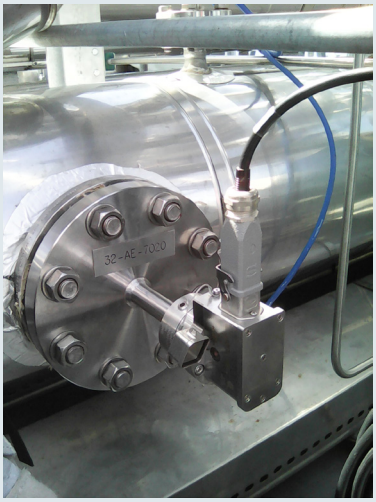
Raman Rxn-41

Cryogenic liquid probe

Rxn-41 fiber optic probe

Benefits at a glance

- *In situ* measurement – no sample transport required
- Compatibility with Endress+Hauser Raman analyzers
- Measures LNG as a cryogenic liquid – eliminates the vaporizer
- Reduces Btu uncertainty by up to 10 times
- Industry standard installation options



Rxn-41 probe for cryogenic liquids

This specially designed Raman Rxn-41 probe offers a unique configuration for the analysis of cryogenic liquid applications. Combined with Endress+Hauser Raman analyzers, the Rxn-41 probe provides a powerful tool for the *in situ* analysis of cryogenic liquids such as liquefied natural gas (LNG) without needing to vaporize the sample.

The modular design of the Rxn-41 allows the sampling point to be customized for each customer's facility, allowing for flexible integration via direct flange mounting onto transfer pipes or integration into a slip-stream or fast loop for easier maintenance. This versatility may reduce maintenance cost, eliminate a potential failure mechanism, improve process safety, and reduce initial installation cost.

All Rxn-41 probes utilize a single fiber for excitation and another for collection. This provides a robust interface, sampling versatility, and reduced cost for long runs of fiber when compared to multi-fiber collection designs. Single collection fibers also permit simultaneous multi-channel operation on a single analyzer. Standard telecommunication fiber diameters (<100 microns) are used to increase mechanical stability and minimize the cost per meter for deployment over long-cable runs.

The Rxn-41 probe has been designed and is manufactured to meet Category I pressure equipment safety standards as defined by the Pressure Equipment Directive (PED). Rxn-41 probes are supplied with an all stainless steel right-angle connector design for installations where marine rating compatibility is required. Rxn-41 probe flanges and insertion lengths are constructed to match customer pipe interface and isolation valve formats.

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Advantages

- Compact, easy to install
- Permanent alignment probe, reproducible sampling
- Direct process measurement, no stream conditioning required
- Can be immersed into cryogenic liquids, down to -196 °C with no vaporizing needed
- Compatible with installation in classified environments
- ATEX, CSA, and IECEx hazardous area certification available

Versatile

- Compatible with installation in various process environments, including top insertion, side insertion, and sample loop
- Flange installation – flange specified at purchase to match customer mating process flange
- Compatible with Endress+Hauser Raman analyzers
- Can be installed up to 500 meters away from the analyzer base unit

Specification

Wetted materials	Metal: Hybrid metal combination (316L stainless steel and C276 alloy); window: high purity sapphire
Laser wavelength	532 nm, 785 nm
Spectral coverage	150-3425 cm^{-1} (Raman Rxn5 analyzer with 532 nm or Raman Rxn4 analyzer with 785 nm)
Laser power	
Maximum laser power	<499 mW into probe head
Sample interface	
Pressure	Hybrid metal combination: 87.5 barg (1270 psig)
Temperature (probe head)	-196 to 70 °C (-320.8 to 158 °F)
Temperature (fiber cable)	-40 to 70 °C; temperature ramp: ≤30 °C/min
Mount	Direct flange
Probe diameter	1 inch (25.4 mm)
Fiber optic cable	
Design	PVC jacketed, proprietary construction, conduit and tray rated
Connections	Industrial hybrid (electro-optical) integrated connector (IP67)
Length	Up to 250 m (532 nm) or 500 m (785 nm); custom lengths available upon request
Minimum bend radius	6 inch (152.4 mm)
Hazardous area certification	
ATEX	CE Ex II 2/1 G Ex ia op is IIA or IIB or IIB+H2 or IIC T3 or T4 or T6 Ga
CSA	Ex ia op is IIA or IIB or IIB + H2 or IIC T3 or T4 or T6 Ga Class I, Zone 0 AEx ia op is IIA or IIB or IIB + H2 or IIC T3 or T4 or T6 Ga Class I, Division 1, Groups A, B, C, D T3/T4/T6
IECEx	Ex ia op is IIA or IIB or IIB + H2 or IIC T3 or T4 or T6 Ga IECEx ITS 14.0015X

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