

Column installation into Agilent GC Split/Splitless and Multimode inlets

and

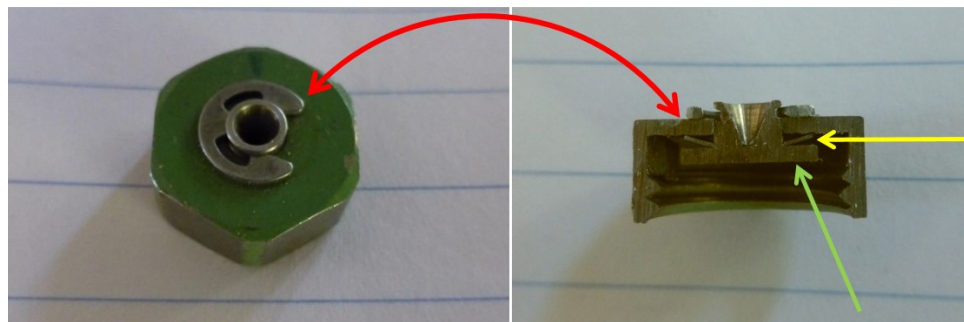
Agilent Single Quad and Tandem Quad GCMS systems

Agilent Customer Community
20May2021



Split/Splitless and MMI

The single problem that is seen the most often on GCs is an overtightened septum. Proper tightness is achieved by screwing down the nut until the "E" clip on top stops moving --- and then only about 1/4 to 1/3 turn more. Any tighter compresses the septum vertically and it will actually tear out more when the needle pierces it.

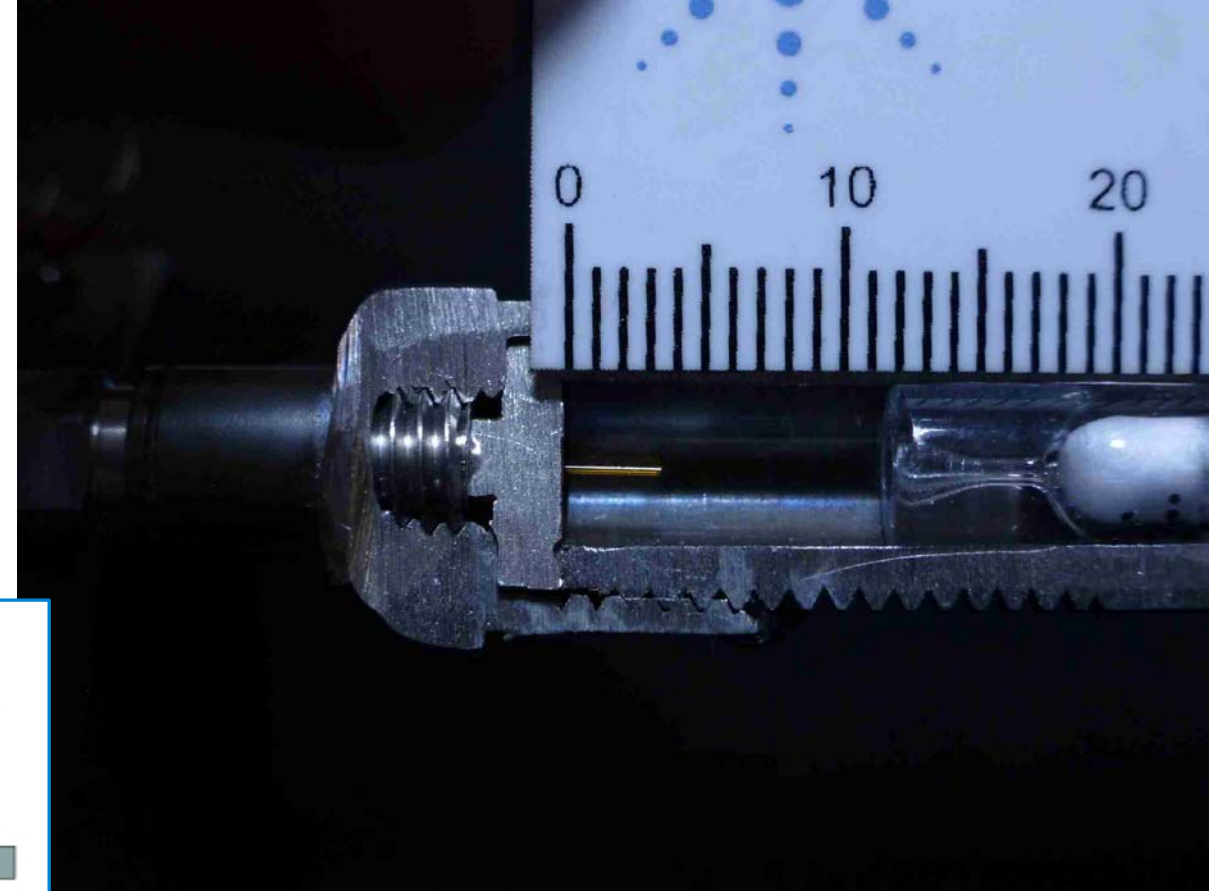
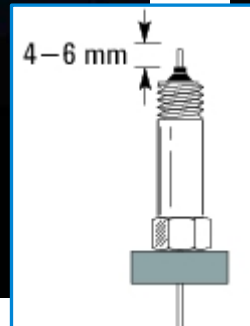
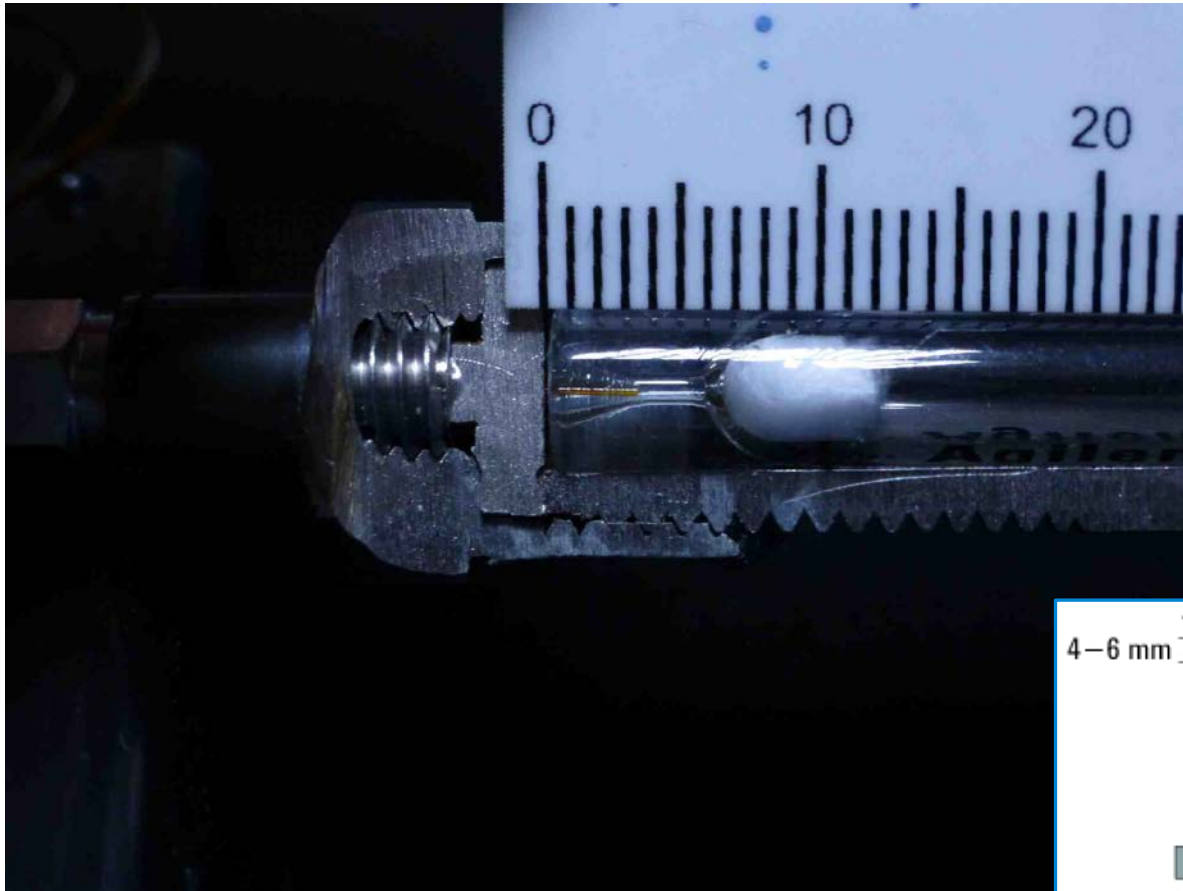


