



Capillary Column Tubing and Column Connectors



**Guard
Columns . . .**

**Fused Silica
MXT**

**Polar
Base
Deactivated**

**Unique to
Restek . . .**

**Hydroguard
Tubing**

**Vu-Union
"Y" Vu-Union
Press-tights**

**MXT
Connectors**

**Guard Columns
Transfer Lines
Polar Deactivated Fused Silica Guard Columns
Base Deactivated Fused Silica Guard
Columns**

**Hydroguard Tubing & Transfer Lines
Vu-Union Connectors
"Y" Vu-Union Connectors
Press-Tight Connectors
MXT Connectors**

**Restek
Australian
Distributors**

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Guard Column Overview

The use of guard columns to protect the analytical column from highly retentive compounds and particles has been commonplace for many years in HPLC. Their use as safeguards is well understood. It has only been in the past few years that the benefits of guard columns have been associated with capillary gas chromatography. Although guard columns prolong the life of capillary columns and protect them from sample contamination, they are not widely used in many laboratories. Understanding the basics of guard columns helps to dispel confusion and apprehension about their use.

What is a guard column?

A guard column for capillary chromatography is a short length of deactivated, uncoated fused silica or MXT tubing that is placed between the injection port and the analytical column. Figure 1 shows a diagram of a guard column connected to an analytical column.

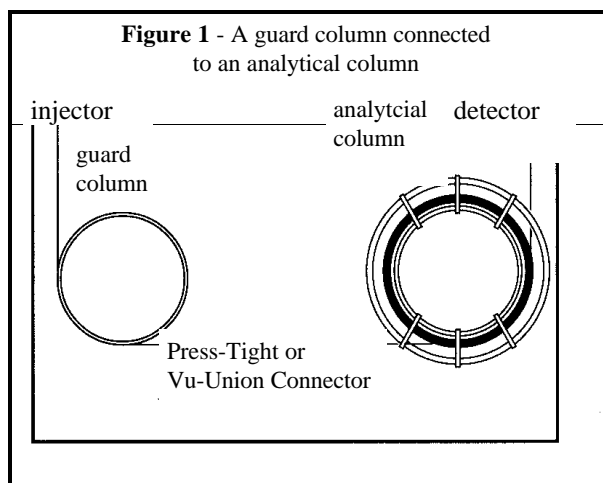
Guard Column Advantages:**Guard Columns Prolong Column Lifetime**

A guard column protects and prolongs the lifetime of an analytical column in several ways.

It traps nonvolatile residues and prevents them from collecting at the head of the analytical column. Packed inlets only remove a portion of the residue. These nonvolatile residues may be very high molecular weight organic compounds, inorganic salts, or particulate materials. If these contaminants enter the analytical column, they can cause adsorption of active compounds, loss of resolution, and poor peak symmetry. When this contamination begins to affect sample analysis, a small section of the analytical column must be removed to restore proper performance. Each time a section of the analytical column is removed, retention times change, some resolution is lost, and column length is decreased, eventually resulting in a useless column. By removing contaminated loops from the guard column, the inertness and length of the analytical column remains intact.

Guard Columns Decrease Maintenance Requirements

The amount of time the sample spends in the guard column is minimized since there is no stationary phase. This reduces the interaction between sample components and contamination from nonvolatile residue (Figure 2). Therefore, guard columns allow more injections to be made before contamination interferes with analytical results.





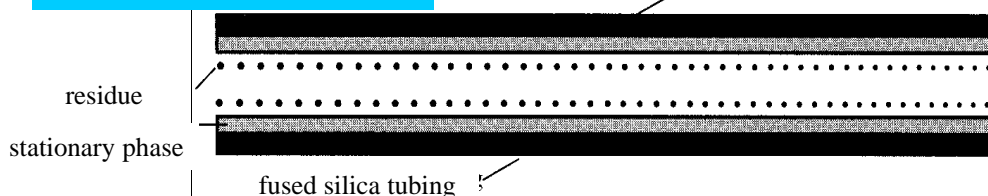
Guard Columns

Guard Columns Decrease Maintenance Requirements The amount of time the sample spends in the guard column is minimized since there is no stationary phase. This reduces the interaction between sample components and contamination from nonvolatile residue (Figure 2). Therefore, guard columns allow more injections to be made before contamination interferes with analytical results.

