

STANDARDS

NFPA – National Fire Protection Association

The NFPA establishes fire safety standards, including standards for the safe operation of processes.

System Installation:

- NFPA 55 – Compressed Gas for Industrial and Medical Facilities.
- NFPA 70 – National Electric Code.

Ovens and Furnaces:

- NFPA 86 – Standards for ovens and furnaces.

Basic Fire Protection Properties:

- NFPA 325 – Guide to Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids.

Purged and Pressurized Enclosures:

- NFPA 496 – Standard for Purged and Pressurized Enclosures for Electrical Equipment.

For more information visit www.nfpa.org

OSHA – Occupational Safety and Health Administration

The OSHA establishes and enforces protective standards to save lives, prevent injuries, and protect the health of America's workers.

- OSHA 1910.107 - Spray finishing using flammable and combustible materials.
- OSHA 1910.103 - Hazardous materials Hydrogen.

For more information visit www.osha.gov

FMR – Factory Mutual Research

The FMR audits insured facilities for compliance to acceptable safety standards.

Hazardous Locations Requirements:

- FM Class 3600 – Hazardous Location General Requirements.
- FM Class 3615 – Explosion Proof Electrical Equipment General.
- FM Class 3611 Class I Division 2 – Hazardous Locations.
- FM Class 3610 Class I, II, III Division 2 – Intrinsically Safe Apparatus & Associated Apparatus.

Performance Criteria:

- FM Class 6310 – Combustible Gas Detectors.

- FM Class 6320 – Combustible Gas Detectors.

Electrical Utilization:

- FM Class 3810 – Measuring and Process Control Equipment.

For more information visit www.fmglobal.com

CFR – Code of Federal Regulations

The CFR is a codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. Every system in use must meet all federal and state regulations in order to operate safely.

Performance Criteria:

- 40CFR60 Method 25A – Performance criteria for monitoring hydrocarbon destruction systems, solvent recovery breakthrough, waste incinerators, and other applications.
- 40 CFR 60.18 General Control Device Requirements. (Flares)
- 29CFR1910.103 – Occupational Safety and Health Standards: Hydrogen.

For more information visit www.gpoaccess.gov/cfr/index.html

ISA – Instrument Society of America

The ISA is globally recognized as a standards writing organization, developing consensus standards and protecting facilities from flammable hazards.

General Requirements:

- ISA S82.01 – Safety Standard for Electrical and Electronic Test, Measuring, Controlling, and Related Equipment.

Hazardous Locations Requirements:

- ISA S12.12 Class I, II Division 2 and Class III Division 1, 2 – Nonincendive Electrical Equipment.
- ISA S12.0.01 Class I Zone 0, 1 – Electrical Apparatus General Requirements.
- ISA S12.1 – Definitions and Information Pertaining to Electrical Instruments.
- ISA S12.16.01 Class I Zone 1 – Electrical Apparatus Type of Protection: Increased Safety "e".
- ISA S12.22.01 Class I Zone 1 – Electrical Apparatus Type of Protection: Flameproof "d".
- ISA S12.23.01 Class I Zone 1 – Electrical Apparatus Type of Protection: Encapsulation "m".

Performance Criteria:

- ISA SP12.13.01 – Performance requirement for combustible gas detectors.
- ISA RP12.13.01 Part 2 – Installation, Operation and Maintenance of Combustible Gas Detection.

Instruments

- ISA S82.03 – Safety Standard for Electrical and Electronic Process Measurement and Control Equipment.
- ISA S84.01 – Application of Safety Instrumented Systems for the Process Industries.

International Building Codes:

- ISA 51.105 (e) - Gas Detection Systems.
- ISA 51.107 (c) - Gas Detection in Storage cabinets.

Pressurized Enclosures:

- ISA 12.04.01 (IEC 60079-2) – Electrical Apparatus for Explosive Gas Atmospheres.

System Installation:

- ISA RP12.24.01 Class I Zone 0,1,2 – Recommended Practices for Classifications for Electrical Installations.

For more information visit www.isa.org

ANSI – American National Standards Institute

The ANSI is a private, non-profit organization that administers, promotes, and facilitates the U.S. voluntary consensus standards and conformity assessment systems. ANSI is also the official U.S. representative to the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO). The National Electric Manufacturers Association (NEMA) publishes a number of their standards.

Electrical Utilization:

- ANSI/NEMA 250 – Enclosures for Electrical Equipment .

For more Information visit www.ansi.org

International

CENELEC - European Committee for Electrotechnical Standardization

The CENELEC has been officially recognized as the European Standards Organization by the European Commission Directives. It works with 35,000 technical experts from 19 European countries to publish standards for the European market.

