Guideline No.: X-02(201510)

X-02 SINGLE POINT MOORING EQUIPMENT

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Foreword:

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.

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SINGLE POINT MOORING EQUIPMENT

1 Application

1.1 This guideline is applicable to single point mooring equipment installed on liquid cargo carriers.

1.2 Single point mooring equipment mainly consists of fairlead, chain stopper, cable guide (if any) and mooring winch.

1.3 Mooring winch is also to comply with the relevant requirements of guideline for Mooring Winch in addition to the requirements of this guideline.

2.1.4 This guideline does not cover the mooring fittings of the single point mooring equipment, such as the head line, chafing chain, etc.

2 Normative references

2.1 The reference documents for approval and inspection used in this guideline are as follows:

CCS Rules for Classification of Sea-going Steel Ships

CCS Rules for Materials and Welding

CCS Rules for the Construction and Classification of Offshore Single Point Mooring Systems (1996 Edition and Amendment 2013)

CCS Guidelines for Implementation of Oil Industrial Organizations' Requirements for the Structure and Equipment of Liquid Cargo Carriers (2010)

OCIMF "Mooring Equipment Guidelines (3rd Edition 2008)" (hereinafter referred to as MEG3)

2.3 Definitions

3.1 Refer to 3.1.2, Chapter 3, PART ONE of CCS Rules for Classification of Sea-going Steel Ships for the definitions of terms related to product inspection, approval, type test, test specimen and unit/batch inspection.

3.2 For the purpose of this guideline, the definitions are as follows:

(1) Single point mooring: the mooring that allows the moored ship to rotate freely around a single mooring point along with the change of prevailing wind and sea conditions so that the ship is continuously located in a place with minimum combined resistance of wind, wave and current. Sometimes single point mooring unit or single point mooring system is also referred to as single point mooring.

(2) Single point mooring unit: the offshore mooring unit which serves as the connecting link between the subsea pipeline and the moored ship, is generally used to convey fluids (e.g. petroleum, natural gas) and secure ships and has the characteristics of single point mooring.

(3) Single point mooring equipment: the mooring equipment on a ship that may berth alongside the single point mooring unit, which usually includes the fairlead, chain stopper, mooring winch, etc.

4 Drawings and documentation to be submitted

4.1 The following plans and technical data are to be submitted to CCS for review:

(1) General arrangement plan or arrangement diagram of the single point mooring equipment;

(2) General assembly drawing of the single point mooring equipment;

(3) Main parts diagram of the single point mooring equipment;

(4) Summary table of material mechanical and chemical properties of main parts;

(5) Strength calculations;

(6) Manufacturer test program;

(7) Single point mooring equipment description.

5 Materials and components

5.1 Main parts refer to the fairlead, chain stopper, cable guide and the main force-bearing parts of the mooring winch.

5.2 A complete quality system to control the quality of subcontractors' work must be established

by the applicant for the purpose of ensuring quality. The steel plates, castings and forgings of the main force-bearing parts are to be surveyed by CCS.

6 Welding procedure qualification

6.1 Welding procedure qualification test is to be carried out for the welding of the components of single point mooring equipment, including the fairlead, chain stopper, cable guide and the structural members of the mooring winch, in compliance with the relevant requirements of CCS Rules for Materials and Welding.

7 Design and technical requirements

7.1 The single point mooring equipment is to be provided and arranged in accordance with the relevant requirements in Chapter 4 of CCS Guidelines for Implementation of Oil Industrial Organizations' Requirements for the Structure and Equipment of Liquid Cargo Carriers (2010) and Appendix E of MEG3.

7.2 Chain stopper

7.2.1 The chain stopper is to be designed in accordance with the relevant requirements in A.4, Appendix A of CCS Rules for the Construction and Classification of Offshore Single Point Mooring Systems and Appendix E.3 of MEG3.

7.2.2 Bow chain stoppers equipped on ships likely to visit SPMS are to be designed to accept 76mm chafe chain.

7.2.3 If the vessel is fitted with a hydraulically operated bow chain stopper, safeguards are to be provided to prevent its accidental release.

7.2.4 The size, quantity and type of chain stopper are to be determined according to the ship dimensions specified by Appendix E.2 ofMEG3.

7.2.5 The chain stopper is to be identified with permanent marks showing its mooring force bearing capacity and furnished with valid certificate.