When the plate (green arrow) touches the septum, the spring washer (yellow arrow) starts to compress and the "E" clip lifts up (red arrow). There is only about 1 mm of available compression space before the spring washer bottoms out! When the "E" clip has lifted up 0.5mm or so - about the thickness of a 26 gauge syringe needle - STOP! That is tight enough to do the job. The septum only needs to be held in place and barely compressed by the spring washer to make a seal sufficient to hold up to 100psi.

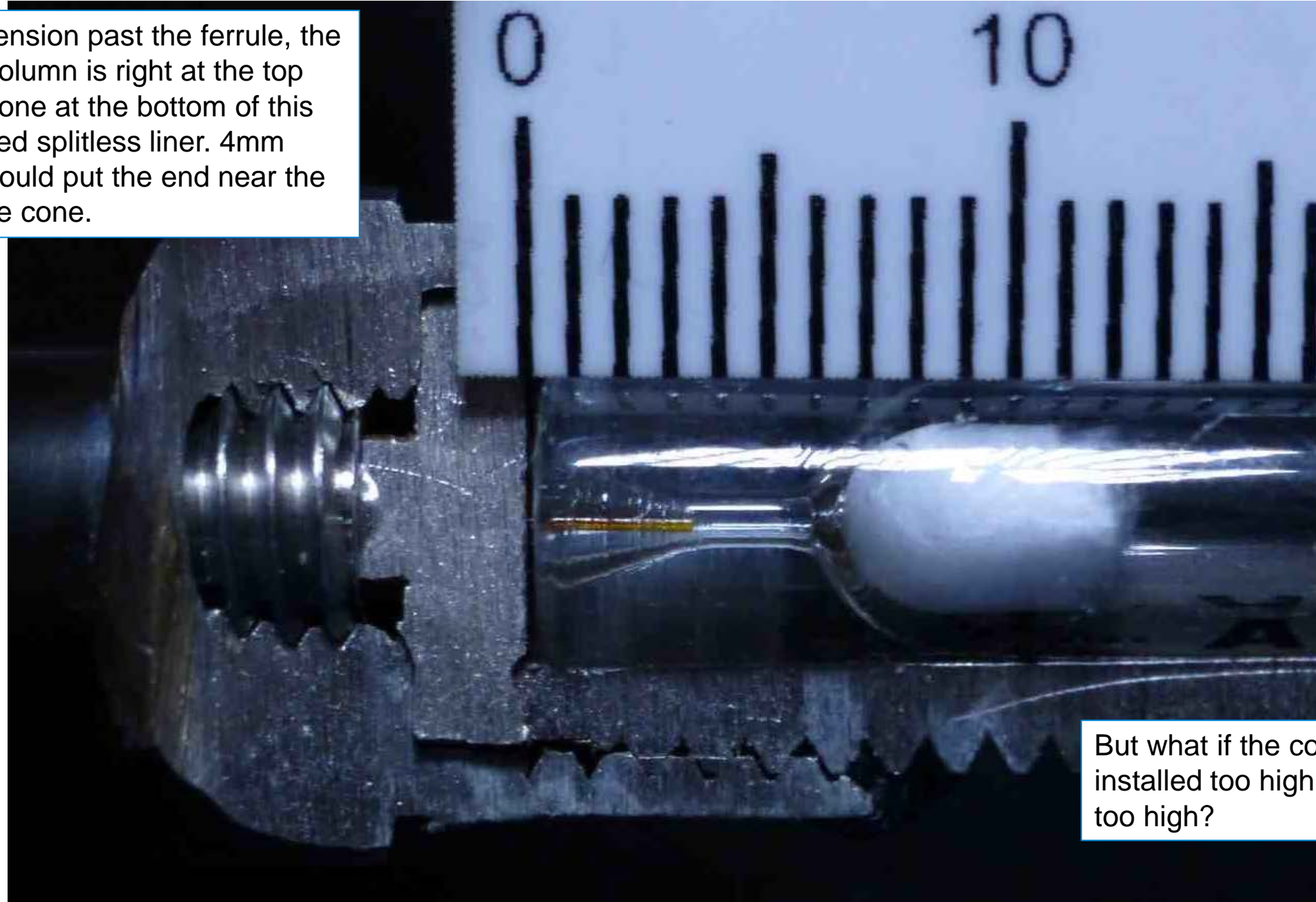
If you think you need to tighten it more to get it to seal, replace the septum and start again.

