

Hydrogen Peroxide Vapor Analyzer (HPVA)

Measuring H₂O₂ and H₂O Under Low Pressure or Vacuum Conditions

GUIDED WAVE'S HPVA is a simple straight forward solution for the measurement of H₂O₂ and H₂O concentrations in a vapor phase. It operates in real time, which takes the guesswork out of determining the H₂O₂ and H₂O concentrations during cycle development and throughout the actual sterilization cycle. The user gains continuous, accurate data for documentation and validation.

Low Pressure or Vacuum Monitoring For Accurate, Reliable Results

Unlike chemical sensors, the HPVA is able to measure H₂O₂ and H₂O concentrations in vapor phase under low pressure and vacuum conditions. Many processes use low pressure in the sterilization process to ensure penetration of product packaging. The HPVA allows you to monitor these cycles so you can determine that the correct concentration of H₂O₂ and H₂O were present during each cycle

Proven Technology

Guided Wave has been measuring H₂O₂ and H₂O concentrations in various vapor mixtures for over 20 years using our near-infrared (NIR), fiber optic-coupled spectrometers. Optimal wavelengths for H₂O₂ and H₂O were selected to produce a simpler yet rugged and reliable non-scanning analyzer for this dedicated application. This new design uses fixed wavelength technology, yet still incorporates dual beam design for stability and accuracy. Fiber optic cables take the NIR light energy to the probe in the isolator and returns the non-absorbed light energy back to the analyzer - the virtual equivalent of vapor sampling. The HPVA measures as low as 0.1 mg/L of H₂O₂ and 1.0 mg/L of H₂O.

Easy Operation and Control

The HPVA is controlled via its touch screen or remotely via Ethernet (Modbus TCP/IP). All of the analytical calculations are encoded in the software.



HPVA in Stainless Steel Cabinet

Quick Installation and Start-up

The complete package consists of the analyzer, one or two probes, and a pair of fiber optic cables for each probe. The HPVA is pre-calibrated at the factory. No programming is required by the user. Start-up requires powering the HPVA, connecting the probe or probes via the fiber optic cables, taking a ZERO reading in the evacuated isolator and the H₂O₂ and H₂O concentration measurements may begin.

Validation

Each probe has a built-in validation filter made of polymeric material. The filter has unique spectral characteristics at the wavelengths used to measure H₂O₂ and H₂O. It was chosen because of its insensitivity to moisture and temperature conditions. To make a validation measurement, the validation filter is temporarily moved into the light path and the optical characteristics of the system are checked. This makes validation of performance easy, at any time.

HPVA Optional Enclosures

Typically for medical, pharmaceutical and food industries, the HPVA is housed in a general purpose Stainless Steel enclosure. Other enclosure options are available, such as, explosion proof, purged, or general purpose powder-coated enclosure, depending on area classification required.

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Specifications

H ₂ O ₂ vapor measurement range	0.1 - 50.0 mg/L [71.2 – 35,600 ppm V/V]
H ₂ O ₂ measurement accuracy	± 0.1 mg/L
H ₂ O vapor measurement range	1.0 mg/L – to condensation [>1345 ppm V/V]
H ₂ O measurement accuracy*	1.0 mg/L
Enclosure (optional)	SS316: 16" x 12" x 6"
One or two channel	

*relative to concentration at time of reference

Operating Environment

Ambient temperature	10 – 45 °C
Optimal ambient temperature stability	< ±2 °C
Relative humidity	0 – 90% non-condensing

User Programmable Features

- Password protection for configuration changes
- Sampling time: 3 - 30 seconds
- Reporting units: mg/L or ppm

HPV System Accessories and Options

- 2nd channel for additional independent monitoring point
- Custom length fiber cables
- KF or Tri-clover® flanged fiber feed throughs and dual fiber feed throughs
- Annual factory calibration service available
- Universal Power Supply (110-240 VAC converter to 24 VDC)

Fiber Cable

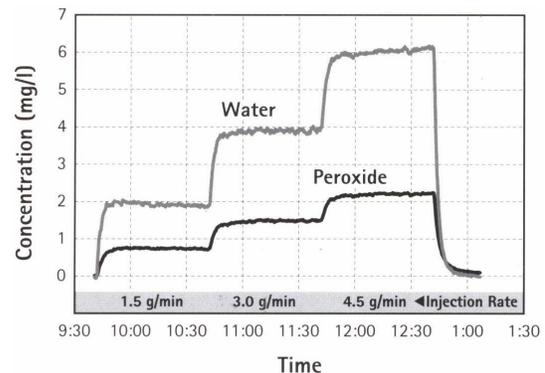
- 500 µm Ultra Low-OH fiber with Stainless Steel SMA-905 connectors
- Kevlar® protected or armored cables available

G-SST Vapor Process Probe works in Vacuum-to-Positive Pressure

G-SST Vapor Process Probe

- Temperature Range: 0°C to 90°C
- 50 cm path length - double pass 25cm
- Suitable for vacuum (down to 1 x 10⁻⁵ Torr) and positive pressure (up to 1520 Torr, 2 atm)
- SMA 905 fiber optic interface
- Built-in validation filter
- Probe may be mounted fully inside the isolator or through hole in isolator wall
- For more information see Guided Wave literature #1055

Typical Water and Hydrogen Peroxide Vapor Concentrations for Various Injection Rates



Hydrogen Peroxide and Water Concentrations in an Isolator

The Power of Online Monitoring

In 1983 Guided Wave was recognized as an industry leader when it delivered the first fiber optic-based NIR analyzers. Today Guided Wave is the only process NIR vendor that provides complete optically matched systems, yielding throughput efficiency and long-term performance that exceeds industry standards.

An ISO 9001 certified company, Guided Wave maintains global support and certified technical distributors worldwide.



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