Hazardous Locations Requirements:

- BS EN 600 79-0 – Electrical Apparatus for Potentially Explosive Atmospheres General Requirements.
- BS EN 60079-2 – Electrical Apparatus for Potentially Explosive Atmospheres Purge and Pressurization.
- BS EN 60079-1 - Electrical Apparatus for Potentially Explosive Atmospheres Flameproof Enclosure.
- BS EN 60079-7 – Electrical Apparatus for Potentially Explosive Atmosphere Increased Safety "e".
- BS EN 60079-11 – Electrical Apparatus for Potentially Explosive Atmosphere Intrinsic Safety "I".
- BS EN 60079-15 – Electrical Apparatus for Potentially Explosive Atmospheres Protection "n".
- EN 50402:2005 - Functional Safety of Electrical Apparatus for the Detection and Measurement of Combustible or Toxic Gases/Vapors

Performance Criteria:

- BS EN 61779-1 – Electrical Apparatus for the Detection and Measurement of Combustible Gases General Requirements.
- BS EN 61779-2 – Performance Requirement for Gr. I Apparatus Indicating up to 5% (v/v) Methane in Air.
- BS EN 61779-3 - Performance Requirement for Gr. II Apparatus Indicating up to 100% (v/v) Methane.
- EN 61779-4 - Electrical Apparatus for the Detection and Measurement of Combustible Gases Performance Requirement for Gr. II Indicating up to 100% LEL.
- EN 50058 - Performance Requirement for Gr. II Apparatus Indicating up to 100% (v/v) Gas.
- BS EN50271– Electrical Apparatus for the Detection of Combustible Gases, Toxic Gases, and Oxygen Requirements for Using Digital Technologies.

Electrical Utilization:

- EN 61000-6-3 – Electromagnetic Compatibility Industrial Environment.
- EN 61000-6-4 – Electromagnetic Compatibility Emitted Interference.
- EN 61000-6-1 – Electromagnetic Compatibility Residential, Commercial, and Light Industrial.
- EN 61000-6-2 – Electromagnetic Compatibility Noise Immunity Industrial Environment.
- EN 61010 – Safety Standard for Electrical Equipment General Requirements.
- ISO 13849-1 - Safety of Machinery.

Ovens and Dryers:

- EN 1539 – Dryers and Ovens where Flammable Substances are Released Safety Requirements.

For more information visit www.cenelec.org

EU - The European Union

The EU is a treaty-based, institutional framework that defines and manages economic and political cooperation among its fifteen European member countries and 370 million citizens. The EU covers many issues, such as the environment, agriculture, trade, energy and transport, and mandates various standards, and directives to which manufacturers must comply. The following are a list of directives to which gas detection equipment manufacturers must comply.

1. CE - European Conformity

The CE mark is the official marking required by the European Community for all electric and electronic equipment that will be sold, or put into service, anywhere in the European community. It ensures that a product fulfills all essential safety and environmental requirements as they are defined by the EU through the European Directives.

- CE Directive 93/68/EEC CE Marking

2. ATEX – Atmosphere Explosive

The ATEX directives are EU legislation to be enforced on July 1, 2003. They are intended to standardize, clarify, and improve the way in which equipment for use in explosive atmospheres is modified, used, and maintained across the EU. The purpose of the directives is to align technical and legal standards while promoting the free movement of goods throughout the EU.

- ATEX Directive 94/9/EC – Explosive Atmospheres

3. EMC – Electromagnetic Compatibility

The EMC Directives set essential apparatus protection requirements while dictating the electromagnetic disturbance a product may generate or be immune to. The directives are in accordance with the EU standards defining the technical requirements necessary to achieve the required level of protection. The EMC Directives are applied to electrical equipment, electronic equipment and components, domestic appliances, and industrial appliances.

- EMC Directive 89/336/EEC – Electromagnetic Compatibility.
- EMC Council Directive 92/31/EEC - Electromagnetic Compatibility Amendment.
- EN 61000-6-4:2007 - Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments.

4. LVD – Low Voltage Directive

The Low Voltage Directives apply to all electrical equipment, designed to operate in the voltage range 50-1000 V ac or 75-1500 V dc. The directives ensure that all electrical and electronic equipment placed on the market in the EU is safe.

- LVD Directive 2006/95/EC – Low Voltage Directive

For more information visit <http://europa.eu>

Safety Instrumented Systems (SIS)

Consists of an engineered set of hardware and software controls which are especially used on critical process systems.

- IEC 61508 - Functional Safety of Electrical/Electronic/Programmable Electronic Safety Related Systems.
- IEC 61511 ANSI/ISA-84.00 - Functional Safety: Safety Instrumented Systems for the Process Industry Sector.
- EN 50402:2005 - Functional Safety of Electrical Apparatus for the Detection and Measurement of Combustible or Toxic Gases/Vapors

Explosive Atmospheres:

- ANSI/ISA - 60079-0 - Electrical Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements

IEC – International Electrotechnical Commission

The IEC is the leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies. These serve as a basis for national standardization.

Performance Criteria:

- IEC 1010-1 – General Safety Requirements for Electrical Equipment for Measurement, Control, Laboratory Use.

Hazardous Locations Requirements:

- IEC 79 – Electrical Apparatus for Explosive Gas Atmospheres.

For more information visit www.iec.ch

CSA – Canadian Standards Association

The CSA is a non-profit association serving business, industry, government and consumers in Canada and the global marketplace. They work to develop standards to enhance public safety, preserve the environment, and facilitate trade.

Performance Criteria:

- CSA C22.2 – Combustible Gas Detection Instruments.
- CSA C22.2 No 152 – Combustible Gas Detection Instruments.
- CSA C22.2 No 142 – Process Control Equipment.

Hazardous Locations Requirements:

- CSA C22.2 No 30 Class I – Explosion Proof Enclosures.
- CSA C22.2 No 157 – Intrinsically Safe and Nonincendive Equipment

For more information visit www.csa.ca

UL – Underwriters Laboratories Inc.

UL is an independent, non-profit product safety testing and certification organization. They test products for public safety, applying more than 17 billion UL Marks to products worldwide each year.

- UL 1950 – Safety of Information Technology Equipment