Split/Splitless

What is the correct column insertion distance for a Split/Splitless Inlet? The current “Maintaining Your GC” manuals say **4-6 mm** extending past the ferrule. Here is what 6mm extended past the ferrule looks like inside the inlet itself. This is a Single Tapered Splitless Liner.

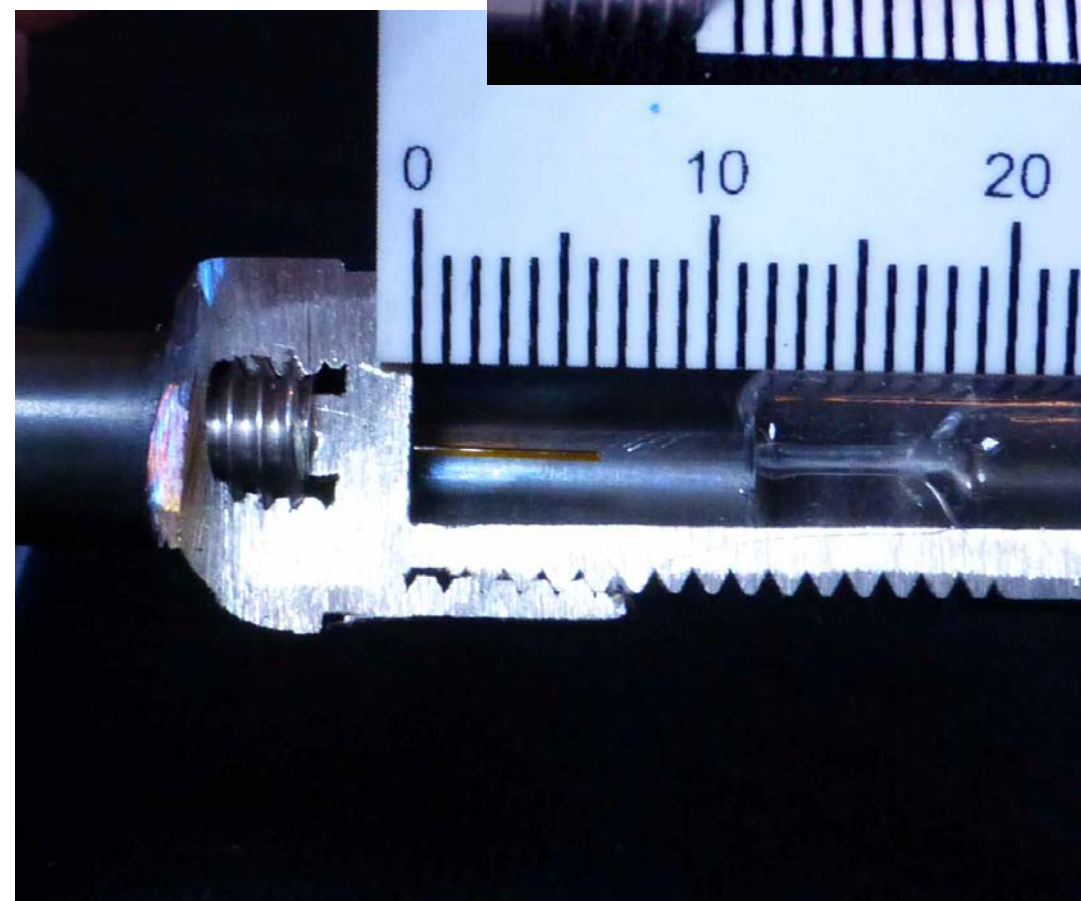
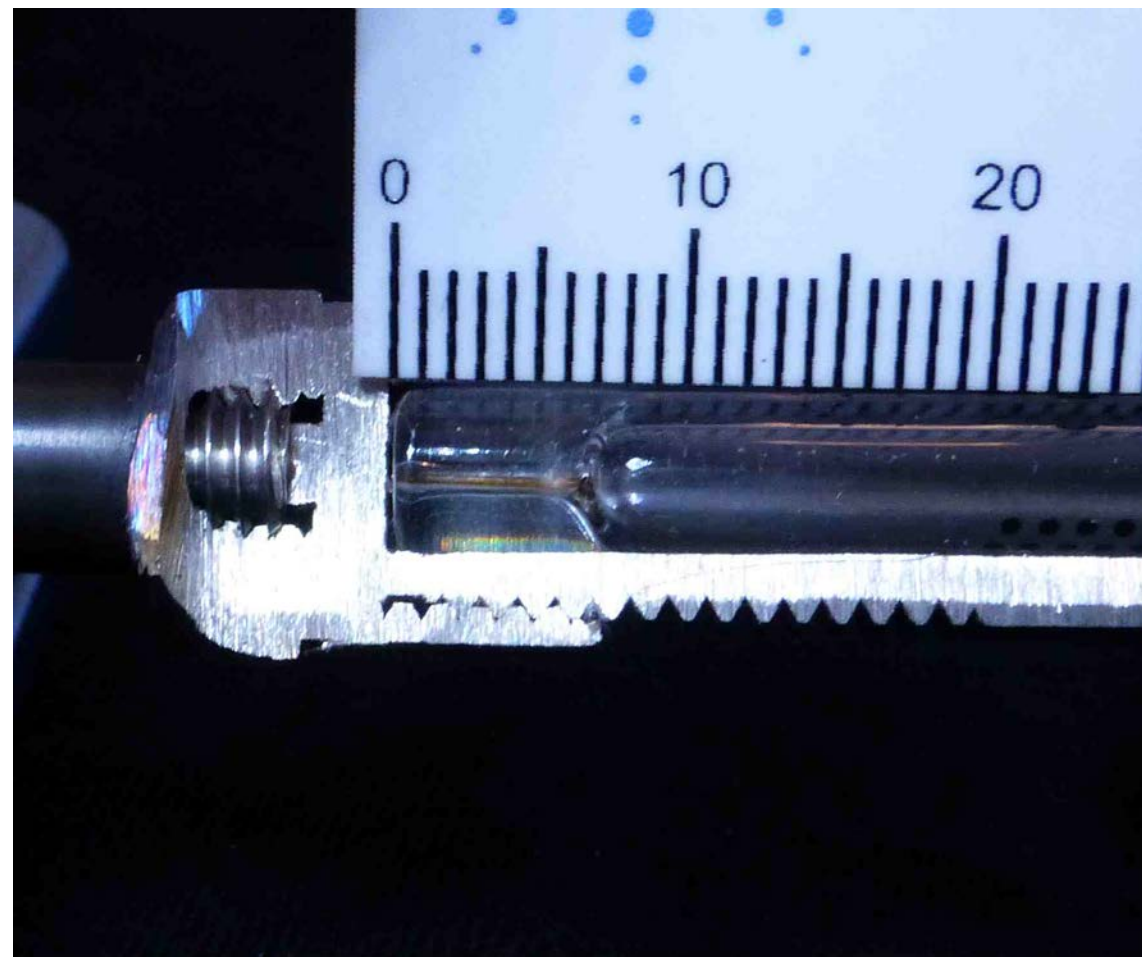


