



MPP PLD port plunger update

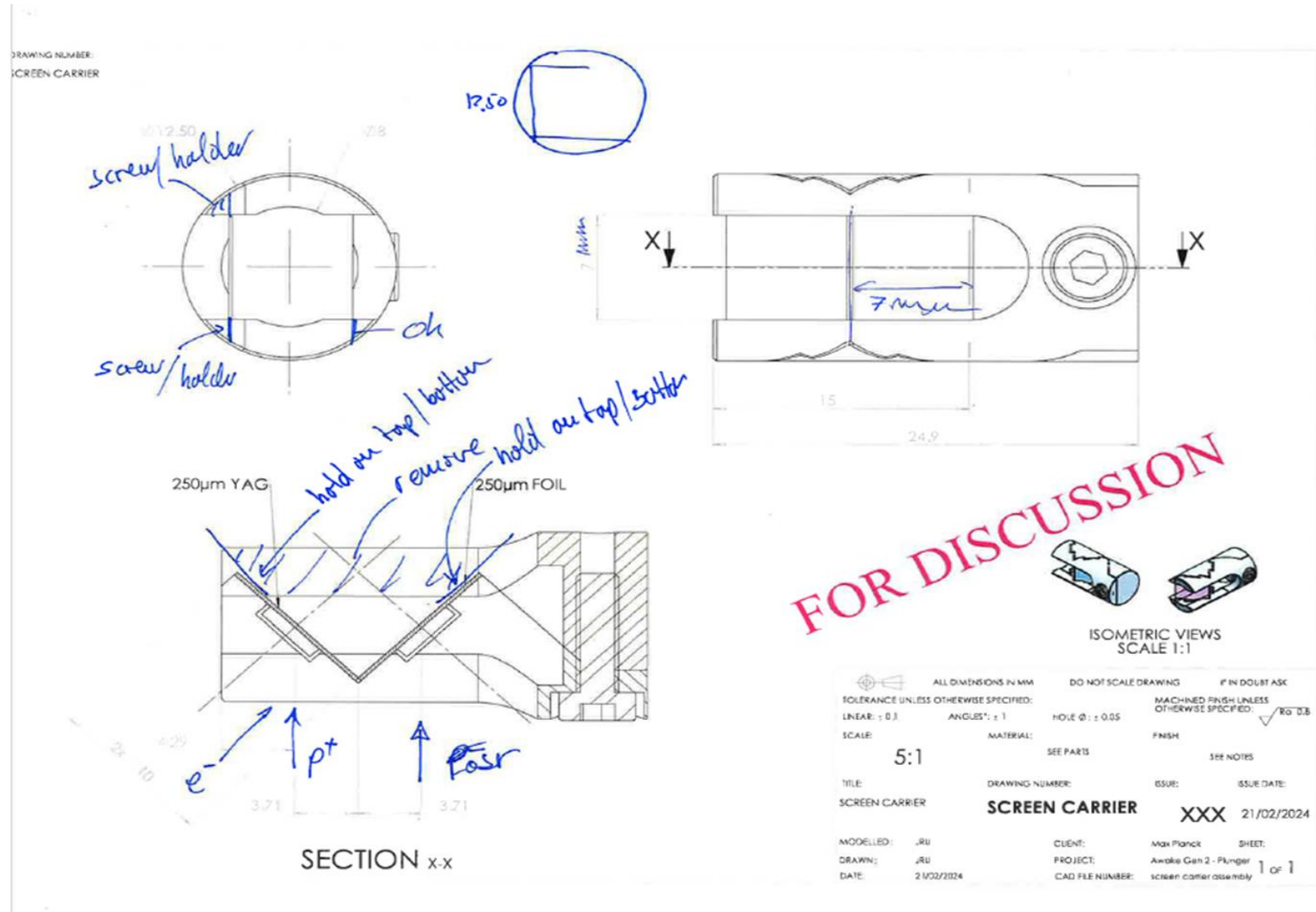
Daniel Easton, Justin Pisani, Jim Uncles

06.02.2024 v0r1

Agenda

- Core Plunger Design Status
- Ancillary systems (heaters, control etc)
- Implementation plan

