

VALVED NMR SAMPLE TUBE OPERATING INSTRUCTIONS

Intermediate Pressure Valved NMR Sample Tubes

Norell, Inc. is pleased to announce the introduction of a new NMR sample tube product line, featuring a glass/PTFE pressure valve permanently joined to your choice of a wide selection of available NMR sample tubes.

**This valve incorporates an advanced seal design that is superior to alternative valves currently available from other manufacturers. A fluoroelastomer o-ring imparts resilience and a high degree of chemical resistance. A PTFE sheath, forming the primary seal, completely covers the fluoroelastomer o-ring, creating the ultimate barrier against aggressive, reactive substances while providing a totally inert surface.*

These pressure tubes facilitate experiments requiring conditions such as pressurized inert atmosphere blanketing, addition of reactive gaseous reagents under pressure, containment of low boiling point solvents or samples at elevated temperatures, and so on.

We recommend that the maximum operating pressure should be limited to 600 kPa (6 bar, 87 psi) when using a thin wall pressure tube, up to 1200 kPa (12 bar, 175 psi) if using a heavy wall pressure tube. (Please see accompanying table for complete details).

Cautionary Note: Glass can be an unpredictable material, especially if it has been scratched or

subjected to rough handling. As such, EXTREME CAUTION should be exercised when using glass at elevated pressure or temperature, because it has the potential to fail suddenly and catastrophically. Therefore, anyone attempting to use glass components, such as NMR sample tubes at elevated or reduced pressures and/or temperatures should ensure that adequate personal protection, such as explosion shields, full face coverage shields, heavy gloves, etc., are employed to protect oneself against flying glass fragments if a glass component fails explosively.

The valve accepts 1/16 inch O.D. PTFE tubing, a common laboratory instrumentation pressure line. The required components, a 1/16 inch ferrule and matching compression nut, are included with the valve assembly. The valve easily and quickly connects and disconnects by means of the single compression nut.

All components of the valved pressure tube consist of either glass or polymer, as described in more detail below, allowing safe use in high magnetic field environments.

The sample tube portion, manufactured from ASTM Type 1 Class A glass (Pyrex[®] or an equivalent) tolerates a maximum temperature of about 230°C, and resists sudden temperature changes, or thermal shock, very well without breakage, but sudden temperature changes should be restricted to a range of 120°C or less.

VALVED NMR SAMPLE TUBE OPERATING INSTRUCTIONS

Intermediate Pressure Valved NMR Sample Tubes (Cont.)

The pressure valve portion possesses superior chemical and corrosion resistance. The glass shell, also formed from ASTM Type 1 Class A glass, matches that of the sample tube, thereby minimizing breakage of the joint caused by internal strain or thermal shock.

The valve stem, composed of PTFE fluoropolymer (polytetrafluoroethylene) is completely inert and resists virtually all solvents, reactive chemicals and reagents, and deterioration induced by corrosive conditions.

NOW AVAILABLE FOR AUTOMATED SYSTEMS

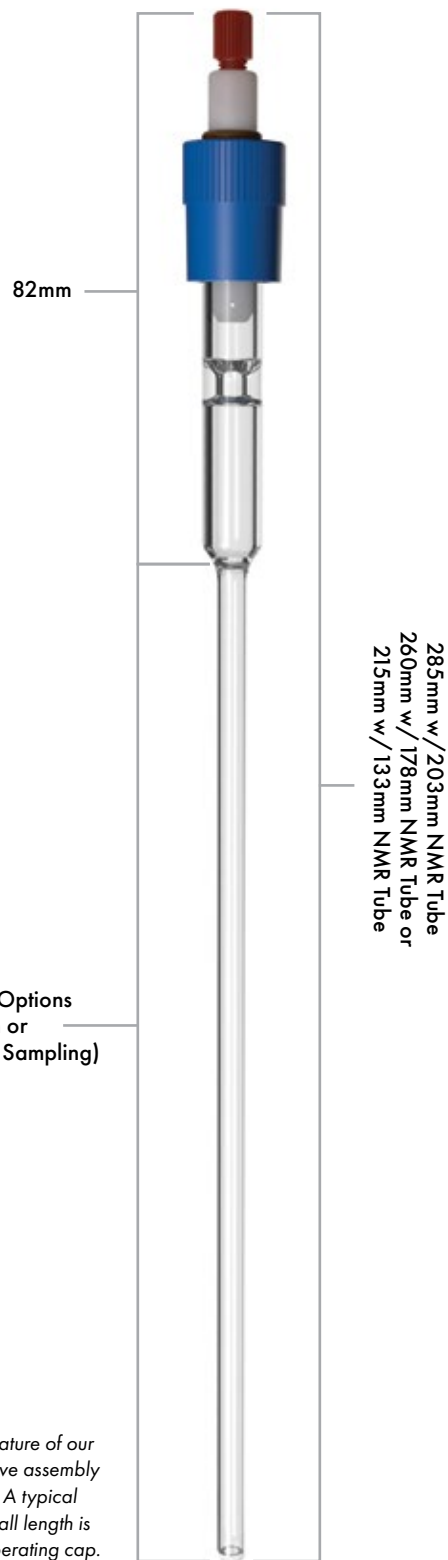
Custom NMR sample tube lengths for our Intermediate Pressure Valve now available for automated sampling systems.

