



FILTERS FOR ASTRONOMY & AEROSPACE



Bringing information to light

introduction Omega® Optical designs and manufactures custom filters and standard prescription filters to the highest imaging quality standards for astronomers, atmospheric scientists, and aerospace instrumentation companies throughout the world. Applications include both terrestrial and space-based observational instruments. We have supplied projects and programs for a wide variety of prestigious universities, observatories, government agencies, and international consortia. As instrument technologies and applications evolve, we work collaboratively with customers to develop solutions for the spectral, optical, and environmental demands that will define observational astronomy and aerospace applications in the future.

bessell sets Our stock Bessell Photometric Sets, manufactured to the definition put forth by M. Bessell, offer high optical quality suitable for demanding imaging requirements. Filters are polished to stringent transmitted wavefront, wedge, and flatness specifications and are then anti-reflective coated. Each filter's spectral response is determined by the combined responses of Schott filter glasses polished to prescription thicknesses. The individual glasses are then laminated into a single-piece optical assembly. The result is a set of precision filters at an economical price.

Imaging Enhancement Attributes:

- Transmitted Wavefront Distortion: 1/4 (or better) per inch.
- Wedge: Less than 30 arc seconds.
- Flatness: 1/4 (or better) per inch.
- Surface Quality: E/E as defined by MIL-C-48497A.
- Anti-Reflective Coating: multi-layer dielectric AR coating on both surfaces. R typically <0.5% to increase transmission and reduce ghosting.
- Anti-Reflective Coating Durability: to moderate abrasion as defined by MIL-C-48497A.

	Filter U	Filter B	Filter V	Filter R	Filter I	Complete Set
	1.0 mm of UG 1 1.0 mm of S-8612 3.0 mm of WG 305	2.0 mm of GG 385 2.0 mm of S-8612 1.0 mm of BG 12	2.0 mm of GG 495 3.0 mm of S-8612	2.0 mm of OG 570 3.0 mm of KG 3	2.0 mm of WG 305 3.0 mm of RG 9	(Filters U-I)
Formats	Part #: XBSSL/U	Part #: XBSSL/B	Part #: XBSSL/V	Part #: XBSSL/R	Part #: XBSSL/I	Part #: XBSSL
25mm Round	\$100	\$100	\$100	\$100	\$100	\$400
25mm Square	\$100	\$100	\$100	\$100	\$100	\$400
28mm Round	\$125	\$125	\$125	\$125	\$125	\$500
32mm Round	\$125	\$125	\$125	\$125	\$125	\$500
38mm Round	\$150	\$150	\$150	\$150	\$150	\$600
50mm Round	\$250	\$250	\$250	\$250	\$250	\$900
50mm Square	\$250	\$250	\$250	\$250	\$250	\$900
SBIG†	\$175	\$175	\$175	\$175	\$175	\$600

Note: Spectrophotometric curve(s) are provided for each filter or set. Instructions for handling and cleaning surface-coated optics are provided for each filter or set.

† Mounted in 1 1/8 in. eyepiece, compatible with SBIG filter wheel.

Prices listed are U.S. domestic prices. Duties, fees, and taxes required for international sales are additional.

custom filters Many astronomy imaging applications require the custom design and manufacture of filters and filter sets. With twenty vacuum deposition systems—including ion, electron, plasma, and multi-planet coating technologies—we are able to produce filters of extreme uniformity and precision in quantities of ten to one thousand according to the following general specifications:

- Wavelength Range: UV to mid IR
- Bandwidths: 0.15nm to several hundred nm
- Tolerances: Critical throughput, bandshape and bandwidth requirements
- Sets: Matching physical and performance attributes
- Materials: Space-flight compatible

As observational instruments and detectors increase in sensitivity and size, we continue to support the needs **large format filters** of the astronomy community through development of capabilities to produce filters as large as 210mm in diameter. These filters can be manufactured using Omega proprietary ALPHA™ Technology, producing a wide variety of bandwidths with highly controlled cut-on and cut-off edge slope. Any of the available scientific glasses can be combined either to match existing requirements or to define novel filters. We also continue to offer the highest finesse Fabry-Perot interference filters using both metal and dielectric reflectors.

