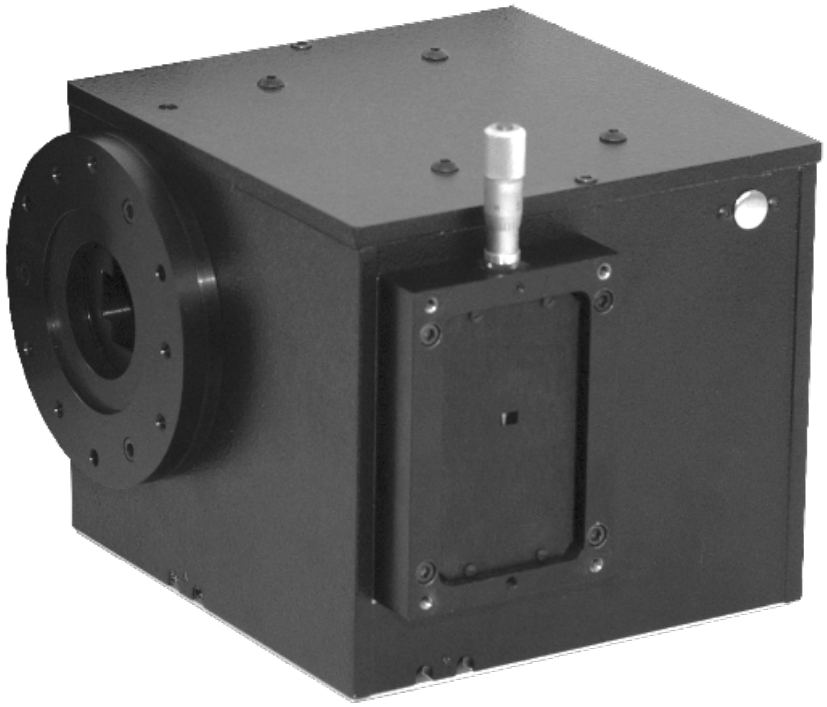

SP-2150

150mm Focal Length Imaging Spectrograph and Scanning Monochromator

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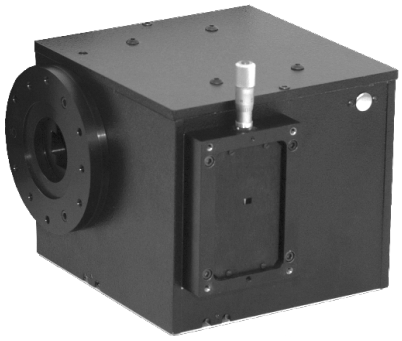
TELEDYNE
PRINCETON INSTRUMENTS
Everywhereyoulook™

150mm Imaging Spectrograph and Scanning Monochromator

Teledyne Princeton Instruments (TPI) SpectraPro® 2150 imaging spectrographs and scanning monochromators are ideal for researchers looking for high quality spectral data in a compact package. These rugged yet versatile instruments are compatible with the full range of TPI CCDs and CMOS detectors, as well as single channel detection systems and can be configured for a wide range of applications. SP-2150 spectrometers feature 150mm focal length, computer-controlled scanning, interchangeable dual indexable gratings and high throughput f/4 optics.



Typical SP-2150 Applications:

Raman spectroscopy, Optical Emission, Spectroscopy (OES), Photoluminescence (PL), Fluorescence, Absorption, Transmission and Reflection.

