Customer Support Note 001

Switching between a GC injector and Markes TD

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Sometimes on an analytical system it is useful to be able to switch easily from thermal desorption sample introduction to standard syringe injection *via* an inlet. The two options below show how this can be achieved. For further information on these procedures, please contact your local Markes agent.

1. Option 1 – Standard configuration

This option allows the use of either the TD or the GC injector. To swap between the two, disconnect the connector between the column and the fused silica inlet in use at the inlet end, and reconnect to the other inlet's guard column/transfer line.

Figure 1 shows the TD connected to the column, with the GC inlet disconnected. Note that the unused GC inlet still has a low carrier gas pressure on, to ensure there is carrier gas passing through the fused silica, and so protect it from degradation. The resultant flow will bleed into the oven.

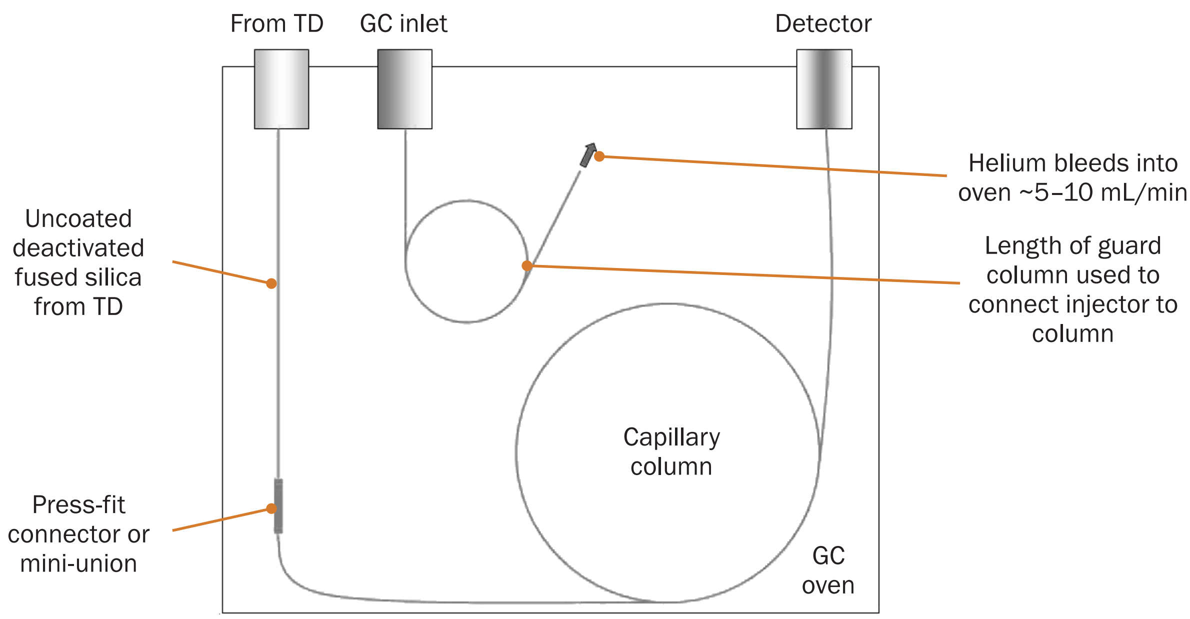

Figure 1: TD transfer line connected to the GC column inside the GC oven.

2. Option 2 – Advanced configuration

Connecting two separate inlets on the GC using a union enables the system to switch easily from thermal desorption sample introduction to standard syringe injection, without having to reconfigure hardware. This can be useful, because swapping columns can be time-consuming, particularly if an MS is configured as the detector.

NOTE: For advanced users only – this is complicated to set up and difficult to support remotely.

2.1 Hardware setup

This option allows the use of both the TD and the GC injector.

Figure 2 shows the TD connected to the column, with the GC inlet also connected *via* a press-fit Y-piece.

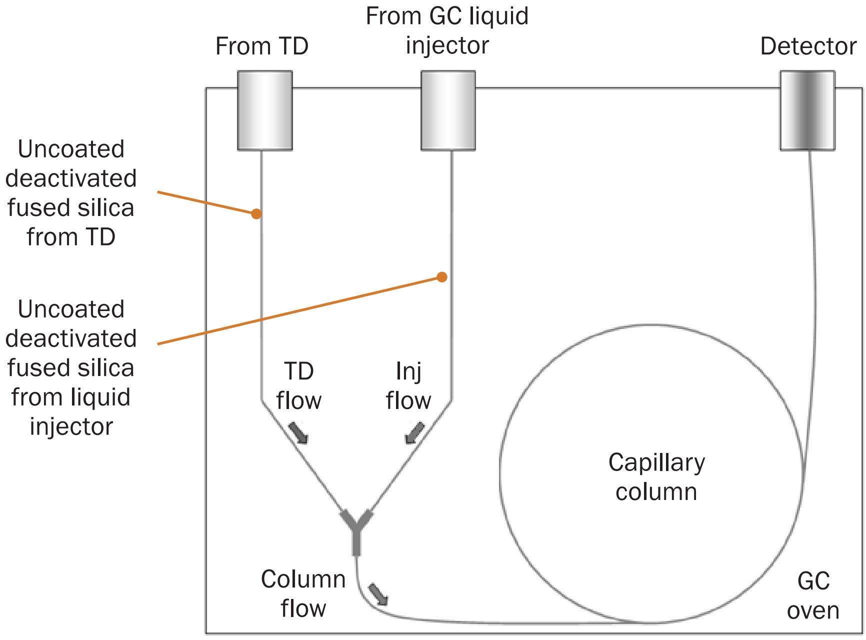

Figure 2: TD transfer line connected to a Y-piece union also connected to the GC inlet and the GC column inside the GC oven.

