CCS Rule Change Notice For:

RULES FOR CLASSIFICATION OF SEA-GOING STEEL SHIPS

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PART ONE

Brief Introduction

Add relevant class notations according to chapter 12 of Part 3 of the Rules, chapters 30, 31 and 32 of Part 8 of the Rules and CCS *Guidelines for Epidemic Prevention and Control of Ships*.

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CHAPTER 2 SCOPE AND CONDITIONS OF CLASSIFICATION

Appendix 1 LIST OF CLASS NOTATIONS FOR SEA-GOING SHIPS

Special Features Notations **Table E**

Class notation	Description		Technical requirements
PVSED	Passenger and vehicle separated embarkation and disembarkation	Ro-ro passenger ships provided with arrangements of passenger and vehicle separated embarkation and disembarkation	Ch. 30, Pt. 8 of the Rules
ESA	Enhanced Shaft Alignment	This applies to bearings which are white-metal lined and oil lubricated, and ships applying for enhanced shaft alignment (ESA) notation.	Appendix 1 of Ch. 12, Pt. 3 of the Rules
EPC 1	Level 1 Epidemic Prevention and Control	The ship's epidemic prevention and control guarantee function, including daily management, emergency plan, food / domestic water sanitation, air ventilation / purification, environmental disinfection, medical waste treatment, provision of basic medical conditions, isolation of groups of people with different health status on board	*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 2, 3, 4
EPC 2	Level 2 Epidemic Prevention and Control		*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 2, 3, 4
EPC 3	Level 3 Epidemic Prevention and Control		*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 2, 3, 4, 6
SVS	Sanitary Ventilation System	Requirements for air conditioning systems in living and isolation areas, including air pressure difference and high protection level air filter requirements, in order to control the air flow direction and provide pathogen filtering function	*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 4
NPR	Negative Pressure Isolation Room	Technical requirements for the negative pressure isolation room to provide the highest level of capacity to isolate the disease transmission through air / aerosol, for which the EPC 3 class notation is to be obtained	*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 5
HIT	Health Investigation and Thermometry System	Tracking and investigating the movement routes of persons and detecting the body temperature of persons	*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 6
TAS	Telemedicine Assistant System	Shore-based telemedicine assistant system	*Guidelines for Epidemic Prevention and Control of Ships*, Chapter 6

Special Equipment and System Notations **Table G**

VDMS	Video monitoring system	Ships provided with video monitoring system may be assigned this notation	Ch. 31, Pt. 8 of the Rules
NVE	Night vision	Ships provided with night vision equipment may be	Ch. 31, Pt. 8 of the

	equipment	assigned this notation	Rules
EFN-x	Fog navigation enhanced sensing system	Ships provided with fog navigation enhanced sensing system may be assigned this notation, where x is replaced by one of the following: M - manual identification of typical targets; A- intelligent identification of typical targets	Ch. 31, Pt. 8 of the Rules
T-Propulsion	Transverse propulsion system	For ships provided with transverse propulsion arrangement, this notation may be added	Ch. 32, Pt. 8 of the Rules

CHAPTER 5 SURVEYS AFTER CONSTRUCTION

Appendix 21

GUIDELINES FOR PILOT SCHEMES OF EXTENDED INTERVAL BETWEEN SURVEYS IN DRY-DOCK − EXTENDED DRY-DOCKING (EDD) SCHEME

1.2 Application

1.2.3 The following ships and ship types are not eligible for the extended dry-docking scheme described in this Guidelines:

− ships fitted with propulsion thrusters;

1.3 Information to be submitted by the owner

1.3.1 Prior to acceptance into an EDD scheme, the owner is to submit the following information:

(3) maintenance required of thrusters and stabilisers, if fitted, and provision for carrying out surveys or maintenance or as required by the surveyor;

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PART THREE

Brief Introduction

1、Adding shafting alignment calculation requirements by taking into account factors such as alternative methods of hull deflections, propeller hydrodynamics, inclination angle of aftermost stern tube bearing, and technical requirements for enhanced shaft alignment notation for bearing load measurement under the ballast condition.

