

# LUMICON

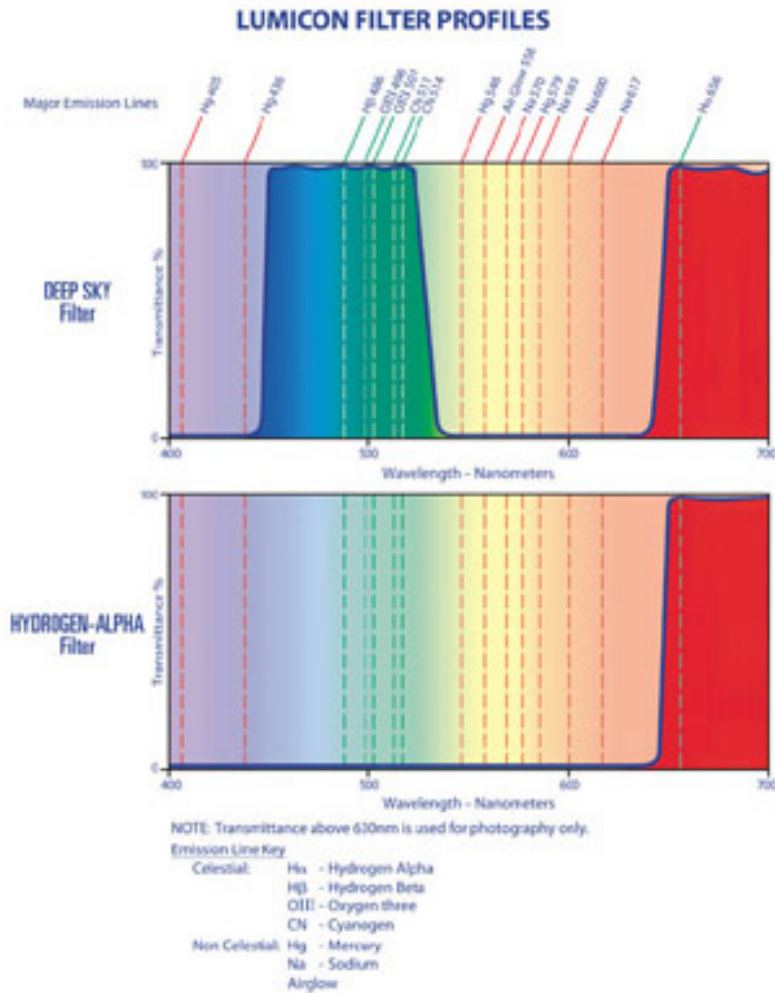
## *Filter Specifications & Uses*

### LUMICON Nebula Filters

The Deep Sky , Hydrogen-Beta , Oxygen III , and Ultra High Contrast Filters are the result of 20 years of steady design improvements, and continue to deliver the highest performance of all anti-light pollution filters obtainable today. The following information recommends which filter to use on which celestial objects, and explains how filter transmissions differ.

<b>Objects</b>	<b>Examples</b>	<b>Best Filter for Viewing</b>	<b>Best Filter for Photography</b>
Stars & Star Clusters	M13, M11	Deep Sky	Deep Sky
Diffuse Nebulae	Lagoon, Swan	OIII (light polluted sky) Deep Sky, UHC (dark sky)	Deep Sky
Planetary Nebulae	Dumbbell, Ring	OIII (light polluted sky) Deep Sky, UHC (dark sky)	Deep Sky
Faint Planetary Nebulae	NGC 7293, Abell 33, Jones 1	OIII	Deep Sky
Reflection Nebulae	Pleiades, Trifid	Deep Sky	Deep Sky
Spiral Galaxies	M33, M101	Deep Sky	Deep Sky
Faint Nebulae	Veil, Rosette, N. American	OIII (light polluted sky) Deep Sky, UHC (dark sky)	Deep Sky
Extremely Faint Nebulae	California, Horsehead	H-Beta	Night-Sky H-Alpha Deep Sky

