Process Analyzers

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Section A—Process Analyzer Considerations

A.1 Scope

Process monitors that measure and transmit information about chemical composition, physical properties, or chemical properties are known as *process analyzer systems.* Many of these systems were first developed for laboratory analysis. Today they are primarily used as continuous on-line analyzers.

A process monitoring system usually requires a sample conditioning system, a process analyzer, and one or more data output devices. Properly designed systems also require overall considerations as to calibration, utilities, sample disposal, safety, and systems packaging.

Process analyzers measure chemical concentrations or physical or chemical properties that can be used as control variables instead of relying on indirect physical parameters, such as pressure, temperature, and inferred data from computer models. Process analyzer systems can provide a significant economic return when incorporated into process optimization and advanced control loops or when used for product quality control.

This section will address the generic design factors that must be taken into consideration in the design and implementation of all analyzer applications.

Chapter 1 provides general information to be considered in the design of analyzer systems.

Chapter 2 describes the requirement for analyzer system data management.

Chapter 3 provides information on analyzer calibration and validation.

Chapter 4 provides an overview of analyzer sample system design considerations.

Chapter 5 describes the benefits of pre-packaging analyzer systems versus field construction methods.

Chapter 6 provides information on the installation and maintenance of analyzer systems.

Chapter 7 provides information on safety in the design of analyzer systems.

1 Analyzer Selection Design Requirements

1.1 Economic Considerations

Analyzer systems can improve product quality, increase the yields of products with higher economic value, increase product throughput and output, and reduce energy costs.

Process analyzer systems should be considered for product quality control when frequent and rapid measurements are required because of fast and substantial variations in process stream quality.

If an analyzer system is to be installed to improve operational efficiency of a process unit, the installation should be justifiable from an economic standpoint. Increased profit from improved efficiency combined with decrease in off-spec material produced must be weighed against the cost of installing, operating, and maintaining the system.