High Spectral Performance—We provide interference passband filters with peak wavelengths located anywhere **technical** from the UV to the mid-IR and with bandwidths ranging from 0.15nm to several hundred nanometers wide. Our filters meet demanding throughput and bandshape requirements while adhering to very close tolerances on bandwidth and peak wavelength. Many of our filters are designed for high attenuation of near out-of-band emission lines. Our coating processes assure uniformity of spectral performance over the physical area of large filters.

High Optical Performance—Our filters are made to rigorous imaging requirements. We start by polishing optical glasses to requisite flatness and wedge values prior to coating and assembly. By designing each coating for the longest free spectral range, we minimize the number of laminations that cause internal reflection and fringe patterns. After assembly, our filters are polished to achieve minimum wavefront distortion. Our Broadband Achromatic Twyman-Green interferometer enables us to evaluate transmitted wavefront at the filter's principal wavelength. Durable anti-reflective coatings are deposited on outer surfaces to increase transmission and reduce ghosting.

Physical Attributes—Many of our astronomy filters are made in sets or as supplements to existing sets. Each filter is designed to match the others in attributes, such as optical thickness, bandshape, throughput, attenuation, sensitivity to system focal ratio, sensitivity to temperature, and imaging quality. Continuum filter sets are made with precise matching of the cut-on and cut-off wavelengths of spectrally adjacent filters. Space-based application filters are manufactured using “space-flight compatible” materials.

Photometric Filter Sets—We make a variety of photometric filter sets (often called “UBVRI”) that isolate broad areas of the spectrum. These filters are made by combining a number of filter glasses and/or dielectric spectral control films. They are useful for both color imaging and photometric classification. We produce many sets with modified designs to achieve required performance, such as accommodating the spectral response of detectors or maximizing peak energy.

Narrow-Band Filters—Our narrow-band filters are highly effective at isolating monochromatic emission and absorption lines, featuring high throughput, deep out-of-band attenuation, and close control of spectral location. The performance of narrow-band filters is critically dependent upon system speed and operating temperature. Much care and attention is given to the design, manufacture, and measurement of these filters to assure that peak performance is reached at the designated system and operating environment.

Omega® Optical has years of experience designing and manufacturing imaging system filters critical **organizations & projects** to the success of a variety of astronomical and aerospace projects and programs including the following:

- AURA
- Canadian-France-Hawaii Telescope Company
- CONICA
- ESA Giotto Mission
- European Southern Observatory Very Large Telescope
- GRANTECAN
- NASA JPL Star Dust Project
- NASA JPL Hubble Space Telescope: WFPC2 and WFPC3
- NASA JPL Martian Rovers 2003–2004: Opportunity and Spirit
- Observatories of the Carnegie Institute of Washington

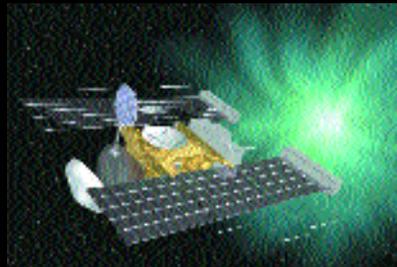
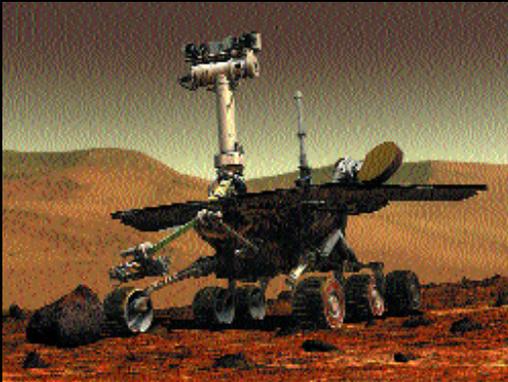
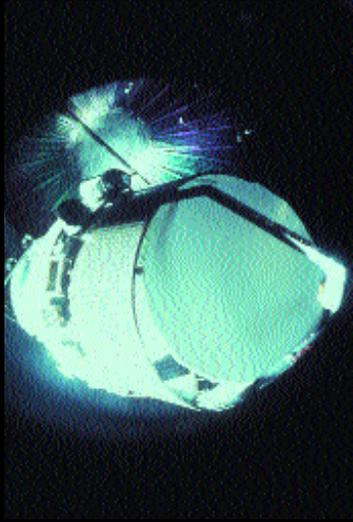
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Photos courtesy of
(clockwise from top right):
NASA JPL Hubble Space Telescope
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ESA Giotto Mission