

# GOW-MAC® Series 590 DID Gas Chromatograph



Trace Gas Analysis

Electronic, Specialty & Industrial  
Bulk Gases

High sensitivity - Impurity levels  
in the low ppb range

Bench or 19" rack mount

Stainless steel or corrosion  
resistant materials

## Detector

The Series 590 DID GC contains a single, GOW-MAC® patented\* discharge ionization detector (DID) which is non-radioactive, universal, and concentration dependent. The detector uses an electrical discharge in helium to generate high energy UV photons and metastable helium which ionizes all compounds except helium. The DID exhibits a dynamic range of < 5 ppb to < 1% by volume.

The most significant feature of the DID is the utilization of an electrical discharge as the radiation source, not a radioactive source. Series 590 DID Gas Chromatographs in operation have displayed a stability and reliability not generally attributed to ppb detection. Performance is equal to or better than detectors with conventional radioactive sources.

The extremely sensitive DID is placed in a helium purged housing to eliminate possible system contamination. Background noise and detector limits are dependent upon the use of an ultrapure helium carrier gas. The entire installation must also be clean and leak-tight. The system is designed to prevent contamination by utilizing bellows type metering valves and by locating gas sample valves in a helium purged housing.

Sample gas "memory" within the system has been eliminated through the use of sample isolation valves. This configuration has proven to be reliable with faster and easier start-up.

\*U.S. Pat. No. 4,975,648

## System

The Series 590 DID GC is offered in several different configurations, each having a unique valving and flow system to accomplish a variety of trace impurity gas applications. When a base gas other than helium is to be analyzed, the separation of the trace impurities from the base gas peak is critical to the analysis. Each system has been developed to chromatographically manipulate this base gas peak.

All Series 590 DID GC systems can be manufactured with corrosion resistant materials. Corrosion resistant refers to the wetted surface area that comes in contact with the sample. All Series 590 DID GC systems are available in either 19" rack or bench top chassis.



*Rack Mounted Series 590 GC*

## Electronics

Electronics for the Series 590 DID GC consist of a high voltage detector power supply and an electrometer amplifier. The DID Power supply provides the high voltage necessary to produce the ionization arc in the DID. Readout occurs on two separate LED displays; one for the discharge current (mA) and one for the dc voltage.

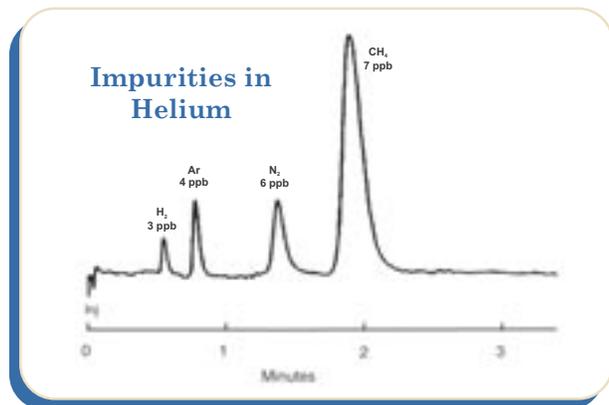
**SB-590**



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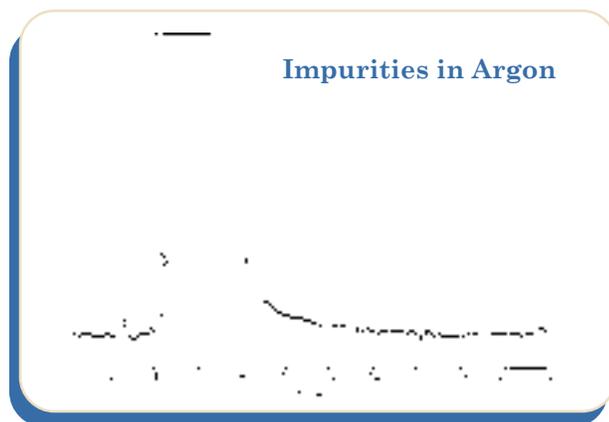
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An electrometer amplifier converts the DID output current to a voltage signal. This signal is fed through a 4-step programmable gain amplifier covering the ranges of  $10^{-9}$ ,  $10^{-10}$ ,  $10^{-11}$  and  $10^{-12}$ . The signal then goes through a 12-step output attenuator (1 to 1024 plus infinity).



