



---

Thought Leadership

Optocouplers for  
Hazardous Enviroments

PARTNER | SOLVE | DELIVER®

**Optocouplers Handle Hazardous Environments And Meet ATEX Intrinsically Safe Requirements - By John Beigel, Standex Electronics**

Many manufacturing plants are considered hazardous environments particularly in petro-chemical and grain processing plants. Any electrical arc could ignite a fire or major explosion. Since these factories use vast arrays of electric and electronic circuitry care must be taken when selecting components.

Standex Electronics is now offering a line of optocouplers that can safely handle input/output isolation as high as 20,000 VDC that have met and been certified for the stringent requirements of ATEX (Directive 94/9/EC and 1999/92/EC). This directive applies to equipment and protective systems that are used in factories where potentially explosive atmospheres exist. The ATEX offers the requirements needed for approval of safety devices, controlling devices and regulating devices.

The ATEX directive is also a requirement in mining operations, flammable gas processing plants, some medical processing plants where ESD could be a real problem, and in any factory that requires high isolation and non-arcing environments.

**How they work**

The optocoupler is composed of two circuits: an input circuit and an output circuit. A light emitting diode (LED) is the key input component, where the key output component is a

photo-detector. Passing a current of approximately 10 ma through the two input terminals and through the light emitting diode, with the correct polarity, converts the electrical current into photons. The photons are then directed down a light tube or tunnel. At the end of the

In contrast, electro-mechanical relays, produce arcs when their contacts close. These arcs could represent ignition points under the right circumstances. Switching signals with semiconductor switching devices generally do not have high isolation from input to output. If a breakdown occurs in the circuitry arcing may occur initiating an ignition point.

Standex Electronics optocouplers offer insulation resistances as high as  $10^{13}$  ohms, operate in less than 10  $\mu$ sec, and creepage distances from input to output are greater than 14.5 mm.

These optocouplers essentially operate in all kinds of extremely hazardous, explosive, moist, dirty environments and operate from -40°C to 85°C. They also transfer their digital or analog signal information from input to output drawing no potentially hazardous arc. They have no moving parts and operate safely for billions of operations, are not affected by magnetic fields and can operate or transfer information at a 50 kHz rate. Several products are available that most closely aligns with your design requirements.

Along with the optocouplers, Standex Electronics also supplies Reed Relays and Reed Sensors that are ATEX certified as well. For more details please see our web site: [www.standexmeder.com](http://www.standexmeder.com) to review these products. Also, contact information is available, where engineers can help with your application and select the best product for your requirement.



**ATEX: 11ATEX 0086, gem. EN 60079**

tunnel, the photons are incident on the photo detector that converts the photons back to an electric current. In this manner, the input information is transferred and amplified in the output detection circuit without any direct electrical conducting path. The longer the light tube the greater the distance between the metalized input terminals to the metalized output terminals. This insures a greater insulation resistance and high voltage isolation.

