GDS500A Glow Discharge Spectrometer
Specification Sheet

Optics	Horizontal-centered sphere with convex grating
Detector	Charge-coupled array with 12,000 active pixels (0.007 mm W x 0.2 mm H)
Spectral Range	Complete spectral coverage (165 nm to 460 nm)
Dispersive Focal Length	0.225 m
Source	4 mm diameter DC glow discharge (2 mm optional)
Vacuum System	Two stage, direct drive vacuum pump for spectrometer and source with air bleed to prevent pump oil vaporization
Temperature Stability	Regulated at 104°F (40°C)

Gas Requirements

Source/Spectrometer:	Argon, 99.998% purity, 40 psi (2.8 bar) ±10%
Pneumatics:	Inert Gas, 99.99% purity; 40 psi (2.8 bar) ±10%

Nominal Environmental Operating Conditions

Temperature:	64 to 86°F (18 to 30°C)
Humidity:	20 to 80% (non-condensing)

Electrical Power Requirements	230 V~ (±10%; at max load), 50/60 Hz, single phase, 6 A, 4,800 BTU/hr
Dimensions	46.5 in. H x 41 in. W x 31.5 in. D (118 cm H x 105 cm W x 80 cm D)
Weight	530 lb. (239 kg)
Shipping Weight	~1000 lb. (450 kg)

Part Numbers

GDS500C	GDS500A Package with PC, 15 in. flat-panel monitor, software

Options

612-625	NWA Quality Analyst Software
617-737	15 in. Flat-Panel Monitor
710-172	19 in. Flat-Panel Monitor
686-024	24 in. Widescreen Flat-Panel Monitor
611-457	PC Table with Adjustable Tray
612-708	Sample Holder; 2 mm wires
612-774	Sample Holder; Porous Samples
612-775	Sample Holder; TRS Bars
612-798	Sample Holder; 13 mm; Briquettes
621-434-110	Deskjet Printer Kit
612-917	Dot Matrix Serial Printer Kit
615-763	SmartLine® Modem-Based Remote Diagnostics
710-198-B/O	SmartLine Internet-Based Remote Diagnostics
618-227	2 mm Lamp Kit

V~ denotes VAC

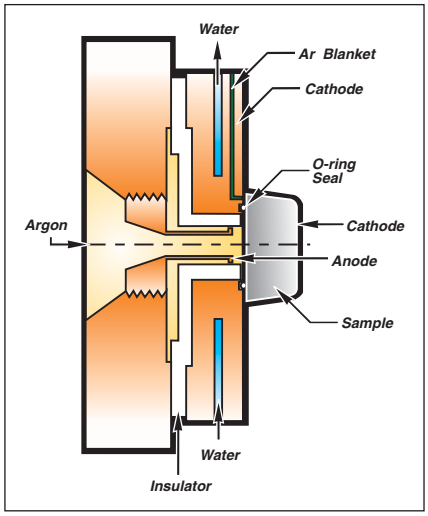
The Sputtering Process

- 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 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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