Specification: Silicon Test Mass HR/AR Coatings, 40m Mariner phase I

APPROVALS	DATE	REV	DCN NO.	CHECK
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1 Description

A list of the high reflectivity (HR) and anti-reflective (AR) coatings for 40m Mariner Phase I Silicon test masses.

2 General Specifications

Wavelengths: 2128.2 nm and 1418.8 nm
Polarization: S
Coating Scatter: < 5 ppm
Type: low absorption, ion beam sputtered deposition

3 HR Coatings

Coating A: (HR: ETMX / ETMY) [requirements stated in decreasing order of importance]

Requirement 1: (absolute value)

- 2128.2 nm / AOI: 0 degrees
  - $T_{ETMX} = 10 \pm 5$ ppm
  - $T_{ETMY} = 10 \pm 5$ ppm

Requirement 2: (absolute value)

- 1418.8 nm / AOI: 0 degrees
  - $T_{ETMX} = 50 \pm 50$ ppm, best effort ± 20 ppm
  - $T_{ETMY} = 50 \pm 50$ ppm, best effort ± 20 ppm

Coating B: (HR: ITMX / ITMY) [requirements stated in decreasing order of importance]

Requirement 1: (differential value)

- 2128.2 nm / AOI: 0 degrees
  - $| T_{ITMX} - T_{ITMY} | < \pm 100$ ppm, best effort $< \pm 10$ ppm

Requirement 2: (absolute value)

- 2128.2 nm _/ AOI: 0 degrees
  - $T_{ITMX} = 2000 \pm 200$ ppm
  - $T_{ITMY} = 2000 \pm 200$ ppm

Requirement 3: (absolute value)

- 1418.8 nm
  - $T_{ITMX} = 50 \pm 50$ ppm, best effort ± 20 ppm
  - $T_{ITMY} = 50 \pm 50$ ppm, best effort ± 20 ppm

4 AR Coatings

Coating C: (AR: ETMX / ETMY)

Requirement 1: (absolute value)

- 2128.2 nm / AOI: 0.5 degrees
  - R_{ETMX} < 2000 ppm
  - R_{ETMY} < 2000 ppm

Requirement 2: (absolute value)

- 1418.8 nm / AOI: 0.5 degrees
  - R_{ETMX} < 1000 ppm
  - R_{ETMY} < 1000 ppm

Coating D: (AR: ITMX / ITMY)

Requirement 1: (absolute value)

- 2128.2 nm / AOI: 0.5 degrees
  - R_{ITMX} < 1000 ppm
  - R_{ITMY} < 1000 ppm

Requirement 2: (absolute value)

- 1418.8 nm / AOI: 0.5 degrees
  - R_{ITMX} < 1000 ppm
  - R_{ITMY} < 1000 ppm

5 Metrology

Coating vendor to provide:

1. Two 1” witness samples from each coating run
2. Spectrophotometer graphs of the reflectance and transmittance of the HR
3. Spectrophotometer graphs of the reflectance of the AR coating

6 Drawings