

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –
Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion

Atmosphères explosives –
Partie 35-1: Lampes-chapeaux utilisables dans les mines grisouteuses – Exigences générales – Construction et essais liés au risque d'explosion



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 35-1: Caplights for use in mines susceptible to firedamp –
General requirements – Construction and testing
in relation to the risk of explosion**

FOREWORD

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International Standard IEC 60079-35-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This first edition cancels and replaces the second edition of IEC 62013-1, published in 2005, and constitutes a full technical revision.

In addition to the general revision and updating of IEC 62013-1, the main technical differences with respect to the previous edition are as follows:

- a) the inclusion of Table 1 listing the application or exclusion of specific clauses of IEC 60079-0;
- b) redrafting in the style of other IEC 60079 series standards;
- c) the introduction of a means to achieve an equipment protection level (EPL) of Ma;

- d) the introduction of a single clause relating to equipment construction replacing individual specific clauses for the headpiece, battery, cable and external charging contacts;
- e) the deletion of statements relating to surface temperature, the rewording of statements relating to creepage and clearance and the addition of statements relating to thermal protection, electronic assemblies and additional circuitry;
- f) specific reference to lithium cells;
- g) the addition of statements relating to battery recharging and protection against deep discharge.

The text of this standard is based on the following documents:

FDIS	Report on voting
31/921/FDIS	31/938/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60079-35 series, under the general title: *Explosive atmospheres – Caplights for use in mines susceptible to firedamp*, can be found on the IEC website.

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The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The general revision and updating of this second edition have been necessitated by the advent of new technologies related to caplight design, in particular those related to lithium batteries and light-emitting diode (LED) light sources, the growing practice of incorporating electronic circuits and the introduction of intrinsically safe caplights which can be certified without reference to performance requirements. It is intended that there should be a stronger link between Part 1 (Construction) and Part 2 (Performance) of this Standard by upgrading the reference in the Scope from a note to a requirement.

In addition, as this standard is now to become part of the IEC 60079 series, changes have been made to bring it more in line with others in the series by cross referencing. This has enabled a reduction in the number and length of clauses in the standard.

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EXPLOSIVE ATMOSPHERES –

Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion

1 Scope

This part of IEC 60079-35 specifies requirements for the construction, testing and marking of caplights, including caplights with a point of connection for other equipment, for use in mines susceptible to firedamp (Group I – electrical equipment for explosive gas atmospheres as defined in IEC 60079-0). It deals only with the risk of the caplight becoming a source of ignition.

The requirements for performance are in IEC 60079-35-2.¹

This standard supplements and modifies the general requirements of IEC 60079-0 except as indicated in Table 1. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirements of this standard take precedence.

Compliance with this standard will provide an EPL of Mb (see 4.1 of this standard). If an EPL of Ma is required, the caplight will need to conform to the requirements of 4.2 of this standard, which in turn refers to IEC 60079-11.

It is expected that from time to time, caplights conforming to this standard (EPL Mb) will operate in atmospheres where the firedamp exceeds statutory levels that require the withdrawal of people from the high firedamp atmosphere to a non-hazardous area.

In designing equipment for operation in conditions other than those given above, this standard may be used as guidance; however, additional testing may be required.

Where a caplight is assessed as intrinsically safe equipment, Ex ia, conforming to IEC 60079-11 only the clauses/subclauses listed in 4.2 require application.

¹ IEC 60079-35-2, *Caplights for use in mines susceptible to firedamp – Part 2: Performance and other safety-related matters* (to be published).

Table 1 – Application or exclusion of specific clauses of IEC 60079-0

Clause of IEC 60079-0			IEC 60079-0 clause application
Ed. 5.0 ^a (2007)	Ed. 6.0 ^a (2011)	Clause/subclause title (normative)	
1	1	Scope	Applies
2	2	Normative references	Applies
3	3	Terms and definitions	Applies
4	4	Equipment grouping	Applies
5	5	Temperatures	Applies
6.1	6.1	Requirements for all equipment – General	Applies
6.2	6.2	Requirements for all equipment – Mechanical strength of equipment	Applies
6.3	6.3	Requirements for all equipment – Opening times	Excluded
6.4	6.4	Requirements for all equipment – Circulating currents	Excluded
6.5	6.5	Requirements for all equipment – Gasket retention	Applies
6.6	6.6	Requirements for all equipment – Electromagnetic and ultrasonic energy radiating equipment	Applies
7	7	Non-metallic enclosures and non-metallic parts of enclosures	Applies
8	8	Metallic enclosures and metallic parts of enclosures	Applies
9	9	Fasteners	Applies
10	10	Interlocking devices	Applies
11	11	Bushings	Excluded
12	12	Materials used for cementing	Applies
13	13	Ex components	Applies
14	14	Connection facilities and terminal compartments	Applies
15	15	Connection facilities for earthing or bonding conductors	Excluded
16	16	Entries into enclosures	Applies
17	17	Supplementary requirements for rotating electrical machines	Excluded
18	18	Supplementary requirements for switchgear	Excluded
19	19	Supplementary requirements for fuses	Excluded
20	20	Supplementary requirements for plugs and socket outlets and connectors	Applies
21	21	Supplementary requirements for luminaires	Excluded
22	22	Supplementary requirements for caplights and handlights	Applies
23	23	Equipment incorporating cells and batteries	Modified
24	24	Documentation	Applies
25	25	Compliance of prototype or sample with documents	Applies
26.1	26.1	Type tests – General	Applies