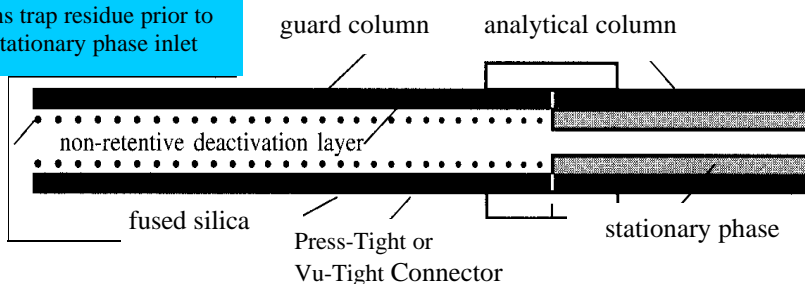
- Figure 2 -

When contamination is deposited onto a stationary phase, the sample must partition in and out of this contaminated region and adsorptive effects are more likely to occur. Guard columns collect dirt but do not retain the sample since there is no stationary phase. The interaction between the residue and subsequent sample injections is minimal and more injections can be performed before maintenance is required

Sample residue mixes with the stationary phase at the column inlet



Guard columns trap residue prior to reaching the stationary phase inlet



♦ What type of guard column should be used?

Wettability is when the sample spreads out evenly on the guard column surface. It is important when guard tubing is being used to focus sample bands. In these cases, the standard IP (intermediately polar) surface should be chosen. The IP surface contains a high percentage of phenyl groups, which allow common solvents (methylene chloride, isooctane, and toluene) to easily wet and create a uniform film on the tubing surface. More polar solvents (methanol) will also wet the IP surface if they are co-solvated with methylene chloride or isooctane. If methanol or water is the primary solvent, then polar surfaces, such as our polar-deactivated tubing, should be used. The polar deactivated surface is not resistant to harsh water vaporization that occurs when water in the liquid state is injected onto the tubing surface and rapidly vaporized (such as steam cleaning). Hydroguard™ tubing is preferred for these situations. However, the Hydroguard™ surface is not easily wetted by polar solvents and will cause bead formation or repulsion if samples pass through the tubing at temperatures 20°C less than the boiling point. Since most transfer lines are heated, no detrimental chromatographic effects occur.

In addition to inner surfaces, different tubing materials are also available. While fused silica is the most common, MXT (Silcosteel) tubing is available for harsh applications. Use MXT guard tubing if it will be subjected to mechanical stress or thermal shock. If the guard tubing is used as a transfer line from a purge & trap instrument to an analytical column, then MXT tubing is the safest material to use because it will not break even after repeated use.

Cold trapping is another important application for MXT guard tubing.



■ Guard Columns

- Increase column lifetime.
- Obtain more injections before residue degrades column performance.
- Prevent peak splitting during splitless analysis.
- Protect expensive analytical columns.
- Prevent damage from harmful materials.
- Improve wettability for the sample.

The life expectancy of a capillary column is greatly increased by using a 5-meter, deactivated uncoated fused silica or MXT guard column



Each guard column/transfer line is pretested with the Grob mix to ensure high inertness

■ Transfer Lines

- Use with GC/MS, ITD, MSD, FTIR, purge & trap, headspace analyzers, and other instruments.
- Ideal for open split interfaces.
- Throttle mass spectrometer flow rates.
- Change columns without venting the source.
- Prevent negative pressures.

Transfer lines provide inert flow paths from a sample introduction device, such as a purge & trap system or a headspace analyzer, to the inlet of an analytical column. They can also be used to interface a mass spectrometer vacuum system directly to a capillary column. This eliminates the time-consuming chore of properly positioning the end of the column every time a new column is installed. The restriction created by installing a narrow-diameter (0.15mm ID) transfer line into the mass spectrometer source allows analytical columns to be changed without venting the vacuum system. The narrow-ID tubing also prevents below-ambient pressures from being formed at the outlet of wide-bore columns, which decreases separation efficiency.

■ Added Benefits of Guard Columns and Transfer Lines:

- Make the connection once and break off 1/2-meter sections as contamination occurs.
- Includes Grob test chromatogram for each tubing lot.
- Phenyl methyl deactivated surface provides optimum wettability for both polar and nonpolar compounds.