Screen Holder

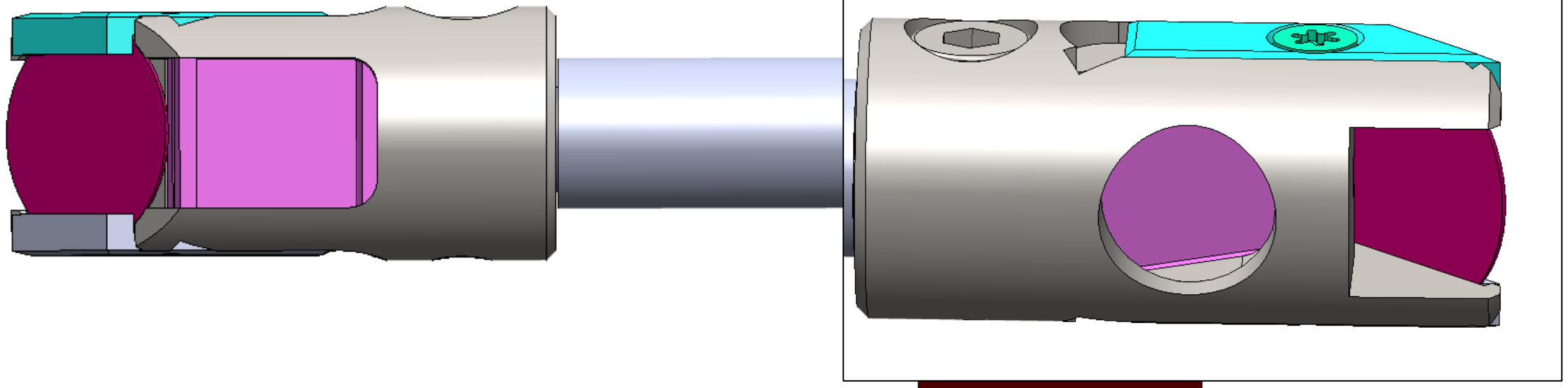


Screen Holder Update

Updates added based on feedback

Design of screen holder not on critical path

- But interface end to plunger must be defined early to allow long lead time part to be ordered

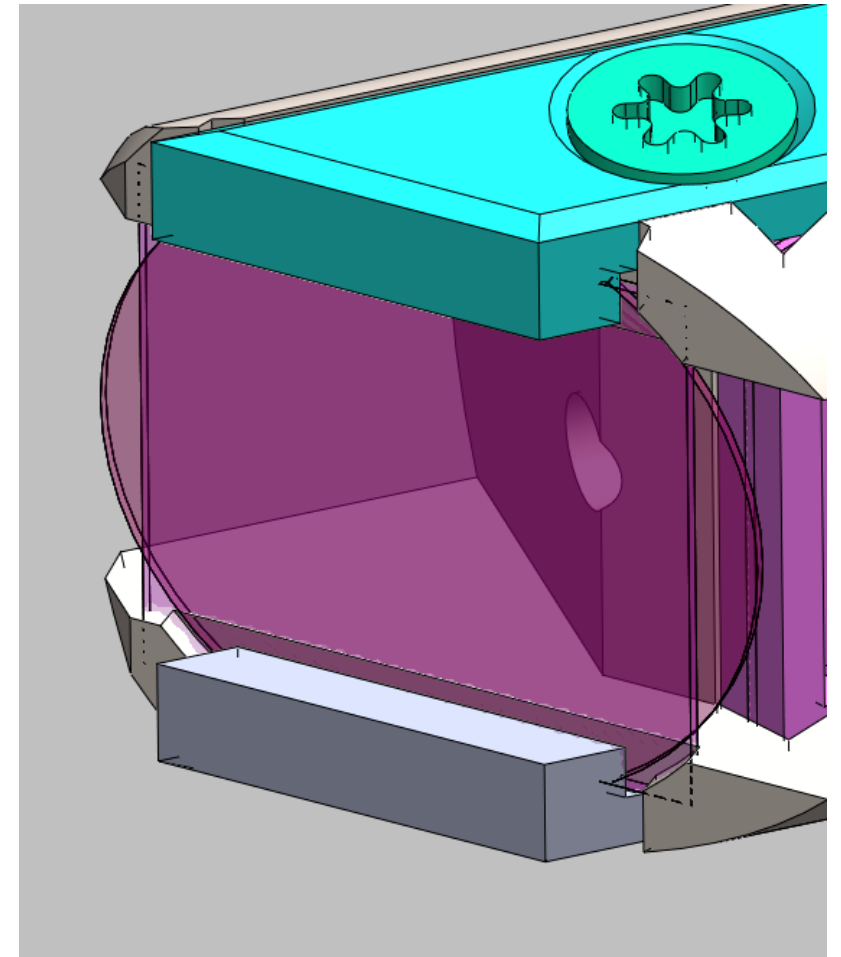
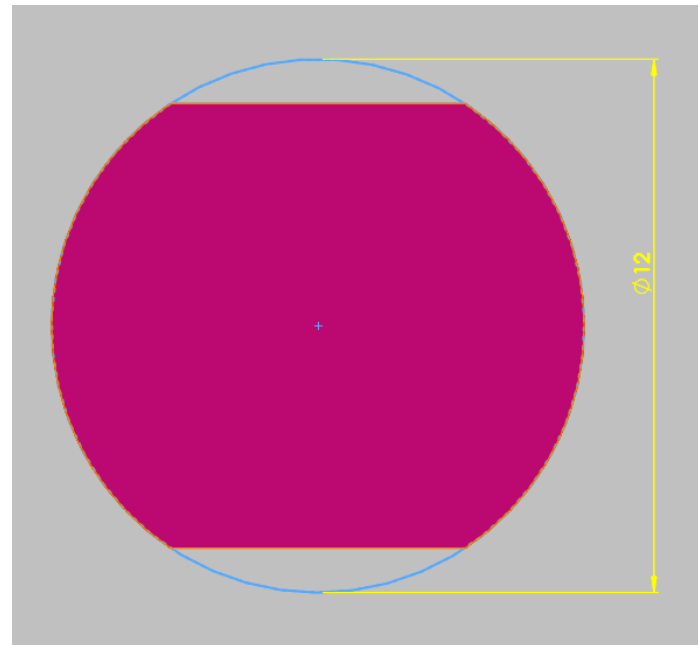


