Flowcell for on-line liquid sampling v1.1

Automated liquid sampling combined with gas chromatography (GC) analysis offers a powerful approach for real-time monitoring and optimisation of biological and chemical processes. This technique enables the periodic extraction of small liquid samples without disrupting the process, followed by precise compositional analysis using GC. By integrating automation, the system minimises human error, enhances reproducibility, and provides high-frequency data critical for kinetic studies, process control, and scale-up validation.

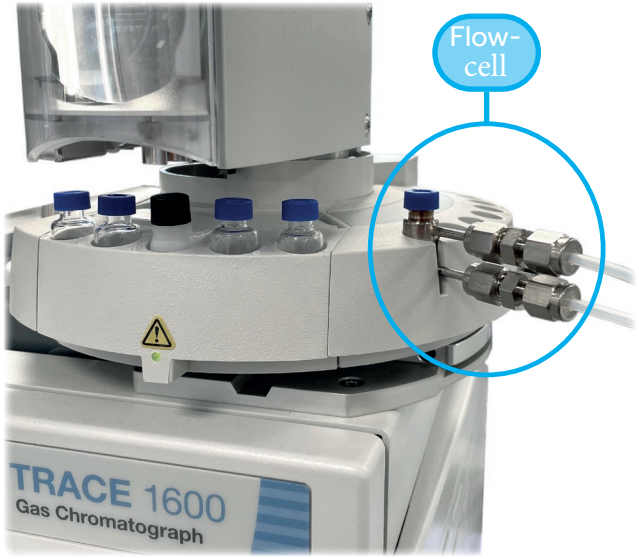

Figure 1 On-line liquid flow cell for automated liquid sampling installed on Thermo Scientific AI 1310/1610 autosampler and TRACE 1600 GC.

Principle of operation:

The automated sampling system enables the transfer of liquid from a reactor to a flow cell positioned in the tray of a gaschromatograph's autosampler. A suitable sample pump is used to draw the liquid through inert tubing into the flow cell, from which the autosampler collects a precise volume for GC injection.

The pump can be operated on a time-controlled basis, allowing precise scheduling of sampling intervals. In the case of pressurised reactors, the internal pressure can be sufficient to drive the liquid through the system without the need for an external pump. For processes with limited sample volume, the system can be configured to flush the flow cell and return the sample back to the reactor or a holding vessel, minimising loss. This setup ensures clean, representative sampling at defined intervals while maintaining system integrity and reducing manual intervention.

Hardware setup

The automated sampling system is based on the Thermo Scientific AI 1310/1610, Triplus and PAL autosamplers. Liquid is transferred from the reactor to a stainless steel flow cell mounted in the autosampler tray. The TRACE GC 1600 gas chromatograph can be configured with different injectors and detectors, depending on the components of interest.

Specification

- Stainless Steel flow cell
- Cell volume 1.7 ml
- 1/8" Swagelok tubing and connections
- Optional basic pump: Diaphragm pump PEEK housing, FFKM seal, 0-8 ml/min, for neutral and aggressive liquids
- Optional precision pump: Dual piston, stainless steel high chemical resistance, 0-10 ml/min, pressure sensor, pressure limit, high flow accuracy

Ordering information:

AA123 - ABCDE (example: AA110-B =Flowcell AI1610, no pump, 1m tube)

2		3		ABCD	
version	code	pump	code	tube length	code
AI1310/1610	1	no pump	0	no tubing	A
Triplus/PAL	2	basic pump	1	1 meter 1/8"PTFE	B
		precision pump	2	2 meter 1/8"PTFE	C
				3 meter 1/8"PTFE	D

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