Hydrogen Absorber

MICE Analysis Workshop

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Outline

- Validation of window geometry.
  - Getting data from CMM measurements.
- Absorber temperature data exported from the Archiver and “fixed”.
  - Initial plots.

Validation of the Geometry

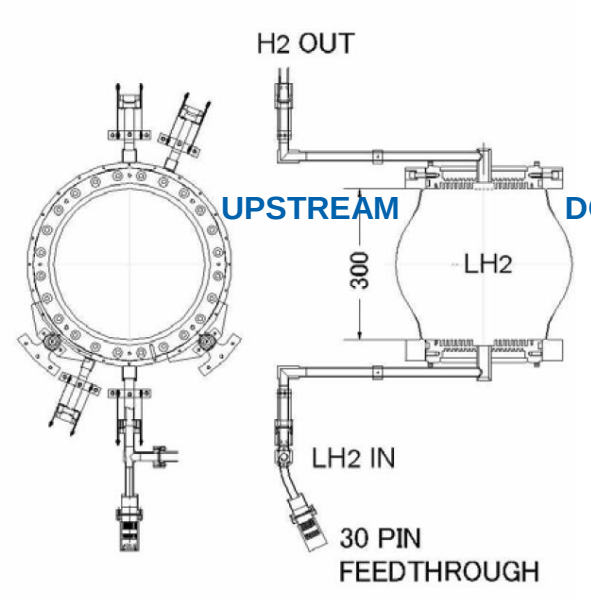
- CMM measurements done after manufacturing.
  - Need to know which windows were used.

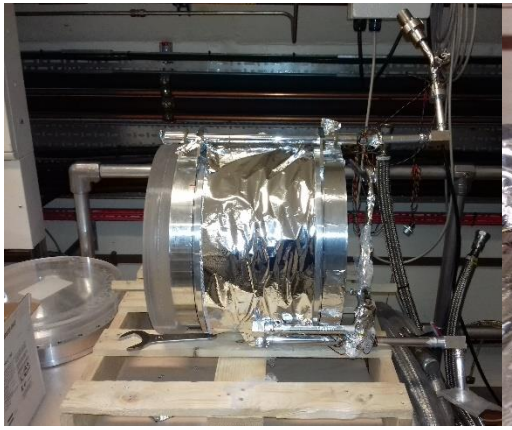
Window #	Window Type	Central Thickness Measured (μm)	Central Thickness Design (μm)	Note
001	Absorber		180	
002	Absorber	174 ± 5	180	
003	Absorber	184 ± 2	180	
004	Absorber		180	
005	Absorber	176 ± 6	180	
006	Safety I	222 ± 6	210	flaw at centre
007	Safety I		210	flaw at centre
008	Safety II	233 ± 5	210	
009	Safety II	230 ± 9	210	
010	Absorber		180	
011	Absorber		180	
012	Safety I	197 ± 7	210	
013	Safety I		210	
014	Safety I	197 ± 8	210	

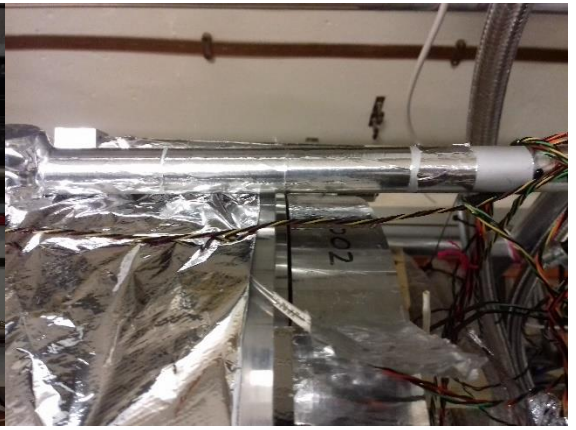
- Two absorbers and one safety window were burst tested.