At 6mm extension past the ferrule, the end of the column is right at the top end of the cone at the bottom of this single tapered splitless liner. 4mm extension would put the end near the middle of the cone.

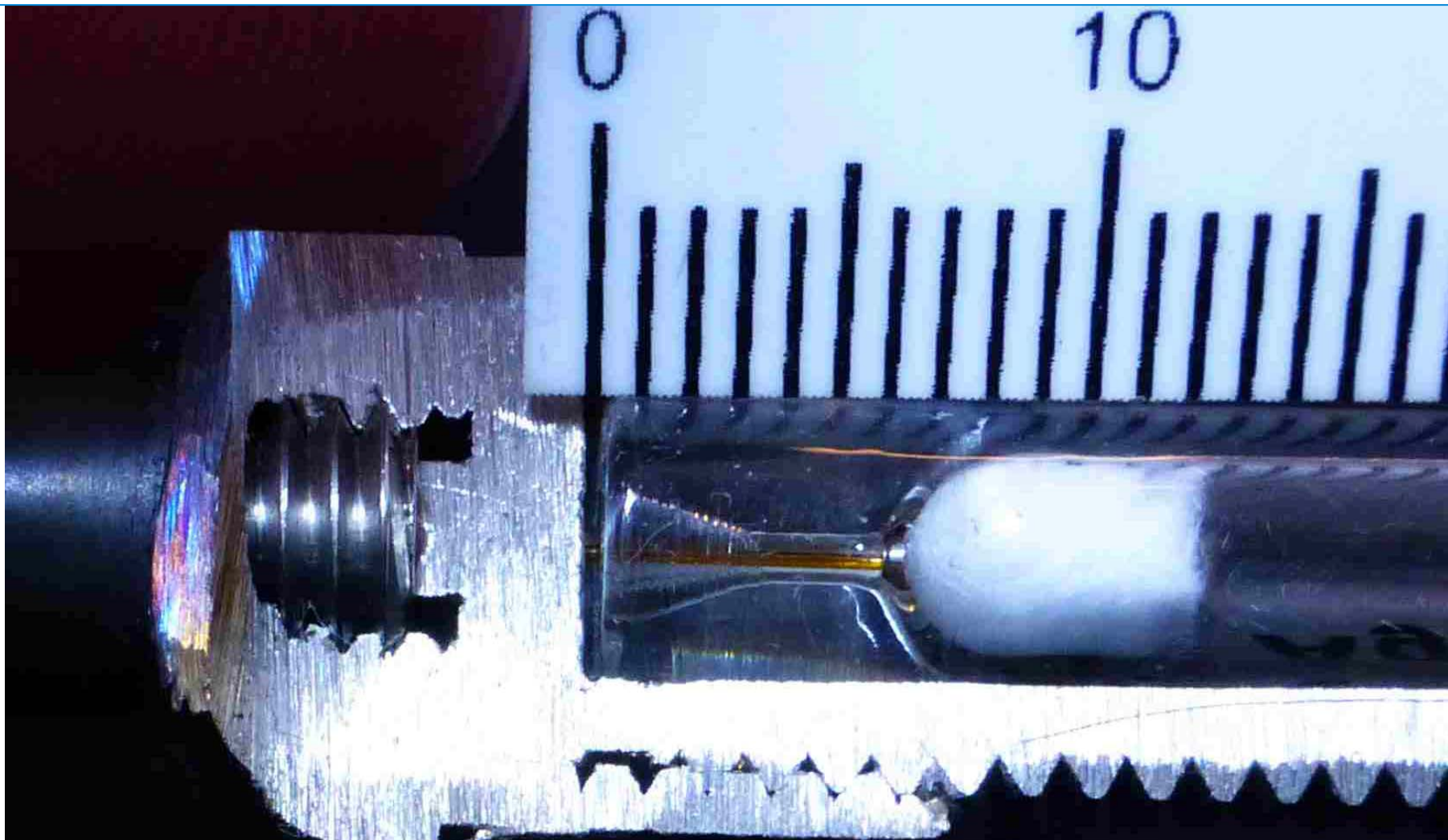


But what if the column gets installed too high? How high is too high?