YAG Screen

YAG screen made as flattened dsic:

- Easier to hold/slot into holder
- Maximises screen area

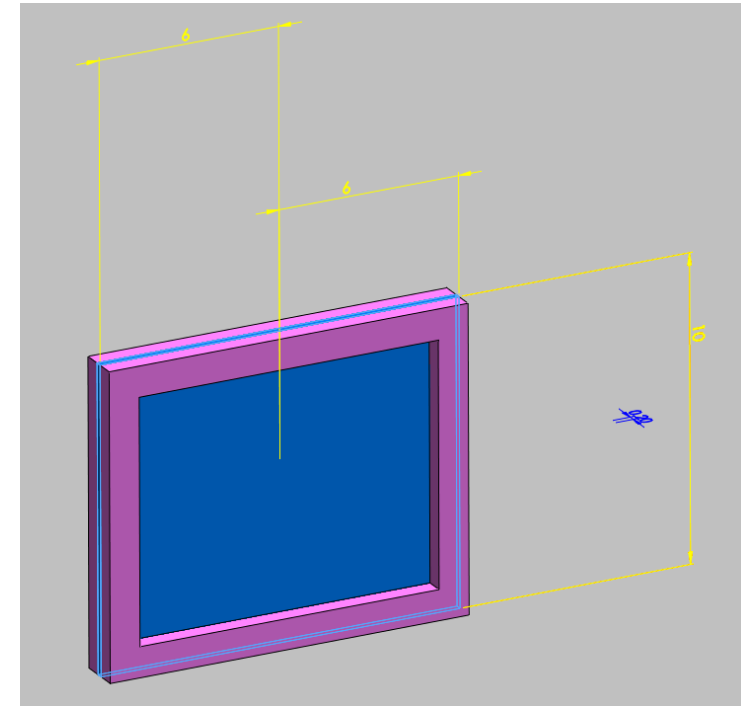
Can be changed to square/rectangle if this is easier to source



Foil Holder Fabrication Options

Looking at options to support 200um laser foil in screen holder (concerns about holding reliably)

- Laser sintered metal (3D printed) parts
Need to ascertain if these are ok for UHV. Might be useful to 3D print holder as it may prove difficult to CNC
- Micro welded frame
We have also had confirmation that we can have the foil welded into a frame to make it easier to assemble more robust (€2500 for 20 parts). Need to make the part longer as the frame shadows the foil and reduces the overall width.
- Photo-etch
We can also get it photo-etched from 0.7 sheet down to 0.2, but the surface quality and thickness will not be as good as the welded frame option

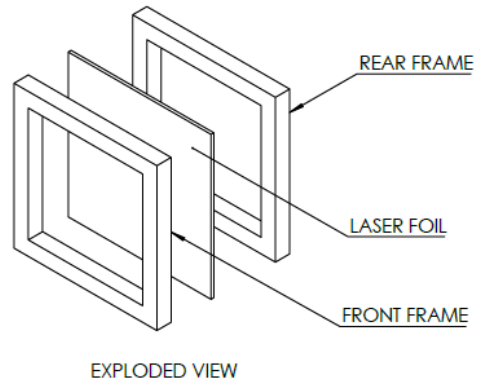
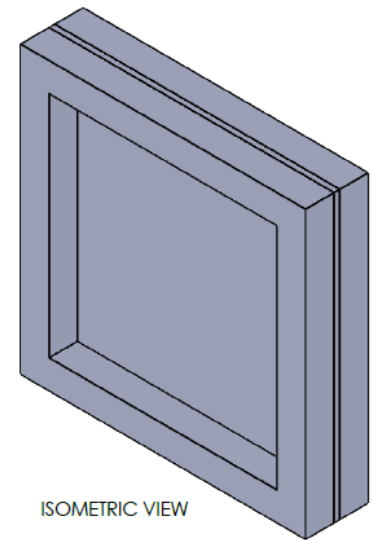
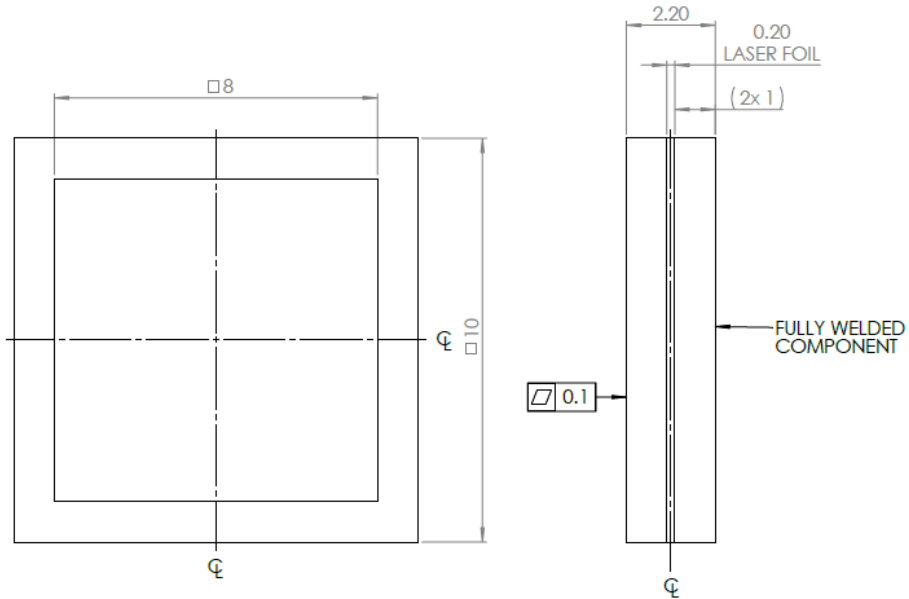


