

WHT M1 Reflectivity measurements (SMS & CT7) before & after CO2 cleaning, 15/3/2013

Distinct locations of measurement identified in column 2. Ref means reference mirror.

User comments show measurements omitted from stastics (omit or near)

Lambda	0.67 micron	<--SMS Summary characteristics
Incident	25 deg	
BW Limits	1 0.01	

Measurements before cleaning with CO2

datum	Θs-> Φs->	0 0	50 180	Reflec- tivity	user comment	Rough- ness RMS(Å)	TIME	DATE
121	location 1	7.53E-03	2.00E-03	0.847		67.9	"11:55:35"	"03-14-1913"
122		7.53E-03	2.00E-03	0.845		68	"11:55:40"	"03-14-1913"
123		7.54E-03	2.00E-03	0.846		68	"11:55:50"	"03-14-1913"
124	2	7.38E-03	2.25E-03	0.848		65.6	"11:56:02"	"03-14-1913"
125		7.38E-03	2.25E-03	0.849		65.6	"11:56:07"	"03-14-1913"
126		7.53E-03	2.97E-03	0.84		64.6	"11:56:31"	"03-14-1913"
127		7.52E-03	2.97E-03	0.84		64.5	"11:56:36"	"03-14-1913"
128	3	5.30E-03	1.67E-03	0.847		55.4	"11:57:32"	"03-14-1913"
129		5.30E-03	1.67E-03	0.847		55.4	"11:57:36"	"03-14-1913"
130	4	6.71E-03	2.36E-03	0.834		61.9	"11:57:48"	"03-14-1913"
131		6.70E-03	2.36E-03	0.833		61.9	"11:57:52"	"03-14-1913"
132	5	5.59E-03	2.03E-03	0.847		55.9	"11:58:10"	"03-14-1913"
133		5.58E-03	2.03E-03	0.847		55.8	"11:58:15"	"03-14-1913"
134	6	5.82E-03	2.05E-03	0.846		57.2	"11:59:18"	"03-14-1913"
135		5.82E-03	2.05E-03	0.846		57.2	"11:59:23"	"03-14-1913"
136	7	5.24E-03	1.70E-03	0.848		54.8	"11:59:36"	"03-14-1913"
137		5.24E-03	1.71E-03	0.849		54.7	"11:59:41"	"03-14-1913"
138	8	7.02E-03	3.02E-03	0.842		61.8	"11:59:54"	"03-14-1913"
139		7.01E-03	3.02E-03	0.841		61.8	"11:59:59"	"03-14-1913"
140	9	5.81E-03	2.05E-03	0.841		57.3	"12:01:16"	"03-14-1913"
141		5.80E-03	2.05E-03	0.843		57.2	"12:01:21"	"03-14-1913"
142	10	6.31E-03	1.93E-03	0.85		60.5	"12:01:34"	"03-14-1913"
143		6.31E-03	1.93E-03	0.849		60.6	"12:01:38"	"03-14-1913"
144	11	8.64E-03	4.42E-03	0.823		68.7	"12:01:52"	"03-14-1913"
145		8.66E-03	4.47E-03	0.823		68.7	"12:01:57"	"03-14-1913"
146	12	7.46E-03	3.87E-03	0.835		63.3	"12:02:12"	"03-14-1913"
147		7.48E-03	3.88E-03	0.835		63.4	"12:02:19"	"03-14-1913"
148	13	6.84E-03	2.32E-03	0.841	solo	62.5	"12:02:38"	"03-14-1913"
Averages (mean)		6.68E-03	2.47E-03	0.842		61.4		
Std deviation				0.007		4.7		
Std Error				0.002				
149	Ref.	2.56E-02	6.87E-03	0.943		118.4	"12:08:28"	"03-14-1913"
150		2.56E-02	6.86E-03	0.944		118.4	"12:08:33"	"03-14-1913"
151		6.54E-03	5.63E-03	0.94		55.4	"12:08:41"	"03-14-1913"
152		6.53E-03	5.62E-03	0.94		55.4	"12:08:47"	"03-14-1913"
153		7.55E-03	2.51E-03	0.94		62.3	"12:08:55"	"03-14-1913"

