

1 Purpose

The purpose of this technical report is to provide recommendations for differential pressure based level measurement in boiler steam drums.

2 Scope

This technical report is intended to provide guidance in the application of differential pressure measurement techniques for measuring water level in boiler steam drums. The report also provides guidance on the use of density compensation techniques to improve the accuracy of the level measurement. This technical report applies to all boilers operating at pressures of 200psig or greater.

3 Definitions

The following definitions are provided to clarify their use in this standard and may not be relevant to the use of the word in other texts. For other definitions, please refer to ANSI/ISA-51.1-1979 (R1993), Process Instrumentation Terminology.

3.1 boiler

The entire vessel in which steam or other vapor is generated for use external to itself, including the furnace, consisting of the following: water wall tubes; the firebox area, including burners and dampers; and the convection area, consisting of any superheater, reheater, and/or economizer sections, as well as drums and headers.

3.4 drum (steam)

A closed vessel designed to withstand internal pressure. A device for collecting and separating the steam/water mixture circulated through the boiler.

3.11 redundant (redundancy)

Duplication or repetition of elements in electronic or mechanical equipment to provide alternative functional channels in case of failure of the primary device.

3.15 shrinkage

A decrease (shrinkage) in drum level due to a decrease in steam-bubble volume. This condition is due to a decrease in load (steam flow), with a resulting increase in drum pressure and a decrease in heat input.

3.18 swell

An increase (swell) in drum level due to an increase in steam bubble volume. This condition is due to an increase in load (steam flow), with a resulting decrease in drum pressure and an increase in heat input. Swelling also occurs during a cold start-up as the specific volume of the water increases.

3.22 two-out-of-three logic circuit (2/3 logic circuit)

A logic circuit that employs three independent inputs. The output of the logic circuit is the same state as any two matching input states.