The new LiquiTrak Nonvolatile Residue Monitor (NRM Model 8000) incorporates a stunning, patented, water-based detector*. Its optimized design features are combined with the proven, unique method of measuring residue after evaporation (RAE). Here are more of the advantages you will enjoy with the Model 8000, now more affordable than ever.

**Benefits**

- Detects dissolved inorganic material including both dissolved and colloidal silica.
- Detects contaminants missed by other water monitoring techniques.
- Superior sensitivity and wide dynamic range from an ultrasensitive 1 part per trillion to 60 parts per billion.
- Rapid response time (less than 90 seconds) to detect a change in contamination levels.
- Water from your ultrapure water system supplies the working fluid – eliminating the need for n-butyl alcohol.
- Wide dynamic range eliminates the need for diffusion screens to cover the measurement range.
- Innovative inlet flow monitor indicates blockages and ensures flow stability.
- Reliable – minimal maintenance requirements. Incorporates an easy access back flush system to clear flow orifice blockages.
- Universal power supply, digital sensors, and expanded communications including a USB port, RS-232 serial port, and 4-20 mA analog output.
- Front panel display for easy viewing.
- Updated software for trend monitoring and long term data collection.
- Small, light, and rugged – half the volume of previous NRM models.

In today's semiconductor manufacturing world of shrinking line geometries, it is critical to use water of the highest purity to limit damaging defects. Thousands of liters of ultrapure water (UPW) are used to wash and process a single wafer. Any dissolved impurities that remain on the wafer's surface after washing can cause defects in the resulting semiconductor devices. Instrumentation that can provide early detection of contamination in the UPW therefore helps control or prevent costly defects.

The NRM is an industry standard for the reliable measurement of dissolved inorganic or colloidal silica impurities in UPW systems for the microelectronics industry. The NRM detects contaminants that other detectors such as TOC monitors, particle counters, and on-line reactive silica monitors do not detect. The NRM is frequently the first instrument to indicate water quality degradation and as such can offer a distinct competitive advantage.


**Applications**

- Monitor mixed-bed ion-exchange breakthrough in UPW systems.
- Monitor lifespan of UPW system components such as ultra filters.
- Detect nm-sized contaminants undetectable by other instrumentation.
- Monitor trends for early detection and anticipation of UPW problems.
- Develop and test filters with colloidal silica challenges.
- Troubleshoot UPW systems, including testing and selecting components to produce the cleanest water possible.

*U.S. Patent Number 6,712,881. Other patents pending.*
Operating Principal

The NRM employs a patented technology where ultrapure water is sprayed into a fine mist of droplets that are heated and dried, leaving behind an ultrafine aerosol of the non-volatile residue impurities. The ultrafine residue aerosol is then detected optically using a water-based condensation detector: the signal generated is in direct proportion to the quantity of impurities in the water. The NRM is calibrated according to ASTM Standard D5544-05 using potassium chloride, a material with density similar to colloidal silica.

Specifications

- **Displayed measurement range**: 0.001 to 60 ppb
- **Response time to impurity change**: Less than 90 seconds
- **Sample flow rate**: 1.5-3.0 ml/min (calibrated drip counter flow meter)
- **Total flow rate**: 120 ml/min
- **Inlet water pressure**: 138 to 483 kPa; 20 to 70 psig (a suitable water drain is required)
- **Compressed air flow rate/pressure**: 25 L/min at 345 kPa; 50 psig (compressed air should be dry and free of particles—Nitrogen may be substituted for compressed air)
- **Residue drying temperature**: 120ºC (248°F)
- **Wetted surface materials**: Sapphire, PFA Teflon®, PTFE, and 316L stainless steel
- **Detector working fluid**: Water, supplied by the UPW system
- **Ambient temperature range**: 15°-35°C (59°-95°F)
- **Ambient relative humidity range**: 0-85%
- **Maximum water temperature**: 80°C (176°F)
- **Dimensions (WDH)**: 41 × 36 × 22 cm (16.2 × 14.1 × 8.5 inches) (depth is 40 cm, 15.7 inches including the fittings on back)
- **Weight**: 8 Kg (18 lbs)
- **Power**: Universal 100 to 230 VAC, 50/60 Hz, 125 VA
- **Output**: USB, RS-232 and 4-20 mA (Ethernet adapter optional)
- **Ultrapure water inlet**: 1/4 inch PFA Flaretek®
- **Waste outlet**: 1/2 inch SS Swagelok®
- **Compressed air inlet**: 1/4 inch SS Swagelok®
- **Software**: Data acquisition program included, Windows® XP/7 platform

Specifications subject to change without notice.