Stability Monitoring System (SMS) for NIR-O™ Analyzer Systems

Peace of Mind for Your Process

An important consideration for successful process monitoring is the ability to continually validate the performance of hardware components of the analyzer system.

The Stability Monitoring System (SMS) is a hardware/software package that continuously monitors the analyzer hardware to ensure that NIR-O is producing validated spectra for your applications. A fiber optic jumper cable must be installed on channel 6 or 12.

NIR-O Analyzer System Available with SMS Option

Guided Wave's NIR-O process analyzer is the core of a comprehensive system that includes the spectrometer, one or more NIR probes, fiber optic cables, and OmniView™ scanning and analysis software.

OmniView is the software controlling all aspects of a NIR-O analyzer. It provides full control of analyzer operations; diagnostics, data manipulation, maintenance and event logging, trend graphs and alarms, calibration model security, and control of inputs and outputs.

The SMS is an optional, added component for NIR-O which includes hardware and software to perform analyzer validation according to ASTM methodology.

Analyzer Performance Tests

This topic is addressed in ASTM practice D-6122-19[1] under instrument performance tests. The ASTM practice provides a set of criteria for establishing baseline analyzer performance validation. Three levels of hardware testing are established:

Level 0 - Tests the analyzer hardware's capability to generate a consistent spectrum. This is accomplished by measuring photometric noise, baseline stability, spectral resolution, photometric linearity, and wavelength stability.

Level A - Tests compare key parts of the spectral data with historical data to identify deviations.

Level B - Tests and monitors the instrument performance for deviations that affect the system calibration models.

Typical SMS Level 0 Validation Process

A flow chart depicting a typical SMS level 0 validation flow diagram is shown in Figure 1. Guided Wave's SMS operation is seamlessly integrated into the OmniView control software. SMS provides assurance that all of the ASTM required measurements are conducted at the appropriate time and will send a signal or message to the control system if a validation issue is encountered.

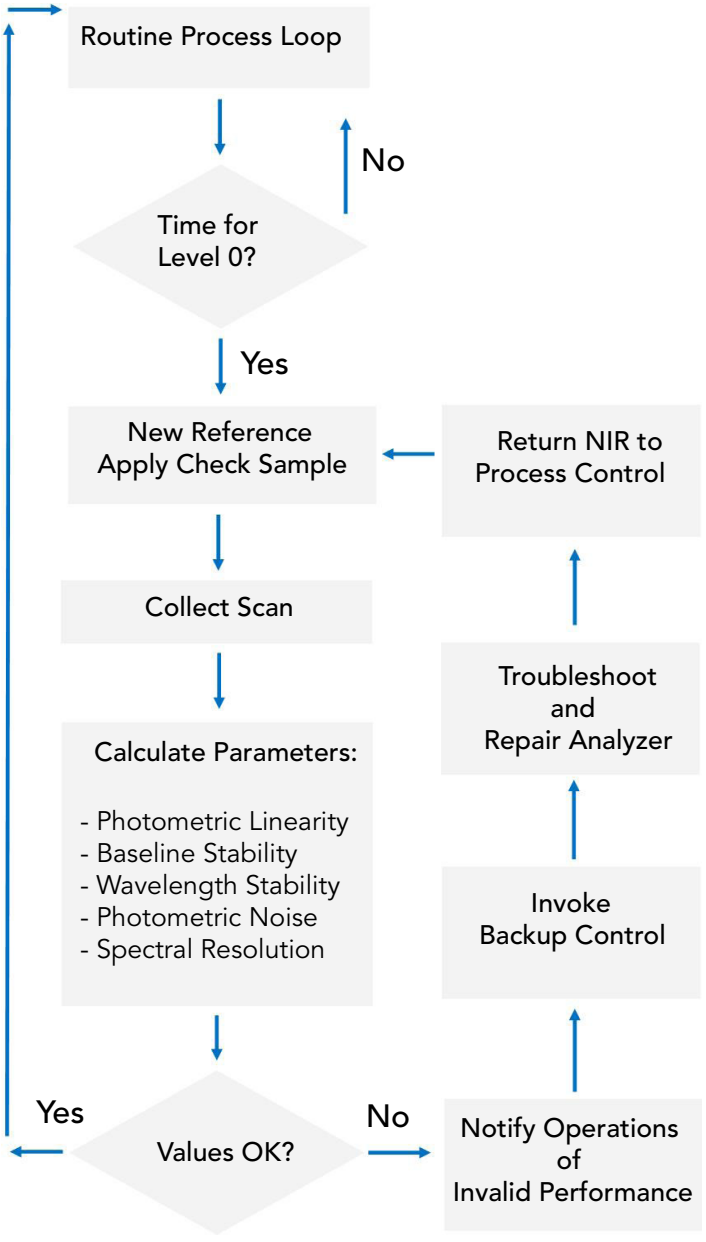

Figure 1 - Typical SMS Level 0 Validation Flowchart

Stability Monitoring System (SMS) for NIR-O Analyzer Systems

SMS Validation Detects Changes in Performance

The performance tests identified in the ASTM practice are diagnostics that can be used to detect changes in analyzer performance. This validation provides assurance that the measurement produced by the analyzer is a result of equipment that is operating properly. Since this is a hands-off procedure, it can be conducted in the background with no human intervention. The validation is done with an internal filter having a characteristic spectral signature. There are no liquids or other external sampling modes that are necessary. Everything is contained inside the NIR-O analyzer enclosure and all SMS related materials are completely non-hazardous.

NIR-O Process Analyzer
(General Purpose enclosure shown)

Tests Implemented in Guided Wave's SMS Package:

Level 0

1. Photometric noise level
2. Peak location (wavelength stability)
3. Baseline stability level
4. Bandwidth
5. Photometric linearity

Level A

This is a pass/fail performance test that is sensitive to all of the Level 0 parameters. Level A tests do not identify specific failure modes, but do indicate if the instrument performance is within historical bounds. In this test, the spectrum of a check sample (or an optical filter) is compared to a historical spectrum of the check sample.

Level B

The level B tests analyze the spectrum of the SMS filter against the models in use on the analyzer system. This monitors for deviations to which the calibration model is sensitive. The results are compared to historical values to detect any change in the analyzer performance.

NOTE: The level B tests are not automatically part of the SMS because they require the customer's unique calibration models, which Guided Wave may not have. Guided Wave can assist customers in implementing Level B tests as part of their SMS installation.

[1] ASTM D6122-19 Standard Practice for Validation of the Performance of Multivariate Online, At-Line, and Laboratory Infrared Spectrophotometer Based Analyzer Systems, ASTM International, West Conshohocken, PA, 2019 www.astm.org

Built-in SMS Provides Peace of Mind

Through the use of the SMS validation system, Guided Wave analyzers provide real-time process measurements with proven reliability. Using Guided Wave's OmniView software with the built-in SMS provides you peace of mind for your process.

Product specifications and data sheets for Guided Wave's NIR-O process analyzer and OmniView software can be found at guided-wave.com.

Guided Wave specializes in on-line optical measurements for process analytical chemistry. We design complete NIR and UV-VIS instrument systems, process probes and flow cells, plus sample conditioning systems that are used continuously, online, in real-time under the rigors of the manufacturing plant environment.

Contact Us

For additional information on Guided Wave's SMS, process analyzers, process probes, and fiber products please call or see our website at the numbers and addresses below.

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Literature: 1057-21-12