

PLOT Column Instruction Sheet

Installation Instructions

1. Before removing the previously installed column from the gas chromatograph (GC), be sure to turn off the detector and cool all heated temperature zones.
2. Once all zones of the GC are cooled, turn off all gases. Remove the installed column, plug each end with silicone septa (or column end caps), and return the column to its original box.
3. Remove the new PLOT column from its box. Remove the septa (or column end-caps) that are on each end of the PLOT column.

Important: If your column is tied onto the metal cage with high-temperature string, do not remove the string. This high-temperature string can withstand temperatures up to 400 °C.

4. Attach the appropriate GC capillary nut (fitting) onto the inlet side of the column. Attach the appropriate GC column ferrule onto the inlet side of the column. See our nut and ferrule compatibility guide for Agilent GCs.

Fused silica columns:

0.25 mm columns, use 0.4 mm ID ferrule

0.32 mm columns, use 0.5 mm ID ferrule

0.53 mm columns, use 0.8 mm ID ferrule

MXT columns:

0.25 mm and 0.32 mm columns, use 0.5 mm ID ferrule

0.53 mm columns, use 0.8 mm ID ferrule

Note: Do not install the capillary column nut (fitting) or ferrule onto the outlet side of the column at this time; this will be performed later.

Note: See Helpful Hints section for information on using particle traps.

5. Trim 2 cm from both ends of the column. If the fused silica column is flame sealed, remove 20 cm from both ends. Make sure that a clean, square cut is obtained. Install the inlet side of the column into the GC injection port at the appropriate distance (see your GC manual to determine the correct installation distance).

6. Turn on the carrier gas flow, using Table I to determine an appropriate head pressure.

Note: A small amount of particles may exit the column when the carrier gas is first turned on. This is normal as particles can become dislodged when the column is cut, when a ferrule is tightened onto a column, or due to vibrations during transport. See section C for tips on protection from particles.

7. Purge the column with clean, dry carrier gas for at least 20 minutes. During this purging step, check for leaks at the injector connections using an electronic leak detector. Note that the use of carrier gas traps is also highly recommended.

Important: If using hydrogen as the carrier gas, be sure to safely vent the gas exiting the column and the split vent.

8. Set the injection port temperature according to the method, but do not exceed the maximum operating temperature for the column. Set the GC oven to 40 °C.

9. Program the GC oven to heat up at 5 °C/min up to the column's maximum temperature.

10. Once the column's maximum temperature is reached, hold this temperature for at least 60 minutes for porous polymer columns (Q-, QS-, S- and U-BOND), and for at least 2 hours for molecular sieve and alumina columns. Do not exceed 6 hours for any column.

11. Cool the GC oven. Do not turn off the carrier gas. Do not remove the inlet side of the column from the injection port.

12. Attach the appropriate capillary column nut (fitting) to the outlet side of the column. Attach the appropriate GC column ferrule to the outlet side of column. Trim an additional 1 cm from the outlet side of the column and verify that a clean, square cut is obtained. Before installing the column into the detector, pre-seat the ferrule onto the column using a capillary installation gauge. This will help prevent dislodged particles from entering the detector.

13. Install the column into the detector at the appropriate distance (see your GC manual to determine the correct installation distance). Confirm that your detector gases and electronics are turned on, then set the appropriate detector and injector temperatures for your analysis and allow them to stabilize. You are now ready to use the column.

Table I: Approximate head pressures (at 40 °C) using hydrogen and helium.

Column Length	Internal Diameter	Head Pressure for Q-, QS-, S-, and U-BOND		Head Pressure for Msieve 5A and all Alumina BOND	
		Approx. psi	Approx. kPa	Approx. psi	Approx. kPa
15 m	0.25 mm	6.5	45	10	69
15 m	0.32 mm	3	21	6.5	45
15 m	0.53 mm	1.5	10	2	14
30 m	0.25 mm	9.5	66	11.5	79
30 m	0.32 mm	6	41	9	62
30 m	0.53 mm	2.5	17	3.5	24
50 m	0.25 mm	18	124	—	—
50 m	0.32 mm	10	69	14	97
50 m	0.53 mm	3.5	24	6	41

Helpful Hints

A. Temperature Limits

Never exceed the recommended maximum temperature of the column, which is given on the box label and product web page for each PLOT column.