### Temperature Controls

Temperature controls are solid state proportioning type with direct dial setting. Temperature readout for the column oven and detector is displayed on a digital LED meter. Selector switches are used to set and read the desired temperature.



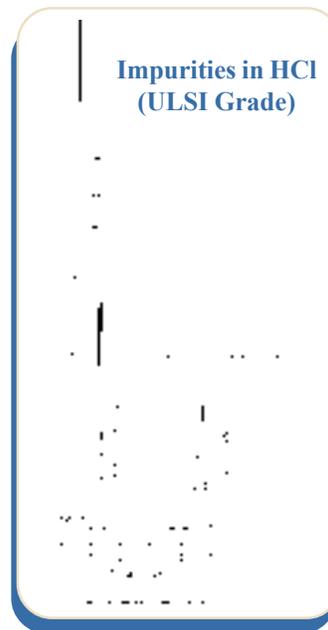
### Column Oven

The column oven temperature of the Series 590 DID GC is proportionally controlled. A centrifugal blower circulates and distributes heated air, thereby eliminating temperature gradients. Platinum temperature sensors, linear throughout a temperature range of ambient to 300°C, ensure excellent reproducibility of column temperatures. Columns of appropriate length and kind, with 1/8" VCR® connections, are quoted for a specified type of analysis.

### Flow System

Two gases are required to operate the Series 590 DID GC. Ultra-high purity helium is used for both the carrier gas and the discharge gas. Zero grade helium is used for purging the detector and valve housing, and to actuate all valves. Bellows metering valves are used to control the carrier gas flow throughout the system. The zero grade helium gas flow is controlled by independent needle valves. All critical gas connections possess 1/4" VCR® fittings.

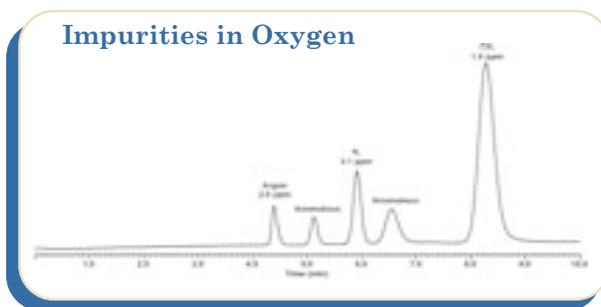
The GOW-MAC® Series 590 GC with Discharge Ionization Detector is a complete, dedicated gas chromatographic system requiring only data handling and a few accessories.



### Data Handling Capabilities

#### *Software*

GOW-MAC offers the powerful Chrom Perfect® chromatography software. A variety of interactive PC chromatography data software packages are available. Each package differs in the degree of remote instrument control and requested comprehensive data handling and reporting capability. A chromatographer can create methods, design custom reports, view calibration curves, acquire and process data, and create and run batch sequences from a single window. Chrom Perfect requires the use of at least a 486 PC with Windows® 3.1.



## Specifications

### Column Oven

Dimensions	10"W x 4 1/2"D x 7 1/2"H (25.64 cm x 11.54 cm x 19.23 cm)
Temperature Range	Ambient to 300°C
Temperature Readout	3 1/2 digit LED digital display meter
Temperature Control	Solid state, time proportioning, RTD sensors, direct reading, ambient to 300°C
Oven Capacity	Can accommodate up to four (4) 20' to 30' 1/8" columns

### Detector

Type	Discharge Ionization
Design	low volume
Sensitivity	<10 ppb CH <sub>4</sub>
Carrier Gas	Ultra-high purity helium
Discharge Gas	Ultra-high purity helium
Temperature Range	Ambient to 120°C
Linearity	> 10 <sup>5</sup>

### Gas Flow

Valves for separate flow control of purged housing and helium actuated valves.

Bellows-type metering valves for separate flow control of column carrier gases and detector discharge gas.