Hardware requirements are:

- Host GC with two available inlets, each with an electronic pressure controller capable of constant and ramped pressure
- Uncoated fused silica transfer line (one line for each inlet)
- Inert column connector Y-piece (can be a glass press-fit or unpurged two-way splitter).

NOTE: The Y-piece union may require securing to the GC oven to prevent damage during GC oven fan operation.

2.2 Prevention of backflushing

Figure 3 shows the TD connected to the column, with the GC inlet also connected *via* a Y-piece union, but with no carrier gas flow through the GC inlet. The lack of positive pressure on the GC inlet creates an additional flowpath for the TD carrier flow onto the GC inlet.

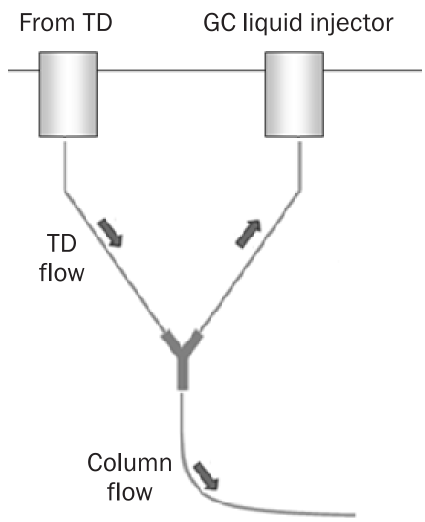

Figure 3: Carrier gas flow through the system with no pressure on the secondary inlet.

This will result in a portion of the TD flow backflushing into the transfer line of the second inlet, resulting in poor reproducibility and reduced sensitivity of analytes. Contamination of the second inlet can occur with high-concentration samples.

NOTE: The same backflushing can occur from the GC inlet onto the TD system, which can cause major issues when the TD is being used for trace analysis.

2.3 Setting up carrier gas pressures/flows to prevent backflushing

In order to ensure the carrier gas flow on the unused inlet is sufficient to prevent backflushing, but not high enough to impede carrier flow from the primary inlet, the following procedures can be used to set up the inlets.

Setting up the TD as primary inlet:

Assume the TD is connected to the GC back inlet (TD), and liquid injection to front inlet.

1. Set desired pressure on back inlet (TD) (for desired column flow).
2. Turn off pressure controller at front inlet (liquid).
3. Leave system to stabilise for 2 min.
4. Note baseline pressure reading that is being shown on front inlet (liquid).
5. Set method pressure on front inlet (liquid) between 1 and 4 psi above baseline.
6. Save the GC method for use with back inlet (TD).

Setting up the GC S/SL as primary inlet:

Assume the TD is connected to the GC back inlet (TD), and tower on top of front inlet (liquid).

1. Set desired pressure on front inlet (liquid) (for desired column flow).
2. Turn off pressure on back inlet (TD).
3. Leave system to stabilise for 2 min.
4. Note baseline pressure reading that is being shown on back inlet (TD).
5. Set pressure on back inlet (TD) between 7 and 10 psi above baseline.
6. Save the GC method for use with front inlet (liquid).

2.4 Setting up a method for constant flow/pressure gradient

GC methods using pressure ramping (*e.g.* constant flow methods) can be used, provided the pressure on the unused inlet is ramped at a suitable rate to maintain the positive pressure on the inlet.

1. Calculate pressure for the unused inlet as described above, for the lowest and highest pressures used in the active inlet gradient. This can be done by setting column flow and adjusting oven temperature to the lowest and highest temperatures for the active inlet method.
2. Create a pressure gradient ramp that matches the timeframe for the active inlet.
3. Ensure that the pressure for the unused inlet doesn't go above that of the active inlet during the run.

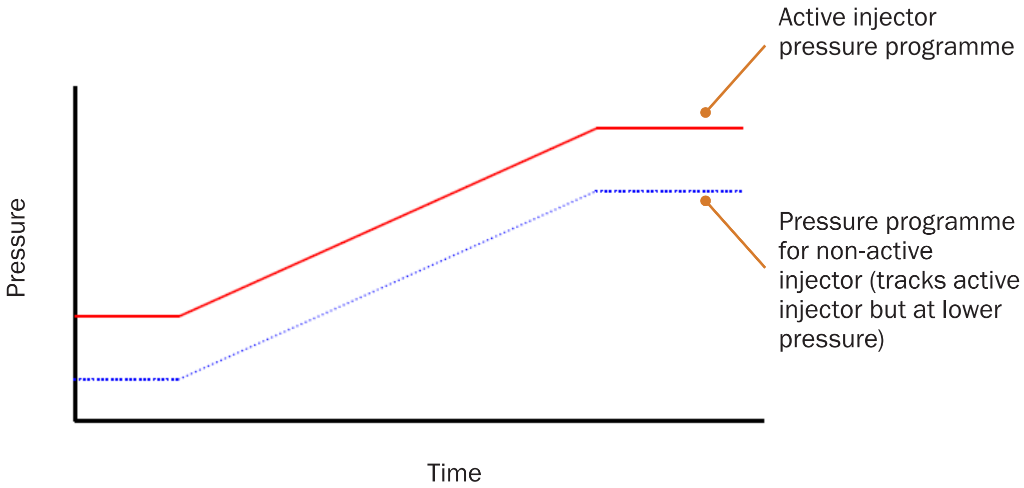

Figure 4: Maintaining pressure ratio between inlets during a gradient programme.

For all technical support queries, please contact Markes International.

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