This is a Split liner and the column is 8.5mm above the ferrule. The column is right at the bottom of the taper.

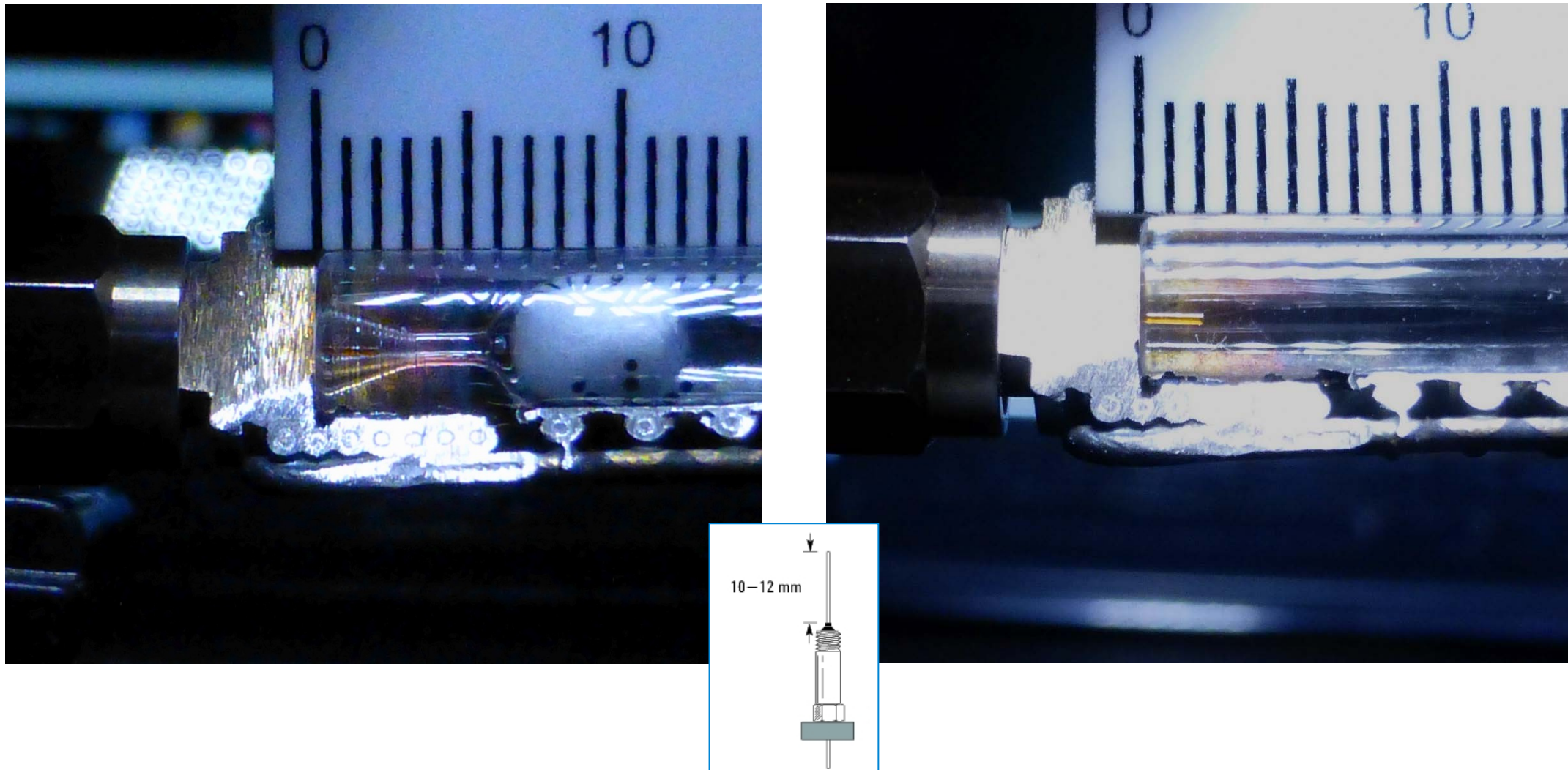


This is a Splitless liner and the column is 8.5mm above the ferrule. The column is right at the bottom of the taper.

