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E-08

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> you're your comments or suggestions are welcomed and may be sent to our email addressed mp@ccs.org.cn. ~~This Guide is a part of CCS Rules, which contains technical requirements, inspection and testing criteria related to classification and statutory survey of marine products.~~

~~This Guide is published and updated by CCS and can be found through <http://www.ccs.org.cn>. Comments or suggestions can be sent by email to mp@ccs.org.cn.~~

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Main changes :

1. According to the IEC standard version update, the version of the standards and the corresponding provisions have been adjusted.
2. The format of the guide is adjusted according to *The instruction for the publish of the guideline of the marine productions.*

3. According to the IEC standard version update, the version of the standards and the corresponding provisions have been adjusted. According to CCS rules amendments, the requirement of LED lamps is listed and pointed to CCS rules.

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LUMINAIRES

1 Application

This Chapter applies to non-explosion-proof luminaires (excluding luminaires for emergency lighting) with operating voltage not exceeding 1000 V, installed and used on ships and offshore installations.

2 Normative reference documents

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

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) IEC 60598-1: ~~2014+AMD1:2017~~2020 Luminaires – Part 1: General requirements and tests
- (2) IEC 60598-2-1: ~~1979~~2020 Luminaires – Part ~~2-1~~: Particular requirements - ~~Section One~~: Fixed general purpose luminaires
- (3) IEC 60598-2-2:2011 Luminaires – Part 2-2: Particular requirements - ~~Recessed~~ luminaires
- (4) IEC 60598-2-4:2017 Luminaires – Part ~~2-4~~: Particular requirements - ~~Section 2~~: Portable general purpose luminaires
- (5) IEC 60598-2-5:2015 Luminaires – Part 2-5: Particular requirements - Floodlights
- (6) IEC 60598-2-8:2013 Luminaires – Part 2-8: Particular requirements - Handlamps
- (7) IEC 60598-2-22: 2014+AMD1:2017 Luminaires – Part 2-22: Particular requirements - Luminaires for emergency lighting
- (8) IEC 61347-2-3:2011+AMD1:2016 CSV Lamp control gear – Part 2-3: Particular requirements for a.c. and /or d.c.supplied electronic control gear for fluorescent lamps
- (9) IEC 61347-2-8: 2000+AMD1:2006 Lamp control gear – Part 2-8: Particular requirements for ballasts for fluorescent lamps

- (10) IEC 61347-2-9:2012 Lamp control gear – Part 2-9: Particular requirements for electromagnetic control gear for discharge lamps (excluding fluorescent lamps)
- (11) IEC 61347-2-1:2000+A1:2005+A2:2013 Lamp control gear – Part 2-1: Particular requirements for starting devices (other than glow starters)
- (12) IEC 60155:1993 Glow-starters for fluorescent lamps
- (13) IEC 60238: 2016+AMD1:2017+[AMD2:2020](#) Edison screw lampholders
- (14) IEC 60092-306:2009 Electrical installations in ships – Parts 306: Equipment-Luminaires and lighting accessories
- (15) IEC 61184:2017+[AMD1:2019](#) Bayonet lampholders
- (16) CCS Rules for Classification of Sea-going Steel Ships, and its amendments;
- (17) CCS GD22-2015 Guideline on Type Approval Test of Electrical and Electronic Products (Current valid version)
- (18) [IEC 62722-2-1:2014 Luminaire performance - Part 2-1: Particular requirements for LED luminaires](#)
- (19) [IEC 62717:2014+AMD1:2015+AMD2:2019 CSV LED modules for general lighting - Performance requirements](#)
- (20) [IEC 62384:2020 RLV DC or AC supplied electronic controlgear for LED modules - Performance requirements](#)
- (21) [IEC 61547:2020 RLV Equipment for general lighting purposes - EMC immunity requirements](#)

3 Definitions

3.1 Rules for Classification of Sea-Going Steel Ships and its Amendments, It means the CCS Rules for Classification of Sea-Going Steel Ships and its Amendments. For definitions of terms such as products inspection, approval, type test, sample and unit/batch inspection, see 3.1.2 of Chapter 3, PART ONE of CCS Rules for Classification of Sea-going Steel Ships and its Amendments.

3.2 Creepage distance means the shortest path between two conductive parts along the surface of

insulating material.

