

Designed to prevent an explosion, a term usually used of a structure or equipment design. Electrical equipment used in an environment where there is a risk of explosion must have a structure that prevents the ignition of flammable materials by a spark or heat from the equipment.

For safe use of electrical equipment in locations with a risk of gas explosion

Petrochemical plants process crude oil to produce daily necessities like gasoline, kerosene, and other fuels, as well as plastic and synthetic fibers.

Such work sites always have a risk of fire or explosion because they handle various flammable materials such as hydrogen, gasoline, and ethylene compounds. In particular, they need to pay special attention to gas explosions, and countermeasures to reduce risk of explosion are taken from a variety of aspects, including maintenance and inspection of the facilities and piping, preparation of manuals for emergency, and training of workers. This also includes the prevention of gas ignition by sparks or heat from the equipment.

The gas cannot ignite itself, but can ignite if mixed with oxygen within a certain concentration range. Gases in this situation is called an explosive atmosphere, in which contact of the gas with an ignition source like a spark, heat, or static electricity will cause the gas to flare up and will rapidly expand and generate high pressure.

To prevent an explosion, the most important thing is not to allow an explosive atmosphere. However, such an atmosphere is difficult to

avoid completely at a petrochemical plant. For this reason, the electrical equipment can be used in an explosive atmosphere when it employs a type of explosion protection.

Typical types of explosion protection for electrical equipment are the flameproof and the intrinsically safe.

In the case of the flameproof, electrical equipment is enclosed in a strong enclosure so that the enclosure can withstand the pressure developed during an internal explosion, and which prevents the transmission of the explosion to the explosive gas atmosphere surrounding the enclosure. The flameproof type is utilized for temperature sensors, flowmeters, portable lamps, earthquake sensors, etc.

In locations where there is a continuous explosive atmosphere, equipment with an intrinsically safe type of protection is needed. For example, when a level sensor measures the amount of oil in the evaporated fuel atmosphere inside the tank, electrical equipment has circuitry designed for low current and voltage so that sparks and heat do not have enough energy to cause ignition.

Many countries— many explosion protection standards Certification system must be globalized

Around the world, in locations with a risk of gas explosion, such as factories or tunneling sites, the use of explosion protected equipment is required by law. Since it is extremely important for safety, in Japan, production of explosion protected equipment must follow “Constructional Requirements for Electrical Equipment for Explosive Atmospheres” or “Recom-

mended Practice for Explosion-Protected Electrical Installations in General Industries”, and products must be approved by the Technology Institution of Industrial Safety.*1

Other countries and areas also determine their own standards and certification systems, such as FM and CSA in North America, ATEX in Europe, and GB in China. Overcoming this barrier, the IECEx system*2 is expected to become widespread, as the same certification standard.

Explosion protected equipment is something special, however, if hydrogen fuel cells come into wide use in the future, explosion protected equipment may increase in locations familiar with us. Explosion protection is an essential technology for the achievement of an ecologically sound and energy-efficient society.

For use in the explosion hazardous areas of plants and factories in major countries and regions around the world, the azbil Group offers a variety of field instruments with explosion protection certification for the country or region, helping to keep plant safety.



AT9000 Advanced Transmitter Model GTX: Differential Pressure and Pressure Transmitters

*1. Technology Institution of Industrial Safety

A non-profit incorporated association that evaluates and approves industrial equipment such as dust masks, gas masks, and hardhats. Explosion protected equipment approved by the Technology Institution of Industrial Safety is called a TIIS-approved product or TIIS-certified product.

*2. IECEx system

An explosion-proof electric equipment certification system operated by the International Electrotechnical Commission (IEC). Based on international standards, its aim is to promote international trade under the certification system with a policy of One Test, One Certification, and One Mark.

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