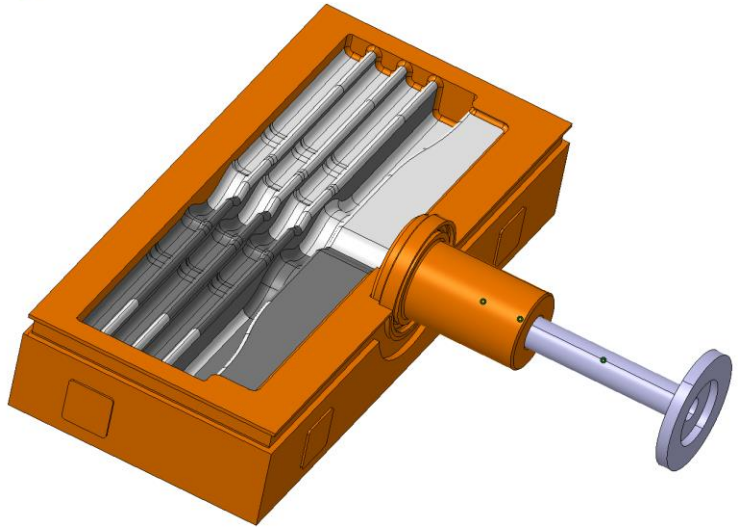
Halves TD26 structure - Small sum-up



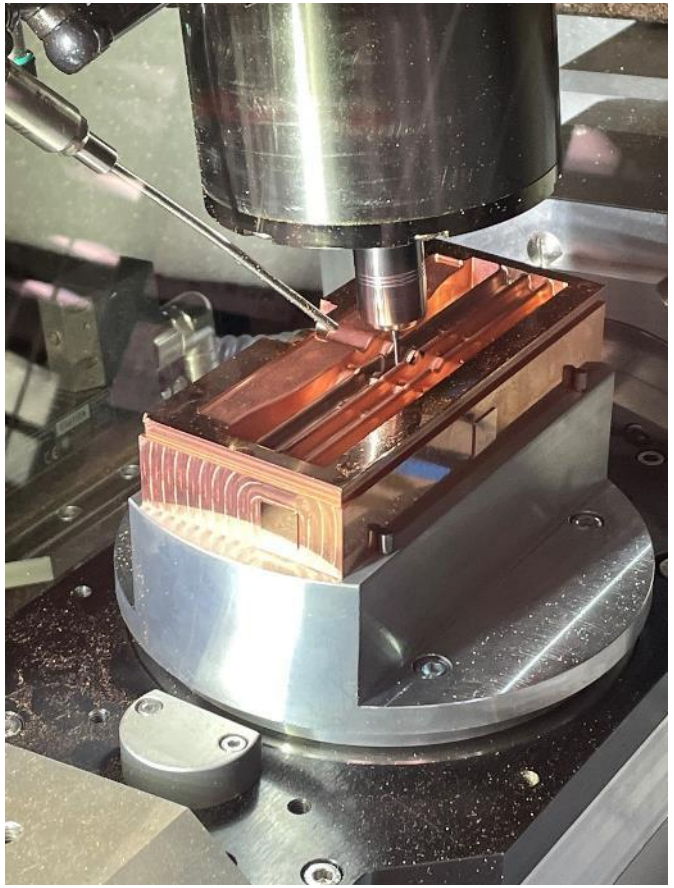
T26 structure in two halves

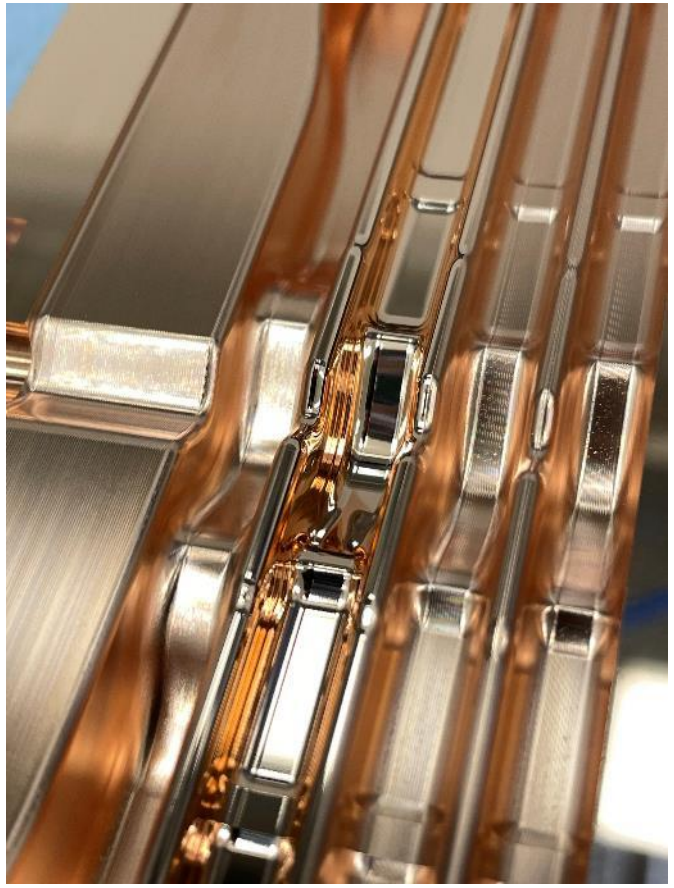




- Reduced dimension mock-up
- Test machinability and welding techniques

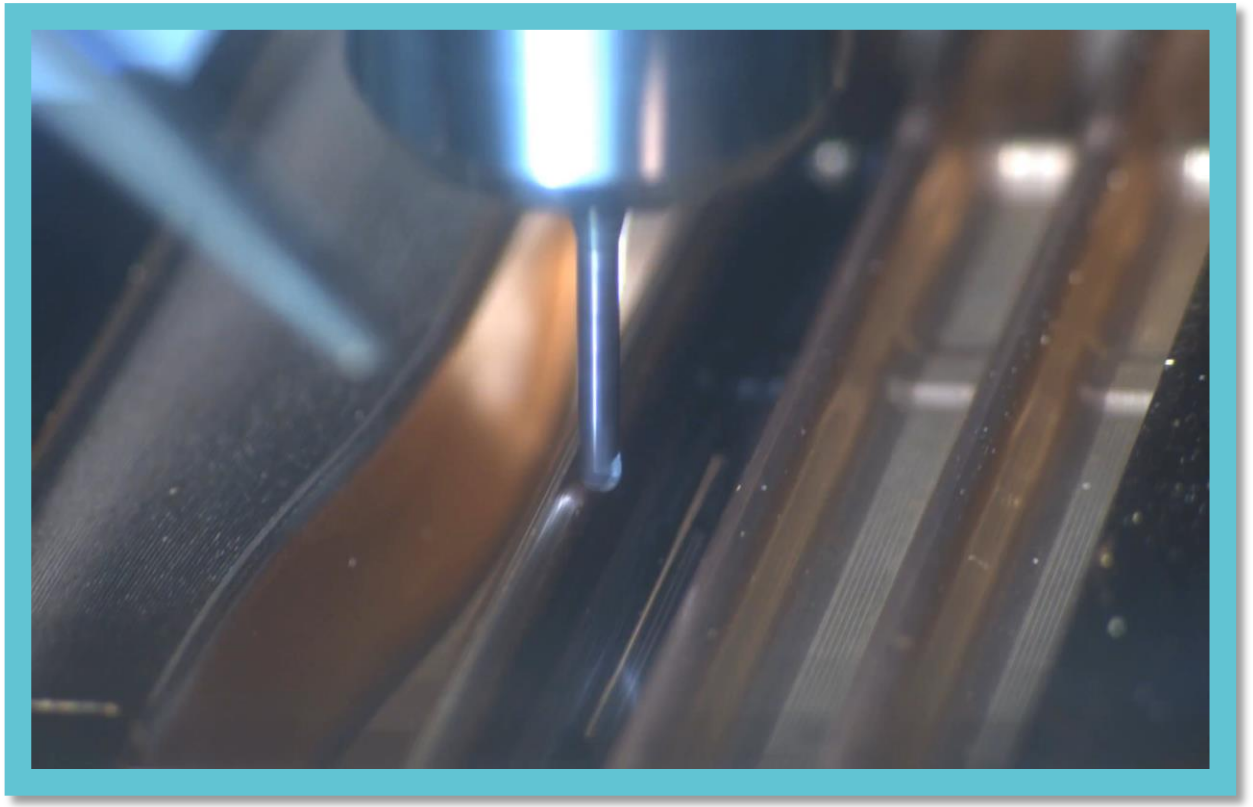
Halves TD26 structure - LT-Ultra process





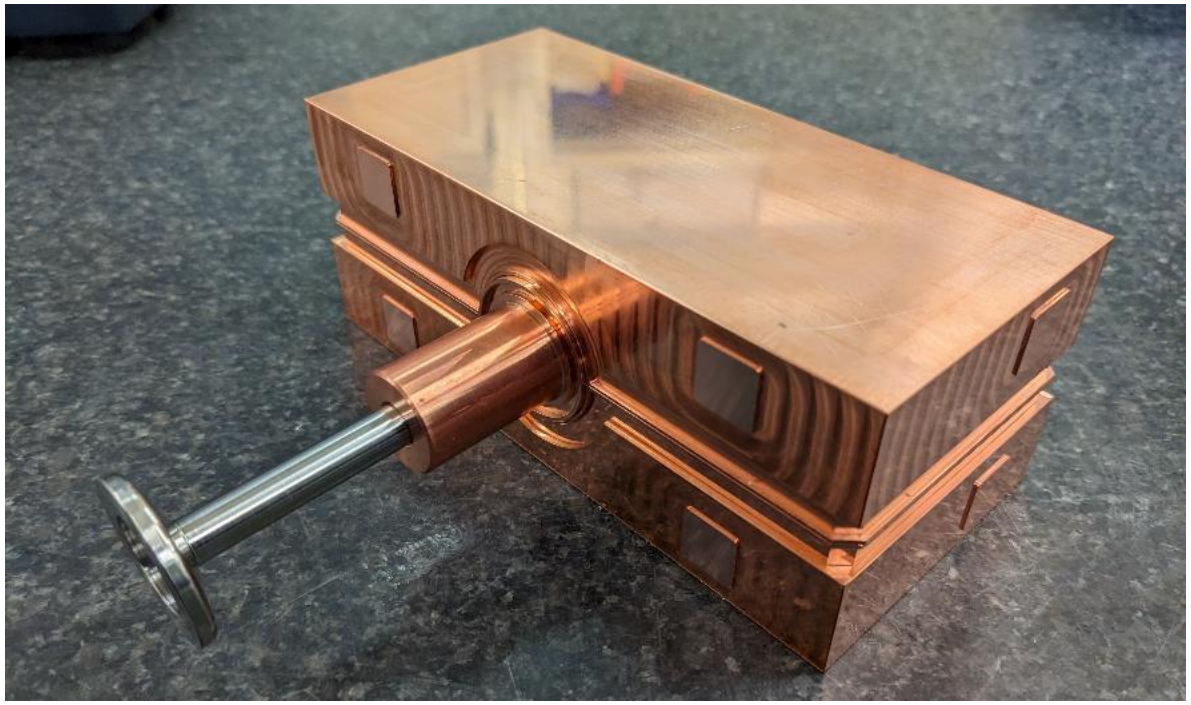
Halves TD26 structure – Lessons learnt

- Before the results of welding and leak testing, we can say that the machining of this small mock-up has been a great exercise to test the capabilities of the industry on this kind of complex machining.
- With the current state of the art in UP-Machining a larger structure will require some attention and maybe some re-design since the parts will be heavier and longer.
- Apart from being a big part, difficult to get tolerances and alignment, there is a risk intrinsic to machining such a large part.



