



CCS Rule Change Notice For:
RULES FOR CLASSIFICATION OF SEA-GOING STEEL
SHIPS

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CCS Rule Change Notice For:
RULES FOR CLASSIFICATION OF SEA-GOING STEEL
SHIPS

PART ONE

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CHAPTER 2 SCOPE AND CONDITIONS OF CLASSIFICATION

Appendix 1 LIST OF CLASS NOTATIONS FOR SEA-GOING SHIPS

Type Notations

Table A

Class notation	Description			Technical requirements ^①
Wave Pierce Craft	Wave piercing craft	A special type of catamaran high speed craft with large aspect ratio and small waterplane area	HSC are ships with maximum speed not less than $3.7 \nabla^{0.1667}$ m/s. For passenger ships as defined in 2.1.3.1(18) of Rules for Construction and Classification of Sea-Going High Speed Craft, the service notation Passenger A is to be added after type notation and where such ships are fitted with ro-ro spaces or special category spaces, the notation Ro-Ro Passenger A is to be added.	Rules for Construction and Classification of Sea-Going High Speed Craft
Air Cushion Craft	Air cushion craft	High speed craft wholly supported by air cushion		
Surface Effect Ship	High speed surface effect craft (side wall hovercraft)	High speed craft with its air cushion being totally or partially retained by permanently immersed hard structure		
Trimaran HSC	High speed trimaran craft	A vessel with three hulls of displacement form, a main centre hull stabilized by two much smaller side hulls, connected by connection bridge	For passenger ships as defined in 2.1.3.1(19) of Rules for Construction and Classification of Sea-Going High Speed Craft, the service notation Passenger B is to be added after type notation and where such ships are fitted with ro-ro spaces or special category spaces, the notation Ro-Ro Passenger B is to be added.	
Catamaran HSC	High speed catamaran craft	High speed craft with upper parts of two parallel hulls being connected by strength framing		
Mono-Hull HSC	High speed mono-hull craft	High speed craft with a single hull	For high speed cargo craft, the notation Cargo is to be added after type notation.	
Hydrofoil Craft	Hydrofoil craft	Ships supported completely clear above water surface in non-displacement mode by hydrodynamic forces generated on foils	High speed craft the main hull of which is made of fiber reinforced plastics and aluminum alloy materials may be assigned the class notation "FRP" and "ALY" respectively	

Special Features Notations

Table E

Class notation	Description		Technical requirements
Specific Communication Network (Px,Rx)	Ship communication networks satisfying specific needs	The specific communication needs such as passenger using the Internet and remote survey are realized through the arrangement of ship communication network equipment on board, based on hosting modes of communication networks such as satellite broadband communication network and 4G or 5G cellular communication network. The specific meanings are as follows: P - network provided for passengers to satisfy the	Chapter 33, Pt. 8 of the Rules

① The technical requirements listed in this Table are the basic ones for ships assigned to the notation; in other special cases involving ship types, special consideration is to be given by CCS according to the ship's specific conditions.

Class notation	Description		Technical requirements
		daily communication needs of passengers to use the Internet (Passenger). R - network provided for crew to satisfy the communication needs for ship remote survey (Remote). x - additional notations for hosting modes of ship communication networks. Each small letter indicates one hosting mode. The ship communication network satisfying one specific need may be realized by one or more hosting modes, which may be assigned one or more additional notations where: s - ship communication network realized by satellite broadband communication network. c - ship communication network realized by 4G or 5G cellular communication network	
COLL	Evaluation of collision resistance capability of ships	This notation may be assigned to ships for which the evaluation of collision resistance capability is carried out to side structures of sea-going ships in accordance with the relevant requirements of “evaluation of collision resistance capability of ships”	Chapter 34, Pt. 8 of the Rules
SAF	Hull structure fatigue strength assessment taking into account linear springing	This notation may be assigned to large ships subject to hull structure fatigue strength assessment taking into account linear springing in accordance with the relevant technical requirements of the Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships satisfying the relevant requirements in 1.1.3, Appendix A of Rules for Structures of Container Ships, hull structure fatigue strength assessment taking into account linear springing is carried out, and this notation is mandatory	Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Appendix A of Rules for Structures of Container Ships
SWAF	Hull structure fatigue strength assessment taking into account whipping and springing	This notation may be assigned to large ships subject to hull structure fatigue strength assessment taking into account whipping and springing in accordance with the relevant technical requirements of the Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships satisfying the relevant requirements in 1.1.3, Appendix A of Rules for Structures of Container Ships, hull structure fatigue strength assessment taking into account whipping and springing is carried out, and this notation is mandatory	Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Appendix A of Rules for Structures of Container Ships
WAU	Hull girder ultimate strength assessment taking into account whipping	This notation may be assigned to large ships subject to hull girder ultimate strength assessment taking into account whipping in accordance with the relevant technical requirements of the Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships satisfying the relevant requirements in 1.1.3, Appendix A of Rules for Structures of Container Ships, hull girder ultimate strength assessment taking into account whipping is carried out, and this notation is mandatory	Guidelines for Direct Calculation Assessment of Springing and Whipping of Hull Structures Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Appendix A of Rules for Structures of Container Ships