Foil Frame Holder (Micro welded Frame Concept)

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DRAWING NUMBER:
E24016-014

ISSUE	DESCRIPTION	DRAWN	ECN	DATE
A	FIRST RELEASE	TDB		27/02/2024

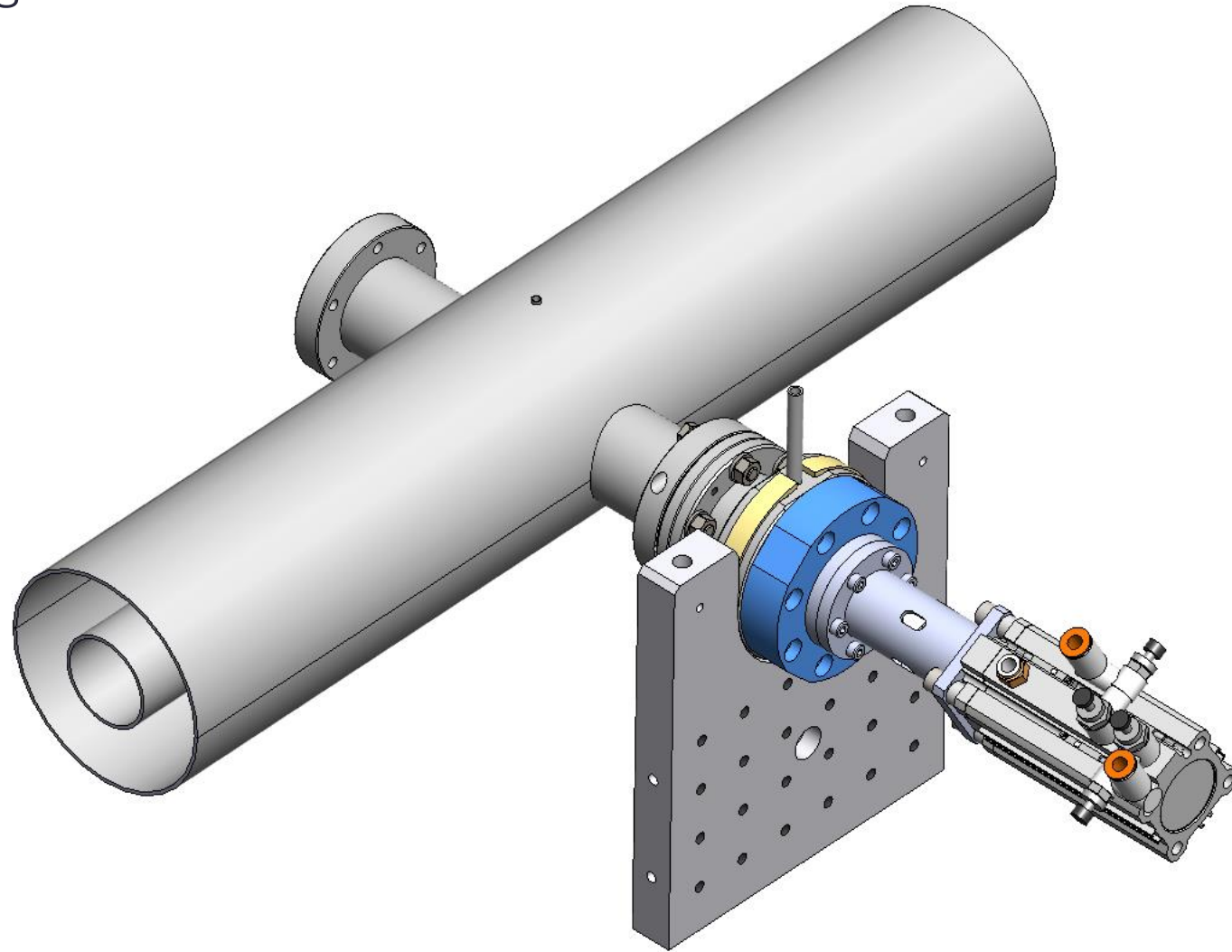


- NOTES:**
1. ALL ANGLES 90° UNLESS OTHERWISE STATED.
 2. DEBURR ALL SHARP EDGES.
 3. MIN. BEND RADIUS UNLESS OTHERWISE STATED.
 4. FINISH IS NATURAL.
 5. PART SYMMETRICAL ABOUT CENTRELINES.
 6. PART TO BE CLEAN.
 7. MATERIAL IS ALUMINIUM 1050, 1200 OR 99% PURE ALU.
 8. FULL HARDNESS MATERIAL.