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CHAPTER 12 SHAFT VIBRATION AND ALIGNMENT

Section 1 GENERAL PROVISIONS

12.1.1.6 In addition to shafting alignment requirements in Section 5 of this Chapter, ships complying with the provisions of Appendix 1 of this Chapter may be assigned the notation ESA upon request.

Section 5 SHAFTING ALIGNMENT

12.5.2.6 The shaft deflection, the bending moments or stresses, shear forces, and angles at different shaft sections, the loads and reaction force influence numbers of bearings obtained during reasonable shafting alignment in both cold and hot conditions are to be submitted. For shafting systems where the propeller shaft has a diameter of 500 mm or greater, or the design of multi-slope aftermost sterntube bearing is used, the shaft deflection, relative angle and bearing loads at the zero rudder angle as a minimum ~~and full rudder angle~~ under rated speed are to be provided, taking into account hydrodynamics of propellers. The calculation results are to comply with the requirements of 12.5.3.2 and 12.5.3.7.

12.5.3.7 For shafting systems where the propeller shaft has a diameter of 500 mm or greater, or the design of multi-slope aftermost sterntube bearing is used, the relative angle between the propeller shaft and the aftermost sterntube bearing at the supporting point of the bearing is not to exceed 3.0×10^{-4} rad in the static condition and in the running condition considering hydrodynamics of propellers. Alternative recognized model technology may be accepted ~~by CCS~~, e.g. multi-point support bearing model or fluid structure three dimensional FE model of interaction between bearing oil film and rotating shaft. Appropriate assumption and recognized modelling methods are to be indicated in the submitted report. The calculated oil film thickness in each analytical condition is not to be less than the minimum thickness value established for the oil film. Such criteria may replace aftermost bearing relative angle criteria.

Appendix 1 ENHANCED SHAFT ALIGNMENT

1 General Provisions

1.1 Application

1.1.1 This Appendix applies to bearings which are white-metal lined and oil lubricated, and ships applying for enhanced shaft alignment (ESA) notation.

2 Calculation Conditions

2.1 When carrying out assessment of reasonable shafting alignment, the following calculation conditions are at least to be considered:

(1) ballast condition in both cold and hot conditions (empty tank and full tank are to be considered for aftpeak tank used as ballast tank);

(2) full load condition in both cold and hot conditions;
(3) ballast condition taking into account hydrodynamic propeller loads (zero rudder angle and full rudder angle under rated speed);
(4) full load condition taking into account hydrodynamic propeller loads (zero rudder angle and full rudder angle under rated speed).

3 Hull Deflections

3.1 Hull deflections are to be obtained by means of FE calculation or measurement data of similar ships (same type, similar ship size, similar double bottom height in engine room, similar sterntube and stern arrangement), and other recognized calculation methods.
3.2 Hull deflections in way of bearing position in the following conditions are to be provided:
(1) floating condition;
(2) ballast condition (empty tank and full tank are to be considered for aftpeak tank used as ballast tank);
(3) full load condition.

4 Hydrodynamic Propeller Loads

4.1 Hydrodynamic propeller loads may be obtained by means of calculation or empirical data.
4.2 In case the data of 4.1 is unavailable, hydrodynamic propeller loads may be selected in accordance with Table 4.2.

Hydrodynamic Propeller Loads Table 4.2

	Zero rudder angle	Full rudder angle
Single screw propulsion	-5% of Q +30% of Q	-30% of Q
Twin screw propulsion	+/-20% of Q	-40% of Q

Note: Q is rated torque;
Positive sign (+) implies upward bending moment;
Negative sign (-) implies downward bending moment.

5 Aftermost Sterntube Bearing Contact Analysis

5.1 The relative angle between the propeller shaft and the aftermost sterntube bearing at the supporting point of the bearing is not to exceed 3.0×10^{-4} rad in the static condition and in the running condition considering hydrodynamics of propellers. Alternative recognized model technology may be accepted, e.g. multi-point support bearing model or fluid structure three dimensional FE model of interaction between bearing oil film and rotating shaft. Appropriate assumption and recognized modelling methods are to be indicated in the submitted report. The calculated oil film thickness in each analytical condition is not to be less than the minimum thickness value established for the oil film. Such criteria may replace aftermost bearing relative

angle criteria.