3.3 Clearance means the shortest distance through air between two conductive parts.

3.4 Floodlighting means lighting projected to the whole site or lighted objects, giving much more illumination than the surrounding illumination.

3.5 Floodlights mean luminaires used for floodlighting.

3.6 Fixed luminaires mean luminaires which are not easy to move from one place to another.

3.7 Portable luminaires mean luminaires which can be moved from one place to another in normal operation after connecting to power source.

3.8 Handlamp means a portable luminaire with one handle and one flexible cable or cord.

3.9 Ballast means one component comprised of inductance, capacitance or resistance individually or jointly, between power source and one or more discharge lamps. Mainly used for restricting the lamp current within required limit.

3.10 AC supplied electronic ballast is powered by network source, comprised of AC-AC inverter of steady-state components, which usually start one or more tubular fluorescent lamps under high frequency.

3.11 Starting device means the device that provides appropriate electrical conditions to start discharge lamps by its own action or in combination with other components in line.

3.12 Glow-starter for fluorescent lamp means the starter that starts the fluorescent lamp by glow discharge.

4 Plans and documents

4.1 General requirements for plans and documents to be submitted to CCS for examination and approval are specified as follows:

- (1) particulars of the manufacturer, including the name, address, history, production capacity, technical and inspection personnel, main products, subordinate relationship, trademark, etc.;
- (2) details of the products for approval;
- (3) main production equipment;

- (4) main test equipment;
- (5) brief production technology of the products for approval;
- (6) quality management documents;
- (7) document of entering to the register of enterprise;
- (8) qualification certificate and/or production license;
- (9) specimen of products quality certificate;
- (10) quality control scheme (where applicable).

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

4.2.1 The following Plans and documents are to be submitted to CCS for approval:

- (1) General plan of luminaires and detailed drawings of main parts;
- (2) Technical specifications of luminaires;
- (3) Type test programme.

4.2.2 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) Documents of manufacturing processes;
- (4) Specifications of associated electrical products;
- (5) Operation instructions for the products.

5 Design and technical requirements

5.1 General technical requirements for luminaires are given in Table 5.1.

General Technical Requirements

Table 5.1

| No. | Item | Technical requirements |
|-----|-------------------------------|---|
| 1. | Marking | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 3 |
| 2. | Construction | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 4 |
| 3. | External and internal wirings | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 5 |
| 4. | Earthing | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 7 |

Continue table 5.1

| No. | Item | Technical requirements |
|-----|---|---|
| 5. | Protection against electric shock | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 8 |
| 6. | Dust proof, solid object proof and humidity proof | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 9 1.3.2, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 7. | Insulation resistance and electrical strength, touch current and protective conductor current | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 10 |
| 8. | Creepage distance and clearances | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 11 |
| 9. | Endurance test and thermal test | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 12 |
| 10. | Resistance to heat, fire and tracking | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 13 |
| 11. | Screw terminals | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 14 |
| 12. | Screwless terminals and electrical connectors | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 15 |

5.2 Marine technical requirements for luminaires are given in Table 5.2.

Marine Technical Requirements

Table 5.2

| No. | Item | Technical requirements |
|-----|------|------------------------|
|-----|------|------------------------|

| | | |
|----|---|--|
| 1. | Power supply variation | 1.2.2, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 2. | Resistance to vibration | Mechanical and electrical connectors or fittings are to be connected tight and certain measures are to be taken to avoid any loosening caused by shock |
| 3. | Ambient temperature | 1.2.1, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 4. | Moisture proof | Without any permanent or temporary breakdown or damage under moisture and heat |
| 5. | Corrosion resistance (for luminaires installed on open deck only) | Metal components of luminaires are to be corrosion-resistant |

