IN THIS STANDARD

Requirements proper are printed in normal helvetica type.
Explanatory matter regarding the requirements is printed in smaller helvetica type.
Test specifications are printed in *italic type*.
Explanatory matter regarding the test specifications is printed in *smaller italic type*.
Further explanatory matter regarding the requirements or specific subject marked by an asterisk can be found in the Appendix.

CAUTION

MANY TESTS REQUIRED BY THIS STANDARD ARE INHERENTLY HAZARDOUS. ADEQUATE SAFEGUARDS FOR PERSONNEL AND PROPERTY SHOULD BE EMPLOYED IN CONDUCTING SUCH TESTS.

1 General

1.1 Scope

This standard applies to electrical, electronic (analog/digital) and electromechanical process measurement and control equipment which:

1) measures and controls directly or indirectly an industrial process through a final control element (or elements)

2) is intended to be connected to supply circuits which do not exceed 250 volts rms, single phase, or dc

3) is rated for use in either indoor, outdoor or sheltered locations

This equipment includes but is not necessarily restricted to:

- indicating, integrating or recording equipment with or without a control function
- transmitters
- transducers
- analyzers
- supervisory or telemetry equipment
- accessories used with any of the above equipment

1.2 Environment

1.2.1 Indoor locations. Equipment according to this standard is intended for use where air temperature is controlled within specified limits.

Exception: where specified otherwise.

The basic climatic conditions for heated and/or cooled locations at an atmospheric pressure of 86 to 106 kPa (12.5 to 15.4 psi) are according to Table 1-1.

Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected. In air-conditioned locations no pollution or only dry, nonconductive pollution occurs and has no influence.

Table 1-1 — Heated and/or cooled indoor locations[a]

Location Class	Temperature (°C)	Relative Humidity	Maximum Moisture Content kg/kg Dry Air
B1	+15 to +30	10 to 75%	0.020
B2	+5 to +40	10 to 75%	0.020
B3	+5 to +40	5 to 95%	0.028
BX	Equipment designed and rated for higher limits, however, intended only for use in indoor locations		

[a] The environment inside an equipment enclosure is considered to be the same as that external to the equipment enclosure when the enclosure does not provide adequate protection against the environmental stresses.

1.2.2 Sheltered locations. Equipment according to this standard intended for use in sheltered locations shall comply with the applicable requirements according to Clause 19 of ISA-S82.03.

Exception: where specified otherwise.

The basic climatic conditions for sheltered locations at an atmospheric pressure of 86 to 106 kPa (12.5 to 15.4 psi) are according to Table 1-2.

Normally, conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected.

Table 1-2 — Sheltered locations[a]

Location Class	Temperature (°C)	Relative Humidity	Maximum Moisture Content kg/kg Dry Air
C1	–25 to +55	5 to l00%[b]	0.028
C2	–40 to +70	5 to l00%[b]	0.028

[a] The environment inside an equipment enclosure is considered to be the same as that external to the equipment enclosure when the enclosure does not provide adequate protection against the environmental stresses.

[b] Including condensation.

1.2.3 Outdoor locations. Equipment according to this standard intended for use in outdoor locations shall comply with the applicable requirements according to Clause 19 of ISA-S82.03.

Exception: where specified otherwise.

The basic climatic conditions for outdoor locations at an atmospheric pressure of 86 to 106 kPa (12.4 to 15.4 psi) are according to Table 1-3.

Normally, the pollution generates high and persistent conductivity caused, for instance, by conductive dust or by rain or snow.

Table 1-3 — Outdoor locations[a]

Location Class	Temperature (°C)	Relative Humidity	Maximum Moisture Content kg/kg Dry Air
D1	–25 to +70	5 to l00%[b]	0.050
D2	–40 to +85	5 to l00%[b]	0.050

[a] The environment inside an equipment enclosure is considered to be the same as that external to the equipment enclosure when the enclosure does not provide adequate protection against the environmental stresses.

[b] Including condensation and direct wetness.

2 Definitions

2.1 Control equipment: Equipment which controls one or more output quantities to specific values, each value being determined by manual setting, local or remote programming, or by one or more input variables.

2.2 Electronic measuring equipment: Equipment which, by means of incorporating electronic devices, serves to measure or to observe quantities or to supply electrical quantities for measuring purposes.

Electronic devices are parts or assemblies of parts which use electron or hole conduction in semiconductors, gases, or a vacuum.

2.3 Indicating measuring equipment: Equipment which indicates the value of the measured quantity.

Process measurement and control equipment may combine one or more of the functions of Sub-clauses 2.1, 2.2, or 2.3 above.

2.4 Outdoor location: Locations where neither air temperature nor humidity are controlled and the equipment is exposed to outdoor atmospheric conditions such as direct sunshine, wind, rain, hail, sleet, snow and icing.

Sensors, transmitters, final control elements and actuators and some indicators separate from controllers are often located in outdoor locations.

2.5 Sheltered locations: Locations where neither air temperature nor humidity is controlled and equipment is protected against direct exposure to such climatic elements as direct sunlight, fall of rain and other precipitation, and full wind pressure.

Indoor locations which are neither heated nor cooled are sheltered locations.

Transmitters, final control elements, and some indicators separate from controllers are often located in sheltered locations when frequent operator attention is not important.