YOUNG LIN INSTRUMENT

YL9180 / YL9181 ELSD (Evaporative Light Scattering Detector)

Our new ELSD is an essentially universal detector, primarily used in High Performance Liquid Chromatography (HPLC). Young Lin ELSD is an ideal substitute,or supplement to, traditional HPLC detectors for liquid chromatography concentration detection.

In comparison to other ELSD detectors, Young Lin ELSD has the ability to vary the split ratio smoothly over a wide range with a new patented (Patent No. US 7,290,723 B1) Thermo-Split Technology. This precise vapor phase control combines a gentle bend with a temperature controlled spray chamber.

This means that with one low cost detector you can handle high volume as well as difficult to evaporate mobile phases optimally, efficiently and easily, all without sacrificing sensitivity.

- Sensitive Detection for a Wide Variety of Chemical Classes and Structures
- Patented Thermo-Split™ Technology for Precise Vapor Phase Control (Patent No. US 7,290,723 B1)
- A single multi-flow, nebulizer for use with micro-bore to semi-preparative flow rates.
- Very low detector volume resulting in the smallest peak within 3 sec
- Fast Start-up / Easy to Use
- No Consumable Parts
- Low Cost of Operation

	YL9180 ELSD	YL9181 ELSD
Display	2 Line x 20 Character per line VFD	
User Interface	Two multi-function buttons	Four multi-function buttons
Evaporative Zone Temp.	60°C	Ambient to 120°C
Thermo-Split™ Chamber Temp.	30°C to 60°C	10°C to 70°C
Liquid Flow Rate	0.2mL/min to 3mL/min	0.2mL/min to 5mL/min
Wetted Materials	Stainless steel, glass, anodized aluminum, Teflon™	
Light Source	670 nm Laser Diode, <5mW	
Detector	Hermetically sealed photo-diode/operational amplifier	
Interface	RS232, Contact Closure	
Typical Laboratory	General Laboratory	Advanced Research
Sensitivity	More Sensitive	Highly Sensitive

Operation

The YL9180 (9181) ELSD employs a unique method of detection. The process involves the nebulization of the column eluent, transforming it into an aerosol cloud. As this cloud travels through a heated zone within the instrument, the more volatile mobile phase evaporates, leaving a smaller cloud of analyte particles. These particles pass through a beam of light, scattering some of the light, which is converted into an electronic signal.

Nebulization

Nebulization transforms the liquid phase leaving the column into an aerosol cloud of fine droplets. The size and uniformity of the droplets are extremely important in achieving sensitivity and reproducibility. The YL ELSD uses a special concentric flow nebulizer and a constant flow of an inert gas to ensure a narrow droplet size distribution. Our nebulizer is constructed entirely from Teflon®, which accumulates deposits less than either glass or stainless steel.

To handle flow rates and mobile phases common in HPLC, all ELSDs need a way to divert part of the aerosol cloud to waste. YL ELSD uses a patent pending **Thermo-Split technology.** Our **Thermo-Split** chamber combines a gentle bend with temperature controlled walls. When the aerosol exiting the nebulizer encounters a cool environment, it partially condenses into larger particles whose momentum carries them into the wall and down the drain.

Fig.1.: *With cooling, the particles condense and increase in size. They are carried into the walls of the bend and exit via the drain.*

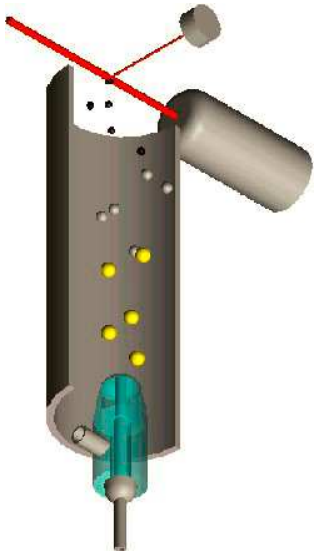
With the Temperature control option installed, the temperature of the Spray Chamber may be elevated. As the aerosol traverses the chamber, it partially evaporates, shifting the particle size distribution low enough for essentially all the particles to negotiate the bend. These operating conditions may be useful for special applications. Under these conditions a majority of the aerosol particles pass through the chamber and are carried into the evaporative zone.

Fig.2. *With heat, the particles decrease in size and all pass the bend in the Thermo-Split chamber.*

Evaporation

After passing through the nebulization chamber the aerosol cloud is propelled through the heated evaporation tube assisted by the carrier gas. In the evaporation tube the solvent is volatilized to produce particles or droplets of pure analyte.

The temperature of the drift tube is set at the temperature required to evaporate the solvent. The temperature is kept as low as possible to avoid particle shape distortion, evaporation of the analyte or when working with thermally sensitive compounds.



Detection

The particles emerging from the evaporation tube enter the optical cell, where the sample particles pass through the light emitted by a low power laser. The particles scatter the light, which is detected by a silicon photodiode located at a 90°angle from the laser. A light trap is located opposite the laser to collect the light not scattered by particles. The quantity of light detected is proportional to the solute concentration and solute particle size distribution. The photodiode produces a signal, which is sent to the outputs for collection.