Halves TD26 structure - Reception assembly

Pictures with the pre-assembly to check that everything was correct upon reception.



The final assembly will be done using EBW technology.
Managed directly by the MW.
We expect to have new results by the end of May.

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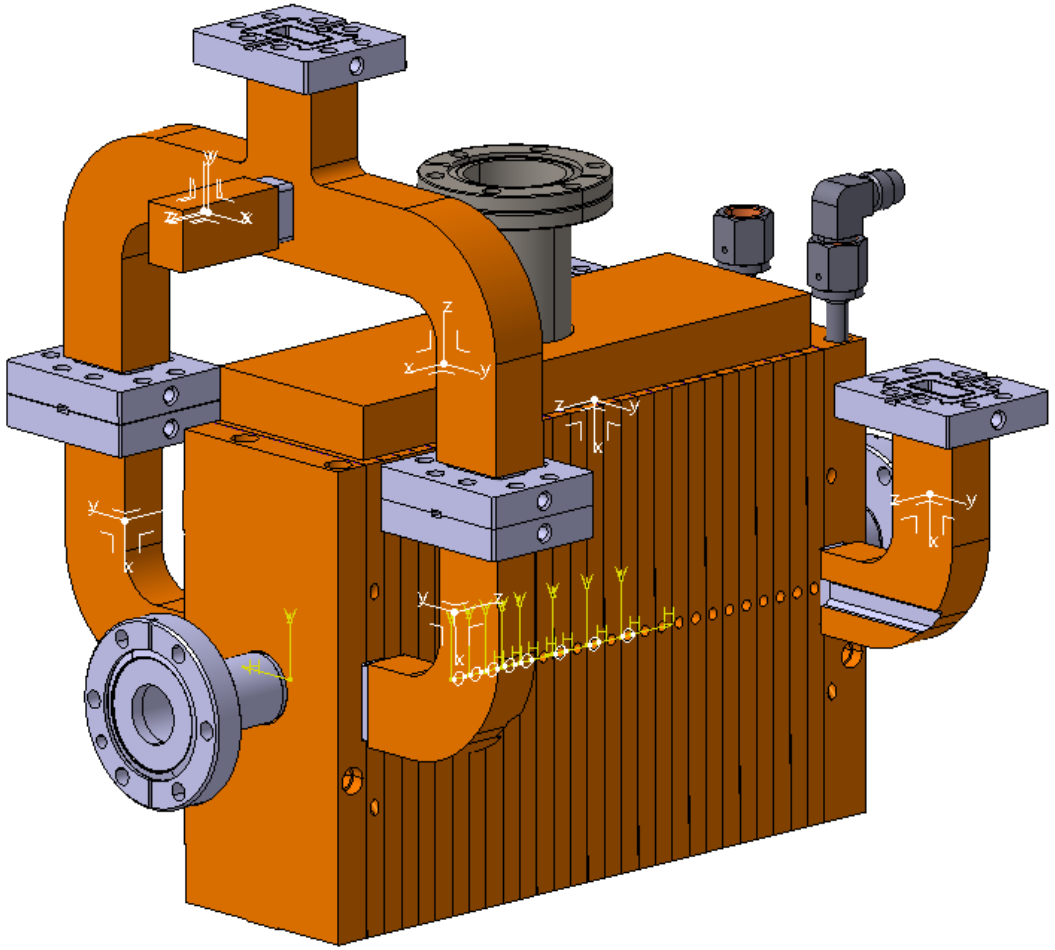
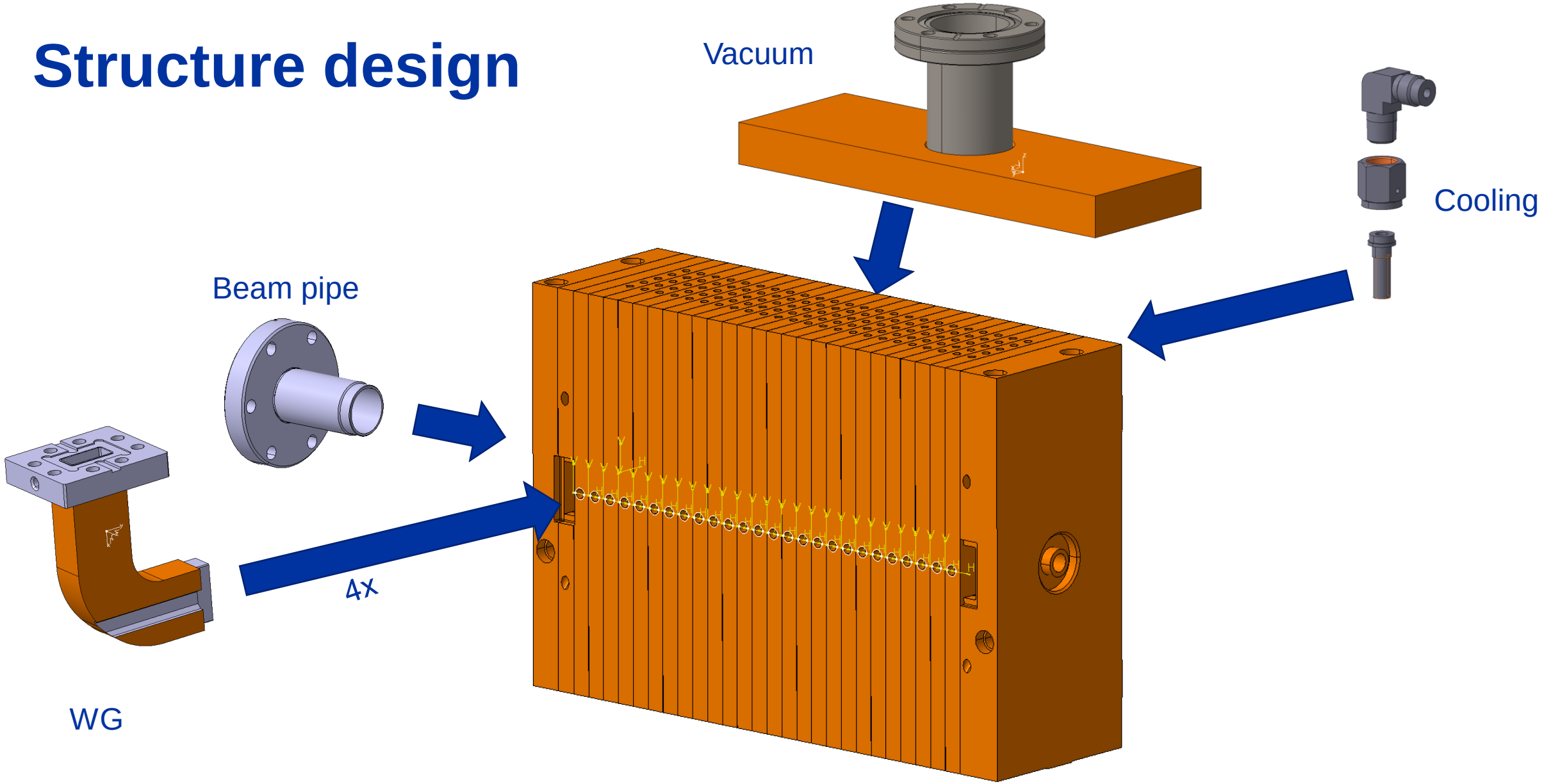
Structure design



Almost all components and geometries have remained frozen since last October when we launched the new mock-up fabrication.

The final design of the structure after the mock-up completion can be ready in 6 to 8 weeks.

Structure design



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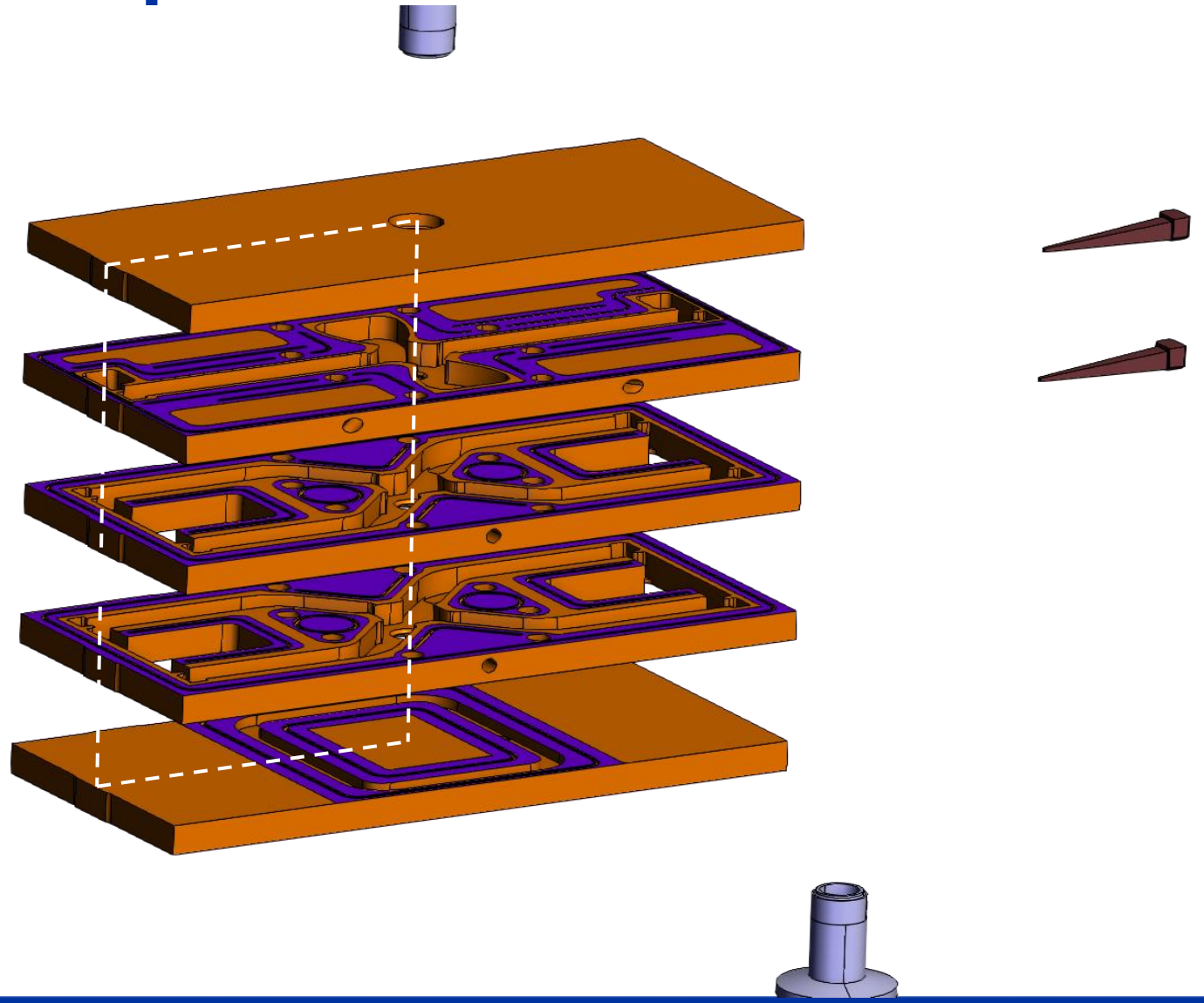
Brazing Mock-up – recap