Class notation	Description		Technical requirements
FL	Minimum design fatigue life	Where a ship is designed for a minimum design fatigue life of 25 years or more, the class notation FL may be assigned at 5-year intervals starting from the 25th year, e.g. FL (25), FL (30) <i>Note: for container ships engaged in unrestricted service and of 150 m and over in length, this notation is mandatory, with suffix (XX, YY) added as follows:</i> <i>XX - wave environmental conditions of ship operation, WW is taken for the environmental condition based on global wave spectrum and NA is taken for the environmental condition based on North Atlantic wave spectrum;</i> <i>YY - fatigue design life, in year; the minimum design fatigue life is 25 years, which may be taken at 5-year intervals starting from the 25th year.</i> <i>E.g., FL(NA, 25) means that design life of 25 years under North Atlantic wave environment</i>	Guidelines for Fatigue Strength of Ship Structure <i>Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Chapter 10 of Rules for Structures of Container Ships</i>
SFA	Spectrum-based fatigue strength assessment	This notation <u>is optional and</u> applies to large membrane tank LNG carriers, container ships and ore carriers. Class notation SFA (XX, YY) may be assigned to the above-mentioned ship types after assessment in accordance with the <u>relevant technical requirements</u> Guidelines for Spectrum-based Fatigue Strength Assessment of Hull Structure and requirements are met. XX refers to environmental condition (e.g.: NA refers to North Atlantic Ocean, see IACS Rec.34 for scatter diagram), YY refers to design life (year), may be taken as 20, 25, 30, 35 or 40. <i>Note: for container ships engaged in unrestricted service and of 150 m and over in length, the suffix is explained as follows:</i> <i>XX - wave environmental conditions of ship operation, WW is taken for the environmental condition based on global wave spectrum and NA is taken for the environmental condition based on North Atlantic wave spectrum;</i> <i>YY - fatigue design life, in year; the minimum design fatigue life is 25 years, which may be taken at 5-year intervals starting from the 25th year</i>	Guidelines for Spectrum-based Fatigue Assessment of Hull Structure <i>Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Appendix 1, Chapter 10 of Rules for Structures of Container Ships</i>
GFE	Global finite element strength assessment	(1) The class notation is mandatory for container ships complying with one of the following conditions: 1) Length L greater than 250 m; 2) Hatch breadth of strength deck greater than 0.89B; 3) Unconventional structural arrangement. (2) The class notation is optional for other container ships	Chapter 8 of Rules for Structures of Container Ships
Underwater Noise N	Underwater radiated noise for ships relying on hydro-acoustic equipment to perform the essential service function	For ships relying on hydro-acoustic equipment to perform the essential service function, the class notation for underwater radiated noise can be assigned if the measured underwater noise meet the requirements. N means underwater radiated noise level, N=1, 2 or 3, in which 1 represents the highest level of underwater radiated noise. Note: to be effective when the Guidelines for	Guidelines for Underwater Radiated Noise of Ships

Class notation	Description	Technical requirements
	Underwater Radiated Noise of Ships enter into force	

