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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TECHNICAL COMMITTEE 31 EQUIPMENT FOR EXPLOSIVE ATMOSPHERES

INTERPRETATION SHEET

IEC 60079-28:2006, 1st edition *Risk of ignition by radiation from optical equipment*

This **draft** for an interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres in accordance with Administrative Circular AC/42/2004 new procedures for Interpretation of standards Annex 2: New text for ISO/IEC Directives (IEC Supplement).

Following the decision No 12 of the TC31-meeting 2011 in Melbourne the issue of an Interpretation Sheet for the 1st edition of IEC 60079-28:2006 was requested to clarify the scope of the existing standard.

Comments / proposals should be submitted using the IEC Electronic voting system by the National Committees. (See AC/3/2011).

Comments/ proposals to be returned by 2013-07-12

Existing Scope

Scope

This part of IEC 60079 explains the potential ignition hazard from equipment using optical radiation intended for use in explosive gas atmospheres. It also covers equipment, which itself is located outside but its emitted optical radiation enters such atmospheres. It describes precautions and requirements to be taken when using optical radiation transmitting equipment in explosive gas atmospheres. It also outlines a test method, which can be used to verify a beam is not ignition capable under selected test conditions, if the optical limit values cannot be guaranteed by assessment or beam strength measurement.

This standard contains requirements for optical radiation in the wavelength range from 380 nm to 10 μm . It covers the following ignition mechanisms:

- optical radiation is absorbed by surfaces or particles, causing them to heat up and, under certain circumstances, this may allow them to attain a temperature which will ignite a surrounding explosive atmosphere;
- direct laser induced breakdown of the gas at the focus of a strong beam, producing plasma and a shock wave both eventually acting as the ignition source. These processes can be supported by a solid material close to the breakdown point.

NOTE 1 See items a) and d) of the introduction.

This standard does not cover ignition by ultraviolet radiation and by absorption of the radiation in the explosive mixture itself. Explosive absorbers or absorbers that contain their own oxidizer as well as catalytic absorbers are also outside the scope of this standard.

This standard specifies requirements for equipment intended for use under atmospheric conditions.

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard will take precedence.

Clarification

The following text is added for clarification:

This part of IEC 60079 specifies the requirements, testing and marking of equipment emitting optical radiation intended for use in explosive atmospheres and also for equipment located outside the explosive atmosphere or protected by a Type of Protection listed in IEC 60079-0, but which generates optical radiation that intentionally enters an explosive atmosphere. It covers the Groups I and II, EPLs Ga, Gb, Gc, Ma and Mb.

This standard contains requirements for optical radiation in the wavelength range from 380 nm to 10 μm . It covers the following ignition mechanisms

- Optical radiation is absorbed by surfaces or particles, causing them to heat up, and under certain circumstances this may allow them to attain a temperature which will ignite a surrounding explosive atmosphere.
- In rare special cases, direct laser induced breakdown of the gas at the focus of a strong beam, producing plasma and a shock wave both eventually acting as ignition source. These processes can be supported by a solid material close to the breakdown point.

NOTE 1 See a) and d) of the introduction.

This standard does not cover ignition by ultraviolet radiation and by absorption of the radiation in the explosive mixture itself. Explosive absorbers or absorbers that contain their own oxidizer as well as catalytic absorbers are also outside the scope of this Standard.

This standard specifies requirements for equipment intended for use under atmospheric conditions.

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard takes precedence. This standard applies to optical fibre equipment and optical equipment, including LED and laser equipment, with the exception of the equipment detailed below:

1. Non-array divergent LEDs used for example to show equipment status or backlight function.
2. All luminaires (fixed, portable or transportable), hand lights and caplights (other than for Group I); intended to be supplied by mains (with or without galvanic isolation) or powered by batteries.
 - with continuous divergent light sources (for all EPLs)
 - with LED light sources (for EPL Gc only).
3. Optical radiation sources for Mb, Gb or Gc applications which comply with Class 1 limits in accordance with IEC 60825-1.
4. Single or multiple optical fibre cables not part of optical fibre equipment if the cables
 - comply with the relevant industrial standards, along with additional protective means, e.g. robust cabling, conduit or raceway (for Gb, Mb or Gc).
 - comply with the relevant industrial standards (for Gc).
5. Enclosed equipment involving an enclosure that fully contains the optical radiation and that complies with a suitable type of protection as required by the involved EPL, with the enclosure complying with one of the following conditions:
 - An enclosure for which an ignition due to optical radiation in combination with absorbers inside the enclosure would be acceptable (such as flameproof "d" enclosures), or
 - An enclosure for which protection regarding ingress of an explosive atmosphere is provided, such as pressurized "p" enclosures, restricted breathing "nR" enclosure", or
 - An enclosure for which protection regarding ingress of absorbers is provided (such as IP 6X enclosures) and where no internal absorbers are to be expected.

NOTE 2 For these scope exclusions it is anticipated that the enclosures are not opened in the explosive atmosphere, so that ingress is protected.