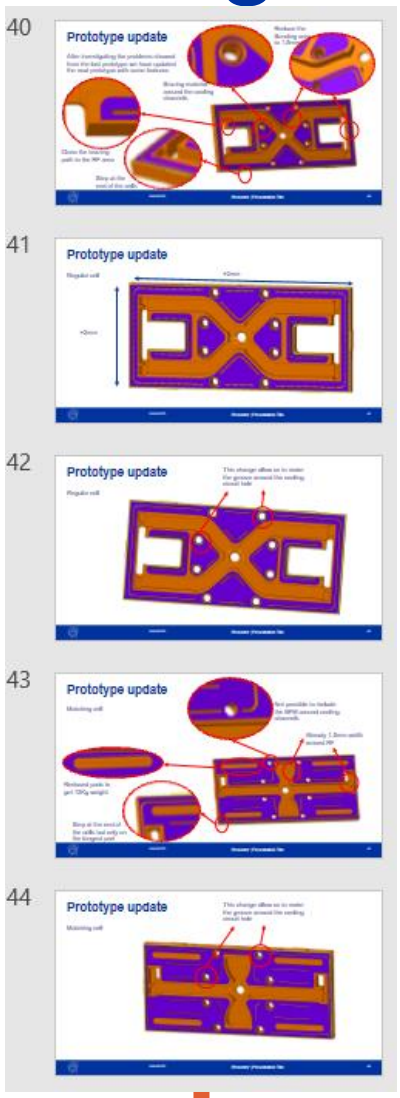
We did already a mock-up previous to this one.

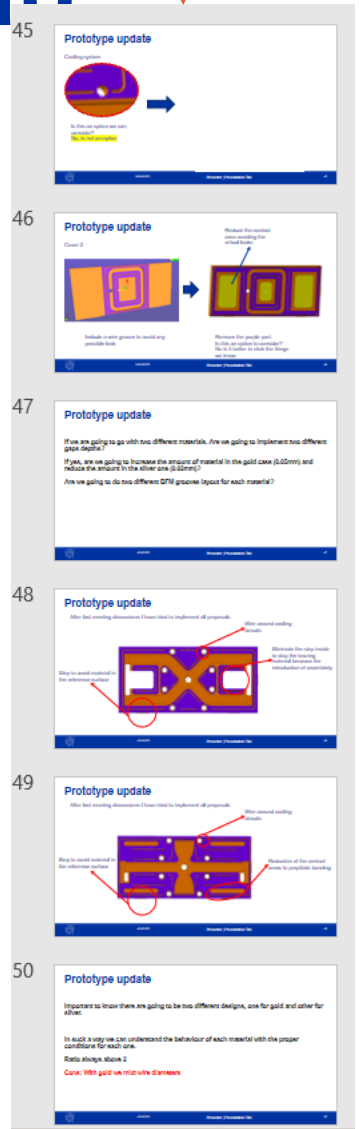
More details about it at this meeting last year:
https://indi.to/zB6GH

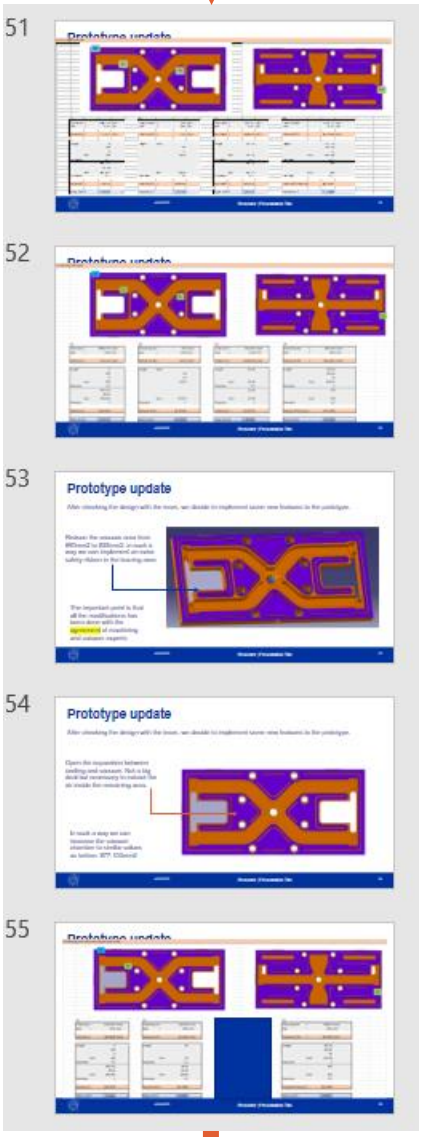
This new brazing test will be done using UP – machining on the production.

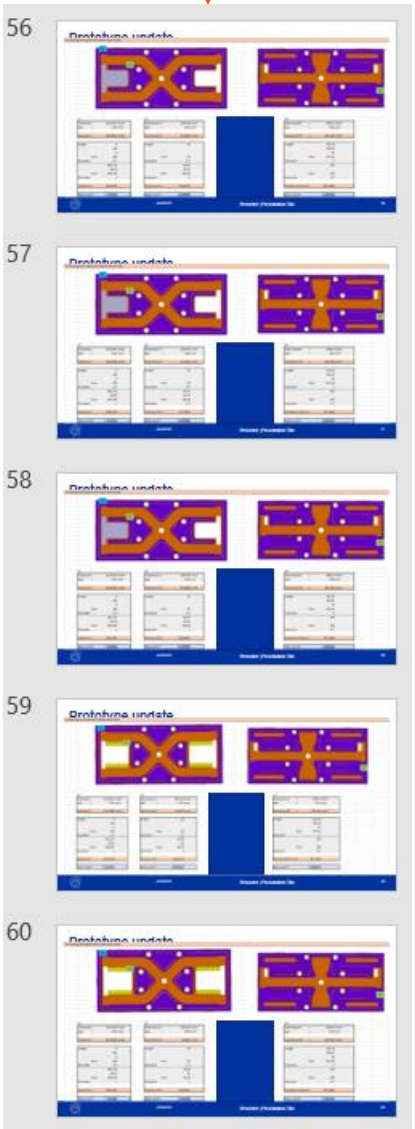


Brazing Mock-up

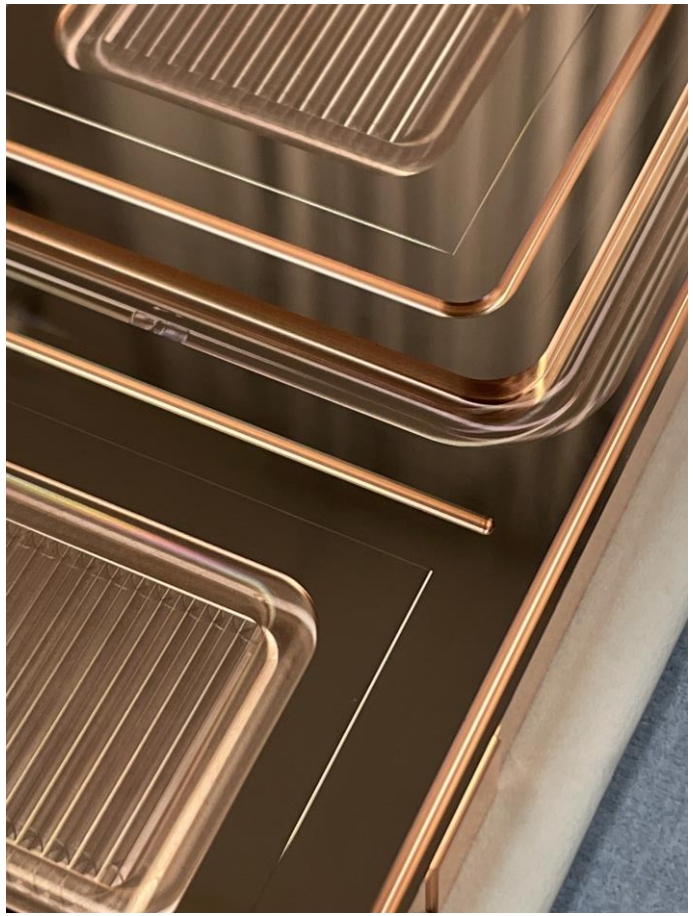


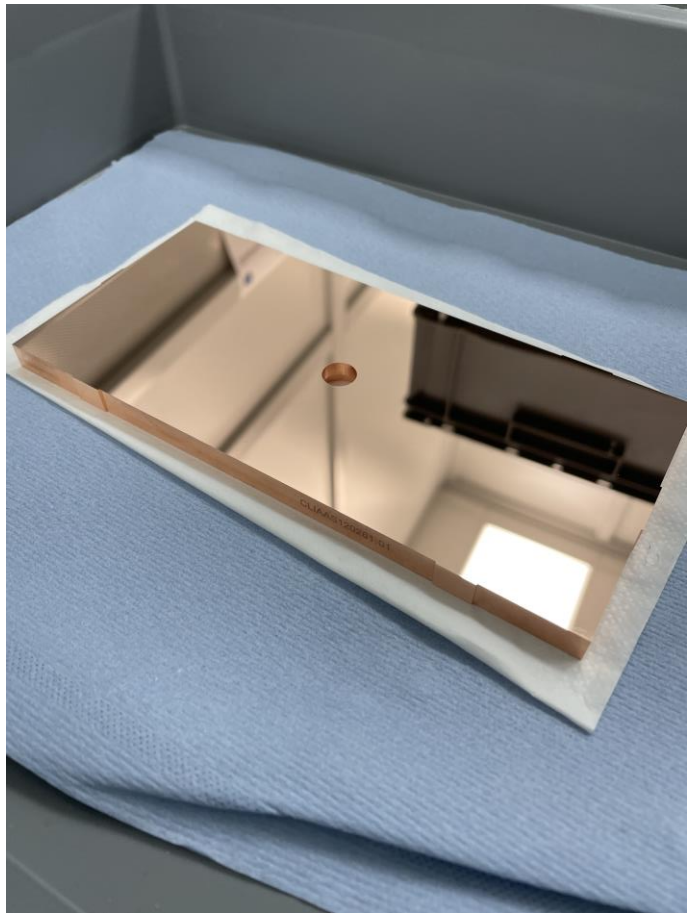






Brazing Mock-up





- Pre-machining done at CERN by MME, metrology ok and sent to UP-Machining
- First 8 cells completely finish and the next 12
- We expect to receive the parts here after UP machining by the beginning of June.

