

Following data taken on the new "LED" version of CT7 (S/N 120010) following upgrade in 2022

9 January: INT Primary mirror, with water stains dust and other solid matter, taken before blowing with compressed air.

13 January: found that Gauge measurements were 2-4% different from 2019 in most wavebands, so new results are not comparable. See next page

Conclusion: at the reference wavelength of 624nm, the reflectivity is just over 80%, similar to minimum values measured in the past.

			REFL								DUST						
			T deg C	365	404	464	522	624	760	970	365	404	464	522	624	760	970
7	09/01/2023 16:43	0 Gauge	18.63	88.65	85.37	90.49	92.56	89.03	85.66	88.4	1.3	1.3	1.2	1.1	0.9	0.9	1.1
8	10/01/2023 12:08	0 INT M1	16.91	83.62	80.66	80.78	81.37	78.83	78.56	84.01	15.9	17.1	19.1	19.6	16.2	18.8	19
9	10/01/2023 12:09	0 INT M1	17.72	80.05	77.55	77.9	79.26	76.7	77.2	82.6	23.7	23.9	26.1	25.2	17.8	19.2	21.1
10	10/01/2023 12:09	0 INT M1	18.25	80.8	78.11	78.63	79.45	76.75	77.03	81.65	20	21	22.4	23.2	17.7	19.2	22.9
11	10/01/2023 12:10	0 INT M1	18.56	77.86	75.61	76.25	76.9	74.42	74.73	79.13	24.6	24.1	27.5	28.5	18.2	19.4	27
12	10/01/2023 12:10	0 INT M1	18.88	75.98	74.2	75.9	76.25	75.05	75.54	80.4	24.1	24	26.5	27.7	18	19.3	24.6
13	10/01/2023 12:10	0 INT M1	19.13	84.1	81.55	81.98	82.78	79.86	80.4	84.84	17.7	17.4	18.2	18.9	15.7	18.3	17.7
14	10/01/2023 12:11	0 INT M1	19.38	82.78	79.37	79.48	80.41	78.22	78.37	83.7	18.1	19.8	21.7	22.7	17.1	19.1	19.4
Average M1				80.74	78.15	78.7	79.49	77.12	77.4	82.33	20.59	21.04	23.07	23.69	17.24	19.04	21.67

almost all > 15%, where %R becomes less reliable.

Comparison with Fresh aluminium

Fresh Aluminised WHT average	93.08	91.36	90.93	90.95	90.03	87.25	93.26
total to be gained by re-aluminising	12.34	13.21	12.23	11.46	12.91	9.85	10.93

Comparison with pre-Wash minimum in 2017

average before wash	82.7	81.5	81.3	81.3	80.4	77.8	83.0
difference today	-1.96	-3.35	-2.60	-1.81	-3.28	-0.40	-0.67
after wash in 2017	89.8	88.8	89	89.4	88.8	86.3	92.7
projected gain from washing	9.06	10.65	10.30	9.91	11.68	8.90	10.37

Change in Gauge measurement

Feb-19 average	84.73	83.93	88.48	90.58	89.45	83.4	87.18
change	3.925	1.445	2.015	1.985	-0.42	2.26	1.225

Note 2-4% change in Gauge measurements with respect to 2019. This implies some values on the INT mirror will be inconsistent with older series.

On next page, we present arguments to show these measurements may not be consistent with older ones from before refurbishment.

The Gauge measurements in datum 7 above are unusually high, especially in 365 and 760 nm. I suspect the calibration was not good on arrival. From reading the manual, I checked the Gauge absolute value using the VW, found it similar (but not identical) to the Factory Param (USB file with exte VW measurements). I loaded this Param file, giving valid Targets, prior to a new Calibration, which I then carried out on the Gauge.

The Gauge now measures with 1.3% of old values. More importantly, measurements are completely consistent with Factory Param values:

13/01/2023 11:27	Gauge	27.09	83.4	83.9	87.3	90.8	89.9	84.4	86.6
	Compare Fac Param		83.41	83.87	87.28	90.75	89.94	84.39	86.6
	Compare Feb-19		-1.325	-0.025	-1.175	0.225	0.450	1.000	-0.575

After recalibration I measured again the INT Primary, values tabulated below.

Data in pairs, using nearby locations, 2-5 cm apart. Analysis using variation between those pairs follows. Some are rejected, yielding higher average.

