

Agilent 1260 Infinity Evaporative Light Scattering Detector (ELSD)

Data Sheet



Introduction

Evaporative light scattering detectors (ELSDs) are ideal for detecting analytes with no UV chromophore as they do not rely on the optical properties of a compound. The Agilent 1260 Infinity Evaporative Light Scattering Detector (ELSD) is a high performance ELSD, benefitting from almost 20 years experience in the design and manufacture of ELSDs. The 1260 Infinity ELSD is the smallest and most flexible ELSD available. Patented gas flow technology gives the 1260 Infinity ELSD unrivalled detection capability at ambient temperatures and uniform response across a gradient. This precision instrument operates up to 120 °C, with a heated nebulizer that makes it a perfect match for a wide range of applications and LC techniques, including GPC/SEC. To detect everything you inject with high sensitivity, the 1260 Infinity ELSD is the ELSD of choice for all high temperature applications.

Key Benefits

- High sensitivity provides superb responses for all compounds, down to low nanogram levels.
- Unrivalled response to semivolatile compounds at ambient temperature from patented gas flow technology.
- Operation up to 120 °C gives improved evaporation of difficult solvents and better response to nonvolatile compounds.
- Low dispersion and high-speed data output rates are the perfect match for fast LC applications.
- Superb reproducibility below 2% gives reliable and accurate results.
- Full DMSO transparency ensures that responses from early eluting compounds are not hidden.



Agilent Technologies

Key Benefits (Continued)

- Multivendor software control and data acquisition using Agilent ChemStation chromatography data system, and other vendors' interfaces, eliminates the need for an analog to digital converter.
- Fully compatible with all Agilent analytical and preparative LC systems for enhanced chromatographic performance.
- Complementary to LC/MS.
- The small ELSD footprint frees up bench space for a less cluttered and safer working environment.
- Simple set up means that you can be up and running in less than five minutes, straight out of the box.

System Details

The Agilent 1260 Infinity ELSD is ideal for the detection of nonvolatile compounds, where temperatures of 100 °C or above are required. The instrument benefits from fast data output rates and extremely low dispersion for fast LC, and delivers a universal response down to the low-nanogram range for truly representative analysis. Reproducibility is less than 2% for improved consistency of results. Control and digital data collection come as standard for multivendor platforms, so

there is no need for an analog to digital converter. On-the-fly adjustment of light source intensity can save time during a run. All this in the smallest footprint available. Being complementary to LC/MS, and offering unrivalled flexibility and sensitivity, the 1260 Infinity ELSD is the ELSD of choice for demanding, high temperature applications.

The Agilent Family of ELSDs

Evaporative light scattering detection is the powerful alternative to RI and UV for all compounds; just inject it and detect it, right down to low nanogram levels. ELSDs provide a universal response independent of the optical properties of the analyte so there is no loss of important information.

Agilent ELSDs can be used for a wide range of analytical techniques, including LC (analytical and preparative), LC/MS, SFC, high throughput screening, GPC/SEC, TREF, and GPEC. The range of application areas is equally broad, encompassing pharmaceuticals, nutraceuticals, combinatorial libraries, carbohydrates, lipids, phospholipids, triglycerides, fatty acids, amino acids, polymers, and surfactants.

For nonvolatile compounds, where temperatures of 100 °C or above are required, the 1260 Infinity ELSD is the instrument of choice.

The Agilent 1290 Infinity ELSD delivers sub-ambient evaporation down to 10 °C, providing maximum sensitivity for compounds with significant volatility below 30 °C.

Choose the Right Agilent ELSD for Your Needs

	Agilent 1290 Infinity ELSD	Agilent 1260 Infinity ELSD
HPLC analysis:		
Nonvolatile compounds:	yes	yes
Semivolatile compounds:	yes	yes
Highly volatile compounds:	yes	x
Ambient GPC analysis:	yes	yes
High temperature GPC analysis:	x	x

Installation Qualification and, Operation Qualification (IQ/OQ)

All Agilent ELSDs are rigorously tested to a high specification, and detailed IQ/OQ documentation is included with every unit before they are shipped. In addition, our detectors can be incorporated into any HPLC system, and a complete Qualification Workbook is provided to help you.

Uniform Mass Response

Agilent ELSDs are not dependent on a compound's optical properties, so the ELSD provides a more uniform response than UV-VIS, making it the ideal detector for purity analysis or where calibration standards are not available.

