

# TWO GREAT TECHNOLOGIES – TOGETHER AT LAST THE 700 SERIES NANO TRACE MOISTURE AND OXYGEN ANALYZERS

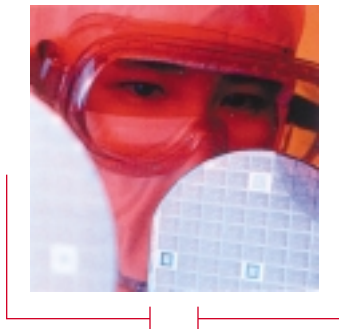


## THE DF-750 NANOTRACE MOISTURE ANALYZER:



### Redefining Moisture Analysis

The DF-750 NanoTrace Moisture Analyzer pushes the boundaries of moisture analysis technology. Using revolutionary Tunable Diode Laser Absorption Spectroscopy (TDLAS), the DF-750 delivers parts-per-trillion (ppt) capabilities for a range of applications in semiconductor fabrication and UHP gas measurements. The analyzer comfortably fits into a 19" rack and is ideal for mobile carts. The analyzer has internal isolation capability so that you can move the analyzer from port to port without incurring any dry-down time. And, like Delta F's world-renowned oxygen analyzers, it provides results that are consistent and reliable over a long instrument life cycle.

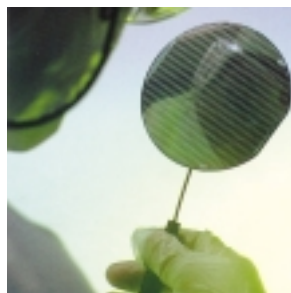


### Unsurpassed Accuracy and Performance

The 700 Series uses laser absorption spectroscopy to identify and "count" the water molecules in a gas sample as it flows through the instrument. Since its fundamental design is based upon Beer's Law, the 700 Series can perform ultra trace moisture determinations and does not require field calibration. In addition, the TDLAS technology delivers:

- 100 ppt sensitivity with very high accuracy
- 200 ppt LDL
- no field calibration necessary
- a wide dynamic range from 100 ppt to 10 ppm (linear)
- an ambient operating temperature range from 10 to 40°C
- fast response time with an initial dry down time of <24 hours to 5 ppb
- fast clean up time with upset recovery from ppm levels in minutes

Every 700 Series Analyzer is custom configured to your specifications and thoroughly tested to ensure flawless performance. You'll be able to start running at installation without field calibration.



## THE DF-760 NANOTRACE DUAL ANALYZER:



### A Dual H<sub>2</sub>O and O<sub>2</sub> Analysis Solution

Only Delta F can provide a moisture and oxygen analysis to ppt levels in a single unit – the DF-760.

The DF-760 is the only analyzer in the world that combines the industry standard O<sub>2</sub> analysis capabilities of the NanoTrace II Oxygen Analyzer with the high accuracy and performance capabilities of TDLAS moisture analysis.

The NanoTrace non-depleting gas-phase oxygen sensor delivers:

- Rapid response
- An inert cathode immune to damage from trace levels of acids or hydrocarbons
- A non-depleting anode - no drifting and no frequent calibrations

Combined these analyzers give you the one-two punch to knockout your moisture and oxygen analysis challenges



# DF-750/760



## Unparalleled Performance

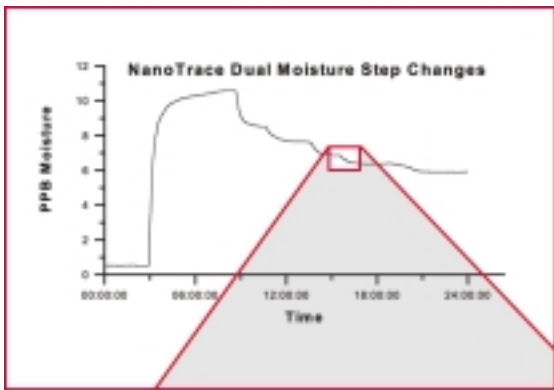
Measures ppt levels instantly!  
High accuracy that matches the performance an APIMS!

## Low Maintenance

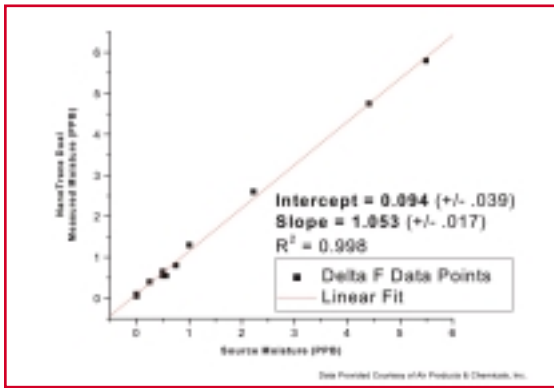
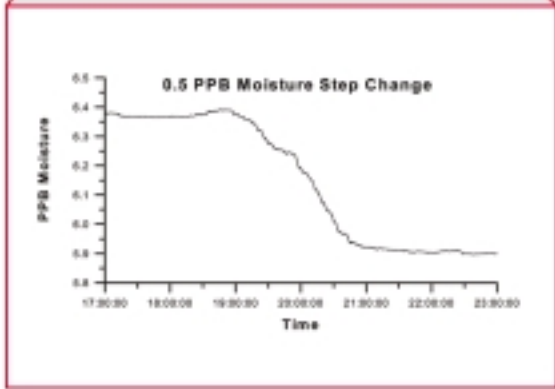
Based on Beer's Law, the measurement requires no field calibration.