ALL DIMENSIONS IN MM DO NOT SCALE DRAWING IF IN DOUBT ASK		TOLERANCE UNLESS OTHERWISE SPECIFIED:	
LINEAR: ± 0.10	ANGLES: ± 0.25	HOLE Ø: ± 0.10	MACHINED FINISH UNLESS OTHERWISE SPECIFIED: N/A
SCALE: 10:1	MATERIAL: ALUMINIUM (SEE NOTES)	FINISH: NATURAL	
TITLE: LASER FOIL WELDED ASSEMBLY	DRAWING NUMBER: E24016-014	ISSUE: A	ISSUE DATE: 27/02/2024
MODELLED:	CLIENT:	MAX PLANCK INSTITUTE:	
DRAWN: TDB	PROJECT: AWAKE GEN 2	1 of 1	
DATE: 27/02/2024	CAD FILE NUMBER: E24016-014		

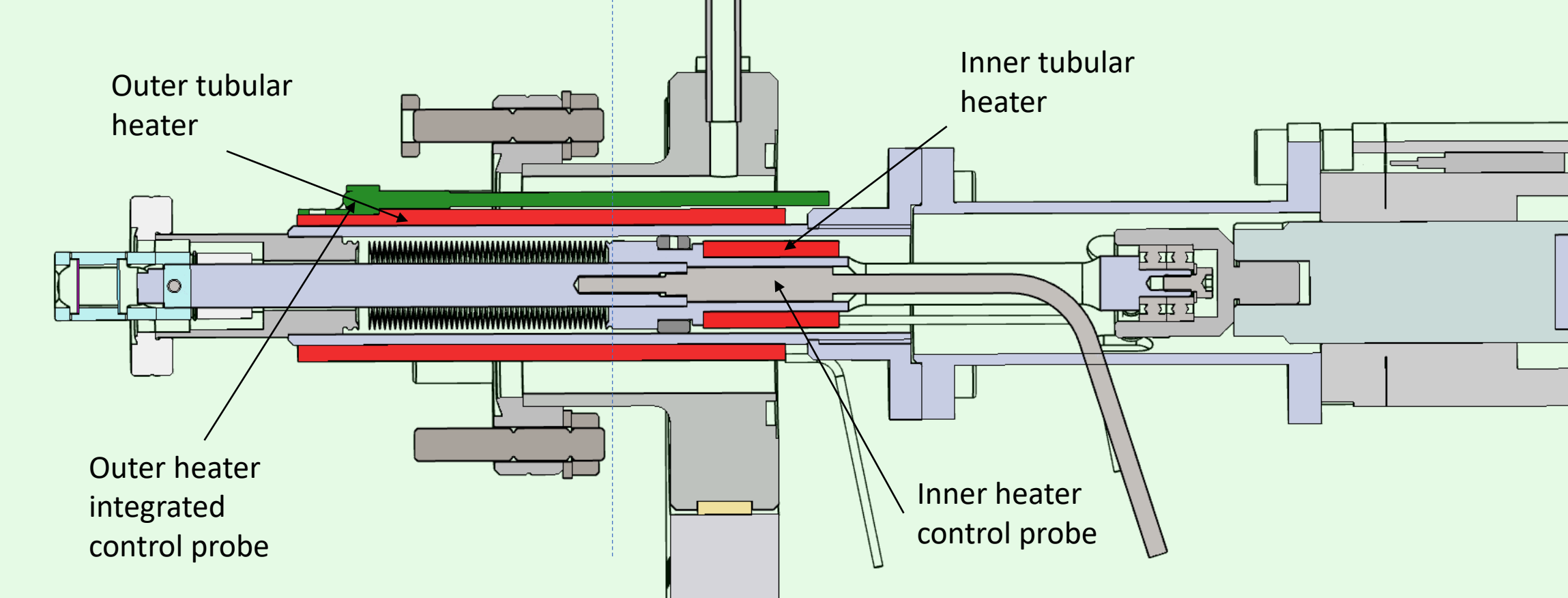
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Current Plunger GA