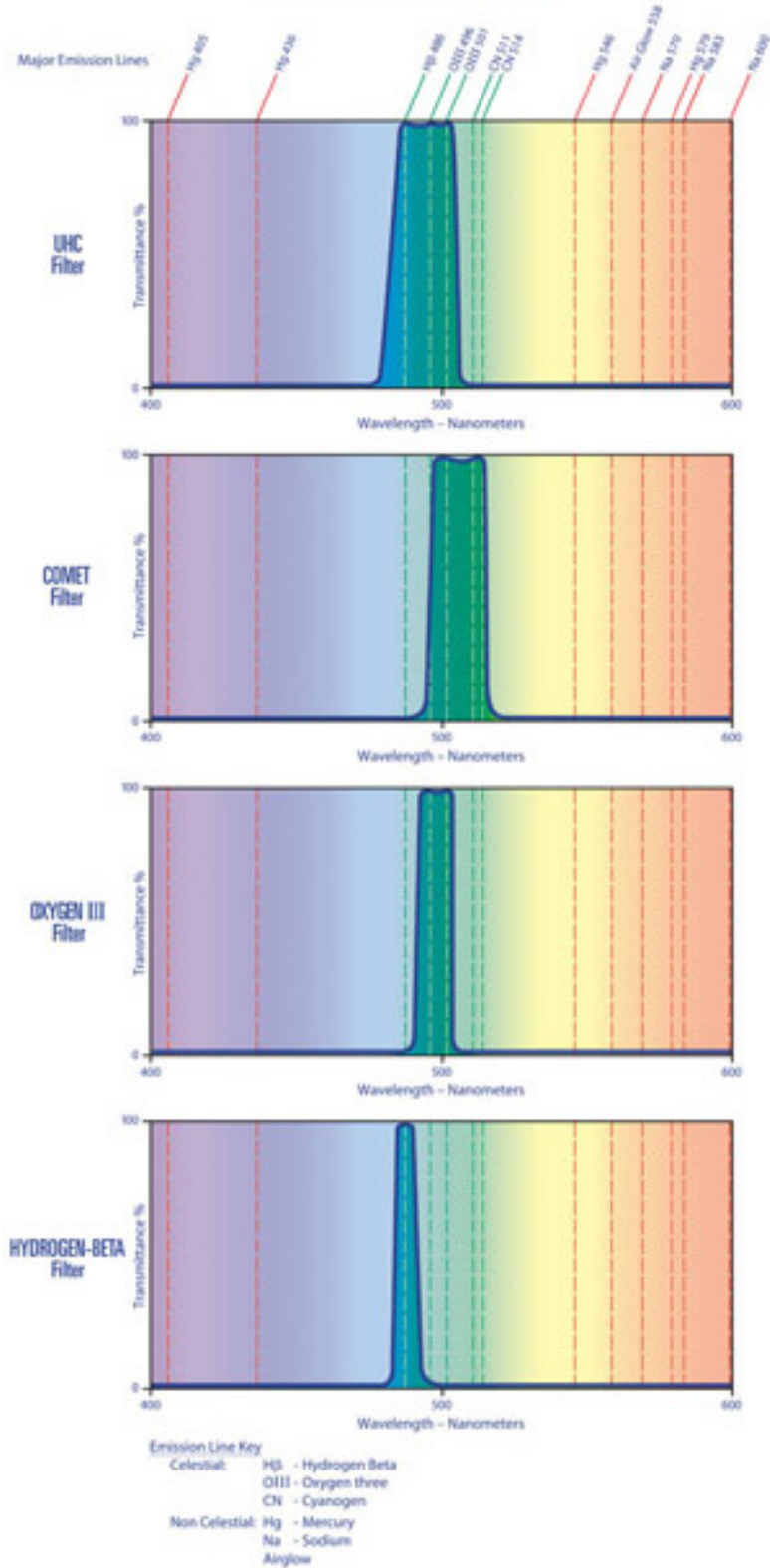
# Ideal for Photographic Applications



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# Ideal for Visual Usage

## LUMICON FILTER PROFILES



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Deep Sky Filter

- Intended for viewing nebulae from light-polluted skies.
- Blocks all mercury vapor and high & low pressure sodium vapor lamp light, neon lights and airglow, while transmitting the rest of the visible spectrum.
- The best all-around visual light pollution filter for use in urban skies.
- This filter also provides high-contrast views of the Martian polar caps

### Ultra High Contrast Filter

- Narrow band pass filter (24nm) isolates the two doubly ionized oxygen lines (496 and 501nm) and the hydrogen-beta line (486nm) emitted by planetary and most emission nebulae.
- Provides superb views of the Orion, Lagoon, Swan and other extended nebulae.
- The best all-around dark-sky nebular filter available.