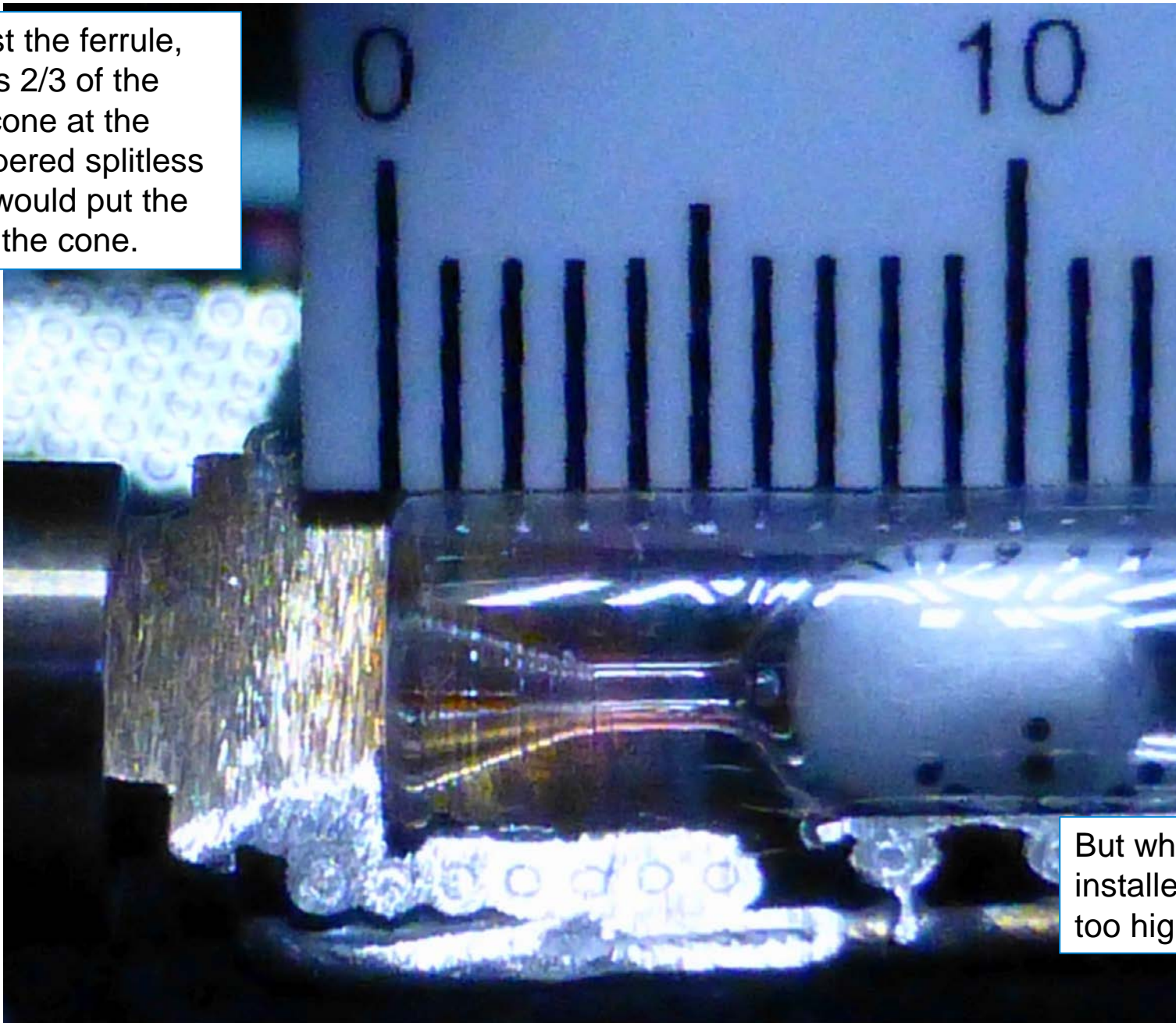


Too low is definitely bad. Below 4mm can cause many issues like boiling point discrimination, reproducibility problems, and poor response. A bit too high is definitely better than too low. In a Split/Splitless inlet, 4 mm up to 8mm is correct. The end of the column is in the narrow tube at the bottom of the liner and anywhere in there is equivalent.

What is the correct column insertion distance for the MMI Inlet? The current “Maintaining Your GC” manuals say **10-12 mm** extending past the ferrule. Here is what 12mm extended looks like inside the inlet itself. This is a Single Tapered Splitless Liner.

