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E-09 EXPLOSION-PROOF LUMINAIRES

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Foreword:

CCS Product Inspection and Testing Guideline (hereinafter referred to as this Guideline) contains the technical requirements, inspection and testing criteria related to classification and statutory survey of marine products to be applied for CCS approval/inspection.

This Guideline frees the users to adopt other test methods and requirements which are equivalent to or are stricter than this Guideline.

This Guideline is published and updated by CCS, and is released at http://www.ccs.org.cn. Your comments or suggestions are welcomed and may be sent to our email addressed mp@ccs.org.cn.

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Main changes and effective date:

1.According to the Explosion protection standards version update, the version of the standards and the corresponding provisions have been adjusted.

2. According to the IEC standards version update, the version of the standards and the corresponding provisions have been adjusted.（2021）

3. Revised the description of product type approval sampling. (2023)

删除的内容: 2021xx

CONTENTS

删除的内容: 6

删除的内容: 2021xx

EXPLOSION-PROOF LUMINAIRES

1 General provisions

1.1 Application

This Chapter applies to explosion-proof luminaires with operating voltage not exceeding 1000 V, installed in spaces of ships and offshore installations where explosive gas mixtures may be present or accumulate (excluding explosion-proof emergency luminaires).

1.2 Normative references

1.2.1 The following standards, rules and guidelines are the basis for approval and inspection of the above luminaires by CCS.

1.2.2 The paragraphs of the following standards, rules and guidelines referred to in this Chapter are to be deemed as part of this Chapter. Where such documents are dated, any subsequent amendments (excluding corrections) or revisions do not apply to this Chapter. However, users of this Chapter are encouraged to study the use of latest versions of these standards, rules and guidelines.

(1) CCS Rules for Classification of Sea-going Steel Ships;

(2) CCS Guidelines for Approval Inspection of Luminaires;

(3) GB 3836.1Explosive atmospheres Part 1：Equipment-General requirements;

(4) GB 3836.2 Explosive atmospheres-Part 2：Equipment protection by flameproof enclosures “d”;

(5) GB 3836.3 Explosive atmospheres-Part 3：Equipment protection by increased safety“e”.

(6) GB 3836.4 Explosive atmospheres-Part 4：Equipment protection by intrinsic safety“i”

(7) GB 3836.8 Explosive atmospheres-Part 8：Equipment protection by type of protection “n”

(8) GB 3836.9 Explosive atmospheres-Part 9：Equipment protection by type of protection “m”

1.3 Terms and definitions

1.3.1 For definitions of terms such as products inspection, approval, type test, sample and

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unit/batch inspection, see 3.1.2 of Chapter 3, PART ONE of CCS Rules for Classification of Sea-going Steel Ships.

1.3.2 Explosive gas atmosphere means mixture with air, under atmospheric conditions, of flammable substances in the form of gas or vapour, in which after ignition, combustion spreads throughout the unconsumed mixture.

1.3.3 Explosion-proof type means specific measures taken to avoid ignition by electrical apparatus of surrounding explosive gas atmosphere.

1.3.4 Increased safety type means a type of protection applied to electrical apparatus in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks in normal service.

1.3.5 Flameproof enclosure means a type of protection whereby the parts which can ignite an explosive atmosphere are placed in an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture penetrating through any joint or structural gap of the enclosure and which prevents the transmission of the explosion to the explosive atmosphere surrounding the enclosure and consisting of one or more explosive gases or vapours.

1.3.6 Intrinsic safety “i” means a type of protection based on the restriction of electrical energy within equipment and of interconnecting wiring exposed to the explosive atmosphere to a level below that which can cause ignition by either sparking or heating effects.

1.3.7 Type of protection “n” means a type of protection applied to electrical apparatus such that, in normal operation and in certain specified abnormal conditions, it is not capable of igniting a surrounding explosive gas atmosphere.

1.3.8 Encapsulation “m” means a type of protection whereby parts that are capable of igniting an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that the explosive atmosphere cannot be ignited under operating or installation conditions.

2 Plans and documents

2.1 General requirements for plans and documents to be submitted to CCS for examination and approval are specified in PART ONE of the Guidelines.

2.2 When applying for approval by CCS, the following plans and documents are to be submitted.

2.2.1 The following plans and documents are to be submitted to CCS for approval:

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(1) General plan of explosion-proof luminaires and detailed drawings of main parts (approved by an appropriate explosion-proof products certification organization authorized by the State and accepted by CCS);

(2) Technical specifications of explosion-proof luminaires (approved by an appropriate explosion-proof products certification organization authorized by the State and accepted by CCS);

(3) Type test programme of explosion-proof luminaires.

2.2.2 The following plans and documents are to be submitted to CCS for information:

(1) Particulars of the manufacturer (including history and current situation) and description of main manufacturing equipment and test equipment;

(2) Documents of the manufacturer's technical management and quality management systems, such as product quality management system (including management of raw materials, semi-products and finished products), test equipment management system and general introduction of testing and inspection personnel;

(3) Explosion-proof certificate issued by an appropriate explosion-proof products certification organization authorized by the State in which the manufacturer is based;

(4) Explosion-proof test report issued by an appropriate explosion-proof products test organization authorized by the State in which the manufacturer is based;

(5) Documents of manufacturing processes;

(6) Specifications of associated electrical products;

(7) Operation instructions for the products.

