



EVAPORATIVE LIGHT SCATTERING DETECTORS FOR HPLC

**Superior HPLC Detection: Replace
or Complement Your Current Detection**

**Exclusive, Patented Thermo-Split Technology
Highest Sensitivity—Lowest Cost**

What is an ELS Detector?

SoftA Evaporative Light Scattering Detectors (ELS Detectors) are essentially universal detectors, primarily used in High Performance Liquid Chromatography (HPLC). ELS detectors are an ideal substitute, or supplement to, traditional HPLC detectors for liquid chromatography concentration detection.

ELS Detectors offer significant advantages over conventional UV and RI detectors:

- ELS Detectors detect everything in your sample independent of a compound's absorbance, fluorescence or electroactivity.
- ELS Detectors respond universally to a wide variety of analytes to accurately compare the actual component ratios.
- ELS detection is compatible with most solvents and fast gradients for better separations.
- ELS Detectors save time by accurately quantifying without pre- or post-column derivitization.
- ELS detection provides excellent baseline stability and sensitivity.
- ELS detection maintains maximum resolution and minimal peak dispersion for your high speed separations.

How an ELS Detector works

An ELS detector employs a unique method of detection. The process involves three steps: nebulization, evaporation and detection.

Nebulization

In the first step, the SoftA ELS detector 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. SoftA ELS Detectors use a concentric gas nebulizer and a constant flow of an inert gas to achieve the required consistency.

Evaporation

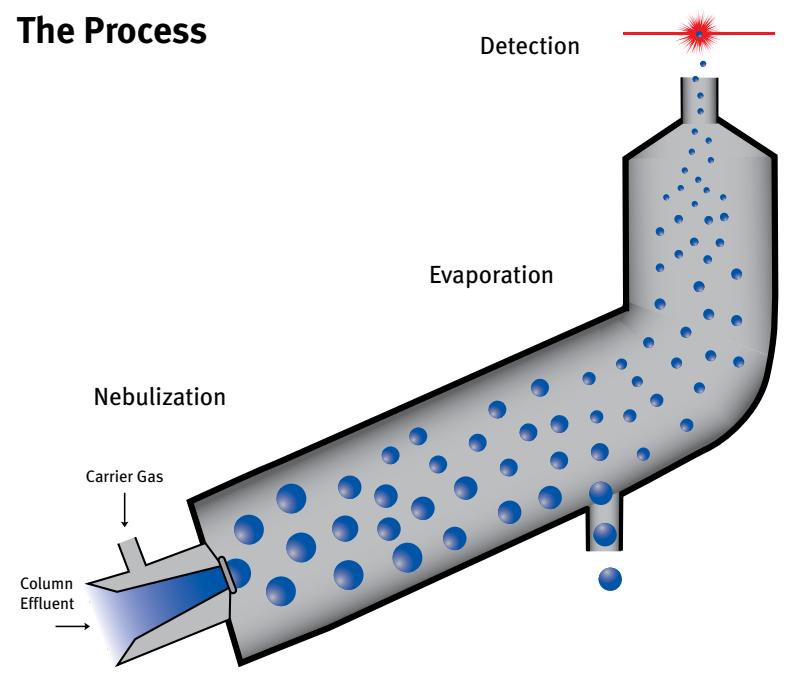
The aerosol cloud is propelled through the heated evaporation tube assisted by the carrier gas. In the evaporation tube the solvent is volatilized to produce particles or droplets of pure analyte. The temperature of the drift tube is set at the temperature required to evaporate the solvent. The design of the SoftA drift tube provides evaporation of solvents at low temperatures to minimize the evaporation of the compound of interest and increases sensitivity.

The total swept volume of the detector is critical to maintain narrow peak widths, especially important for work with small column volumes. The SoftA ELS detectors feature extremely low swept volume and minimum peak dispersion.