FEATURES	BENEFITS
Dual Indexable Gratings	Quickly change gratings by computer-control to change spectral resolution/dispersion or to optimize system efficiency for the desired wavelength region of interest.
Astigmatism-Corrected Optics	We incorporate a toroidal mirror to correct astigmatism for improved spatial resolution. Suitable for multichannel fiber spectroscopy applications excellent imaging quality and enhanced spatial and spectral resolution.
High Efficiency Optical Coatings for Spectrometer Mirrors and Gratings	The Acton #1900 Al+MgF_2 coating is optimized for reflection from UV (200nm) to SWIR to deliver the highest broadband light throughput in the industry. Optional protected silver (>400nm) or gold (>650nm) coatings are also available.
f/4 Aperture Ratio	Fast f/4 optics insure maximum light collection and system throughput.
Array Detectors: CCDs, CMOS and InGaAs	We offer a complete selection of CCDs and CMOS array detectors, including front and back-illuminated silicon-based detectors, ICCDs, EMCCDs, EMICCDS, CMOS, NIR InGaAs arrays, plus TEC, liquid and LN-cooled sensors.
Accessories	Optional accessories include fiber optic bundles, fiber adapters, filter wheels, sample chambers, light sources and single channel detection systems.
Optional: LightField® software	Highly versatile and powerful software package for control of Teledyne Princeton Instruments spectrographs and array detectors, including data acquisition, display and analysis features. LightField offers an intuitive, cutting-edge user interface, plus easy LabVIEW® and MATLAB integration and more.
Optional IntelliCal®	Automated spectrometer system calibration: easy push-button wavelength calibration plus intensity calibration, all integrated and automated through LightField software
Optional Scientific Toolkit (SITK)™ for LabVIEW®	Expert tool kit for programming LabView to control SP-2150 series spectrographs and scanning monochromators

SpectraPro®-2150 Configurations

Model	Operating Mode	Port Configuration	Optical Path
SP 2155	Scanning Monochromator	Side Entrance Slit / Front Exit Slit	90°
SP 2156	Imaging Spectrograph	Side Entrance Slit / Front CCD Port	90°

SpectraPro®-2150 Specifications (1200g/mm grating at 435nm):

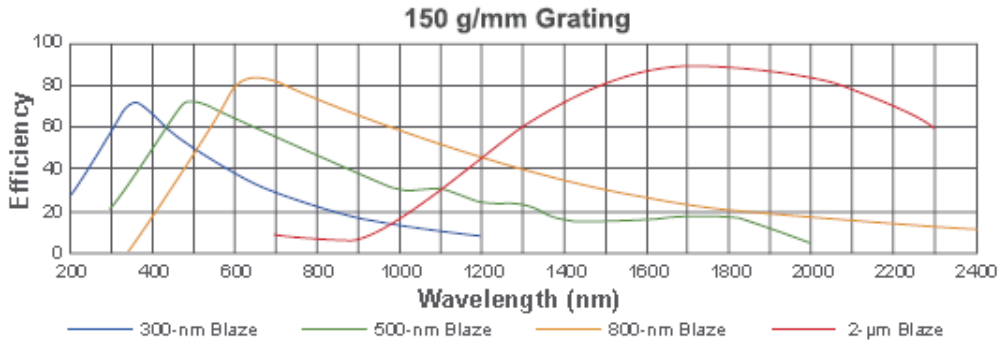
Focal length	150 mm
Aperture ratio	f/4
Scan range	0 - 1400 nm mechanical range
Linear dispersion[1]	4.17 nm/mm
CCD resolution[2]	0.4 nm with 20 µm pixel, 20 µm slit width
PMT resolution[1]	0.4 nm with 10 µm wide by 4mm high slits
Wavelength coverage	111 nm across 26.8 mm CCD
Grating size	32 x 32 mm
Grating mount	Interchangeable dual grating turret. Accepts up to three turrets
Focal plane size	26.8 mm wide x 10 mm high
Astigmatism	Corrected at focal plane center. ~690 mm at sides of 25mm wide focal plane
Standard Slits	10 µm to 3mm width, micrometer-controlled3.
Wavelength Accuracy	± 0.25 nm
Wavelength Repeatability	± 0.05 nm
Drive Step Size	0.005 nm/step
Dimensions	7 in (178 mm) long 7 in (178 mm) wide 6.5 in (165 mm) high
Optical Axis Height	4 in (102 mm)
Weight	10 lbs. (4.5 kg)
Computer Interface	USB2

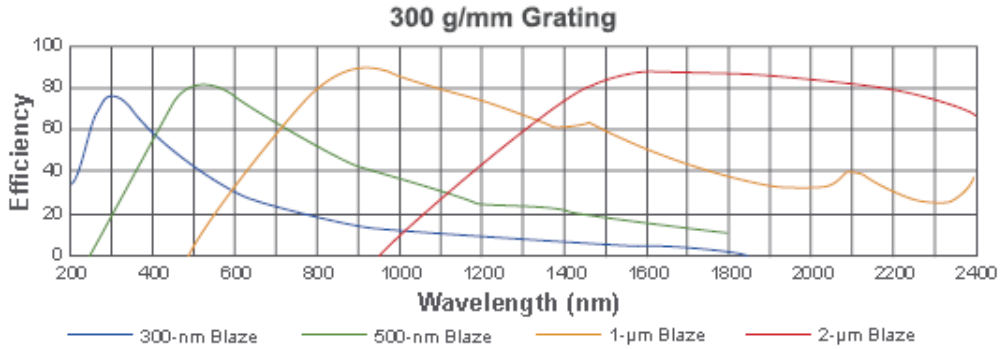
Notes:

