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Intrinsic Safety and Potentially Explosive Dust Atmospheres

A White Paper



TURCK Inc.
3000 Campus Drive
Minneapolis, MN 55441
Phone: (763) 553-7300
Fax: (763) 553-0708
Application Support:
1-800-553-0016
www.turck.com/process

Intrinsic Safety and Potentially Explosive Dust Atmospheres

In 2008, a number of explosions occurred in areas where combustible dust atmospheres exist, prompting OSHA (Occupational Health and Safety Administration), a government agency responsible for enforcing safety in the workplace, to send out thousands of letters to facilities that have areas where potentially dangerous combustible dust atmospheres exist. These areas are considered a fire or explosion risk. A recent, and very dramatic, example of this is the sugar dust explosion that occurred at a facility near Savannah, Georgia, where several lives were lost and the plant suffered massive damage. Unfortunately, explosions or fires are not uncommon where these atmospheres exist, and the prevention of accidents of this nature can be more easily prevented than one might think.

OSHA has implemented the Combustible Dust National Emphasis Program to assess facilities where employees may be exposed to combustible dust hazards. This program took effect in March 2008 and replaced the former Combustible Dust National Emphasis Program. In addition to the implementation of this program, the United States Congress passed legislation in April 2008 that mandates the implementation of preventive measures designed to prevent the disastrous consequences that can result in areas where combustible dust hazards exist, but are not appropriately dealt with. The bill, Combustible Dust Explosion and Fire Prevention Act of 2008, is awaiting Senate approval.

Regardless of whether the law is passed, there will be an increased focus on any facility that deals with combustible dust. Intrinsic Safety makes instrumentation in areas where combustible dusts exist simple and safe. Using intrinsic safety in areas where combustible dust mixtures exist (potentially explosive atmospheres Class II, Divisions 1 & 2) is the safest level of explosion protection possible.

There is considerable misinformation when it comes to hazardous (potentially explosive) area protection techniques that can be easily remedied by incorporating intrinsic safety for explosion protection. Intrinsic safety is inherently safe and will remain safe even with up to two simultaneous faults in the interface, field wiring and field devices present in a process control loop. It is always fail safe by design.

Intrinsic safety also makes installation in any hazardous area simple. The energy levels used in intrinsically safe circuits are below the levels (for both thermal and electrical energy) needed for ignition of combustible mixtures in potentially explosive atmospheres.

Intrinsically safe installations allow the use of any wiring techniques used in other industrial installations without requiring the use of rigid conduit, armored cable or specially certified cable. The NEC allows the use of the same cable types used in ordinary industrial installations, including the use of multi-core cable that can support multiple intrinsically safe signals, in the same wire run. The wiring methods are similar to those used in non-hazardous area industrial installations. Electricians with no hazardous area installation experience can use the installation methods they are familiar with in any installation that incorporates intrinsic safety. The use of quick disconnect cordsets may also be used, even in areas that have the highest potential for the possibility of an explosion. The use of standard wiring techniques allows enormous flexibility as well as added cost savings on installation and maintenance, while maintaining the safest installation available of any explosion protection technique.

The incorporation of intrinsic safety in a process plant where the potential for explosions may exist can dramatically increase the safety of a plant, while simplifying the installation by providing increased flexibility, simple maintenance and an unsurpassed level of safety.