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.
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 setup 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 down to 30 °C.

Choose the Right Agilent ELSD for Your Needs

<table>
<thead>
<tr>
<th></th>
<th>Agilent 1290 Infinity ELSD</th>
<th>Agilent 1260 Infinity ELSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC analysis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonvolatile compounds:</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Semivolatile compounds:</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Highly volatile compounds:</td>
<td>yes</td>
<td>x</td>
</tr>
<tr>
<td>Ambient GPC analysis:</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>High temperature GPC analysis:</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
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)

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 patented 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.

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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 °C are advantageous.

Column: Phenyl hexyl, 4.6 × 50 mm, 5 µm
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.

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.

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

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: Phenyl hexyl, 4.6 × 50 mm, 5 µm
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 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.

Column: Agilent Polaris C18, 4.6 × 150 mm, 5 µm
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 µL
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.

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

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.
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.

### Table 1

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

### 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.

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

Figure 7

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

<table>
<thead>
<tr>
<th>Light source</th>
<th>LED 480 nm (Class 1 LED Product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector</td>
<td>Photomultiplier tube digital signal processing</td>
</tr>
</tbody>
</table>
| 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

<table>
<thead>
<tr>
<th>Product description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agilent 1260 Infinity ELSD (110 or 240 V) including ChemStation driver</td>
<td>G4260B</td>
</tr>
<tr>
<td>Agilent ELSD Dimension Software</td>
<td>PL0890-0375</td>
</tr>
<tr>
<td>Agilent ELSD Driver for ChemStation</td>
<td>PL0890-0370</td>
</tr>
</tbody>
</table>