



**ETM QUAD\_End Reaction Mass (ERM) component specification**

### 1 Applicable Documents

This document supports the drawing:

D080116\_ALIGO\_SUS\_ETM QUAD\_End Reaction Mass (ERM) -A

### 2 Requirements

**Material**

Fused Silica:

- Corning 7980 3F
- Or vendor preferred equivalent fused silica, subject to approval of LIGO scientists

Material must meet the following requirements:

Index Homogeneity in central 200 mm diameter is  $\leq 5.0 \times 10^{-6}$  P-V after subtracting tilt and power.

Total bubble and inclusion cross section within the clear aperture is  $\leq 0.5 \text{ mm}^2/100\text{cm}^3$ .

Inclusions with a diameter of 80  $\mu\text{m}$  or less are not included in the total.

Material to be supplied with a certificate of conformity

**Physical configuration**

Shape and polish according to:

D080116\_ALIGO\_SUS\_ETM QUAD\_End Reaction Mass (ERM)

Additional shaping information not in drawing, requirement may be met by satisfying the following:

Surface figure (see LIGO-D080116, surfaces “S1” and “S2”) in the central 200 mm diameter clear aperture: nominally flat, with the residual peak to valley < 100 nm after subtracting tilt and power.

**Reference Markings:**

Registration marks shall be etched, ground or sandblasted, and located per LIGO-D080116.

**Serial Number:**

The serial number shall be etched, ground or sandblasted, and located per LIGO-D080116.

### 3 Inspection

| Specification    | Manufacturing note / drawing zone (LIGO-D080116) | Test Method         | Data delivered   |
|------------------|--|---------------------|--|
| Outside diameter | (Zone C8)  | Physical inspection | Measurement at four equally spaced locations, plus mean measurement  |
| Thickness        | (Zone F5)  | Physical inspection | Measurement at six locations (equally spaced around barrel, starting at location of arrow pointing at surface ‘S1’), plus mean measurement |



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|   |                     |                     |   |
|---|---------------------|---------------------|---|
| Wire groove separation                              | (Zone A6)           | Physical inspection | Measured dimension at four locations (12 o'clock, 3 o'clock, 6 o'clock and 9 o'clock, when looking at surface 'S1' - arrow at 12 o'clock) |
| Face to wire groove check                           | -                   | Physical inspection |   |
| Surface S3 to wire groove 1                         | Note 5              | "                   | Measured dimension  |
| Surface S4 to wire groove 2                         | Note 5              | "                   | Measured dimension  |
| Edges and chamfers                                  | Note 3              | Visual inspection   | Inspection report included with certification   |
| Scratches and point defects                         | Note 3              | Visual inspection   | Inspection report included with certification   |
| Serial Number                                       | Note 6              | Visual inspection   | Inspection report included with certification   |
| Surface figure (200mm clear aperture "S1" and "S2") | (Zones E8 & Note 4) | Interferometry      | Surface map   |

*Table 1: Inspection requirements list*

**Data**

To be taken as instructed in Table 1.  
Instrumentation used for any given measurement should be listed alongside that measurement.

**Orientation**

For the purpose of all data collection, data should be taken where possible from side 1 (surface S1). If this is not possible there shall be a special note beside the data indicating from what direction/how it was taken.

**Format**

All data shall be delivered according to Table 1.