### Oxygen III Filter

- Narrow band pass filter (11nm) isolates just the two doubly ionized oxygen lines (496nm and 501nm) emitted by planetary and extremely faint nebulae.
- Produces near-photographic views of the Veil, Ring, Dumbbell, Orion, plus many other nebula.

### Hydrogen-Beta Filter

- Extremely narrow bandpass filter isolating the hydrogen-beta line alone (486nm).
- Excellent for viewing the Horsehead, Cocoon and California Nebulae.
- Often the only way to view certain nebulae.
- It is best used under clear skies with large aperture.

### Exit Pupil Specifications:

The exit pupil of a telescope is a measure of specific magnification, which differs from absolute magnification, and which determines the surface brightness of an extended object image. Exit pupil diameter may be expressed as the quotient of eyepiece focal length divided by the telescope's focal ratio. For example, a 32mm eyepiece used on an f/10 telescope will have a 3.2mm exit pupil. Each Lumicon filter has an optimum eyepiece exit pupil range shown below.

Filter Type	Deep Sky	UHC	OIII	H-Beta

<b>Bandpass</b>	<b>90nm</b>	<b>22-26nm</b>	<b>10-12nm</b>	<b>8-10nm</b>
<b>Optimum Exit Pupil (Light-polluted sky)</b>	<b>0.5-2mm</b>	<b>1-4mm</b>	<b>2-5mm</b>	<b>3-7mm</b>
<b>Optimum Exit Pupil (Dark sky)</b>	<b>1-4mm</b>	<b>2-6mm</b>	<b>3-7mm</b>	<b>4-7mm</b>

### **Notice:**

As filter bandpass decreases, optimum exit pupil size tends to increase. To determine the best eyepiece focal length to use with a given filter, simply multiply the Exit Pupil value shown above by your telescope's focal ratio. For example, if you are using the Lumicon H-Beta filter at a dark site and your telescope has an f/6 focal ratio, the best range of eyepiece focal lengths to use with this filter is  $[(4 \text{ to } 7) \times 6] = 24\text{mm to } 42\text{mm}$ .

### **Filter Construction:**

Lumicon nebula filters are made using thin-film dielectric coatings on optically flat glass. These exclusively designed dielectric coatings consist of over 30 alternating layers of several different materials. Each layer is about a wavelength of light thick and has a thickness accurate to 2 - 3 angstroms. The Deep Sky Filters use very hard electron-beam deposited coatings on one side of the glass substrate, and delicate anti-reflection coatings on the other. Except for the Deep Sky Filter, all Lumicon filter coatings are very hard, and may be cleaned carefully with alcohol. The UHC, OIII, and H-Beta filters consist of two elements, sandwiched coatings, and anti-reflection coatings on all surfaces to prevent ghosting.

### **Mechanical Design:**

These filters thread directly into most eyepieces and telescope accessories. Threads are standard for 1¼" filters. 48mm filters are standard for 2" O.D. eyepieces.

### **Bandpass:**

These Lumicon filters reject man-made and natural light pollution. Mercury light pollution occurs at 365, 405, 436, 546, 577, and 617nm. High-pressure sodium streetlights emit at 570, 583, 600, and 617nm. Natural airglow occurs at 558 and more weakly at 630nm. There is a window of greatly reduced light pollution from 440nm (blue) to 540nm (green). The Lumicon Deep Sky Filter has a wide 90-100nm bandpass for most of this range (441-535nm) to yield maximum transmission of light from stars and galaxies. The UHC Filter has a narrow 22nm bandpass through 484-506nm. The OIII Filter has a very narrow 11nm bandpass for 495-501nm, and the H-beta Filter has the narrowest bandpass of all - only 8nm centered at 486nm. The narrower the bandpass, the higher the rejection of light pollution and the blacker the skies. However, a narrower bandpass also means fainter star images. Nevertheless, the Deep Sky Filter has high transmission for the photographic red nebula emission lines.