MXT guard columns are available in any length.

MXT Guard Columns & Transfer Lines (intermediate polarity deactivation)

Nominal ID	5-meter length		10-meter length
	Nominal OD	each	each
0.28mm	0.53 +- 0.025mm	70044	70044-600
0.53mm	0.74 +- 0.025mm	70045	70045-600

■ MAX Needle Files

Use the MXT Needle File to cut MXT columns and tubing. cat.# 21601, /2-pk.

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Fused Silica Guard Columns & Transfer Lines (intermediate polarity deactivation)

Nominal ID	Nominal OD	1-meter length	5-meter length
0.025mm	0.363 +- 0.012mm	10097	
0.05mm	0.363 +- 0.012mm	10098	10040
0.075mm	0.363 +- 0.012mm	10099	
0.10mm	0.363 +- 0.012mm	10100	10041
0.15mm	0.363 +- 0.012mm	10101	10042
0.18mm	0.34 +- 0.01mm	10102	10046
0.25mm	0.37 +- 0.04mm		10043
0.32mm	0.45 +- 0.04mm		10044
0.53mm	0.69 +- 0.05mm		10045

Nominal ID	Nominal OD	10-meter length	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10049	10012	10013
0.32mm	0.45 +- 0.04mm	10048	10022	10023
0.53mm	0.69 +- 0.05mm	10047	10032	10033

5m length Fused Silica Guard Columns & Transfer Line 6-pks

Nominal ID	cat.#
0.05mm	10040-600
0.25mm	10043-600
0.32mm	10044-600
0.53mm	10045-600

10m length Fused Silica Guard Columns & Transfer Line 6-pks

Nominal ID	cat.#
0.25mm	10049-600

Polar Deactivated Fused Silica Guard Columns

- Provides optimum wettability for polar compounds.
- Minimizes peak splitting when using polar solvents such as methanol and water.
- Polyethylene glycol deactivation layer.
- Compatible with Stabilwax, Rtx-225 and Rtx-2330 capillary columns.

Fused Silica Guard Columns & Transfer Lines (polar polyethylene glycol deactivation)

Nominal ID	Nominal OD	5-meter length	10-meter length	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10065	10068	10014	10015
0.32mm	0.45 +- 0.04mm	10066	10069	10024	10025
0.53mm	0.69 +- 0.05mm	10067	10070	10034	10035

■ Base Deactivated Fused Silica Guard Columns

- Provides excellent inertness for the analysis of basic compounds.
- Recommended for use with Rtx@-5 Amine and Stabilwax--DB capillary columns.
- Tested with basic amine test
- Batch test chromatogram included

Fused Silica Guard Columns (base deactivated)		
Nominal ID	Nominal OD	5-meter length
0.25mm	0.37 +- 0.04mm	10000
0.32mm	0.45 +- 0.04mm	10001
0.53mm	0.69 +- 0.05mm	10002

for use with
Rtx-5 Amine columns

5m length Baes Deactivated Fused Silica Guard Columns 6-pks

Nominal ID	cat.#
0.25mm	10000-600

Chemists using guard columns for the analysis of basic compounds frequently experience peak tailing and low recovery. This problem occurs because the deactivated surface of the guard column can be adsorptive to basic compounds. Restek offers base-deactivated guard columns for completely inert, basic pathways for basic compound analysis.

**Not tested with the Grob mix because a high pressure drop.*

***Recommendation: Cut 60m guard columns into shorter lengths. Using full length may cause peak distortion. +30 and 60-meter lengths are banded in 5-meter sections.*

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■ **Hydroguard Water-Resistant Guard Tubing/Transfer Lines**

When transfer lines from purge & traps, air monitoring equipment, or other instruments carry condensed water vapor, the deactivated tubing of a column quickly becomes active because of the creation of free silanol groups. These silanol groups subsequently cause adsorption of active oxygenated compounds such as alcohols and diols.

Restek's chemists have addressed this concern and found a solution, our Hydroguard™ deactivation process.

By using a unique deactivation chemistry, a high-density surface is created that is not readily attacked after an aggressive hydrolysis treatment. The high-density surface coverage effectively prevents water vapor from reaching the fused silica surface beneath the Hydroguard deactivation layer.

