

# Operating Instructions

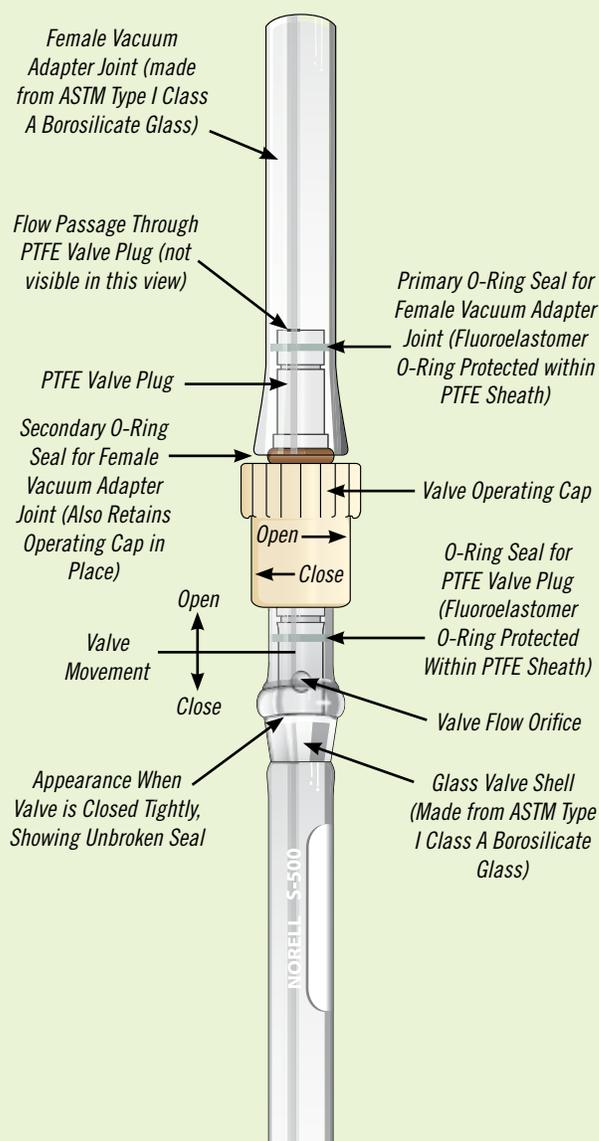
## NORELL® VT VALVED NMR SAMPLE TUBES FOR VACUUM & REDUCED PRESSURE

The VT Valved NMR Sample Tubes are designed principally for negative pressure use, from slightly less than ambient pressure to high vacuum (10–7 kPa or 10–6 torr) using the supplied female vacuum adapter joint.

A glassblower can seal the glass female joint to a glass vacuum manifold for the most reliable, permanent connection, but the female vacuum joint can also be attached to the vacuum source using rubber or other vacuum hose as a simpler alternative.

The VT Valved NMR Sample Tube can also withstand an internally generated positive pressure to 500 kPa (5 bar, 72 psi) when the valve is tightly closed, by, for example, heating the contents of the NMR tube, or from pressure generated internally by a chemical reaction.

However, the female vacuum adapter joint must not be used to apply positive pressure, or be exposed to a positive pressure, because it is held onto the PTFE valve plug by a frictional slip-fit only.



1. Once installed in the vacuum system, the female vacuum adapter joint enables fast and easy connection or disconnection of the VT Valved NMR tube to the vacuum source. To connect, simply push the end of the white PTFE valve plug into the female adapter joint until the flared end of the female joint contacts the lower, secondary o-ring seal, as shown in the adjacent Figure 1.

2. Commence evacuation of the VT Valved NMR tube by turning the Valve Operating Cap counter-clockwise (CCW) to lift the PTFE valve plug from its seated position and open the valve. Gas flow can now proceed from the interior of the VT Valved NMR tube through the open valve seat, into the expanded bulb of the glass valve shell, then into the Valve Flow Orifice at the bottom of the PTFE valve plug to finally be exhausted from the system through the axial flow passage of the PTFE valve plug.

3. Upon evacuation to the desired level, the VT Valved NMR tube can, for example, be used as a “cold finger” trap to collect sample by vacuum distillation, or pre-contained sample may be easily purified through a series of “freeze – pump – thaw” cycles to remove traces of paramagnetic oxygen gas. Very importantly, however, only the NMR tube should be cooled to cryogenic temperatures, because the PTFE valve plug contracts and shortens considerably more than glass, and in some instances may therefore become too short to reach the valve seat and seal tightly.

4. To disconnect the VT Valved NMR tube upon completion of the vacuum work, first ensure that the VT valve is closed tightly, as shown by the white band of contact (Figure 1 at bottom) by turning the Valve Operating Cap fully clockwise (CW). After closing any additional valve(s) as necessary to the vacuum source, the end of the VT Valved NMR tube can be gently pulled free from the female vacuum adapter joint to be taken elsewhere as needed.

5. To disassemble the VT Valved NMR tube for cleaning, turn the Valve Operating Cap counter-clockwise (CCW) until the threads disengage. The white PTFE valve plug can now be carefully removed from the glass valve shell.

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