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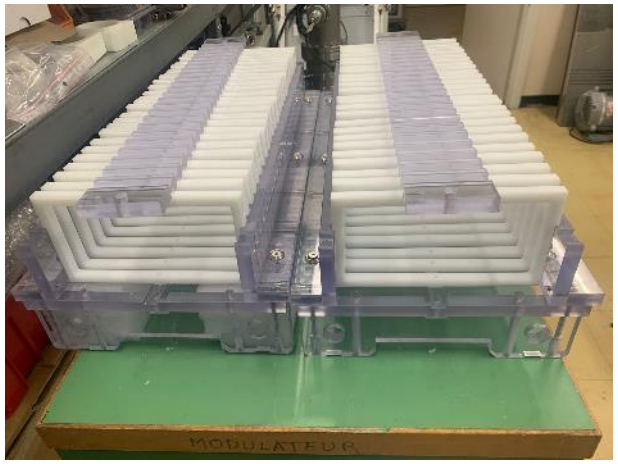
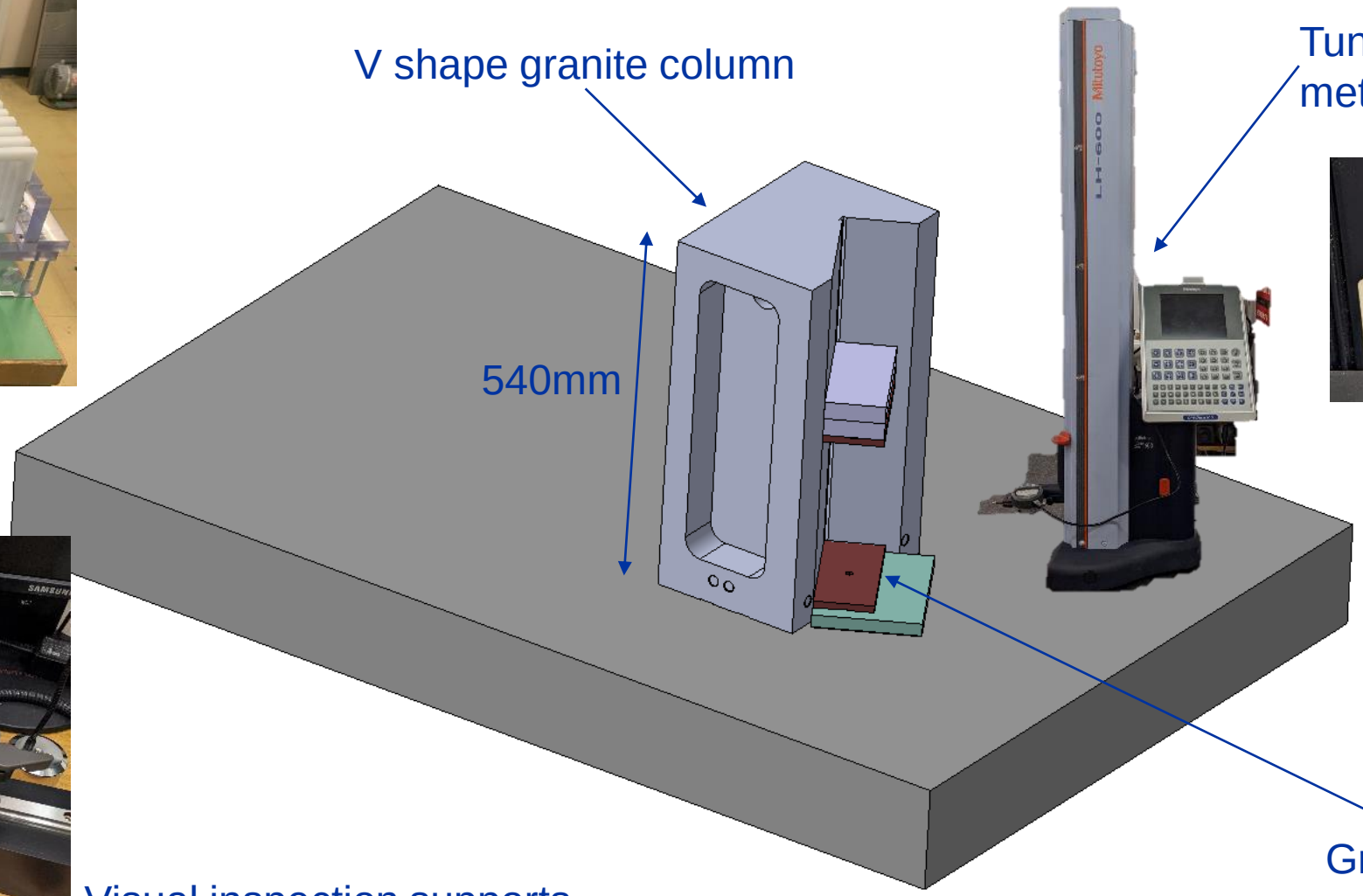
Tooling for the assembly – From circle to rectangle



Transporting and cleaning racks

Visual inspection supports



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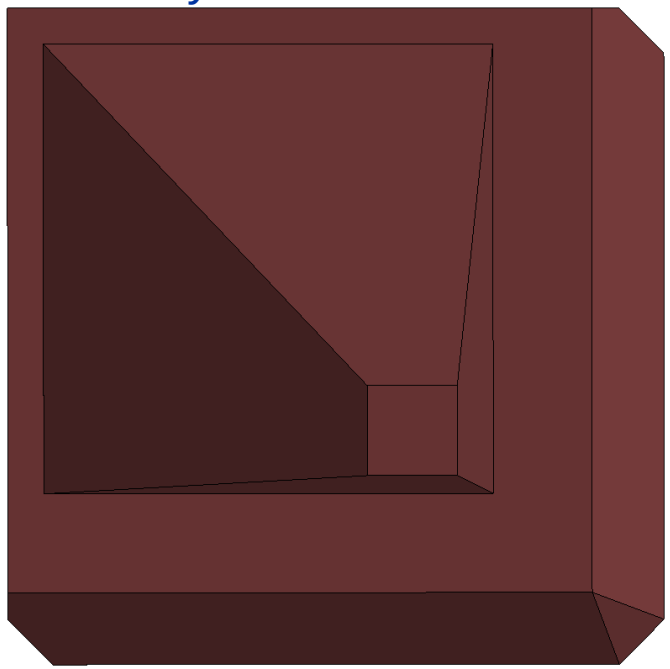
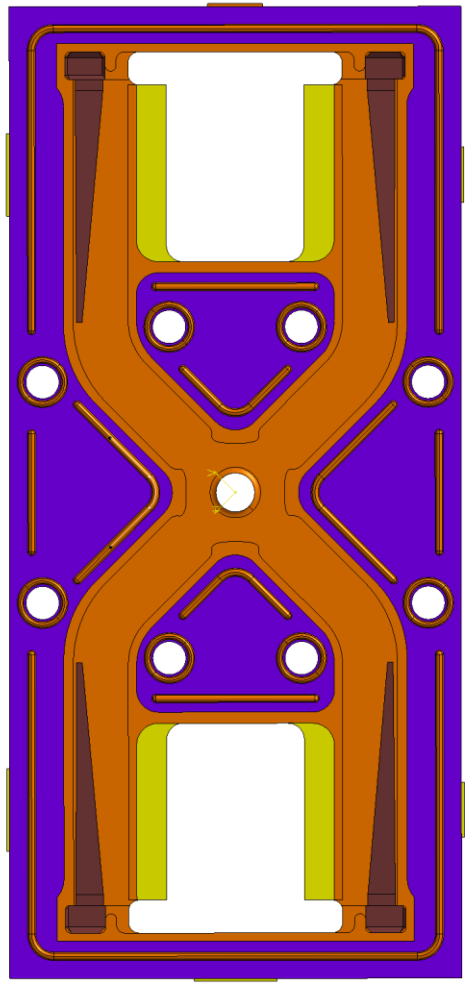
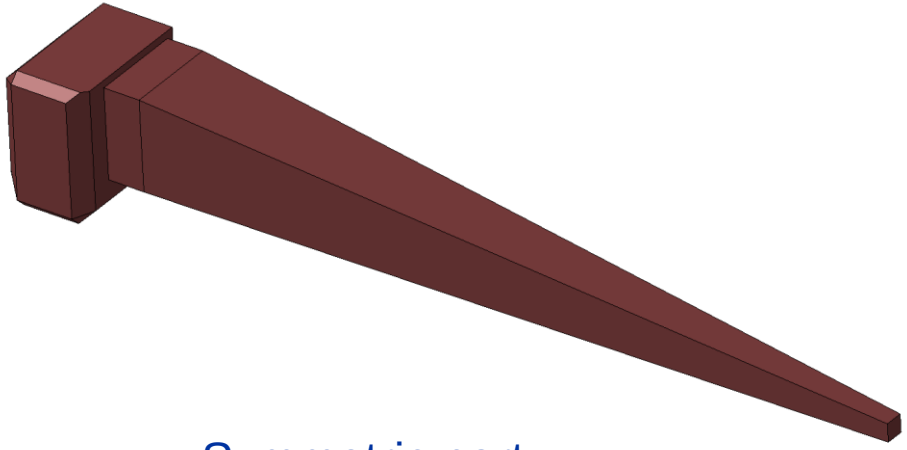
SiC Loads

This part turned out to be very expensive because of different factors.