### Detector Power Supply

Output	Continuous, stable adjustment, from zero to rated voltage and current by means of an external zero
Linearity	±1% full scale
Accuracy	1% of rates, ± 1% of setting
Output Voltage	0 - 1.5 kV
Output Current	0 - 10 mA
Stability	0.01%/hr after 1/2 hour warm-up
Ripple:	10 μV
Input:	115/230Vac ±10%, 50-60 Hz, 0.5A/0.25A
Temp. Coefficient:	50 ppm/°C over the range 0 to +50°C
Stability:	0.01%/hr; 0.02%/8hrs after 1/2 hr warm-up
Protection:	Short circuit output is limited to <120% of the max. rated output current. Arc protected and self restoring. Provision for remote TRIP input is included. Includes input line fuses.

### Electrometer Amplifier

Circuit	Solid state FET operational amplifier powered by voltage regulated hybrid regulator circuit
Sensitivity	1.5 x 10 <sup>-12</sup> amps at maximum
Dynamic Range	1 x 10 <sup>6</sup>
Noise	With cable ±2 μV at maximum
Drift	<2 μV/hr under controlled environmental conditions
Input Ranges	10 <sup>-9</sup> , 10 <sup>-10</sup> , 10 <sup>-11</sup> , 10 <sup>-12</sup> A/mV
Output Ranges	Binary, 1 to 1024 plus infinity (∞)

### Power Requirements

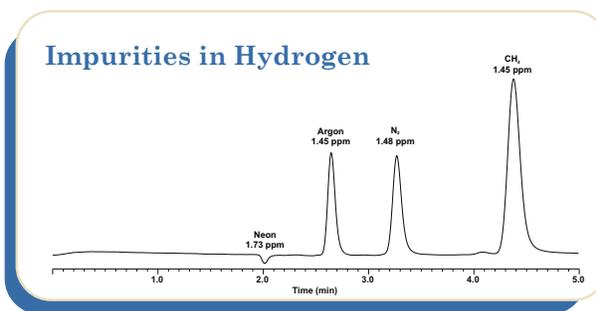
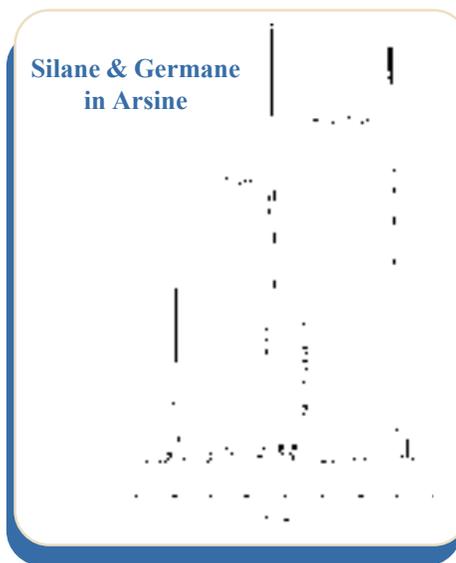
Series 590	105 - 125 Vac, 60 Hz
Series 592	200 - 240 Vac, 50 Hz
Circuit Breaker	Series 590: 10 amp Series 592: 5 amp

### Overall Dimensions

Bench Top	26"W x 23"D x 12 1/2"H (66.67 cm x 58.42 cm x 58.97 cm)
Rack Mount	19"W x 23"D x 21"H (48.26 cm x 58.42 cm x 53.34 cm)

### Weight

	Bench Top	19" Rack Mount
Net	125 lbs. (56.70 kg)	140 lbs. (63.76 kg)
Shipping	140 lbs. (63.76 kg)	165 lbs. (74.84 kg)



## Ordering Information

Each Series 590 is custom built to a particular application. Call GOW-MAC or your local representative to discuss the details of your specific requirements.

## Accessories

Model	75-500	He Purifier, H <sub>2</sub> Separator, & O <sub>2</sub> Trap System
Model	75-800	Noble Gas Purifier
Model	75-850	Hydrogen Separator
Model	75-900	Oxygen Trap
Model	21-050	Mini Gas Leak Detector
Model	21-250	Deluxe Gas Leak Detector
Part No.	180-567	Digital Flowmeter (for non-corrosive gases)
Part No.	180-380	Digital Flowmeter (for corrosive gases)
Part No.	59-595	Complete DID Accessory Package (REQUIRED to install and operate a GOW-MAC DID-GC system)



Visit our web site at  
**[www.gow-mac.com](http://www.gow-mac.com)**  
to view product information,  
descriptions and applications for  
additional GOW-MAC® products



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