6 Criteria

6.1 The calculation results of calculation conditions (1) and (2) in paragraph 2 of this Appendix are to satisfy applicable requirements of 12.5.3.1 to 12.5.3.6 of this Chapter.

6.2 The bearing load calculation results of calculation conditions (3) and (4) in paragraph 2 of this Appendix are to satisfy applicable requirements of 12.5.3.2 of this Chapter, and there is to be no voidable bearing load. The aftermost bearing relative angle is to satisfy applicable requirements of paragraph 5 of this Appendix.

7 Survey

7.1 The bearing actual load in cold or hot ballast conditions (empty tank and full tank are to be considered for aftpeak tank used as ballast tank) corresponding to the calculations may be generally measured by means of jack-up tests. The jack-up position is to be the same as the calculations. The actual load is to comply with provisions for bearing loads in 12.5.3.2.

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PART EIGHT

Brief Introduction

1. Relevant technical requirements for one special features notation and four special equipment and system notations are added in conjunction with the latest research results of ship type design and external research and feedback in recent years, as well as the progress of new technology and equipment engineering practical research, in order to improve the safety performance and facilitate the high quality development of ships.

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CHAPTER 31 **NOTATIONS FOR OTHER EQUIPMENT**

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Section 3 NOTATION FOR NIGHT VISION EQUIPMENT

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CHAPTER 32 **Transverse Propulsion arrangement**

Section 1 GENERAL PROVISIONS

Section 2 TRANSVERSE PROPULSION ARRANGEMENT

Section 3 CONTROL,MONITORING AND ALARM

CHAPTER 30 ADDITIONAL PROVISIONS ON THE FUNCTIONALITY OF RO-RO PASSENGER SHIPS

Section 1 GENERAL PROVISIONS

30.1.1 Application

30.1.1.1 This Chapter applies to ro-ro passenger ships applying for the notation specified in 30.1.2.

30.1.2 Notation

30.1.2.1 Upon application, ro-ro passenger ships complying with the relevant requirements of this Chapter may be assigned the notation: PVSED (Passenger and Vehicle Separated Embarkation and Disembarkation).

30.1.3 Definition

30.1.3.1 Variable lane, means an arrangement in which both big vehicle lane and small vehicle lane are marked in the same area, and the use of big vehicle lane or small vehicle lane is decided according to the vehicle condition of each voyage.

30.1.4 Plans and documents

30.1.4.1 In addition to those required in relevant Parts and Chapters of the Rules, the following plans and documents are to be submitted:

(1) Passenger and Vehicle Embarkation and Disembarkation Arrangement (approved);

Section 2 PASSENGER AND VEHICLE EMBARKATION AND DISEMBARKATION ARRANGEMENT

30.2.1 Passenger and vehicle separated embarkation and disembarkation arrangement

30.2.1.1 The ship is to be provided with embarkation and disembarkation access and entrance and exit dedicated to passengers.

30.2.1.2 The ship is to be provided with ramps for embarkation and disembarkation of vehicles.

30.2.1.3 Ro-ro spaces or special category spaces is to be provided with access for drivers to go directly to passenger spaces, and clear width of access is not to be less than 700 mm, in which the inclination angle of stairway is not to be greater than 50°. If the access is used as an escape route, it is also to meet the relevant requirements of the Administration of the flag State.

30.2.1.4 If passengers can only embark on and disembark from the ship through the vehicle ramp due to the limited terminal facilities, clear width of the passenger access is not to be less than 900 mm, and means of isolation that are not easy to be surmounted are to be provided on both sides of the access. Dedicated personnel are to guide passengers and vehicles and maintain order during embarkation and disembarkation. This measure is to be included in the safety management documents on board.

30.2.2 Vehicle deck

30.2.2.1 Upper and lower vehicle decks are to be connected by fixed or movable ramps.

30.2.2.2 Where terminal facilities are provided with multi-tier vehicle and/or passenger separated access, on-board vehicle and/or passenger decks are also to be provided with docking facilities with corresponding access of the terminal(if applicable).