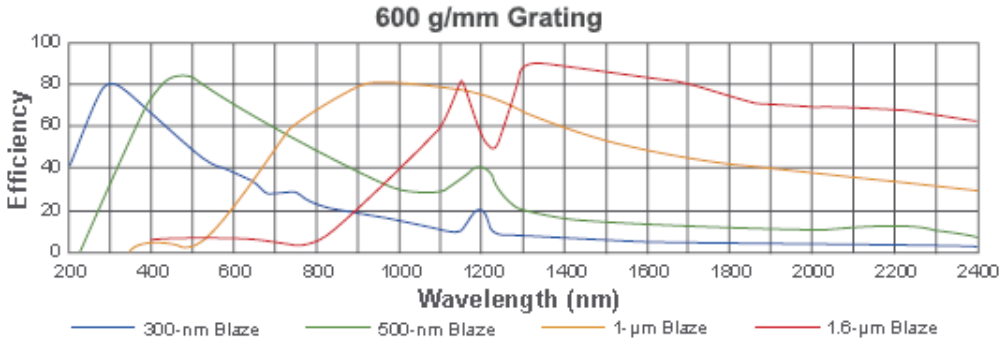
1. Linear reciprocal dispersion measured with a 1200 g/mm grating @ 435.8 nm, PMT resolution measured with a 1200 g/mm grating @ 435.8 nm,10 µm slit width and 4 mm slit height.
2. CCD resolution measured with a 1200 g/mm grating @ 435.8 nm, 20 µm slit width and 20 µm pixel.
3. Optional motorized slits are available. Contact your sales representative for more information.

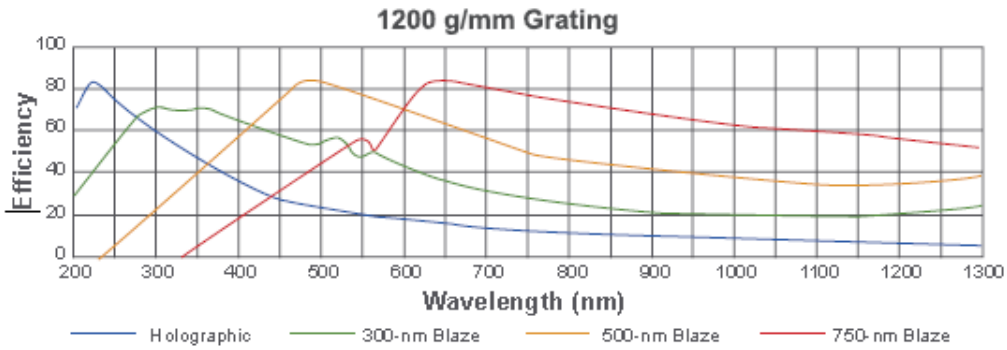
All specifications subject to change without prior notice.

SpectraPro®-2150 Diffraction Gratings:









High-Efficiency Optical Coatings

Teledyne Princeton Instruments operates its own state-of-the-art coating laboratory, Teledyne Acton Optics, which provides high-efficiency mirrors and coatings for use in the UV, VIS, and NIR. The coating facility is renowned for producing some of the highest-efficiency UV mirrors and coatings commercially available. Acton coatings are utilized by industrial customers, universities, space agencies, and government research facilities worldwide.

This exclusive coating capability enhances the performance of Teledyne Princeton Instruments spectrographs and monochromators. Whether the broadband performance of the Acton #1900 enhanced aluminum or the superior VIS-NIR reflectance of the Acton protected silver is selected, maximum throughput is ensured!

