

Explosion Proof & Intrinsically Safe



This application note defines some of the terms associated with use of transducers and electrical equipment in areas which are defined as hazardous by national rating agencies. It also outlines Setra products which have Factory Mutual approvals for use in hazardous areas.

Explosion Proof

Explosion proof products are capable of containing an explosion. The term explosion proof doesn't mean that the product is capable of withstanding an external explosion. It indicates that the product can withstand an internal explosion, without allowing flames or hot gases to escape from the transducer housing to trigger an explosion in the surrounding atmosphere.

Explosion proof can only be used with products which are certified by the national rating agencies, such as Underwriters Laboratories (UL) and Factory Mutual Research after meeting their specifications and passing their tests. Unless certified by one of these agencies, the product does not meet the explosion proof requirements of the National Electrical Code (NEC).

Intrinsically Safe

Intrinsically safe products receive their classification because their electrical power usage is below the level of power required to set off an explosion within a given hazardous area. These products are incapable of storing large amounts of energy, which could spark an explosion when discharged.

Hazardous Areas

Both national rating agencies, as well as the American National Standards Institute adhere to the same definitions of what contributes a hazardous area. These areas are defined as Class I (combustible gas and liquids), Class II (combustible dust), and Class III (combustible fibers). Class I is subdivided into Group A (acetylene), Group B (Hydrogen and butadiene), Group C (diethyl ether, ethylene, isoprene and UDMH), and Group D (acetone, gasoline, lacquer solvent, styrene, propane and natural gas). Class II is divided into Group E (metal dust), Group F (carbon black, coal and coke) and Group G (flour, starch and grain dusts).

All classes include two divisions. Division I covers electrical equipment directly exposed in an explosion atmosphere of the material of a specific group. Division II covers electrical equipment in an explosive atmosphere only when an accident, a fallout or properly vented direct exposure occurs.

Qualification for a rating automatically qualifies the equipment for a lower class and group. For example, Class I equipment can be used in Class II and Class III applications with no restrictions.

An explosion proof rating is given only to a single piece of equipment for a specific class, division and group. The end-user is responsible for equipment installation, which is defined by the NEC. For example, a piece of equipment with a Class I rating can only qualify for a Class II rating after installation and inspection of the installation, if it originally didn't meet the requirements. The NEC doesn't allow modification of rated equipment.

A single piece of equipment, a system or parts of a system can receive an intrinsically safe rating for a class, group and division. The rating agencies usually test the equipment as a system, and all parts of the system receive the highest class and group reached by the system, regardless of any previous explosion proof rating. The entire system also receives a collective rating, which will generally be the lowest rated piece within the system. If the system isn't modified by the end-user, it retains the rating. The end-user must follow proper installation procedures for the equipment, which are not specified by the NEC.

Setra Products For Use in Hazardous Areas

Setra pressure transducer and transmitter Models 204, 205 and 280, when factory installed in an explosion proof enclosure, are Factory Mutual approved explosion proof for:

- Class I, Divisions 1 and 2, Groups A, B, C and D
- Class II, Divisions 1 and 2, Groups E, F and G
- Class III, Divisions 1 and 2
- NEMA 4 Weatherproof

Setra pressure transducer Models 204 and 239 are available in an intrinsically safe design (optional) and are Factory Mutual approved for:

- Class I, Divisions 1 and 2, Groups A, B, C and D
- Class II, Divisions 1 and 2, Groups E, F and G
- Class III, Divisions 1 and 2

Reference: National Electrical Code of the American National Standards Institute