GA Baseline

End of UHV



Updates - Heaters

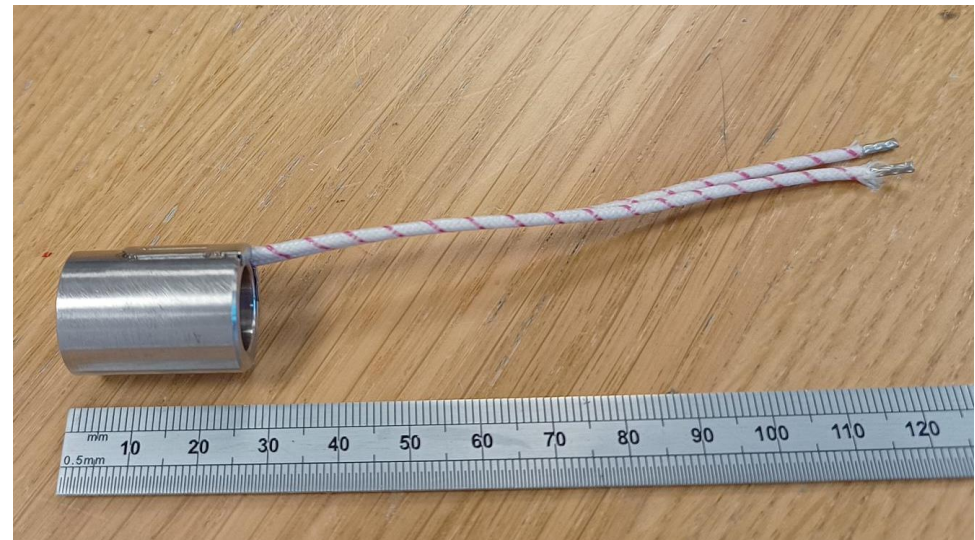
Tubular cartridge heaters detailed discussion with
KIT Electroheat Ltd

Heaters can be made to fit design in ~3 weeks

High precision mechanical fit to plunger body

Thermocouple probe can be integrated into heater
(back up probe)

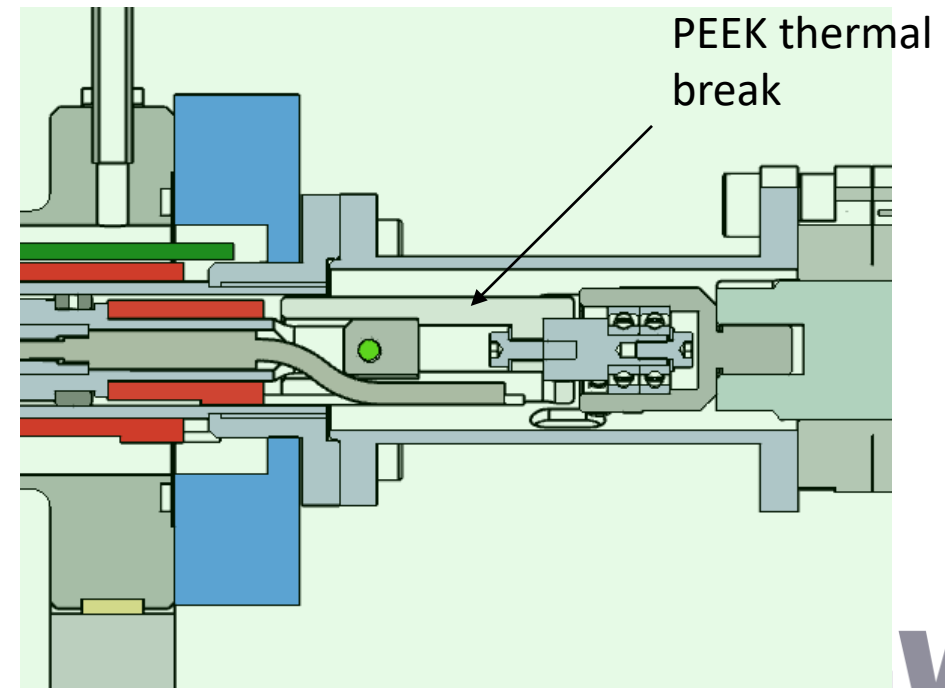
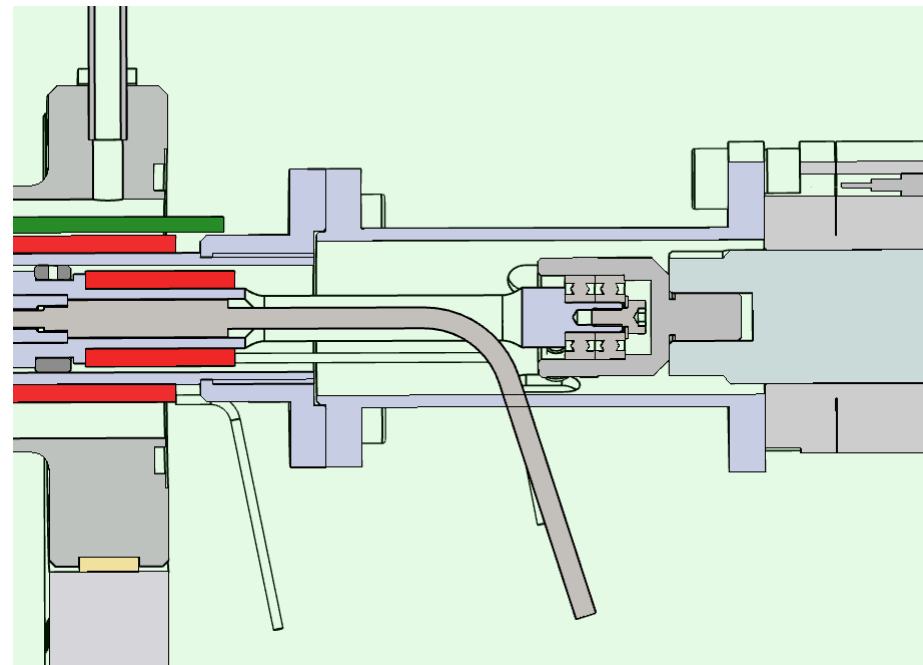
Threaded feature can be added to allow PT100 to be
mounted to heater (integrated unit for easier
fitting/service)