Detection

The particles emerging from the evaporation tube enter the optical cell, where the sample particles pass through a beam of light. The particles scatter the light. A light trap is located opposite the laser to collect the light not scattered by particles. The amount of light detected is proportional to the solute concentration and solute particle size distribution. SoftA ELS detectors guarantee years of stable detection by employing a laser diode light source instead of a short-lived halogen lamp. This eye-safe laser, when combined with our high gain and wide range photo-diode detector, provides at least 3 orders of magnitude detection without changing gain or range.

The Process



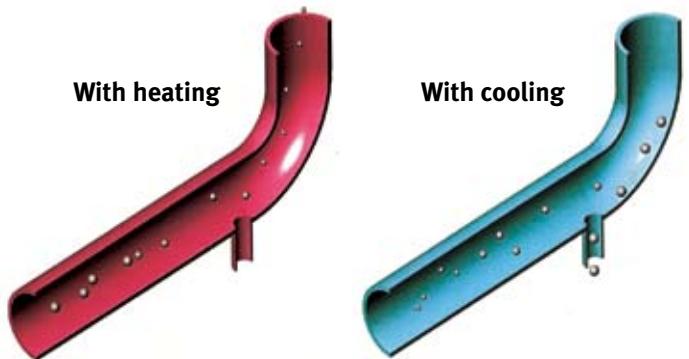
Unique SofTA Technology

Exclusive Thermo-Split™ Technology

HIGHEST SENSITIVITY - ULTIMATE CONTROL

All ELS detectors divert part of the aerosol cloud to accommodate high flow rates and mobile phases common in HPLC. SofTA has developed a new patented (Patent No. US 7,290,723 B1) Thermo-Split

With heating



With cooling

Technology that has the ability to vary the split ratio smoothly over a wide range. This precise vapor phase control combines a gentle bend with a temperature controlled spray chamber.

For easy to evaporate mobile phases, the walls are heated. 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.

For difficult to evaporate mobile phases, or high flow rates, the walls are cooled. When the aerosol exiting the nebulizer encounters a cooled environment, it partially condenses into larger particles whose momentum carries them into the wall and down the drain. By making the walls cold, a portion of the vapor phase is diverted away from the evaporative zone.

The ultimate benefit of Thermo-Split technology is that it can be controlled in a smooth analog fashion, by simply controlling a temperature. The temperature of the nebulization zone can be set from 10°C to 70°C, in 1°C increments. This achieves split ratios of approximately 99% to 1%. Unlike some ELS detectors, our splitter isn't always on. And unlike others, it isn't constrained to the two choices of either on or off. Instead, it can be on, off, or anything in between. This patented technology was invented by SofTA Corporation, and is exclusive to our products.

All SofTA ELS detectors use Thermo-Split Technology to provide full control of the ratio of mobile phase to analyte particles. This ratio can be optimized for increased sensitivity and varying flow rates or mobile phase gradients. 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.

How to choose an ELS Detector

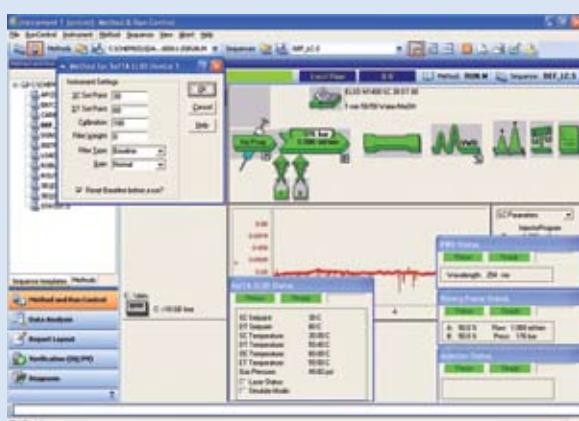
- DO try a variety of instruments in your lab with your samples. SofTA will provide you with an instrument to evaluate. Ask other manufacturers to do the same.
- DO compare how easy each detector is to set up and use. Compare how each detector handles gradients, semi-volatile compounds, and fast chromatography.
- DO NOT rely only on published sensitivity specifications. The ultimate sensitivity is limited by the physics of light scattering, and is very similar for all instruments. However, other important properties, such as baseline stability, dynamic range, signal to noise ratios at working concentrations, peak width and peak shape are profoundly influenced by instrument design. Choose the detector that demonstrates the best chromatography for your application, not the optimized method used for published sensitivity data.
- DO look inside. Are the common maintenance items, such as nebulizer, light source, and light trap, easily accessible? Is the instrument neatly assembled? Are all thermal components well insulated? Are electrical components clear of, and not underneath, liquid lines?
- DO consider cost of ownership. Ask for pricing on common replacement parts. You will find the SofTA ELS detectors to be the most cost-effective solution.