Analysts using guard tubing or transfer line tubing that will be exposed to condensed water vapors should use Hydroguard™ tubing and transfer lines. For those analysts injecting organic solvents, Restek's standard deactivated guard tubing is preferred.

Use Hydroguard™ Tubing for Connecting GCs to:

- Purge and trap systems
- Headspace analyzers
- Air concentrator units
- Air analysis equipment
- Other instruments that trap/release water vapors
- Any analytical instrument that needs an inert, water resistant pathway

Benefits of Hydroguard™ Tubing:

- Resists degradation from water injections.
- Withstands harsh "steam-cleaning" chromatography processes. Increases column lifetime. Reduces effects of dirty samples on column performance.
- Reduces downtime and maintenance.
- Protects expensive analytical columns.
- Prevents damage from harmful materials.

10m length Fused Silica Guard Columns & Transfer Line 6-pks

Nominal ID	cat.#
0.25mm	10049-600

Hydroguard MXT Guard Columns & Transfer Lines					
Nominal ID	Nominal OD	5-m length	10-m length	30-m length	60-m length
0.25mm	0.53 +- 0.025mm	70080	70083	70086	70089
0.32mm	0.74 +- 0.025mm	70081	70084	70087	70090

Hydroguard Fused Silica Guard Columns & Transfer Lines					
Nominal ID	Nominal OD	5-m length	10-m length	30-m length	60-m length
0.05mm	0.363+- 0.012mm	10075			
0.10mm	0.363+- 0.012mm	10076			
0.15mm	0.363+- 0.012mm	10077			
0.18mm	0.34 +- 0.01mm	10078			
0.25mm	0.37+- 0.04mm	10079	10082	10085	10088
0.32mm	0.45+- 0.04mm	10080	10083	10086	10089
0.53mm	0.69+- 0.05mm	10081	10084	10087	10090

*Not tested with the Grob mix because of a high pressure drop.
 **Recommendation: Cut 60m guard columns into shorter lengths.
 Using full length may cause peak distortion.
 +30 and 60-meter lengths are banded in 5-meter sections.



■ **Deactivated, Uncoated Fused Silica Tubing**

- Useful as long retention gaps, guard columns, or transfer lines.
- 3 common deactivated surfaces available.
- Inertness-tested with the Grob mix.
- Includes test chromatogram.
- 5-meter banded sections mounted in a Restek cage.

Same surface used for Restek guard columns !

Non-Polar Dimethyl Deactivated Surface

Nominal ID	Nominal OD	15-meter length	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10009	10010	10011
0.32mm	0.45 +- 0.04mm	10098	10020	10021
0.53mm	0.69 +- 0.05mm	10099	10030	10031

Intermediate Polar Phenyl-Methyl Deactivated Surface

Nominal ID	Nominal OD	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10012	10013
0.32mm	0.45 +- 0.04mm	10022	10023
0.53mm	0.69 +- 0.05mm	10032	10033

Polar Carbowax Deactivated Surface

Nominal ID	Nominal OD	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10014	10015
0.32mm	0.45 +- 0.04mm	10024	10025
0.53mm	0.69 +- 0.05mm	10034	10035

■ **Undeactivated, Untreated Fused Silica Tubing**

- Useful for making your own columns.
- Strength tested.
- Inexpensive.
- Coiled in 7-inch diameters, banded in 5-meter sections, and mounted in a Restek cage.

Nominal ID	Nominal OD	30-meter length	60-meter length
0.25mm	0.37 +- 0.04mm	10050	10052
0.32mm	0.45 +- 0.04mm	10056	10057
0.53mm	0.69 +- 0.05mm	10061	10062

Try Restek's **SilcoSmooth** tubing for packed GC columns. See page 106 for details

■ **SFC/CE Narrow-Bore Tubing**

Restek offers both untreated and deactivated narrow-bore tubing for use in CE. The tubing can also be used as GC transfer lines or SFC restrictors. The IP deactivation process provides a phenyl-methyl deactivated surface that gives optimum wettability and inertness for both polar and nonpolar compounds. Deactivated tubing is available in continuous lengths up to 20-meters. The 0.1 Smm ID and 0.18mm ID IP-deactivated tubing is tested with the Grob test mix.