3 Design and technical requirements

3.1 Explosion-proof performance requirements

The relevant standards for explosion-proof performance adopted by the State, in which the manufacturer is based, are to be complied with. The explosion-proof luminaires produced by manufacturers in the People's Republic of China are to comply with the following standards:

(1) GB3836.1 Explosive atmospheres Part 1：Equipment-General requirements.

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(2) The explosion-proof performance standards relating to the type of protection of luminaires against explosion. For example, flameproof luminaires are to comply with GB3836.2 Explosive atmospheres-Part 2：Equipment protection by flameproof enclosures “d”, Increased safety luminaires are to comply with GB3836.3 Explosive atmospheres-Part 2：Equipment protection by flameproof enclosures “d”.. Intrinsic safety “i” luminaires are to comply with GB 3836.4 Explosive atmospheres-Part 4：Equipment protection by intrinsic safety“i”. Type of protection “n” luminaires are to comply with GB 3836.8 Explosive atmospheres-Part 8：Equipment protection by type of protection“n”. Encapsulation“m” luminaires are to comply with GB 3836.9 Explosive atmospheres-Part 9：Equipment protection by type of protection “m”.

3.2 Requirements for marine luminaires

The requirements as specified in 5, E08 of guideline of Luminaires are to be complied with.

4 Selection of typical samples

4.1 Explosion-proof luminaires to be tested are to be selected by CCS Surveyor on site or under his supervision.

4.2 Selection of samples

Explosion-proof luminaires to be tested are to represent or cover, in terms of characteristics, features and manufacturing quality, the products or product series for which approval is sought and are to be manufactured by the required manufacturing methods and means. Type test samples are to be taken randomly for each type of finished explosion-proof luminaires satisfactorily inspected by the manufacturer. The sampling principle shall refer to clause 7.4.10 of E08 guide "lighting fixtures" .

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5 Type test

5.1 Test locations

5.1.1 For initial type approval, samples are to be submitted to a verification organization designated or recognized by CCS for type test. Explosion-proof performance tests are to be carried out by an appropriate explosion-proof products test organization authorized by the State in which the manufacturer is based.

5.1.2 For renewal of the type approval certificate, explosion-proof performance tests are to be carried out by an appropriate explosion-proof products test organization authorized by the State in which the manufacturer is based. The tests for other items may be carried out at the manufacturer’

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s laboratory in the presence of CCS Surveyor, subject to agreement of CCS and provided that the manufacturer has required test environment and equipment as well as competent inspection and test personnel.

5.2 Test environment

Unless otherwise specified, all tests are to be carried out under the following atmospheric conditions:

(1) ambient temperature: 15℃ to 35℃;

(2) relative humidity: 30%RH to 90%RH;

(3) pressure: 86 to 106 kPa.

5.3 Exemption from test items

Any exemption requested by the manufacturer from type test items will be addressed by the related CCS inspection organization, taking into consideration the significance of products, their mature manufacturing procedures and history of use as well as the availability of appropriate test reports issued by any IACS member or verification test organization. If the manufacturer declares that there is no any substantial change in design, construction and materials of the products, of which the type approval certificate is to be renewed, consideration may be given to an appropriate exemption from type test items.

5.4 Type test items

5.4.1 Test items for explosion-proof performance

The test items are to be confirmed by an appropriate explosion-proof products certification organization authorized by the State in which the manufacturer is based.

5.4.2 Test items for non-explosion-proof performance

The requirements as specified in chapter 7.4 of guideline LUMINAIRES E08 are to be complied with.

6 Unit/batch inspection

According to the requirements of the LIST OF CERTIFICATION REQUIREMENTS FOR CLASSED MARINE PRODUCTS of "Rules for Classification of sea-going steel ships", the

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product is approved only for non-inspection. If the manufacturer applies for unit/batch inspection, the inspection items and the sampling quantity shall be carried out according to the provisions in Table 6. Additional items may be added, as appropriate. If any sample is found unsatisfactory for any listed test item, such samples are to be doubled for re-inspection. If any unsatisfactory sample is found again, the inspection is to be stopped and the manufacturer is to be required to remove the defects for further inspection.

Items and Sampling Number of Explosion-Proof Luminaires for Unit/Batch Inspection

Table 6

No.	Test item	Technical requirements	Test method	Sampling number by manufacturer	Sampling number by Surveyor
1.	External appearance, marking, construction and material	3 of this Chapter	As per type test sample and approved technical documents	1%, not less than 3	1%, not less than 3
2.	Pressure test of empty enclosure (for explosion-proof luminaires only)	GB 3836.2 para. 16	GB 3836.2 para. 16	100%	1%, not less than 3
3.	Other routine test items confirmed by explosion-proof products certification organization (if applicable)	GB 3836 series standards	GB 3836 series standards	Confirmed by explosion-proof products certification organization	1%, not less than 3
4.	Functional testing	IEC 60598-1:2020 Annex Q	IEC 60598-1:2020 Annex Q	100%	
5.	Reliability of earthing				
6.	Dielectric strength and insulation resistance				