30.2.3 Lane arrangement

30.2.3.1 Dedicated lanes in ro-ro spaces or special category spaces are to be clearly marked.

30.2.3.2 The arrangement of variable lanes is acceptable.

30.2.3.3 Where big vehicle and small vehicle dedicated lanes are arranged in vehicle decks or some areas, such lanes are to be clearly marked with different colors and lines.

30.2.4 Lane width

30.2.4.1 Width of small vehicle lanes is not to be less than 2.4 m, and width of big vehicle lanes is not to be less than 3 m.

CHAPTER 31 NOTATIONS FOR OTHER EQUIPMENT

Section 1 GENERAL PROVISIONS

31.1.1 General requirements

31.1.1.1 The provisions of this Chapter are voluntary and optional, which apply to ships with various special equipment.

Section 2 NOTATION FOR VIDEO MONITORING SYSTEM

31.2.1 Notation

31.2.1.1 Upon application, a ship provided with equipment complying with the requirements of this Section may be assigned the following notation: VDMS(video monitoring system).

31.2.2 Definitions

31.2.2.1 For the purpose of this Section, the following definitions apply:

(1) Video detection means a kind of detection method to perceive the object by photoelectric imaging technology (from near-infrared to the limit of visible spectrum) and to form video picture signals.

(2) Video monitoring means to monitor the object by adopting with video method and to record object information.

(3) Video transport means or from one equipment to another one directly or through modulation demodulation by adopting with the wire or wireless transmission medium.

(4) Video switcher means the video controller, which is the core device of the operation and controlling of the video system and generally is able to complete the video switching and the controlling of cradle head and lens, etc.

(5) Front-end device means all kinds of equipment distributed on the detection site. In this system, it usually refers to the video camera as well as its relevant matching devices (such as lens, cradle head, decoding driver, shield, etc.).

(6) Video motion alarm means a means of alarm that uses video detection technology to detect changes in scene images and sends out alarm information once the set threshold is reached.

(7) Video signal loss alarm means a system function, i.e. when the video switcher monitors the video signal from the front end, once the peak value of the video signal is less than the set value, the system will consider the video signal loss and provide alarm information.

31.2.3 Plans and documents

31.2.3.1 The following plans are to be submitted for approval:

(1) Electrical system diagram of video monitoring system;

(2) Electrical equipment arrangement plan of video monitoring system.

31.2.4 General requirements

31.2.4.1 Ship video monitoring system is generally composed of four main parts, i.e. front-end device, transport device, control and record display device.

31.2.4.2 The front-end device can be divided into separate combined camera or integrated camera.

31.2.4.3 Control and record display device can be separated or integrated.

31.2.5 Video detection front-end device

31.2.5.1 Video detection front-end device is to be able to clearly and effectively detect and identify pictures of important locations, covering areas such as navigation bridge, engine room, public spaces, corridors and stairways (passenger ship), special category and ro-ro spaces, fire control stations, etc.

31.2.5.2 Video detection front-end device is to be able to adapt to the lighting conditions of the site. When the illumination of the site cannot meet the requirements for clear detection, the equipment is to be provided with night vision function or auxiliary lighting equipment.
31.2.5.3 The enclosure protection grade and certified safe type (if applicable) of the video detection front-end device is to be appropriate to the space where it is installed.

31.2.6 Video monitoring system

31.2.6.1 The video monitoring system is to have automatic storage function, not causing loss of stored data in case of power off or shutdown.
31.2.6.2 The video monitoring system for ro-ro spaces is to monitor the front-end video signal and give a video motion alarm.
31.2.6.3 The video monitoring system is to give a video signal loss alarm at the display terminals, and this alarm is auditory and visual.
31.2.6.4 The video monitoring system is to be able to store monitoring records for at least 30 days.
31.2.6.5 The video monitoring system is to have ports for networking and remote operation and invocation.

Section 3 NOTATION FOR NIGHT VISION EQUIPMENT

31.3.1 Notation

31.3.1.1 Upon application, a ship provided with equipment complying with the requirements of this Section may be assigned the following notation: NVE (night vision equipment).

