SLOVENSKI PREDSTANDARD

OSIST prEN 62013-2:2004

oktober 2004

Rudarske naglavne svetilke za uporabo v rudnikih, kjer se lahko pojavijo eksplozivni plini – 2. del: Lastnosti in druge z varnostjo povezane teme

Caplights for use in mines susceptible to firedamp – Part 2: Performance and other safety-related matters

ICS 29.260.20; 73.100.20

Referenčna številka
OSIST prEN 62013-2:2004(en)

31/530/CDV

COMMITTEE DRAFT FOR VOTE (CDV)
PROJET DE COMITÉ POUR VOTE (CDV)

	Project number / Numéro de projet	31/62013-2 Ed 2
IEC/TC or SC: **31** / CEI/CE ou SC:	Date of circulation / Date de diffusion **2004-07-16**	Closing date for voting (Voting mandatory for P-members) / Date de clôture du vote (Vote obligatoire pour les membres (P)) **2004-12-17**
Titre du CE/SC:	TC/SC Title: Electrical apparatus for explosive atmospheres	
Secretary: UK — G F Thompson / Secrétaire:		
Also of interest to the following committees / Intéresse également les comités suivants	Supersedes document / Remplace le document 31/481/CD - 31/524/CC	

Functions concerned
Fonctions concernées

- ☐ Safety / Sécurité
- ☐ EMC / CEM
- ☐ Environment / Environnement
- ☐ Quality assurance / Assurance qualité

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Titre :

Title : IEC 62013-2, Ed.2: Caplights for use in mines susceptible to firedamp – Part 2: Performance and other safety-related matters

Note d'introduction

Introductory note

The general revisions and updating of Edition 1 are as a result of feedback from manufacturers and certifiers following of use of the standards and aim to clarify what was originally intended and remove ambiguities. Account has also been taken of changes in related standards.

The main technical differences apart from the general revision and updating from Edition 1 is clause 5 to accommodate new LED technology and reflector/lens design and to allow calculation as an alternative to testing, and, as a result, simplification of the illumination type test in clause 8

ATTENTION	ATTENTION
CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC)	**Parallel IEC CDV/CENELEC Enquiry**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC 62013-2 Edition 2 has been prepared by technical committee 31: Electrical apparatus for explosive atmospheres.

The general revisions and updating of Edition 1 are as a result of feedback from manufacturers and certifiers following of use of the standards and aim to clarify what was originally intended and remove ambiguities. Account has also been taken of changes in related standards.

The main technical differences apart from the general revision and updating from Edition 1 is clause 5 to accommodate new LED technology and reflector/lens design and to allow calculation as an alternative to testing, and, as a result, simplification of the illumination type test in clause 8.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/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.

The committee has decided that the contents of this publication will remain unchanged until _200X_. At this date, the publication will be

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

CAPLIGHTS FOR USE IN MINES SUSCEPTIBLE TO FIREDAMP –

Part 2: Performance and other safety-related matters

1 Scope

This part of IEC 62013 details those performance and other safety features of caplights, including those with a point of connection for another apparatus, not covered in IEC 62013-1, but which are nevertheless important for the safety and working conditions of the user. It may also be applied to caplights for use in mines not likely to be endangered by firedamp. When this part of the standard is used as a "stand-alone" document for non-gassy mines, any relevant constructional requirements should be the subject of agreement between the supplier and the user and, where possible, be as described in IEC 62013-1.

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(845):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

IEC 60983, *Miniature lamps*

IEC 62013-1: *Caplights for use in mines susceptible to firedamp – Part 1: General requirements – Construction and testing in relation to the risk of explosion*

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

3 Definitions

For the purposes of this part of IEC 62013, the definitions of ISO 1000 and IEC 60050(845) and the following apply:

3.1
useful working period
period in hours during which the main light source of the caplight may be continuously used with thecurrent drain specified by the manufacturer and comply with the minimum luminous intensity requirements of this part of IEC 62013

4 General

The caplight shall be designed in accordance with good engineering practice. It shall be fit for purpose and shall provide sufficient light for the user throughout the duration of the working period specified by the manufacturer.

5 Light Output

5.1 Light sources

5.1.1 Every headpiece shall have a minimum of two light sources, at least one of which shall be the main source and meet the requirements of this part of IEC 62013. A single light source may be used if it is a non filament type and has a lamp life of at least 5,000 hours according to 8.2.

5.1.2 Where a caplight is fitted with two lamps or filaments, each of which is capable of being the main source, the manufacturer shall designate which of these shall be the main source and which the auxiliary source; otherwise, both sources shall meet the requirements for the main source.

5.1.3 Filament lamps for main and auxiliary sources shall comply with IEC 60983. Where the relevant data sheet is not given in IEC 60983, an equivalent shall be provided by the caplight manufacturer.

5.2 Light source holder

The holder for the main light source shall be capable of locating and retaining it securely in a focused position with respect to the reflector profile in accordance with 5.6.