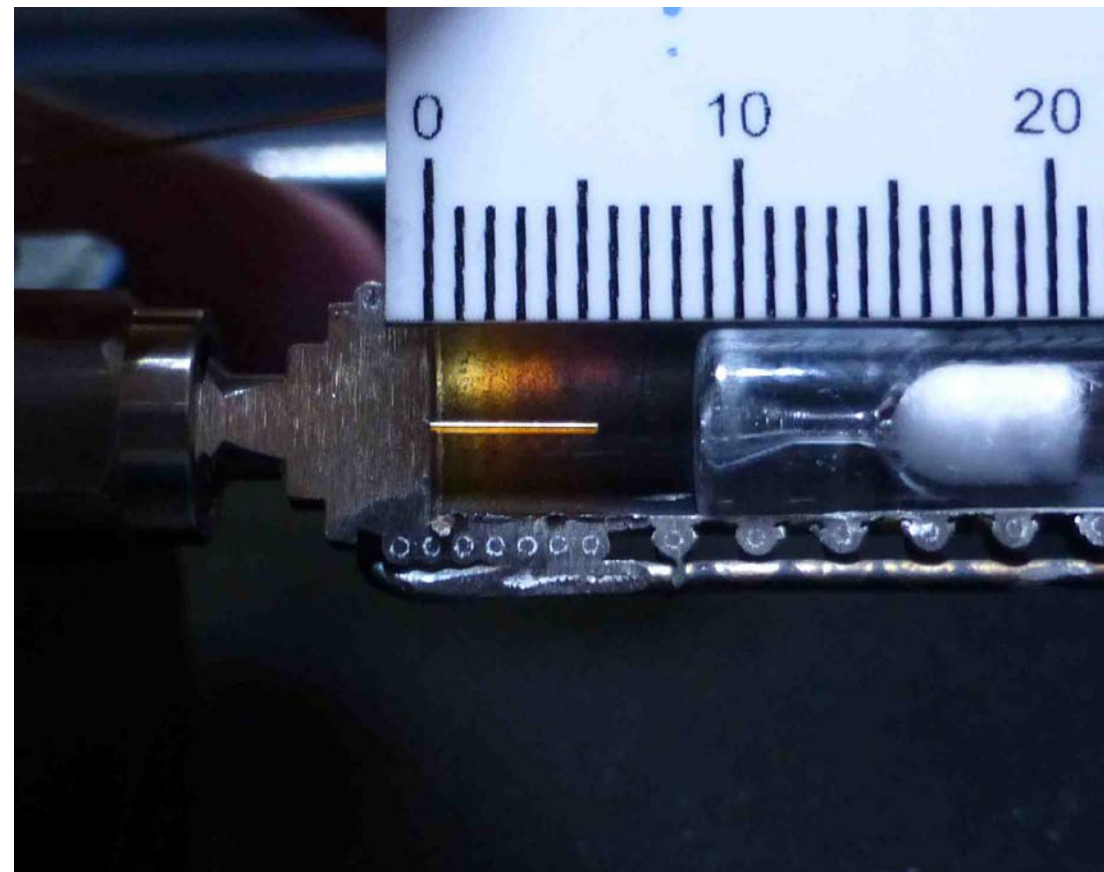
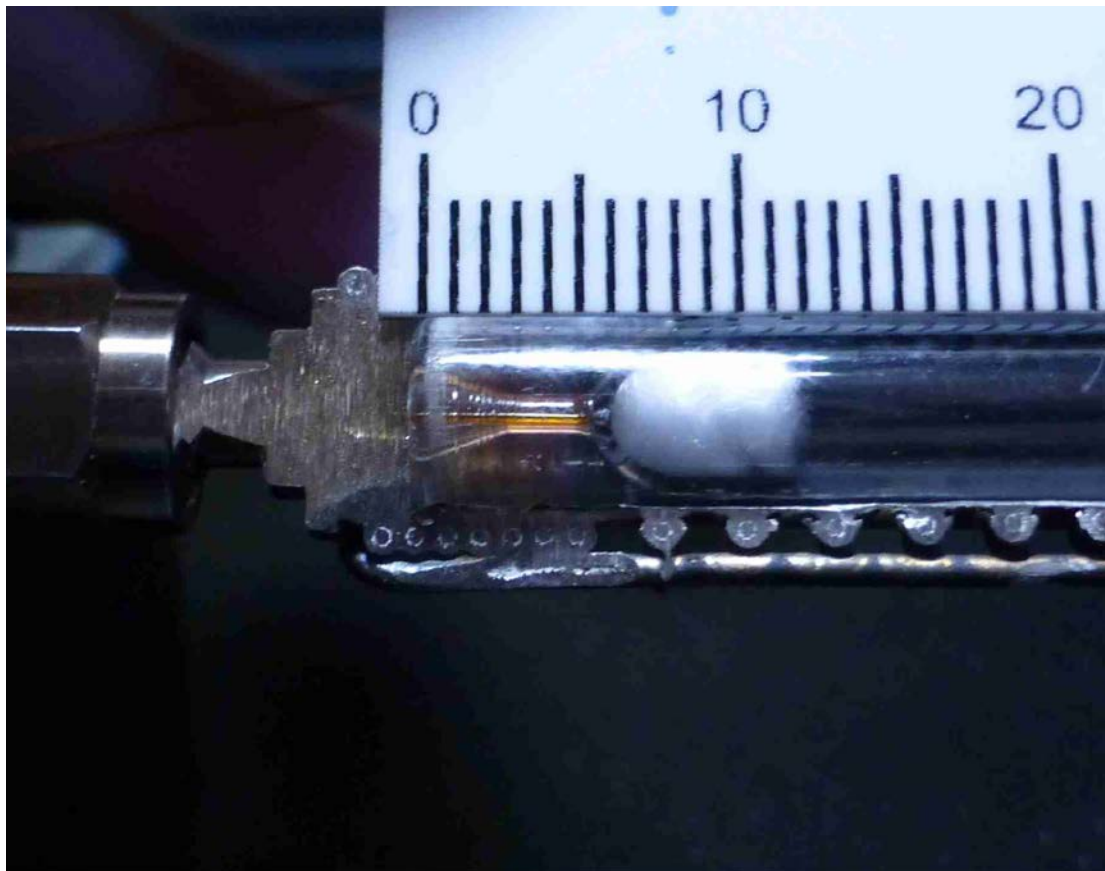


At 12mm extension past the ferrule, the end of the column is 2/3 of the way up the end of the cone at the bottom of this single tapered splitless liner. 10mm extension would put the end near the bottom of the cone.



But what if the column gets installed too high? How high is too high?

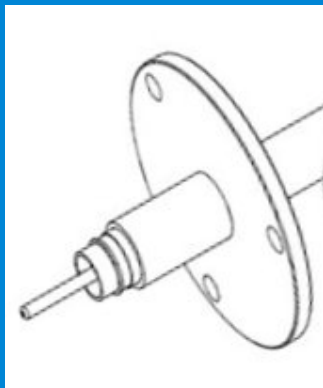
This is with the column 16 mm above the ferrule. The column is right at the bottom of the taper.



Too low is definitely bad. Below 10 mm can cause many issues like boiling point discrimination, reproducibility problems, and poor response. The bottom of the MMI is in the oven and may be too cold for hot injection modes. A bit too high is definitely better than too low. In the MMI 12 mm up to 15.5 mm is correct. The end of the column is in the narrow tube at the bottom of the liner and anywhere in there is equivalent. (see 5991-7619EN)