A Coating options for Teledyne Princeton Instruments spectrographs and monochromators

The standard coating provided with IsoPlane spectrographs and monochromators is the #1900 enhanced aluminum. Silver and gold coatings are available as an option.

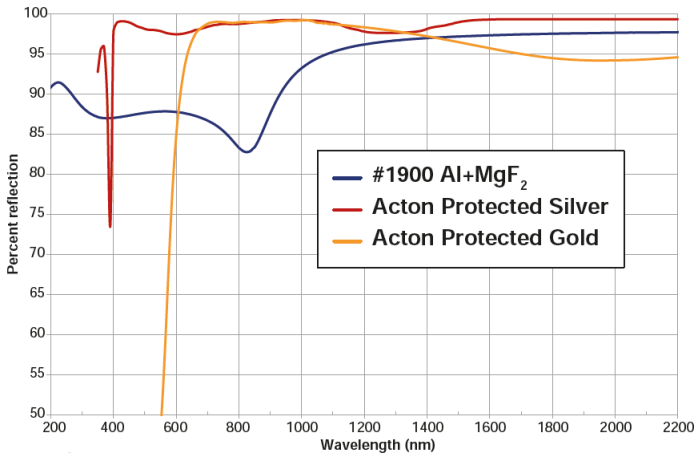
B Acton #1900 UV-enhanced Al+MgF2 vs. bare aluminum

The Acton #1900 coating provides superior reflection in the UV compared to conventional aluminum coatings. At 200 nm, reflection throughput can be up to 1.65x greater with exclusive Teledyne Princeton Instruments coatings. Calculated reflection at 200 nm shows that the #1900 coating will have 1.65x greater light throughput than aluminum after only three reflections!

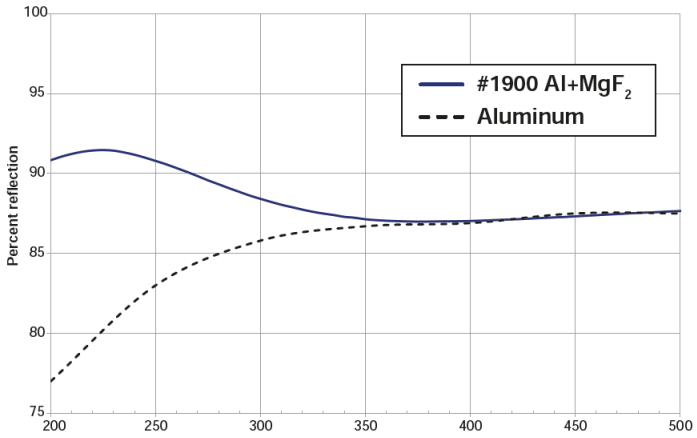
C Acton protected silver vs. conventional protected silver

Acton protected silver actually enhances reflectance (and light throughput) down to 400 nm whereas conventional silver absorbs significantly. After only three reflections, calculated throughput at 400 nm using Acton protected silver can be ~1.48x greater than conventional protected silver coatings.

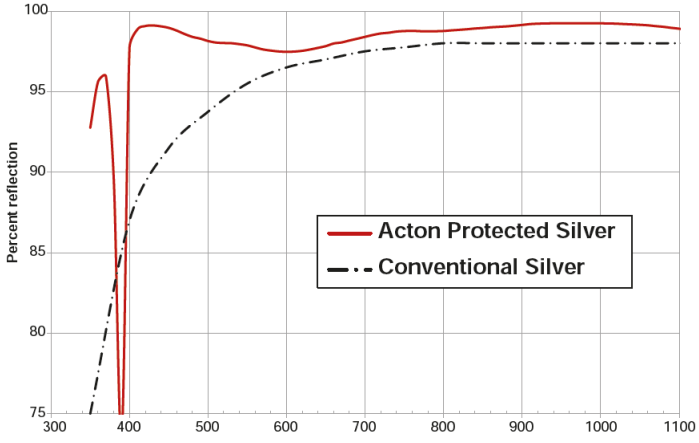
A Coating Options for Teledyne Princeton Instruments Spectrographs and Monochromators



