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Find the *International Light Technologies ZCIE* at our website: ***Click HERE***

ILT Optical Filters

Optical filters are often used to attenuate certain wavelengths of light and produce an overall desired detector response.



Interference filters rely on harmonic interference between waves to provide very narrow passbands. Thin metal films are spaced half the desired wavelength apart by a dielectric spacer. Interference filters are capable of bandwidths less than 10 nm.

Absorptive filters typically consist of glass that has been doped with a concentration of dye that absorbs particular colors. Since spectral transmission varies logarithmically with thickness, the band pass can be reduced by thickening the filter.

Bouger's law describes the effect of thickness on transmission: $\log_{10}(\tau_1) / d_1 = \log_{10}(\tau_2) / d_2$, where t is the internal transmittance, and the thickness, for two filters made from the same material. Internal transmittance is greater than external transmittance due to reflection losses.

Fresnel's law of reflection states that the fraction of light reflected for normal incidence is: r = (n-1)2 / (n+1)2, where n is the ratio of the refractive indexes of the two media. If n = 1.5 for air and glass, then r = 4% for each surface. Two filters separated by air transmit 8% less than two connected by optical cement (or even water).

Multiple color filters can be layered to match a desired function, such as the CIE photopic response, which defines the eye's sensitivity to color. The combined spectral response is the product of the filter's transmission and the spectral responsivity of the detector doped with a concentration of dye that absorbs particular colors. Since spectral transmission varies logarithmically with thickness, the band pass can be reduced by thickening the filter.

ILT's optical filters are the building blocks that allow a myriad of applications. Mounted in threaded (1 1/4-24 thread) black anodized rings, all filters may be repeatedly interchanged on any SED, SEL, and SHD detector. Unmounted filters and empty filter rings are also available.

ILT can also create weighted measurement functions for applications such as the new UV Actinic Hazard standard, where UV exposure at a critical wavelength has a proportionally greater effect (as defined by ACGIH, NIOSH) than exposure at nearby wavelengths. ILT weights the sensitivity at each wavelength using thin film techniques or composite absorptive layering to accurately indicate exposure levels in a single measurement. Please contact an ILT Applications Engineer for technical assistance.

Wide Band Optical Glass Filter Wavelength Chart

Narrow Band Filter Wavelength and Transmission Chart

Sharp Cut Filter Available Wavelength Chart

NOTE: Click links below for individual filter transmission scans

Part Number, Description	Specifications
A, Photoresist Filter	25 mm dia. tailored filter designed to provide 'A' response (320-475 nm) with silicon sensors.
ACT5, Actinic/Germicidal Filter	20 mm dia. multipurpose filter produces expanded actinic response or effective germicidal/bactericidal response when used with SED(SEL)240 Detector as well as UV Actinic Hazard response curve per ACGIH.
T2ACT5, Actinic Germicidal Filter / Diffuser	ACT5 combined with T2X Diffuser. Provides extra sensitivity with good spatial response required for use with ILT1400 for optical hazard measurements.
B, Photoresist Filter	25 mm dia. tailored filter designed to provide 'B' response (326-401 nm) with silicon detectors.
BR, Bilirubin Phototherapy Filter	12.5 mm dia. tailored filter to be combined with silicon detectors for hyperbilirubinemia phototherapy.
F, Flat Response Filter	12.5 mm dia. tailored filter to be combined with silicon detectors to produce a flat spectral response.
FQ, Attenuated Flat Response Filter	Attenuated F filter to be combined with silicon detectors to produce a flat spectral response.