597Xx, 7000x, and 7010x Mass Spectrometer Transferline

There are two basic types of transferlines*



Captive – where the transferline tip seal is attached to the transferline

Non-Captive – where the transferline tip seal is loose



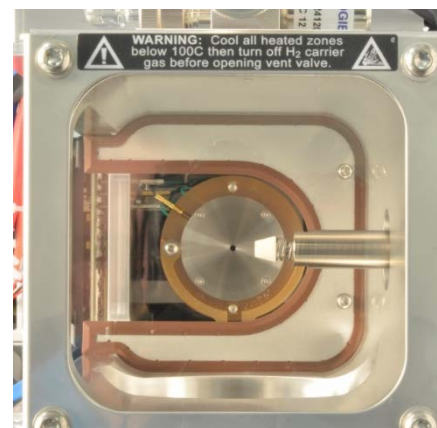
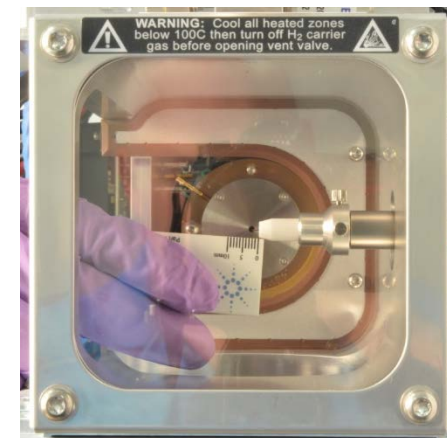
Captive transferline:

Inert/Stainless/Extractor/CI/RIS

- Tip seal removed 1-2 mm exposed
- w/tip seal installed 0 mm exposed

HES/LE-EI

- Tip seal removed 4-5 mm exposed
- w/tip seal installed 2.5 mm exposed - maximum



Non-captive transferline:

EI

- Tip seal removed
 - Inert/Stainless 1-2 mm exposed
 - HES 4-5 mm exposed

CI

- Tip seal removed 1-2 mm exposed

The metal tip of the transferline sits **1.9mm to 2.1mm** down inside the ceramic tip seal.



* There are CI versions with the plumbing attached as well as these tip configurations.

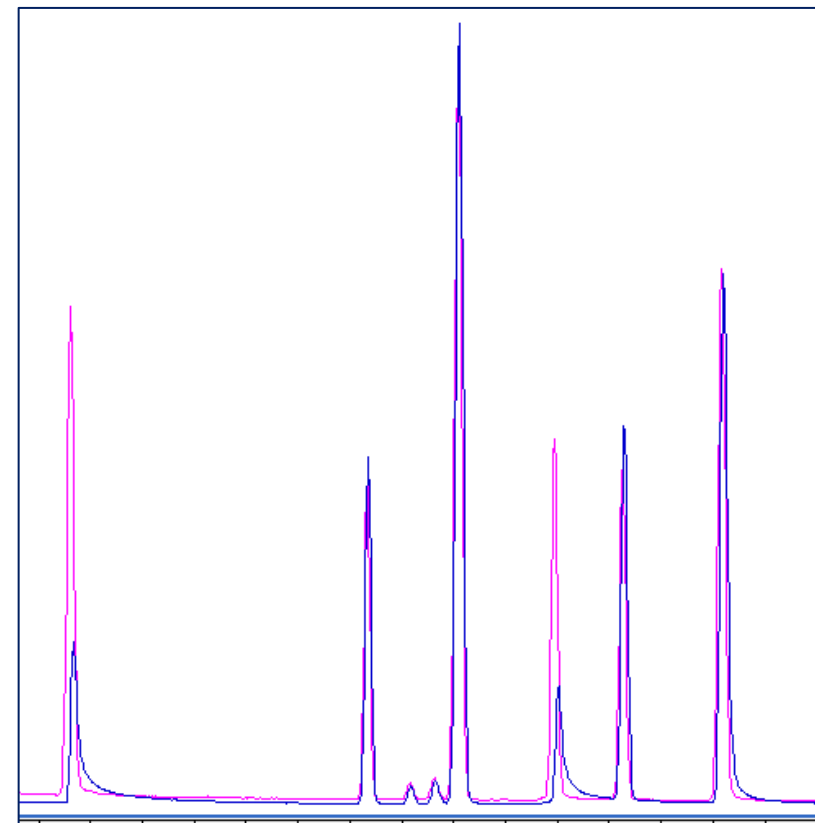
- If the column is installed too far out of the transferline and into the ion source, it is bad.
- A few millimeters extended too far out of the transferline may cause peaks to disappear.
- Pulled too far back into the transferline is not great, but not as bad as too far out. Some peaks begin to tail and some peaks lose response, but it takes a few millimeters or more before it's a problem.
- There were no obvious problems with the peaks tested with the column back 5 mm.

As the car people say, "Your mileage may vary."

- On Orthogonal source systems - SS/Inert/Extractor/CI:
 - Install the column flush with the ceramic transferline tip.
- On Axial source systems – High Efficiency Source (HES):
 - Install the column sticking out of the ceramic transferline tip 2 mm.

And don't worry if it's a tiny bit too short.

Pink is normal column insertion distance
Blue is 2 inches – 50.8 mm pulled back
into the transferline!



Self-Tightening Column Nuts

Capillary Column Ferrules – for use with most brands of column, including DB, HP, CP, VF and Select columns

Column ID (mm)	Ferrule Nom ID	UltiMetal Plus Flexible Metal Ferrule Part No.	Graphite Short Ferrule Part No.	Polyimide Short Ferrule Part No.	85% Polyimide/ 15% Graphite Short Ferrule Part No.
0.025-0.05	0.4		500-2114	5062-3515	5062-3516
0.075	0.4		500-2114	5062-3515	5062-3516
0.1-0.25	0.4	G3188-27501	500-2114	5181-3322	5181-3323
0.1-0.25*	0.5		5080-8853	5062-3513	5062-3514
0.32	0.5	G3188-27502	5080-8853	5062-3513	5062-3514
0.45	0.8	G3188-27503	500-2118	5062-3511	5062-3512
0.53	0.8	G3188-27503	500-2118	5062-3511	5062-3512
No hole					5190-4054



Injection Port Self-Tightening Column Nut with Collar
G3440-81011



Recommended MS Interface Connections

Description	Part No.
Recommended	
Nut	
Self Tightening column nut, for MS interface	G3440-81013
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	short 5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	short 5062-3514
No hole	short 5190-4054



GCMS Transferline Self-Tightening Column Nut with Collar
G3440-81013

