

Protection Method / Definition	Acceptable Uses
<p><b>Intrinsic Safety</b>            Intrinsic Safety is the highest level of protection afforded electrical equipment installed in potentially explosive atmospheres. It is a means to limit the amount of energy (power) supplied to a device, via a barrier or isolator, to a point below that which may ignite an explosive gas/air mixture (atmosphere). In effect, the barrier or isolator, “separates” the device in a hazardous area from its control equipment, and by means of on-board circuitry will shunt any adverse condition caused by the control equipment, or field fault. A fault, for example, is a field connection that comes loose and touches another terminal of different potential (voltage), causing a spark. The circuitry of the barrier, or isolator, “recognizes” this condition and “shunts” power to a point where the heat generated from the spark is insufficient to ignite the explosive atmosphere.</p>	<p>ZONE 0            ZONE 1            Class I, Division 1</p>
<p><b>Explosion Proof Enclosure</b>            An Explosion Proof enclosure is designed in such a manner that provides flamepaths to quench the heat generated by an internal explosion to point that is too cool to ignite the surrounding explosive atmosphere. The enclosure is not intended to contain an internal explosion, only to “hold” it long enough for the flame to cool before it escapes to the surrounding atmosphere. For example, a flamepath is made by a flat joint between the lid and base of an enclosure. That gap, controlled by design standards, must meet very specific criteria for material type, surface finish, fit tolerance and distance from internal space to external space. As one can imagine, it is unlikely to make a joint between two parts air tight; therefore, the explosion pressure is allowed to pass through the joint, only that the geometry, or labyrinth, of the joint will sink the heat out of the explosion’s flame.</p> <p>A “No lead seal required” marking indicates the enclosure has survived ignition pressures higher than that as tested with the standard 18” length of conduit. This means that for this enclosure a conduit lead seal is <b>not</b> required to be installed within 18” of the enclosure. This, however, does eliminate the requirement for any adjacent enclosure where a lead seal is required.</p>	<p>ZONE 1            Class I, Division 1</p>
<p><b>Flameproof Enclosure</b>            A Flameproof enclosure is a term used in the European Community which is a device of construction comparable to an explosion proof enclosure. The method is the same, and many of the same geometric criteria are employed.</p>	<p>ZONE 1</p>
<p><b>Increased Safety by Encapsulation</b>            A device that is encapsulated would indicate that all heat producing components are “sealed”, or surrounded, by some inert compound that prevents these components from coming into contact with the surrounding flammable atmosphere. This method is typically achieved by the use of a “sealing cement”, or epoxy potting. There are also specific guidelines that must be employed in regards to type of materials, spacing of components and depth (thickness) of the sealing compound in relation to external atmosphere.</p>	<p>ZONE 1            Class I, Division 1</p>
<p><b>Non-incendive</b>            A Non-incendive device is constructed such that any arc producing element, or component, is sealed against the intrusion of any external potentially explosive gas/air mixture. One method of achieving this, is to incorporate a <i>hermetic seal</i>. A hermetic seal, typically, is a glass tube filled with an inert gas which houses a set of sparking contacts. This seal is governed by specific criteria for “hermeticity”, or lack of permeation, which deem it hermetically sealed. Other methods of reducing the occurrence of sparks may be employed through wiring and installation techniques.</p> <p>The hermetic seal employed in the GO Switch, is a glass-to-metal seal with conductive pins molded through the glass insulator. This seal assembly, in turn, is then soldered inside the switch housing to separate the contact chamber form the external atmosphere.</p>	<p>ZONE 2            Class I, Division 2</p>
<p><b>Power Limited</b>            The Power Limited technique is typically in regard to the output drivers of an electrical device. This would indicate that the power of the device’s output is regulated to such low levels as to prevent the connected device, a solenoid perhaps, from being able to produce enough heat to ignite a flammable gas/air mixture.</p>	<p>Zone 2            Class I, Division 2            (or may be incorporated with a higher protection method)</p>