COMPONENT SPECIFICATION

COS Steering Mirror-1, -2, -3 High Reflectance Coating

APPROVALS:	DATE	REV	DCN NO	BY	CHK	DCC	DATE
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CHECKED:							
APPROVED:							
DCC RELEASE:							

1 SCOPE

This is a specification for fused silica, flat mirrors with three different high reflectance dielectric coatings on one side, with specified polarizations and incident angles.

2 APPLICABLE DOCUMENTS

2.1. LIGO Documents

LIGO-E960022-03, Vacuum Compatibility, Cleaning Methods and Compatibility Procedures
- *http://ligo.caltech.edu/LIGO_web/dcc/docs/E960022-03.pdf*

2.2. Non-LIGO Documents

MIL-C-675C, Coating Adhesion and Durability

3 REQUIREMENTS

3.1. Physical Characteristics

Diameter:	2.00" +/- 0.01" or 50 mm +/-0.25 mm
Material:	fused silica
Thickness:	0.37"/0.39" +/-0.01"
Chamfers:	.02"/.03" x 45 deg. +/- 15 deg.
Clear Aperture:	Central 85%
Flatness:	S1, 1/10 wave @633nm over clear aperture
Wedge:	<5 arc min.
Surface Roughness	<0.8 Å (Superpolish)

3.2. Optical Characteristics

3.2.1. High Reflectance Coating Mirror-1, 0 deg

Polarization:	p or s
Incidence Angle:	0 deg.

Reflectivity:	>0.999 @ 1060 nm
Durability:	Mil-C-675C

3.2.2. High Reflectance Coating Mirror-2, 45 deg, p

Polarization:	p
Incidence Angle:	45 deg.
Reflectivity:	>0.999 @ 1060 nm
Durability:	Mil-C-675C

3.2.3. High Reflectance Coating Mirror-3, 45 deg, s

Polarization:	s
Incidence Angle:	45 deg.
Reflectivity:	>0.999 @ 1060 nm
Durability:	Mil-C-675C

3.3. Quality Assurance/Control

3.3.1. Purchaser Access

Non-escort privileges for the buyer, owner, government and owner representatives to all areas of the facilities where work is being performed shall be arranged. This will include access to all areas where material is being processed and stored. The purchaser shall have the right to witness all manufacturing processes.

3.3.2. QA Approval

LIGO QA reserves the right to inspect and approve vendor/fabricator QA plan and processes.

4 TEST PROCEDURES

4.1. Visual Surface Inspection Test

The high reflectance side of the mirror shall be free of visible stains and surface defects, when the mirror is illuminated with a high-intensity light source and viewed in a darkened environment with the unaided eye.

4.2. Reflectivity Test

Reflectivity within the clear aperture shall be measured at 1064 nm wavelength. The beam diameter shall fill the clear aperture when making reflectivity measurements.

4.3. Wavefront Distortion Test

Wavefront distortion over the clear aperture shall be measured at 633 nm wavelength with an appropriate interferometer.

5 DOCUMENTATION

1) Interferogram of reflected wavefront across clear aperture
2) Reflectivity measurement
3) Compliance Certification for this specification
4) Calibration certification for the test equipment, as appropriate
5) Inspection report
- dimensional verification
- test results
- materials list
- inspection test procedure

6 ENVIRONMENTAL CHARACTERISTICS

The mirrors will operate in a non-vibrational, ultra high vacuum environment, at room temperature (68F,+/-4F).

7 HANDLING AND SHIPPING PROCEDURES

7.1. Cleaning

Approved cleaning procedures for UHV components are detailed in LIGO-E960022, Vacuum Compatibility, Cleaning Methods and Compatibility Procedures.

7.1.1. Optical Surfaces

All optical surfaces shall be cleaned in accordance with good commercial practice. Nothing shall contact the optical surfaces after cleaning, except for lint-free lens tissue.

7.2. Packaging for Shipment

7.2.1. Optical Parts

The cleaned optical components shall be protected with 6 layers of lint-free lens tissue. In addition, all components shall be wrapped in UHV quality aluminum foil and placed in a sealed, clean polyethylene bag before shipping.

The shipping containers must be such that they insure that the bag does not get punctured and that the parts are properly supported during transit.

The CP Stat material is ordered as follows:
CP Stat 100 ESD sheeting cleaned to Class 100 with CFC certification that it passes JPL specifications. At the time of this writing, it is available in various sheet and bag sizes from:Caltex Plastics, Inc.

P.O. Box 58546
2380 E. 51st Street
Vernon, CA 90058
(213) 583-4140

At the time of this writing, one source for UHV Quality Aluminum Foil is:

ASTM B-479 Dry Annealed A Allfoil
4597 Vanepps Rd.
Brooklyn, OH 44131
(216) 661-0211

8 MIRROR OUTLINE DRAWING