Clause of IEC 60079-0			IEC 60079-0 clause application
Ed. 5.0 ^a (2007)	Ed. 6.0 ^a (2011)	Clause/subclause title (normative)	
26.2	26.2	Type tests – Test configuration	Applies
26.3	26.3	Type tests – Tests in explosive test mixtures	Applies
26.4	26.4	Type tests – Tests of enclosures	Modified
26.5.1	26.5.1	Thermal tests – Temperature measurement	Applies
26.5.2	26.5.2	Thermal tests – Thermal shock test	Applies
26.5.3	26.5.3	Thermal tests – Small component ignition test	Applies
26.6	26.6	Torque tests for bushings	Excluded
26.7	26.7	Non-metallic enclosures or non-metallic parts of enclosures	Applies
26.8	26.8	Thermal endurance to heat	Applies
26.9	26.9	Thermal endurance to cold	Applies
26.10	26.10	Resistance to light	Excluded
26.11	26.11	Resistance to chemical agents for Group I electrical equipment	Applies
26.12	26.12	Earth continuity	Excluded
26.13	26.13	Surface resistance of parts of enclosures of non-metallic materials	Applies
26.14	NR	Charging tests	Applies
26.15	26.14	Measurement of capacitance	Applies
NR	26.15	Verification of ratings of ventilating fans	Excluded
NR	26.16	Alternative qualification of elastomeric sealing O-rings	Applies
27	27	Routine tests	Applies
28	28	Manufacturer's responsibility	Applies
29	29	Marking	Modified
30	30	Instructions	Applies
<p>Applies – This requirement of IEC 60079-0 is applied without change.</p> <p>Excluded – This requirement of IEC 60079-0 does not apply.</p> <p>Modified – This requirement of IEC 60079-0 is modified as detailed in this standard.</p> <p>NR – No requirements.</p>			
<p>^a The clause number in this table is shown for information only. The applicable requirements of IEC 60079-0 are identified by the clause title which is normative. This table was written against the specific requirements of the sixth edition of IEC 60079-0:2011. The clause numbers for the previous edition are shown for information only. This is to enable the General requirements of the fifth edition of IEC 60079-0:2007 to be used where necessary with this part of IEC 60079. Where there were no requirements (indicated by NR) or there is a conflict between requirements, the later edition requirements take precedence.</p>			

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-426, *International Electrotechnical Vocabulary – Part 426: Equipment for explosive atmospheres*

IEC 60050-845, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-7, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60127-2, *Miniature fuses – Part 2: Cartridge fuse-links*

IEC 60332-1-1, *Tests on electric and optical fibre cables under fire conditions – Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

<https://standards.iteh.ai/catalog/standards/sist/3b77d231-94ad-4146-a23e-b7924cbb59ae/iec-60079-35-1-2011>

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

UL 1642, *Standard for Lithium Batteries*

3 Terms and definitions

For the purposes of this document, the terms and definitions in IEC 60079-0, IEC 60050-426 and IEC 60050-845 as well as the following apply.

3.1

battery enclosure

enclosure to contain the battery

3.2

caplight

equipment comprising a headpiece and rechargeable secondary cell(s)/battery supplied either in separate enclosures connected together with a cable as a complete assembly (see Figure 1) or in a single unit complete with security lanyard

3.3

light source

device serving as a source of illumination

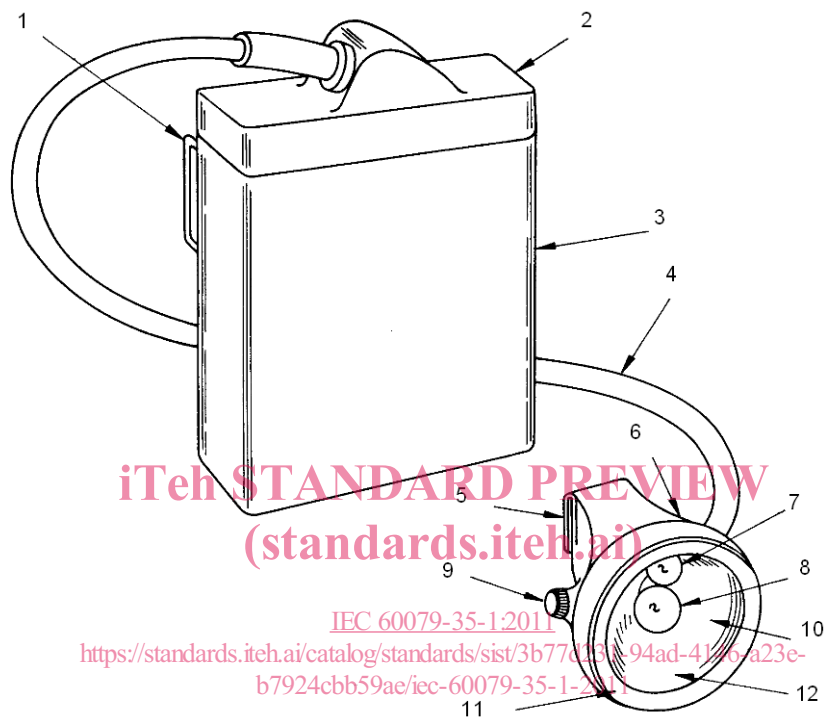
3.4

filament lamp

light source that emits light by heating a filament

3.5**light-emitting diode****LED**

semiconductor diode that emits light when conducting a current



IEC 1143/11

Key

1 Belt loop	7 Auxiliary light source
2 Cover	8 Main light source
3 Battery enclosure	9 Switch knob
4 Cable	10 Reflector
5 Cap clip	11 Bezel ring
6 Headpiece	12 Light transmitting protective cover

Figure 1 – Example of a caplight assembly**4 Level of protection****4.1 General**

Equipment complying solely with this standard is suitable for use in Group I situations as defined in *Equipment grouping* in IEC 60079-0, and has an equipment protection level (EPL) “Mb”.