Windows

- Paolo saved me a trip to RAL and looked for the window numbers.
  - Thanks!







- Absorber 002 was upstream.
- Absorber 003 maybe the downstream one.

Validation of the Geometry

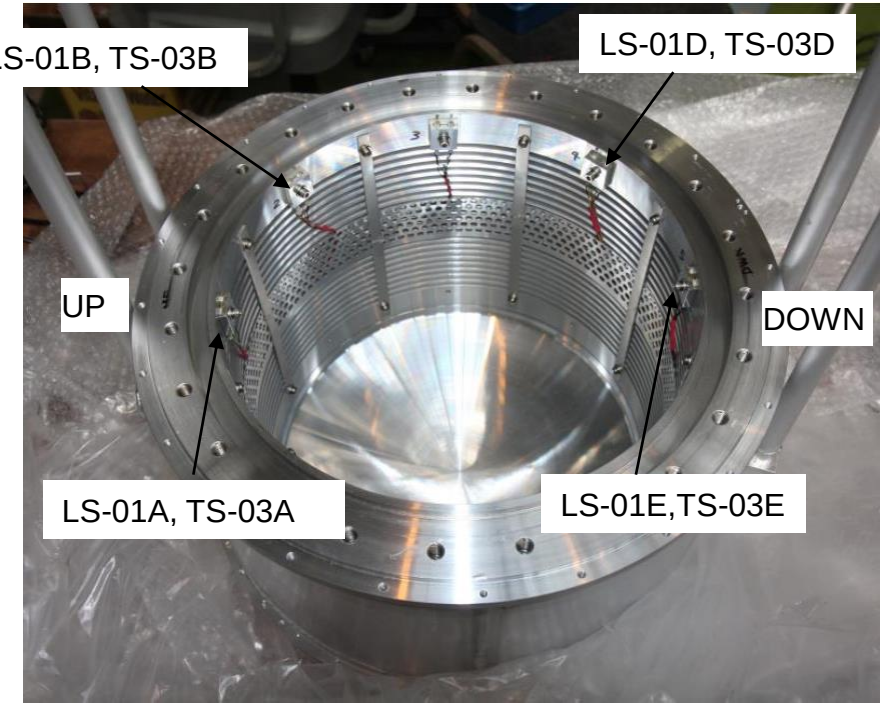
- Have asked for the measurements for windows 002 and 003.

- Look at effect of geometry changes on scattering measurement.
  - Will generate MC data with modified window geometries.
    - Maximum change in path length through LH2 will be of the order of a few mm.
  - Scott can run scattering analysis on this to see if effect is significant.