Updates – PEEK Interface

PEEK thermal break concept design completed

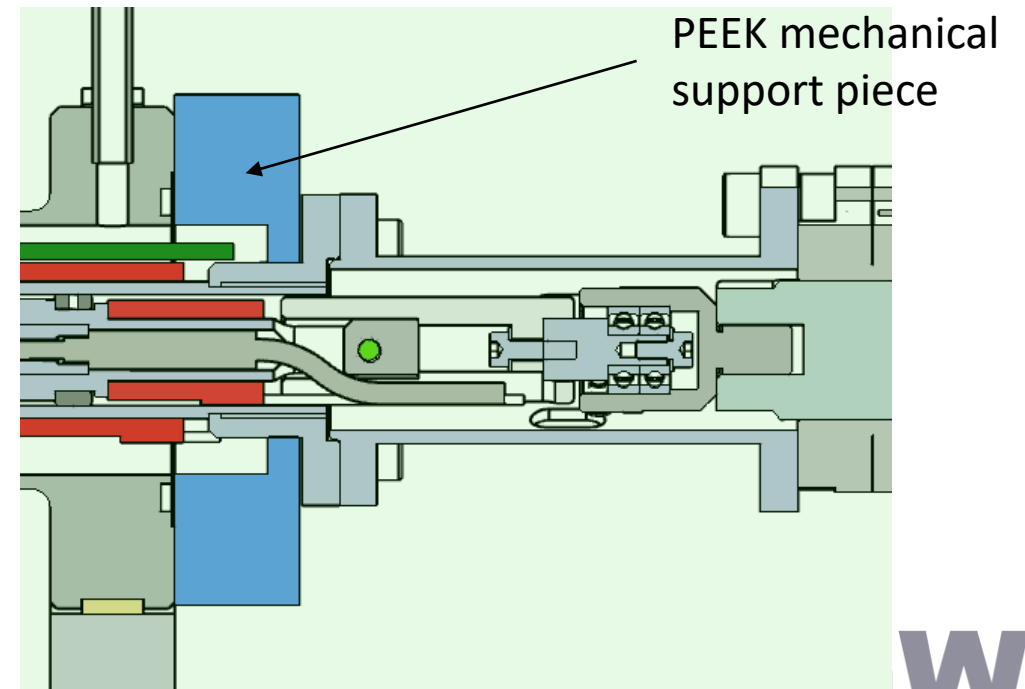
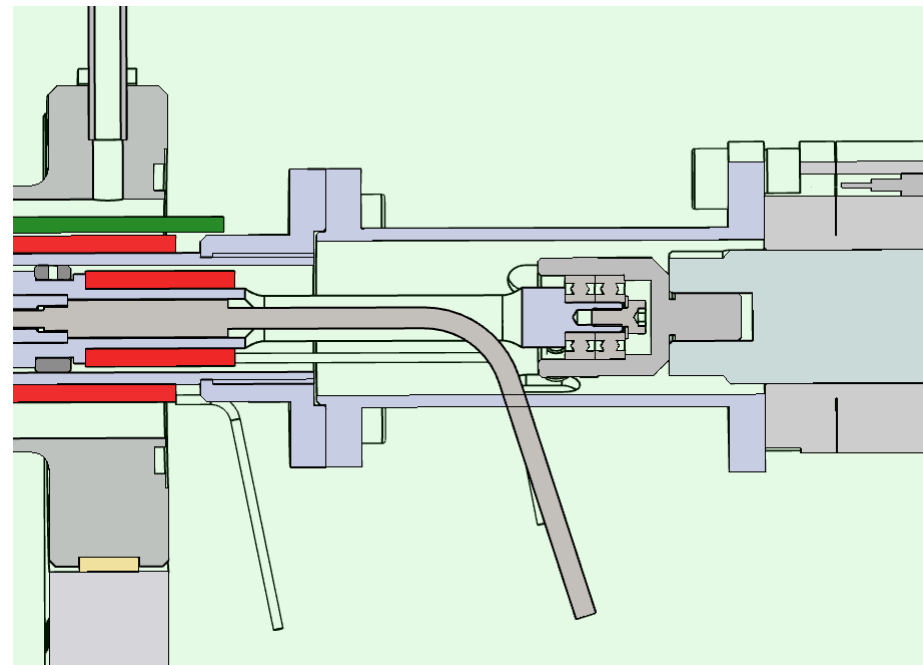
Reviewed with UHV design and concept is can be integrated into 'standard' plunger



