

Measurements using CT7 of WHT Primary Mirror immediately following completion of Aluminization, 18th February 2020.

Bracketed by calibration measurements on "Gauge" mirror. Process and analysis led by Neil O'Mahony with Juerg Rey.

Values are largely consistent with previous aluminisations. Most inconsistent values highlighted in yellow, best values in green, worst in brown.

Temp. °C	wavelength of band (nm)									"Dust Indices"						
	365	404	464	522	624	760	970	365	404	464	522	624	760	970		

Data taken during loan to GTC course by Daniel Malaise, using Gauge mirror

1631	18/02/2020 11:53	Normal	26.8	84.9	83.8	88.3	90.5	89.4	83.5	87.5	2.7	3.2	2.8	1.7	1.3	1.0	1.3
1632	18/02/2020 11:56	Normal	27.4	84.5	83.6	88.4	90.6	89.5	83.1	86.3	2.7	3.2	2.8	1.7	1.3	1.0	1.3

M1 before alum.; hose rinse & clean oil stains with Tork paper/kitchen detergent in hot water/propanol. Dried naturally over 3 days, leaving water stains.

1637	02/03/2020 10:10	M1 water hosed	17.8	81.6	81.2	81.8	82.5	82.1	80.5	86.3	23.9	22.8	22.9	18.0	19.7	15.3	14.8
1638	02/03/2020 10:11	M1 water hosed	17.9	81.7	80.9	81.4	82.4	82.4	80.1	86.5	25.3	24.3	24.0	18.1	18.9	15.4	13.7
1639	02/03/2020 10:12	Soap, IPA wash	18.1	86.9	86.2	87.0	87.7	87.5	85.0	91.2	12.8	10.9	9.3	5.9	5.4	3.5	3.0

Above measurements show that plain water hosing is significantly less effective (5% R less) than detergent swabbing, even when not followed by forced drying.

nm:	365	404	464	522	624	760	970	365	404	464	522	624	760	970
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Measurements with M1 in aluminising tank, straight after venting from 14 hours at 100 mb pressure. Data at 4 cardinal points, with a 10x repetition at Left.

1640	04/03/2020 10:20	Right M1	18.6	92.9	91.3	90.9	90.9	89.9	87.0	92.8	2.4	2.2	2.1	1.5	1.5	1.1	1.0
1641	04/03/2020 10:21	near	18.6	92.9	91.3	90.9	90.9	89.9	87.0	92.7	2.5	2.2	2.1	1.5	1.5	1.0	1.1
1642	04/03/2020 10:23	Bottom M1	18.7	92.9	91.3	90.9	90.9	89.9	86.9	92.6	2.4	2.2	2.1	1.5	1.5	1.1	1.1
1643	04/03/2020 10:24	near	18.8	92.9	91.3	90.9	90.9	89.9	86.9	92.6	2.5	2.2	2.1	1.5	1.5	1.1	1.1
1644	04/03/2020 10:25	Left x10	19	92.8	91.2	90.8	90.8	89.8	86.8	92.5	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1645	04/03/2020 10:25	Left x10	19	92.8	91.2	90.8	90.8	89.9	86.8	92.5	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1646	04/03/2020 10:26	Left x10	19.2	92.8	91.2	90.8	90.8	89.8	86.8	92.4	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1647	04/03/2020 10:26	Left x10	19.3	92.8	91.2	90.8	90.8	89.8	86.8	92.4	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1648	04/03/2020 10:27	Left x10	19.3	92.8	91.2	90.8	90.8	89.8	86.7	92.3	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1649	04/03/2020 10:28	Left x10	19.4	92.8	91.2	90.8	90.8	89.8	86.7	92.3	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1650	04/03/2020 10:28	Left x10	19.6	92.8	91.2	90.8	90.8	89.8	86.7	92.3	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1651	04/03/2020 10:29	Left x10	19.6	92.8	91.2	90.8	90.8	89.8	86.7	92.3	2.5	2.3	2.2	1.7	1.6	1.3	1.2
1652	04/03/2020 10:29	Left x10	19.7	92.8	91.2	90.8	90.8	89.8	86.7	92.3	2.5	2.3	2.2	1.7	1.6	1.3	1.2

