

Environmental Ratings

IP Environmental Protection Codes

First Numeral - Protection from Particles

- 0 No protection
- 1 Particles >50 mm
- 2 Particles >12 mm
- 3 Particles >2.5 mm
- 4 Particles >1 mm
- 5 Dust protected - limited ingress, no deposits
ingress permitted
- 6 Dust tight - totally protected

Second Numeral - Protection from Water

- 0 No protection
- 1 Vertical falling water
- 2 Direct sprays up to 15° from vertical
- 3 Direct sprays up to 60° from vertical
- 4 Direct sprays from all directions - limited ingress permitted
- 5 Low pressure jets of water from all directions - limited
- 6 Strong jets of water from all directions
- 7 Immersion in water from 15 cm to 1 m
- 8 Immersion in water under pressure for long periods of time
- 9 High pressure steam jet up to 100 bar

IP (first numeral, second numeral), for
example IP67

Environmental ratings on NOSHOK transducers are indicated with the individual specifications throughout this catalog. The following ratings are used and this is how they are defined.

- IP65 Totally protected from dust as well as protection from low pressure jets of water from all directions - limited ingress permitted (no effect on performance)
- IP67 Dust tight and capable of immersion in water from 15 cm to 1 m
- IP68 Capable of immersion in water for long periods of time.
- IP69K Capable of steam jet washdown.

Since IP65, NEMA 4 and NEMA 4X are related, the differences are in the standards used in qualification. Here they are:

	IP65	NEMA 4
Method	Stream of water	Stream of water
Nozzle Size	1/2 "	1 "
Distance	10 ft	10 ft
Duration	15 minutes	5 minutes
Direction	All angles	All angles
Pressure/Flow	10 m of water	65 gallons/min.

In order to meet the standard, the IP65 test results allow some ingress of water as long as it does not affect the performance of the instrument. In order to meet the standard, the NEMA 4 test results do not allow any ingress of water. NEMA 4X includes the NEMA 4 standard requirements plus corrosion resistance.

Hazardous Location Classifications (NEC)

Class I: *Areas in which flammable gases or vapors may be present in the air in sufficient quantities to be explosive*

Group A: Atmospheres containing acetylene

Group B: Atmospheres such as butadiene, ethylene oxide, propylene oxide, acrolein, or hydrogen (gases or vapors equivalent in hazard to hydrogen, such as manufactured gas)

Group C: Atmospheres such as cyclopropane, ethyl ether, ethylene, gas or vapors of equivalent hazard

Group D: Atmospheres such as acetone, alcohol, ammonia, benzene, benzol, butane, gasoline, hexane, lacquer solvent vapors, naphtha, natural gas, propane, or gas or vapors of equivalent hazard

Class II: *Areas made hazardous by the presence of combustible dust*

Group E: Atmospheres containing combustible metal dusts, regardless of resistivity; dust of similarly hazardous characteristics having a resistivity of less than 100 K Ω -cm; electrically conductive dusts

Group F: Atmospheres containing combustible carbon black, charcoal, or coke dusts having more than 8% total volatile material; dusts so sensitized that they present an explosion hazard, and dusts having a resistivity of greater than 100 Ω -cm but less than or equal to 1x10⁸ Ω -cm

Group G: Atmospheres containing combustible dust having resistivity equal to or greater than 100K Ω -cm; electrically nonconductive dusts

Class III: *Areas made hazardous by the presence of easily ignitable fibers or dust, but which are not likely to be in suspension in the air in quantities that are sufficient to ignite*

Division 1: Atmospheres where hazardous concentrations exist continuously, intermittently or periodically under normal operating conditions

Division 2: Atmospheres where hazardous concentrations exist only in case of accidental rupture or breakdown of equipment

Hazardous Location Pressure Measurement with NOSHOK Pressure Transmitters

NOSHOK has solutions to your applications in areas with flammable gases and liquids. Let's start with the definitions related to equipment used in hazardous environments:

Intrinsic Safety Protection

Protection in which the measurement system contains only transmitters and associated equipment that are incapable of causing ignition of the surrounding flammable atmosphere. Normally an intrinsic safety barrier is employed between the transmitter which is located in the hazardous area and the downstream receiving equipment. This barrier contains a electrical network designed to limit the energy (voltage and current) available to the protected circuit in the hazardous location under specified fault conditions. NOSHOK 625, 626 and 627 Series are Factory Mutual and Canadian Standards Association approved as intrinsically safe.

Non-Incendive Protection

Protection in which the measurement may contain arcing or sparking equipment but is still incapable, under specified test conditions, of igniting the flammable gas, vapor or dust-air mixture. This applies only in Division 2 environments. An intrinsic safety barrier is not required in this measurement system. No special wiring is required. NOSHOK 623 and 624 Series are Factory Mutual and Canadian Standards Association approved as non-incendive.

Explosion-Proof Protection

Protection in which the enclosure of the transmitter is capable of withstanding an explosion of the specified gas or vapor that may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited. Explosion-proof installation techniques are required including special electrical conduit and junction boxes. NOSHOK 621 and 622 Series are Factory Mutual approved as explosion-proof.