Nominal ID	Nominal OD	Untreated	IP Deactivated
0.025mm	0.36 +- 0.012mm	10091	10097
0.05mm	0.36 +- 0.012mm	10092	10098
0.075mm	0.36 +- 0.012mm	10093	10099
0.10mm	0.36 +- 0.012mm	10094	10100
0.15mm	0.36 +- 0.012mm	10095	10101
0.18mm	0.34 +- 0.01mm	10096	10102

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Vu-Union Connectors *

Restek's Vu-Union connectors provide leak-free connections for capillary chromatography

Capillary Vu-Union Connector

Includes one metal housing body and one deactivated glass tapered insert (fits column ODs 0.33 to 0.74mm). cat.# 20418, each replacement inserts: cat.# 20419, /3-pk. (use only with graphite ferrules)

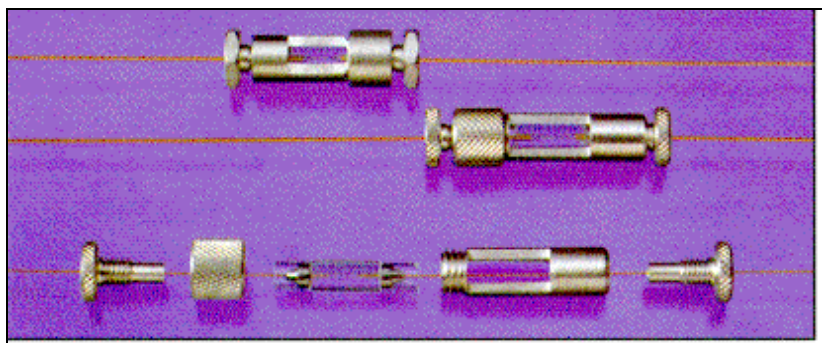
Microbore Vu-Union Connector

Includes one metal housing body and one deactivated glass tapered insert (fits column ODs ranging from 0.15 to 0.45mm). cat.# 20416, each replacement inserts: cat.# 20417, /3-pk. (use only with graphite ferrules)

Capillary and Microbore Vu-Union Ferrules

- Use only graphite ferrules, with the Vu-Union connector.
Universal: fits Vu-Union~connector, connects capillary columns to most GC inlets.
450°C maximum operating temperature

Table with 3 columns: Ferrule ID, Fits Column OD, cat.#. Rows include 0.3mm, 0.4mm, 0.5mm, 0.8mm ferrules for Graphite: 10-pack.



Free ! with the Vu-Union purchase Vu-Union Helping Hand

The Helping Hand is designed to hold the metal housing of the Vu-Union in place. This allows the user to easily assemble the columns in the glass insert and tighten the knurled nuts. The helping hand is included with all Vu-Union connectors except the "Y" union.

Vu-Union Connector for GC/MS and SFC Applications

Our Vu-Union connector for GC/MS or SFC applications uses Vespel/graphite ferrules (order separately). A shortened version of the original Vu-Union glass insert allows more torque to be applied to the ferrules without fear of cracking the insert. The addition of hex end nuts allows wrenches to be used to tighten the end fittings.

High-Pressure Vu-Union Connector

- Will not leak or crack under highpressure SFC conditions.
Deactivated, tapered glass insert (fits column ODs from 0.15 to 0.45mm).
Vespel~/graphite ferrules only.**
cat.# 20425, each replacement inserts: cat.# 20426, /3-p

High-Pressure and Vacuum Vu-Union Ferrules

- Use only with the High-Pressure and Vacuum Vu-Union connectors.
60% Vespel~/40% graphite.
400°C maximum operating temperature.

Vacuum Vu-Union Connector

- Connect analytical columns to mass spec transfer lines.
Use under vacuum conditions.
Deactivated, tapered glass insert (fits column ODs from 0.33 to 0.74mm).
Vespel~/graphite ferrules only.**
cat.# 20427, each replacement inserts: cat.# 20428, /3-pk

Table with 3 columns: Ferrule ID, Fits Column mm, cat.#. Rows include 0.3mm, 0.4mm, 0.5mm, 0.8mm ferrules for Vespel/Graphite: 10-Pack.