## Nebula Emission Lines:

The main visible radiation from emission nebulae consists of doubly ionized oxygen near the wavelength of 500nm. There is also weaker emission due to hydrogen-beta at 486nm. The invisible but photographically important emission of red hydrogen-alpha and ionized nitrogen occur near 657nm.

## LUMICON Color and Neutral Density Filters

The Lumicon Color and Neutral Density Filters are made from renowned Schott and Hoya optical glass and allow for maximum contrast on viewing planetary and lunar detail. Individually precision ground, highly polished with maximum light transmission coatings on both sides, these filters are 100% guaranteed for life.

### #8 Light Yellow

Moon: Feature Contrast  
Mars: Maria  
Jupiter: Belts  
Jupiter: Orange-Red Zonal  
Uranus: Dusky Detail  
Neptune: Dusky Detail

### #11 Yellow-Green

Mars: Maria  
Jupiter: Clouds  
Jupiter: Red/Blue Contrast  
Saturn: Clouds  
Saturn: Cassini Division  
Saturn: Red/Blue Contrast

### #12 Yellow

Moon: Feature Contrast  
Mars: Blue-Green Areas  
Jupiter: Red-Orange Features  
Saturn: Clouds  
Saturn: Red-Orange Features

### #15 Dark Yellow

Moon: Feature Contrast  
Mars: Clouds  
Mars: Polar Caps  
Jupiter: Belts  
Saturn: Belts  
Uranus: Dusky Detail  
Neptune: Dusky

### Detail #21 Orange

Mars: Maria  
Jupiter: Belts

### #25 Red

Mercury: Features  
Venus: Planet/Sky Contrast  
Venus: Terminator  
Mars: Maria  
Mars: Polar Caps  
Jupiter: Belts  
Jupiter: Galilean Moon Transits  
Saturn: Clouds

### #29 Dark Red

Mercury: Features  
Venus: Planet/Sky Contrast  
Venus: Terminator  
Mars: Maria  
Mars: Polar Caps  
Jupiter: Belts  
Jupiter: Galilean Moon Transits  
Saturn: Clouds

### #38A Dark Blue

Venus: Clouds  
Mars: Dust Storms  
Jupiter: Belts  
Jupiter: Great Red Spot  
Jupiter: Disc  
Saturn: Belts

### #47 Violet

Venus: Clouds  
Mars: Polar Caps  
Saturn: Rings

### #56 Light Green

Moon: Detail

### #80A Blue

Moon: Feature Contrast  
Jupiter: Belts  
Jupiter: Rilles  
Jupiter: Festoons  
Jupiter: Great Red Spot  
Saturn: Belts  
Saturn: Polar Regions

### #82A Light Blue

Moon: Low-Contrast Features  
Mars: Low-Contrast Features  
Jupiter: Low-Contrast Features  
Saturn: Low-Contrast Features

