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Standard



Inherent Flow Characteristic and Rangeability of Control Valves



ISA-S75.11 — Inherent Flow Characteristic and Rangeability of Control Valves

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Prior to the issuance of this standard, there had been no standard which provided allowable deviations for control valve flow characteristics and which established criteria for rangeability of control valves.

In contrast to conventional globe valves, most rotary motion control valve types such as ball valves, butterfly valves, or plug valves do not have a mathematically definable flow characteristic. The users of control valves, therefore, have to depend on the manufacturer to state the specific flow characteristic for a given style or size of valve either in graphic or tabular form. For sake of consistency, this method of presentation was also adapted for generic flow characteristics such as "equal-percentage" or "linear."

This standard states the limits within which a stated flow characteristic can be expected to be reproducible. Knowledge of specific flow coefficients (within allowable deviations) at stated travel positions will enable the user to calculate the installed flow characteristic for a specific control system.

The stated inherent rangeability of a specific control valve is related solely to the interaction between the closure member and the flow control orifice of a valve. This given value may not be applicable when the control valve is installed. Other factors such as the positioning accuracy of the actuator or the effects of hydraulic, flow resistance of associated piping have to be considered when deriving the installed rangeability for a specific application.

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This is a preview of "ISA S75.11-1985 (R19...)". [Click here to purchase the full version from the ANSI store.](#)

1 Scope

The scope of this standard is to define the statement of typical control valve inherent flow characteristics and inherent rangeabilities, and to establish criteria for adherence to manufacturer-specified flow characteristics.

2 Basic definitions

2.1 Terminology

Basic terminology used herein is based on definitions stated in "Control Valve Terminology" ISA Standard S75.05.

2.2 Flow coefficient

A constant (C_v), related to the geometry of a valve, for a given valve opening, that can be used to predict flow rate. See ANSI/ISA S75.01 "Control Valve Sizing Equations" and ANSI/ISA S75.02 "Control Valve Capacity Test Procedure."

2.3 Inherent flow characteristic

The relationship between the flow rate through a valve and the travel of the closure member as the closure member is moved from the closed position to rated travel with constant pressure drop across the valve.

2.4 Inherent rangeability

The ratio of the largest flow coefficient (C_v) to the smallest flow coefficient (C_v) within which the deviation from the specified inherent flow characteristic does not exceed the limits stated in [Section 4](#).

2.5 Relative flow coefficient (ϕ)

The ratio of the flow coefficient (C_v) at a stated travel to the flow coefficient (C_v) at rated travel.

2.6 Relative travel (h)

The ratio of the travel at a given opening to the rated travel.