31.3.2 Definition

31.3.2.1 For the purpose of this Section:
(1) Night vision equipment means any technical means enabling the position and aspect of objects above the water surface relative to the ship to be detected at night.

31.3.3 Plans and documents

31.3.3.1 The following plans and documents are to be submitted for approval:
(1) Electrical system diagram of night vision equipment;
(2) Electrical equipment arrangement plan of night vision equipment.

31.3.4 General requirements

31.3.4.1 Night vision equipment① facilitates the detection at night of hazards to navigation above the water surface, thus providing essential information to the navigator for collision avoidance and safe navigation.

31.3.5 Technical requirements

31.3.5.1 Night vision equipment is to be capable of detecting objects within a certain distance from the ship, and of displaying the information pictorially in real time, to assist in collision avoidance and safe navigation.
31.3.5.2 Night vision equipment is to be operational in less than 15 min after the equipment has been switched on, and is to be capable of continuous operation from after sunset until before sunrise.
31.3.5.3 The controls of night vision equipment are to be installed in the work area for navigating and manoeuvring, within easy reach of the navigator. For any failure of the night vision equipment, a visual indication is to be provided on the navigation bridge.
31.3.5.4 The operational controls of night vision equipment are to be clearly identifiable in the dark. If illumination is used, the brightness is to be adjustable.

①Refer to Annex of resolution MSC.94(72) Recommendation on Performance Standards for Night Vision Equipment for High Speed Craft (HSC).

Section 4 NOTATION FOR FOG NAVIGATION ENHANCED SENSING

31.4.1 Notation

31.4.1.1 Upon application, a ship provided with equipment complying with the requirements of this Section may be assigned the following notation: EFN-M (fog navigation enhanced sensing system - manual identification) and EFN-A (fog navigation enhanced sensing system - intelligent identification).

31.4.2 Definitions

31.4.2.1 For the purpose of this Section:

(1) Typical target identification means the cognition of target characteristics of ships, buoys, shorelines, islands, reefs, etc. Target characteristics are to at least include target position, speed, heading, category, encounter distance, encounter time, movement trend, etc.

(2) Visual fog penetration means the use of optical fog penetration, software fog penetration, thermal imaging and other technologies to detect and identify typical targets in the navigation environment. These targets are visually displayed on the display unit, and the navigator or intelligent system can effectively identify typical targets.

(3) Image identification function means identification using computer programs or algorithms based on the image or thermal imaging of typical targets, by means of of machine learning and other artificial intelligence technologies.

(4) Data fusion function means the automatic fusion of visual fog penetration data and traditional navigation sensing data through computer programs or algorithms for comprehensive identification of typical targets, such as radar echo of collision-avoiding targets, automatic identification instrument, and superposition of image data.

(5) Cradle head means the supporting equipment installed with fog penetration sensor to provide stability function and ensure the stability of target detection during ship navigation.

(6) Fog penetration sensor means the camera or heat source probe with fog penetration function,.

(7) Control and data processing unit means the control, data collection, storage and processing of visual fog penetration equipment based on computer technology, which can access the data of traditional navigation sensing equipment, realize image identification and data fusion, continuously detect the operational state of the equipment, and provide man-machine operation interface.

(8) Fault alarm means the alarm information given when the performance of fog navigation enhanced sensing system is significantly reduced or fails.

(9) Traditional navigation sensing equipment means the detection equipment for navigation environment and collision-avoiding targets provided according to the requirements of the existing conventions and rules, such as radar, electronic chart display and information system, automatic identification instrument, etc.

(10) Intelligent identification means identification of the fused data of typical targets by use of artificial intelligence technology or automation technology.

(11) Visibility means the maximum horizontal distance a person with normal vision can see the outline of a target clearly in prevailing weather conditions.

31.4.3 Plans and documents

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

(1) Electrical system diagram of fog navigation enhanced sensing system;

(2) Electrical equipment arrangement plan of fog navigation enhanced sensing system.

31.4.4 General requirements

31.4.4.1 Fog navigation enhanced sensing system is based on optical fog penetration, software fog penetration, thermal imaging, image identification and other technologies. By filtering the impact of haze and fog, smoke and soot, rain and snow on vision, it identifies collision-avoiding targets and reduces collision risk.