Column: Agilent Polaris C18
4.6 × 150 mm, 5 µm
Eluent: Water/Acetonitrile 1:1
Flow rate: 1.0 mL/min
Injection volume: 10 µL
Detector: Agilent 1260 Infinity ELSD
(neb = 30 °C, evap = 30 °C,
gas = 1.4 SLM)

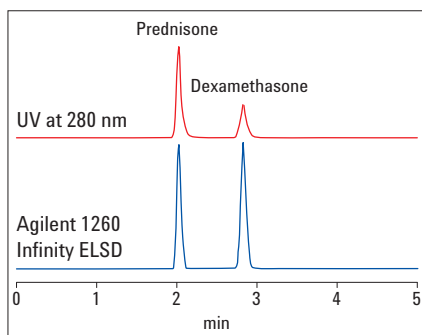


Figure 1

The Agilent 1260 Infinity ELSD delivers a more uniform mass response than UV from a 1:1 mixture.

Agilent ELSDs - Better by Design

ELSD involves a three stage process.

1. **Nebulization**—Using an inert gas stream to form a plume of uniformly sized droplets.
2. **Evaporation of the eluent**—Generating a plume of nonvolatile solute particles.
3. **Optical detection**—Where the intensity of scattered light is proportional to the mass of solute passing through the optical chamber.

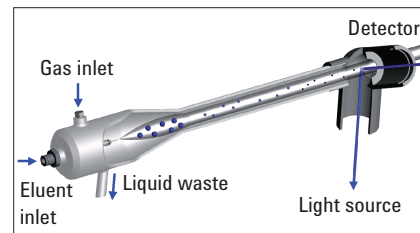
Nebulization

Efficient nebulization using low gas flow rates is a feature of Agilent ELSDs. Independent nebulizer temperature control and digital gas flow control provide excellent stability and reproducibility. Baseline noise is minimized by the removal of any poorly nebulized eluent through a drain port.

Evaporation

The nebulized stream passes through an independently temperature-controlled evaporator tube where solvent is removed at high temperature, leaving the less volatile solute particles behind.

The 1260 Infinity ELSD features patented¹ gas flow control technology with a short evaporator tube that gives an extremely low swept volume for minimal peak dispersion. This provides maximum resolution from the separation, especially important for work with small columns.



Optical detection

The solute particles are detected as they pass through the optical chamber. The high power LED and advanced design of the electronics delivers maximum sensitivity.

¹ UK Patent 0304253.8, US Patent 6/0238744

Separation of Nonvolatile Compounds

The 1260 Infinity ELSD is ideal for nonvolatile compounds with a weak or no chromophore, such as surfactants, sugars, polymers, and lipids, where evaporation temperatures of $> 80^{\circ}\text{C}$ are advantageous.

Column: Phenyl hexyl, 4.6×50 mm, $5\ \mu\text{m}$
 Eluent A: 0.5 g/L Ammonium acetate in water
 Eluent B: Methanol
 Gradient: 70% to 100 % B in 4 minutes
 Temperature: 35°C
 Flow rate: 1.0 mL/min
 Detector: Agilent 1260 Infinity ELSD
 (neb = 35°C , evap = 60°C , gas = 1.1 SLM)

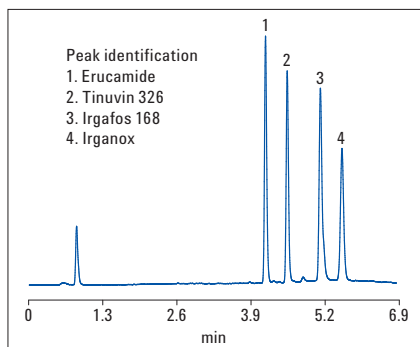


Figure 2
 Excellent baseline stability of four polymer additives.

Column: Agilent Polaris C18, 4×250 mm, $5\ \mu\text{m}$
 Eluent A: Acetonitrile
 Eluent B: Dichloromethane
 Gradient: 25% to 45% B in 45 minutes,
 45% to 90% B in 5 minutes
 Flow rate: $5\ \mu\text{L}$
 Detector: Agilent 1260 Infinity ELSD
 (neb = 60°C , evap = 50°C ,
 gas = 1.6 SLM)

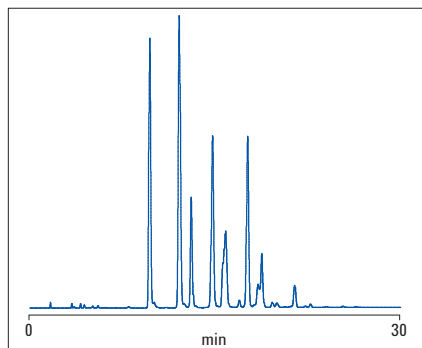


Figure 3
 Separation of a sample of sesame oil.