5.3 Luminous intensity

The luminous intensity from the main light source in a fully assembled headpiece in its normal orientation at the end of the useful working period shall extend a cone with a minimum of 1 cd. This cone shall not be less than 30 degrees vertically upwards, 60 degrees vertically downwards and 45 degrees horizontally each side. This may be calculated from manufacturers' data or tested in accordance with 8.1.

5.4 Auxiliary light source

The auxiliary light source is primarily intended for emergency use if the main source fails and is exempt from the type tests in clause 8.

5.5 Focus

The main light source shall be focused, or capable of being focused, so that the light pattern is not impaired by distortion.

6 Reliability

6.1 Lamp life

The life of the main and auxiliary lamps shall comply with the values given in the data sheets in 5.1.3 when tested in accordance with 8.2. The minimum life shall be not less than 200 h for the main source and 50 h for the auxiliary source.

6.2 Battery life (charge/discharge cycles)

It is not possible to specify a cyclic life for the battery due to the multiplicity of battery types, charging regimes and conditions of use.

It is therefore important that the manufacturer provides instructions to the user on the recharge time and routine checks which are necessary to ensure that the battery is capable of performing its intended duties during the actual working period. See clause 9 and annex A.

NOTE The choice of battery charging equipment will depend on the time available between successive actual working periods. When the recharge time is insufficient to fully recharge the battery, the manufacturer may need to advise the user to provide additional caplights.

6.3 Caplight useful working period

The manufacturer shall declare the useful working period of the caplight when new, taking into account the current drawn by the main light source and, if appropriate, the average current drawn by any accessories during that period. The test requirements are given in 8.2.

6.4 Durability

6.4.1 Fasteners and connectors

Fasteners and connectors shall be designed so that they do not loosen in normal use.

6.4.2 Resistance to abrasion

The caplight shall be constructed from materials which are resistant to abrasion in normal use.

6.4.3 Operability after mechanical tests

Following completion of the drop tests described in 10.3 of IEC 62013-1, at least one light source shall still be operable and there shall be no leakage of electrolyte.

7 Ergonomics

7.1 Mass

Unless otherwise agreed between the manufacturer and the user, the mass of the battery and container shall not exceed 2 750 g and the total mass of the complete caplight assembly shall not exceed 3 250 g.

7.2 Ease of operation

The switch shall be easily accessible to the wearer with the caplight in the position normally worn. The switch shall be positive in action and shall have an "off" position and such "on" positions as are appropriate.

NOTE The switch should be operable while wearing protective gloves.

7.3 Maintainability

The caplight shall be constructed in such a manner that user replaceable parts are easily accessible after operation or removal of any special fasteners.

If necessitated by the battery design, means shall be provided for initial filling, subsequent topping up and changing of electrolyte.

8 Type tests

8.1 Illumination throughout the useful working period

The following test shall be carried out in a darkened room or enclosure where any reflected light will not influence the results, at a temperature of 20 °C ± 5 °C.

Connect the headpiece and cable to a fully charged battery of the type to be evaluated.

NOTE It may be necessary to cycle the battery several times to achieve full capacity.

Switch on the main light source and, if appropriate, any additional device to simulate the manufacturer's declared total current drain.

Allow the caplight to operate for the useful working period.

Record the battery voltage.

NOTE If an active device which affects the battery output is present, for example a switching regulator, the voltage shall be measured at the input of such a device.

Disconnect the headpiece and cable from the battery and connect it to a d.c. power source with a residual ripple not greater than 3 mV and capable of maintaining the voltage within ± 0,01 V throughout the test.

Adjust the power supply to the voltage measured at the end of the useful working period.Focus the main light source of the headpiece.

Position the headpiece so that the protective cover is 1,000mm ± 5mm away from a calibrated photometric cell.

Move either the headpiece or photocell through the angles specified in 5.3 maintaining the distance specified above. Record the reading on the photocell at 5° intervals, or in a specified rectangular grid which gives the same result. Rotate the headpiece through a right angle about its central axis and repeat the test.

NOTE: This test may be carried out by the caplight manufacturer.

8.2 Lamp life

All lamps shall be tested in accordance with section 4 of IEC 60983. If the lamp manufacturer provides a data sheet showing such test results, it may be accepted without further testing.

9 Documentation

The manufacturer shall produce a comprehensive installation, operation, maintenance and repair manual which includes at least the following:

a) information about the safe use of the caplight;

b) caplight useful working period;

c) permitted lamp types;

d) periodic checks by the user to ensure continued safe use, maintenance and lighting performance (see annex A);

e) those parts which the user may replace;

f) list of special tools.

10 Marking

Caplights meeting the requirements of this part of IEC 62013 shall be marked with the following information:

a) the name or trademark of the caplight manufacturer;

b) the manufacturer's type identification;

c) the number of this part of IEC 62013;