



What is the difference between MS and non-MS GC columns?

The major difference between a standard phase GC and a MS phase GC column, such as a SCION-1 vs a SCION-1MS, is column bleed. The column bleed causes an increase in baseline signal which is an issue when aiming to identify analytes with low signal to noise ratio. This increased baseline signal is especially problematic for sensitive detectors such as a Mass Spectrometer (MS). The bleed detection and baseline noise will have a negative impact on the ability to have accurate, precise and repeatable results. This is due to being able to identify peaks correctly and integrate peaks consistently.

What is column bleed?

Column bleed is the degradation of polymer from mainly the column stationary phase. The amount of bleed from a column is dependant on the type of column and the film thickness. The thicker the column film, the higher the bleed due to there being more stationary phase.

For a capillary column with a polysiloxane based chemistry stationary phase there is a reaction mechanism referred to as "backbiting" which causes column bleed. This reaction causes cyclic siloxanes to be cleaved from the polymer stationary phase. This reaction is catalysed by oxygen and increases with temperature. The product from the reaction will elute from the column onto the detector which will increase baseline noise and if using MS will fragment on the source.

It is important to note that increased noise in the baseline can be due to other factors and a regular maintenance schedule should be in place for your instrument.

Types of low bleed columns

There are three main types of low bleed columns:

- The chemistry is altered to make the polymer more stable but the polarity of the phases is in line with the non-MS phase e.g. SCION-5 vs SCION-5MS.
- The manufacturing process is optimised to make the current non-MS GC column phase low bleed but the polymer chemistry is unchanged e.g. SCION-1 vs SCION-1MS.
- Brand new GC column phases are manufactured which are unique to low bleed columns.

How to prevent column bleed

Some column bleed is inevitable. To reduce column bleed always stay within manufacturer guidelines for temperature limits and if possible update your instrument settings with these limits to protect your column. There are temperature limits provided by the manufacturer in the documents or on the box your column comes with. The longer you work at your column at its maximum limit, the shorter the life span of your column. This highlights the importance of choosing the correct column for your application, see our [column selection guides](#) for more information. Other factors can affect column bleed such as oxygen, use of some chemicals and the sample matrix and UV from light. For more information on how to care for your column to extend its lifespan, see our [column care technical note](#).

Do I need a MS GC column?

Column bleed can dirty the detector which will reduce sensitivity and cause a need for it to be cleaned which will take the instrument out of service. This avoidable extra cleaning can cause backlogs of samples. For example, a FID detector can become blocked and need the FID flame tip replaced.

Depending on your method will determine if you will benefit from using a MS phase or low bleed column. If you work at elevated temperatures close to column manufacturer temperature limits, this will increase the amount of bleed from your column. If using a sensitive detector such as a MS then low bleed will mean a cleaner mass spectra which will simplify mass spectral identifications. Depending on your application's detection limits, it may also be beneficial to reduce system noise as much as possible to avoid interference with the analysis.