Separation of Semivolatile Compounds

The 1260 Infinity ELSD is ideal for separating compounds with different degrees of volatility, as shown in Figure 4. With the nebulizer and evaporator running at the same temperature, 50°C , nonvolatile indapamide gives a large response, but the other more volatile components give very poor peak response due to loss through evaporation.

As the temperatures are reduced to 35°C , and even more so at ambient, the 1260 Infinity ELSD reveals much improved recovery data of the semivolatile components, with no deterioration in baseline stability.

DMSO Transparency for High

Column: Agilent Polaris C18,
 4.6×150 mm, $5\ \mu\text{m}$
 Eluent A: 0.1% TFA in water
 Eluent B: 0.1% TFA in Acetonitrile
 Gradient: 60% to 90% in 5 minutes
 Flow rate: 1.0 mL/min
 Injection volume: $20\ \mu\text{L}$
 Sample concentration: 1 mg/mL
 Detector: Agilent 1260 Infinity ELSD
 (gas = 1.6 SLM)

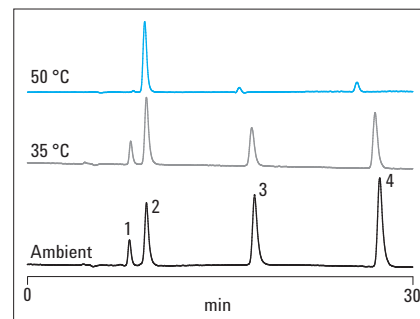


Figure 4
 The ability of the Agilent 1260 Infinity ELSD to operate at ambient improves data quality.

Throughput Screening

The vast majority of combinatorial libraries screened by high throughput methods are stored in dimethylsulfoxide (DMSO). UV and mass spectrometry will miss potential drug compounds that have no UV chromophore therefore ELSD is commonly used. However, at the low evaporator temperatures required to detect volatile components, the presence of DMSO in the sample can mask the response of early eluting compounds. In the 1260 Infinity ELSD, the addition of a carefully controlled stream of gas to the evaporation step enables complete removal of the DMSO to take place without increasing the operating temperature.

Sample: 2 mg/mL in DMSO
Column: 4.6 × 150 mm, 5 µm
Eluent A: 0.1% HFBA in water
Eluent B: 0.1% HFBA in Acetonitrile
Gradient: 5% to 30% B in 10 minutes,
30% to 80% B in 5 minutes
Flow rate: 1.0 mL/min
Injection volume: 20 µL
Detector: Agilent 1260 Infinity ELSD
(neb = 25 °C, evap = 25 °C,
gas as shown)

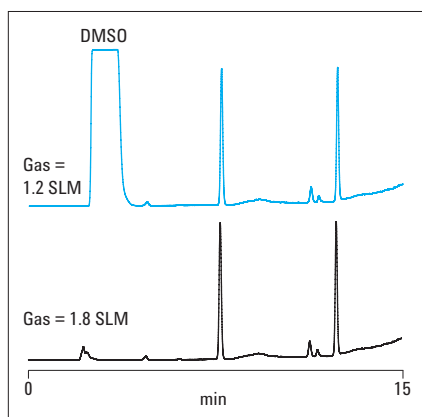


Figure 5
Increasing gas flow on the Agilent 1260 Infinity ELSD provides DMSO transparency.

Superb RSD

Excellent reproducibility below 2% gives reliable and accurate results. You can have complete confidence in your data.

Column: Agilent Pursuit C18,
4.6 × 150 mm, 5 µm
Eluent: Water/Acetonitrile 40:60
Flow rate: 1.0 mL/min
Injection volume: 10 µL
Detector: Agilent 1260 Infinity ELSD
(neb = 40 °C, evap = 40 °C,
gas=1.4 SLM)

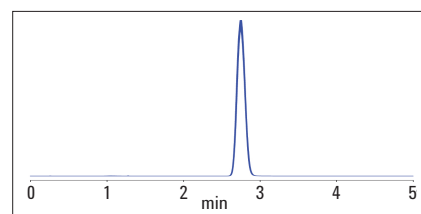


Figure 6
Fifty caffeine injections produce an RSD of 1.27%, demonstrating the excellent reproducibility of the Agilent 1260 Infinity ELSD.