13/01/2023 13:35	Gauge	22.06	82.7	83.8	87.1	90.5	89.7	84	86.5
13/01/2023 13:35	Gauge	22.41	82.8	83.9	87.3	90.6	89.8	84.1	86.5

			REFL							DUST							
T deg C			365	404	464	522	624	760	970	365	404	464	522	624	760	970	
17	13/01/2023 13:18	0 right	22.19	76.36	77.66	76.79	79.3	79.03	77.49	82.65	21.5	22.5	23.4	23	17.6	19.1	20
18	13/01/2023 13:19	0 right 2	22.91	76.96	78.29	77.48	79.86	79.64	78.1	82.89	19.9	20.7	22	20.6	17.1	19	18.2
19	13/01/2023 13:19	0 midR	23.34	79.29	80.41	79.64	81.48	81.14	79.72	84.34	18.1	19.1	18.9	19	15.7	18.5	16.9
20	13/01/2023 13:20	0 midR2	23.69	79.55	80.42	79.25	81.5	80.69	79.34	83.91	16.6	16.7	18.1	17.3	15.8	18.4	17.2
21	13/01/2023 13:20	0 bottom	23.91	81.59	82.65	81.88	83.87	83.78	82.03	87.06	13.7	13.8	13.8	14	11.1	13.8	12
22	13/01/2023 13:21	0 bot2	24.16	82.03	82.91	81.82	84.04	83.69	82	87.07	13.5	14.4	14.3	13.6	11.5	13.9	11.8
23	13/01/2023 13:21	0 midbot	24.28	79.04	79.62	79.7	81.09	81.88	79.9	84.96	18.9	19.8	18.8	20.2	14.5	17.8	15.4
24	13/01/2023 13:21	0 midb2	24.44	79.24	79.94	79.09	81.59	82.09	80.58	85.93	20.3	21.3	22	20.4	15.3	17.8	14.5
25	13/01/2023 13:22	0 left	24.31	75.84	76.69	75.57	77.77	77.6	75.88	80.46	21.3	22.3	24.3	24.2	18	19.4	22.7
26	13/01/2023 13:22	0 left2	24.47	74.91	75.79	74.91	77.14	76.98	75.33	79.75	22.1	23.3	25.8	26.3	18.2	19.6	23.8
27	13/01/2023 13:23	0 midL	24.31	72.15	75.21	76.92	75.34	76.86	76.83	75.32	23.2	22.1	21.4	25.2	18	19.2	26
28	13/01/2023 13:24	0 midL2	24.5	77.56	77.82	77.2	78.56	79.31	76.84	81.65	19.4	20.7	21.3	23.2	17.4	19.3	20.7
29	13/01/2023 13:24	0 midTop	24.5	73.18	74.48	73.5	75.32	75.18	73.71	77.84	24.1	24.2	26.9	29.1	18.4	19.7	26.3
30	13/01/2023 13:25	0 mTop2	24.75	71.43	72.44	72.1	73.62	73.98	72.24	76.13	26.8	25	30.5	32.1	18.5	19.8	29.3
average all				77.08	78.17	77.56	79.32	79.42	77.86	82.14	19.96	20.42	21.54	22.01	16.22	18.24	19.63
difference from pre-Cal				-3.66	0.016	-1.14	-0.17	2.299	0.452	-0.19	-0.63	-0.62	-1.54	-1.67	-1.02	-0.81	-2.04

difference between pairs	0.6	0.63	0.69	0.56	0.61	0.61	0.24	-1.6	-1.8	-1.4	-2.4	-0.5	-0.1	-1.8
	0.26	0.01	-0.39	0.02	-0.45	-0.38	-0.43	-1.5	-2.4	-0.8	-1.7	0.1	-0.1	0.3
	0.44	0.26	-0.06	0.17	-0.09	-0.03	0.01	-0.2	0.6	0.5	-0.4	0.4	0.1	-0.2
	0.2	0.32	-0.61	0.5	0.21	0.68	0.97	1.4	1.5	3.2	0.2	0.8	0	-0.9
	-0.93	-0.9	-0.66	-0.63	-0.62	-0.55	-0.71	0.8	1	1.5	2.1	0.2	0.2	1.1
mid-Left area streaky water stains	5.41	2.61	0.28	3.22	2.45	0.01	6.33	-3.8	-1.4	-0.1	-2	-0.6	0.1	-5.3
water streak?	-1.75	-2.04	-1.4	-1.7	-1.2	-1.47	-1.71	2.7	0.8	3.6	3	0.1	0.1	3
Average using only consistent pairs:	78.48	79.44	78.61	80.76	80.65	79.04	83.9	18.59	19.39	20.14	19.86	15.48	17.73	17.25
	365	404	464	522	624	760	970	365	404	464	522	624	760	970

The large variation between some pairs (2-5%) occurred in areas affected by water streaks.

The lower values (the last 4) may safely be omitted as unrepresentative of the global reflectivity of the mirror.