Clarus 590 and 690 GC Systems

PRODUCT NOTE

Gas Chromatography

Key Features:

- Delivers 10^7 quantifiable peak dynamic range
- Better characterization of samples with fewer reruns

Wide-Range Flame Ionization Detectors (FID) for the Clarus 590 and 690 GC Systems

With the PerkinElmer Clarus® 590 and 690 Gas Chromatography instruments, analytical laboratories can benefit from increased efficiencies due to the new wide-range FID. The FID technology enables identification and quantification of the very largest peaks and very smallest peaks in every sample in the same chromatographic run. The amplifier used for the new wide range FID has an extended dynamic range of 10^9, enabling chromatographic peaks covering a range of 10^7 to be quantified with precision—without the need to change Range or Attenuation settings.

In fact, since users do not need to manually change the sensitivity of the amplifier to attain this range of magnitude peaks, the Range setting button has been removed altogether on the Clarus 590/690 GC's innovative color touchscreen. The Attenuation control button can be left at x64 for optimum wide-range performance, but can be adjusted for those applications where the user desires greater detail on peaks near the noise level and wide dynamic range performance is not required.

These improvements mean fewer process steps as well as less expertise required of the operator, driving faster and easier set-up and analysis, as well as optimized accuracy and greater throughput.

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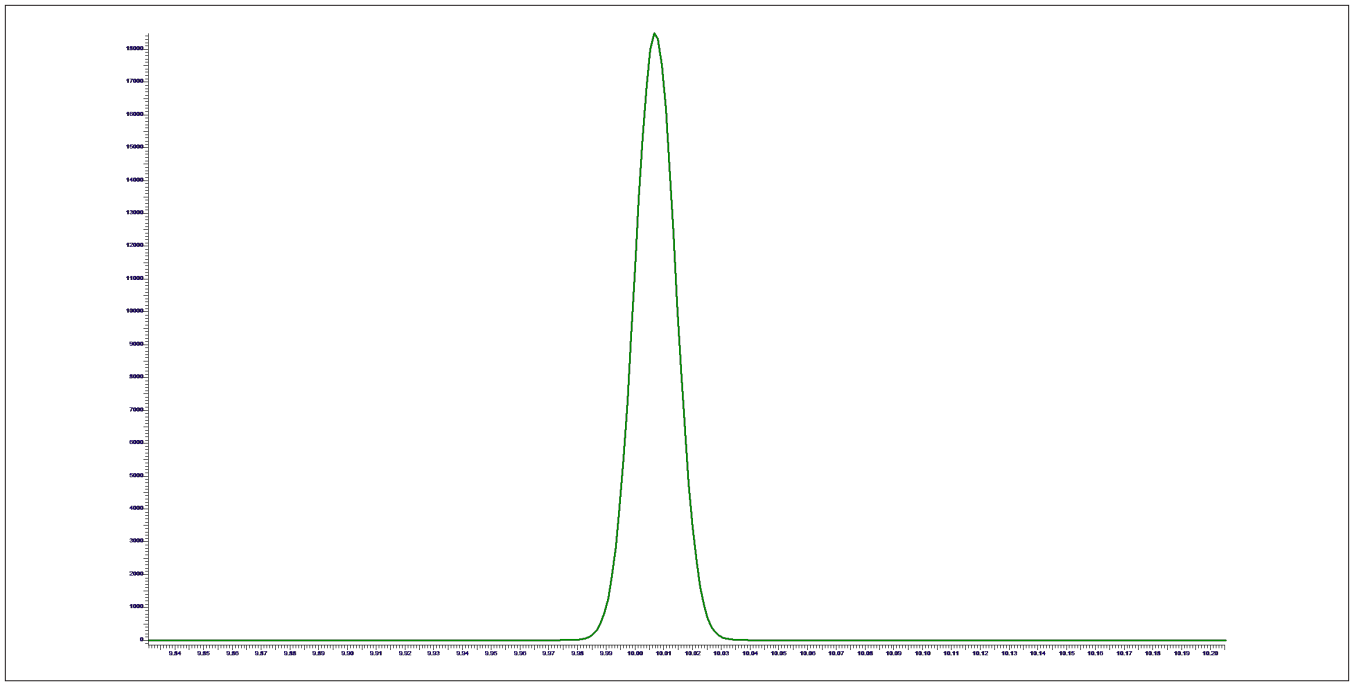

Figure 1. Example (synthetic) chromatographic peak with a height of 1,000,000,000 counts.