Continue table 5.2

| No. | Item | Technical requirements |
|----------------|--|--|
| 6. | Flame retardant | Plastic components of luminaires have flame-retardant and self-quenching characteristics at specified flame |
| 7. | External and internal wirings | <p>Conducting wires used in luminaires are to be shipboard wires of an appropriate specification, of which the nominal section is not to be less than the requirements of section 5 of IEC 60598-1:0.75 mm² and voltage rating not less than 250 V.</p> <p>Enclosures of fixed luminaires are to have at least 2 power cable access holes. For emergency luminaires, 2 additional power cable access holes are needed</p> |
| 8. | Conducted emissions (for discharge lamps only) | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 3.2 |
| 9. | Particular requirements for incandescent lamps | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 10. | Particular requirements for discharge lamps with operating voltage not exceeding 250 V | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 11. | Particular requirements for discharge lamps with operating voltage more than 250 V | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 12. | Requirements on luminaires | IEC 60092-306:2009 Chapter 4 |

| | | |
|-------------------|--|---|
| 13 12. | Requirements on socket-outlets and plugs for luminaires connection | IEC 60092-306:2009 Chapter 6 |
| 14 13. | Requirements on lighting accessories | IEC 60092-306:2009 Chapter 5 |
| 15 14. | Shock exposure | IEC 60092-306:2009 Section 7.2.2, Chapters 7 |
| 16 15. | Special chemical and physical attributes. | IEC 60092-306:2009 Section 7.2.5, Chapters 7 |
| 17 16. | Coating thickness | IEC 60092-306:2009 Section 7.2.6, Chapters 7 |
| 17. | <u>Requirements for LED lamps</u> | <u>Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments</u> |
| 18 | <u>Electromagnetic compatibility (if applicable)</u> | <u>IEC 61547:2020 RLV</u> |

5.3 Floodlights are to comply with the requirements of 5.1 and 5.2 in this Chapter and in addition, the technical requirements listed in Table 5.3.

Technical Requirements for Floodlights

Table 5.3

| No. | Item | Technical requirements |
|-----|---------------------------------|---------------------------------|
| 1. | Marking | IEC 60598-2-5:2015 Chapter 5.5 |
| 2. | Construction | IEC 60598-2-5:2015 Chapter 5.6 |
| 3. | Endurance test and thermal test | IEC 60598-2-5:2015 Chapter 5.12 |
| 4. | Dust proof and humidity proof | IEC 60598-2-5:2015 Chapter 5.13 |

5.4 Fixed general purpose luminaires are to comply with the requirements of 5.1 and 5.2 in this Chapter and in addition, the technical requirements listed in Table 5.4.

Technical Requirements for Fixed General Purpose Luminaires

Table 5.4

| No. | Item | Technical requirements |
|-----|---------------------------------|---|
| 1. | Endurance test and thermal test | IEC 60598-2-1: 1979 2020 Chapter 1. 13 13 |
| 2 | Dust proof and humidity proof | IEC 60598-2-1: 1979 2020 Chapter 1. 13 14 |

5.5 Portable general purpose luminaires are to comply with the requirements of 5.1 and 5.2 in this Chapter and in addition, the technical requirements listed in Table 5.5.

Technical Requirements for Portable General Purpose Luminaires Table 5.5

| No. | Item | Technical requirements |
|-----|-----------------------------------|---------------------------------|
| 1. | Construction | IEC 60598-2-4:2017 Chapter 4.7 |
| 2. | External and internal wirings | IEC 60598-2-4:2017 Chapter 4.11 |
| 3. | Protection against electric shock | IEC 60598-2-4:2017Chapter 4.12 |
| 4. | Endurance test and thermal test | IEC 60598-2-4:2017 Chapter 4.13 |
| 5. | Dust proof and humidity proof | IEC 60598-2-4:2017 Chapter 4.14 |

5.6 Handlamps are to comply with the requirements of 5.1 and5.2 in this Chapter and in addition, the technical requirements listed in Table 5.6.

Technical Requirements for Handlamps Table 5.6

| No. | Item | Technical requirements |
|-----|---------------------------------------|---------------------------------|
| 1. | Marking | IEC 60598-2-8:2013 Chapter 8.6 |
| 2. | Construction | IEC 60598-2-8:2013 Chapter 8.7 |
| 3. | Terminals | IEC 60598-2-8:2013 Chapter 8.10 |
| 4. | External and internal wirings | IEC 60598-2-8:2013 Chapter 8.11 |
| 5. | Protection against electric shock | IEC 60598-2-8:2013 Chapter 8.12 |
| 6. | Endurance test and thermal test | IEC 60598-2-8:2013 Chapter 8.13 |
| 7. | Dust proof and humidity proof | IEC 60598-2-8:2013 Chapter 8.14 |
| 8. | Resistance to heat, fire and tracking | IEC 60598-2-8:2013 Chapter 8.16 |

5.7 Recessed luminaires are to comply with the requirements of 5.1 and 5.2 in this Chapter and in addition, the technical requirements listed in Table 5.7.