SofTA's ELS Detectors

SofTA Corporation offers five ELS Detector models; one is perfect for your laboratory whether it is a high throughput, advanced research, quality control or educational lab. Regardless of the model you choose, you'll get the most advanced, easiest to use ELS Detector.

High Throughput and Software Controlled

These NEW Models are the first Evaporative Light Scattering Detectors designed for use with Rapid Resolution and Ultra Performance LC Systems. They maintain the peak widths obtained with these systems. These are our fastest ELS detectors yet, with the narrowest peaks of any ELS Detector, peak widths less than 1 second. The narrow peak widths provide for the extremely high sample throughput required in today's laboratories. Narrow peaks also result in improved signal to noise making this series of detectors about 2 times more sensitive than our other models. The 1300 and 1400 have been designed with physical dimensions to fit with almost all manufacturers' LC systems including Agilent 1100 and 1200, Perkin Elmer Series 200 and 275, Hitachi LaChromUltra, Jasco XL-C, Thermo Accela, and Shimadzu Prominence. The ELS Detector is placed in the instrument stack to conserve bench space and reduce the tubing length between the autosampler, or UV, and the ELS Detector.



Communication between the ELS detector and system software, either ChemStation or DataApex Clarity, is achieved via an exclusive SofTA driver. An analog output is provided for use with other system software.



The Model 1400 features a 5" full color WVGA display and can be controlled via system software or a USB mouse and keyboard.



The Model 1300 performance mirrors that of the Model 1400 but uses a 2 line LCD display and multifunction touch sensitive keys for the user interface.

High Performance Research Systems

Our Model 300S is ideal for any advanced research laboratory requiring extremely high sensitivity, high flow rates, or analysis of semi-volatile compounds. It provides both heating and sub-ambient cooling of the Thermo-Split chamber for superior ELS detection. Two filter algorithms allow for adapting the instrument to either conventional or fast liquid chromatography. With 3+ orders of magnitude dynamic range, the 300S allows a user to quantify an analyte and still see an impurity.



The Model 300S features an easy to use and learn 4 button interface, as

well as an informative dual zone display. Instrument output is always displayed, along with one other user selected instrument parameter. Changing the secondary parameter is as easy as using the up and down arrows on the keypad.

Because the Model 300S is oriented toward a research environment where a wide variety of analytical methods may exist, it can store and recall 10 different instrument profiles. Profiles (methods) can be created to optimize for commonly encountered HPLC conditions and analytes, then re-loaded with a few key strokes.

During start-up, the Model 300S performs an extensive series of diagnostic checks, ensuring instrument functionality. And unlike ELSDs from other manufacturers, the 300S controls internal temperatures from the nebulizer all the way to the exhaust tube. Fluctuations in laboratory temperature during the course of a day, or from season to season, have negligible effect.

With its clog-free 100% Teflon nebulizer, long life laser, wide ranging adaptability, and a price thousands less than the competition, the Model 300S is a great choice for demanding users.

Quality Control and Educational Laboratories

These detectors meet the requirements of any laboratories looking to add ELS detection technology for repetitive analysis or higher concentration samples.

