

# GAS CHROMATOGRAPHY AUTOSAMPLER SYRINGES

CTC PAL® System Combi PAL / PAL Combi-**xt** Headspace



Hamilton offers a headspace syringe featuring a unique plunger designed specifically for the CTC PAL System Combi PAL®-**xt** gas chromatography (GC) autosampler. The High Dynamic (HD) plunger is optimized for high-throughput, excellent reproducibility, and sets a new standard for headspace syringes.

Modern GC headspace analysis, such as ITEX, requires injecting over large temperature ranges. Conventional headspace syringes on the market use a rubber O-ring sealed plunger which has a limited sealing performance at high temperatures due to varying thermal expansion between the different materials. The high dynamic HD-Type syringe employs a unique spring in the plunger tip which compensates for the materials' different expansion coefficients, creating a better seal over a larger temperature range, and it also improves lifetime.

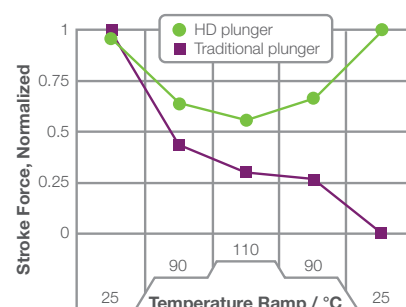
## Market Comparison

A head-to-head comparison with other conventional syringes used for GC headspace demonstrates Hamilton HD-Type syringes perform better in a wider range of temperatures. In the study, sealing performance was estimated by measuring the force needed to move the plunger in the glass barrel. The force was monitored for a temperature ramp from 25°C to 110°C and back to 25°C. The HD-plunger demonstrated improved sealing performance at higher temperatures (110°C and above) and did not lose its sealing properties during cool down as is often a problem with traditional plungers. Instead, the HD plunger dynamically reacted to temperature changes and compensated for the thermal expansion of the PTFE tip, maintaining a perfect seal.

## Benefits of Hamilton CTC PAL System Combi PAL Autosampler Headspace Syringes:

- Unique spring-in-plunger design creates a dynamic seal between the plunger tip and the inside of the glass barrel for leak-free operation
- Excellent performance over a large temperature range
- Increased lifetime compared to traditional headspace syringes
- Improved accuracy and reproducibility of GC headspace analyses

## Sealing Performance of HD and Traditional Plungers



## The HD-Type Syringe Design



## Hamilton HD-Type Syringes are Specially Designed for the CTC PAL System Combi PAL-xt and Combi PAL-xt Extended Autosamplers Sold Under the Following Brands:

- AB SCIEX™
- Agilent
- Alpha M.O.S.
- Antek
- Bruker
- Dionex®
- GE®
- GERSTEL®
- GL Sciences
- Lauda
- LEAP Technologies
- MicroCal™
- MPS
- PERICHROM
- PerkinElmer®
- Shimadzu
- SOTAX
- Thermo Scientific®
- Waters®
- Zoex



Hamilton CTC PAL System Combi PAL syringes are Gastight® syringes with a PTFE plunger tip that creates a tight seal between the syringe barrel and plunger allowing for liquid or gas sampling.

## Ordering Information

Volume	Hamilton P/N	PAL System P/N	Description	Gauge	Point Style
1.0 mL	203082	SYRC HS1.0-23-5	Model 1001 HD CTC SYR	23	5
2.5 mL	203084	SYRC HS2.5-23-5	Model 1002 HD CTC SYR	23	5
5.0 mL	203086	SYRC HS5.0-23-5	Model 1005 HD CTC SYR	23	5
1.0 mL	203141	SYRC HS1.0-26-5	Model 1001 HD CTC SYR	26	5
2.5 mL	203181	SYRC HS2.5-26-5	Model 1002 HD CTC SYR	26	5
5.0 mL	203182	SYRC HS5.0-26-5	Model 1005 HD CTC SYR	26	5

All syringes listed feature a Luer Tip Cemented (LTN) needle termination.

For more information on these and other Hamilton syringes, including information on terminations, point styles, gauges, and other specifications, please visit [www.hamiltoncompany.com/syringes](http://www.hamiltoncompany.com/syringes).

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