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| **APPROVALS** | **DATE** | **REV** | **DCN NO.** | **BY** | **CHECK** | **DCC** | **DATE** |
| **AUTHOR: L. McCuller** | **05-18-23** |  |  |  |  |  |  |

# **Description**

0.5” wedged optics with high reflectivity for 1550nm and 775nm light.

**To be used as cavity mirrors**

# **Material**

Corning HPFS 7980 (high purity fused silica, UV grade)

Grade 0A (Low inclusion class: <0.3 mm² cross section, 0.1 mm max. size;

Homogeneity < 1ppm)

# **Dimensions**

All mirrors:

**Wedge:** 30 arcmin ± 5 arcmin (Side 1 has Flat or ROC polish, Side 2 is wedged)

**Diameter**: 25.4mm +0/-0.1mm

**Thickness** (thick edge): 6.35mm ± 0.1mm

**MIRROR M1**

**FLAT-FLAT**

**MIRROR M2**

**FLAT-FLAT**

**MIRROR M3**

**FLAT-Concave**

**ROC: -1.5m ± 0.5% (“-“ indicates concave) on Side 1**

**MIRROR M4**

**FLAT-Concave**

**ROC: -3m ± 0.5% (“-“ indicates concave) on Side 1**

# **Surface Roughness**

**Side 1**

**Super-polished**

< 1 Angstrom over central 80% of diameter with 10-5 scratch-dig; best effort for 0/0.

20-10 scratch-dig outside central 80% of diameter.

**Side 2**

< 5 Angstrom over central 80% of diameter

# **Surface Figure**

**Side 1**

Flat < λ/10 at 632.8 over central 80%

**Side 2**

Flat < λ/4 at 632.8 over central 80%

# **Coating**

All Mirrors:

Ion Beam Sputtered for high damage threshold and low scatter & absorption losses

Wavelengths: 1550nm and 775nm

Polarization:  **S & P** (both for 1550nm and 775nm)

AOI: 0-6 degrees (nominal operation at 3 degrees)

**Coating-A, for M1 (cavity couplers 1550nm, HR 775nm)**

**Side 1**

T@1550nm = 1000ppm (0.1%) ± 50ppm (require well matched pairs)

T@775nm= 0 ppm best effort, <100ppm required

Surface Electric Field: Design for minimum surface electric field at 1550nm

**Side 2**

AR@1550 < 0.1% (best effort AR as low as possible)

AR@775 < 0.2% (best effort AR as low as possible)

**Coating-B, for M2/M3/M4 (cavity couplers 775nm, HR 1550nm)**

**Side 1**

T@1550nm = 0 ppm best effort, <5ppm required

T@775nm = 0.01 ± 1000ppm (should be M2-M3 and M2-M4 as matched-pairs)

Surface Electric Field: Design for minimum surface electric field at 1550nm

**Side 2**

AR@1550 < 0.1% (best effort AR as low as possible)

AR@775 < 0.2% (best effort AR as low as possible)

# **Coating vendor to provide:** 1. Spectrophotometer graph of the reflectance of the AR coating and the transmittance of the HR coating; covering the spectrum from 1500nm to 1600nm and 750nm to 800nm.