The Model 200S accommodates common HPLC mobile phases and flow rates by controlling the Thermo-split chamber and evaporation zone temperatures at ambient or higher.



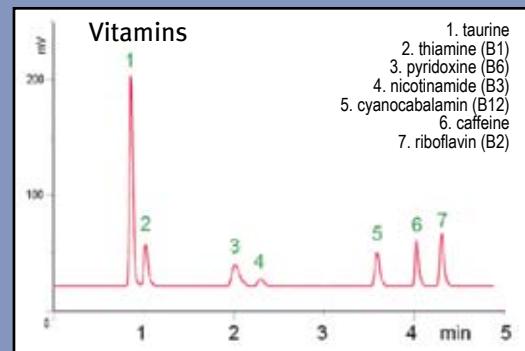
The Model 100, our lowest cost ELS detector, has been designed to replace conventional HPLC detectors in most laboratories. The Model 100 can easily accommodate common HPLC conditions using the preprogrammed primary method.



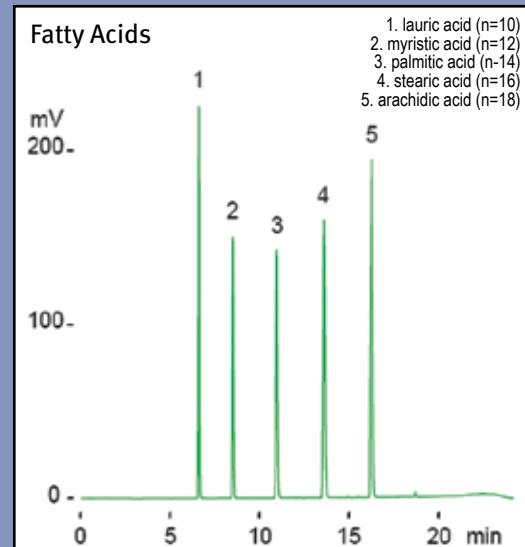
SoftA ELS Detector

Features and Benefits

- Easy-to-use, fast start-up, no consumable parts and low cost of operation
- Patented Thermo-Split Vapor Phase Control for optimum sensitivity
- Very low detection limits, as low as 10ng with conventional HPLC flow rates and columns. Lower detection limits can be achieved with $\mu\text{L}/\text{min}$ flows and narrow columns.
- Extended dynamic range, up to 0.25mg or 3+ orders of magnitude.
- Outstanding reproducibility, $\sim 2\%$ RSD
- Low evaporation temperatures (3mL/min water at 10°C SC/40°C DT)
- No baseline shift with extreme gradients
- Easy to use interfaces, automated system diagnostics and context sensitive help features. With the push of one button the user receives detailed instruction, providing increased productivity with less training.
- A single robust, chemical-resistant nebulizer for use with microbore to semi-preparative flow rates. No lost time changing nebulizers when your method changes. The nebulizer is fully guaranteed, saving you money!
- Reproducible droplet distributions are assured by thermally isolating the nebulizer from the spray chamber and drift tube, improving reproducibility between methods.
- Very low effective detector volume resulting in the narrowest peak widths of any ELS detector to match the speed requirements of today's fast LC.
- Long-life lasers with a continually monitored output for stable detection without costly lamp replacements.
- Gas flow optimization is not required. Low gas pressure and flow requirements allow use of cylinder, house systems, or gas generators. The pneumatic system is protected by a high pressure shut off, and provides a signal in the event of unstable or insufficient pressure.
- Designed for unattended operation. If the detector encounters a deviation from one of the predefined set points, an audible signal accompanies an electronic signal which can be used to stop the mobile phase and auto sampler.
- The industries lowest purchase price. SoftAs state-of-the-art technology provides ELS detectors with the best performance at the lowest cost.