The ferrule, or sealing nut (included with the valve), used to seal the pressure supply tubing to the valve, also displays excellent corrosion and chemical resistance. Constructed from ETFE (ethylene-tetrafluoroethylene) fluoropolymer, this material combines excellent mechanical properties, such as toughness, high impact strength, long flex life, medium stiffness and good abrasion resistance with nearly the same level of chemical resistance shown by the fully fluorinated polymers such as PTFE.

The compression nut (also included with the valve) is machined from PEEK (polyether ether ketone). This material is an advanced, high-performance polymer having excellent mechanical properties, ensuring long life and reliable performance throughout numerous connecting and disconnecting operations. It is a very hard material, with a very high degree of tensile strength, stiffness and dimensional stability, along with excellent chemical resistance.

3 NMR Tube Length Options
203mm, 178mm or
133mm (for Automated Sampling)

Due to the hand crafted nature of our pressure valves overall valve assembly length can vary slightly. A typical variance is 1-2mm. Overall length is based on a fully seated operating cap.



VALVED NMR SAMPLE TUBE OPERATING INSTRUCTIONS

Intermediate Pressure Valved NMR Sample Tubes (Cont.)

5mm Intermediate Pressure Valved NMR Tubes

Item No.	MHz	Tube Length (mm)	I.D. mm (Volume µL/cm)	Tube Wall	Recommended Maximum Operating Pressure		
					kPa	bar	psi
S-5-500-IPV-7	500	178	4.20 (138)	thin	600	6	87
S-5-500-MW-IPV-7	500	178	3.43 (92)	medium	900	9	130
S-5-500-HW-IPV-7	500	178	2.20 (38)	heavy	1200	12	175
S-5-500-IPV-8	500	203	4.20 (138)	thin	600	6	87
S-5-500-MW-IPV-8	500	203	3.43 (92)	medium	900	9	130
S-5-500-HW-IPV-8	500	203	2.20 (38)	heavy	1200	12	175
S-5-600-IPV-7	600	178	4.20 (138)	thin	600	6	87
S-5-600-MW-IPV-7	600	178	3.43 (92)	medium	900	9	130
S-5-600-HW-IPV-7	600	178	2.20 (38)	heavy	1200	12	175
S-5-600-IPV-8	600	203	4.20 (138)	thin	600	6	87
S-5-600-MW-IPV-8	600	203	3.43 (92)	medium	900	9	130
S-5-600-HW-IPV-8	600	203	2.20 (38)	heavy	1200	12	175
Valved NMR for Automated Sampling							
S-5-500-IPV-AS	500	133	4.20 (138)	thin	600	6	87
S-5-600-IPV-AS	600	133	4.20 (138)	thin	600	6	87

