

GC Liners

A crucial component of the GC is the liner. The liner selection is critical to your analysis as the GC liners facilitate the injection of your sample by transferring it onto the GC column. By selecting the wrong liner it can lead to issues such as incomplete transfer, poor separation of compounds and peak tailing. As well as selecting the right liner for your application based on sample matrix and analyte concentration, it is essential to be aware of liner volume and diameter to avoid issues such as backflash. See our [SSL liner guide](#) and [Spare and Consumable Brochure](#) for more information on liner selection.

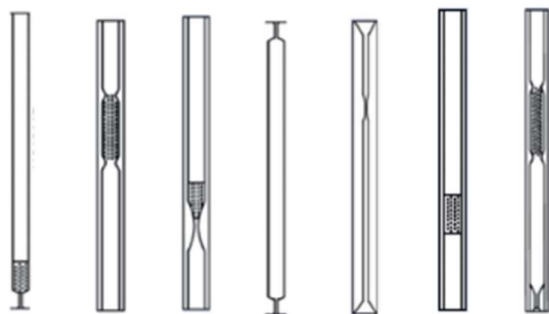


Figure 1 Liner type examples

What is backflash?

Backflash occurs when the vapor cloud that is produced from injecting your liquid sample into the GC injection port, where rapid solvent vapor expansion occurs, exceeds the volume of the liner. The vapor then flashes back up the injection port, escaping from the liner and can expand into the other areas of the GC such as carrier gas lines or purge vent lines and septum purge.

What is the impact of backflash?

When backflash occurs it causes many issues which lead to poor reproducibility, sample loss, carry-over, loss of resolution and poor peak shape.

Backflash can cause contamination to your system as it can cause your sample to be deposited onto the non-heated surfaces in your system such as the septum purge, split and carrier gas lines. These deposits can later leach back into the inlet on subsequent injections and go onto the column. This contamination can lead to ghost peaks, tailing, fronting and split peaks.

If vaporising of your sample is causing backflash then it will lead to sample being lost outside of the liner and lead to variability in your injections. This causes inconsistency and higher RSDs.

How to prevent backflash?

The ultimate way to avoid backflash is to calculate the vapour volume of the solvent volume being injected and to know the volume of your liner.

If the vapor volume is exceeding the capacity of your liner then you need to reevaluate the sample being injected. You could reduce your sample volume to the minimum needed to be able to achieve your detection and quantification limits or adjust the temperature of your injector lower but still high enough so everything in your sample will volatilize. Another option could be to consider using a different solvent as solvents have different solvent expansion volumes. Water in particular is known to have a large solvent expansion volume.

If sample volume cannot be reduced then an option could be to make a change in your sample preparation to concentrate your sample. There are many sample preparation technical notes available through the [SCION knowledge centre](#).

Other factors which can help to avoid backflash include using wool in your liner. The wool allows a large surface area for the solvent evaporation with more efficient vaporization. Wool liners also protect the sample from condensing within the injector.

Pulsed splitless injections could be advantageous as this injection technique increases the pressure in the injection inlet temporarily in a set time range which helps to push the analytes onto the column. This can prevent backflash as the sudden increase in pressure, reduces solvent expansion volume.

If the sample volume being injected cannot be reduced, solvent and injector temperature can't be changed then you may need to consider the type of injector your GC has as it may not be suitable for your application. PTV injectors are able to do Large Volume Injections (LVI) which a Split/Splitless (SSL) injector will not be able to cope with. For more information see our PTV Guide in the SCION Knowledge Centre.