Reference measurements are within usual range 92-94 %

After cleaning, a few measurements at AP3 near "lower" end of mirror								
154		6.67E-03	1.47E-03	0.842		66.8	"13:27:24"	"03-14-1913"
155		6.68E-03	1.47E-03	0.845		66.7	"13:27:31"	"03-14-1913"
156		6.67E-03	1.47E-03	0.853		66.4	"13:27:37"	"03-14-1913"
157		4.36E-03	1.02E-03	0.847		53.1	"13:27:58"	"03-14-1913"
158		4.35E-03	1.02E-03	0.847		53	"13:28:04"	"03-14-1913"
159		4.35E-03	1.02E-03	0.846		53	"13:28:09"	"03-14-1913"
160		4.90E-03	1.35E-03	0.836		54.8	"13:28:16"	"03-14-1913"
161		4.89E-03	1.35E-03	0.836		54.7	"13:28:20"	"03-14-1913"
average reflectivity		0.844			58.6			

162	Ref.	3.56E-03	1.33E-03	0.945		42.1	"15:20:35"	"03-14-1913"
163		3.57E-03	1.33E-03	0.946		42.1	"15:20:40"	"03-14-1913"
164		1.98E-02	1.58E-03	0.937		188.3	"15:20:48"	"03-14-1913"
165		1.98E-02	1.59E-03	0.937		188.1	"15:20:53"	"03-14-1913"
166		9.00E-03	5.02E-03	0.941		65.3	"15:21:00"	"03-14-1913"

Reference measurements again within usual range

Measurements at portholes with telescope at zenith:

167	location 1	8.07E-03	1.78E-03	0.855		72.9	"15:26:06"	"03-14-1913"
168		8.08E-03	1.78E-03	0.854		72.9	"15:26:11"	"03-14-1913"
169	2	5.43E-03	1.20E-03	0.859		59.6	"15:26:20"	"03-14-1913"
170		5.43E-03	1.20E-03	0.861		59.5	"15:26:25"	"03-14-1913"
171	3	5.60E-03	1.20E-03	0.859		61	"15:26:36"	"03-14-1913"
172		5.60E-03	1.20E-03	0.858		61.1	"15:26:41"	"03-14-1913"
173	4	5.46E-03	1.56E-03	0.854	near	56.8	"15:26:53"	"03-14-1913"
174	5	4.62E-03	1.09E-03	0.823		55.3	"15:32:53"	"03-14-1913"
175		4.63E-03	1.09E-03	0.823		55.3	"15:33:00"	"03-14-1913"
176	6	6.15E-03	1.88E-03	0.821	near	60.9	"15:33:09"	"03-14-1913"
177	7	3.76E-03	7.68E-04	0.829	near	51.6	"15:33:19"	"03-14-1913"
178	8	4.62E-03	1.08E-03	0.861	near	54.1	"15:33:31"	"03-14-1913"
179	9	5.18E-03	1.42E-03	0.84		56.2	"15:33:46"	"03-14-1913"
180		5.18E-03	1.42E-03	0.84		56.2	"15:33:52"	"03-14-1913"
181	10	4.86E-03	1.16E-03	0.855		55.5	"15:34:15"	"03-14-1913"
182		4.86E-03	1.16E-03	0.854		55.6	"15:34:19"	"03-14-1913"
183	Null	8.79E-06	2.25E-08	0.001	omit	>1177	"15:34:34"	"03-14-1913"
184	11	4.18E-03	1.15E-03	0.862		49.8	"15:35:51"	"03-14-1913"
185		4.18E-03	1.15E-03	0.861		49.8	"15:35:56"	"03-14-1913"
186	12	4.37E-03	1.08E-03	0.862		52	"15:36:07"	"03-14-1913"
187		4.76E-03	1.15E-03	0.858		54.7	"15:36:16"	"03-14-1913"
188	13	6.69E-03	1.65E-03	0.854		64.6	"15:36:28"	"03-14-1913"
189		6.69E-03	1.66E-03	0.855		64.6	"15:36:32"	"03-14-1913"
190	14	4.25E-03	9.14E-04	0.863		52.9	"15:36:48"	"03-14-1913"
191		4.25E-03	9.11E-04	0.863		53	"15:36:53"	"03-14-1913"
192	15	6.16E-03	1.33E-03	0.847		64.4	"15:37:14"	"03-14-1913"
193		6.17E-03	1.32E-03	0.846		64.5	"15:37:19"	"03-14-1913"
194	16	5.11E-03	1.56E-03	0.86		54.2	"15:38:21"	"03-14-1913"

