

# GDS850A Atomic Emission Spectrometer

## Specification Sheet



<b>Optics</b>	0.75 m 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 $\pm 0.1$ °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>Environmental Conditions</b>	
Operating Temperature:	10 °C to 30 °C (50 °F to 86 °F)
Relative Humidity:	20 to 80% (non-condensing)
<b>Sound Pressure</b>	57 dBa (max reading at operator's level per IEC/EN 61010-1)
<b>Power Requirements</b>	230 V~ ( $\pm 10\%$ ; at max load), 50/60 Hz, single phase grounded supply, 13A; 10,300 Btu/hr
<b>Dimensions</b>	51 in H x 55 in W x 35 in D (130 cm H x 140 cm W x 87 cm D)
<b>Weight (approx.)</b>	1400 lb (635 kg)
<b>Shipping Weight (approx.)</b>	1840 lb (835 kg)
<b>Regulatory</b>	Not EU RoHS compliant; No CE marking

### Available Models

The GDS850A can be configured with:

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

### Options

619-580-107	Sample Holder, Wires	686-551	24 in. Widescreen Flat-Panel Monitor
612-798	Sample Holder, Briquettes	621-453-110	Deskjet Printer Kit
612-774	Sample Holder, Porous Samples	611-457	PC Table with Adjustable Tray
612-775	Sample Holder, TRS Bar Holder	686-550	19 inch Monitor Kit
612-625	NWA Quality Analyst Software	710-198-B/O	SmartLine® Remote Diagnostics

V~ denotes VAC.

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

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## 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 ( $\text{Ar}^+$ ) are accelerated across the anode/cathode gap by this potential.

The collision of  $\text{Ar}^+$  ions with argon gas molecules causes plasma formation and further production of  $\text{Ar}^+$  ions. This plasma is called a glow discharge.

Some of these high velocity  $\text{Ar}^+$  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:

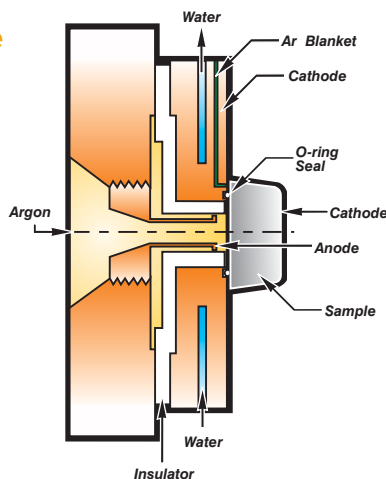
- More burns before required resurfacing
- Shallower burn spots requiring less material removal during resurfacing

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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