



Safe Installation and Use of the NanoRam[®] Immersion Probe

Description: NanoRam Immersion Probe - 12 inch length; Immersion Probe Disposable Protective Sleeve

Model Number: NR2-IMP; NR2-IMPS

Part Number: 840000347; 840000398

Safety Precautions:

The NanoRam Immersion Probe (NR2-IMP) is an accessory designed to be used with the NanoRam Handheld Raman Spectrometer. Disposable protective sleeves can also be purchased for use with the Immersion Probe (NR2-IMPS)

The installation and operation of this Immersion probe accessory requires proper training of the users to follow all safety precautions. Failure to strictly follow these procedures may result in hazardous situations which will be the sole responsibility of the user.

The Immersion Probe accessory requires that the lensed shaft be removed from the NanoRam unit and replaced with the immersion probe. The NanoRam must be powered down when the lensed shaft is removed. The NanoRam must never be powered on without the lensed shaft or a fully installed accessory that uses a lens-less shaft. This constitutes improper use of the unit.

Note: The Nominal Ocular Hazard Distance (NOHD) from the lens-less aperture on a NanoRam without any aperture is 12 meters. When the lensed shaft or Immersion probe is installed, the NOHD is 30 cm or less.

The Immersion Probe is manufactured from 316 SS, and can be cleaned between use. It has Kalrez[®] O-rings and a quartz window. An optional disposable probe sleeve is available for use in conjunction with the Immersion Probe. The probe sleeve is made from Polyethylene Terephthalate Copolymer (PETG), and is designed for single use. Users may refer to the Chemical Compatibility Chart in Appendix A for guidance on the chemical resistance of the probe assembly with/without sleeve. Users should consult the compatibility of their materials with the probe and sleeve before use, and should limit exposure of the probe for any extended periods of time, especially at elevated temperatures. The chart is provided as a guide and for situations



where chemical resistance may be of concern, it is recommended that users conduct testing with the specific materials under actual use conditions.

It is strongly suggested that the probe sleeve only be used once. Due to the differences in chemical compatibility, it is also recommended that the user conduct chemical resistance testing of the sleeve depending on application.

Installation Instructions:

1. Users are recommended to wear the Laser Safety goggles supplied with the NanoRam while installing the Immersion Probe. The safety precautions as given in the NanoRam User Manual should always be followed when operating the system.
2. Completely power down the NanoRam unit before installation of the immersion probe. The NanoRam must be turned off to avoid the possibility of the laser being turned on when the lensed shaft is removed as the standard lensed shaft must be removed from the NanoRam in order to install the Immersion Probe
3. Remove any adaptor on the NanoRam by pulling it off.





4. Remove the standard lensed shaft by unthreading it (turn counter-clockwise) from the NanoRam measurement port.



5. Install the immersion probe by threading the matching end all the way into the measurement port. Screw in the immersion probe clockwise until it is snugly in place. Hand tighten only!





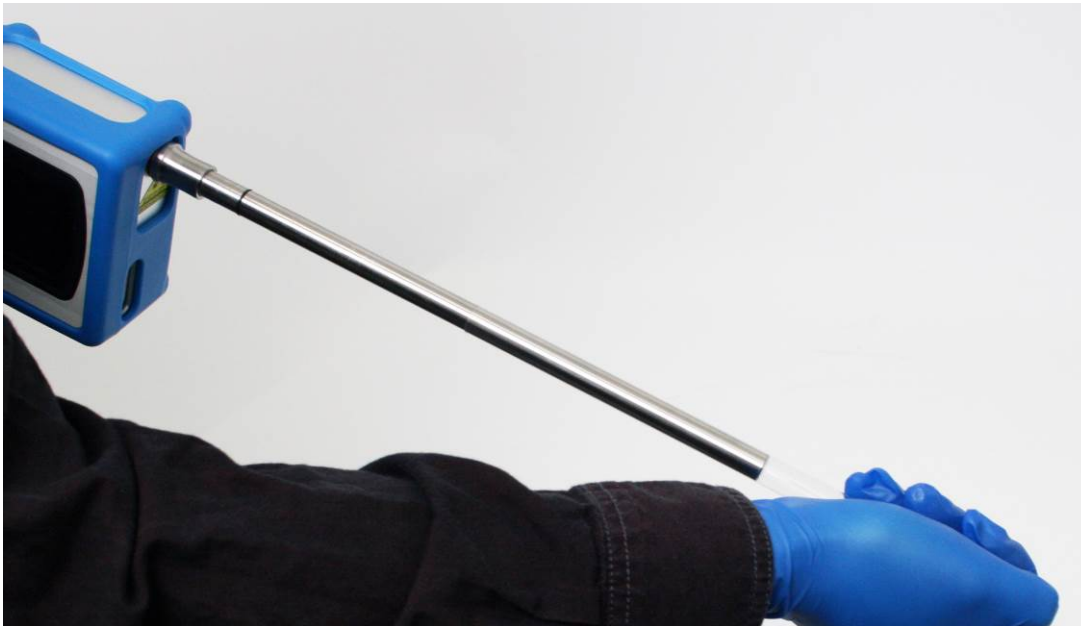
6. Slide protective cap down all the way into the measurement port with the locating notch aligned with the location pin on the NanoRam port.