Technical Requirements for Recessed Luminaires **Table 5.7**

| No. | Item | Technical requirements |
|-----|-----------------------------------|---------------------------------|
| 1. | External and internal wirings | IEC 60598-2-2:2011 Chapter 2.11 |
| 2. | Protection against electric shock | IEC 60598-2-2:2011 Chapter 2.12 |
| 3. | Endurance test and thermal test | IEC 60598-2-2:2011 Chapter 2.13 |
| 4. | Dust proof and humidity proof | IEC 60598-2-2:2011 Chapter 2.14 |

5.8 Technical requirements for essential components of luminaires are given in Table 5.8.

Technical Requirements for Main Components **Table 5.8**

| No. | Item | Technical requirements |
|-----|---|---|
| 1. | A.C. and/or d.c. supplied electronic control gear for fluorescent lamps | IEC 61347-2-3:2011+AMD1:2016 CSV |
| 2. | Inductance ballast for fluorescent lamps | IEC 61347-2-8: 2000 +AMD1:2006 |

Continue table 5.8

| No. | Item | Technical requirements |
|-----|--|---|
| 3. | Electromagnetic control gear for discharge lamps (excluding fluorescent lamps) | IEC 61347-2-9:2012 |
| 4. | Glow-starters for fluorescent lamps | IEC 60155:1993 |
| 5. | Starting devices (excluding glow-starters) | IEC 61347-2-1:2000+A1:2005+A2:2013 |
| 6. | Edison screw lampholders | IEC 60238: 2016+AMD1:2017+ AMD2:2020 |
| 7. | Bayonet lampholders | IEC 61184: 2008 2017+AMD1:2017 |

5.9 LED luminaires, LED modules and control gear for LED modules are to comply with the requirements of 5.1 and 5.2 in this Chapter and in addition, the technical requirements listed in Table 5.9.

LED luminaires, LED modules and control gear for LED modules Technical Requirements table 5.9

| <u>No.</u> | <u>Item</u> | <u>Technical requirements</u> |
|------------|---|---|
| <u>1.</u> | <u>Particular requirements for LED luminaires</u> | <u>IEC 62722-2-1: 2014</u> |
| <u>2</u> | <u>LED modules for general lighting</u> | <u>IEC 62717:2014+AMD1:2015+AMD2:2019 CSV</u> |
| <u>3</u> | <u>DC or AC supplied electronic controlgear for LED modules</u> | <u>IEC 62384:2020 RLV</u> |

6 Main components and parts

The main materials and parts of the products shall be controlled in accordance with the CCS rules.

7 Type test

7.1 Test location

7.1.1 For initial type approval, samples are to be submitted to a verification organization designated or recognized by CCS for type test.

7.1.2 For renewal of the type approval certificate, type test may be carried out at the manufacturer'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.

7.2 Test environment

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

- (1) ambient temperature: 15°C to 35°C;
- (2) relative humidity: 30%RH to 90%RH;
- (3) air pressure: 86 to 106 kPa.

7.3 Exemption from test items

7.3.1 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.

7.4 Type test items

7.4.1 Type test items in respect to general requirements for luminaires are given in Table 7.4.1.

General Type Test Items

Table 7.4.1

| No. | Test item | Technical requirements | Test method |
|-----|---|---|---|
| 1. | Marking | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 3 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 3 |
| 2. | Construction | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 4 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 4 |
| 3. | External and internal wirings | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 5 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 5 |
| 4. | Earthing | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 7 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 7 |
| 5. | Protection against electric shock | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 8 | IEC 60598-1: 2003 — <u>2020</u> Chapter 8 |
| 6. | Dust proof, solid object proof and humidity proof | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 9 1.3.2, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 9 |
| 7. | Insulation resistance and electrical strength | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 10 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 10 |
| 8. | Creepage distances and clearances | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> Chapter 11 | IEC 60598-1: 2014+AMD1:2017 <u>2020</u> |

| | | | |
|--|--|--|------------|
| | | | Chapter 11 |
|--|--|--|------------|

Continue table 7.4.1

| No. | Test item | Technical requirements | Test method |
|-----|---|---|--|
| 9. | Endurance test and thermal test | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 12 | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 12 |
| 10. | Resistance to heat, fire and tracking | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 13 | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 13 |
| 11. | Screw terminals | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 14 | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 14 |
| 12. | Screwless terminals and electrical connectors | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 15 | IEC 60598-1: 2014+AMD1:2017 2020 Chapter 15 |