Special Equipment and System Notations

Table G

Class notation	Description	Technical requirements
CLC	Lashing calculation programme of containers Ships provided with onboard container lashing calculation programme may be assigned this notation. This notation is optional and suffixes V, W may be added. Meanings of the suffixes are as follows:: V - specified voyage. Ships applying for securing of containers for specified voyage may be assigned the CLC (V) notation; W- specified weather. Ships applying for securing of containers for specified weather may be assigned the CLC (V, W) notation on the basis of CLC (V)	Appendix 1 of Ch. 7, Pt. 2 of the Rules <i>Note: for container ships engaged in unrestricted service and of 150 m and over in length, in accordance with Chapter 12 of Rules for Structures of Container Ships</i>
Ammonia Fuel	Using ammonia as fuel This notation is assigned to ships the main propulsion of which uses ammonia as fuel	Guidelines for Ships Using Ammonia as Fuel
AFD Ready 1	Principled plan design and approval are carried out to ammonia fuel power system ready	
AFD Ready 2	Detailed plan design and approval are carried out to ammonia fuel power system ready	
AFD Ready 2(X)	Based on satisfying the requirement of AFD Ready 2, equipment or system related to ammonia fuel power system have been fitted on board. The X stands for one or more added suffixes, which refers to: ① The letter S in capital means that relevant hull structure and the supporting structure of ammonia fuel tank have been strengthened; ② The letter T in capital means that ammonia fuel tank and containment system have been fitted; ③ The letter E in capital means that the main propulsion engine using ammonia fuel has been fitted; ④ The letter P in capital means that ammonia fuel piping system has been fitted; ⑤ The letter H in capital means that electrical equipment within relevant hazardous areas of ammonia fuel power system meets the corresponding explosion-proof requirements	
FC-FULL	Pure fuel cell power A ship is only provided with FC power installations without any other main power, such as any main engine/main generating set/power battery. The FC power installations supply power to the ship's electrical equipment	
FC-POWER 1	Fuel cell power A ship is provided both FC power installations and other main power (any main engine/main generating set/power battery etc.), and the former, as part of the main source of electrical power of the ship, supplies power to the ship's electrical equipment	Guidelines for Ships Using Fuel Cell Power Installations
FC-POWER 2	A ship is provided both FC power installations and other main power (any main engine/main generating set/power battery etc.), and the former, not as part of the ship's main generator, supplies power to the ship's electrical equipment	

Class notation	Description		Technical requirements
HFC Ready 1	Hydrogen fuel cell ready	Principled HFC power installations ready plan design and approval have been carried out to ensure that the ship complies with basic requirements for using HFC power installations in the future, and equipment and system related to HFC power installations are not fitted on board	
HFC Ready 2		Detailed HFC power installations ready plan design and approval have been carried out to ensure that the intended HFC power installations can satisfy relevant requirements of the Guidelines, and equipment and system related to HFC power installations are not fitted on board	
HFC Ready 2(X)		Based on satisfying the requirement of HFC Ready 2, equipment or system related to HFC power installations have been partially fitted on board, subject to CCS survey and approval. The suffix X refers to: ① The letter S in capital means that relevant hull structure has been strengthened and the supporting members of hydrogen fuel tanks/hydrogen cylinders have been fitted; ② The letter P in capital means that the piping system of hydrogen fuel has been fitted; ③ The letter FC in capital means that the cell module of hydrogen fuel has been fitted; ④ The letter D in capital means that the classification of all the hazardous areas related to HFC power installations has been considered and the electrical equipment within the above areas meets the corresponding explosion-proof requirements	
Methyl/ Ethyl Alcohol Fuel	Using methyl/ethyl alcohol as fuel	This notation is assigned to ships the main propulsion and/or auxiliary machinery of which use methyl/ethyl alcohol as fuel	Guidelines for Ships Using Methyl/Ethyl Alcohol as Fuel
M/E FR (X₁,..., X_N)	Methyl/ethyl alcohol fuel ready	This notation is assigned to ships adopting a ready plan of methyl/ethyl alcohol fuel, where the meaning of X_N is as follows: S: the hull structure has been strengthened in accordance with the relevant requirements; T: methyl/ethyl alcohol fuel containment system and its supporting structure have been fitted; F: methyl/ethyl alcohol fuel bunkering station and bunkering system have been fitted; P: methyl/ethyl alcohol fuel pipelines and related systems have been fitted, or the relevant requirements for the design and arrangement of methyl/ethyl alcohol fuel pipelines for future modification have been fully considered; M: the main engine fitted during ship construction is a dual-fuel engine; m: the main engine fitted during ship construction may be retrofitted as/replaced with methyl/ethyl alcohol engine in the future; A: the auxiliary engine fitted during ship construction is a dual-fuel engine; a: the auxiliary engine fitted during ship construction may be retrofitted as /replaced with methyl/ethyl alcohol engine in the future; B: the boiler fitted during ship construction is a dual-fuel boiler; b: the boiler fitted during ship construction may be retrofitted as methyl/ethyl alcohol boiler in the future; FC: due consideration has been given to relevant	