## Increased Capabilities

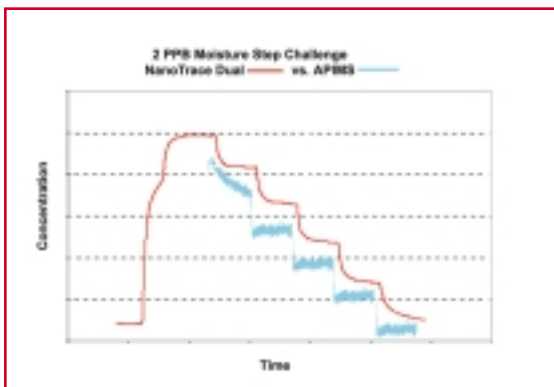
When packaged with the NanoTrace II Oxygen Analyzer, you can easily make both measurements from a single unit.



*A 0.5 ppb step change is measured instantly by the NanoTrace Dual.*



*The NanoTrace Dual correlation to an APIMS is an amazing 0.998!*



*The NanoTrace Dual duplicates the APIMS performance when measuring the same sample gas.*

*(courtesy of SAES Getters S.P.A.)*

## System Specifications

### Gas Sample Conditions

|                                                         |                                             |
|---------------------------------------------------------|---------------------------------------------|
| <b>Sample Pressure</b>                                  |                                             |
| Operating limits:                                       | 15 to 150 psig (2.03 to 11.3 bar)           |
| <b>Sample Return Pressure</b>                           | Atmospheric Vent (optimal)                  |
|                                                         | Limits: -2 to 2 psig (0.88 bar to 1.14 bar) |
| For H <sub>2</sub> and He                               | Maximum limit: ± 1 psig                     |
| For N <sub>2</sub> , Ar, and all other background gases | Maximum limit: ± 2 psig                     |

### Flow Rate:

|                   |                                                                             |
|-------------------|-----------------------------------------------------------------------------|
| Operating: DF-750 | 2 to 4 slpm for N <sub>2</sub> . Contact factory for other background gases |
| DF-760            | 3 to 5 slpm for N <sub>2</sub> . Contact factory for other background gases |
| Bypass:           | 0.25 to 2.5 slpm                                                            |

### Sample Line Temperature

|                            |                                                |
|----------------------------|------------------------------------------------|
| Heat Trace to 140°F (60°C) | Limits: 50° to 176°F (10° to 80°C)             |
|                            | For best results, maintain sample line at 60°C |
|                            | 60 to 100 psig                                 |

### Pneumatic Pressure

### Gas Flow System

|                               |                            |
|-------------------------------|----------------------------|
| <b>Construction Materials</b> | 300 Series stainless steel |
|-------------------------------|----------------------------|

### Gas Connections

|                |                                                           |
|----------------|-----------------------------------------------------------|
| <b>System:</b> | 1/4 inch VCR compatible inlet fitting                     |
|                | 1/4 inch compression bypass outlet fitting                |
|                | 1/8 inch compression fitting for pneumatic gas inlet      |
| <b>Pump:</b>   | 1/4 inch compression outlet fitting to vacuum pump        |
|                | 1/4 inch compression inlet/outlet fittings on vacuum pump |

### Electrical

|                             |                               |
|-----------------------------|-------------------------------|
| <b>Back Lighted Display</b> | 7.4" VGA Monochrome (640x480) |
|-----------------------------|-------------------------------|

### Audible/Visual Alarm Status Indicators

4 oxygen levels, 4 moisture levels, temperature, electrolyte condition, moisture sensor diagnostic, loss of flow, zero calibration-in-process, moisture analyzer off-line, oxygen analyzer analog output freeze control during calibration

### Relays

(Failsafe action upon loss of power to alarm condition)

4 non-latching, independently assignable to oxygen alarms or oxygen calibration-in-process indicator and 4 non-latching independently assignable to moisture alarms. SPDT contacts rated for 1 amps at 30 VDC

### Power Requirements

100-120 VAC @ 5A, 50/60 Hz (standard); 200-240 VAC @ 2.5A, 50/60 Hz (optional). Configurable at factory.