7.4.2 Type test items in respect to marine requirements for luminaries are given in Table 7.4.2.

Marine Type Test Items

Table 7.4.2

| No. | Test item | Technical requirements | Test method |
|-----|------------------------|--|---|
| 1. | Power supply variation | 1.2.2, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 2.4 |
| 2. | Vibration endurance | Mechanical and electrical connectors or fittings are to be connected tight and certain measures are to be taken to avoid any loosening caused by shock | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 2.7 |
| 3. | Ambient temperature | Section 1.2.1, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version). 2.8;2.9 |

| | | | |
|----|---|--|--|
| 4. | Moisture proof | Without any permanent or temporary breakdown or damage under moisture and heat | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 2.10 |
| 5. | Corrosion resistance (for luminaires mounted on the open deck only) | Metal components of luminaires are to be corrosion-resistant | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 2.12 |

Continue table 7.4.2

| No. | Test item | Technical requirements | Test method |
|-----|--|---|--|
| 6. | Flame retardant | Plastic components of luminaires have flame-retardant and self-quenching characteristics at specified flame | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 2.16 |
| 7. | External and internal wirings | Conducting wires used in luminaires are to be shipboard wires of an appropriate specification, of which the nominal section is not to be less than 0.75 mm² and voltage rating not less than 250 V. Enclosures of fixed luminaires are to have at least 2 power cable access holes. For emergency luminaires, 2 additional power cable access holes are needed <u>the requirements of section 5 of IEC 60598-1.</u> | Visual examination |
| 8. | Conducted emissions (for discharge lamps only) | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version), 3.2 | <i>Guideline on Type Approval Test of Electrical and Electronic Products</i> (Current valid version). 3.2 |
| 9. | Particular requirements for incandescent lamps | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 10. | Particular requirements for discharge lamps with operating | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel |

| | | | |
|----------------|---|--|--|
| | voltages not exceeding 250 V | Steel Ships and its Amendments | Ships and its Amendments |
| 11. | Particular requirements for discharge lamps with operating voltages more than 250 V | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments | Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments |
| 12. | Requirements on luminaires | IEC 60092-306:2009 Chapters 4 | IEC 60092-306:2009 Chapters 4 |
| 12. | Requirements on socket-outlets and plugs for luminaires connection | IEC 60092-306:2009 Chapter 6 | IEC 60092-306:2009 Chapter 6 |

Continue table 7.4.2

| No. | Test item | Technical requirements | Test method |
|------------------|--|---|---|
| 14 13 | Requirements on lighting accessories. | IEC 60092-306:2009 Chapter 5 | IEC 60092-306:2009 Chapter 5 |
| 15 14 | Shock exposure | IEC 60092-306:2009 Section 7.2.2, Chapters 7 | IEC 60092-306:2009 Section 7.2.2, Chapters 7 |
| 16 15 | Special chemical and physical attributes. | IEC 60092-306:2009 Section 7.2.5, Chapters 7 | IEC 60092-306:2009 Section 7.2.5, Chapters 7 |
| 17 16 | Coating thickness | IEC 60092-306:2009 Section 7.2.64, Chapters 7 | IEC 60092-306:2009 Section 7.2.64, Chapters 7 |
| 17. | <u>Requirements for LED lamps</u> | <u>Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments</u> | <u>Chapter 3, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships and its Amendments</u> |
| 18. | <u>Electromagnetic compatibility (if applicable)</u> | <u>IEC 61547:2020 RLV</u> | <u>IEC 61547:2020 RLV</u> |