195		5.10E-03	1.56E-03	0.86		54.1	"15:38:26"	"03-14-1913"
196	17	9.16E-03	2.13E-03	0.853		76.7	"15:38:39"	"03-14-1913"
197		9.17E-03	2.13E-03	0.854		76.7	"15:38:43"	"03-14-1913"
198	18	5.07E-03	1.35E-03	0.857	solo	55.3	"15:38:55"	"03-14-1913"
Averages		5.57E-03	1.36E-03	0.852		59.1		
Std deviation				0.012		7.6		
Std Error				0.003				

199	Ref.	3.09E-03	1.98E-03	0.947		38	"15:59:11"	"03-14-1913"
200		3.10E-03	1.99E-03	0.946		38	"15:59:18"	"03-14-1913"
201		1.99E-03	1.03E-03	0.939		30.9	"15:59:34"	"03-14-1913"
202		2.00E-03	1.03E-03	0.939		30.9	"15:59:41"	"03-14-1913"
203		6.36E-03	2.63E-03	0.941		55.8	"15:59:51"	"03-14-1913"

Reference values after measurements are again within range

		CT7 Reflectivity % by wavelength (nm)						
datum	Tempr	365	404	424	522	624	760	970
516	22.4	95.2	96.1	91.7	83.8	83.4	79.1	85.2
517	22.5	94.9	96.3	91.7	84	83.6	79.6	85.4
518	22.6	94.6	96.4	91.9	84.1	83.8	79.4	85.5
519	22.9	94.4	96.2	91.7	84.1	83.6	79.5	85.5
520	23.1	94.5	96.5	92	84.4	83.9	79.7	85.8
521	23.2	94.3	96.3	91.7	84.2	83.5	79.4	85.4
522	23	95.1	96.7	92.4	84.6	83.8	79.8	85.5
523	23.1	94.8	96.7	92.4	84.7	84.1	79.8	85.7
524	23.1	94.4	96.5	92.2	84.7	83.9	79.8	85.6
525	23.3	94.4	96.4	92.4	84.9	84.2	80	86
526	23.4	94.4	96.6	92.3	84.8	84.2	79.9	86
527	23.6	94.1	96.3	92.3	84.7	84	79.6	85.7
AVERAGES %R		94.6	96.4	92.1	84.4	83.8	79.6	85.6

Averages after
water wash
08/2012

92.7 96.2 91.5 84.9 84.0 80.0 86.4

Corresponding Dust Index Measurement

19.2 11.8 9.3 7.9 6.9 6.5 6.2
21.2 13 10.2 8.6 7.8 6.8 6.5
12.3 7 6.1 6.1 5.9 6.4 6.6
12 6.8 6 5.8 5.5 6 5.9
12 6.6 5.7 5.8 5.3 6.3 5.9
12.1 6.8 5.9 5.8 5.4 6 6
11.6 6.4 5.5 5.5 5 5.7 5.6
12.1 7 6.1 6.1 5.9 6.6 6.6
11.4 6.3 5.4 5.6 5.4 6.1 6.2
11.9 6.5 5.8 5.7 5.5 6.1 6.2
11.6 6.8 5.9 5.7 5.4 6 6.1
11.6 6.4 5.4 5.4 4.9 5.6 5.4
11.8 6.8 6 5.9 5.4 6.1 5.8
11.9 6.7 5.8 5.7 5.5 6.1 6
29 16.1 15.1 12.9 11.7 10 9.3

28.8 16.2 15.7 13.4 12.1 10.3 9.9

Conclusions: Reflectivity at 670nm has increased by 1%, roughness decreased by ~20%
Scattering has decreased by ~20% at 0,0 and by a factor ~2 at 50,180
CT7 reflectometer shows similar values as after water washing in August 2012

date

07/03/2013 13:35

14/03/2013 14:00

14/03/2013 14:00

14/03/2013 14:01

14/03/2013 14:02

14/03/2013 14:02

14/03/2013 14:02

14/03/2013 14:11

14/03/2013 14:11

14/03/2013 14:11

14/03/2013 14:13

14/03/2013 14:13