Class notation	Description		Technical requirements
		<u>requirements for arrangement and fitting of methyl/ethyl alcohol fuel cell system during modification;</u> <u>E: the power distribution system of equipment related to methyl/ethyl alcohol fuel power system has been reserved during ship construction;</u> <u>D: hazardous areas have been considered during ship construction;</u> <u>C: due consideration has been given to control, monitoring and safety systems of methyl/ethyl alcohol fuel during ship construction</u>	

CHAPTER 4 SURVEYS DURING CONSTRUCTION

Appendix 2 SHIPBUILDING AND REPAIR QUALITY STANDARD

1 Shipbuilding and Remedial Quality Standards for New Construction

1.1 Scope

It is intended that these standards provide guidance where established and recognized shipbuilding or national standards accepted by CCS do not exist.

1.1.3 The standard covers typical construction methods and gives guidance on quality standards for the most important aspects of such construction. Unless explicitly stated elsewhere in the standard, the level of workmanship reflected herein will in principle be acceptable for primary and secondary structure of conventional designs. A more stringent standard may however be required for critical and highly stressed areas of the hull, and this is to be agreed with CCS in each case. In assessing the criticality of hull structure and structural components, reference is made to References 1.1, 1.2, 1.3, 1.11, 1.13, 1.14, 1.15, ~~and 1.16,~~ 1.19 and 1.21 to this Section.

1.3 Qualification of personnel and procedures

1.3.1 Qualification of welders

1.3.1.1 Welders are to be qualified in accordance with UR W32 (Reference 1.18) or other recognized standard accepted by CCS ~~the procedures of CCS or to a recognized national or international standard.~~ Recognition of other standards is subject to submission to CCS for evaluation. Subcontractors are to keep records of welders qualification and, when required, furnish valid approval test certificates.

1.3.3 Qualification of NDT operators

1.3.3.1 Personnel performing non-destructive testing for the purpose of assessing quality of welds in connection with new construction covered by this standard, are to be qualified in accordance with CCS rules or to a recognized international or national qualification scheme. Records of operators and their current certificates are to be kept and made available to the Surveyor for inspection.

In case of non-destructive examination carried out by an independent firm from the shipbuilder, such firm has to comply with UR W35 (Reference 1.20).

1.4 Materials

1.4.1 Materials for Structural Members

1.4.1.1 All materials, including weld consumables, to be used for the structural members are to be approved by CCS as per the approved construction drawings and meet the respective IACS Unified Requirements (References 1.4, 1.5, 1.6, 1.7, 1.8, ~~and 1.9~~ and 1.17 to this Section). Additional recommendations are contained in the following paragraphs.

1.4.2 Surface Conditions

1.4.2.2 Acceptance without remedies

(3) For isolated surface discontinuities, influenced area is obtained by drawing a continuous line which follows the circumference of the discontinuity at a distance of 20 mm (Figure 1).

(4) For surface discontinuities appearing in a cluster, influenced area is obtained by drawing a continuous line which follows the circumference of the cluster at a distance of 20 mm (Figure 2).