7.4.3 Type test items for floodlights are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.3.

Type Test Items for Floodlights

Table 7.4.3

| No. | Test item | Technical requirements | Test method |
|-----|-----------|--------------------------------|--------------------------------|
| 1. | Marking | IEC 60598-2-5:2015 Chapter 5.5 | IEC 60598-2-5:2015 Chapter 5.5 |

| | | | |
|----|---------------------------------|---------------------------------|---------------------------------|
| 2. | Construction | IEC 60598-2-5:2015 Chapter 5.6 | IEC 60598-2-5:2015 Chapter 5.6 |
| 3. | Endurance test and thermal test | IEC 60598-2-5:2015 Chapter 5.12 | IEC 60598-2-5:2015 Chapter 5.12 |
| 4. | Dust proof and humidity proof | IEC 60598-2-5:2015 Chapter 5.13 | IEC 60598-2-5:2015 Chapter 5.13 |

7.4.4 Type test items for fixed general purpose luminaires are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.4.

Type Test Items for Fixed General Purpose Luminaires **Table 7.4.4**

| No. | Test item | Technical requirements | Test method |
|-----|---------------------------------|---|---|
| 1. | Endurance test and thermal test | IEC 60598-2-1: 1979 <u>2020</u> Chapter 1. 42 <u>13</u> | IEC 60598-2-1: 1979 <u>2020</u> Chapter 1. 42 <u>13</u> |
| 2. | Dust proof and humidity proof | IEC 60598-2-1: 1979 <u>2020</u> Chapter 1. 43 <u>14</u> | IEC 60598-2-1: 1979 <u>2020</u> Chapter 1. 43 <u>14</u> |

7.4.5 Type test items for portable general purpose luminaires are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.5.

Type Test Items for Portable General Purpose Luminaires **Table 7.4.5**

| No. | Test item | Technical requirements | Test method |
|-----|-----------------------------------|---------------------------------|---------------------------------|
| 1. | Construction | IEC 60598-2-4:2017 Chapter 4.7 | IEC 60598-2-4:2017 Chapter 4.7 |
| 2. | External and internal wirings | IEC 60598-2-4:2017 Chapter 4.11 | IEC 60598-2-4:2017 Chapter 4.11 |
| 3. | Protection against electric shock | IEC 60598-2-4:2017 Chapter 4.12 | IEC 60598-2-4:2017 Chapter 4.12 |
| 4. | Endurance test and thermal test | IEC 60598-2-4:2017 Chapter 4.13 | IEC 60598-2-4:2017 Chapter 4.13 |
| 5. | Dust proof and humidity proof | IEC 60598-2-4:2017 Chapter 4.14 | IEC 60598-2-4:2017 Chapter 4.14 |

7.4.6 Type test items for handlamps are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.6.

Type Test Items for Handlamps **Table 7.4.6**

| No. | Test item | Technical requirements | Test method |
|-----|-----------|------------------------|-------------|
|-----|-----------|------------------------|-------------|

| | | | |
|----|---------------------------------------|---------------------------------|---------------------------------|
| 1. | Marking | IEC 60598-2-8:2013 Chapter 8.6 | IEC 60598-2-8:2013 Chapter 8.6 |
| 2. | Construction | IEC 60598-2-8:2013 Chapter 8.7 | IEC 60598-2-8:2013 Chapter 8.7 |
| 3. | Terminals | IEC 60598-2-8:2013 Chapter 8.10 | IEC 60598-2-8:2013 Chapter 8.10 |
| 4. | External and internal wirings | IEC 60598-2-8:2013 Chapter 8.11 | IEC 60598-2-8:2013 Chapter 8.11 |
| 5. | Protection against electric shock | IEC 60598-2-8:2013 Chapter 8.12 | IEC 60598-2-8:2013 Chapter 8.12 |
| 6. | Endurance test and thermal test | IEC 60598-2-8:2013 Chapter 8.13 | IEC 60598-2-8:2013 Chapter 8.13 |
| 7. | Dust proof and humidity proof | IEC 60598-2-8:2013 Chapter 8.14 | IEC 60598-2-8:2013 Chapter 8.14 |
| 8. | Resistance to heat, fire and tracking | IEC 60598-2-8:2013 Chapter 8.16 | IEC 60598-2-8:2013 Chapter 8.16 |

