

Trace **Moisture Analysis** of **Specialty Gases** **Done Right**

The Delta F **DF-745SG**

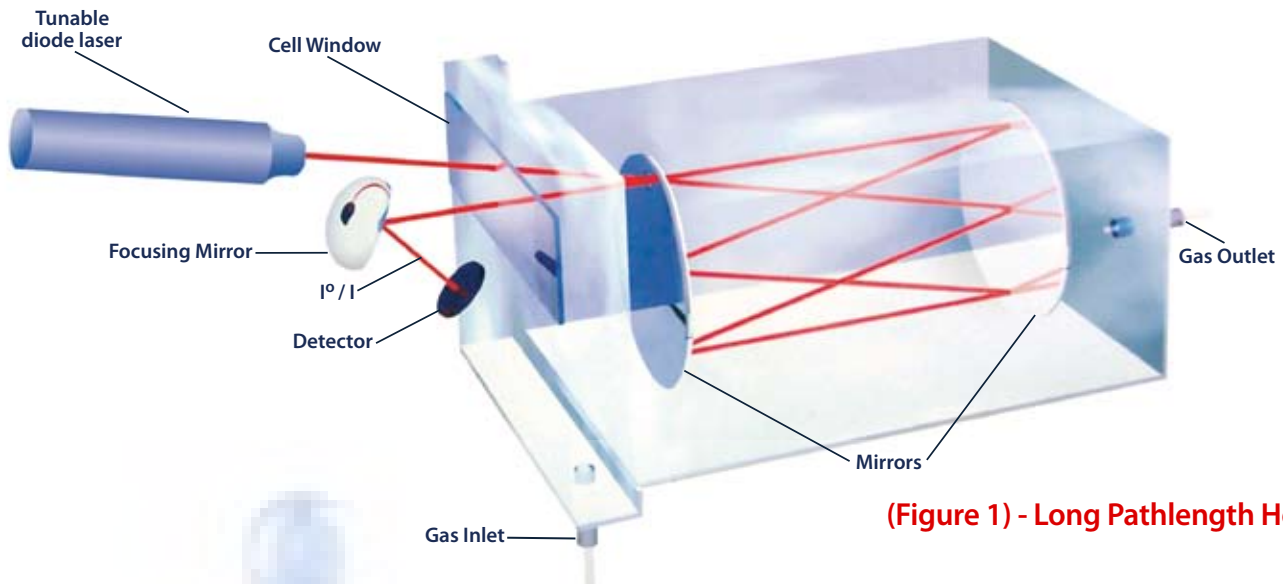
All the power of Delta F's 700 Series trace moisture analyzers specifically engineered for specialty gas applications to provide:

- Increased productivity
- Lower sensitivity
- Operational simplicity



DELTA F

The **Ultimate** in Moisture Analysis Specifically Engineered for **Specialty Gases** The **DF-745SG**



(Figure 1) - Long Pathlength Herriott Cell

Spec gas plant operators can now harness the power of a state-of-the-art moisture analyzer to improve operator efficiency, increase plant throughput and improve yields with the introduction of the DF-745SG specialty gas trace moisture analyzer.

The DF-745SG Trace Moisture Analyzer brings the industry-leading capabilities of the DF-700 Series analyzers to applications in the specialty gas industry as well as allied applications requiring the accurate measurement of trace moisture levels in gas mixtures. The combination of fast speed of response, high sensitivity – 100ppb LDL – with broad range – 100ppm – at an attractive price means that high-value specialty gas operations can now be controlled to ensure high yields economically with the DF-745SG analyzer.

The DF-745SG is a sophisticated process analyzer that has application software specifically designed for blending specialty gases involving single gases and gas mixtures drawn from a database of 13 standard background gases.

Standard gases include:

- N₂
- O₂
- H₂
- Ar
- He
- CO
- CO₂
- SF₆
- Xe
- Ne
- Kr
- PH₃
- N₂O

Defining Mixtures as Templates

The user can create a pre-defined template for routine blends, with up to 30 templates allowed. Each mixture is identified by a 30 character description. A mixture can have from two to eight gases with each gas given a volume percentage of the total mixture. One gas can be defined as a “balance gas” and the DF-745SG firmware will automatically calculate its appropriate percentage.

Custom blends can be handled by either selecting gases from the data base or by modifying a pre-defined template – whichever is easiest to do. Both routine and custom blends are set up using the simple and easy to use front panel interface.

Custom Gases

Working with Delta F, the user can define up to 10 additional gases to be added to the database. The custom gases are analyzed and the spectroscopic data for these gases is added to the background gas database. With this feature, the data base can contain up to 23 gases for blending.

Production Reports

The analyzer collects production data that identifies the components and volumes in a mixture as well as the date and time of the blend. This data can be displayed on the analyzer’s front panel or downloaded onto a USB drive and printed out as a report in an Excel format.

The combination of an easy-to-use operator interface and the analyzer’s fast speed of response allows the operator to produce more gas mixtures with the same production equipment, leading to increased incremental profits. All in all, the DF-745SG is an essential productivity improvement tool now available to spec gas plants.

DF-745SG



Unmatched Speed, Sensitivity and Range

The DF-745SG combines fast response – 90% of step change in <10 minutes, high sensitivity – 100 ppb LDL – with a broad measurement range – 100 ppm. It gives specialty gas suppliers a versatile tool for minimizing the moisture in their specialty gas products. And, it is delivered ready for use.

The analyzer fits in a standard 19 inch rack or panel mount configurations as a fixed system and at only 64 lbs. is also ideal for a cart or other mobile applications. The analyzer can be quickly moved from port-to-port thanks to optional isolation hardware and software routines that eliminate long dry-down times often associated with other analyzers. In fact, the DF-745SG has a fast clean-up time with upset recovery from high ppm levels to within 1 ppm of previous stable reading within 5 minutes.