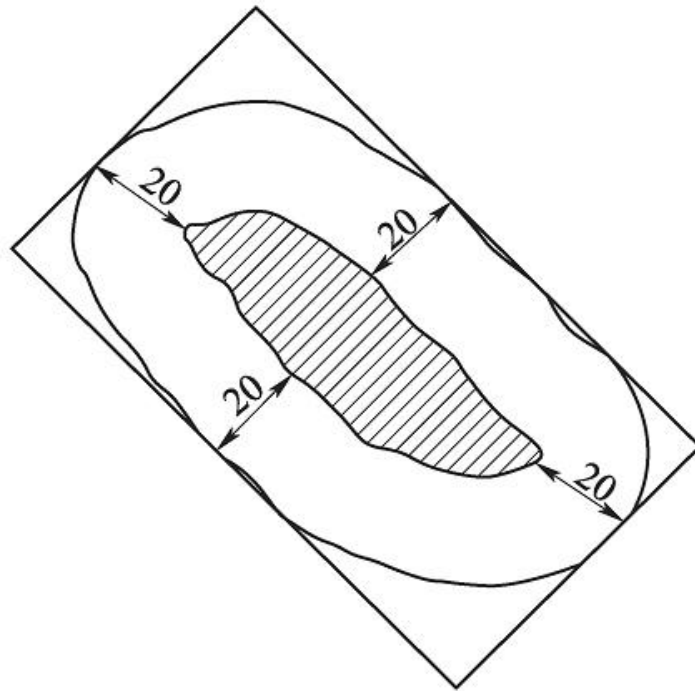


Figure 1 - Determination of the area influenced by an isolated discontinuity
 (Ref. Nr. EN 10163-1:2004+AC:2007-E)

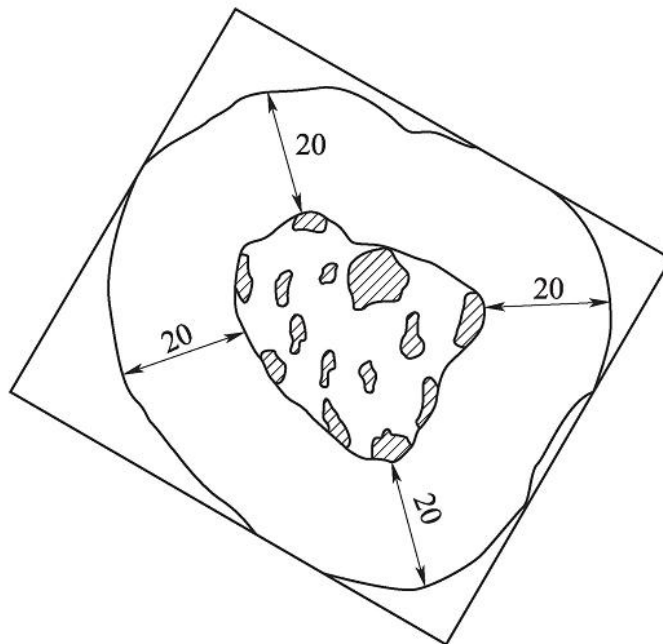


Figure 2 - Determination of the area influenced by clustered discontinuities
 (Ref. Nr. EN 10163-1:2004+AC:2007-E)

References:

- 1.1 IACS Recommendation No.76 "Bulk Carriers - Guidelines for Surveys, Assessment and Repair of Hull Structure"
- 1.2 TSCF "Guidelines for the inspection and maintenance of double hull tanker structures"
- 1.3 TSCF "Guidance manual for the inspection and condition assessment of tanker structures"
- 1.4 IACS UR W7 "Hull and machinery steel forgings"
- 1.5 IACS UR W8 "Hull and machinery steel castings"
- 1.6 IACS UR W11 "Normal and higher strength hull structural steel"

- 1.7 IACS UR W13 “Thickness tolerances of steel plates and wide flats”
- 1.8 IACS UR W14 “Steel plates and wide flats with specified minimum through thickness properties (“Z” quality)”
- 1.9 IACS UR W17 “Approval of consumables for welding normal and higher strength hull structural steels”
- 1.10 IACS UR W28 “Welding procedure qualification tests of steels for hull construction and marine structures”
- 1.11 IACS UR Z10.1 “Hull surveys of oil tankers”, Z10.2 “Hull surveys of bulk carriers”, Z10.3 “Hull surveys of chemical tankers”, Z10.4 “Hull surveys of double hull oil tankers” and Z10.5 “Hull surveys of double skin bulk carriers” Annex I
- 1.12 IACS UR Z23 “Hull survey for new construction”
- 1.13 IACS UR W33 “Non-destructive testing of ship hull steel welds”
- 1.14 IACS Recommendation No.96 “Double Hull Oil Tankers - Guidelines for Surveys, Assessment and Repair of Hull Structures”
- 1.15 IACS Recommendation No.55 “General Dry Cargo Ships - Guidelines For Surveys, Assessment and Repair of Hull Structures”
- 1.16 IACS Recommendation No.84 “Container Ships - Guidelines for Surveys, Assessment and Repair of Hull Structures”
- [1.17. IACS UR W31 “YP 47 Steels and Brittle Crack Arrest Steels”](#)
- [1.18. IACS UR W32 “Qualification scheme for welders of hull structural steels”](#)
- [1.19. IACS UR W34 “Advanced non-destructive testing of materials and welds”](#)
- [1.20. IACS UR W35 “Requirements for NDT Suppliers”](#)
- [1.21. IACS UR S33 “Requirements for Use of Extremely Thick Steel Plates in Container Ships”](#)