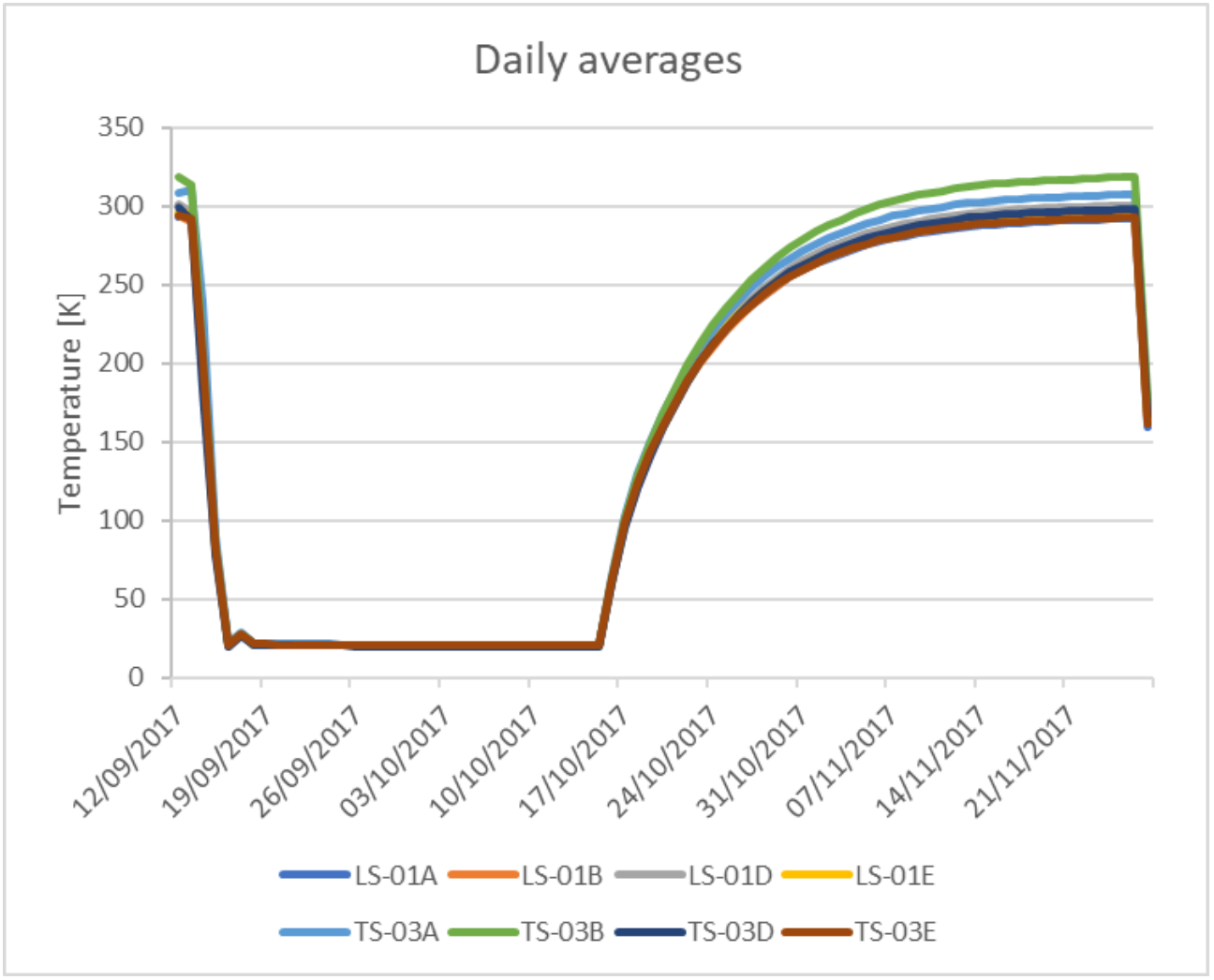
- Chris R. said the window stretches when it is filled.

Temperature probe data

- 8 probes used.
  - Connected in pairs: LS for level sensing measurement and TS for temperature.
- Each probe is calibrated by the manufacturer.
  - Temperature read out into EPICS is calibrated.
- Data in the Archiver, approximately every 2 seconds.
- Exported from the Archiver to a text file.

