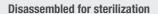
## Hudson<sup>™</sup> Bioreactor Raman Immersion Probe

High-performance process monitoring of bioprocess samples via Raman spectroscopy

Tornado's Hudson™ Bioreactor Raman Immersion Probe capitalizes on the power of Raman in bioprocess manufacturing by measuring multiple, specific components in real-time for continuous, around-the-clock process feedback. Its optical design is optimized for compatibility with Tornado's Process Guardian<sup>™</sup> and HyperFlux<sup>™</sup> PRO Plus Raman analyzers and can be used for the superior representative sampling and measurement reproducibility for liquids, solids, slurries, powders, and heterogeneous mixtures. The Hudson™ Bioreactor Raman Immersion Probe can collect high-quality data on either flowing or stationary samples and allows users to optimize accuracy. quality, and yield over a wide range of biological processes.







## ★ KEY FEATURES

- Compact stainless steel Raman probe with fully integrated optics, eliminating the risk of misalignment or internal contamination
- Optimized for compatibility with Tornado's Raman analyzers with HTVS<sup>™</sup> technology for 10x to 30x higher Raman signal than conventional Raman systems, delivering better precision and sensitivity
- High purity optical elements ensure low background
- No epoxy or gold seals, providing zero leaching risk

## **KEY APPLICATIONS:**

- Cell Line Development
- Cell Fermentation (Mammalian or Bacterial)
- Manufacturing Scale-Up
- Cell Culture: Quantification of glucose, lactate, cell density, protein titer, amino acids, acetate, and ammonium





## **PERFORMANCE**

The unrivaled optical efficiency of Tornado's analyzer and probe solutions enables bioprocess Raman measurements with maximum dynamic range using typical exposure times of only 0.1 to 1 second, and with spectral averaging enabled, users can get high-precision metabolite predictions every 1 minute to 5 minutes.



Tornado's Hudson™ Bioreactor Raman Immersion Probe with Process Guardian™ Raman Analyzer

- Compatible with bioprocess industry standard ports
- PG13.5 threaded connector
- Autoclavable
- Compatible with single use mixers/reactors

For non bio immersion probes, please contact Tornado for other OD and housing material options

Device Specifications:	
SIZE	13.4 x 1.8 x 1.1 in (34 x 4.5 x 2.8 mm)
WEIGHT	1.6 lbs (735 g) (complete assembly: Hudson™ Probe, Inner Lens Tube Assembly & ViewPort)
EXCITATION WAVELENGTH	785 nm
IMMERSION TUBE DIMENSIONS	12 mm diameter, 215 mm wetted length
FITTINGS	Industry standard PG13.5
WORKING DISTANCE (FOCAL OFFSET)	Factory-configured for either 0 mm (for turbid samples) or 2 mm (for transparent samples)
SURFACE FINISH	Ra 0.8 µm (32 µinch)
AUTOCLAVE CYCLES	Up to 1000









