Guideline No.: S-02(201510)

S-02

NAVIGATION LIGHT AND SIGNAL LIGHT CONTROLLERS

Issued date: October 20,2015

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.

Historical version and release date: S-02(201510) October 20, 2015

Main change: New Release

CONTENTS

NAVIGATION LIGHT AND SIGNAL LIGHT CONTROLLERS

1 Application

This guideline is applicable to the approval and inspection of navigation light controllers installed and used on ships engaged in international voyage. Reference may be made to this chapter for navigation light controllers installed and used on ships navigating in inland waterways and the signal light controllers installed on ships nagged in international voyage and navigating in inland waterways.

2 Basis for approval and inspection

2.1 2.7.4, Section 7, Chapter 2, PART FOUR of CCS Rules for Classification of Sea-going Steel Ships

2.2 Annex to MSC.253(83) Performance Standards for Navigation Lights, Navigation Light Controllers and Associated Equipment

2.3 Chapter 13, Volume 2B of Code for Statutory Inspection of Ships and Offshore Installations

2.4 IEC60945:2002Navigation and Radio Communication Equipment and Systems-General Requirements-Methods of Testing and Required Test Results.

3 Definitions

3.1 Navigation light &signal light controller is a device capable of operating and controlling the navigation light and signal light.

3.2 The terms and definitions used in this chapter are consistent with those in MSC.253(83).

4 Drawings and documentation to be submitted

4.1 The following drawings and documentation to be submitted are to be submitted to CCS for approval

4.1.1 General drawing;

4.1.2 Shell drawing (including panel drawing, bottom plate drawing, etc.);

4.1.3 Panel arrangement plan;

4.1.4 Signs and marks diagram;

4.1.5 Electrical circuit diagram

4.1.6 List of elements and components (including the name, type, specification, quantity, manufacturer or brand of the elements and components as well as their codes in electrical circuit);

4.1.7 Product technical specifications or enterprise standard.

4.2 The following drawings and documentation to be submitted are to be submitted to CCS for review:

4.2.1 Instructions for use (both in Chinese and English);

4.2.2 Process flow chart showing quality monitoring points;

4.2.3 Type, specification and list of qualified suppliers of main raw materials and parts (e.g. integrated circuit chip, printed circuit board, semi-conductor element, fuse, switch, power module, light emitting diode, printed product, insulation paint, etc.);

4.2.4 External wiring diagram;

4.2.5 Software description (including programming platform, software type, software version, etc., applicable to products with programmable elements);

4.2.6 Software flow chart/program block diagram (applicable to products with programmable elements).

5 Design and technical requirements

5.1 Navigation light and signal light controllers are to be powered directly from the main switchboard and emergency switchboard; if an emergency source of power is provided, navigation light and signal light controllers are to be powered from the emergency switchboard and temporary emergency charging and discharging panel. Navigation light and signal light controllers are to have the function of main power failure alarm and power source change over.

5.2 Navigation light and signal light controllers are to have light testing function.

5.3 The failure of indicator light of navigation light and signal light controllers is not to cause extinction of the navigation light and signal light.

5.4 Navigation light and signal light controllers are to be such as to facilitate the on/off control of each navigation light and signal light.

5.5 Navigation light and signal light controllers are to provide visual indication of the on/off condition of the navigation light and signal light.

5.6 Navigation light and signal light controllers are to provide setting of pre-grouped navigation light and signal light.

5.7 Navigation light and signal light controllers on ships not less than 50m in length are to provide alarms of the following failures:

5.7.1 Navigation light and signal light power failure; and

5.7.2 Failure, including short circuit, of a lamp which is switched ON.

5.7.3 Navigation light and signal light controllers on board a ship not less than 50 m in length should present the status of all NLs in a logical presentation, meeting the requirements set out in resolution MSC.191(79), *e.g.*, by symbol marks on a display.

5.7.4 All indicators of Navigation light and signal light controllers should be dimmable to ensure easy reading without disturbing the night vision of the Officer of the Watch. The brightness of a display, if fitted, of Navigation light and signal light controllers should be controllable.

5.7.5 Navigation light and signal light controllers are to support use of standard serial interface of the maritime navigation and communication system.

5.7.6 The NLC should have a bi-directional interface to transfer alarms to external systems and receive

acknowledgements of alarms from external systems. The interface should comply with the relevant international standards IEC61162.

5.7.7 If LED is used as the source for navigation light or signal light, the light controller is to comply with the requirements in 4.3 of the Annex to MSC.253 (83).

