

Use of First Contact Polymer at the Gran Telescopio Canarias

News Release: Stunning success restoring reflectivity to like new condition! January 2016 trials atop La Palma at the 10.4 meter Gran Telescopio Canarias. Photos show the 1.9 m mirror segments partially cleaned, during cleaning, and completely clean with First Contact Polymer.

Summary of Findings: Regularly scheduled in-situ cleaning with First Contact can avoid coating damage, extend segment service life, significantly reduce re-aluminizing and man hour costs, and increase telescope operational uptime.

Data Explanation: Microscratches and pinholes from routine CO₂ cleaning and natural corrosion on the aged mirrors physically damaged the mirror coatings and resulted in increased scatter and transmission losses relative to the original, fresh coatings. Damage could clearly be seen by eye in both transmission and reflection. On a 4 year old very dusty segment reflectivity improved from 67% to 88% upon First Contact Polymer removal. A similar but only 1 year old mirror coating is shown in the table below to be restored to like new reflectivity. The “newer but dirty” coating had minimal transmission losses and was not yet “destroyed” as a coating demonstrating that regular cleaning before damage occurs is beneficial. Nevertheless, microscratches and pinholes were evident and resulted in increased total integrated scattering, preventing restoration to like new condition. Future tests of in situ First Contact Polymer cleaning should unambiguously demonstrate that without the physical damage and scratches caused by routine CO₂ cleaning and corrosion, telescope mirrors can be indefinitely maintained at maximum reflectivity.

First Contact Polymer Trials- Gran Canarias Telescopio: 2/2/16

Mirror Name: La Palma		Reflectivity %			
Color	λ nm	Before	After	Orig. %	% Gain
Blue	470	81	90	92	9
Green	530	81	90	91	9
Red	650	79	89	90	9
Near IR	880	77	87	88	10
Total Integrated Scattering, 670 nm					
		Before	After	Improv.	Original
		2.71	0.88	6.75	0.2 [‡]

This mirror had light dust, water marks, some pinholes, insects marks, bugs & some microscratches.

Primary Mirror Segment Installed 3/27/2015, removed January 2016