7.3 Mooring winch

7.3.1 The mooring winch is to have the ability to lift 15t load and the general requirements for the mooring winch are to be in accordance with 3.7, Chapter 3 Mooring Winch, PART SEVEN.

7.3.2 Winch brakes are to be designed to hold 80% of the line's MBL and have the capability to be adjusted down to 60% of the line's MBL, at which level they are to be set in service.

7.3.3 The primary brake is to be set to hold 60% of the mooring line's MBL. Since brakes may deteriorate in service, it is recommended that new equipment be designed to hold 80% of the line's MBL, but have the capability to be adjusted down to 60% of the line's MBL.

7.3.4 The mooring winch is to be provided with mooring line storage reel having the capacity of storing 150m mooring line of 80mm diameter.

7.3.5 Remote operated winch storage drums may afford some additional whiplash injury protection for the winch operator.

7.4 Fairlead

7.4.1The fairlead is to be designed in accordance with the relevant requirements in A.3, Appendix A of CCS Rules for the Construction and Classification of Offshore Single Point Mooring Systems and Appendix E.3 of MEG3.

7.4.2 All fairleads on liquid cargo carriers are to be of closed type.

7.4.3 The net dimensions of the fairlead opening are to be no less than 600mmX450mm.

7.5 Cable guide

7.5.1 The cable guide of single point mooring equipment, if provided, is to take the structural form of the roller guide with base.

7.5.2The cable guide is to be designed and manufactured in compliance with the requirements of relevant standards.

7.6 Strength calculation for single point mooring equipment

7.6.1 The design load of single point mooring equipment is the minimum breaking load (MBL) of the mooring cable.

7.6.2 The strength of single point mooring equipment is to be calculated by the method complying with the relevant requirements of Appendixes A, B, C and D of CCS Guidelines for Implementation of Oil Industrial Organizations' Requirements for the Structure and Equipment of

Liquid Cargo Carriers (2010) and Appendix E of MEG3.

8 Type test

8.1 Inspection mode

The single point mooring equipment is to be inspection mode of unit/batch inspection and A type approval or B type approval may be selected.

8.2 Selection of typical test specimens

The selected typical specimens for type approval are to cover and represent the types and specifications of products within the scope of approval.

8.3Type test items are generally to include:

(1) Material tests for main parts;

(2) Load test;

(3) Disassembly and inspection.

8.4 The type test items for mooring winch may be executed in accordance with CCS guideline of Mooring Winch,8.2.

9 Single piece/

9.1 The inspection of single point mooring equipment to which CCS marine product certificate has been issued is to cover the following items:

(1) Document review, inspections during manufacturing and load test.

(2) Inspections during manufacturing mainly include material tests, NDT of critical parts (if required), quality inspection of manufacturing and assembly of parts, etc.

9.2 Where the single point mooring equipment has not been type approved by CCS, the inspection items required to obtain CCS marine product certificate are as follows:

(1) Document review and confirmation;

(2) Material tests for main parts;

(3) Load test;

(4) Visual inspection and inspection of minimum breaking load (MBL) marks;

(5) The unit/batch inspection items for mooring winch may be executed in accordance with CCS guideline of Mooring Winch,8.2.

9.3 Where the single point mooring equipment has been type approved by CCS, the unit/batch inspection is to be carried out in accordance with the approved inspection plan. The inspection plan is to include the inspection and test items requiring witness, review and random inspection. These items are to include at least the following items:

(1) Document review and confirmation;

(2) Confirmation of safe working load (SWL);

(3) Visual inspection and inspection of minimum breaking load (MBL) marks;

(4) The type test items for mooring winch may be executed in accordance with CCS guideline of Mooring Winch,9.3.

9.4 In any case, the records and reports to be submitted by the manufacturer to facilitate the inspection qualifying issuance of CCS marine product certificate are to include at least the following items:

(1) Warranty certificates, mechanical and chemical property re-test reports of main materials of the product;

(2) Conformity certificates and other relevant certificates of main purchased parts or the parts manufactured by outsourcing manufacturer;

(3) Manufacturer’s inspection, measurement and test conditions, list of testing and inspection equipment, copies of valid verification certificates of the equipment;

(4) The test reports are to include the type, specifications, serial number of the product or test specimen, test location and test date, test environment, test items and various test data, problems identified during the test and inspection, test conclusions.

9.5 Where adequate test facilities cannot be provided by the manufacturer, the load test may be carried out at the test location which has been approved by CCS and has the required test conditions or carried out after the equipment has been installed on board.