SGE GC column

# Instructions for GC column installation

## Introduction

This guide provides a simple stepwise approach to installing your new column into the GC, and also presents some useful information, hints and tips to help always get the best performance and lifetime from your column.

## Important

⚠ **Caution**
Damage to the protective polymer or aluminum coating of the column must be avoided as this will almost certainly result in fracture of the column.

Column ends should be properly sealed when not in use.

## Instructions

**1. Check gas filters, carrier gas supply.**

If your carrier gas supply employs oxygen and water filters, check the indicators on these filters to ensure they are not exhausted and replace if necessary.

**2. Place correct nut and ferrule on the column and cut column end.**

Once the nut and ferrule have been placed on the column, a 10 cm section of the column needs to be removed. Hold the column between your index finger and thumb and scribe across the surface of the column with a cutting tool. This will leave a scratch in the polyimide surface. Apply a slight pressure to either side of the scribe mark. The column will snap and should leave a clean square end. If a clean break is not achieved, repeat the scribing process making sure you are further into the column than the initial scribe.

**3. Install column into the GC inlet.**

As all GC systems vary, consult your GC installation manual for the correct distance a column should be inserted into the GC inlet. Once inserted, finger tighten the nut. Using a wrench, tighten by about another 1/2 turn. You should not be able to pull the column out of the ferrule. If movement is felt, tighten until secure. If this cannot be achieved check the correct ferrule has been used.

If the column is installed too far into the inlet, the distance for good mixing of the sample is reduced and some discrimination can be observed. It is also possible if the column is inserted too far, the needle of the syringe will go beyond the end of the column at the time of injection. In this circumstance, very poor sensitivity or no peaks at all will be observed. Set your ferrule depth before installing the GC column.

**4. Turn on carrier gas and check flow.**

Turn on the carrier gas and adjust the column pressure to the desired value. If pressure for the column has not been pre-determined, adjust flow rate temporarily to that recommended on www.trajanscimed.com/gccolumns. Cut the column end according to the procedure described in Step 2. Check column flow by dipping the column end into a small vial containing a solvent (e.g. pentane). A stream of bubbles should be observed. If not, check for possible leaks in the GC inlet or for any sign of damage to the column.

**5. Install column into detector.**

Place nut and ferrule on the column. Cut the column end again to ensure no ferrule material is deposited in the column end. As all instruments require the column end to be located at different positions in the detector, consult your GC installation manual. Determine if the signal is stable and is not subject to sharp movements. This would indicate a problem with the column position or foreign material in the detector. The baseline should stabilize in a uniform manner. If not, remove column, inspect column end and, if necessary, the detector assembly. Consult your GC installation manual for this step.

**6. Check for leaks.**

Once the column is installed and a preliminary gas flow applied, check for leaks. For non GC-MS applications (e.g. FID, ECD, NPD being used) you only need to check the injector system. Use an electronic leak detector if possible. To check for leaks at a GC-MS interface, use a stream of argon. If a leak is present, an argon signal will be detected on the MS system.

**7. Set the carrier gas flow rate.**

Set the carrier gas flow rate (or column head pressure) according to method requirements. Set the split flow, septum purge flow, and any other applicable gas rates.

Inject a non-retained compound to determine the average linear gas velocity and to confirm the column is installed correctly. A symmetric peak indicates correct installation.

**List of suitable non-retained compounds.**

| Detector | Compound |
|---|---|
| FID | Methane, Butane |
| MS, TCD | Argon, Methane, Butane, Air |
| ECD | Dichloromethane[1] |
| NPD | Acetonitrile[2] |
| PID | Ethylene, Acetylene |

*1 Only use the headspace of dichloromethane, do not inject neat solvent.*
*2 A column temperature of 100 – 130°C is required. Acetonitrile may be retained at lower temperature.*

## 8. Column conditioning.

SGE GC columns have been pre-conditioned to guarantee a stable baseline is achieved quickly. However for optimum performance we recommend a column always be conditioned prior to first use on your instrument.

As a precaution if using a Mass Spectrometer, or other highly sensitive detector, the column should be removed from the detector during conditioning. Never exceed the maximum cycling temperature specified for the column for more than 10 to 15 minutes.

Install the column into the GC inlet (following the manufacturer's instructions), then set the carrier gas flow (see www.trajanscimed.com/gccolumns). Ensure that there is gas flowing from the end of the column before installing into the detector. To condition the column, program the Gas Chromatograph to ramp at 10°C/min to the maximum continuous operating temperature of the column. Once the heating ramp has started monitor the detector signal, it should initially increase and then gradually decrease until a flat baseline is observed. Continue to condition the column for 60 minutes at the maximum continuous operating temperature, if the baseline is not flat (still dropping) a further 30 to 60 minutes may be required.

**Table of recommended gas flows for column conditioning.**

| Column ID | Flow helium (at max. temperature) |
|---|---|
| < 0.2 mm | 1.0 mL/min |
| 0.2 - 0.32 mm | 2.0 mL/min |
| > 0.32 mm | 5.0 mL/min |

A common bleed profile can be seen in Figure 1. In general, thick film (> 1.0 µm) and polar phases do require additional conditioning time to produce a stable baseline. If a stable, flat baseline is not achieved even after additional conditioning, the system may have an air leak or another form of contamination. Cool the column to room temperature and re-check the fittings for leaks or possible sources of contamination.

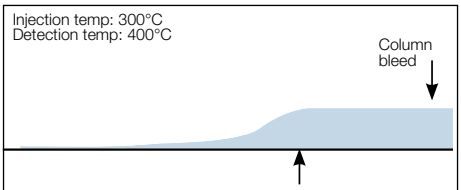

*Figure 1 - Column bleed profile*

## 9. Column storage.

When a column is not in use column ends should be sealed. Sealing column ends eliminates the possibility of contaminants and any other foreign material entering the column and causing long term damage. Please note the injector and detector ends of your column so that on re-installation the column is properly oriented.

## 10. Regeneration of columns.

Deterioration of column performance with use is very much application dependent. However, it is important to note that SGE GC columns have been specifically designed to resist permanent damage, and usually a simple 1 or 2 step recovery process is all that is needed to restore the column to its original performance. Typical symptoms of deterioration in column performance include unstable signal, large baseline rises on temperature programming, or peak tailing especially for active components. Common causes include deposition of non-volatile material from the sample solvent deposited on the column and damage from the syringe needle. The solution here is to remove approximately 50 cm from the front of the column. If this does not work the column can usually be returned to its original state by repeating the column conditioning step.

## Warranty

Trajan Scientific and Medical warrants the enclosed capillary column against defective materials, breakage and faulty workmanship for a period of forty five (45) days from the date of shipment. Trajan also warrants the column to meet the performance obtained under the conditions given in the enclosed report. This warranty implies free replacement of the column upon receipt of proper proof of the defect.

## Information and support

Visit www.trajanscimed.com or contact techsupport@trajanscimed.com

*Specifications are subject to change without notice.*

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