Meller Optics Manufacturing Capabilities

**Materials**

Wide Range of Optical Materials
Sapphire, Optical Ceramics, Laser Crystals, Zinc Selenide, Zinc Sulfide, Silicon, and Germanium

The Very Soft and Extremely Hard Materials are our Forte
- Zinc Selenide: Able to finish to a 10 Angstroms RMS surface roughness
- Sapphire: Able to finish to 2 Angstrom RMS surface roughness

**Processes**

Shaping
- Loose Abrasive Grinding
- Loose Abrasive Polishing (Lapping)
- Chemical - Mechanical Polishing (CMP)
- X-Ray Diffractometric Crystal Analysis
- Laser Marking
- Precision Ultra-Sonic Cleaning
- On-Site Machine Shop for Tooling and Fixtures

**Equipment**

Shaping
- Programmable Surface Grinders
- Blanchard Grinders
- Programmable OD Grinders
- Programmable Beveling Machine
- Edge Honing Machines
- 5-Axis Machining Platforms

Finishing (Grinding / Lapping / Polishing)
- Multiple Spindles for Single-Sided Processes
- Multiple Planetary Machines for Double-Sided Processes
- CO² 60-Watt Laser Engraver
- Ultrasonic Precision Cleaning Systems
- Laminar Flow Booths

**Coatings**

Meller Optics has a long history with two outstanding coating houses
- Vendor 1: Ultraviolet to Midwave Infrared Coating
- Vendor 2: Midwave Infrared to Longwave Infrared Coatings
Meller Optics Manufacturing Capabilities

**Sapphire Masters**

**Sapphire Windows**
- Crystallographic Orientations
  - All Crystal Orientations (c, a, m, and r Planes)
  - c-Plane is Preferred
- Size Limitations
  - Diameters: 3.00mm to 450.00mm
  - Thicknesses: 0.25mm to 100.00mm
  - 100:1 Maximum Aspect Ratio
- Parallelism: 2 Arc Seconds Maximum
- Transmitted Wavefront Error:
  - 1/20 Wave Peak-to-Valley Maximum @ 633nm
  - Over any 2.00” Sub-Aperture, With a 250.00mm Diameter Size Limitation
- Surface Quality: 10-5 per MIL-PRF-13830
- Surface Roughness: 2 Angstroms RMS Maximum

**Sapphire Domes**
- Crystallographic Orientation: c-Plane
- Size Limitations
  - Diameters: 10.00mm to 150.00mm
  - Wall Thicknesses: 1.00mm Minimum
  - 50:1 Maximum Aspect Ratio
- Wedge Error: 3 arc Minutes Maximum
- Surface Accuracy:
  - Power: 4 Fringes Maximum @ 633nm
  - Over any 2.00” Sub-Aperture
  - Irregularity: 2 Fringes Maximum @ 633nm
  - Over any 2.00” Sub-Aperture
- Surface Quality: 20-10 per MIL-PRF-13830
- Surface Roughness: 10 Angstroms RMS Maximum

**Other Sapphire Components**
- Sapphire Spherical Lenses
- Sapphire Prisms
- Sapphire Waveplates
- Non-Optical Applications:
  - Sapphire Perforated Wafer Carriers
  - Sapphire Spacers and Wear Pad Applications

**Metrology**
- 6” Zygo Verifire Horizontal Interferometer
- 4” Zygo Verifire Vertical Interferometer
- Zygo ZeGage Interferometric Surface Analyzer Microscope
- EFG-Berlin X-Ray Diffractometer
- Keyence XM-C1000 CMM
- Interoptics Opto Flat
- Zeiss Stemi 2000-C 50x Microscope
- Edmunds Twin Head Gage Block Comparator
- 4” x 4” Micro-VU Measuring System
- Autocollimators