The Following Steps are for the Use of the optional Immersion Probe Sleeves

7. Insert the NanoRam Immersion Probe into the sleeve



8. Push the NanoRam Immersion Probe to the end of the sleeve. At the very end, the sleeve should cover the rubber O-ring on the instrument end of the immersion probe. The probe tip should sit flush against the probe sleeve's flat sealed end.





9. Insert immersion probe into the sample for identification measurement.
10. After each use, remove and discard the sleeve. Pinch the sleeve near the O-ring and slide the sleeve off of the probe. Exercise caution to not allow the chemicals to touch the skin. Dispose of the used sleeve following site safety guidelines.



Use of the NanoRam® Immersion Probe:

The immersion probe is designed for contact measurements with solids and liquids. It is the responsibility of the user to ensure material compatibility of their samples with the immersion probe.

- The immersion probe should be cleaned of any sample before introducing it to a new sample. The probe can be cleaned by wiping with a soft cloth with isopropyl alcohol. An immersion probe sleeve can be used to minimize the need for probe cleaning between measurements.
- The immersion probe sleeve is designed to be used in conjunction with the Immersion probe for the NanoRam. This is a disposable one time use only protective sleeve that minimizes the need for probe cleaning between measurements. The sleeve itself is made from Polyethylene Terephthalate Copolymer (PETG), and should only be used with chemicals within a limited time frame.



Appendix A: Chemical Compatibility Chart

Compatibility Guide			
A = Suitable for use			
X = Not Recommended			
U = Unknown or Not Applicable			
F = Some effect			
	Immersion Probe without Sleeve	Immersion Probe with Sleeve	
		20°C	50°C
Acetic Acid	A	X	X
Acetone	A	X	X
Alcohols: Isobutyl	A	U	U
Alcohols: Isopropyl	A	U	U
Alcohols: Methyl	A	A	F
Ammonia, Anhydrous	A	U	U
Ammonia, Liquid	A	U	U
Ammonium Hydroxide	A	X	X
Amines	F	U	U
Benzene, pure	F	X	X
Benzol, pure	U	X	X
Benzyl Alcohol, pure	U	X	X
Boric Acid	A	X	X
Butyl Acetate	A	U	U
Calcium Chloride	A	U	U
Calcium Hypochlorite	A	U	U
Carbon Tetrachloride (wet)	A	X	X
Carbonic Acid	A	U	U
Caustic Potash, 50%, concentrated	U	X	X
Caustic Soda, 1%	U	A	U
Caustic Soda, 50%, concentrated	U	X	X
Cedarwood Oil, pure	U	X	X
Chlorine Water	X	U	U
Chlorine, Anhydrous Liquid	X	U	U
Chromic Acid, 10%, 20%	U	A	U
Citric Acid, 10%	F	A	U
Citric Acid, 1M	F	A	F
Copper Sulfate, pure	U	A	U