B Acton #1900 UV-Enhanced Al+MgF² vs. Bare Aluminium



C Acton Protected Silver vs. Conventional Protected Silver



TELEDYNE IMAGING
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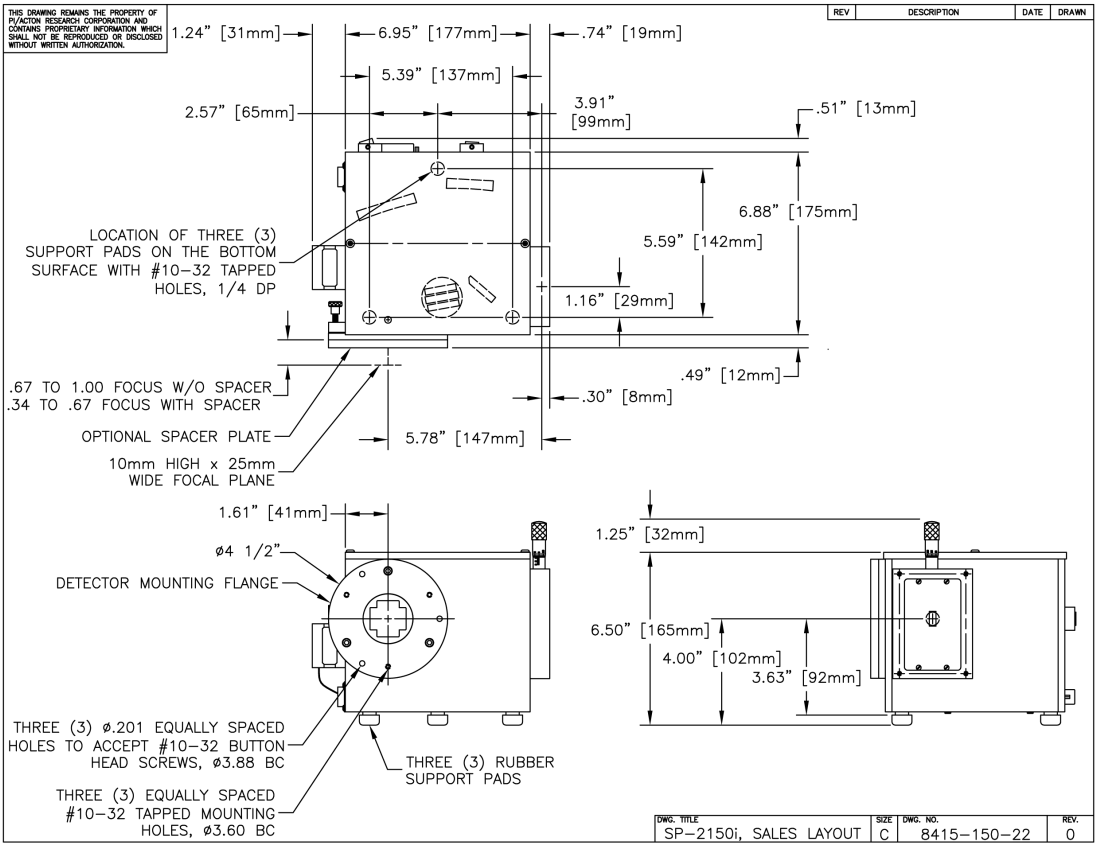
Dispersion and Wavelength Coverage (26.8 mm focal plane)

Grating	150 g/mm	300 g/mm	600 g/mm	1200 g/mm	1800 g/mm	2400 g/mm	3600 g/mm*
Dispersion	39.7 nm/mm	19.5 nm/mm	9.33 nm/mm	4.17 nm/mm	2.37 nm/mm	1.4 nm/mm	1.07 nm/mm
Coverage	1064 nm	522 nm	250 nm	111 nm	63 nm	37 nm	28.6 nm

* Center wavelength of 254 nm used for 3600 g/mm grating. Center wavelength of 435 nm used for all other gratings.

SpectraPro®-2150 Dimensions



SP-2150

150mm Focal Length Imaging Spectrograph and Scanning Monochromator

Accessories for the SP-2150 include the IntelliCal calibration system, fiber optic bundles, CCD, CMOS and InGaAs detectors, single-channel PMT, Si and InGaAs detectors, sample chambers, spectroscopy cube accessories and integrated software for control and data acquisition. Complete information can be found here: www.princetoninstruments.com

Contact your local Teledyne Princeton Instruments representative for additional information.

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