** Order ferrules separately

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"Y" Vu-Union Connectors *

■ **"Y"Vu-Union Connectors**

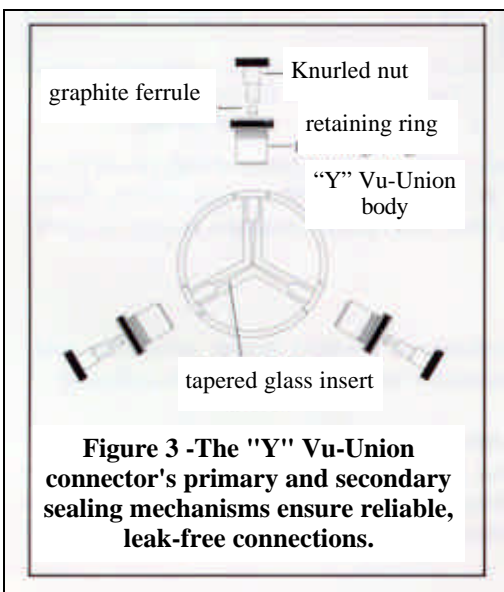
Will not unexpectedly disconnect.
 Primary seal utilizes a dead-volumefree press-tight connection.
 Secondary seal utilizes standard graphite ferrules. * *
 Seals easily without wrenches.
 Universal, fits column ODs from 0.33 to .74mm .
 The glass "Y"s have a press-tight region near the center for the primary column seal. The arms terminate in a cup configuration similar to our Capillary/Microbore Vu-Union connectors.



Standard capillary graphite ferrules (order 1/16-inch graphite ferrules with the appropriate ID separately)** fit into the cups and are compressed via knurled nuts that screw into the collars. Hooks are included to hold the connector securely onto the column cage and to prevent stress on the fused silica tubing.
 The new "Y" Vu-Union connector produces a dead-volume-free connection with fused silica tubing having outside diameters from 0.33 to 0.74mm. The glass insert is deactivated for inertness and produces no breakdown of endrin or DDT when used for dual-column confirmational analysis of pesticides. The "Y" Vu-Union connector can be used at oven temperatures up to 400°C and at pressures up to 100psi without leaking or unexpectedly disconnecting. Each "Y" Vu-Union connector comes with one tapered glass insert.
 Replacement deactivated glass "Y" inserts can be purchased separately

Vu-Union BENEFITS

Restek's Vu-Union connector combines the benefits of both Press-Tight connectors and metal unions.
 A precision tapered glass insert joins the two fused silica ends together in a union similar to that made by the Press-Tight connector. The glass window allows visual confirmation of the seal. Graphite or Vesper graphite ferrules are located on both ends of the glass insert, adding a positive seal to the end of the column and connector.
 Because of the secondary ferrule seal, the column cannot unexpectedly disconnect or lose sealing integrity, even at temperatures as high as 400°C.



"Y" Vu-Union Connector:
 cat.# 20432, ea.
Replacement Inserts:
 cat.# 20433, ea.
 cat.# 20434, /3-pk.

****Use only with graphite ferrules.**



Brad Rightnour
Instrument Parts &
Accessory Product
Line Manager

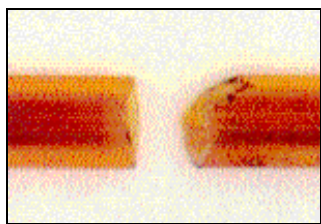
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A **Sapphire Scribe** (cat.# 20115) or a **Ceramic Scoring Wafer** (cat.# 20116) is the most effective cutting tool, producing the most consistent cuts. After choosing a cutting tool, practice scoring on an old column and examine the fused silica ends with a **Pocket Magnifier** (cat.# 20124).



Good and bad column cuts

■ **Fused silica connectors seal all common sizes of fused silica tubing!**

Press-Tight connectors are lightweight, quickly installed, and are easy to use. They do not cause solvent tailing or adsorption of active compounds. Connect fused silica tubing with outside diameters ranging from 0.3 to 0.75mm (0.18 to 0.53mm IDs).

■ **Restek's Press-Tight Connector**

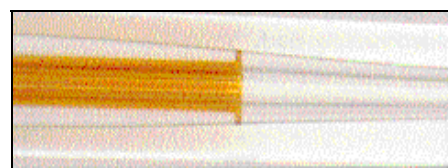
Not all fused silica or glass connectors are the same. Restek has thoroughly investigated the taper angle and tolerances to ensure a leak-tight fit on every connector. If other connectors left you dissatisfied in the past, try our connectors. We are confident the results will please you. Press-Tight connectors are most often used to connect a guard column to an analytical column. They are also used to connect columns differing in polarity for unique separations, or to repair a broken column. Mass spectroscopists also use Press-Tight connectors for connecting analytical GC capillary columns to smaller-diameter transfer lines.

