

## PRECISION MIRRORS

# ULTRA PRECISION REFLECTIVE OPTICS FOR THE MOST DEMANDING APPLICATIONS

Novanta develops photonics solutions through our globally recognized brands— ARGES, Cambridge Technology, Laser Quantum and Synrad— specializing in cutting-edge components and sub-systems for laser-based diagnostic, analytical, micromachining and fine material processing applications. Powerful lasers, coupled with advanced beam steering and intelligent sub-systems incorporating software and controls, deliver extreme precision and performance, tailored to our customers' demanding applications.

## HIGH PRECISION BERYLLIUM MIRRORS

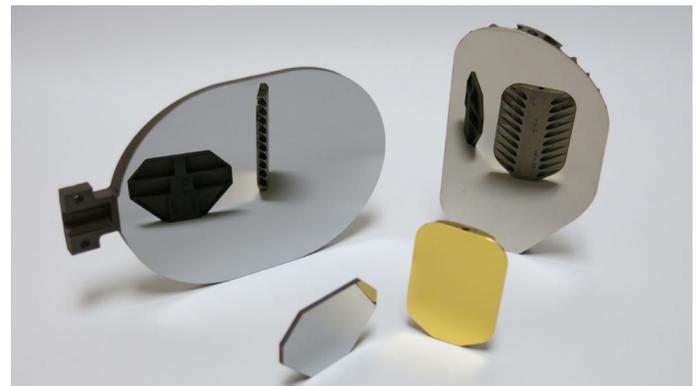
Beryllium offer unique performance advantages for many industrial and medical applications. Low mass, low inertia, high stiffness, excellent thermal conductivity, and exceptional dimensional stability make beryllium the perfect solution when the highest dynamic performance is required.

Offering a one-stop-shop for all processes, Novanta's in house manufacturing capabilities allow flexible mirrors to be produced from raw material through precision, polished, optically coated products ready for integration into OEM equipment.

## HIGH PRECISION SILICON MIRRORS

Silicon offers a lower-cost alternative to beryllium and depending on the coating and application needs, silicon designs can approach the dynamic performance of beryllium mirrors and exceed the optical performance. Good stiffness, excellent thermal conductivity, and exceptional dimensional stability often make silicon an excellent choice.

Novanta has vast experience working with OEM customers to manufacture and deliver beryllium and silicon mirror solutions to exacting specifications in high volume.



## FLEXIBLE OPTICAL COATING OPTIONS

We offer a variety of precision reflective coatings using advanced optical coating chambers. Our coating and processing capabilities apply to a variety of substrates including beryllium, silicon and fused silica.

We provide tailored solutions for specific needs like:

- Gold, enhanced silver, aluminum
- Various dielectric films
- High-damage threshold laser coatings
- Low UV through far IR films
- In addition, we offer expanded support for demanding coating requirements through partner coating houses specializing in specific wavelengths. These coatings are typically available on all substrate materials, including beryllium.

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Specifications	Model 711-80159
Power Requirements	<ul style="list-style-type: none"> <li>• Single-rail, +12VDC. Contact factory for other power supply configurations.</li> <li>• 12V ~ 1A current</li> </ul>
Angle Control	<ul style="list-style-type: none"> <li>• Variable Angle Configuration.</li> <li>• In place of the on-board 5V reference, the user supplies an external 0-5V analog variable reference to adjust the angle from full field to minimum either statically or dynamically (zoom function).</li> </ul>
Sync Signal	<ul style="list-style-type: none"> <li>• Sync signal occurs at each change in scan direction.</li> <li>• Phase adjustment range relative to mirror position: 45 degrees.</li> <li>• Symmetry adjustment of the trigger point for a zero crossing on the rising or falling edge of the sync signal to compensate for DC offset.</li> <li>• Symmetric sync signal edge rate: 50 nanoseconds.</li> </ul>
Output Drive Signal	Clean sinusoidal drive sign minimizes crosstalk between velocity and drive coils.
Integration Features	<ul style="list-style-type: none"> <li>• Locking connectors</li> <li>• Single 9-pin interface connector</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>• The driver is equipped with a mounting kit that includes double-sided thermal tape and an optional heatsink and insulating film. For some applications, simply attaching the board to a metal mass (e.g. galvo block) with the thermal tape is sufficient. Otherwise, the optional heat sink can be provided that attaches to the thermal tape. In this case, standoffs and mounting screws are used to mount the driver.</li> <li>• Two mounting holes in opposite corners (spaced 1.0" x 1.5" and sized for #2 screws) are also provided.</li> </ul>
Dimensions (L x W)	30.5mm x 43mm (1.2" x 1.7")
Quality	RoHS Compliant

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## WAVELENGTH & APPLICATIONS

Application Examples	Typical Apertures <sup>2</sup>	Coatings <sup>1</sup>
Via-Hole Drilling	10 mm, 14 mm	UV, Green
	20 mm, 25 mm, 27 mm & 30 mm	CO <sub>2</sub>
Additive Manufacturing	20 mm, 30 mm	Fiber/YAG
Micromachining	10 mm, 14mm	UV, Green, Fiber/YAG
	20 mm	Fiber/YAG
Marking & Coding	6 mm - 8 mm, 10 mm, 14 mm, 15 mm	UV, Green, Fiber/YAG, CO <sub>2</sub>
Microscopy	3 mm, 5 mm, 6 mm	Broadband Visible, Protected Aluminum, Protected Silver
Ophthalmic	Various Custom	Broadband Visible, Protected Silver

Handling Beryllium in solid form poses no special health risk. Once leaving our facility all beryllium products are certified contaminants free and can be handled without concern for health and safety. Whilst providing exceptional performance characteristics, Beryllium alloys and derivatives do require careful processing to ensure the safety of the manufacturing team. As such, Cambridge Technology process Beryllium in a licensed production facility which exceeds all current health, safety and environmental requirements and accredited to ISO14001. Beryllium components should not be abraded outside a licensed facility and local laws should be observed when disposing of any beryllium-based items.

### References:

#### 1. Coating Definitions:

- a. UV (dielectric): 343-355nm, Green (dielectric): 515-532nm, Fiber/YAG (dielectric): 1040-1090nm, CO<sub>2</sub> (dielectric): 9.3-10.6µm
- b. Broadband Visible (dielectric): 450 – 650nm, Protected Aluminum (metallic): 300 – 1200nm, Protected Silver (metallic): 350 – 7000 nm

#### 2. Most apertures are available in standard performance Silicon substrate and high-performance Beryllium substrate

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