Chromatography Products

Using Micropacked Columns

By Alan Sensue, Technical Service Specialist

Most analysts are familiar with capillary gas chromatography columns and packed GC columns, but many are not familiar with micropacked columns. Here, we briefly discuss these useful columns, instrument requirements, and applications.

What Are Micropacked Columns?
Micropacked columns are short, narrow bore stainless steel columns packed with diatomaceous earth solid support, porous polymer, molecular sieve, or other particles. Standard Restek micropacked columns are 1 meter or 2 meters long and 0.75mm ID x 0.95mm OD or 1mm ID x 1/16 inch OD. Like most micropacked columns, ours have a larger internal diameter than mega-bore (wide-bore) capillary columns (0.53mm ID) and a smaller outside diameter than traditional packed columns (1/8 inch or 3/16 inch).

As you might suspect from this description, performance characteristics of micropacked columns are intermediate between those of packed columns and those of capillary columns: they offer higher efficiency than traditional packed columns, and higher capacity than wall coated open tubular (WCOT) capillary columns or porous layer open tubular (PLOT) columns. They are inexpensive, very durable, and easy to install and operate.

Instrument Requirements
To use micropacked columns, a high carrier gas head pressure is needed to overcome the large pressure drop created in the narrow, densely packed bore. For helium, typical column head pressures for 1-2 meter micropacked columns range from 30-45psi for 1mm ID columns to 50-65psi for 0.75mm ID columns.

Installation of micropacked columns will vary according to instrument make and model. The injection port nuts in many capillary column injection ports will accommodate 0.95mm OD micropacked columns, but not 1/16 inch OD columns. If the injection port nut will not accommodate the column, you can attach a short piece of 0.53mm ID fused silica tubing to each end of the column, using 1/16 inch compression fitting unions and appropriate ferrules. Alternatively, Restek sells inlet conversion kits which contain appropriate selections of injection port accessories.

For GCs with packed column injection ports, a reducing ferrule or a tube-end reducer fitting, and appropriate ferrules, usually are all that are needed for installing a micropacked column.

Applications
Micropacked columns have a wide range of applications, from analyses of the lightest gases (permanent gases) to simulated column distillation (Sim-Dist). They are especially useful for analyses of gas mixes, including sulfur compounds or light hydrocarbons, in which the use of a packed column is necessary to obtain baseline separations of the gaseous components.

Typically, chromatogram peaks are sharper than from traditional packed columns, and micropacked columns are less likely to be overloaded by concentrated samples than are capillary columns. Micropacked columns do have limitations, however: like packed columns, they do not have the efficiency of capillary columns. Therefore, they typically are not adequate for baseline separations of complex multi-component mixtures. Also like packed columns, they require a carrier gas flow rate that is higher than most mass spectrometer pumping systems can accept.

When choosing a micropacked column, consider that, as with any column, internal diameter affects column capacity. If you intend to use a sensitive detector, such as a helium ionization detector (HID), flame ionization detector (FID), nitrogen-phosphorus detector (NPD), or flame photometric detector (FPD), typically you can use a smaller ID column – either a conventional capillary column or a micropacked column. If you intend to use a thermal conductivity detector (TCD), however, consider using a 1/8 inch OD packed column, rather than either a capillary column or a micropacked column.

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For a complete listing of micropacked columns and installation kits offered by Restek, please visit our website, www.restek.com and enter "micropacked columns" in the search feature. For typical applications, see web page: www.restek.com/micropacked

You also will find these items in the Restek Chromatography Products Catalog. For additional information concerning micropacked columns, please contact Restek Technical Service at **800-356-1688, ext 4.**

Custom Micropacked Columns

To order:
Contact your Restek representative and specify the following:
1) dimensions (length, OD, ID, and tubing material)
2) packing description (percent coating and phase, support mesh size, and treatment)
3) installation kit

Ordering Example:
(2m x 1/16" OD x 1.00mm ID) (Silcosteel® tubing) (5%) (Carbowax® 20M) (CarboBlack™ B) (80/120) (installation kit for valve applications, cat. #21065)

To Obtain a Quote:
See our custom products web page, or contact us at csreps@restek.com or by phone at 800-356-1688, ext. 3.

Maximum length for custom micropacked columns is 25ft./8m.