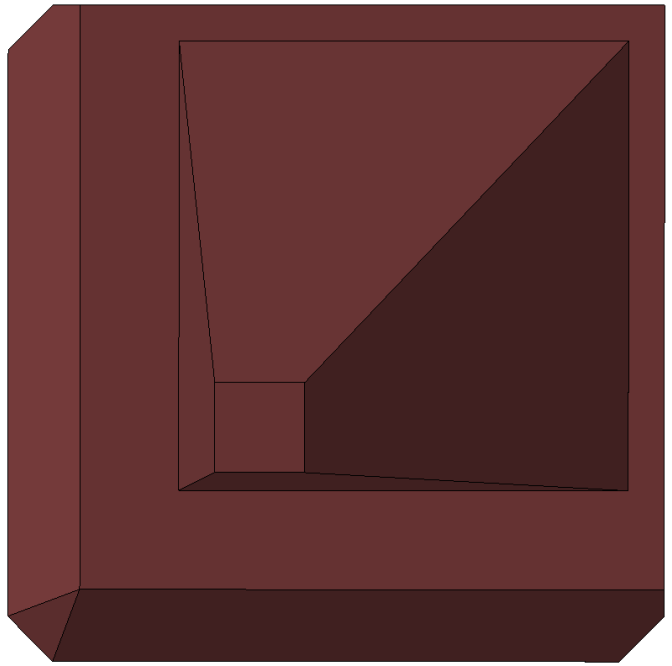
- Material
- Head
- Body





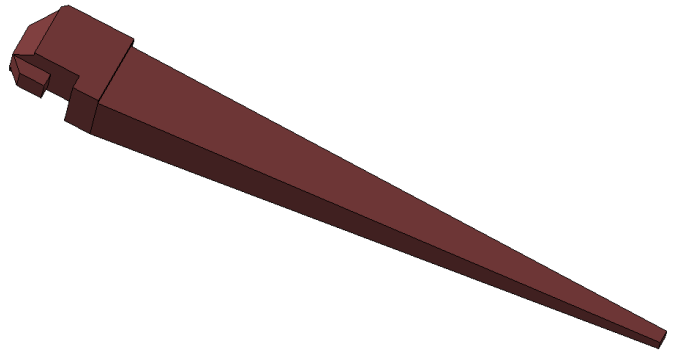


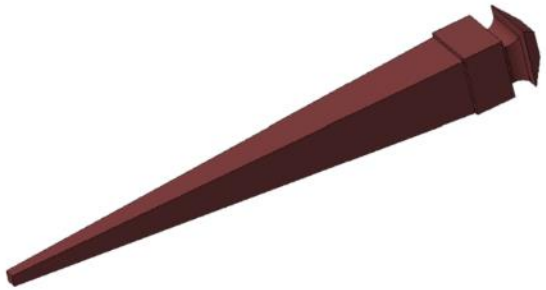
Symmetric part

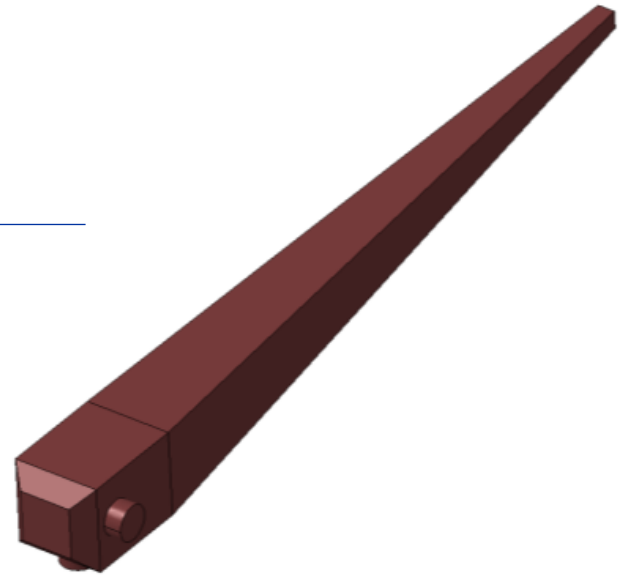


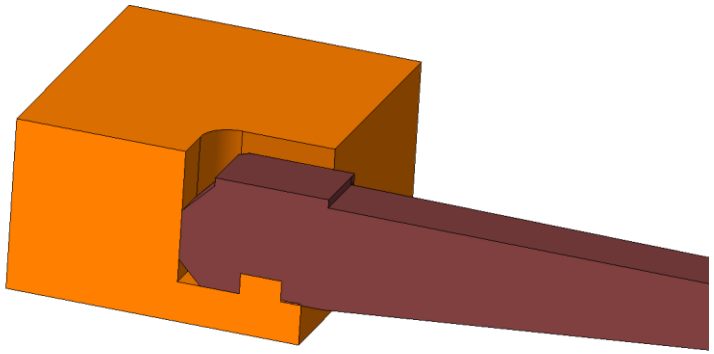
SiC Loads - Alternatives

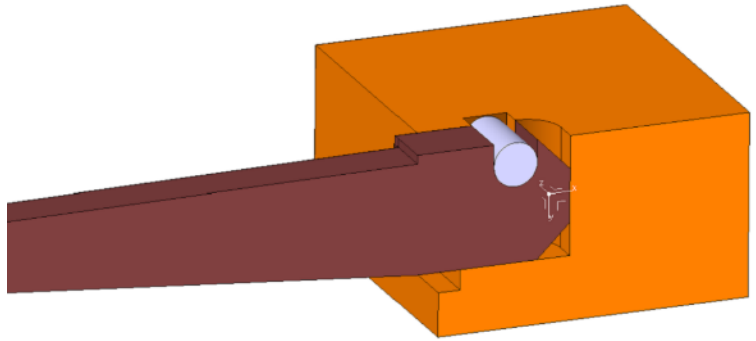
No changes in price

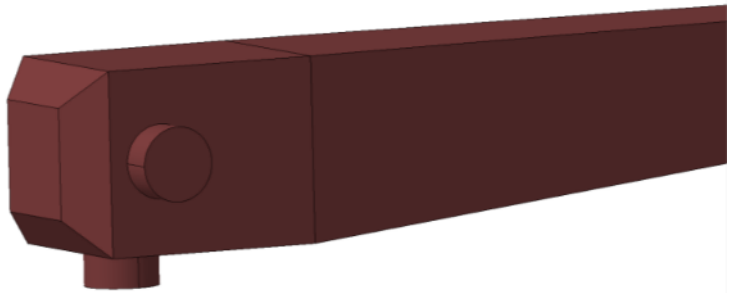








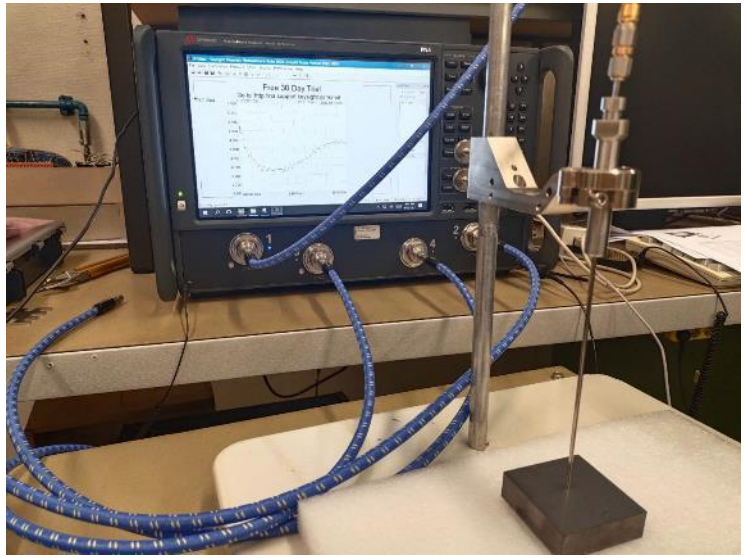




SiC Loads – Material problem

Detected a lack of consistency in the SiC materials used up to now. One of the most commonly used Ekasic P changed some of the components

KEYSIGHT TECHNOLOGIES



#	Description
1	Performance probe
2	Performance probe short

Characteristic of the material we need are not commonly provided by the industry

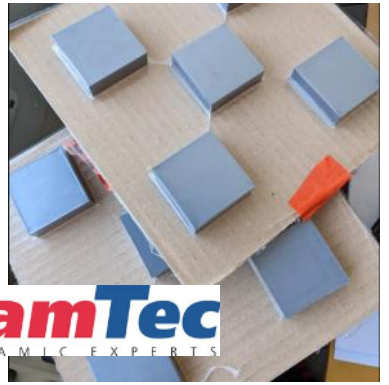
qsil

CoorsTek

MERSEN BOOSTEC

MERSEN

3M



CeramTec
THE CERAMIC EXPERTS

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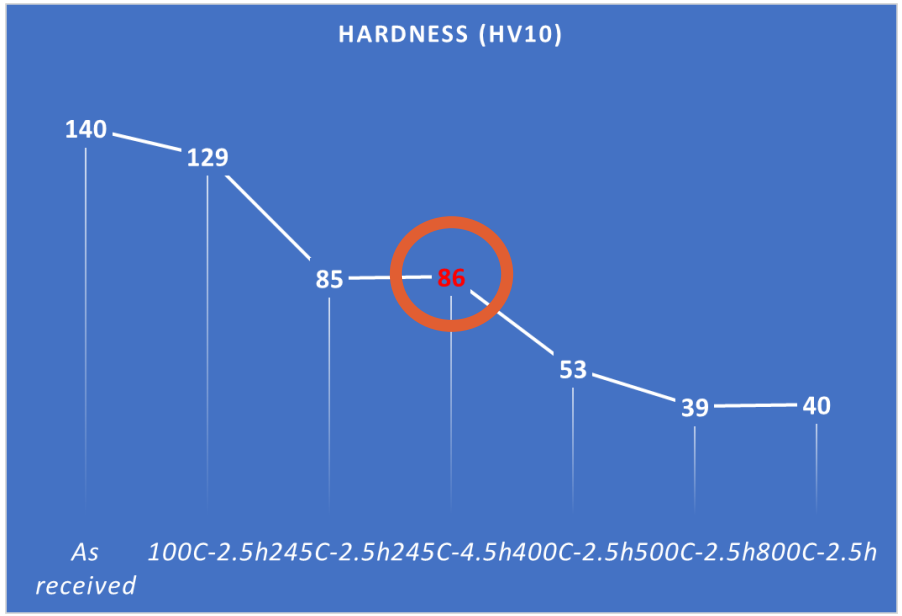
Copper characterization – From 3D forged to what?

Our current cycle. 245C – 4,5h from **laminated** copper.