Improved Sensitivity over an RI Detector

The 1260 Infinity ELSD has better baseline stability and sensitivity than an RI detector, making it a great choice for carbohydrate analysis.

Column: Agilent Hi-Plex Ca, 4 × 250 mm
 Eluent: Water
 Flow rate: 0.6 mL/min
 Temperature: 85 °C
 Injection volume: 10 µL
 Detector: Agilent 1260 Infinity ELSD
 (neb = 30 °C, evap = 30 °C,
 gas = 1.6 SLM)

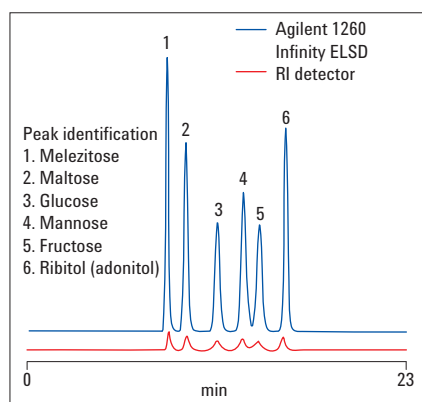


Figure 7

The Agilent 1260 Infinity ELSD delivers more stable baselines and much improved sensitivity compared to an RI detector.

Choosing Detector Settings

The unique patented gas flow operation of the 1260 Infinity ELSD makes it mobile phase independent. Instead, settings are optimized according to the thermal sensitivity of compounds injected.

As a general rule, all solvents can be evaporated with nebulizer and evaporator temperatures at 30 °C and a gas flow of 1.6 SLM. This can be used as a starting point and adjustments made according to the sample injected (if necessary), see Table 1.

Compound class	Nebulizer temperature (°C)	Evaporator temperature (°C)	Gas flow (SLM)
Parabens	30	20	1.40
Vitamins	25	25	1.60
Phthalates	25	25	1.60
Analgesics	25	25	1.60
Sudan dyes	30	30	1.60
Glycerides	30	30	1.40
Alkaloids	40	40	1.40
Amino acids	50	50	1.60
Natural products	30	50	1.40
Antibiotics	40	85	1.20
Polar lipids	30	80	0.90
Carbohydrates	50	90	1.00

Table 1
 Choosing detector settings.

Technical Specifications

Agilent 1260 Infinity ELSD		
Light source	LED 480 nm (Class 1 LED Product)	
Detector	Photomultiplier tube digital signal processing	
Temperature range	Evaporator	OFF, 25–120 °C (1 °C increments)
	Nebulizer	OFF, 25–90 °C (1 °C increments)
Gas requirements	Flow rate	0.9 SLM to 3.25 SLM at 25 °C with integrated controlled gas shut-off valve
	Pressure operating range	60–100 psi (4–6.7 bar)
Eluent flow rate	0.2–5 mL/min	
Analog output	0–1 V FSD	
Digital output	24 bit digital data, 10, 40, or 80 Hz	
Communication	Serial (RS232) Remote start input Remote A/Z Contact closure TTL	
Instrument operation	Graphical vacuum fluorescent display with keypad Real-time control through ELSD Dimension Software 10 predefined methods	
PC operation (software)	Stand-alone control software utilities, Agilent ChemStation control software, Agilent EZChrom Elite control software	
Power requirements	90/120 V AC or 220/250 V AC 50/60 Hz 2A max	
Detector status	Standby, run	
Size	Unpackaged	200 × 450 × 415 mm (w × d × h)
Weight	Unpackaged	11 kg
Safety features	Gas shut off valve, vapor and leak detection	

Ordering Information

Product description	Part number
Agilent 1260 Infinity ELSD (110 or 240 V) including ChemStation driver	G4260B
Agilent ELSD Dimension Software	PL0890-0375
Agilent ELSD Driver for ChemStation	PL0890-0370

www.agilent.com/chem/1260elsd

Agilent shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Information, descriptions, and specifications in this publication are subject to change without notice.

© Agilent Technologies, Inc., 2012
Published in USA,
December 1, 2012
5990-8179EN



Agilent Technologies