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| **AUTHOR(S)** | DATE | Document Change Notice, Release or Approval |
| **Gautam Venugopalan** | 04/12/2018 |  |

1. **Description**

Specification for 2” diameter optic that will replace existing PR3/SR3 at the CIT 40m. Designed to be concave to account for the fact that PR2/SR2 at the CIT 40m are convex with RoC ~600m, such that the PRC/SRC will be stable (TMS in the 1.4-1.8 MHz range for PRC and SRC), tolerances specified such that mode matching between recycling cavity and arm cavity will be > 98.5% (assuming the RoC of the installed PR2/SR2 to be approximately -700m).

HR side coating specified for minimum T for 1064nm (p-pol).

From E1700016-v9 to this document, the dichroic coating performance requirements have been relaxed, but the requirement for HR reflectivity at 1064nm (p-pol) has been preserved.

1. **Radius of Curvature**

RoC = 1000 meters +/- 150 meters

Sagitta = $0.538\_{-0.042}^{+0.049}$$0.538\_{-0.042}^{+0.049}$$0.538\_{-0.042}^{+0.049}$microns [ 7% @ 633 nm precision needed]. Calculated using $sag=R-\sqrt{R^{2}-\left(\frac{d}{2}\right)^{2}}$, where $R$ is the RoC of the optic and $d$ is its diameter.

1. **Physical dimensions**

Diameter: 50.8 +/- 1 mm

Thickness (at center of optic): 10 +/- 1 mm

Horizontal Wedge: 2 degrees

1. **Surface finish**

Super polished on both faces with < 1 Angstrom RMS roughness

Clear aperture 80%

Quality 10-5

1. **Coating**

HR side (Angle of Incidence =40o-50o, see Fig. 1)

**T<50 ppm @ 1064 nm, p-Pol**

1. **Marking**

Serial number to be etched on barrel, centered at thickest location.

Indicate HR side with arrow on barrel at the thinnest location.

1. **Substrate**

The substrate should be Corning 7980 High Purity Fused Silica Standard (UV) Grade 0F (or better).

 

**Figure 1:** Sketch of optic, showing angles of incidence on HR and AR sides