

**ANSI/FCI 70-2-2006**  
**AMERICAN NATIONAL STANDARD**  
**Control Valve Seat Leakage**

**1. PURPOSE**

1.1 This standard establishes a series of seat leakage classes for control valves and defines the test procedures.

**2. SCOPE & LIMITATIONS**

2.1 Selection of a leakage class is not restricted as to valve design, but acceptable values for various commercially available designs are suggested for each class under Section 4.

2.2 The standard cannot be used as a basis for predicting leakage at conditions other than those specified.

2.3 This standard is similar to IEC 60534-4, except that no provision is made for Class IV-S1 and the standard is applicable for valves with a  $C_v$  value less than 0.1. The air leakage test and allowable leak rates for Class V are equivalent to the water test and allowable water leakage rates for a water test performed at a nominal temperature of 60°F.

**3. DEFINITIONS**

**3.1 Control Valve**

3.1.1 A valve with a power positioning actuator for moving a closure member to any position relative to a valve seat or seats in response to and in proportion to an external signal. The energy for a control valve actuator is derived from an independent source.

3.1.2 Control valve body subassemblies on which an actuator is to be mounted at some later date are within the intent of this definition.

3.2  $C_v$  - An experimentally determined valve sizing coefficient. (Ref. ISA S75.01, ISA S75.02 and FCI Standard 84-1).

3.3 Rated Valve Capacity. The quantity of test fluid (air or water) that would pass through the valve at rated travel under the stated pressure conditions as determined by the appropriate equations and manufacturer's ratings.

3.4 Rated Travel. The valve travel at which the manufacturer's rating is established.

3.5 Seat Leakage. The quantity of test fluid passing through an assembled valve in the closed position under the test conditions as defined.

**4. LEAKAGE SPECIFICATIONS & CLASSES**

4.1 The maximum allowable seat leakage as specified for each class shall not exceed the seat leakage in Table 1 using the test procedure as defined in Section 5. For Classes II through VI each and every valve shall be tested.

**4.2 Leakage Classes**

4.2.1 CLASS I. A modification of any Class II, III or IV valve where design intent is the same as the basic class, but by agreement between user and supplier, no test is required.

4.2.2 CLASS II. This class establishes the maximum permissible leakage generally associated with commercial double-seat control valves or balanced single-seat control valves with a piston ring seal and metal-to-metal seats. Use test procedure Type A.

4.2.3 CLASS III. This class establishes the maximum permissible leakage generally associated with Class II (4.2.2), but with a higher degree of seat and seal tightness. Use test procedure Type A.

4.2.4 CLASS IV. This class establishes the maximum permissible leakage generally associated with commercial unbalanced single-seat control valves and balanced single-seat control valves with extra tight piston rings or other sealing means and metal-to-metal seats. Use test procedure Type A.

4.2.5 CLASS V. This class is usually specified for critical applications where the control valve may be required to be closed, without a blocking valve, for long periods of time with high differential pressure across the seating surfaces. It requires special manufacturing, assembly and testing techniques. This class is generally associated with metal seat, unbalanced single-seat control valves or balanced single-seat designs with exceptional seat