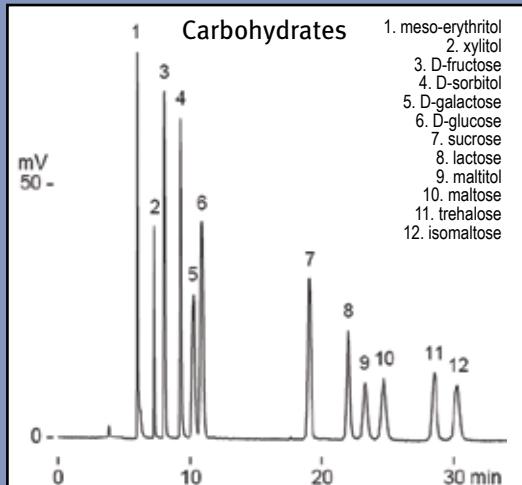
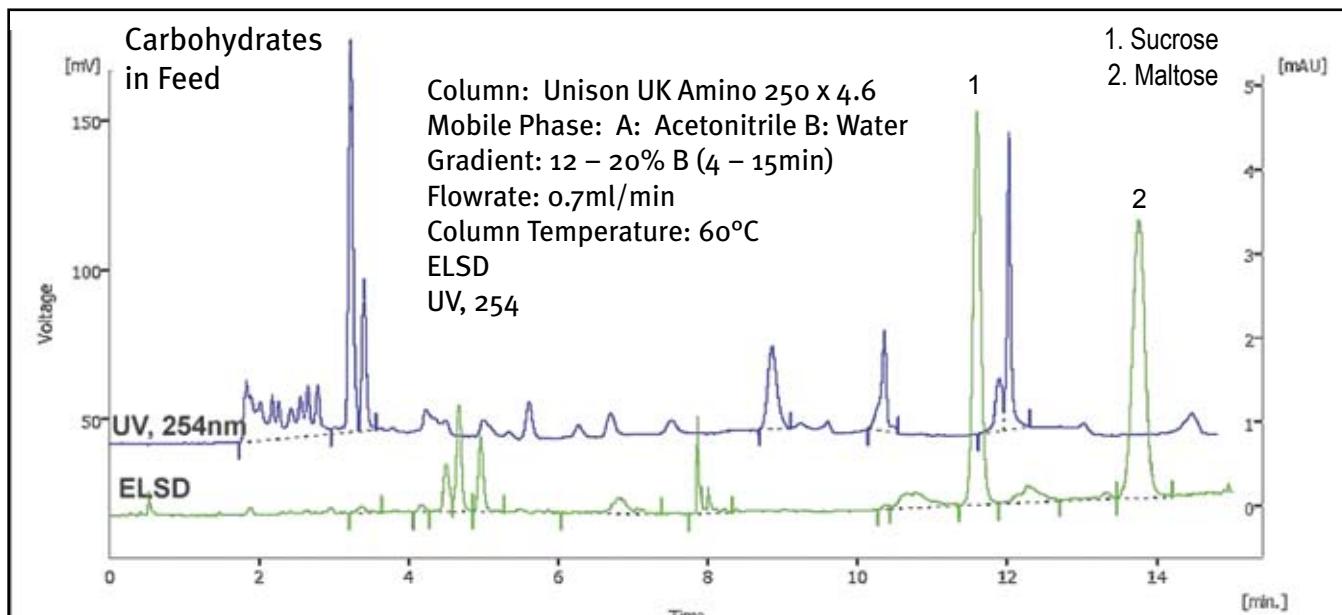
Column: Unison UK-c18, 75 x 4.6 mm
Mobile Phase: A: 5mM HCOONH₄
B: methanol
Gradient: 10-50% B (0-2min), 50% B (2-5min)
Flowrate: 1 mL/min