How does a Press-Tight connector work?

Press-Tight connectors form a leak-tight seal by using concentric compressive forces as the tubing end is pushed into a tightly controlled radial restriction. These forces are strong enough to form a leak-tight seal under the normal pressures used in capillary gas chromatography. The seal is further strengthened as the column's exterior polyimide coating bonds to the inner surface of the connector after several thermal cycles at 200°C

Obtaining a leak-tight seal:

To achieve optimum performance for any of these connectors, begin with properly cut fused silica column and retention gap ends. Even when using the polyimide resin for extra insurance, a poorly cut capillary column will produce an inadequate seal.



Shown: A column exhibiting the proper connection -notice the ring.

■ **Polyimide Resin**

- Permanently connects Press-Tight connectors to a fused silica column.
- Has a 350°C maximum operating temperature.



Flow should be established through the columns, and the seal leak-checked with an electronic leak detector such as a Leak Detective™ (cat.# 21607) or Gow-Mac (cat.# 20130) before heating the system. The seal is made permanent when the column is heated to more than 200°C and held for several hours.

Can the connection be strengthened?

Absolutely. A curable polyimide resin is available to create a strong, permanent seal. However, a good press-tight seal must be made first in order for the resin to be effective.

What is A Press-Tight connector's maximum temperature?

Press-Tight connectors are effective up to oven temperatures of 325°C. Above 325°C, the polyimide on the column decomposes and leakage will occur. Restek strongly recommends using a Vu-Union connector if oven temperatures exceed 325°C for prolonged periods of time.

Can MXT columns be used with Press-Tight connectors?

To achieve a leak-free fused silica to stainless steel connection, we recommend using the appropriately sized MXT Low-Dead-Volume connector and simply substituting a Vespel/graphite ferrule in place of the metal ferrule for the fused silica tubing

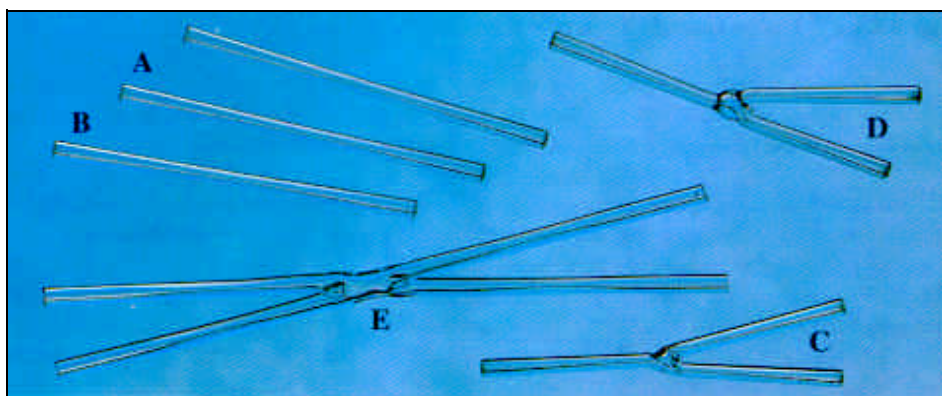
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Press-Tight Connectors *



A) Universal Press-Tight Connectors

- Connect guard columns to analytical columns.
- Repair broken columns.
- Connect column outlets to transfer lines.

cat.# 20400, /5-pk.

cat.# 20401, /25-pk.

cat.# 20402, /100-pk.

B) Deactivated, Universal Press-Tight Correctors

- Utilize a high-temperature silanization for excellent inertness.

- Ideal for trace analysis of active compounds. Restek's Universal Press-Tight connectors are made from rugged, highly inert fused silica and are compatible with most common tubing diameters. However, if your application requires an extremely inert surface, we now offer connectors that have been treated with the same high-temperature deactivation process used for our inlet sleeves. These connectors are ideal for the analysis of pesticides, semi-volatile pollutants, and clinical/ forensic samples.

cat.# 20429, /5-pk.

cat.# 20430, /25-pk.

cat.# 20431, /100-pk.

