

Changes shown by

SCOPE

- I 1.1 This practice covers environmental conditions for control house and field measurement and control devices.
- I 1.2 **An asterisk (*)** indicates that a decision by the Owner's Engineer is required, that additional information is to be furnished by the Owner's Engineer, or that information for approval by the Owner's Engineer is to be supplied by the vendor or contractor.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the practice and standards which shall be used with this practice.
- I * 2.2 **Table 2** lists the practices and standards which shall be used with this practice as specified by the Purchaser.

TABLE 1

PRACTICE			
IP 16-1-3 Protection of Electrical Equipment in Contaminated Environments			
STANDARDS			
ANSI / ISA		IEC	
S71.01	Environmental Conditions for Process Measurement and Control Systems: Temperature and Humidity	529	Degrees of Protection Provided by Enclosures (IP Code)
S71.04	Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants	68-2-x	Basic Environmental Testing Procedures
		-6:	Test Fc and Guidance: Vibrations (Sinusoidal)
		-27:	Test Ea and Guidance: Shock
		-31:	Test Ec, Drop and Topple
		-64	Test Fh: Vibration, Broad-Band Random (Digital Control) and Guidance
ANSI / IEEE			
C 62.41	IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits		
CENELEC		1000-4-x	Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment - Testing and Measurement Techniques.
EN 50081-2	Electromagnetic Compatibility - Generic Emission Standard - Part 2: Industrial Environment	-2:	Electrostatic Discharge Immunity Test
EN 50082-2	Electromagnetic Compatibility - General Immunity Standard - Part 2: Industrial Environment	-3:	Radiated, Radio Frequency, Electromagnetic Immunity Test
ENV 50141	Electromagnetic Compatibility - Basic Immunity Standard - Conducted Disturbances Induced by Radio Frequency Fields - Immunity Test	-4:	Electrical Fast Transient/Burst Immunity Test
		-5:	Surge Immunity Test

TABLE 2

PRACTICES	
IP 4-3-1	Plant Buildings for Operation and Storage
IP 4-3-3	Shelters for Process Analyzers
STANDARDS	
IEC	
770	Methods of Evaluating the Performance of Transmitters for Use in Industrial-Process Control Systems
1131-2	Programmable Controllers: Part 2: Equipment and Requirements Tests
ANSI / ISA	
250	Enclosures for Elec. Equipment: 1KJ MGR
CENELEC	
EN 50529	Degrees of Protection by Enclosures (IP Code)

IP 15-6-2		Environmental Protection for Instrumentation	EXXON INTERNATIONAL PRACTICE
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(This practice is appropriate for attachment to Inquiry or Purchase Document)

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DESIGN

- O,R *3.1 Instrumentation shall be capable of satisfactory performance in one of five environmental categories (**Categories 1 to 5**) defined in [Table 3](#). Any additional requirements shall be specified by the Owner's Engineer.
- I 3.2 **Category 1** environments include most control houses, control centers, and remote instrument buildings (RIB's) where temperature, humidity and air quality are controlled within specified limits. This may include some analyzer shelters and substations.
- I 3.3 **Category 2** environments include most substations, walk-in analyzer shelters and other buildings where temperature is controlled but humidity or air quality may not be. Control setpoints and limits are typically less stringent than for Category 1 environments.
- I 3.4 **Category 3** environments typically include temperature controlled (heated or cooled) enclosures designed to maintain an instrument within it's operating limits. Air quality and humidity are not controlled. An example would be a winterized instrument enclosure.
- I 3.5 **Category 4** environments typically include non-enclosed walk-in shelters, equipment shelters, sheltered enclosures and the interior of field control panels protected from direct exposure to climatic elements such as sunlight, precipitation and full wind pressure. No control of temperature, humidity and air quality are provided. Purged enclosures should also be considered a **Category 4** or more severe if temperature variations dictate.
- I 3.6 **Category 5** environments typically include any field or outdoor location with no protection from the environment. Examples include sensors, valves and junction boxes.
- I 3.7 Where an instrument is not designed to operate in **Category 3, 4, or 5** environments with respect to airborne aerosols or particulates, the vendor shall install such devices in weatherproof or dustproof enclosures rated **IP65** per EN 50529 or **NEMA 4X** per NEMA 250 in [Table 2](#).
- R 3.8 Where equipment contained in enclosures may be subjected to temperatures exceeding the value in [Table 3](#) (85°C) due to solar, radiant or self heating, the enclosure shall be either provided with a canopy type covering or a cooling system to maintain internal temperature below this value.
- O,R 3.9 **Electro-magnetic Compatibility and Electrostatic Discharge Protection shall be** imposed in accordance with **IEC 1000-4-x** and **ENV 50141** standards listed in [Table 1](#).
- O,R 3.10 **Mechanical shock and Vibration compatibility shall be** imposed in accordance with **IEC 68-2-27, IEC 770, and IEC 1131-2**. Where no product specific standards exist, a continuous or repetitive vibration of 2.5G, 5-500 Hz shall not cause any damage or malfunction.

Revision Memo

12/90
12/91

Original Issue of Basic Practice
Revision 1

12/96
3/98

Revision 0 - Original Issue of International Practice
Revision 1

Complete editorial revision to rationalize this practice with the referenced standards and other IPs. Significant changes include: Deletion of **old Pars. 1.3 and 3.1-3.8** which are covered by the appropriate standards listed in **Tables 1 and 2**. Deletion of **old Pars. 1.2, 5.1, 5.2, 5.3, 5.4, 6.1, and 6.2** which are no longer relevant to this IP. Deletion of **old Pars. 4.12-4.18** by consolidating under statement in **Par 3.9**. Deletion of **old Pars. 4.19 and 4.20** by consolidating under **Par. 3.10**. Revised **Par. 2.2, Table 2** formatting and added relevant standards referencing electrical enclosure requirements from **Par. 3.7**. Revised **Par. 3.1** to clarify Owner's Engineer role. Minor editing of **Table 3** for consistency and clarity.

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