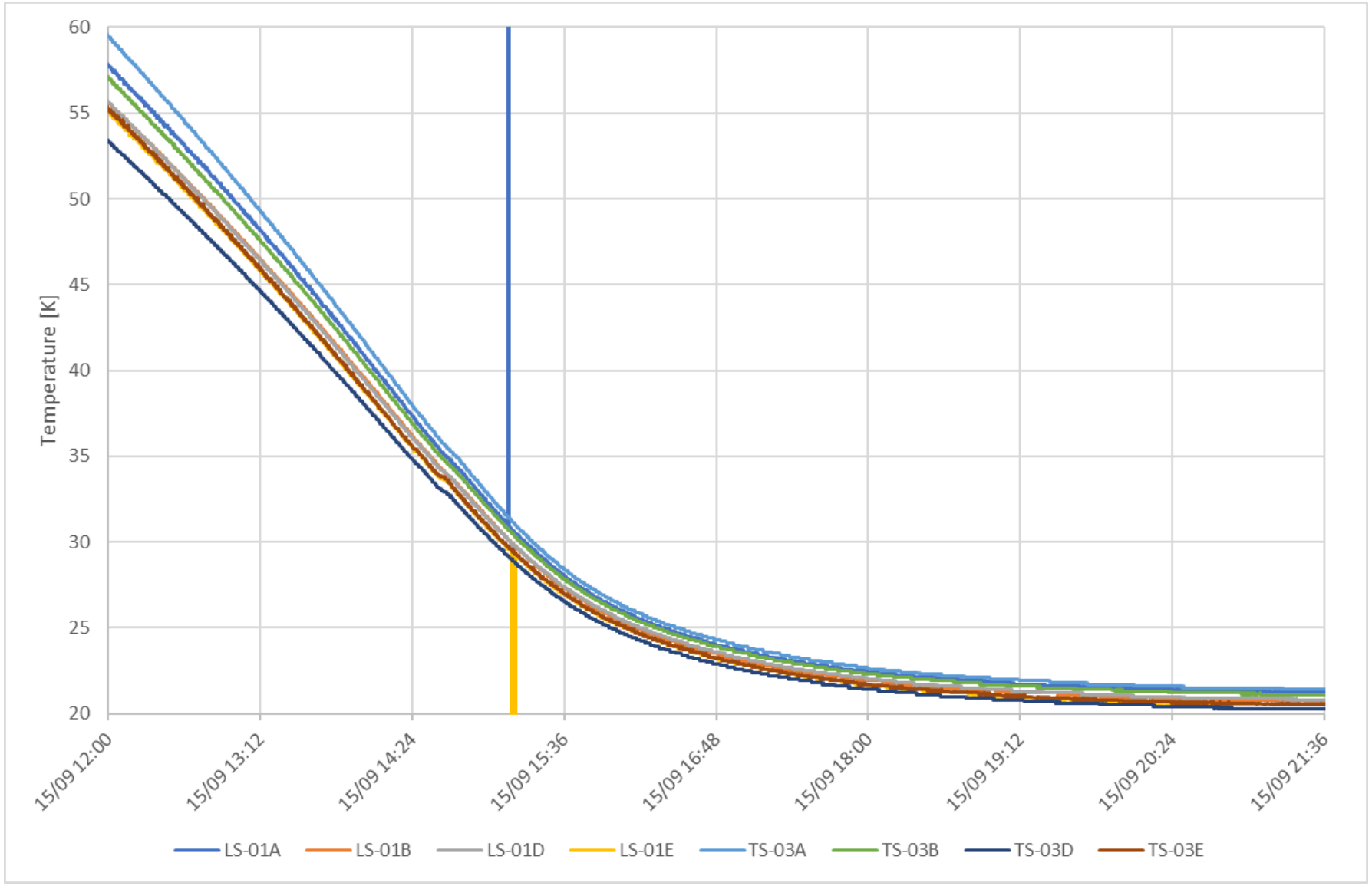


Daily averages

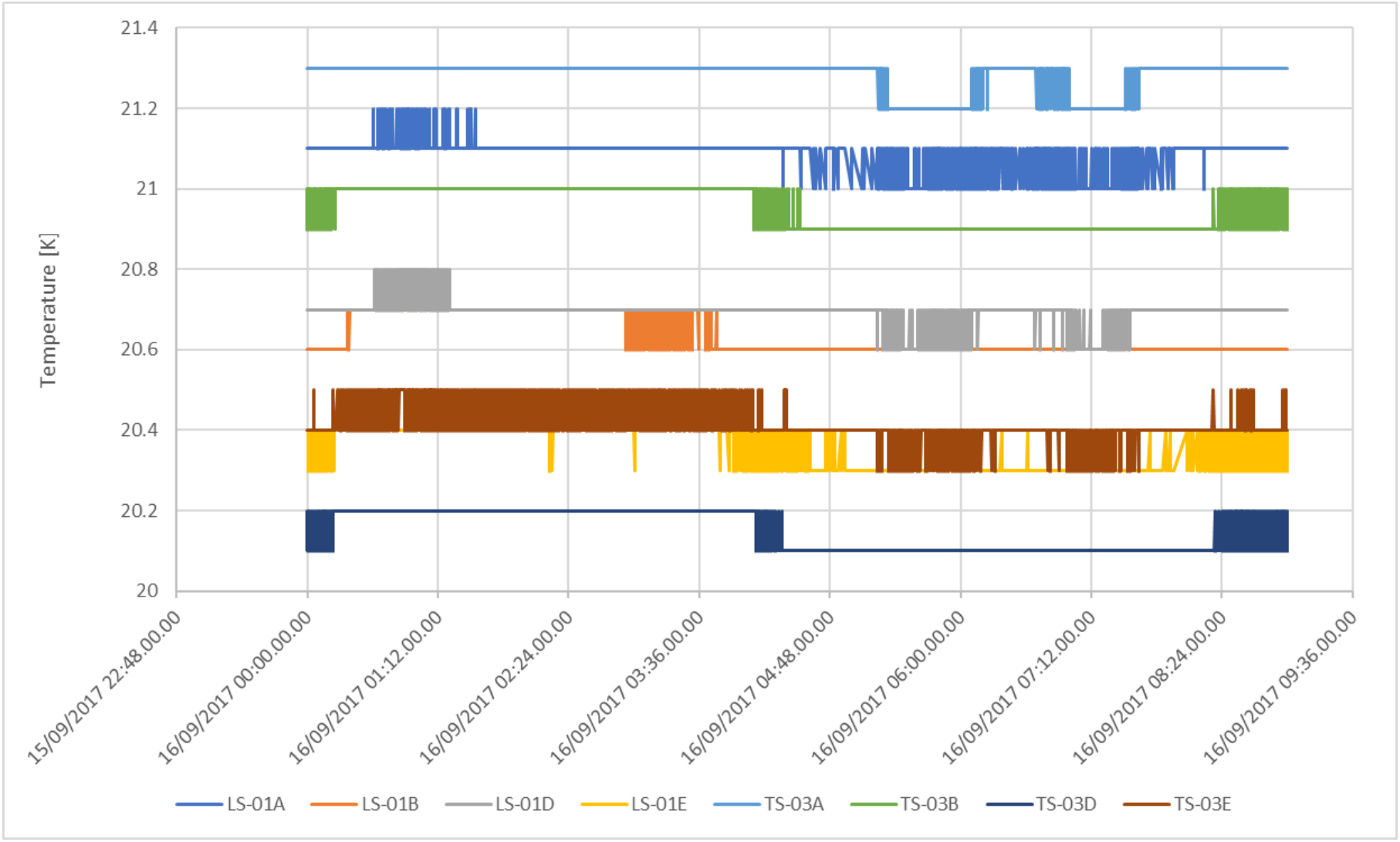


- Data averaged after excluding missing data points due to the Archiver restarting.