6 Type test

A complete set of navigation light controller is to be sampled by the surveyor for type testand the type testis to be carried out at least in accordance with the test items listed in the table below:

TYPE TEST ITEM TABLE **Table 6**

No.	Test item	Technical requirements	Test method
1	Visual inspection	CCSrules/enterprise standards/drawings	Visual inspection
2	Function test		
2.1	Main power failure alarm and power changeover function tests	2.7.4.3, Section 7, Chapter 2, PART FOUR of the Rules for Classification of Sea-going Steel Ships (2012); 5.4.1 and 6 of Resolution MSC. 253(83)	When the main power supply is disconnected, the system is to be capable of automatically changing over to the backup source of power and continuing to operate, and activate the visual and audible alarms at the same time. The alarm sound pressure level is to comply with 11.1.3 of IEC60945:2002.
2.2	Failure of indicator light of controllers is not to cause extinction of the navigation light.	2.7.4.4, Section 7, Chapter 2, PART FOUR of the Rules for Classification of Sea-going Steel Ships (2012)	When the indicator light on any controller panel is disconnected or short circuited, the corresponding navigation light is still to operate properly.
2.3	Navigation light on/off and condition indication function test	5.1, 5.2 and 5.5 of Resolution MSC. 253 (83)	The on/off indicator lights of navigation light controller are to be capable of turning on and off the corresponding navigation lights and correctly indicating the operating condition of each navigation light.
2.4	Controller dimming function test	5.6 of Resolution MSC. 253 (83)	When the upper dimming knob (or push button) of the controller is adjusted, the brightness of various indicator lights is to vary accordingly. The indicator light, when adjusted to dim level, is not to affect the night vision of the officer.

Continued Table 6

2.5	Navigation light broken circuit fault alarm function test	5.4.2 of Resolution MSC. 253 (83)	Disconnection of any navigation light and its circuit is to be capable of activating the controller's visual and audible alarms. The alarm sound pressure level is to comply with 11.1.3 and 6.2.2 of IEC60945:2002. The alarm is to meet the requirements of IMO A.1021(26).
2.6	Navigation light short circuit fault alarm function test	5.4.2 of Resolution MSC. 253 (83)	Short circuit of any navigation light and its circuit is to be capable of activating the controller's visual and audible alarms. The alarm sound pressure level is to comply with 11.1.3 and 6.2.2 of IEC60945:2002. The alarm is to meet the requirements of IMO A.1021 (26).
2.7	Alarm signal external transmission and answer signal receiving function test	5.8 of Resolution MSC. 253 (83)	IEC61162
2.8	Two-way serial communication interface test	5.7 of Resolution MSC. 253 (83)	IEC61162
3	Determination of alarm sound pressure level	11.1.3 and 6.2.2 of IEC60945:2002	11.1.3 and 6.2.2 of IEC60945:2002
4a	Maximum steady-state power fluctuation test	7.1 and 5.2.2 of IEC60945:2002	7.1 and 5.2.2 of IEC60945:2002
4b	Power anomaly	7.2 and 5.2.3 of IEC60945:2002	7.2 and 5.2.3 of IEC60945:2002
4c	Transient power fluctuation test	7.3 and 10.7 of IEC60945:2002	7.3 and 10.7 of IEC60945:2002

Continued Table 6

4d	Power failure test	7.4 and 10.8 of IEC60945:2002	7.4 and 10.8 of IEC60945:2002
5	Compass safe distance	11.2 of MSC. 253 (83)	11.2 of MSC. 253 (83)
6	Low temperature test	8.4 of IEC60945:2002	8.4 of IEC60945:2002; IEC60068-2-1 Edition 6.0 (2007-03), (test Ab is applicable to equipment without a heat radiating device; test Ad is applicable to equipment with a heat radiating device)
7	High temperature (dry heat) test	8.2 of IEC60945:2002	8.2 of IEC60945:2002; IEC60068-2-2 Edition 5.0 (2007-07), (test Bb is applicable to equipment without a heat radiating device; test Bd is applicable to equipment with a heat radiating device)
8	Alternate damp heat test	8.3 of IEC60945:2002	8.3 of IEC60945:2002; IEC60068-2-30 Edition 3.0 (2005-08)
9	Vibration test (sine)	8.7 of IEC60945:2002	8.7 of IEC60945:2002; IEC60068-2-6 Edition 7.0(2007-12) Test Fc
10	Electromagnetic compatibility test		
10.1	Immunity to electrostatic discharge	10.9 of IEC60945:2002	10.9 of IEC60945:2002; IEC61000-4-2 Consolidated Edition 2.0(2008-12)
10.2	Immunity to radiated radiofrequencies	10.4 of IEC60945:2002	10.4 of IEC60945:2002; IEC61000-4-3 Edition 3.1 (2008-04)
10.3	Immunity to conducted radio frequency disturbance	10.3 of IEC60945:2002	10.3 of IEC60945:2002; IEC61000-4-6 Consolidated Edition 3.0(2008-10)

Continued Table 6

10.4	Immunity to fast transients on a.c. power, signal and control lines	10.5 of IEC60945:2002	10.5 of IEC60945:2002; IEC61000-4-4 Edition 2.0 (2004-07)
10.5	Immunity to surges on a.c. power lines	10.6 of IEC60945:2002	10.6 of IEC60945:2002; IEC61000-4-5 Edition 2.0 (2005-11)
10.6	Radiated emissions from enclosure port	9.3 of IEC60945:2002	9.3 of IEC60945:2002; CISPR16-1
10.7	Conducted emissions	9.2 of IEC60945:2002	9.2 of IEC60945:2002; CISPR16-1

7 Unit/batch inspection

7.1 After CCS type approval certificate has been obtained, the manufacturer is to carry out unit/batch inspection of each navigation light controller and submit the manufacturer inspection test report. CCS surveyor will inspect unit by unit.

7.2 Unit/batch inspection items are to include at least the following: visual inspection, inspection of appearance, identification and process, function test, voltage withstanding test and insulation resistance measurement.