Building on the Proven 580/680 Platform

To deliver this performance, the Clarus 590 and 690 instruments build on the familiar 580 and 680 platforms, re-engineered with a combination of hardware and software including a new wide range FID amplifier, a new nozzle assembly with modified polarizing voltage of +50 Volts, a smaller inner diameter jet and a reconfigured collector assembly, as well as re-coded firmware and new drivers and/or LIB files for the appropriate TurboMass™, and TotalChrom®, Thermo Scientific™ Chromeleon™ or Waters® Empower® software. The wide-range amplifier uses a non-linear (square-root) compression algorithm to reduce the amplitude of the analog detector signal, and digitizes it and rescales the output to effectively increase the digital dynamic range.

Since the data from the Clarus 590/690 GCs have been scaled to fit the entire available 10^9 range within the 4-byte data outputted to the data handling systems, users familiar with the 580/680 devices will notice peaks that are ~6x smaller than they would have been using the prior detectors.

Needs no makeup gas

Unlike most other GC FIDs on the market, the Clarus 590/690 platform has no need for makeup gas, reducing system complexity, saving you time and money and reducing upkeep demands on nitrogen gas plumbing.

Greater flame efficiency—with less hydrogen demand than prior models

Due to the redesign, the internal jet diameter in the new FID is now only 0.28 mm, delivering greater efficiency with a lower hydrogen flow rate of only 30 mL/min.

Full color touch screen for outstanding ease of use

First and still one of the only suppliers to offer a large, full-color touch-screen interface, PerkinElmer's Clarus 590/690 detectors display the chromatogram in real time, allowing users the ability to continually monitor signal status. The intuitive display also provides support in eight different languages, reducing training issues even further and driving day-to-day lab efficiencies.

Fastest heat up/cool down optimizes performance

The innovative, high performance oven design of the Clarus 690 provides the fastest available conventional GC heat-up and cool-down rate, enabling shorter injection-to-injection and analytical cycle times, and optimizing sample throughput in your lab. Oven cool-down from 450 °C to 50 °C can be achieved in as little as 1.5 - 2 minutes.

The new PerkinElmer 10^7 peak dynamic range flame ionization detector designed for Clarus 590/690 GC systems provides a valuable increase in quantifiable peak range for those applications where this capability is needed, as well as delivering the traditional strengths of PerkinElmer GCs—such as ease of use and robust and reliable performance—to every lab, every application, every day. In addition, customers will also benefit from fast and cost-effective upgradability from their existing Clarus 580/680 GC systems. All Clarus 590 and 690 gas chromatographs configured with FIDs are currently shipping with this new wide range system.

Table 2. Specifications for current and new wide-range FID systems.

Metric	Current FID	Wide-Range FID
Air flow designed to minimize contamination and residue buildup	Yes	Yes
1/8 in. fittings	Yes	Yes
PPC pneumatics – software flow control of hydrogen and air	Yes	Yes
Flame out warning and ready interlock	Yes	Yes
Auto ignite if flame out detected	Yes	Yes
Operating temperature	100 °C to 450 °C in 1 °C increments	100 °C to 450 °C in 1 °C increments
Minimum detectable quantity	$< 3x10^{-12}$ g Carbon/sec octane at a S/N = 2 to 1	$< 3x10^{-12}$ g Carbon/sec octane at a S/N = 2 to 1
Dynamic range	$>10^8$	$>10^9$
Linear quantifiable range	$>10^6$	$>10^7$
Signal filtration	50, 200, 800 msec	50, 200, 800 msec
Input range	x1, x20	Not required
Makeup gas	Not required	Not required

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