The Technology Behind the Analyzer: TDLAS

Like all Delta F 700 Series analyzers, the DF-745SG uses Tunable Diode Laser Spectroscopy (TDLAS) technology to measure moisture in gases. TDLAS is a spectroscopic technique that uses a diode laser as its light source. TDLAS has advantages over other techniques because the moisture sample only comes in contact with a few optical components that are made from very robust materials. The diode laser is tuned and modulated over a narrow wavelength range that is specific to moisture by changing the current delivered to the laser.

The TDLAS technique is governed by Beer's Law: $\ln(I^0/I) = S*L*N$

- I** – the measurement of beam intensity when tuned to the absorbing wave length of moisture
- I⁰** – the reference measurement for beam intensity when tuned away from the moisture absorbing wavelength
- S** – the fundamental absorption line strength (fixed constant)
- L** – the path length of the beam through the sample (fixed constant)
- N** – the number of water molecules contained in the beam path passing through the sample

In addition, the longer the path Length, the higher the sensitivity. Inside the Delta F Herriott Cell (Figure 1), the laser beam is reflected back and forth numerous times using custom mirrors. By making multiple passes, the laser path length, L, is increased to achieve extremely high sensitivity and low detection limits. Delta F's TDLAS technology offers a robust and simple optical design with the sample and reference measured with a single laser source and a single detector.

The DF-745SG – Unsurpassed Capability and Performance

- 100 ppb sensitivity with very high accuracy
- 100 ppb low detection limit (LDL)
- No field calibration necessary
- A wide dynamic range from 0.1 ppm to 100 ppm (linear)
- An ambient operating temperature from 10 – 40°C
- Fast response: 90% time at <10 min.
- Fast clean-up time with upset recovery from high ppm levels to within 1 ppm of previous stable reading within 5 minutes
- Optional HSS2 – Hydrogen System Safety Purge
- Optional Isolation Package

Every DF-745SG is custom configured to your specifications and thoroughly tested to ensure flawless performance – out of the box. You can start running at installation without field calibration.

A Guided Tour of the DF-745SG Operator Interface

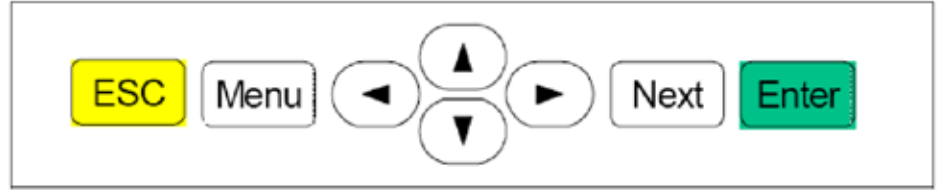
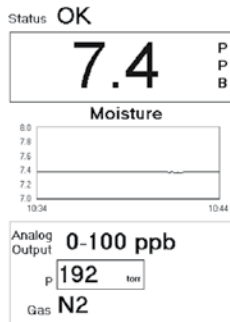
The DF-745SG allows a user to quickly and easily configure the system to analyze gas mixtures using the menu controls on the front panel (Figure 2) to call up and interact with various displays.

The main screen allows the user to select up to eight gases from the standard gas data base to include in a blend and to specify their relative proportions. (Figure 3)

For routine blends, the user can define a recipe in terms of gases and proportion... (Figure 4)...and to give the recipe a unique name containing up to 30 characters using a simple input display. (Figure 5)

A production log containing the date and time that blends were made along with the gases used and their proportions and moisture content is automatically created by the system. This log can be viewed on the screen or downloaded via a USB thumb drive for storage and/or printout as an Excel spreadsheet. (Figure 6)

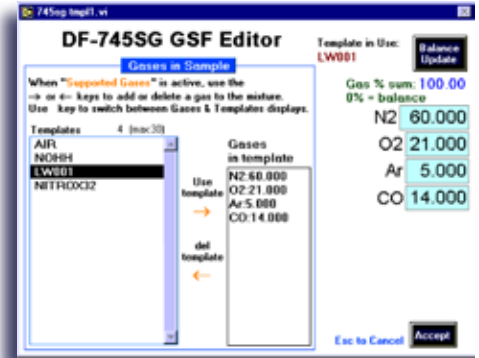
When the mixture has been defined and entered, the moisture content is measured and displayed in the Data Display screen, shown below:



(Figure 2) - Keypad



(Figure 3) - Main Screen, Supported Gases Display



(Figure 4) - Main Screen, Templates display



(Figure 5) - Template Name Input



(Figure 6) - GSF Log Viewer and Download



DF-745SG

Delta F Corporation More Than Superior Technology

While Delta F analyzers incorporate advanced concepts that are driving today's low detection limits, it is the company's business philosophy that keeps customers coming back. Since 1969, Delta F has implemented world-class organizational practices.

- Delta F was the first oxygen analyzer company to receive an ISO certification, passing its first audit by Lloyd's Register Quality Assurance, Ltd. in June 1992.
- Continuing investment in market-needs R&D has allowed Delta F's products to achieve the industry's lowest detection levels, with superior performance in many other areas of analyzer capability.
- Continuous monitoring of customer needs has resulted in a world-class customer support organization which is second to none. As a result of this track record of continuous improvement, companies that require reliable, cost-effective analyzers to measure critical applications keep returning to Delta F years after their first purchase. We invite you to join the ranks of Delta F users.



Delta F's research and development efforts created the first oxygen analyzer immune to false low readings and continue to set industry standards in analyzer sensibility and sensitivity.



A worldwide network of well-trained and well-equipped distributors provide sales and service support to Delta F's global customer base.