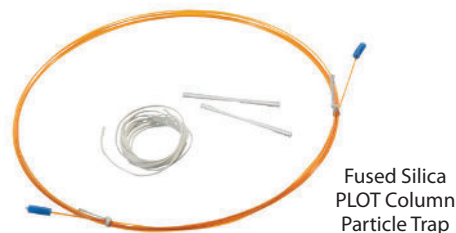
B. Column Regeneration

- Occasionally, alumina PLOT columns need to be regenerated to remove moisture. To regenerate, set the carrier gas head pressure as shown in Table I, set the GC oven temperature to the maximum column operating temperature, and condition the column for 6 hours.
- Occasionally, molecular sieve PLOT columns also need to be regenerated to remove moisture. To regenerate, set the carrier gas head pressure as shown in Table I, set the GC oven temperature to the maximum column temperature, and condition the column for 1–3 hours.

Caution: If using hydrogen as a carrier gas, subjecting molecular sieve columns to high temperatures using hydrogen carrier gas for more than an hour will cause surface activity, resulting in carbon monoxide (CO) peak tailing.

C. Protection from Particles

- PLOT columns are not ideal for use in MS or valve systems due to their potential to generate particles that can contaminate and, in severe cases, damage GC parts. If a PLOT column must be used in these instances, a particle trap is necessary to reduce the chances of particles getting into the GC system.
 - For fused silica columns, see Table II for a list of available particle traps.
 - For MXT columns, contact Customer Service to order custom particle traps and install them using the appropriate MXT connector (cat.# 21385 for 0.32 mm ID columns and cat.# 21384 for 0.53 mm ID columns).
 - If the PLOT column will be connected to a mass spectrometer (MS), the pressure drop (vacuum) may dislodge particles into the MS. To minimize the amount of particles from entering the MS, couple the detector end of the PLOT column to a particle trap (e.g., 5 m x 0.25 mm ID fused silica tubing coated with 0.25–0.50 μm of a nonpolar stationary phase, such as Rtx-1 phase). Use a connector suitable for MS application.
 - If the PLOT column will be connected to a non-MS detector, connecting a particle trap to the detector end of the column is recommended.
 - To ensure protection against particles flushing back into a valve/flow switching setup, connecting a particle trap to the injector end of the PLOT column is recommended.
 - If the PLOT column is connected using a valve/flow switching setup, use of a particle trap on the outlet and inlet ends is recommended to minimize the number of particles entering the GC system. Conditioning the column as instructed under steps 6–11 (previous page) using three times higher gas flow to elute any loose particles is recommended. After column conditioning is complete, restore normal column flow and connect to the detector as described in steps 12–13. Now your column is stable for valve/flow switching applications.
- D. To prevent high boiling point compounds from contaminating a PLOT column, use of a pre-column (backflush column) or a valve/flow switching system should be considered.
- E. Please note that PLOT columns have a unique appearance due to the particle deposition on the inside wall of the columns. Variation in color and appearance is normal and does not affect performance.
- F. Never abruptly pull the inlet end of the column from the injector while under pressure; this can cause a pressure surge in the column, resulting in particles being dislodged. Instead, turn off pressure to the injector and allow it to drop to atmospheric pressure before disconnecting the column.



Fused Silica
PLOT Column
Particle Trap

Table II: Fused Silica PLOT Column Particle Traps

Description	Includes	qty.	cat.#
PLOT Column Particle Trap, 0.25 mm ID	Press-Tight connectors (2); 2.5 m, 0.25 mm ID column; high-temperature string	ea.	19774
PLOT Column Particle Trap, 0.32 mm ID	Press-Tight connectors (2); 2.5 m, 0.32 mm ID column; high-temperature string	ea.	19753
PLOT Column Particle Trap, 0.53 mm ID	Press-Tight connectors (2); 2.5 m, 0.53 mm ID column; high-temperature string	ea.	19754

For particle traps for MXT columns,
contact Customer Service.



Questions about this or any other Restek product?

Contact us or your local Restek representative (www.restek.com/contact-us).

Restek patents and trademarks are the property of Restek Corporation. (See www.restek.com/Patents-Trademarks for full list.) Other trademarks in Restek literature or on its website are the property of their respective owners. Restek registered trademarks are registered in the U.S. and may also be registered in other countries.

© 2019 Restek Corporation. All rights reserved. Printed in the U.S.A.

www.restek.com

#600-55-001 Rev. date: 06/19



RESTEK
Pure Chromatography