

# 450-GC Specification Sheet



## ▶ Dimensions and Weights

Size: 53 cm (h) x 66 cm (w) x 56 cm (d).

Weight: 43 kg.

## ▶ Environmental Conditions

Operating temperatures: 10 °C to 40 °C.

Operating humidity (relative): 5 % to 95 %.

Line voltage requirements: 101 V, 120 V, 230 V ( $\pm 10$  % nominal).

## ▶ Column Oven

Dimensions: 28 cm (w) x 20 cm (d) x 28 cm (h).

Temperature range:

- Ambient temp.: +4 °C to 450 °C.
- With liquid N<sub>2</sub>: -99 °C to 450 °C.
- With liquid CO<sub>2</sub>: -65 °C to 450 °C.

Temperature program ramps/holds: 24/25.

Maximum temperature ramp rate: 120 °C /min for all voltages.

Cool down rate: 400 °C to 50 °C in 4.5 minutes.

Temperature set-point resolution: 1 °C.

## ▶ General Specifications

GC Control: External events (digital output):

- 7 standard.
- 8 optional.

Max number of timed events: 15 x 99.

Heated zones: 7 (including column oven).

Local display and control:

- Display: • TFT full color screen.
- VGA resolution (640 x 480).
- 8.4 " (20 cm).
- Control: • Touch screen.
- Hard keys.

Maximum stored methods: 50 (max 30 alphanumeric characters).

System operational qualities:

- High inertness: sample path UltiMetal™ treatment (optional).
- Low level detection assurance: purged valves (optional).

Logging:

- Run log file (stored with the chromatogram when using Galaxie™ or WSMS).
- Error log file.

## ▶ Communication

Ethernet: Protocol: TCP/IP.

Data rate: 100 Mbps.

Control: GC control and method parameters.

Analog output (optional):

- Number of channels: 3.
- Time programmable steps: 25.
- Output (set individual): • 0-1 V (default).
- 0-10 V.

Synchronization signals with other devices and data systems:

- Ready in.
- Start out.

Data handling and system control:

- GC: Galaxie Chromatography Data System (CDS).
- GC/MS: MS workstation (see GC/MS brochure and datasheet for more information).

## ▶ Certifications

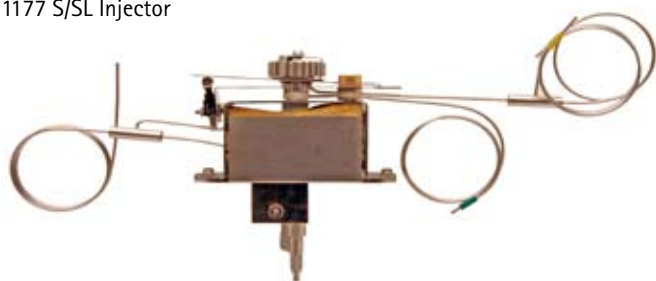
- CSA: C22.2 61010-1  
UL 61010-1
- IEC: 61010-1
- EMC: 47 CFR part 15  
ANSI C63.4  
EN 61326



**VARIAN**

# 450-GC Specification Sheet

1177 S/SL Injector



## ▶ Injector Options

Maximum injectors: three, operating concurrently.  
Pneumatics: Electronic Flow Control (EFC), or manual.  
Columns: Capillary columns, packed column (optional).  
Injector types:

- 1177 Split/Splitless injector (S/SL).
- 1079 Programmable Temperature Vaporizing (PTV).
- 1093 Cold On-Column injector (COC).
- 1061 Flash injector.
- 1041 Packed/Wide bore On-Column injector (PWOC).

## ▶ 1177 Split/Splitless (S/SL) Injector

Pressure range: 0-150 psi.  
Total flow: 500 mL/min at 10 psi.  
Maximum temperature: 450 °C.  
Split range: 1-10,000 (column dependent).  
Suited for columns:

- Wide bore (0.53 mm).
- Narrow bore (0.05 to 0.32 mm).

## ▶ 1093 Cold On-Column (COC) Injector

Pressure range: 0-150 psi.  
Total flow:

- 50 mL/min (Type 3 EFC)
- 500 mL/min (Type 4 EFC).

Maximum temperature: 450 °C.  
Maximum temperature ramp rate: 200 °C/min.  
Temperature ramps/holds: 24/25.  
Suited for columns:

- Wide bore (0.53 mm).
- Narrow bore (0.32 mm).

## ▶ Quick-Switch Valve Option

Instantly switch between injectors/columns and detectors.  
Configurations: automated or manual, factory or field installed.

## ▶ 1079 Programmable Temperature Vaporizing (PTV) Injector

Pressure range: 0-150 psi.  
Total flow: 500 mL/min at 10 psi.  
Temperature range:

- Ambient +10°C to 450°C using air cooling.
- -99 °C to 450 °C using liquid N<sub>2</sub> cooling.
- -65 °C to 450 °C using liquid CO<sub>2</sub> cooling.

Maximum temperature ramp rate: 200 °C/min.

Temperature ramps/holds: 24/25.

Split range: 1-10,000 (column dependent).

Operational modes:

- Large volume injection.
- Temperature ramped splitless.
- Cold on-column.
- Split and splitless.
- ChromatoProbe™ solid sample introduction (optional).

Suited for columns:

- Wide bore (0.53 mm).
- Narrow bore (0.05 to 0.32 mm).

Maximum injection volume: 250 µL (LVI mode).

## ▶ 1061 Flash Injector

Pressure range: 0-150 psi.  
Total flow:

- 50 mL/min (Type 3 EFC).
- 500 mL/min (Type 4 EFC).

Maximum temperature: 450 °C.  
Suited for columns:

- Wide bore (0.53 mm).
- Packed (1/8 " to 1/4 ").

