Ponderomotive Interferometer
Input Mirror - Coating Specification

APPROVALS	DATE	REV	DCN NO.	BY	CHECK	DCC	DATE
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History

HR transmission was changed from 400 ppm to 800 ppm +/- 5[a]

Applicable Documents

LIGO-D040539-B Ponderomotive Interferometer Input Mirror Substrate
LIGO-E040468 Ponderomotive Interferometer – ITM Substrate

Requirements

Fabricate from LIGO-D040539-B Ponderomotive Interferometer Input Mirror Substrate

Surface 1: HR Coating

Transmission: 800 ppm ± 5[a]
0° angle of incidence
If preferable, only the central 30 mm could be coated

[a] This is a tolerance on how well the two ITM transmissivities are matched, rather than on the absolute value of each ITM transmission

Surface 2: AR Coating

AR Transmission < 300 ppm
0° angle of incidence
Coat entire surface

Surface 1 and 2

Coating to be centered at 1064 nm
Coating thickness uniformity: <0.1% over the entire surface
Scatter: <10 ppm
Absorption: <1 ppm @1064nm
Zero surface electrical field on the HR coating

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Scratches and Point Defects

There shall be no scratches, sleeks or point defects within the central 30 mm
The total area of scratches outside the central 30 mm diameter shall not exceed 5,000 square micrometers.

Inspection Method

1. The surface should be examined visually against a dark background using a three-bundle fiber optic illumination system of at least 200W total power. A 100% inspection of the surface must be carried out. Any defects detected will be measured using a calibrated eyepiece.
2. An inspection of the entire surface should then be carried out with a dark field microscope.
   A sketch of the surface must be generated showing the location of defects, using the substrate's engraved arrow as reference for orientation.

NOTE:

The coating manufacturer must supply:

1. One 1" witness sample from each coating run
2. Two spectrophotometer graphs of the reflectance and transmittance of the HR coatings must be provided; one covering the spectrum from 530nm to 1200nm; the other, with increased sensitivity, to show wavelengths from 900nm to 1100nm
3. Spectrophotometer graphs of the reflectance of the AR coating taken as cited above.