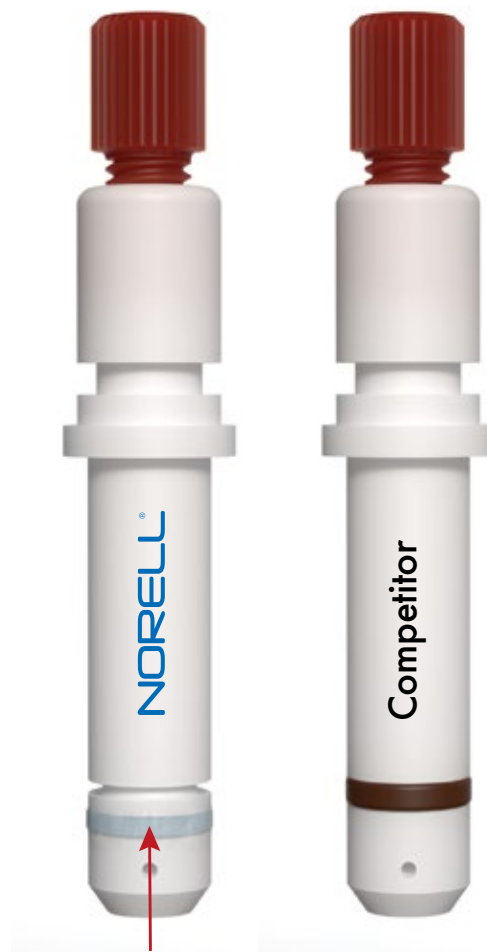
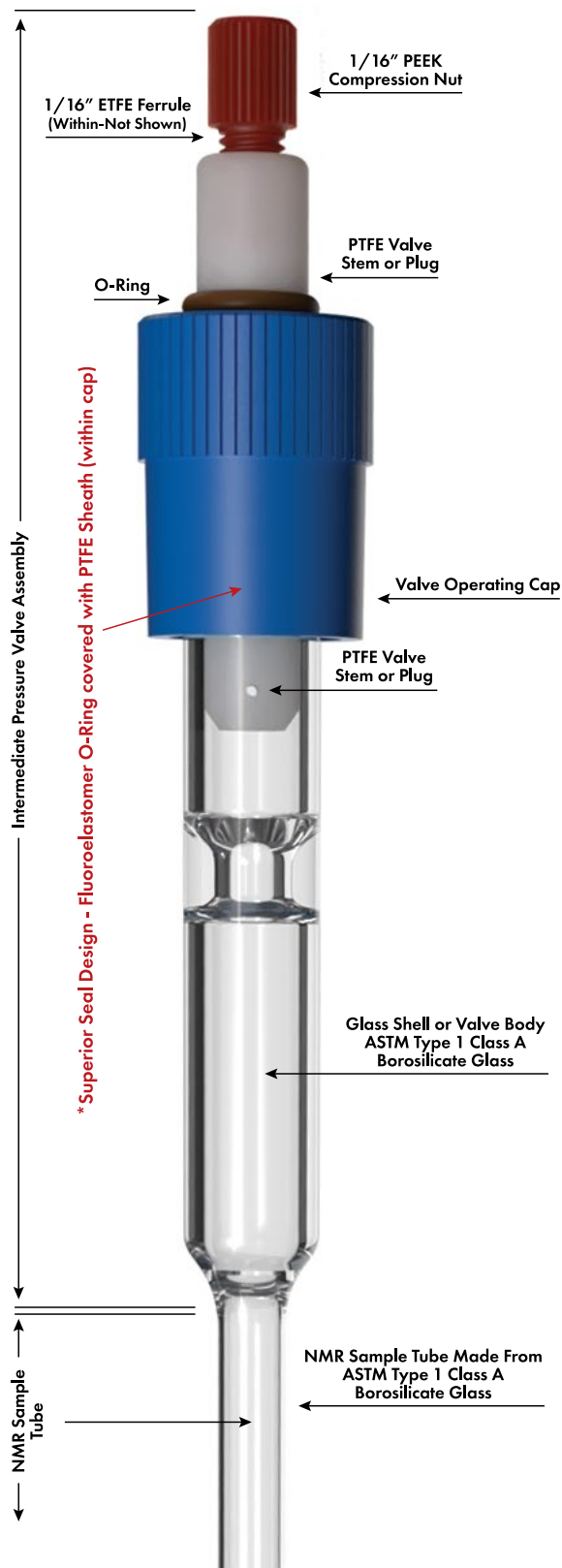
3mm Intermediate Pressure Valved NMR Tubes

Item No.	MHz	Tube Length (mm)	I.D. mm (Volume µL/cm)	Tube Wall	Recommended Maximum Operating Pressure		
					kPa	bar	psi
S-3-500-IPV-7	500	178	2.41 (46)	thin	860	8.6	125
S-3-500-IPV-8	500	203	2.41 (46)	thin	860	8.6	125
S-3-600-IPV-7	600	178	2.41 (46)	thin	860	8.6	125
S-3-600-IPV-8	600	203	2.41 (46)	thin	860	8.6	125
Valved NMR for Automated Sampling							
S-3-500-IPV-AS	500	133	2.41 (46)	thin	860	8.6	125
S-3-600-IPV-AS	600	133	2.41 (46)	thin	860	8.6	125



VALVED NMR SAMPLE TUBE OPERATING INSTRUCTIONS

Intermediate Pressure Valved NMR Sample Tubes (Cont.)



* Fluoroelastomer
O-Ring covered
with PTFE Sheath

NORELL®

E-MAIL: customerservice@nmrtubes.com

WEBSITE: nmrtubes.com

TO ORDER CALL: 1.828.584.2600 **FAX:** 1.828.584.2604