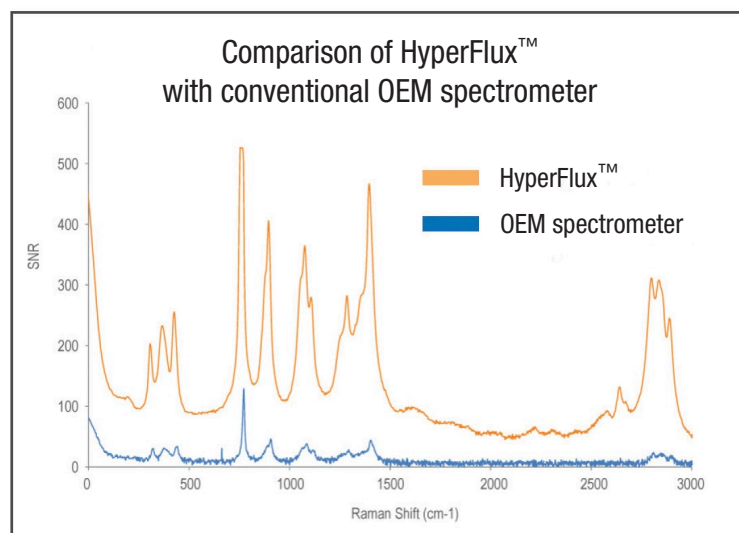


HyperFlux™ PRO Plus Raman Spectroscopy System



Tornado's HyperFlux™ PRO Plus is a complete Raman spectroscopy system including a proprietary HTVS-enabled spectrometer, a high-quality stabilized laser, multiple laser safety interlocks, temperature monitoring and dynamic re-calibration, and automated system health monitoring and fault detection. This powerful, reliable, and easy-to-use instrument is contained in a small, lightweight, cost-effective package which is readily deployed in both in-line process and laboratory settings.

The PRO Plus is compatible with a broad range of probes, chemometric software packages, and hazardous environment configurations. All these features combine to provide unequalled Raman sensitivity, quality, and convenience for process and laboratory applications.



HIGHER RAMAN SENSITIVITY THAN EVER BEFORE POSSIBLE

Sensitivity, Speed and Safety



MORE ACCURATE IDENTIFICATION AND QUANTITATION
For challenging mixtures and low concentration levels



FASTER MEASUREMENT
For precise tracking of rapid changes and transient features



LOWER LASER POWER OPERATION
Allows ATEX compliant laser power (i.e. 35 mW) with better sensitivity

HIGH THROUGHPUT VIRTUAL SLIT (HTVS™)

Tornado's proprietary HTVS™ design eliminates spectrometer slit losses while maintaining high spectral resolution. This allows for the best possible combinations of signal strength and spectral resolution in a dispersive spectrometer and results in an order of magnitude improvement in sensitivity.

- Robust, reliable, and easy to use
- Broad selection of probes
- Pharma-ready: 21 CFR Part 11 and IQ/OQ protocols
- ATEX configured
- Equal spectral resolution across entire spectra
- Global support
- Chemometric software compatibility

Technical Specifications

LASER WAVELENGTH	785 nm wavelength, Configurable power output from 5 to 495 mW; Output power stability $\leq \pm 1\%$
LASER POWER	20 mW up to 495 mW
SPECTRAL RANGE	200 cm^{-1} to 3300 cm^{-1} (Raman shift from 785 nm excitation)
FIBER OPTIC INTERCONNECT	FC/PC (excitation/collection) Dual interlock optional expansion
FIBER LENGTH	2 m standard - Different lengths available upon request
X-AXIS	Spectral Range: 200-3300 cm^{-1} Spectral Resolution: $< 5 \text{ cm}^{-1}$ (average across spectral range) Wavenumber Stability: $\pm 0.1 \text{ cm}^{-1}$
Y-AXIS	Dynamic Range: 45,000 counts (pre-calibration) Instrument Detection Limit: 4 counts (minimum acquisition 34ms, peak at 1001.4 cm^{-1})
COMMUNICATIONS	OPC UA Modbus TCP
STANDALONE PREDICTION	SIMCA .usp PEAXACT .pxm
USB EXPANSION ACCESSORIES	4 8 channel fiber switch (rack mountable) OPIS 35™ ATEX/IECEx certified laser (shelf mountable)
PROBES	Immersion and Non-Contact
ENVIRONMENTAL	Operating temp 0 °C to +35 °C Operating relative humidity $\leq 65\%$ non-condensing
MOUNTING	Benchtop
ELECTRICAL	100 V to 240 V AC line power; 35 W
DIMENSIONS	18.4 x 8.5 x 5.4 in (46.7 x 21.6 x 13.7 cm)
WEIGHT	22 lbs (9.8 kg)