Thanks Ana Teresa and the team from materials, for the work here

We will test 3 more options + the previous.
Exactly same design of the Matching cell

- Laminated Cu 245C – 4.5h
- Laminated Cu 500C – 2h
- 3D forged Cu 245C – 4,5h
- 3D forged Cu 500C – 2h

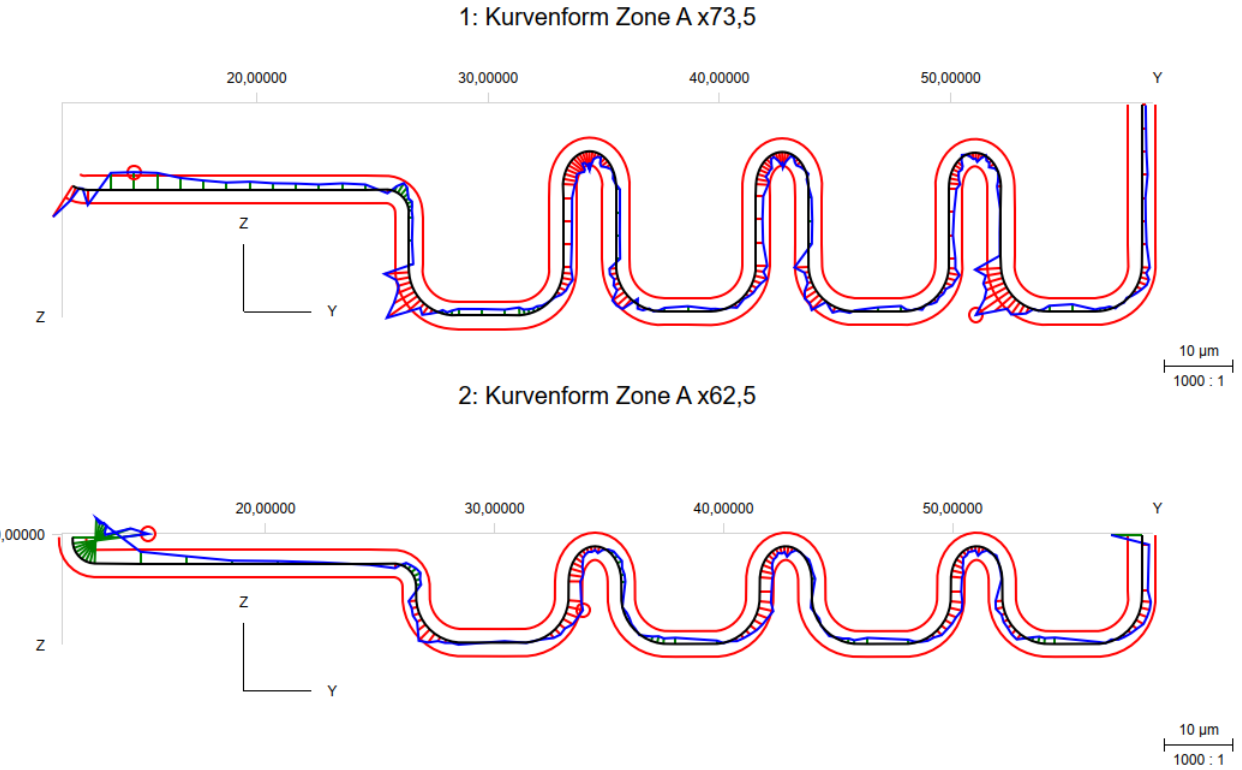
X Band Prototypes Production

Thank you for your attention and do not hesitate to ask any question.

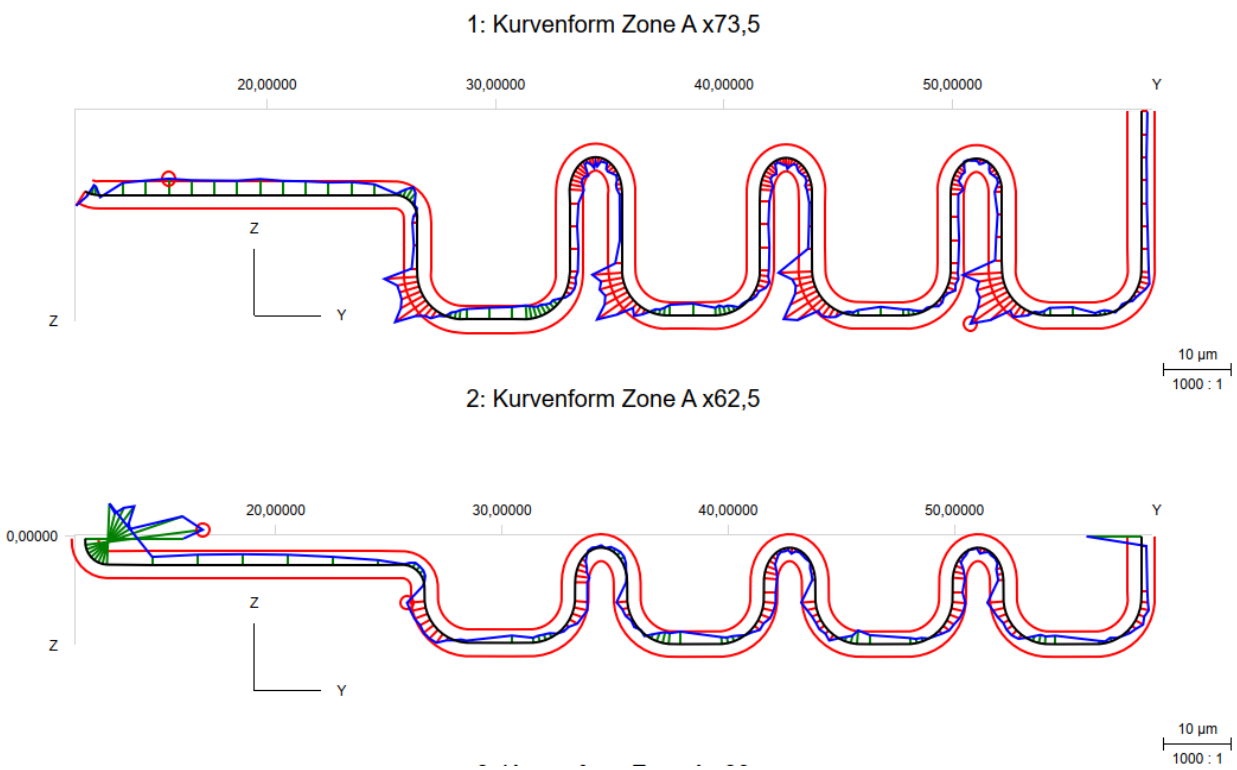
Thanks to Nuria Catalan Laseras and all the team for the help on the presentation and the pictures.

LT-Ultra Repeatability

T3



T4

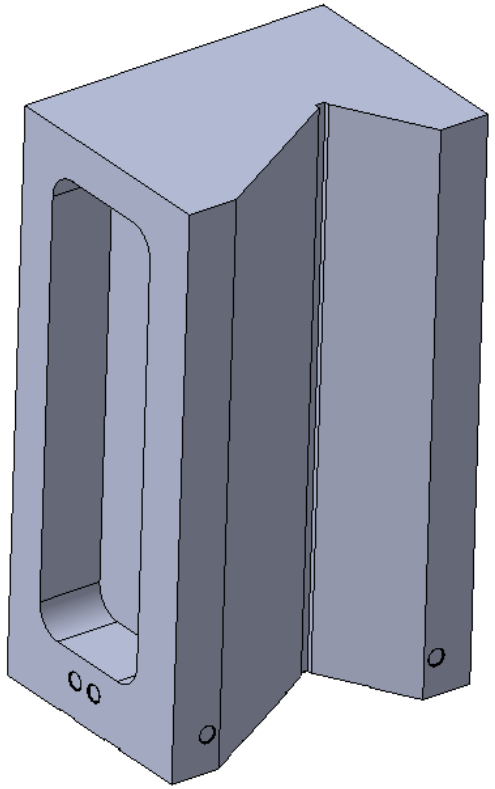


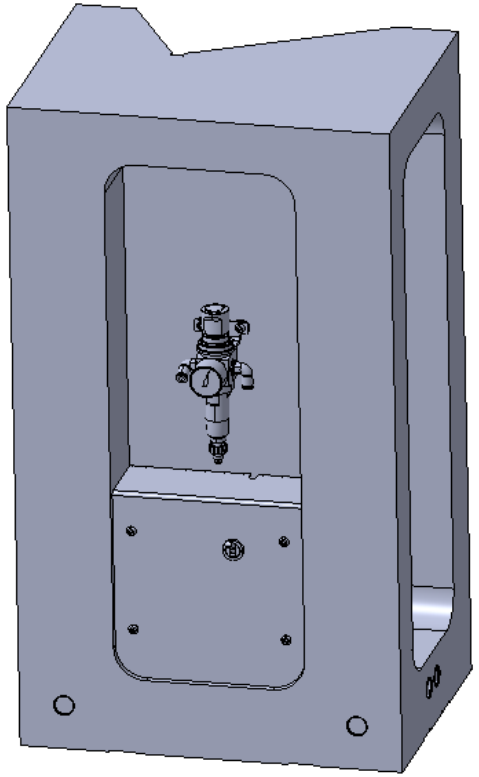
Tooling for the assembly

Air bearing system to move it easily.

