Evaporative Light Scattering Detection (ELSD) for HPLC

Market Application Publication

Background:

Evaporative light scattering detection (ELSD) is a commonly used detection technique for high performance liquid chromatography which is able to detect essentially all compounds in a sample. ELSD involves nebulization and evaporation of the eluant from the column using nitrogen followed by light scattering detection of the resulting particles. The nebulization step requires a supply of clean dry nitrogen from 98 to 99% purity that is regulated from 65 to 80 psig. In many laboratories, the nitrogen is provided by the evaporation of liquid nitrogen from a high-pressure liquid nitrogen tank, a Dewar flask, or a high-pressure gas cylinder. While these methods are satisfactory, the use of an in-house generator to provide the nitrogen for ELSD detection offers a number of significant benefits. An in-house nitrogen generator is completely automatic and requires a minimum of maintenance.

Features and Benefits:

- Generates pure nitrogen from laboratory air with minimum user interaction
- Eliminates the use of liquid nitrogen Dewars and the need for periodic refilling of liquid nitrogen
- Using nitrogen vs. air provides an inert environment and suppresses the potential for explosion
- Safe, produces only the amount of nitrogen that you need, minimizing the possibility of asphyxiation
- Eliminates acquisition and installation of bulky and hazardous nitrogen tanks
- Prevents running out of gas during instrument operation
- Extremely low cost of operation, no hidden costs (demurrage, maintaining inventory)
- Minimum environmental impact, while fractional distillation of air and transportation of tanks has a significant impact
- Oxygen sensor available for detection of oxygen-reactive compounds
- Operates on a 24 hours a day, 7 days a week basis with minimum maintenance

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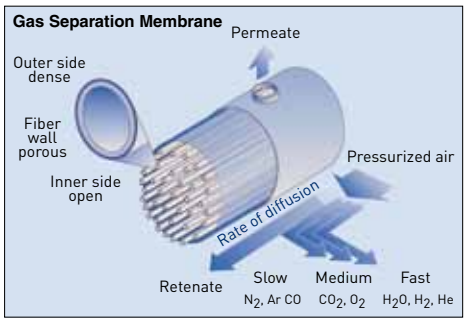
Application:

Dry, pure Nitrogen for ELSD is provided by Parker Balston High Flow Nitrogen generators using a hollow fiber membrane that permits oxygen and water vapor to permeate the membrane and escape through the sweep port while the nitrogen flows through the tube to the ELSD. While each individual fiber membrane has a small internal diameter, a large number of fibers are bundled together to provide an extremely large surface area for the permeation of oxygen and water.



Case Study:

A typical use of an in-house nitrogen generator, Dr. Lakshmy Nair, a research scientist at Baxter Healthcare in Deerfield, IL, reports that "the use of a generator for her ELSD systems provides an uninterrupted supply of nitrogen, which is especially useful for long runs of a large number of samples." Calibration of the detector simply requires the measurement of a standard sample at a user-specified interval to ensure that the system is operating properly. In contrast; when the when a new tank is installed, it may be necessary to recalibrate the system to ensure accurate results. This can be a time-consuming procedure that decreases laboratory efficiency. In addition, the maintenance requirements for the in-house nitrogen generator are minimal; only the filters must be replaced on a periodic basis. Dr. Nair indicated that she has used her generator on a continuous basis since 2000 with only minor maintenance on an annual basis.

The N2-04 nitrogen generator, which is commonly used for ELSD can produce up to 99.5% pure nitrogen on a continuous basis. The purity of the nitrogen is dependent on the operating pressure and the desired flow rate; as an example, 4 L/min of nitrogen gas can be generated using an operating pressure of 100 psi at room temperature, sufficient to supply the gas that is required for an ELSD system. The N2-14 provides 13 L/min (for laboratories with several ELSD detectors).

Specifications:

Nitrogen Generators	
Nitrogen Purity	95.0-99.5%
Atmospheric Dewpoint	-58°F (-50°C)
Suspended Liquids	None
Particles >0.01 micron	None
Commercially Sterile	Yes
Hydrocarbon, Phthalate Free	Yes
Min./Max. Operating Pressure	60/145 psig
Output Flow Rate (99% N2) at 100 psig input	Model N2-04: 4 LPM Model N2-14: 13 LPM Model N2-14A: 13 LPM
Maximum Pressure Drop (99% N2 Purity, 125 psig)	10 psig
Inlet/Outlet Ports	1/4" NPT
Oxygen Analyzer	Included with Model N2-14A
Dimensions N2-04: N2-14, N2-14A:	16"h x 11"w x 13"d (40cm x 61cm x 50cm) 52"h x 18"w x 13"d (131cm x 46cm x 41cm)

Ordering Information

Description	**Model Number**
Low and Mid Flow Nitrogen Generator	N2-04, N2-14, N2-14A
Galvanic Cell	72695A (N2-14A only)
Maintenance Kit	MK7840, MK7572C
Installation Kit	IK7572 (N2-04) IK7572 (N2-14, N2-14A)
Preventive Maintenance Plan	N2-04-PM, N2-14-PM, N2-14A-PM
Extended Support with 24 Month Warranty	N2-04-DN2, N2-14-DN2, N2-14A-DN2

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