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American National Standard

Transducer and Transmitter Installation For Nuclear Safety Applications

ANSI/ISA-S67.01 — Transducer and Transmitter Installation For Nuclear Safety Applications

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Preface

This preface, as well as all annexes and footnotes, is included for informational purposes and is not a part of ANSI/ISA-S67.01.

This revised standard has been prepared as a part of the service of ISA, the international society for measurement and control, toward a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subjected to periodic review. Toward this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Standards and Practices Board Secretary; ISA; 67 Alexander Drive; P. O. Box 12277; Research Triangle Park, NC 27709; Telephone (919) 549-8411; Fax (919) 549-8288; e-mail: standards@isa.org.

Begun in April 1974, under the directorship of Robert L. Galley and the assistance of H. C. Schmidt, W. M. Deutsch, J. A. Nay, and M. J. Kimbell, this standard was one of the first ISA ventures directed specifically at the nuclear power industry. Shortly thereafter, the ISA Nuclear Power Plant Standards Committee (NPPSC) was formed within the Power Industries Division of ISA to oversee the development of standards for the nuclear power industry and to serve as the SP67 Committee for those standards.

The question of definitions between "transducer" and "transmitter" was raised repeatedly in the early development of this standard. It was generally agreed that industry practice is to use "transmitter" for devices in which the values of the measurand are converted, operated upon, and scaled to a standardized output signal. In contrast, a "transducer" is commonly considered to be a fixed device for a single conversion of measurand value to some signal that is physically inherent to the "transducer" design, and that cannot be scaled or operated upon within the "transducer" itself. Thus, in common usage as seen by this Subcommittee, a "transmitter" will contain at least one "transducer" (and often several) along with amplifiers and other devices. However, the Subcommittee recognizes (with some reservation) that "transducer" can, through generic expansion, be used to designate devices commonly referred to as "transmitters." Because this standard is meant to apply to instruments included in both definitions, the word "transducer" has been selected for consistent use throughout. The user of this standard is respectfully requested to include the instrument person's common usage of "transmitter" or "sensor" as part of the thought process when the single word "transducer" appears.

It is important to note that the installation of transducers, if not done properly, can negate the suitability of a device for its use in nuclear safety-related systems. Since there are many different instrument service conditions and a wide variety of viable system and instrument designs, the user of this standard will find that the design responsibilities, rather than the design itself, are sometimes delineated herein.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general, and the International System of Units (SI) in particular, in the preparation of instrumentation standards, recommended practices, and technical reports. The Department is further aware of the benefits to USA users of ISA Standards of incorporating suitable references to the SI (and the metric system) in their business and professional dealings with other countries. Toward this end, this Department will endeavor to introduce SI and SI-acceptable metric units as optional alternatives to English units in all new and revised standards, recommended practices, and technical reports to the greatest extent possible. SI (metric) unit conversions in this standard are given only to the precision intended in selecting the original numerical value. When working in the SI units system, the given SI value should be used. When working in customary U.S. units, the given U.S. value should be used.

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Contents

1 Scope

This Standard covers the installation of transducers for nuclear safety-related applications.

2 Purpose

This Standard establishes requirements and recommendations for the installation of transducers and auxiliary equipment for nuclear applications outside of the main reactor vessel.

3 Definitions and terminology

ISA-S51.1* is the basic reference for terms not defined herein. ISA-S37.1* is the reference for terms not included in S51.1.

3.1 auxiliary equipment: Separate devices, such as field-mounted power supplies, that are appended to the basic transducer and are located in the same general area as the transducer. Equipment located away from the transducer (such as control-board-mounted controllers and rack-mounted power supplies) is not included in the definition as used in this Standard.

3.2 Code: Refers to the ASME Boiler and Pressure Vessel Code, Section III* and other sections required to implement the requirements of Section III.

3.3 Code class: The applicability of the Code, determined through consideration of pressure-boundary integrity.

3.4 in-line: Transducers exposed directly to the process fluid in piping, vessels, equipment, or the main flow paths of fluid systems.

3.5 nuclear safety-related: That which is essential to

a) emergency reactor shutdown;
b) containment isolation;
c) reactor core cooling;
d) containment or reactor heat removal;
e) prevention or mitigation of a significant release of radioactive material to the environment; or
f) maintaining safe shutdown conditions;

*See References and bibliography