

# Shimadzu's Newest TOC/TN/TP Sampling and Sample Pretreatment Systems Satisfy the Needs of the Industries

Nutrients are naturally present in the environment, and are very important for maintaining a balanced aquatic ecosystem. Adverse human activities can lead to an increase in the level of nutrients present in the environment, and consequently disrupt the aquatic ecosystem and lead to eutrophication. Increase in the level of nutrients is a very serious issue, as it can increase the algal bloom, which consequently die and are consumed by microorganisms that use oxygen and as a result cause fish kill. The U.S. Environmental Protection Agency (EPA) is currently trying to enforce the nutrient criteria enacted in 2002. As a result, the industry will soon be required to monitor and regulate the release of nutrients into the environment, as well as monitor organic carbon. The industry is also continuously striving to use sampling systems that will help in obtaining data exhibiting better accuracy and precision, to meet the requirements.

With the industry and the regulations to be enacted in mind, Shimadzu recently launched the TNPC-4110 series instruments, which have the capability of simultaneously analyzing for TOC (Total organic carbon), TN (Total nitrogen), and TP (Total phosphorous). The TNPC-4110 series can be used with different applications from drinking water supply management, to waste water treatment plant influent and effluent, and monitoring of process and surface water. Monitoring TOC, TN, and TP means less pollutants are released, and as a result leads to a better environment. The sampling system is compatible with oxidation methods (Combustion or Wet chemical) that are approved by various organizations such as the EPA, ASTM, and USP. Shimadzu's newest sampling system not only saves money and time, but also increases the productivity and efficiency.

The sampling system (Figure 1) possess multi-function features, such as

- Off-line or On-line measurement capability
- Automatic acidification and sparging for TOC analysis, which reduces measuring time
- Automatic dilution capability, which
  - Reduces salinity, acidity, and alkalinity of samples, thus reduces instrument maintenance
  - Reduces sample preparation time
  - Reduces the number of standards needed, and enables the use of one standard to prepare different calibration curves
- Consecutive parallel sample preparation and measurement capability

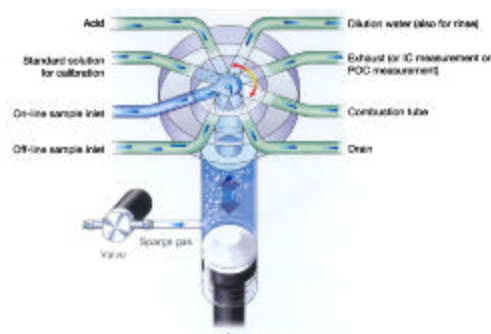


Figure 1. The New 8-port Valve Sampling System

In order to provide the industry with a complete and self reliable sampling system, Shimadzu developed the "Sample Pretreatment Sampling Units" that are compatible with the new multi-function sample injection system. The units display the easiness and reliability of pretreatment of the samples, with free-flow blockage, therefore reducing the time and money involved in filtration of the samples. Pretreatment of the sample takes a few seconds, and occurs during the measurement cycle. The "Pretreatment Sampling Units" were developed by Shimadzu to be used with sampling of streams and/or pipelines in process plants, with suspended particles. Depending on the number of streams or pipelines needed to be sampled, and presence of suspended particles, the following units can be used.

- **Backwash Strainer Unit**

A simple and effective sample pretreatment system, capable of preventing adhesion of contaminants, slime and/or algae, through back washing of the strainer and as a result prevents the strainer from clogging (Figure 2).



Figure 2. The New Backwash Strainer Unit

- **Single Stream Suspended Solids Unit**

A flow blockage free unit designed for on-line analysis of a single stream with suspended particles (Figure 3).

A 2-stage pretreatment process is involved, where foreign matter is removed by the strainer, and the suspended particles are pulverized by a homogenizer, thus creating a uniform sample.

Minimum sample is introduced to reduce algae and slime problems. All sample contact components are rinsed immediately after sampling with rinse water.

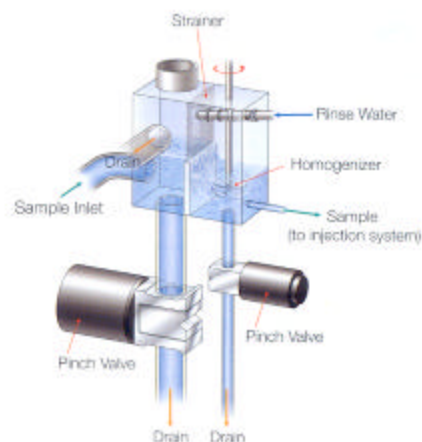


Figure 3. The New Single Stream Suspended Solids Unit

- **Multi-Stream Suspended Solids Unit**

A multi-stream pretreatment sampling unit, that is capable of sampling up to 6 streams. The unit utilizes a "Sample Thief" system that eliminates filtering, thus reducing the expensive replacements of filters for the majority of applications (Figure 4).

The sample is introduced through the "Sample Thief", onto the strainer for removal of large particles, then into the homogenizer compartment, where other particulates are then pulverized.

All sample contact components are rinsed immediately after sampling with rinse water, as result minimizing the contamination between the streams.

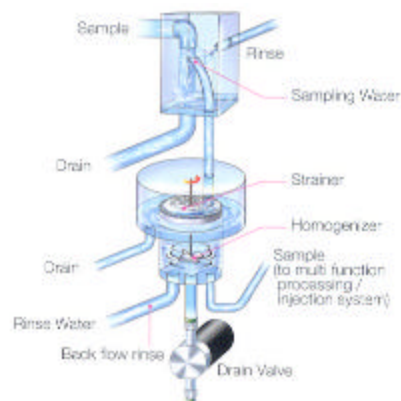


Figure 4. The New Multi-Stream Suspended Particle Unit