

## New AC TPI with Septum Purge

- **Minimized Carry-Over**
- **Improved repeatability/robustness**
- **Improved IBP/FBP accuracy in SIMDIS analyzers**
- **Eliminates Septum Peaks**

**Keywords:**

**TPI, Septum Purge, SIMDIS**



### INTRODUCTION

Sample introduction is one of the most important factors in gas chromatography. Vaporizing liquids at higher temperatures or with higher programming rates can be particularly challenging as factors such as vapor expansion, discrimination and carry over need to be dealt with.

Key issues in designing inlet hardware are geometry, dead volume, cold spots and inlet temperature profile.

In simulated distillation analyses the sample generally consists of higher boiling components in a very volatile and expansive solvent such as Carbon Disulfide (for D2887/D7213 this is a neat sample with a higher relative volatility). For handling these sample types, AC developed its Temperature Programmable Inlet (TPI) a long time ago. Based on programmed temperature vaporization and optimized for SIMDIS, it is responsible for the AC SIMDIS leading market position.

The next generation TPI now adds a Septum Purge Option to the design.

### NEW TPI with SEPTUM PURGE

The TPI septum purge design consists of a new injector head with purge line, and a flow control unit for regulating the purge flow. This design facilitates a small flow of carrier gas to sweep the area just below the septum and avoid build up from high boiling components, or peaks originating from the septum – especially after repeated injections. The injector head has the septum purge line connection drilled next to inlet line for near zero minimized dead volume. The chamber is milled 0,5 mm deep to prevent any septa suppression the purge hole.

A pressure regulator with fixed restriction supplies a stable back pressure, resulting in pressure-independent purge flows.

Additionally a special gas-line support has been added, to secure tubing and avoid breakage

### RESULTS

The figures below demonstrate the improved performance of the TPI with Septum Purge Option:

- Minimal septum background
- Minimal carry over, even after extended use
- Improved peak shape
- Improved accuracy on TBP

### ASTM D2877 SIMDIS

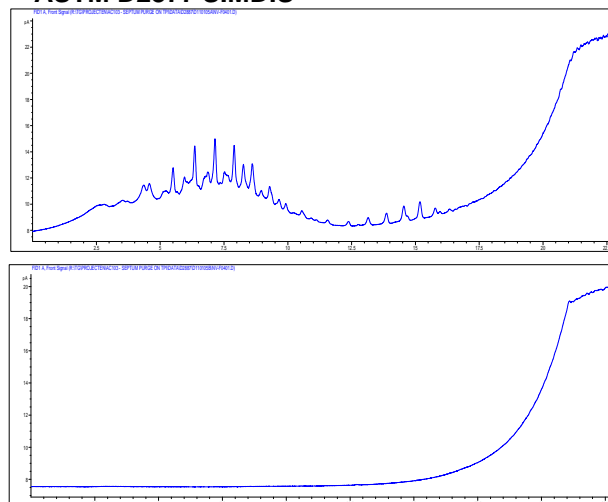


Figure 1: Blank run ASTM D2887 on an inlet without Septum Purge (after extensive use, but peaks visible after a few injections; traces are magnified). TPI with Septum Purge (bottom trace, same zoom) is clean.

## ASTM D7500 SIMDIS

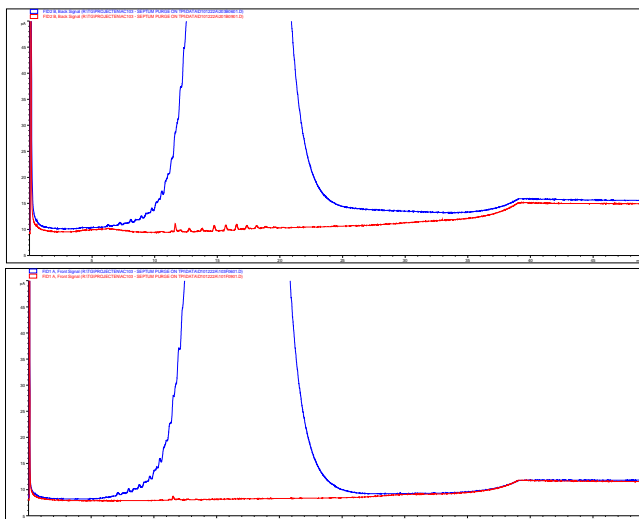


Figure 2: Reference sample and Blank in ASTM D7500 HT SIMDIS (after extensive use). TPI with Septum Purge (bottom trace) is clearly better than inlet without Septum Purge (top trace).

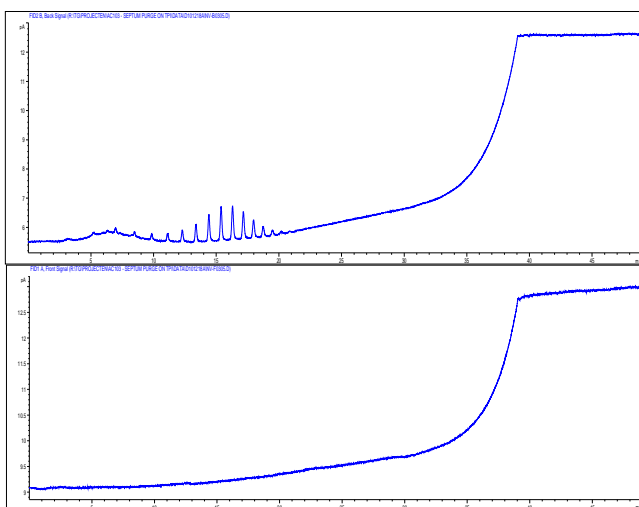


Figure 3: Blank run in ASTM D7500 HT SIMDIS (after extensive use, but peaks are visible after a few injections). TPI with Septum Purge (bottom trace) is clearly better than inlet without Septum Purge (top trace).

With the improved chromatography, the new TPI with Septum Purge ensures a more robust and accurate TBP determination.

Table 1 shows a typical result for TPI with Septum Purge after extensive use. Clearly results are excellent, and no significant shift in FBP was observed compared to reference value.

mass%	BP °C	dBp °C	BP °C	dBp °C
0.5	366	6	366.9	0.9
10	423	3	423	0
20	436	3	436.3	0.3
30	445.5	3	445.3	-0.2
40	454	3	453.3	-0.7
50	462	4	460.6	-1.4
60	469.5	4	468.2	-1.3
70	477.5	4	475.9	-1.6
80	486	4	485	-1
90	498	4	497.7	-0.3
99.5	544.5	8.5	546.1	1.6

Table 1: Typical Boiling Point reports for AC SIMDIS analyzer with TPI with Septum Purge Option.

## CONCLUSION

The improved AC TPI with Septum Purge clearly improves performance for SIMDIS applications. It eliminates septum peaks, carry over even after extended use, and increases accuracy and robustness SIMDIS results – in particular the FBP determination.

All AC SIMDIS Analyzer Systems are standard equipped with the new Septum Purge Option. It can be retrofitted on AC SIMDIS Systems that are currently in use.

## P/N INFO

p/n	Description
80101.600	TPI SEPTUM PURGE SET 7890
80101.610	TPI SEPTUM PURGE HEAD
80101.620	TPI SEPTUM PURGE FLOW CONTROL SET
15.10.406	TPI WRENCH MODEL 2

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