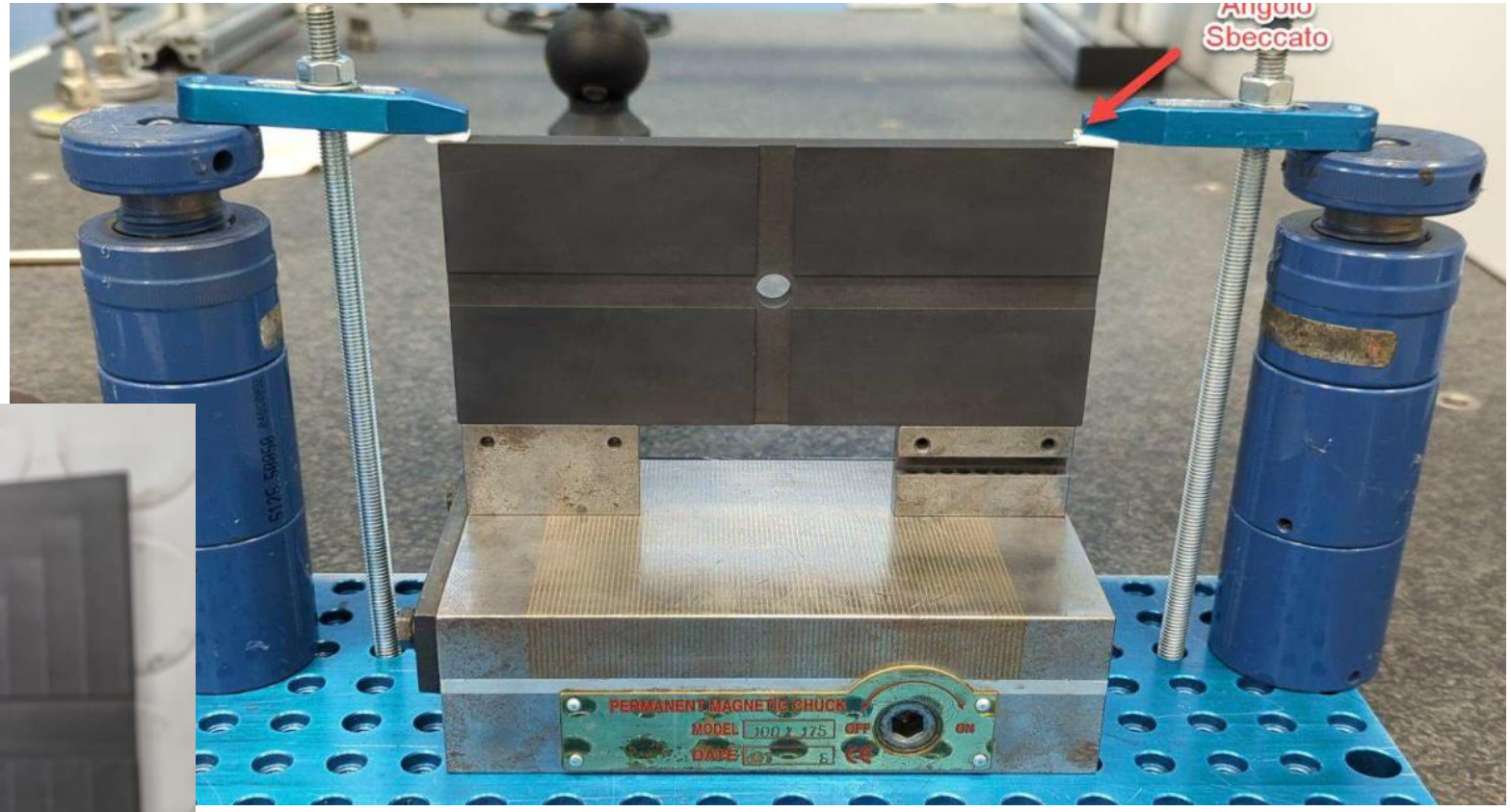
Weight 58kg

Adapting our air system to this with filters and some extensions

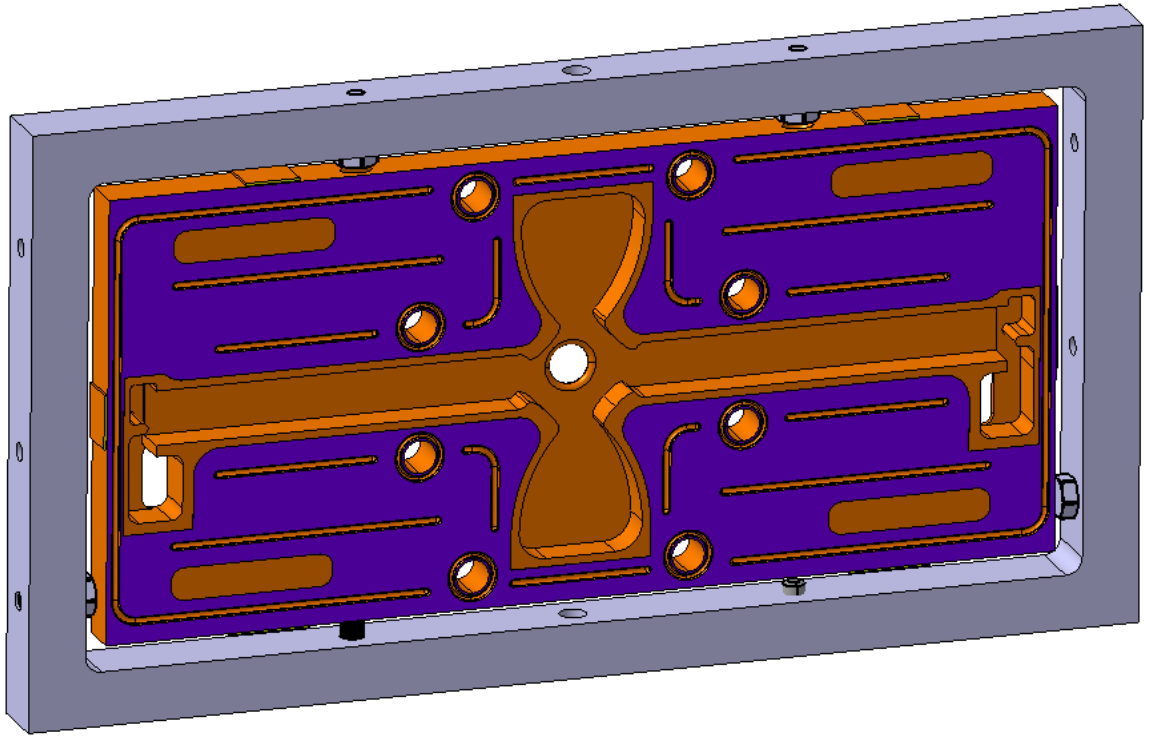


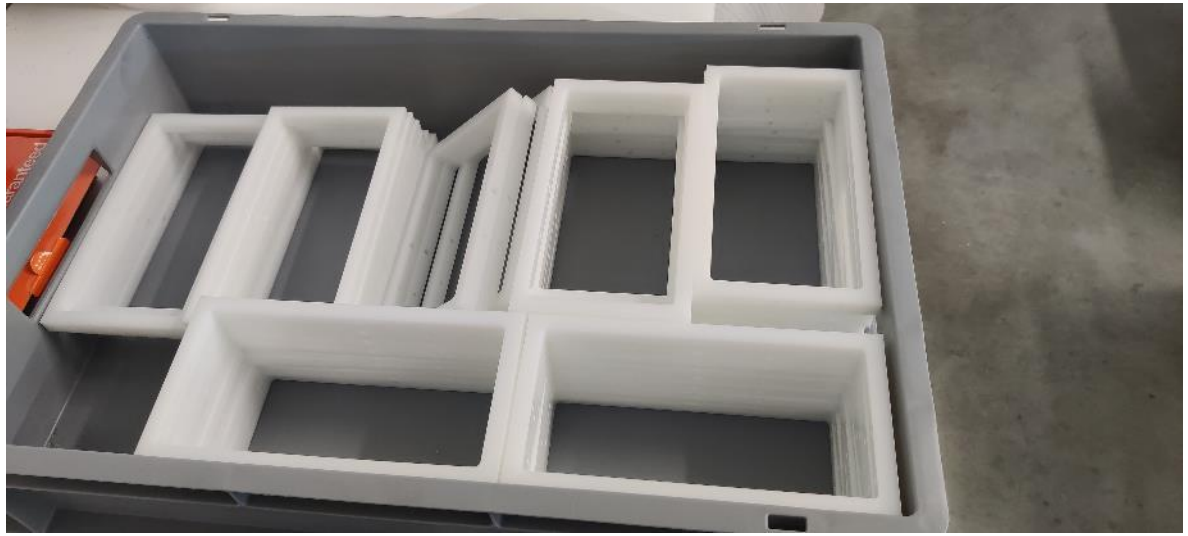


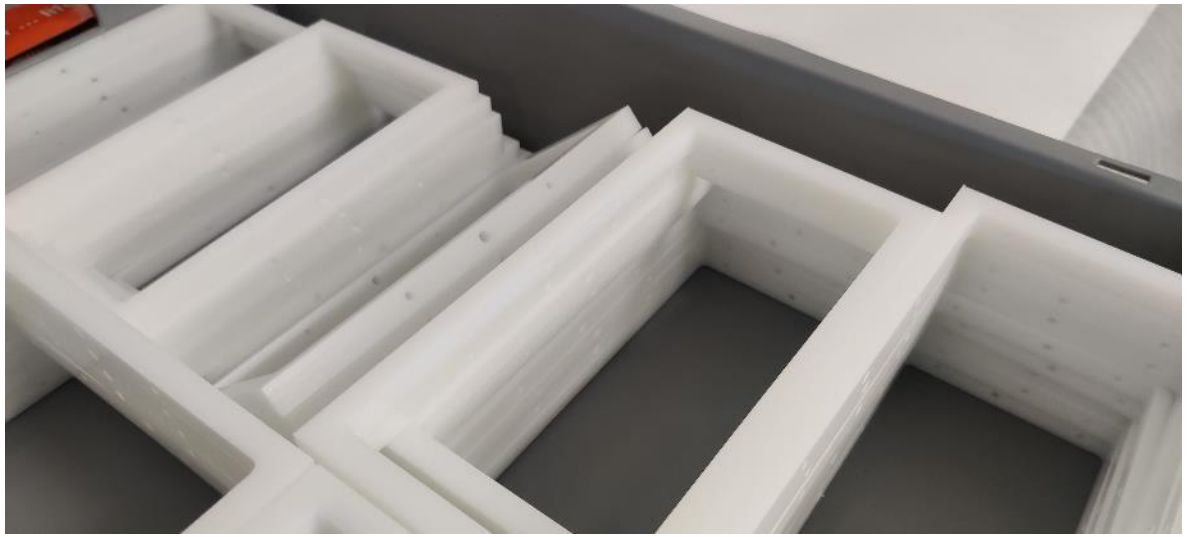
Tooling for the assembly



Tooling for the assembly

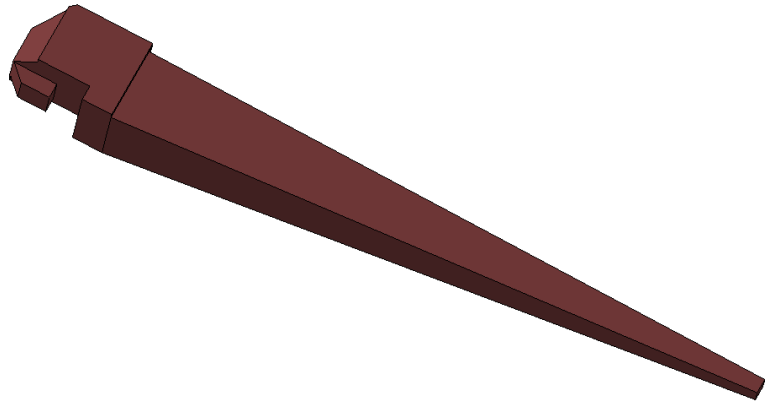






Compatible with previous frame.
Saving money, resources and time

HOM Loads - Alternatives