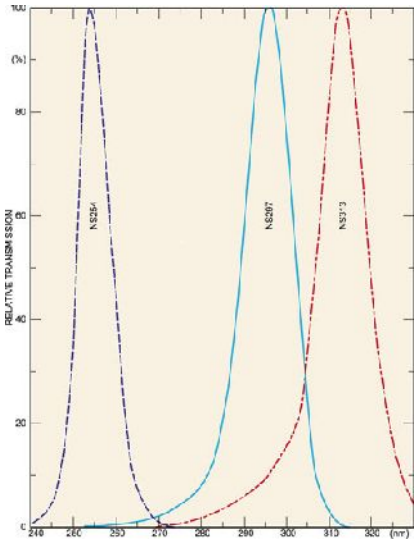
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Part Number, Description	Specifications
HMR, Hot Mirror	IR rejecting hot mirror. Combined with F filter for flat VIS response.
HPS515, Photopic Filter	25 mm dia. filter corrects Photomultiplier to C.I.E. eye response.
NS185, Narrow Band Filter, UV	25 mm dia. mounted interference filter with center wavelength 185 nm.
NSXXX, UV Narrow Band filters, Ultraviolet	25 mm dia. mounted interference filter with center wavelength at XXX nanometers, FWHM 10 nm. Standard filters available are NS254, NS280, NS313, NS335, NS350, NS365.
NSXXX, Visible Narrow Band Filter, Visible	25 mm dia. mounted interference filters with center wavelength at XXX nanometers, FWHM 10 nm. Standard filters available are NS400, NS405, NS436, NS500, NS546, NS600, NS633 and NS700.
NSXXX, custom	25 mm dia. mounted interference filter with center wavelength at XXX nanometers, for ranges not noted above. CUSTOM NSUV, NSVIS and NSIR, with many FWHM and CW ranges available, contact technical support for assistance.
NDFSS102, Neutral Density Filter Set	UV-IR: 25 mm dia. filters mounted to fit SED(SEL)(SHD)(SL) detectors. QNDS1, QNDS2 and QNDS3 included.
PAR, Photosynthetically Active Radiation	25 mm dia. tailored filter to be combined with silicon detectors. Combined quantum response is spectrally flat in the visible range.
QNDS1, Neutral Density Filter	25 mm dia. mounted quartz filters with 10 times attenuation.
QNDS2, Neutral Density Filter	25 mm dia. mounted quartz filters with 100 times attenuation.
QNDS3, Neutral Density Filter	25 mm dia. mounted quartz filters with 1000 times attenuation.
SCSXXX, Sharp Cut Filters	25 mm dia. mounted glass filters with a wavelength of XXX at 60% transmission. They pass wavelengths above XXX and absorb wavelengths below XXX. Standard filters available are SCS280, SCS365 (**LIMITED AVAILABILITY**), SCS395, SCS440, SCS465, SCS490, SCS520, SCS530, SCS545, SCS590, SCS605, SCS622, SCS695, SCS740, SCS780, SCS810, SCS830.
SPS300, Super Solar Blind UV Filter	25 mm dia. tailored filter when combined with the SED(SEL)240 Detector produces UV response from 280 to 315 nm with a billion-to-one VIS/IR rejection.
TBLU, Blue Color And Hazard Filter	12.5 mm dia. filter mounted for use with silicon detectors.
TFRD, Far Red Color Filter	25 mm dia. filter mounted for use with silicon detectors.
TGRN, Green Color Filter	25 mm dia. filter mounted for use with silicon detectors.
TRED, Red Color Filter	25 mm dia. filter mounted for use with silicon detectors.
TYLW, Yellow Color Filter	25 mm dia. filter mounted for use with silicon detectors.
TLS312, Narrowband UVB Phototherapy Filter	25 mm dia. narrow band filter for use with GaAsP detector, for TL-01 lamp measurement.
UVA, Phototherapy Filter	12.5 mm dia. tailored filter when combined with silicon detector produces UVA response from 315 to 390 nm (10%).
UVB, Filter	OBSOLETE - See SPS300
UVB-1, Phototherapy Filter	20 mm dia. tailored filter when combined with solar blind vacuum photodiode produces response from 265 to 332 nm.
WBSXXX, Wide Band Filters, UV-IR	Mounted glass filters with center wavelength at XXX nanometers. (note, many WBS filters cannot be used with silicon sensors due to secondary response in the IR, so they are typically sold with the SED(SEL)005. Standard filters available are WBS320, WBS350, WBS375, WBS400, WBS405, WBS440, WBS460, WBS465, WBS480, WBS520.
Y, Photopic Filter	OBSOLETE
Y2, Photopic Filter	OBSOLETE
Y3, Photopic Filter	Proprietary blend of filter glass and custom coatings. Works with ILT silicon sensors to provide accurate lux, lumen, and cd/m2 readings when combined with ILT silicon sensors, optics and calibrations. Better match to the CIE photopic curve with an F'= 1.58 versus the previous Y2 filter with F' of 1.78. For measuring lower visible light levels, Y3 filter has 80% transmission, double that of the Y2 filter (40%). Can be purchased mounted in ILT's standard 42 mm diameter ring or sold unmounted in 3/8", 1/2" and 1".

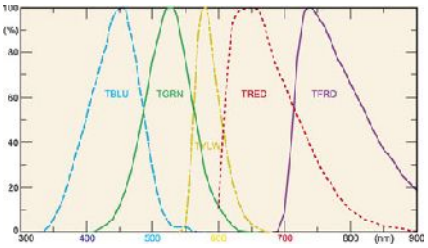
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Part Number, Description	Specifications
ZCIE, Scotopic Filter	12.5 mm dia. filter used with silicon detectors to produce a match to the CIE Scotopic Response.

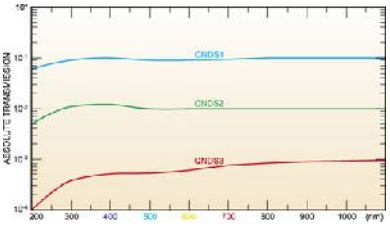
NSxxx Narrowband Filter Realtive Transmission:



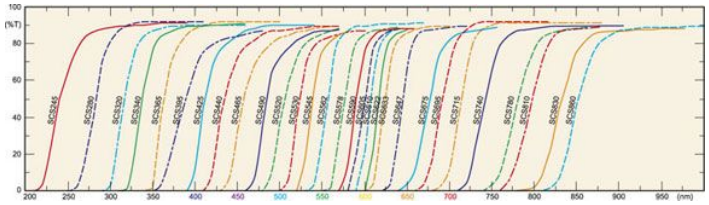
Tcolor Colored Filter Relative Transmission:



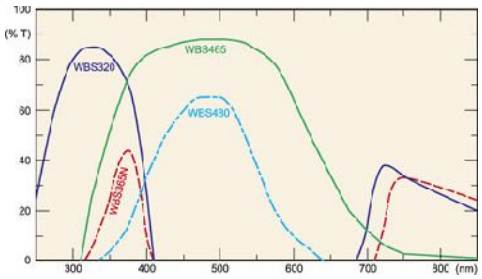
QNDSx Neutral Density Filter Absolute Transmission:



SCSxxx Sharp Cut Filter Relative Transmission:



WBSxxx Wideband Filter Relative Transmission:



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