

# GDS850A Atomic Emission Spectrometer

## Specification Sheet

<b>Optics</b>	0.75 meter focal length f/10, Paschen-Runge mounted simultaneous vacuum spectrometer
<b>Grating</b>	2400 groove/mm holographic standard; (3600 groove/mm; 1800 groove/mm optional)
<b>Spectral Range</b>	120 to 600 nm (800 nm optional)
<b>Resolution</b>	<0.025 nm over the spectral range
<b>Maximum Channels</b>	58 channels (all channels have background correction and multi-scan capabilities); 56 channels with RF option installed
<b>Source</b>	4 mm diameter DC glow discharge source (optional 2 and 7 mm for DC); 2 and 4 mm diameter RF source also available (optional)
<b>Vacuum System</b>	Dual-stage direct-drive vacuum pump for spectrometer chamber with inert gas bleed to prevent pump oil back streaming; second identical pump for GDL evacuation
<b>Sample Cooling</b>	Automated water-cooled puck for thin and other temperature sensitive materials
<b>Temperature Stability</b>	Thermostatically-controlled spectrometer chamber to a tolerance of $\pm 0.1^{\circ}\text{C}$
<b>Gas Requirements</b>	Argon 99.998% pure @ 40 psi (2.8 bar) $\pm 10\%$  Compressed air or other inert gas @ 40 psi (2.8 bar) $\pm 10\%$ ; source must be oil and water free
<b>Nominal Environmental Operating Conditions</b>	Temperature: 50 to 86°F (10 to 30°C); Relative Humidity: 20 to 80% (non-condensing)
<b>Power Requirements</b>	Measurement Unit: 230 V~ ( $\pm 10\%$ ; at max load), 50/60 Hz, single phase grounded supply, 13A, 10,300 BTU/hr
<b>Dimensions</b>	Width: 35 in. (87 cm) Length: 55 in. (140 cm) Height: 51 in. (130 cm)
<b>Weight</b>	1370 lb. (621 kg)
<b>Total Shipping Weight</b>	1860 lb. (844 kg)

### Available Models

The GDS850A can be configured with:

- Single/Dual Spectrometer Configuration
- RF Source for Non-conductive Materials
- Bulk Analyses Only
- Bulk and Quantitative Depth Profile Analyses
- RF-Only
- High Vacuum Turbo Kit for VUV Elements (with heated window)

### Options

612-455	RF Kit for Non-Conductive Materials
611-518	QDP Kit for Depth Profiling
620-785	RF Non-Conductive Cooler, 115V
620-786	RF Non-Conductive Cooler, 230V
612-881	2 mm Lamp Kit 98; DC
615-699	7 mm Lamp Kit 98; DC
612-924	2 mm Lamp Kit 98; RF
612-933	Reamer - Soft Materials (4 mm DC Source)
612-708	Sample Holder, Wires
612-798	Sample Holder, Briquettes
612-774	Sample Holder, Porous Samples
612-775	Sample Holder, TRS Bar Holder
612-625	NWA Quality Analyst Software
TBD*	Color Inkjet Printer Kit
TBD*	Dot Matrix Printer Kit
617-737	15 in. Flat-Panel Monitor
710-172	19 in. Flat-Panel Monitor
686-024	24 in. Widescreen Flat-Panel Monitor
615-763	SmartLine® Modem-Based Remote Diagnostics
710-198-B/O	SmartLine Internet-Based Remote Diagnostics

V~ denotes VAC.

\*Please consult your LECO sales engineer or quotation for current part numbers.

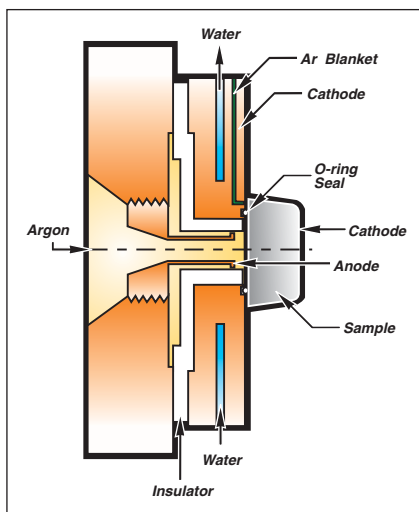


## The Sputtering Process

- The Glow Discharge Spectrometer (GDS) lamp provides a low pressure argon environment (typically 5-10 Torr) over the sample surface.
- A high negative potential (typically -800 to -1200V) is applied to the sample. The sample thus becomes the cathode.
- Spontaneously produced Argon ions ( $Ar^+$ ) are accelerated across the anode/cathode gap by this potential.
- The collision of  $Ar^+$  ions with argon gas molecules causes plasma formation and further production of  $Ar^+$  ions. This plasma is called a glow discharge.
- Some of these high velocity  $Ar^+$  ions reach the sample surface where they sputter (or mill out) materials uniformly from the sample substrate.
- Some of this sputtered material diffuses into the glow discharge plasma where it is dissociated into atomic particles and finally excited.
- The light emitted from these excited state species as they collapse back to a lower energy level is characteristic of the elements composing the sample.
- The wavelengths and intensity of the light emission are used to identify and quantify the composition of the sample.

## GDS Advantages

- Layer-by-layer removal of material allows for qualitative and quantitative depth profile analysis
- Separation of sampling (sputtering) and excitation resulting in:
  - Freedom from metallurgical history
  - Fewer matrix effects
- Grimm-type Lamp design provides lowered self-absorption and material re-deposition
- Linear calibration curves with wide dynamic range
- Fewer lines required to analyze full concentration range
- Linear calibrations require fewer standards for calibration
- Fewer spectral interferences due to:
  - Narrow emission lines
  - Excitation of almost exclusively atom lines
- Very little sample-to-sample carry-over allows quick matrix changes
  - Automatic cleaning between samples
  - No sputtering of anode or other lamp components
- Low reference material consumption
  - More burns before required resurfacing
  - Shallower burn spots requiring less material removal during resurfacing
- Low gas and other consumable consumption
- Very easy to operate
- Quiet, clean, and low maintenance



**GDS Source**

Specifications and part numbers may change.  
Consult LECO for latest information.

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