Cyclohexane, pure	U	A	X
Cyclohexanone, pure	F	X	X
Detergents	A	U	U
Diacetone, pure	U	X	X
Diesel Fuel	A	U	U
Diethyl ether, pure	A	A	U
Dimethyl Formamide, pure	A	X	X
Dimethylsulfoxide (DMSO), pure	U	X	X
Ether, pure	U	A	U
Ethyl Acetate, pure	U	X	X
Ethyl Alcohol, (ethanol) pure, 40%, 96%	A	F	X
Ethyl Benzene, pure	A	A	U
Ethylene Chloride, pure	U	X	X
Ethylene Glycol, pure	A	A	U
Ethylene Glycol	A	F	X
Ethylene Dichloride	A	U	U
Ethylene/ Propylene Oxide	X	A	F
Ethylene Oxide, gas, pure	U	A	F
Fatty Acids saturated/unsaturated, pure	U	A	F
Ferric Chloride	X	U	U
Fuel Oils (#1 and #2)	A	U	U
Gasoline, Unleaded	A	A	U
Glutaraldehyde, pure	U	A	U
Heptane	A	U	U
Hexane, pure	U	A	U
Hydraulic Oil (Petro)	A	U	U
Hydraulic Oil (Synthetic)	A	U	U
Hydrochloric Acid 5%	U	A	U
Hydrochloric Acid 20%	X	A	U
Hydrochloric Acid 37%	X	A	U
Hydrochloric Acid 100%	X	U	U
Hydrofluoric Acid 4%	X	F	X
Hydrofluoric Acid 48%	X	X	X
Hydrofluoric Acid 20%	X	U	U
Hydrofluoric Acid 100%	X	U	U
Hydrogen Peroxide 10%	A	A	U
Hydrogen Peroxide 30%	A	A	U
Hydrogen Peroxide 100%	A	U	U



Isopropyl Acetate	A	U	U
Kerosene	A	A	U
Ketones	A	U	U
Lacquer Thinners	A	X	X
Lacquers	A	U	U
Lactic Acid, 3%	U	F	X
Lactic Acid, 85%	U	X	X
Lye: NaOH Sodium Hydroxide	X	U	U
Magnesium Hydroxide	A	U	U
Mercuric Chloride, pure	X	X	X
Methanol (Methyl Alcohol)	A	A	U
Methoxyethyl Oleate, pure	U	A	U
Methyl Acetate, pure	A	X	X
Methyl Ethyl Ketone (MEK)	A	A	U
Methyl Isobutyl ketone, pure (MIBK)	F	X	X
Methyl Propyl Ketone, pure	U	X	X
Methylene Chloride, pure	F	X	X
Methyl-t-Butyl Ether, pure	U	X	X
Mineral Oil	A	A	X
Mineral Spirits	U	A	U
Motor Oil	A	U	U
Nitrating Acid (>15% H2SO4)	X	U	U
Nitric Acid (5-10%)	A	A	U
Nitric Acid (50%)	A	A	U
Nitric Acid (Concentrated)	A	X	X
Nitrobenzene, pure	A	X	X
Nitromethane, pure	A	X	X
o-Dichlorobenzene, pure	U	X	X
Oils: Fuel, Mineral and Hydraulic	A	U	U
Oxidizers, Strong	F	U	U
p-Dichlorobenzene, pure	U	X	X
Phenol, 50%, 100%, Crystal, Liquid	U	X	X
Phosphoric Acid	X	U	U
Potassium Chloride	A	U	U
Potassium Hydroxide (Caustic Potash)	X	X	X
Potassium Hypochlorite	A	U	U
Propane (Liquefied)	A	U	U
Propylene Glycol	A	U	U



Silicone Oil, pure	A	X	X
Soap Solutions	A	U	U
Sodium Bicarbonate	A	U	U
Sodium Carbonate, pure	A	A	U
Sodium Chloride	A	U	U
Sodium Hydroxide (20%)	A	U	U
Sodium Hydroxide (50%)	A	X	X
Sodium Hydroxide (80%)	A	X	X
Sodium Hypochlorite (<20%)	X	A	U
Sodium Hypochlorite (100%)	X	U	U
Sulfuric Acid (<10%)	A	A	U
Sulfuric Acid (75-100%)	X	X	X
Toluene (Toluol)	A	X	X
Tris Buffer Solution, PH 11	U	F	X
Tris Buffer Solution, PH 7.0	U	A	A
Trichloroethylene	A	U	U
Turpentine	A	A	U
Vinegar	A	U	U
Water	A	U	U
Water, Steam/Hot	F	U	U
Xylene	A	U	U

For more detailed information please refer to manufacturer's chemical compatibility charts for PETG copolymer, Dupont's Kalrez[®] and 316 SS.