7.4.7 Type test items for recessed luminaires are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.7.

Type Test Items for Recessed Luminaires

Table 7.4.7

| No. | Test item | Technical requirements | Test method |
|-----|-----------------------------------|---------------------------------|---------------------------------|
| 1. | External and internal wirings | IEC 60598-2-2:2011 Chapter 2.11 | IEC 60598-2-2:2011 Chapter 2.11 |
| 2. | Protection against electric shock | IEC 60598-2-2:2011 Chapter 2.12 | IEC 60598-2-2:2011 Chapter 2.12 |
| 3. | Endurance test and thermal test | IEC 60598-2-2:2011 Chapter 2.13 | IEC 60598-2-2:2011 Chapter 2.13 |
| 4. | Dust proof and humidity proof | IEC 60598-2-2:2011 Chapter 2.14 | IEC 60598-2-2:2011 Chapter 2.14 |

7.4.8 Type test items for main components of luminaires are given in Table 7.4.8.

Type Test Items for Main Components of Luminaires

Table 7.4.8

| No. | Test item | Technical requirements | Test method |
|-----|---|------------------------|----------------------------------|
| 1. | A.C. and/or D.C. supplied electronic control gear for | IEC 61347-2-3: | IEC 61347-2-3: 2011+AMD1:2016 |

| | | | |
|----|--|---|---|
| | fluorescent lamps | 2011+AMD1:2016 CSV | CSV |
| 2. | Inductance ballast for fluorescent lamps | IEC 61347-2-8: <u>2000+AMD1:2006</u> | IEC 61347-2-8: <u>2000+AMD1:2006</u> |
| 3. | Electromagnetic control gear for discharge lamps (excluding fluorescent lamps) | IEC 61347-2-9:2012 | IEC 61347-2-9:2012 |
| 4. | Glow-starters for fluorescent lamps | IEC 60155:1993 | IEC 60155:1993 |
| 5. | Starting devices (excluding glow-starters) | IEC 61347-2-1:2000+A1: 2005+A2: 2013 | IEC 61347-2-1:2000+A1 : 2005+A2: 2013 |
| 6. | Edison screw lampholders | IEC 60238: 2016+AMD1:2017+ <u>AMD2:2020</u> | IEC 60238: 2016+AMD1:2017+ <u>AMD2:2020</u> |
| 7. | Bayonet lampholders | IEC 61184: 2017+ <u>AMD1:2019</u> | IEC 61184: 2017+ <u>AMD1:2019</u> |

7.4.9 Type test items for LED luminaires, LED modules and controlgear for LED modules are to comply with the requirements of 7.4.1 and 7.4.2 in this Chapter and in addition, the technical requirements listed in Table 7.4.9.

LED luminaires, LED modules and controlgear for LED modules Technical Requirements table 7.4.9

| <u>No.</u> | <u>Test item</u> | <u>Technical requirements</u> | <u>Test method</u> |
|------------|---|---|---|
| <u>1.</u> | <u>Particular requirements for LED luminaires</u> | <u>IEC 62722-2-1: 2014 chapter 6.4</u> | <u>IEC 62722-2-1: 2014 chapter 6.4</u> |
| <u>2.</u> | <u>LED modules for general lighting</u> | <u>IEC 62717:2014+AMD1:2015+AMD2:2019 CSV</u> | <u>IEC 62717:2014+AMD1:2015+AMD2:2019 CSV</u> |
| <u>3.</u> | <u>DC or AC supplied electronic controlgear for LED modules</u> | <u>IEC 62384:2020 RLV</u> | <u>IEC 62384:2020 RLV</u> |

7.4.9—10 Selection of typical samples

(1) Luminaires and main components to be tested are to be selected by CCS Surveyor on site or under his supervision.

(2) Selection of samples

Luminaires and main components 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. Three type test samples are to be taken randomly for each type of finished luminaires and main components satisfactorily inspected by the manufacturer. For similar lamps with similar construction, the same characteristics of light source, the same protection against electric shock, and the same IP rating. These samples can be selected for each category. The sampling of LED luminaires, LED modules and controlgear for LED modules shall be carried out in accordance with relevant IEC standards.

8 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 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 8. 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 Luminaires for Unit/Batch Inspection Table 8

| 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. | Functional testing | IEC 60598-1: <u>2014+AMD1:20172020</u> | IEC 60598-1: <u>2014+AMD1:20172020</u> | 100% | |
| 3. | Reliability of | Annex Q | Annex Q | | |

| | | | | | |
|----|---|--|--|--|--|
| | earthing | | | | |
| 4. | Dielectric strength and insulation resistance | | | | |