ANSI/ISA-TR12.12.04-2011
(formerly ISA-TR12.06.01-1999)
ANSI Technical Report prepared by ISA

Electrical Equipment in a Class I, Division 2/Zone 2 Hazardous Location

Approved 20 June 2011

ANSI/ISA-TR12.12.04-2011 (formerly ISA-TR12.06.01-1999), Electrical Equipment in a Class I, Division 2/Zone 2 Hazardous Location

ISBN: 978-1-936007-95-0

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1 Introduction

When electrical equipment is used in locations in which fire or explosion hazards may exist due to flammable gases or vapours, flammable liquids, combustible dust, or ignitable fibers or flyings, the National Electrical Code® (NEC®), ANSI/NFPA 70 requires special precautions to be taken in equipment construction and installation to minimize risks of fire and explosions. There are several protection techniques in common use, each of which has its own set of advantages and disadvantages. Other countries, including Canada, utilize varying wiring methods, so the contents of this report may not be applicable to countries other than the United States.

A location in which the fire or explosion hazard exists infrequently and for short periods is designated as a Division 2 or Zone 2 location. Two of the primary protection techniques for Division 2 or Zone 2 locations are “Nonincendive equipment” or “Non-sparking equipment”. This Technical Report is intended to explain these protection techniques and to clarify the associated terminology. This Technical Report also addresses field wiring for Division 2/Zone 2 locations.

Division 2 equipment is permitted to be marked and used in Zone 2 hazardous locations per the NEC®, Section 505.9(C)(1).

Zone 2 equipment, in accordance with ANSI/ISA-60079-15, is permitted to be marked and used in Division 2 hazardous location per the NEC®, Section 501.5.

The term “combustible material” will be used throughout this Technical Report to refer to materials mentioned above, i.e., flammable gases, flammable liquid produced vapours, or combustible liquid produced vapours. Similarly, the term “hazardous location” will be used in place of the phrase “hazardous (classified) location” used in the NEC® and in the product standards. Finally, although combustible materials pose a fire hazard, the primary concern is an explosion.

2 Hazardous locations

2.1 General

To understand this Technical Report, it is necessary to know the terminology associated with hazardous locations as defined in the NEC®. Although there are numerous hazards such as high voltages, carcinogens and moving objects, the term “hazardous locations” only refers to areas made hazardous by the presence of a combustible material that may create an explosion hazard when mixed with air.

A much fuller discussion of hazardous locations can be found in numerous publications, including ANSI/ISA-12.01.01, “Definitions and Information Pertaining to Electrical Apparatus in Hazardous (Classified) Locations.” The following is provided as an overview. In some cases, terms have been defined in a simplified manner to ease understanding. There are four essential elements used to define a hazardous location in North America: Class, Division or Zone, Group, and Temperature Class.

2.2 Class

Hazardous locations are divided into three classes:

- Class I for flammable gases or vapours.