### Output Signals

#### Analog Outputs:

|                                                                                          |                         |
|------------------------------------------------------------------------------------------|-------------------------|
| Menu scaleable single output range:                                                      |                         |
| Moisture:                                                                                | 0-10 ppb up to 0-20 ppm |
| Oxygen:                                                                                  | 0-2 ppb up to 20 ppm    |
| Isolated 4-20 mA DC, 0-100 mVDC, 0-1, 0-2, 0-5, or 0-10 VDC for both moisture and oxygen |                         |

#### Expanded Range Scales

Two user selectable secondary analog output ranges for re-scaling the output once the primary range is exceeded

|                 |                |
|-----------------|----------------|
| Digital Output: | RS232 or RS485 |
|-----------------|----------------|

### Configuration and Installation

Delta F provides comprehensive assistance for a broad variety of application problems including measurements of semiconductor specialty gases. Depending on the model, Delta F analyzers can be configured to provide a wide choice of outputs for data collection and process control systems. Contact your Delta F representative for an Applications Data Sheet and pricing information.

## Moisture System Performance

|                                                              |                                                        |
|--------------------------------------------------------------|--------------------------------------------------------|
| <b>Lowest Detection Level</b>                                | 200 ppt                                                |
| <b>Resolution</b>                                            |                                                        |
| Analytical ( <i>Sensitivity-smallest detectable change</i> ) | 100 ppt                                                |
| Display                                                      | 10 ppt                                                 |
| <b>Accuracy (greater of)</b>                                 | ±3% of reading<br>or ±0.2 ppb<br>(Constant Conditions) |

### Speed of Response (typically)

Time to reach 90% of final reading in <10 minutes

|                             |          |
|-----------------------------|----------|
| <b>Range (Output Scale)</b> | 0-10 ppm |
|-----------------------------|----------|

### Ambient Operating Temperature

50° to 105° F (10° to 40° C)

### Background Gas Compatibility

All inert and passive gases including N<sub>2</sub>, He, H<sub>2</sub>, Ar, and O<sub>2</sub>, (DF-760 is not O<sub>2</sub> compatible)  
Includes Scale Factor as standard which permits accurate read-out of moisture in background gases other than nitrogen

## Oxygen System Performance

|                                                              |                                                        |
|--------------------------------------------------------------|--------------------------------------------------------|
| <b>Lowest Detection Level</b>                                | 75 ppt                                                 |
| <b>Resolution</b>                                            |                                                        |
| Analytical ( <i>Sensitivity-smallest detectable change</i> ) | 50 ppt                                                 |
| Display                                                      | 10 ppt                                                 |
| <b>Accuracy (greater of)</b>                                 | ±3% of reading<br>or ±0.1 ppb<br>(Constant Conditions) |

### Speed of Response (typically)

Time to reach 90% of final reading in either direction

|                            |              |
|----------------------------|--------------|
| <b>Upset Recovery Time</b> | < 15 minutes |
|----------------------------|--------------|

Time from high ppm upset to within 10 ppb of the previously stable reading

|              |          |
|--------------|----------|
| <b>Range</b> | 0-20 ppm |
|--------------|----------|

### Ambient Operating Temperature

50° to 105° F (10° to 40° C)

### Background Gas Compatibility

All inert and passive gases including N<sub>2</sub>, He, H<sub>2</sub>, Ar, light hydrocarbons, halocarbons, etc.  
Includes Scale Factor as standard which permits accurate read-out of oxygen in background gases with different diffusivities to nitrogen.

### Extended Tracking Range (standard)

When the analyzer reads over range, 10 ppm, it will continue to read, for tracking purposes, up to 100 ppm for a limited time



THE DIFFERENCE  
**DELTA F**

# NanoTrace Moisture Analyzer

Rev. Date: April 25, 2002

DF-750

## Ordering Codes

### Base Model

**750-0020** NanoTrace Moisture Analyzer

**-V** (added to model number)  
230 VAC/50/60 Hz Input Power

### Outputs

(pick one Serial Communication)

**750-RS232** Two-Way Serial Communications

**750-RS485** Two-Way Serial Communications

(pick one VDC Output)

**750-OS-1** 0-1 VDC

**750-OS-2** 0-2 VDC

**750-OS-5** 0-5 VDC

**750-OS-10** 0-10 VDC

### Cabinet

**760-KYLK** Key Lock

### Plumbing

**760-HSS1** *Hydrogen Safety System with Pump Purge*  
Includes Sample Delivery Interlock and Case Purge valves for instrument housing, and enclosure with purge protection system for vacuum pump.

**760-HSS2** *Hydrogen Safety System without Pump Purge*  
Same as above, except vacuum pump is mounted on bracket only and does not include purge protection system.

### Miscellaneous

**DF-E07** *Electrolyte Solution* (One charge)