

ChemScan[®]

PROCESS ANALYZERS

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ChemScan[®] Method Summary #128 Spectrum Matching

Full Spectrum Analysis

Many organic compounds, unsaturated hydrocarbons, halogens, nutrients, heavy metals and ion forming compounds have ultraviolet-visible absorbance characteristics in water or other solvents. A "full spectrum" analyzer can detect an absorbance signature in a sample of the water or solvent over some predefined range of wavelengths. The absorbance signature in a sample is a function of the combined absorbances from all absorbing compounds in the sample.

Absorbance signatures are usually of interest because they contain information concerning the presence and concentration of a specific compound. Special mathematical algorithms are necessary to extract this information, after calibration (learning set) assistance from a number of samples with known concentrations for the compound of interest. This technique, which may or may not require the assistance of a reagent addition to the sample, is the basis for numerous analytical procedures able to be performed by on-line absorbance spectrometers such as the ChemScan Process Analyzer.

Spectrum Matching

Spectrum matching is an application that uses the capability of a full spectrum analyzer to compare the degree of agreement between periodic samples and a standard. The signature of the standard represents the desired composition of a liquid as described by its ultraviolet-visible absorbance spectrum. Samples from the manufacturing or treatment process are automatically characterized by its absorbance spectrum, which can be automatically compared to the desired spectrum from the standard. Unallowable deviations from the standard can be rapidly identified and used to initiate action alarms.

A spectrum can deviate from the standard if the sample does not contain a desired component, or if an undesired component is present, or if any of the desired components are not present in the desired concentration.

ChemScan Process Analyzer

The samples are typically introduced into the ChemScan Analyzer as a side stream from the manufacturing or treatment process. If no chemical alteration of the sample is necessary prior to analysis, the sample can return to process or drain to waste after passing through the analyzer.

In order for this method to be successful the analyzer must be capable of performing a standardized analysis for comparison. This requires a standard flow cell with a fixed path length for processing standards and samples. This also requires a way to zero out any variations attributable to lamp output variations, detector variations and fouling within the cell. All ChemScan analyzers have automatic zeroing using DI water standards and automatic cleaning to assure comparable results.