



CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

E960094- A -D

DRWG NO. REV. GID

SHEET 1 OF 2

COMPONENT SPECIFICATION

TITLE

MIRROR BLANK MATERIAL, BEAM SPLITTER

APPROVALS:	DATE	REV	DCN NO	BY	CHK	DCC	DATE
DRAWN:		A	E960103-00-D	n/a	n/a	n/a	n/a
CHECKED:							
APPROVED:							
DCC RELEASE:							

Applicable Documents

LIGO-D960793-A-D Beam Splitter Blank

MIL-G-174-B Glass, Optical

Requirements

Physical Dimensions	per LIGO-D960793 Beam Splitter Blank
Clear Aperture	Central 235 mm
Serial Number	Blanks and corresponding witness samples shall be serialized as BSXX, where XX increments starting at 01
Material	Fused Silica A 25mm diameter X 25mm cylindrical witness sample from a nearby portion of the boule shall be provided with each optic
Final shaping	Shaping shall be performed using a progression of grit size ending with a 320 or smaller grit wheel.
Defect depth	Maximum on any surface or corner shall be less than 0.5 mm
Homogeneity	$\leq 5 \times 10^{-7}$ peak to valley at $\lambda = 632.8$ nm within the central 150 mm $\leq 2.5 \times 10^{-6}$ peak to valley at $\lambda = 632.8$ nm within the central 225 mm
Birefringence	≤ 1 nm/cm within the central 150 mm ≤ 5 nm/cm within the central 225 mm
Bubble and Inclusion Cross section within the clear aperture	Total $\leq 0.03 \text{ mm}^2/100\text{cm}^3$ of Glass Inclusions with a diameter of .06 mm or less are disregarded Maximum inclusion diameter - ≤ 0.1 mm
Striae within the clear aperture	Grade A according to MIL-G-174
Absorption	< 2 parts per million per centimeter at $\lambda=1.06\mu\text{m}$



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MIRROR BLANK MATERIAL, BEAM SPLITTER

Specification	Method	Frequency of Inspection	Data Delivered
Physical Dimensions	Visual Inspection	100%	Diameter Thickness
Registration Mark - Location	Visual Inspection	100%	Inspection Report included with Certification
Serial number	Visual Inspection	100%	Inspection Report included with Certification
Material	Process Control Material Certification	100%	Witness Sample, see description below
Defect depth	Visual Inspection	100%	Hand sketch indicating location and dimensions
Homogeneity	Interferometric Measurement	100%	See description below
Birefringence	MIL-G-174 Section 4.4.5	100%	Inspection Report included with Certification
Inclusions	Visual Inspection	100%	Hand sketch indicating location and dimensions
Striae	MIL-G-174 Section 4.4.6, method 1 or 2 (in optical axis only)	100%	Inspection Report included with Certification
Absorption at 1.06 μ m	Measurement	100%	Certification

Table 1: MEASUREMENT MATRIX: FREQUENCY AND METHOD

Data:

Orientation: For the purpose of all data collection the Registration mark shall be at the top center of the optic. Data shall be taken from side 1 where possible. If this is not possible there shall be a special note on the data indicating they were taken from side 2. The witness sample and blank location and orientation with respect to the boule shall be provided.

Format: All Data shall be delivered according to Table 1. In addition to the hard copy the Homogeneity Data shall be delivered on IBM PC compatible disk in ASCII format. Measurements of variation in optical homogeneity shall be in units of nanometers of optical path.