31.4.4.2 Fog navigation enhanced sensing system can effectively make up for the defect of navigator's vision in the fog condition, i.e. not being able to effectively find collision-avoiding targets at a long distance.
31.4.4.3 Visual fog penetration equipment is composed of fog penetration sensor, control and data processing unit and display unit.
31.4.4.4 Fog navigation enhanced sensing system is composed of traditional navigation sensing equipment and visual fog penetration equipment, realizing one of the following two functions.
(1) The navigator integrates the data of two types of equipment to manually identify typical targets, i.e., EFN-M;
(2) On the basis of (1), the system can carry out image identification and display for typical targets, and carry out intelligent identification for fusion data of typical targets, i.e., EFN-A.

31.4.5 Technical requirements

31.4.5.1 The fog navigation enhanced sensing system is to have video fog penetration function as a minimum, and the following advanced functions may also be provided:
(1) image identification function;
(2) data fusion function.
31.4.5.2 Video fog penetration can be realized by one or more fog penetration technologies such as optical fog penetration, software fog penetration and thermal imaging.
31.4.5.3 The application environment of fog navigation enhanced sensing system is haze and fog, smoke and soot, rain and snow as well as other typical marine environment.
31.4.5.4 The camera of video fog penetration is to have optical zoom function.
31.4.5.5 The effective distance of the fog navigation enhanced sensing system is to be not less than 1 nautical mile, including at night.
31.4.5.6 The fog penetration sensor can rotate at least 180°in the horizontal direction and is to be adjustable; the maximum horizontal rotation speed is above 20°/S and adjustable; the detection range in the vertical direction is to be at least +60~-60° and adjustable; the maximum vertical rotation speed is above 20°/S and adjustable. The fog navigation enhanced sensing system shall be able to operate normally in the visibility of 0.28 nautical mile to 0.55 nautical miles, and the operating distance shall be greater than 1 nautical mile, including the dark environment.
31.4.5.7 Video fog penetration camera is to have not less than 2 million pixels. The resolution of the thermal sensor is not to be less than 320×240.
31.4.5.8 On the basis of visual fog penetration, the image identification function can in general automatically identify typical targets such as ships, buoys, shorelines, islands and reefs.
31.4.5.9 The data fusion function needs to fuse the following data, and achieve the artificial identification by navigator or intelligent identification by system of typical targets:
(1) automatic identification instrument data;
(2) electronic chart data;
(3) information of other ships, such as position, heading, speed and encounter distance;
(4) information of other obstacles, such as position, relative direction, relative speed;
(5) navigation radar data;
(6) data of visual fog penetration equipment.
31.4.5.10 The fog navigation enhanced sensing system is to meet the following design principles of bridge equipment:
(1) assisting bridge staff and pilots to perform navigation tasks;
(2) promoting effective and safe management of bridge resources;
(3) enabling bridge staff and pilots to conveniently and continuously obtain important information;
(4) indicating the working state of fog navigation enhanced sensing system;
(5) enabling bridge staff and pilots to process information and make decisions quickly, continuously and effectively;
(6) preventing or minimizing unnecessary work in the bridge that may lead to fatigue of staff and pilots, decreased vigilance and other factors, such as distractive affairs;
(7) identifying and reducing the risk of human error to the maximum extent through monitoring and alarm system, so that bridge staff and pilots can take corresponding actions in a timely manner;
(8) effective maintenance, such as maintenance manual, maintenance plan, etc.
31.4.5.11 The fog navigation enhanced sensing system is to have the functions of self-inspection

and alarm, and can provide continuous monitoring during normal operation of the equipment. When the equipment performance is significantly reduced or failure is detected, the system is to be able to send prompt alarm and fault information.

31.4.5.12 The fog navigation enhanced sensing system shall have an interface connected to the ship voyage recorder.

CHAPTER 32 TRANSVERSE PROPULSION ARRANGEMENT

Section 1 GENERAL PROVISIONS

32.1.1 Application

32.1.1.1 This Chapter applies to ships provided with transverse propulsion arrangement and applying for the T-Propulsion notation.

