NORELL® CONSTRICTED NMR SAMPLE TUBES

Description & Instructions for Use

Constricted NMR sample tubes offer a convenient way to permanently seal and protect NMR samples from exposure to air, moisture and other sources of contamination. Constricted NMR tubes also provide a means for long term preservation of samples, by preventing evaporation of volatile solvents or other components from archived samples, as well as maintaining initial concentrations of analytical reference standards used, for example, to check sensitivity, or to calibrate the integral response of NMR instruments for quantitative measurements.

Constricted NMR tubes are designed to be flame sealed to provide ultimate protection to the contained NMR sample, by encasing the sample within a single piece of seamless, all glass tube, with no screw caps, valves or other closures that have an inherent potential to leak.

Constrictions form a convenient starting point for the flame sealing process and, as shown in the accompanying illustration, constrictions placed at 7" (178mm) or 8" (203mm) length from the tube bottom are standard, yielding 7" or 8" long NMR tubes, respectively, when finished, but other, custom lengths are also available on special order.

The 1" (25mm) length of tube above the constriction is standard for all lengths of constricted tubes, but other, custom lengths are available on special order.

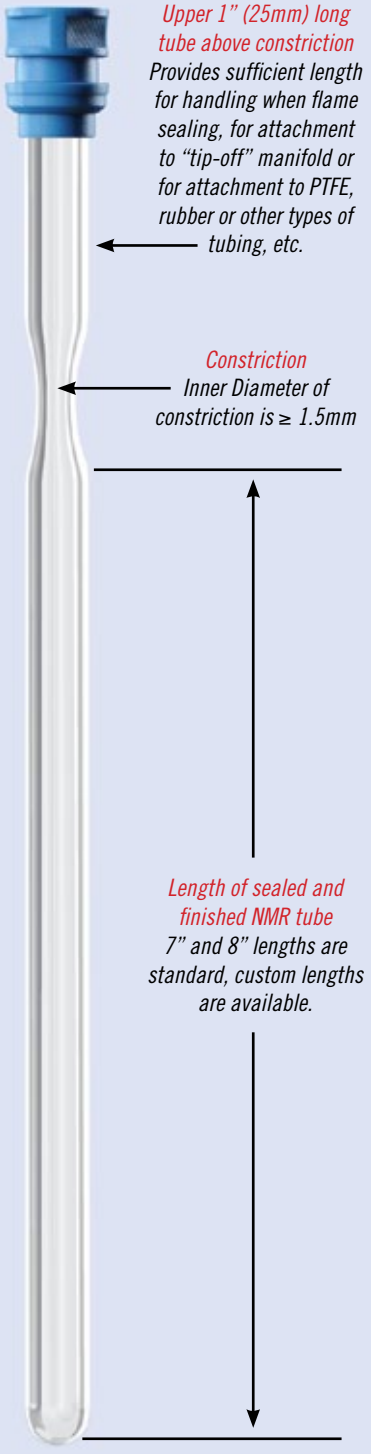
The inner diameter of the constriction is never less than 1.5mm, allowing sample to be added through and below the constriction using a long tip pipette, such as Norell Item No. NP204 (please see Pasteur Pipettes for NMR Tubes from NORELL®) or a PTFE Syringe Tube, also available from Norell as Item No. NDL-PTFE-22X12 (please see PTFE Syringe Tubing from NORELL®).

The basic tool needed to seal a constricted tube consists of a heat source that is hot enough to melt the glass quickly. A glassblower's torch burning an oxygen / fuel mixture (such as natural gas, LPG or propane fuel) is ideal, but a small hand held butane torch with a hot, concentrated flame or even a plumber's torch using a MAPP gas mixture can also work.

Usually, the sample solution must be cooled to prevent volatile organic vapors from contacting the hot glass surface and depositing soot or other decomposition products that hinder the formation of an intact, reliable glass seal. Depending on the particular sample, simple refrigeration may suffice, but immersion in water ice, solid carbon dioxide ("dry ice snow") or possibly even liquid nitrogen may be required.

In the simplest cases, flame sealing can be accomplished by merely rotating the constricted tube in the flame and then, with the aid of forceps, gently twist and pull off the 1" long top part when the constriction has heated sufficiently.

The 1" length of tube above the constriction can also be attached to a vacuum rack through a "tip-off" manifold (or simply through a short length of PTFE, rubber or other suitable vacuum tubing) to allow, for example, air or moisture sensitive compounds to be collected in the constricted NMR tube. After filling with sample, the tube can be flame sealed at the constriction point while still attached to the tip-off manifold or vacuum tubing. Before flame sealing though, any vacuum in the NMR tube can be partially or wholly filled with an inert gas such as argon, or it can be flame sealed under vacuum, but flame sealing under vacuum can be more difficult to do, and may require some practice to master the technique.



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