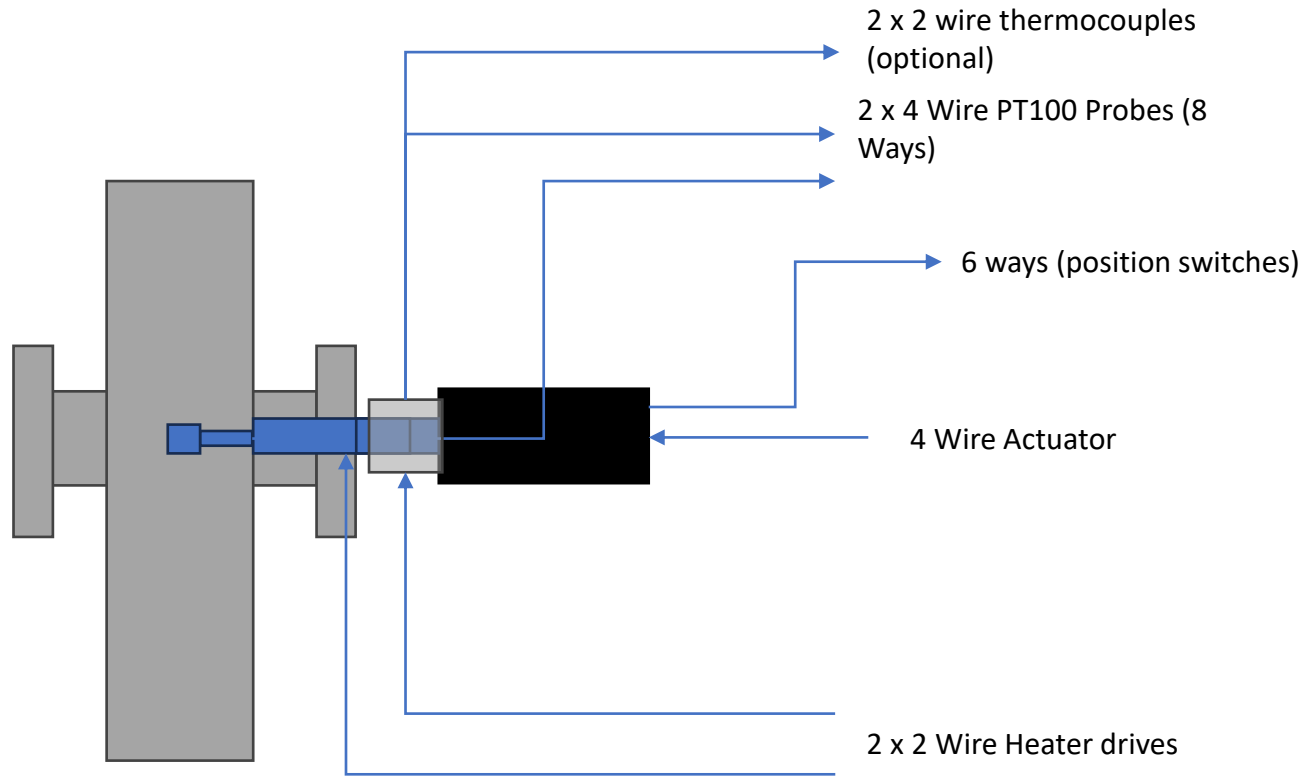
Updates – Mechanical support

PEEK mechanical support piece added

Allows UHV section to be fully supported (to reduce chances of UHV leak)



Updates - Control System IO



I/O per plunger

2 x RTD/TC channels

2 x RTD/TC channels

3 x DI channels

2 x DQ channels

2 x DQ channels

Full I/O (10 plungers):

- 20 RTD input channels (5 cards) – optional additional 5 cards
- 30 DI channels (4 cards)
- 40 DQ channels (5 cards)

Costs & Timescales

Timeline

