

## Hazardous Area Types of Protection used in North America

Explosions of volatile liquids and gases resulting in severe fire conflagrations are real hazards, involving high economic costs and often, injury or loss of life. The types of protection required for electrical components in the areas depends on the risks involved. In general the types of protection can be summarized to:

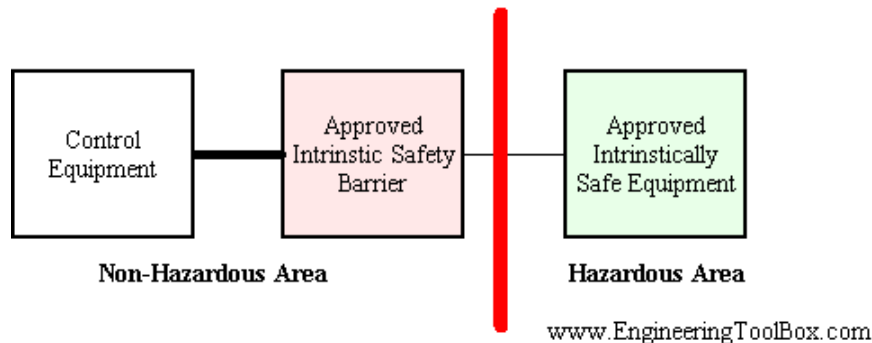
**Dust-ignition proof:** A dust ignition proof component prevents dust entering from outside. Arcs, sparks and heat generated inside of the enclosure will not be allowed ignite the exterior surroundings near the component.

**Explosion proof:** An explosion proof component is capable to keep an internal explosion of a specific flammable air-vapor mixture within the component enclosure without releasing burning or hot gases to the external environment which may be potential explosive. The explosion proof equipment must also operate below safe temperatures.

The potentially arcing parts are encapsulated in a specially housing which is designed to prevent explosions:

- Prevents the entry of the hazardous material in potentially hazardous concentrations.
- If hazardous materials do manage to enter the encapsulation chamber, then the chamber will be capable of containing any explosion or fire and preventing it spreads outside the chamber to cause a secondary explosion.

**Intrinsically Safe:** An intrinsically safe component is incapable of releasing sufficient electrical or thermal energy to cause ignition of a specific hazardous substance under normal or abnormal (fault) operating conditions. (ISA-RP12.6 - Wiring Practices for Hazardous Area Instrumentation)



In simple terms this means that intrinsically safe equipment and wiring limits electrical and thermal energy to a level below that required to cause an explosion.

Intrinsic-safety equipment operates on low power level with no shock hazard due to excess thermal energy and arcing. Safety barriers are grounded to be effective under fault conditions; intrinsic safety is provided through voltage and current limiters. Zener diodes and resistors that provide this limiting are usually mounted away from hazardous areas. Failure to replace enclosure covers or bolts will not imperil protection.

Intrinsically safe wiring must be separated from non-intrinsically safe wiring by at least 2 inches in order to prevent the transfer of unsafe levels of energy to the hazardous area and it is vital therefore that planning and installation of such systems are undertaken with utmost care and attention. Note! Intrinsically safety can be compromised after initial installation due to improper maintenance or repair and it is important to ensure such works are always carried out properly.

**Nonincendive:** A nonincendive component is nonsparking and incapable of releasing sufficient electrical or thermal energy to cause ignition of a hazardous substance under normal operating conditions.