32.1.1.2 Certification requirements and inspections of products with regard to transverse propulsion arrangement are to comply with relevant provisions of Chapter 3, PART ONE of the Rules.

32.1.2 Notation

32.1.2.1 Ships provided with transverse propulsion arrangement complying with the provisions of this Chapter may be assigned the notation: T-Propulsion.

32.1.3 Definition

32.1.3.1 Transverse propulsion arrangement is a special propelling unit fitted in the transverse duct below the waterline at the ship's bow or stern.

32.1.4 Plans and documents

32.1.4.1 The following plans and documents are to be submitted for approval or information:

(1) arrangement plan of transverse propulsion arrangement (for information);

(2) plan of piping system of hydraulic system (where fitted);

(3) plan of piping system of lubricating oil (where fitted);

(4) plan of electrical system of transverse propulsion arrangement;

(5) list of control, monitoring and alarm.

Section 2 TRANSVERSE PROPULSION ARRANGEMENT

32.2.1 General requirements

32.2.1.1 Transverse propulsion arrangement is to have sufficient transverse thrust to satisfy the working requirements of navigation at low speed and docking and leaving wharf.

32.2.1.2 Material and test of transverse propulsion arrangement and its components are to comply with the relevant requirements of CCS Rules for Materials and Welding.

32.2.1.3 Diesel engines driving transverse propulsion arrangement are to comply with the relevant requirements in Chapter 9, PART THREE of the Rules.

32.2.1.4 Motor and distribution system of driving transverse propulsion arrangement are to comply with the relevant requirements in PART FOUR of the Rules.

32.2.1.5 The design of shafting together with its parts and propeller is to comply with the relevant requirements of Chapter 11, PART THREE of the Rules.

32.2.1.6 The thickness of tunnel of transverse propulsion arrangement is not to be less than the adjacent part of the hull.

32.2.1.7 The shaft sealing box is to be installed to prevent water so as to protect steel shafts from

sea water.

32.2.1.8 For installed corrosion prevention of cylinders, means of cathodic protection or corrosion prevention materials are to be provided.

32.2.2 Hydraulic transmission piping system (where fitted)

32.2.2.1 After being assembled as a set, the pipe lines and pressure elements of hydraulic transmission system and control system for controllable pitch propellers are to be subject to tightness test to a pressure of 1.25 times the design pressure. There is to be no leakage in way of permanent sealing and pipe joints.

32.2.2.2 Materials, piping systems and arrangement of hydraulic transmission piping system are to comply with applicable requirements of Section 7, Chapter 4, PART THREE of the Rules.

32.2.3 Lubricating oil piping system (where fitted)

32.2.3.1 Lubricating oil system and tank arrangement are to comply with applicable requirements of Chapters 3 and 4, PART THREE of the Rules.

Section 3 CONTROL, MONITORING AND ALARM

32.3.1 General requirements

32.3.1.1 Control, monitoring and alarm of the transverse propulsion arrangement are, in addition to requirements of this Chapter, to comply with relevant requirements of PART SEVEN of the Rules.

32.3.1.2 It is to be possible to stop the transverse propulsion arrangement from the bridge by means of a system independent of the remote control system.

32.3.1.3 The transverse propulsion arrangement is to be provided with indications, individual or groupwise alarms specified in Table 32.3.1.3.

Alarm and monitoring Table 32.3.1.3

Item	Indication	Alarm
Overload of prime mover and servo unit		X
Power failure of remote control system		X
Power failure of alarm system		X
Level in lubrication oil tank (if fitted)		Low
Lubrication oil pressure (if forced lubrication		Low

oil system)		
Level in hydraulic daily service tank (where applicable)		Low
Pressure in hydraulic system		Low
Running and stop of prime mover	X	
Propeller pitch for controllable pitch propeller plants	Propeller pitch	
Direction of rotation for fixed propeller plants;	Direction of rotation	
r.p.m. for fixed propeller plants	r.p.m.	

32.3.1.4 Where the ship applies for the dynamic positioning notation at the same time, the transverse propulsion arrangement is to be provided with alarms and indications complying with Chapter 11, PART EIGHT of the Rules in the dynamic positioning control station.