

In-Line Sample Preparation



For some analytes, automating the chemistry is the easy part; it's the sample preparation that really requires innovation to increase your laboratory's productivity. Lachat Instruments' suite of in-line sample preparation and determination methods thoroughly automates tedious, time-consuming, expensive and error-prone manual methods. The suite of automated in-line modules includes Ammonia, Total Cyanide, Total Nitrogen, Phenolics, Total Phosphorus, Surfactants, and TKN.

In-Line Ammonia Distillation

In some states, as well as for some sample types, distillation is required prior to the measurement of ammonia. The In-Line Ammonia Distillation System automatically performs these functions including:

- Heated distillation of sample in buffer
- Separation of ammonia from the matrix across a hydrophobic membrane
- Trapping of ammonia in dilute sulfuric acid
- Determination of ammonia by automated colorimetry (Phenate or Salicylate Chemistry)

In-Line Total Cyanide

In order for total cyanide to be determined, a digestion and distillation of the sample are required. Both of these steps are very time-consuming and prone to introducing error into the determination. The In-Line Cyanide System automatically performs these functions including:

- Heated digestion of sample in phosphoric acid
- UV-irradiation of the mixed stream to break down metal-cyanide complexes
- Heating of sample to vaporize the cyanide and drive it across a gas diffusion block where it is trapped by a flowing stream of sodium hydroxide
- Determination of cyanide by automated colorimetry

In-Line Total Nitrogen

A high temperature sample digestion is required prior to the determination of total nitrogen. This is often accomplished using a block digester which is bulky, expensive and slow. In contrast, the in-line total nitrogen method completely automates the test as follows —

- Heating and digestion of sample in a persulfate/borate reagent
- UV irradiation
- Determination of total nitrogen as nitrate-N

In-Line Phenolics

Prior to determination of total recoverable phenolics, samples must be distilled. This is often done using a classical macro glass distillation apparatus which is bulky, slow and expensive. In contrast, the in-line phenolics method completely automates the process including:

- Heating of sample
- Distillation across a semi-permeable membrane

- Condensation of sample
- Colorimetric determination of phenol

In-Line Total Phosphorus

A high temperature sample digestion is required prior to the determination of total phosphorus. This is often accomplished using a block digester which is bulky, expensive and slow. In contrast, the in-line total phosphorus method completely automates the test as follows —

- Heating and sequential digestion of sample in sulfuric acid and potassium persulfate
- UV irradiation
- Determination of total phosphorus as phosphate-P

In-Line Surfactants

The manual determination of surfactants (also called methylene blue active substances) includes an extremely complex, time-consuming and error prone extraction method which also involves exposure to chloroform. The Lachat in-line surfactants method thoroughly automates both the extraction and colorimetric determination and maintains the chloroform in a closed system to minimize exposure with the following steps:

- Injection of sample into alkaline methylene blue
- Segmentation of sample/alkaline methylene blue stream with chloroform
- Extraction into chloroform to remove the negative interference from proteinaceous materials
- Back-extraction with acidified methylene blue to remove positive interference from other ionic species
- Measurement of absorbance

In-Line Distillation of TKN Digests

In some states, as well as for some sample types, distillation is required prior to the measurement of ammonia in Total Kjeldahl Nitrogen Digests. The In-Line TKN Distillation System automatically performs these functions including:

- Heated distillation of sample in buffer
- Separation of ammonia from the matrix across a hydrophobic membrane. This is especially useful for saline and brackish samples.
- Trapping of ammonia in dilute sulfuric acid
- Determination of ammonia from the digest by automated colorimetry (Mercury or copper digests)