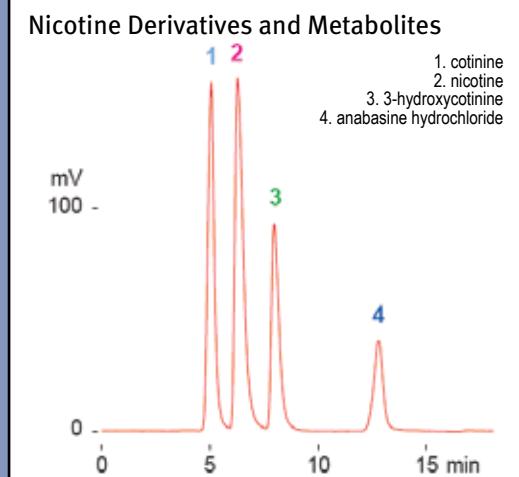
Column: Cadenza CD-C18, 250x3mm
Mobile Phase: A: water/formic acid = 100/0.1
B: acetonitrile/THF/formic acid 50/50/0.1
Gradient: 75-95% B (0-20min)
Flowrate: 0.4 mL/min
Column Temperature: 37°C

See Everything in Your Sample

The ELS detector accurately identifies the carbohydrates in this complex feed sample without interference from chromaphoric compounds. Using the ELSD in series with UV provides a better understanding of the actual sample components.



Column: Unison UK-Amino, 250 x 3 mm
Mobile Phase: Acetonitrile /water = 88 /12
Flowrate: 0.4 mL/min
Column Temperature: 60°C



Column: Unison UK-Amino, 100 x 3 mm
Mobile Phase: A: Hexane /TFA = 100 /0.5
B: Ethanol /Water /TFA = 100 /0.1 /0.5
Gradient: 15-65% B(0-15min)
Flowrate: 0.4mL/min
Column Temperature: 37°C

| | Model 1400 | Model 1300 | Model 300S | Model 200S | Model 100 | | |
|--|--|------------------------------------|------------------------------------|----------------------------|---------------|--|--|
| Display | 5" Color WVGA | 2 line x 20 character per line VFD | 2 Line x 20 character per line VFD | | | | |
| User Interface | Computer control via Agilent Chem-Station Rev B or DataApex Clarity or touch sensitive keys for manual operation | | Four multi-function buttons | Two multi-function buttons | | | |
| Evaporative Zone Temperature | Ambient to 120°C | | | 60°C | | | |
| Thermo-Split™ Chamber Temperature | 10°C to 60°C | | 30°C to 60°C | 30°C | | | |
| Liquid Flow Rate | 0.2mL/min to 5mL/min | | 0.2mL/min to 3mL/min | | | | |
| Gas Requirements | 65 psi Nitrogen or other inert gas | | | | | | |
| Gas Consumption | ~3 SLPM | | ~ 2.5 SLPM | | | | |
| Gain Settings | Normal, Low | | Normal, EDR | Normal, Low | Normal or Low | | |
| Operating Conditions | Intended for indoor use only, 60°F to 85°F and <90% R.H. non condensing | | | | | | |
| Electrical Requirements | Nominal 120 VAC, 50/60 Hz or Nominal 240 VAC, 50/60 Hz; 600 watts | | | | | | |
| Wetted Materials | Stainless steel, glass (lenses only), anodized aluminum, Teflon™ | | | | | | |
| Light Source | 650 nm Laser Diode, <5mW | | | | | | |
| Detector | Hermetically sealed photo-diode/operational amplifier | | | | | | |
| Output Signal | 0 - 1 VDC | | 0 - 5 VDC | | | | |
| Interface | RS232, Contact Closure, Software Driver | | RS232, Contact Closure | | | | |
| Dimensions | 13.8" w x 17.2" d x 6.3" h | | 9.8" w x 18" d, 11.5" h | | | | |
| Weight | 46 lbs | | 23 lbs | | | | |

Experience the superior performance of Evaporative Light Scattering Detection today!
Call 877-465-1106 for a quotation or demonstration in your laboratory.



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