# CALIDUS$^{tm}$ 101 HT micro Gas Chromatograph

Simulated Distillation GC analysis for virtually any hydrocarbon fuel or fuel blend component up to $C_{50}$ for laboratory, at-line, transportable or online use.

- **Upstream (E&P)**
- **Petrochemical/Chemical**
- **Educational**
- **Refining**
- **Military**

**CALIDUS Model 101 HT -** comprised of 3 modules fitted with high temperature inlet and column operational components

A single Sample Processing Unit with a standard split/splitless injection port (1:1 up to 1:200) suitable for gas and liquid samples via either syringe through the septum injections, optional gas, liquid or headspace auto-sampler, or automated sampling valves. The inlet includes septum purge to prevent bleed components from entering the system. The maximum operating temperature is 350°C.

A single Programmed Temperature Column Module containing a high temperature resistively heated steel capillary chromatography column with necessary hardware, software and electronic control to enable temperature programming from 0.1°C to 5°C per second from 5°C above ambient to 400°C. The column is Mxt 1-HT for high temperature simulated distillation gas chromatography.

A single Detector Module incorporating a micro Flame Ionization Detector (FID) with the necessary hardware, software and electronic control to provide detector temperature control (350°C maximum), digital output signal and additionally for proper FID fuel supply pressure and auto-ignition.

> The micro FID is a fully digital carbon/hydrogen bond detector using the hydrogen flame to burn the sample components. It uses an electrometer to sense the current changes in the flame cell due to chromatographic component elution. The data rate is 100 Hz.

CALIDUS 101-HT is controlled with ChromPerfect chromatography data system fully integrated with LineUp and SimDist 2000 running on a Windows PC. An ASTM method for Ultra Fast Micro GC D-2887 is currently under development based on CALIDUS 101-HT.

FALCON
Fast Analytical Solutions & Technologies

100 AEI Drive
Fairlea, WV 24901
P.O. Box 518
Ronceverte, WV 24971

Phone: 304-647-5860
Fax: 304-645-4006
E-mail: info@falconfast.net

**SIGNIFICANCE AND USE**

The Model 101 HT provides a simple ultra-fast (10 to 50 times faster than conventional lab or process GC's) simulated distillation analysis for hydrocarbons to $C_{50}$. This system is ideally configured for liquid fuels and fuel component characterization by boiling range distribution including gasoline range organics up through gas oil and even crude oil.

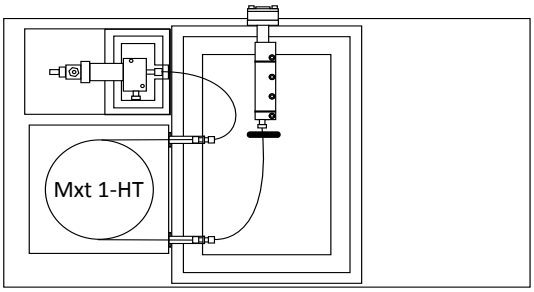
The analyses are used for exploration & production liquids characterization, fuels specification testing, regulatory evaluations, environmental measurements, process control, transportable spot check of fuels and many more.

**Faster, Smaller, Smarter, Easier, Greener**

# CALIDUS™ 101 HT Specifications (global patents pending)

December 1, 2010

**Ambient Environment**
Operating Temperature Range: 0°C to 35°C
Storage Temperature Range: -20°C to 60°C
Relative Humidity Range: 0 to 100% (non-condensing)

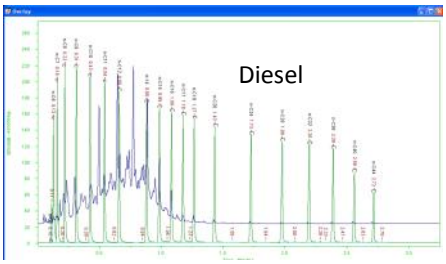



**Power Requirements**
Less than 300 watts peak power at startup, practical use < 200 Watts for gas or liquid analyses
24 VDC supplied from external power supply, 100-240VAC using 50/60Hz AC

**Safety**
General purpose, light industrial (lab instrument environment)
CE Mark and Nationally Recognized Testing Laboratory (NRTL) certified pending (TUV Rheinland)

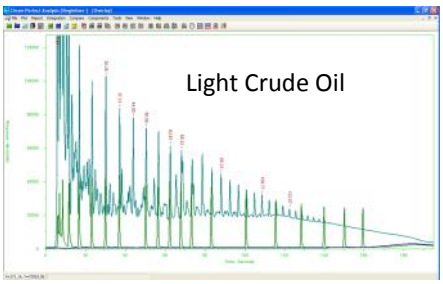
**Gas Supplies**
50 PSIG, 99.995% $H_2$ or He at up to 250 ml/min, 50 PSIG zero air for FID operation

**Sample Requirements** (via split/splitless injector with septum purge)
Air or gaseous samples at 0 to 50 PSIG at ambient temperature
Membrane, SPME and static and dynamic headspace extracts
Direct liquid injections neat or dilute organic solvents (DCM, hexane, MEK, toluene, methanol, $CS_2$ etc.)




**Dimensions**
17" wide by 8.5" deep by 11" high, ~ 20 lbs
Uninterrupted power supply and data acquisition computer external to the base unit

**Controls/Outputs**
All functions and parameters via ethernet or RS-232 using ChromPerfect™ software
Start analysis from keyboard or GC
Set method from external computer using ChromPerfect software
50-100Hz digitization (detector dependent) on each column, 24 bit resolution, auto zero on each run
Trigger in and ready out signals plus an array of others via ChromPerfect




**Front Panel Displays**
Temperature and pressure readings, function on/off, other
Power on/off
Status of analysis columns (isothermal, programming, cool down, ready, cycles run, other)

**Standard Equipment**
One capillary column, 2m long, 100µm, Mxt 1-HT, temperature programmable from 0.1 to 5°C per second from 5°C above ambient to 400°C (maximum temperature software limited to be no greater than the limit for the Mxt 1 HT column installed, isothermal operation is available).
Flame ionization detection, data rate 100 Hz
Gas and liquid inlet for syringe injection of samples or automated gas and liquid sample valves available

**Performance** (application dependent)
Repeatability of ± 1% RSD or better (area) and of ± 0.1% RSD or better (retention times)
Analysis times for fuel and fuel components: can be <60 seconds and up to 300 seconds
Dynamic range: depends on detector used and application (FID typically $10^5$)

**Data Processing and Instrument Control**
Note: computer system is integral and necessary component of the analysis system and includes the following requirements:
- RS-232 or USB to RS-232 adapter, ethernet
- Windows XP or newer operating environment
- ChromPerfect software for single column data acquisition via RS-232 serial or ethernet ports
- CALIDUS 101 HT comes with LineUp peak alignment and Simdist-2000 simulated distillation software fully integrated.

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