

# Advanced Septic System Nitrogen Sensor ISO 14034 ETV Field Test

## Background Information and Updated Testing Schedule for 2020-2021



The EPA Advanced Septic System Nitrogen Sensor Challenge is now closed, and the Agency is no longer accepting testing applications.

Due to COVID-19 pandemic, the six-month ISO 14034 ETV field test scheduled to start in May and run through November 2020 will not occur until fall 2020.

This website will be updated in the coming months with the new test date.

### **Background Information**

EPA selected Battelle Memorial Institute (Battelle) to oversee the ISO 14034 ETV Field Test. The testing will be conducted according to the Test /Quality Assurance Plan (T/QAP), which is based on the International Organization for Standardization Environmental Technology Verification (ETV) Standard - ISO 14034. Funding for the testing program is from the US EPA Office of Water/Wastewater Management.

The six-month field test will be conducted at the Massachusetts Alternative Septic System Test Center (MASSTC), a National Sanitation Foundation (NSF) certified test facility in Barnstable, Massachusetts.

Battelle will verify the results of the six-month field performance test based on the VerifiGlobal Performance Verification Protocol and the requirements of the ISO 14034 ETV standard. The sensor package will then be eligible for an EPA-provided ISO 14034 ETV verification report and statement.

**For more information email Gail DeRuzzo at:**  
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# Advanced Septic System Nitrogen Sensor ISO 14034 ETV Field Test Performance Goals



## Advanced septic system nitrogen sensor performance goals

Attribute	Attribute Description	Performance Goals		
		Minimum	Almost Ideal	Ideal
Parameter <sup>1</sup>	What is being measured	NO <sub>3</sub> <sup>-</sup> , NH <sub>4</sub> <sup>+</sup>	NO <sub>3</sub> <sup>-</sup> , NH <sub>4</sub> <sup>+</sup> , TOC	Total nitrogen (TN) <sup>2</sup>
Installation Price	Price to the homeowner to install	\$1,500	\$1,250	\$1,000
Data Management	Ability to record and transmit data (i.e., telemetry) for real-time access by practitioners, regulators, and interested stakeholders	Record and automatically transmit data to designated server or cloud	Record and automatically transmit data to designated server or cloud	Record and automatically transmit data to designated server or cloud; include remote capability of programming variable sampling frequencies.
Applicability & Accessibility	Applicability of sensor(s) to various innovative/alternative system designs and ease of access to OWTS for installation and maintenance	Located in-situ to provide performance information on the OWTS; must be accessible for maintenance	Located in-situ to provide performance information on the OWTS; must be accessible for maintenance	Located in-situ to provide performance information on the OWTS; must be accessible for maintenance
Frequency of Sensor System Maintenance	How often the sensor(s) need to be maintained	No more than quarterly	No more than semi-annually	No more than annually
Accuracy	Accuracy of sensor measurements to the true measurement	Within 20% of true value <sup>3</sup>	Within 20% of true value <sup>3</sup>	Within 20% of true value <sup>3</sup>
Precision	Repeatability of sensor measurements	≤30% RSD	≤20-30% RSD	≤20% RSD
Range <sup>4</sup>	Range of the detection	2-60 mg N/L	2-60 mg N/L 2-60 mg/L TOC	2-60 mg N/L
Frequency of Sensor Readings <sup>5</sup>	Capability of the sensor to provide parameter concentrations at time frequencies of:	Hourly <sup>5</sup>	Hourly <sup>5</sup>	Hourly <sup>5</sup>
Sensor Operating Temperature Range	Temperature range in which the sensor can operate	4° C to 35° C	4° C to 35° C	4° C to 35° C
Deployment	Period of deployment	Continuous	Continuous	Continuous
System Lifetime	Expected life of sensor	5 years	5 to 10 years	10 years

<sup>1</sup> Refer to Section B1.4 for information on the sources of nitrate (NO<sub>3</sub><sup>-</sup>), ammonia (NH<sub>4</sub><sup>+</sup>), and total organic carbon (TOC).

<sup>2</sup> Total Nitrogen (TN) is defined as the sum of total kjeldahl nitrogen (ammonia, organic and reduced nitrogen) and nitrate-nitrite.

<sup>3</sup> True value is defined as the certified laboratory result for the parameter using approved test methods.

<sup>4</sup> The sensors must be capable of alerting about or otherwise notifying of an over range value.

<sup>5</sup> Frequency of sensor readings during the preliminary and 6-month testing are detailed in Section B1.2. For deployment in an actual application, sensor frequency readings will depend on end user needs and may vary from hourly to daily or more frequently than hourly. 2  
Sensors should have the flexibility for varying frequency of readings.

**Advanced Septic System Nitrogen Sensor  
ISO 14034 ETV Field Test  
Market Opportunity**



## **2021 Market Stimulation Opportunity**

If a sensor package receives an ISO 14034 ETV verification report and statement, then an external technical panel and The Nature Conservancy (TNC) will review the results. TNC and others are seeking funding for an order of 200 deployable septic sensor units, not to exceed a total cost of \$300,000. The order would be presented in 2021 if a sensor package completes the 6-month field performance test and meets or exceeds the minimum performance goals.

**For more information email Gail DeRuzzo at:**

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(This project is being conducted by Battelle for the US EPA under contract #EP-C-16-014)