## ▶ 1041 Packed/Wide-bore On-Column (PWOC) Injector

Pressure range: 0-150 psi.  
Total flow:

- 50 mL/min (Type 3 EFC).
- 500 mL/min (Type 4 EFC).

Maximum temperature: 450 °C.  
Suited for columns:

- Wide bore (0.53 mm).
- Packed (1/8 " to 1/4 ").

## ▶ Electronic Flow Control: Injectors (EFC)

Module types: 4 injector-specific modules.  
Accuracy: ± 0.1 psi, 5 % full scale flow.  
Resolution: 0.1 psi or 0.1 mL/min.

# 450-GC Specification Sheet



PFPD Detector

## ▶ Detector Options

Maximum detectors: three: operating concurrently.  
Pneumatics: Electronic Flow Control (DEFC) or manual.  
Columns: Capillary columns standard.  
Optional packed column.

Detector types:

- Flame Ionization Detector (FID).
- Thermal Conductivity Detector (TCD).
- Electron Capture Detector (ECD).
- Thermionic Specific Detector (TSD, also known as NPD).
- Pulsed Flame Photometric Detector (PFPD).
- Pulsed Discharge Helium Ionization Detector (PDHID).
- Mass Spectrometer (MS) (see GC/MS brochure and datasheet).

## ▶ Flame Ionization Detector (FID)

Maximum temperature: 450 °C.  
Detectivity: 2 pg C/sec.  
Linear dynamic range:  $10^7$ .  
Flame tip type: ceramic (patented).  
Operational quality:

- Flame-out detection.
- Auto re-ignition.

## ▶ Thermal Conductivity Detector (TCD)

Maximum temperature: 450 °C.  
Detectivity: 300 pg/mL (Butane).  
Linear dynamic range:  $10^6$ .  
Operational quality:

- Filament protection.
- Automatic bridge balancing.

## ▶ Electron Capture Detector (ECD)

Maximum temperature: 450 °C.  
Detectivity: 7 fg/s Lindane.  
Linear dynamic range:  $10^4$ .

## ▶ Thermionic Specific Detector (TSD)

Maximum temperature: 450 °C.  
Detectivity:

- N: 100 fg N/sec (Azobenzene).
- P: 100 fg P/sec (Malathion).

Linear dynamic range:

- N:  $10^5$ .
- P:  $10^4$ .

Operational quality: self-aligning bead.

## ▶ Pulsed Flame Photometric Detector (PFPD)

Photomultiplier tube:

- S/P (sulfur/phosphorus).
- S/P/N (sulfur/phosphorus/nitrogen).

Maximum temperature: 450 °C.  
Detectivity:

- S: 1 pg S/sec (S/P tube).
- P: 100 fg P/sec (S/P tube).
- N: 20 pg N/sec (S/P/N tube).

Linear dynamic range:

- S:  $10^3$ .
- P:  $10^4$ .
- N:  $10^2$ .

Up to 23 elements can be detected.

## ▶ Pulsed Discharge Helium Ionization Detector (PDHID)

Detectivity: 50 ppb (Methane).  
Linear dynamic range:  $10^4$  (Methane).  
Operational quality:

- Gold plated connections.
- Welded column connections.

## ▶ Electronic Flow Control: Detectors (DEFC)

Module types: 6 detector-specific modules.  
Accuracy:  $\pm 7\%$  set point flow.  
Resolution: 0.1 or 1 mL/min.

*All analytical specifications are applicable under optimal conditions.*

# 450-GC Specification Sheet



## Automation Options

### ▶ 8410 Auto Injector

Sample capacity:

- 10 x 2 mL vials.
- 6 x 5 mL vials.
- 5 x 10 mL vials.

Large solvent wash vial: 2 x 120 mL (optional).

Dual and duplicate mode.

Internal standard addition.

Modes of operation:

- Liquid.
- Ambient headspace (optional).
- SPME (Solid Phase MicroExtraction) (optional).

Pre-programmed modes of injection.

### ▶ 8400 AutoSampler

Sample capacity: 100 x 2 mL vials.

Large solvent wash vial: 2 x 120 mL (optional).

Dual and duplicate mode.

Internal standard addition.

Modes of operation:

- Liquid.
- Ambient headspace (optional).
- SPME (optional).
- Sample heating and cooling (optional).

Pre-programmed modes of injection.

### ▶ CombiPAL™ AutoSampler

Sample trays: two standard, expandable to four.

Tray types:

- 98 x 2 mL vials.
- 200 x 1 mL vials.
- 32 x 10 mL/20 mL vials.
- 96-well plates.

Dual and duplicate mode.

Internal standard addition.

Modes of operation:

- Liquid.
- Heated headspace (optional).
- SPME (optional).

Sample heating and cooling.

Optional modules: additional sample trays, micro-well plate holders, wash station, SPME fiber bake-out station, dilutor, barcode readers, and flowcell.

Varian, Inc.  
www.varianinc.com  
North America: 800.926.3000, 925.939.2400  
Europe The Netherlands: 31.118.67.1000  
Asia Pacific Australia: 613.9560.7133  
Latin America Brazil: 55.11.3238.0400  
Other sales offices and dealers throughout the world—  
check our Web site



GC • LC • MS • GPC/SEC • AA • ICP • ICP-MS • UV-Vis-NIR • FT-IR • Fluorescence • Dissolution • NMR • MRI • FTMS • Consumables • Data Systems  
ChromatoProbe, UltiMetal, Galaxie, Varian and the Varian logo are trademarks or registered trademarks of Varian, Inc.  
in the U.S. and other countries. CombiPAL is a trademark of CTC Analytics AG.

© 2008 Varian, Inc.

SI-1073 03/08 Printed in the UK