imspector RAMAN

ImSpector Raman spectrographs are high performance imaging spectrographs for Raman spectroscopy applications that require high throughput, high spectral resolution, and the best possible imaging performance. The spectrographs are available for the system integrators both as an imaging and multichannel devices.

ImSpector	R6E	R10E
Optical characteristics		
Spectral range	530 - 630 nm (18 900 - 15 900 cm $^{-1}$)	770 - 980 nm (13 000 - 10 200 cm $^{-1}$)
Image size	13 x 13 mm	13 x 13 mm
Spectral dispersion	7,7 nm / mm	16,15 nm / mm
Spectral resolution (FWHM)	0,3 nm (~10 cm^{-1})	0,6 nm (~10 cm^{-1})
Numerical aperture /(F/#)	0,21 (F/2,4)	0,21 (F/2,4)
Slit width, default	30 µm	30 µm
Slit length	14,2 mm	14,2 mm
Optical input	Telecentric	Telecentric
Grating efficiency	> 65 %	> 65 %
Aberrations		
Smile	< 3 µm (0,025 %)	
Keystone	< 3 µm (0,025 %)	
Mechanical characteristics		
Size, OEM	187 x 83 x 60 mm	
Weight	1100 g	
Body, OEM	Anonized aluminium tube	
Lens and camera mount	Standard C-mount adapter (removable) *	
User adjustments	Image axis relative to detector rows, back focal length adjustable ±1mm	
Environmental characteristics		
Storage	- 20 ... + 85 °C	
Operating	+ 5 ... + 40 °C	

* Filter holder inside front c-mount

Like all the other SPECIM ImSpector imaging spectrographs, Raman spectrographs are based on fully transmissive optical design with lenses and transmissive dispersive element. This structure enables building a rugged device with a small footprint and easy integration to different types of CCD and CMOS cameras, as well as to the microscope or standard imaging optics. By combining the Raman ImSpector with a sensitive camera, optimised objective lens, and excitation line-laser, SPECIM customers are able to construct a truly imaging Raman measurement system.

By replacing the standard input slit and objective lens with multichannel fiber input, the ImSpector Raman spectrographs can be used to build up multipoint Raman measurement systems.

ImSpector R6E, side view

ImSpector R6E, front view

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Optical Quality

The selection of fully transmissive optical design for the Raman spectrograph provides the best available optical performance for Raman measurements. This means

- High light throughput thanks to large numerical aperture, high transmission of the wavelength optimised optics, and high diffraction efficiency of transmissive grating
- Polarization free optical design thanks to transmissive dispersive element
- Distortion free performance with sub-pixel smile and keystone

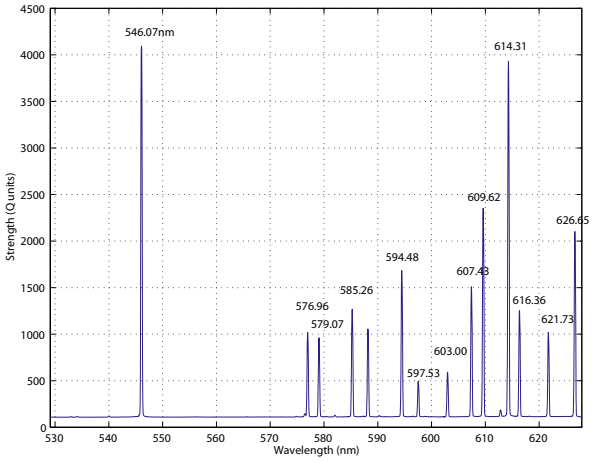
Customised Solutions

The ImSpector Raman imaging spectrographs are available for two standard wavelength ranges in the VNIR (500 – 1000 nm) range to be used together with the standard Raman excitation lasers around 500 and 800 nm. If the application requires a dedicated wavelength range, customization can be done without large NRE costs.

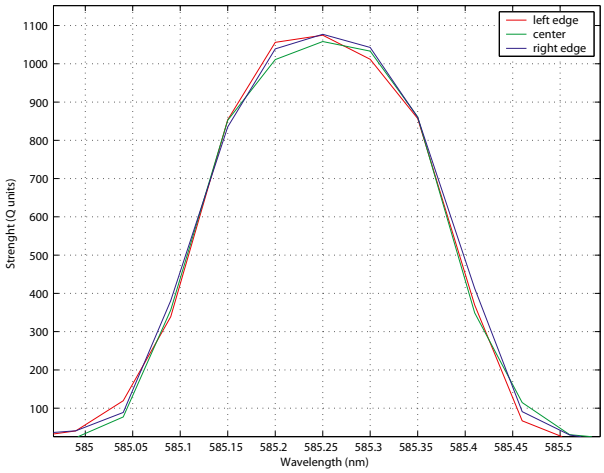
SPECIM is also capable of designing and manufacturing high resolution imaging spectrographs working in the wavelength range from 900 to 1700 nm that can be used together with NIR sensitive sensors.

Accessories

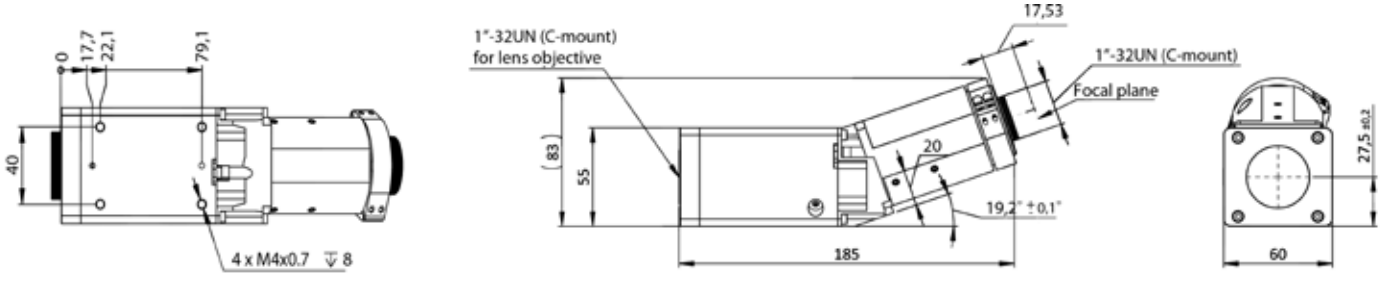
- Mechanical shutter: for dark image acquisition
- Collection fiber optics: 4 to 100 separate channels with selectable lengths and SMA connections



Example of spectral profile from HgNe calibration lamp measured with Imspector R6E



Spectral profiles of the same spectral peak from edges and centre of the image area to demonstrate the subpixel geometrical aberrations.



ImSpector R6E mechanical dimensions