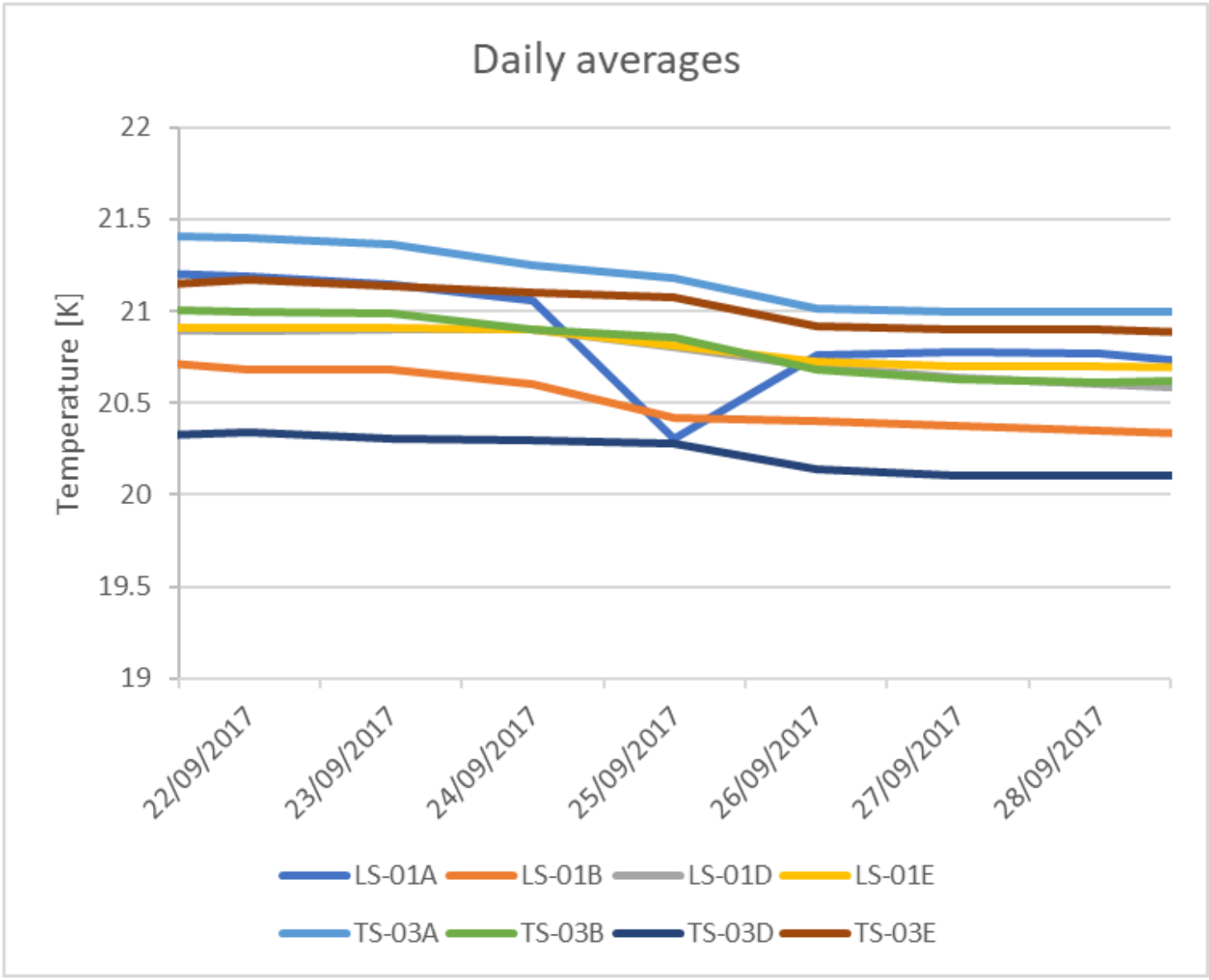
Approaching Operating Temperature



At Operating Temperature



Full!


Daily averages
Temperature [K]
22
21.5
21
20.5
20
19.5
19
22/09/2017
23/09/2017
24/09/2017
25/09/2017
26/09/2017
27/09/2017
28/09/2017
LS-01A
LS-01B
LS-01D
LS-01E
TS-03A
TS-03B
TS-03D
TS-03E

Summary and Next Steps

- Validation of the window geometry ongoing.
  - Need to determine if the effect is significant.
    - Generate MC data with modified geometry.

- Need to look at the temperature probe data in more detail as the absorber fills.
  - Looks like each probe requires a correction factor.
  - Probably due to the way in which the probes are clamped to the absorber body.