### ND13 Neutral Density

13% Transmission  
Moon: Glare Reduction  
Double Stars: Bright Primary

### ND25 Neutral Density

25% Transmission

### ND50 Neutral Density

50% Transmission

### Single Polarizing Filter

### Rotating Polarizing Filter

Moon: Glare Reduction or  
Variable Transmission

Jupiter: Polar Regions  
Saturn: Belts  
Saturn: Polar Regions

**#23A Light Red**

Mercury: Planet/Sky Contrast

Mars: Maria

Mars: Blue-Green Areas

Jupiter: Belts

Jupiter: Polar Regions

Saturn: Belts

Saturn: Polar Regions

Mars: Dust Storms

Mars: Polar Caps

Jupiter: Belts

Jupiter: Atmosphere

Jupiter: Red/Blue/Light Contrast

**#58 Green**

Venus: Clouds

Mars: Polar Caps

Jupiter: Red/Blue/Light Contrast

Saturn: Belts

Saturn: Polar Regions

**Object**

**Features**

**Recommended Filter**

Mercury

Planet/Sky Contrast

#23A Light Red

Features

#25 Red

#29 Deep Red

Venus

Clouds

#38A Deep Blue

#47 Violet

#58 Green

Planet/Sky Contrast

#25 Red

#29 Deep Red

Terminator

#25 Red

#29 Deep Red

Moon

Detail

#56 Light Green

Feature Contrast

#8 Light Yellow

#12 Yellow

#15 Deep Yellow

#80A Blue

Low Contrast Features

#82A Light Blue

Glare Reduction

ND13 Neutral Density

Mars

Clouds

#15 Deep Yellow

Maria

#8 Light Yellow

#15 Deep Yellow

#11 Yellow-Green

#21 Orange

#23A Light Red

#25 Red

#29 Deep Red

	<b>Blue-Green Areas</b>	<b>#12 Yellow #23A Light Red</b>
	<b>Dust Storms</b>	<b>#38A Deep Blue #56 Light Green</b>
	<b>Polar Caps</b>	<b>#15 Deep Yellow #25 Red #29 Deep Red #47 Violet #56 Light Green #58 Green Deep Sky Filter</b>
	<b>Low Contrast Features</b>	<b>#82A Light Blue</b>
<b>Jupiter</b>	<b>Clouds</b>	<b>#11 Yellow-Green</b>
	<b>Belts</b>	<b>#8 Light Yellow #15 Deep Yellow #21 Orange #23A Light Red #25 Red #29 Deep Red #38A Deep Blue #56 Light Green #80A Blue</b>
	<b>Rilles</b>	<b>#80A Blue</b>
	<b>Festoons</b>	<b>#80A Blue</b>
	<b>Atmosphere</b>	<b>#56 Light Green</b>
	<b>Red-Orange Features</b>	<b>#12 Yellow</b>
	<b>Orange-Red Zonal</b>	<b>#8 Light Yellow</b>
	<b>Red/Blue Contrast</b>	<b>#11 Yellow-Green</b>
	<b>Blue/Light Contrast</b>	<b>#25 Red</b>
	<b>Great Red Spot</b>	<b>#38A Deep Blue #80A Blue</b>
	<b>Galilean Moon Transits</b>	<b>#25 Red #29 Deep Red</b>
	<b>Red/Blue/Light Contrast</b>	<b>#56 Light Green #58 Green</b>



	<b>Polar Regions</b>	<b>#21 Orange #23A Light Red</b>
	<b>Disc</b>	<b>#38A Deep Blue</b>
	<b>Low Contrast Features</b>	<b>#82A Light Blue</b>
<b>Saturn</b>	<b>Clouds</b>	<b>#11 Yellow-Green #12 Yellow #25 Red #29 Deep Red</b>
	<b>Belts</b>	<b>#15 Deep Yellow #21 Orange #23A Light Red #38A Deep Blue #58 Green #80A Blue</b>
	<b>Polar regions</b>	<b>#21 Orange #23A Light Red #58 Green #80A Blue</b>
	<b>Rings</b>	<b>#47 Violet</b>
	<b>Cassini Division</b>	<b>#11 Yellow-Green</b>
	<b>Red/Blue Contrast</b>	<b>#11 Yellow-Green</b>
	<b>Red/Orange Features</b>	<b>#12 Yellow</b>
	<b>Low Contrast Features</b>	<b>#82A Light Blue</b>
<b>Uranus</b>	<b>Dusky detail</b>	<b>#8 Light Yellow #15 Deep Yellow</b>
<b>Neptune</b>	<b>Dusky detail</b>	<b>#8 Light Yellow #15 Deep Yellow</b>
<b>Double Stars</b>	<b>Bright Primary</b>	<b>ND13 Neutral Density</b>

## **Tech-Support**

**All Technical questions should be directed to:**  
[tech-support@lumicon.com](mailto:tech-support@lumicon.com)

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