1653	04/03/2020 10:30 Left x10	19.8	92.8	91.2	90.8	90.8	89.8	86.7	92.2	2.6	2.3	2.2	1.7	1.6	1.3	1.2	
1654	04/03/2020 10:32 Top	19.9	92.9	91.3	90.8	90.9	89.9	86.9	92.4	2.5	2.3	2.2	1.6	1.6	1.1	1.2	
1655	04/03/2020 10:35 near	19.9	92.8	91.3	90.8	90.9	89.9	86.8	92.4	2.6	2.3	2.2	1.6	1.6	1.2	1.2	
Average (2 points per Quad)		92.9	91.3	90.9	90.9	89.9	86.9	92.6	2.5	2.3	2.2	1.6	1.6	1.2	1.1		
Optimum values		92.9	91.3	90.9	90.9	89.9	87.0	92.8	2.4	2.2	2.1	1.5	1.5	1.0	1.0		
Range		0.1	0.1	0.1	0.1	0.1	0.3	0.6	0.2	0.1	0.1	0.2	0.1	0.3	0.2		
std dev		0.05	0.05	0.05	0.05	0.04	0.08	0.14	0.06	0.05	0.05	0.09	0.05	0.11	0.07		
2016 M1 Aluminisation, averages		93.1	91.3	90.9	90.9	90.0	87.2	93.3	2.3	2.1	2.0	1.4	1.4	1.1	1.0		
std devs		0.09	0.09	0.09	0.10	0.08	0.09	0.09									
Differences from 2016 values		-0.2	-0.1	0.0	-0.1	-0.1	-0.3	-0.7	0.2	0.2	0.1	0.1	0.1	0.1	0.1		
Reference mirror values 2016		84.7	83.8	88.5	90.7	89.7	83.5	87.0	2.4	3.0	2.6	1.5	1.1	0.8	1.1		
Change in reference since 2016		-0.2	-0.2	-0.1	-0.1	-0.2	-0.5	-0.8	0.1	0.0	0.0	0.0	0.0	0.1	0.1		
2019 Oct Best Aluminisation values (TNG M3)		93.8	92.0	91.2	91.1	90.1	87.5	93.8	0.4	0.3	0.2	0.3	0.2	0.2	0.6		
Differences from best 2019 Alum		-0.9	-0.7	-0.3	-0.2	-0.2	-0.5	-1.0	2.0	1.9	1.9	1.2	1.3	0.8	0.4		
Reference mirror values Oct 2019		84.7	83.8	88.2	90.5	89.3	83.4	87.2	2.8	3.4	3.0	1.7	1.3	1.0	1.2		
Changes in reference since Oct 2019		-0.2	-0.2	0.2	0.1	0.2	-0.4	-1.0	-0.3	-0.4	-0.4	-0.2	-0.2	-0.1	0.0		
Reference mirror after Alum		nm:															
04/03/2020 12:07 Gauge (from PC)		23.8	84.3	83.6	88.4	90.6	89.4	82.9	86.1	2.7	3.2	2.7	1.7	1.2	1.0	1.2	
04/03/2020 12:08 Gauge rep		24	84.3	83.6	88.4	90.6	89.4	82.9	86.0	2.7	3.2	2.7	1.7	1.2	1.0	1.2	
1656	04/03/2020 13:44 Gauge		21.1	84.5	83.6	88.4	90.6	89.5	83.0	86.2	2.5	3.0	2.6	1.5	1.1	0.9	1.2
	difference before vs after, omit first			-0.1	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	
	std dev before+after			0.3	0.1	0.1	0.0	0.0	0.3	0.7	0.0	0.0	0.1	0.0	0.1	0.1	

Conclusions:

Reflectivity of the freshly aluminised surface is consistent with that measured on WHT M1 after 2016 aluminising, to within 0.2%, except in two red-most bands, 0.5 to 0.8% lower, probably explained by similar differences also seen in reference mirror w.r.t. 2016. Scattering is consistent with 2016 Alumzn to within 0.1% but up to 2% higher than Alumzns in 2019, in blue for non-ING mirrors. Compared with best values from 4 aluminium coatings done in autumn 2019, this WHT M1 coating is <1% lower in reflectivity & <2% higher in scattering. The differences in red bands are consistent with a change in reference mirror data since Oct 2019 while differences in blue bands are more likely "real" differences between substrates as they are also seen in scattering in blue (esp. JKT).