C) Universal "Y" Press-Tight Connectors

- Split sample flow onto two columns.
- Split a single column flow into two different detectors.
- Perform confirmational analysis with a single injection.
- cat.# 20405, ea.
- cat.# 20406, /3-pk.

D) Universal Angled "Y" Press Tight Connectors

- Alleviates column-end connection strain.
- Inlet and outlet ends conform to the column radius.
- Perform confirmational analysis with a single injection.

cat.# 20403, ea.

cat.# 20404, /3-pk.

E) Universal "X" Press-Tight Connectors

- Connect to three detectors or to two detectors and a sniffer port.
- Make injections onto three columns simultaneously.

cat.# 20407, ea.

cat.# 20408, /3-pk.

Universal Angled Press-Tight Connectors

- Ideal for connecting guard columns to analytical columns.
- Designed at an angle approximating the radius of a capillary column.
- Reduces strain on column-end connections.
- Seals all common sizes (0.18 to 0.53mm ID) of fused silica tubing.
- Connects fused silica tubing with outside diameters ranging from 0.3 to 0.75mm.
- Made from inert fused silica.

Universal Angled Press-Tight Connectors:

cat.# 20446, /5-pk.

cat.# 20447, /25-pk.

Let Restek make the connection for you!

Restek will connect a guard column/transfer line with a Universal Press-Tight connector and polyimide sealing resin to any analytical column, leak-check the connection, and confirm analytical integrity by running a test mixture. To order a preconnected guard column/transfer line, add the three digit suffix (from the chart) to any analytical column's catalog number when ordering.

Example:

A 30m, 0.32mm ID, 1.0um Rtx-5 connected to a 0.32mm ID guard column is
cat.# 10254-304.

5-meter Guard

Column/ Transfer Line	cat.# suffix
0.15mm	-301
0.18mm	-302
0.25mm	-303
0.32mm	-304
0.53mm	-305

10-meter Guard

Column/ Transfer Line	cat.# suffix
0.25mm	-309
0.32mm	-310
0.53mm	-306



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MXT Connectors *

MXT Low-Dead-Volume Connectors

In response to customer requests, the Restek wizards have developed metal connectors to connect two MXT columns together, to attach an MXT guard column to an analytical column, or to perform confirmational analysis with two MXT columns. These low-dead-volume connectors are treated with Silcosteel and are deactivated to make them inert to active compounds, just like our MXTfD columns. They will not cause peak tailing or affect system inertness and can be used up to 400°C without degrading the deactivation layer. We chose a 1/32" body size to minimize thermal mass. Special metal ferrules were designed to fit the OD of the 0.28 and 0.53mm ID MXT columns. Purchase the appropriately sized replacement ferrules when connecting 0.28 and 0.53mm ID columns together with either MXT low-dead-volume connectors.

MXT Low-Dead-Volume Connector

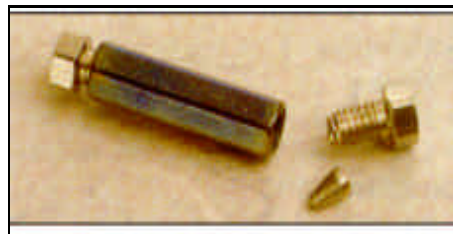
- Connect guard columns/transfer lines to MXT columns.
- Low thermal mass tracks rapid oven temperature programming.

for 0.28mm ID MXT columns:

cat.# 20397, each

or 0.53mm ID MXT columns:

cat.# 20394



MXT Low-Dead-Volume "Y" Connector

- Connect two MXT columns to one inlet.
- Connect one MXT column to two detectors.

0.28mm ID MXT columns: cat.# 20396, each

0.53mm ID MXT columns: cat.# 20395, each



Connector Replacement Ferrules and Nuts

1/32" replacement nut: cat.# 20389, /5-pk.
1/32", 0.5mm Vespelt /graphite ferrule for MXT Connector to use fused silica tubing in an MXT connector:
cat.# 20259, /5-pk.

1/32" Stainless Steel Replacement Ferrules for MXT Connector

Ferrule ID	Fits Column	cat.#
0.59mm	0.28mm	20398
0.79mm	0.53mm	20399

1/4"-3/16" Open-End Wrench

A high-quality miniature wrench to use with the MXT Low-Dead-Volume connectors.
cat. # 20388, /2-pk.