

### Product Description

Valuing, pressure regulation, and flow meters are used to send a filtered water sample into a Membrane Stripper Transfer Unit. The water passes along one side of a polymer membrane and VOCs in the water permeate through the membrane. Clean dry carrier gas flowing past the other side of the membrane evaporates the permeated VOCs and sweeps the gaseous VOCs through at GC injection valve and then into a tin oxide solid state sensor. The solid-state sensor that responds to total VOCs is very sensitive at low ppbw because of its exponential response. The GC is used to speciate the VOCs. Optionally, an automatic permeation tube can validate instrument response.

### Selected Product Specifications

#### Solid State Sensor Method

|                          |   |
|--------------------------|---|
| Compounds                | Instrument responds to all VOCs and the sensor indicates total VOCs; Speciation is done separately by GC column.  |
| Detection Limit          | 1 ppb, Sensors can measure long term at below 5 ppbw.   |
| Equilibrium              | A chart recording indicates equilibrium by a constant reading.  |
| Critical Parameters      | Temperature can affect reading. An air-conditioned enclosure is recommended for low ppbw samples. Readout is directly proportional to carrier flow rate. Readout is not sensitive to sample water flow rate.  |
| Flow Rate (ml/min)       | 20 ml/min, normally   |
| Temperature (°C)         | Automatic control   |
| Humidity (%)             | Not specified   |
| Sample Pressure          | 10 psig minimum at 20ml/min sample flow   |
| Sampling Interval        | Continuous, when a GC readout is used sampling time may vary with type of column used.  |
| Response Time            | Averages 10-15 minutes (including sampling line absorption and instrument response), varies with type of compound   |
| QA/QC, Calibration       | Quality assurance/quality controls are provided by a permeation tube reference standard built into the instrument for manual or automatic operation that validates instrument operation. Reference standard is mixed and immediately used eliminating determination of sample.                                |
| Preventative Maintenance | Primary spin clean filter regeneration is automatic and secondary filter is replaced monthly. If permeation tube standards shows any change the operator checks pressure settings, flow rate, and temperature control. Once a week verification is recommended. Adjustment period is usually 3 months longer. |
| Environmental Changes    | Environmental conditions are provided for by final design for a job. With custom modifications there are no environmental Limits. For ppb range analyzers, a temperature controlled building is recommended.  |
| Intrinsic Safety         | Air purge is provided for hazardous locations.  |
| Size                     | Stainless Steel Cabinet:<br>24"H x 36"W x 10"D (90 cm H x 60 cm W x 26 cm D), 200 lb. (91 kg.)<br>Power 110/220 VAC, 50/60 Hz (please specify)  |

### Product Results

The manufacturer provided a case study paper that includes data obtained from operation of the analyzer in the ethylene plant. It shows a 72-hour run during which two benzene leaks were detected and corrective action taken at the 2 ppbw level. (Reference: Proceedings of the 46<sup>th</sup> Annual ISA Analysis Division Symposium, Vol. 34, April 2001, "Volatile Organic Compound (VOC) Analyzer for Cooling Tower Water".)