Don't Overstate Your NOx Emissions

Comparison of the standard electrochemical sensor vs SEM sensor performance as the ambient temperature is increased. Testing Procedure: After each sensor was exposed to 1000 PPM NO gas for ten minutes, the gas was removed, and both sensors were allowed to return to zero. The temperature was then raised from 70°F to 97°F.

SEM™

Not all electrochemical sensors are the same.

Normal temperature variations can overstate your emissions. When the test box temperature was raised from 70°F to 97°F, the standard electrochemical sensor erroneously reported a concentration of 47 PPM of NO gas when no gas was present. This change is the result of the interaction between temperature and a sensor's history of exposure. The SEM sensor is temperature controlled per EPA's CTM-022 Sec.7.2.1. (Electronic manipulation of a sensor's output would understate emissions and is "unacceptable" per CTM-022 Sec.2.3.1.)

Accurate data for Monitoring and Compliance Certification is essential. Not knowing your actual emission is risky.

Although electrochemical sensor technology offers the benefits of low cost, without proper safeguards data accuracy is uncertain (see above) and can undermine programmatic confidence.

After years of rigorous scientific investigation by Enerac and City Technology Ltd., the underlying causes of electrochemical sensor performance variability are now understood. Important performance considerations include temperature control, selection of appropriate operational ranges, sensitivity, drift, filter effectiveness, etc.

Standard Sensor

SEM Sensor

All of these performance considerations are incorporated into the *EPA's CONDITIONAL TEST METHOD (CTM-022): Determining.... NOx Emissions By Electrochemical Analyzer,* providing data accuracy and reliability equivalent to *EPA's METHOD 7E.*

The ENERAC 3000SEM series of Compliance Level Emmisions Analyzers provides a number of automatic QA/QC capabilities to insure compliance with these EPA Test Method requirements.

To obtain more information about the proper use of electro-chemical sensor technology for your application, and to receive a copy of the *EPA's CONDITIONAL TEST METHOD (CTM-022): A Scientifically Sound Framework For The Use Of NOx Electrochemical Sensors*, call us at 1-800-695-3637.

For continuous updates, visit our website at: www.enerac.com

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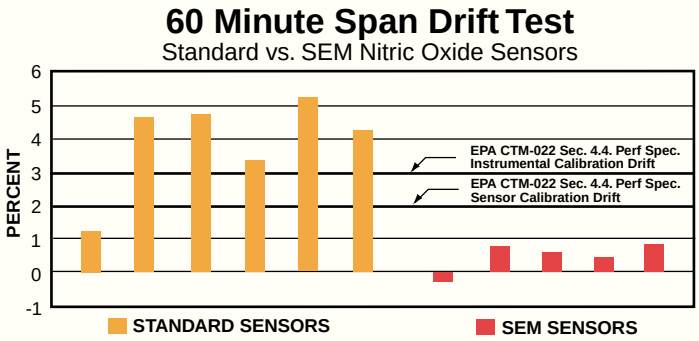
THE ENERAC 3000SEM Meets All EPA Test Method Requirements

CTM-022 SEC. 40: EQUIVALENT PERFORMANCE STANDARDS TO METHOD 7E

4.1	Analyzer Calibration Error	<+/-2% Calibration Gas
4.2	Sampling System Bias	<+/-5% Calibration Gas
4.3	Zero Drift	<+/-3% High Range Cal Gas
4.4	Calibration Drift	<+/-3% High Range Cal Gas
4.5.2	Interference Performance Check	<+/-2% High Range Cal Gas

CTM-022 SEC. 4.6: SENSITIVITY RANGE

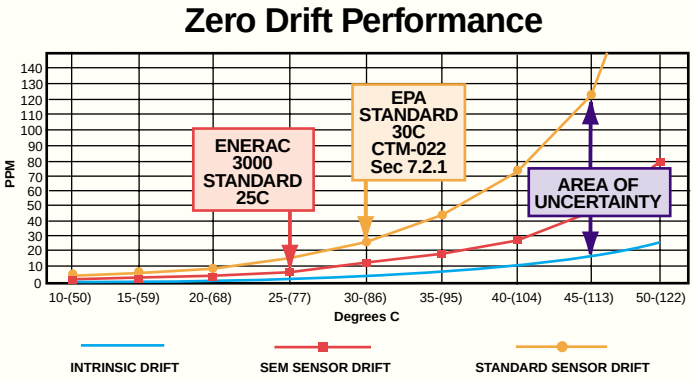
Every ENERAC 3000SEM NOx sensor is factory tested and certified to have less than two percent drift over 60 minutes at 90% of its upper range. Special “Dual-Range", single sensors offer operational flexibility and Quality Assurance.

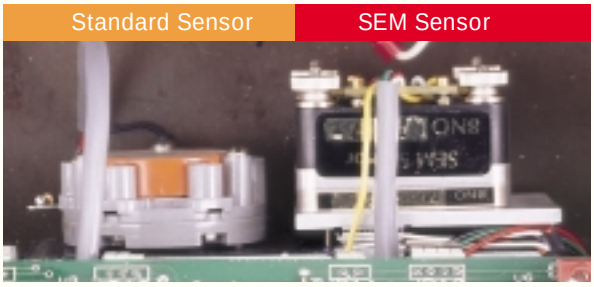


A simple flip of a switch will automatically change a sensor’s physical configuration and acceptable range of application.

CTM-022 SEC. 7.2.1: TEMPERATURE CONSIDERATIONS

The ENERAC 3000SEM incorporates a proprietary battery-operated temperature control system designed to automatically hold the nominal filter and sensor temperatures at <25°C (5°C below the requirements of Sec. 7.2.1.)

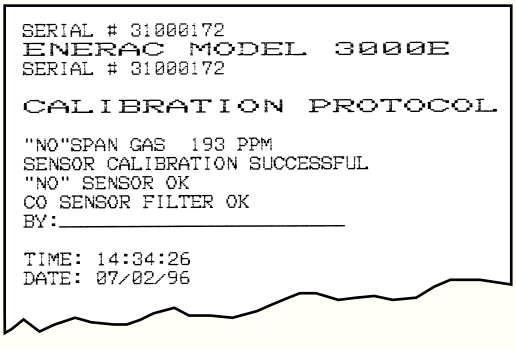


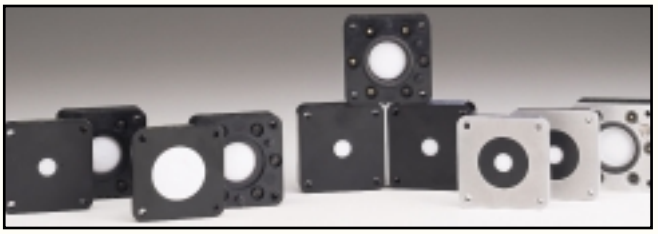


The SEM Nitric Oxide sensor incorporates a built-in temperature sensor to insure and document proper temperature control system performance.

CTM-022 SEC. 6.6: CALIBRATION CERTIFICATION PROTOCOL

ENERAC 3000SEM incorporates an automatic Calibration Certification Protocol (CCP) which provides documented assurance of proper sensor and filter performance. Interchangeable Precision Control Modules (PCM) allow expired filter material to be changed in the field without changing the sensor.





A full line of interchangeable Precision Control Modules (PCM) can change NO operating ranges from 15 ppm to >4000 ppm.