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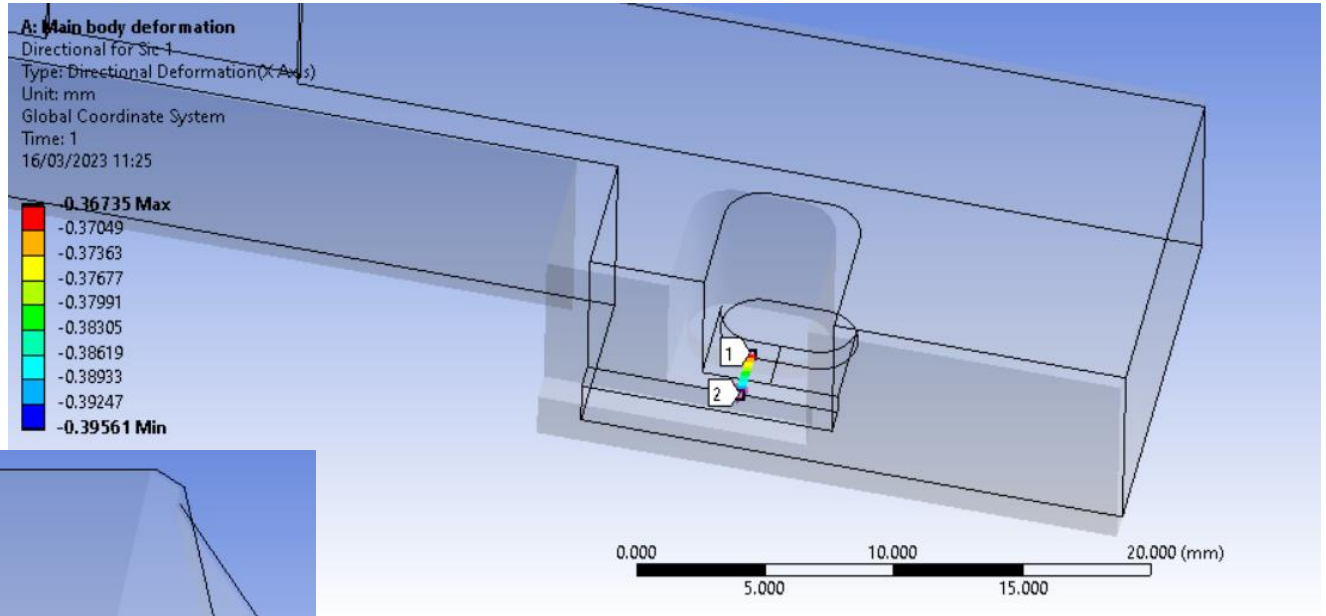

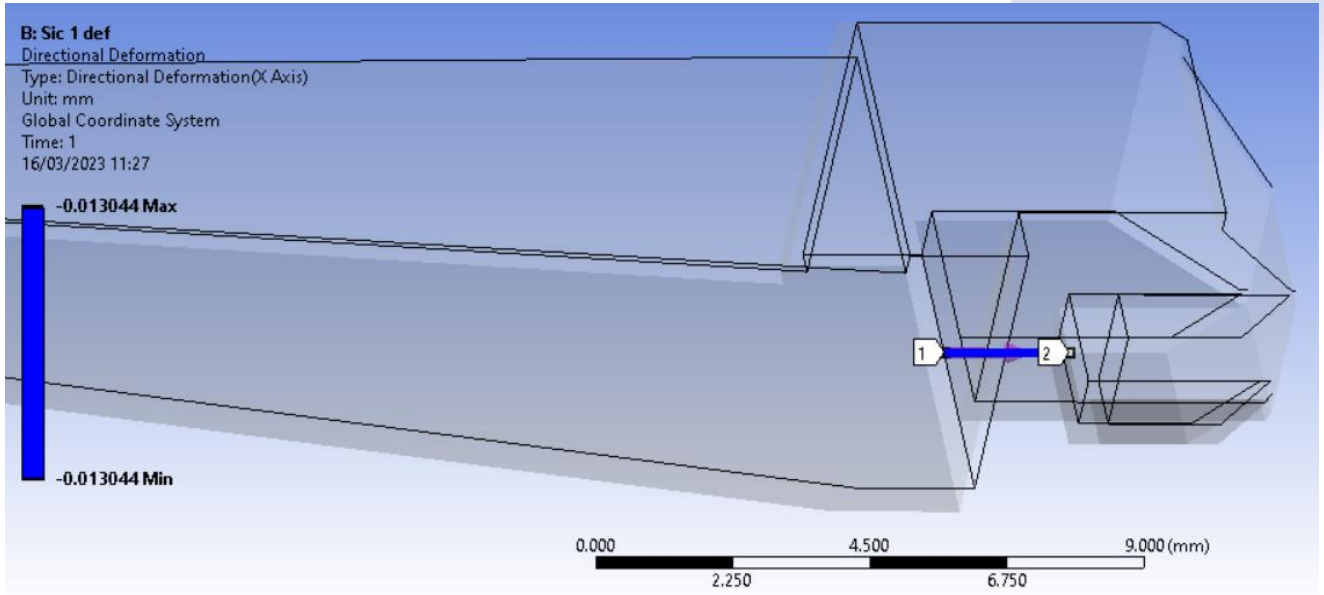

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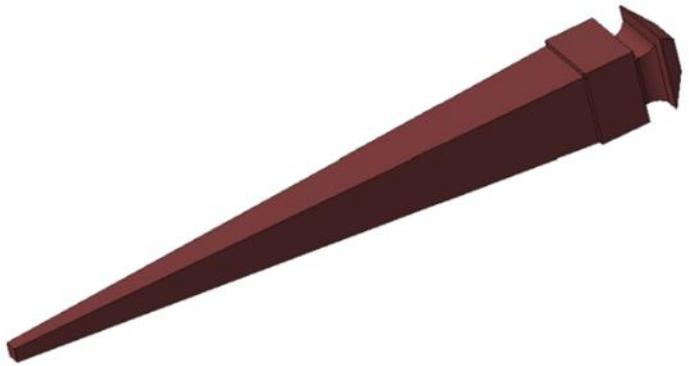
HOM Loads - Alternatives



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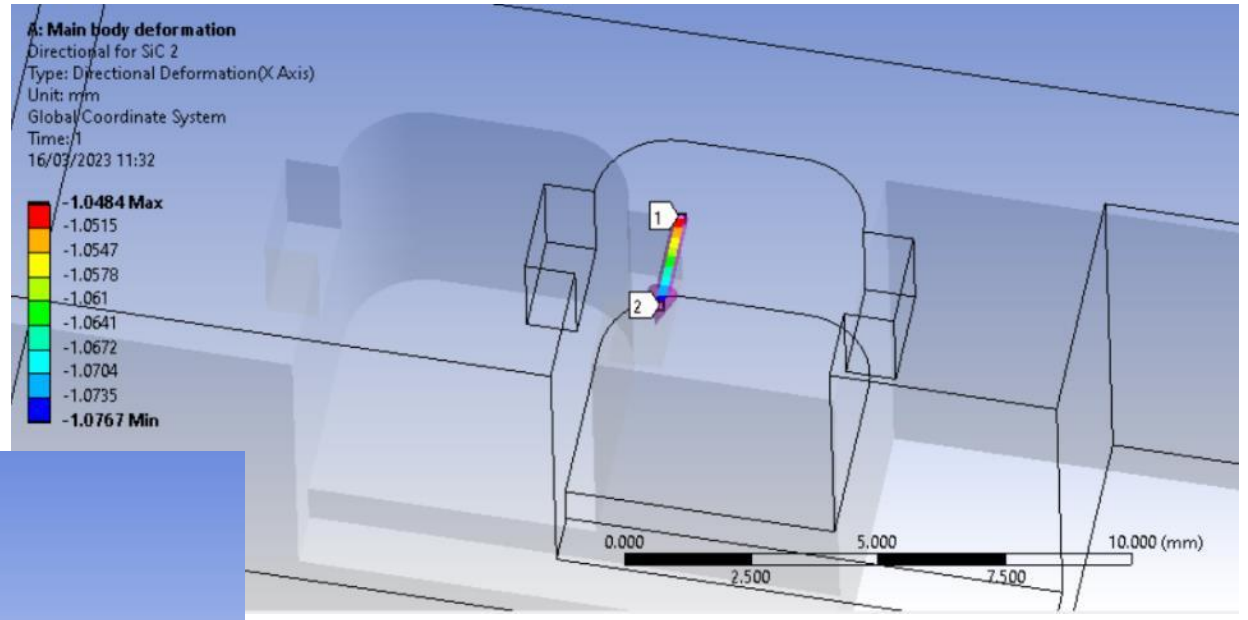

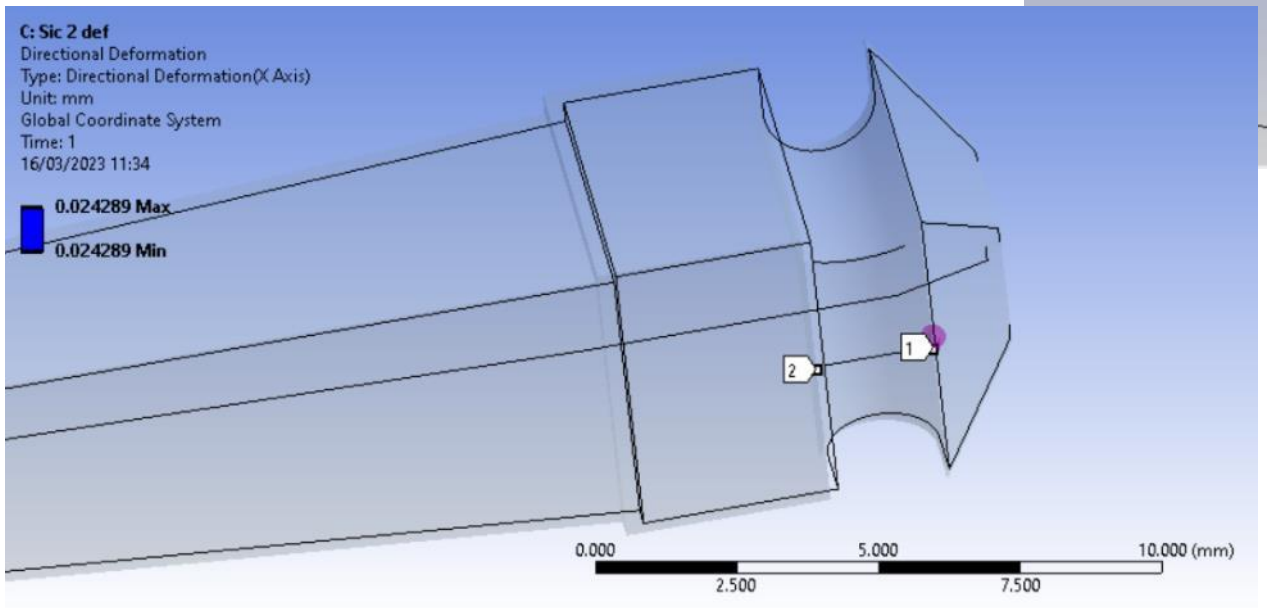

Def = 0.024289mm

Brazing Mock-up

We are now controlling the groove dimensions…