Standards

[1 EN 10163-1:2004 Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 1: General requirements](#)

2 Repair Quality Standard for Existing Ships

2.1 Scope

[2.1.4 IACS UR W33 \(Reference 2.8\) scope is for new construction only, however, for the purpose of NDT applicability within this Appendix, UR W33 may be used as reference for NDT methods and acceptance standards.](#)

2.3 Qualification of personnel

2.3.1 Qualification of welders

2.3.1.1 Welders are to be qualified in accordance with [IACS UR W32 \(Reference 2.13\) ~~the procedures of CCS~~](#) or to a recognised national or international standard, e.g. [EN 287](#), [ISO 9606-1:2012/COR2:2013](#), [ASME BPVC](#), Section IX:[2019](#), [ANSI/AWS D1.1:2020](#). Recognition of other standards is subject to submission to CCS for evaluation. Repair yards and workshops are to keep records of welders qualification and, when required, furnish valid approval test certificates.

2.3.2 Qualification of welding procedures

2.3.2.1 Welding procedures are to be qualified in accordance with [IACS UR W28 \(Reference 2.12\) ~~the procedures of CCS~~](#) or a recognised national or international standard, e.g. [EN288](#) [EN ISO 15607:2019](#), [ISO 9956](#) [15614-1:2017](#), [ASME BPVC](#), Section IX:[2019](#), [ANSI/AWS D1.1:2020](#). Recognition of other standards is subject to submission to CCS for evaluation. The welding procedure should be supported by a welding procedure qualification record. The specification is to include the welding process, types of electrodes, weld shape, edge preparation, welding techniques and positions.

2.4.2 Equivalency of material grades

Guidance on steel grades comparable to the normal and high strength hull structural steel grades given in CCS rules
Table 2.4.2

Steel grades according to CCS rules (Reference 2.4 to this Section)							Comparable steel grades (1)			
Grade	Yield stress R_{eH} (N/mm ²)	Tensile strenth R_m (N/mm ²)	Elongation A_5 min. (%)	Average impact energy for t≤50mm		EN 10025:1990 (2) ISO 4950-2:1995	EN 10025 series:2004	A131	G3106	
				Test temp. (°C)	(J,min.)					
					L					T
A B D E	235	400-520	22	+20 0 -20 -40	- 27 27 27	- 20 20 20	Fe 360B Fe 360C Fe 360D -	S235JR S235J0 S235J2 S275NL,S275ML	A B D E	SM400B SM400B,SM400C -
A27 D27 E27	265	400-530	22	0 -20 -40	27	20	Fe 430C Fe 430D -	S275J0 S275J2,S275N,S275M S275NL,S275ML	- - -	- - -
A32 D32 E32	315	440-570	22	0 -20 -40	31	22	- - -	- - -	AH32 DH32 EH32	SM490B,SM490C -
A36 D36 E36	355	490-630	21	0 -20 -40	34	24	Fe 510C Fe 510D,E355D D E355E	S355 J0 S355J2,S355N,S355M S355NLS355ML	AH36 DH36 EH36	SM520B,SM520C -
A40 D40 E40	390	510-660	20	0 -20 -40	39	26	E390CC E390DD E390E	S420N,S420M S420N,S420M S420NL,S420 ML	AH40 DH40 EH40	SM570 - -

Notes:

(1) In selecting comparable steels from this table, attention should be given to the requirements of Table 2.4.1 and the dimension requirements of the product with respect to CCS rules. Some steel grades as per national or international standard are defined with specified yield and tensile strength properties which depend on thickness. For thicknesses with tensile properties specified lower than those of CCS Rules, case-by-case consideration is to be given with regards to design requirements.

(2) EN 10025:1990 is superseded by EN10025 series: [2019 \(e.g. EN 10025-2:2019, EN 10025-3:2019, EN 10025-4:2019\)](#).

2.5 General requirements to welding

Preheating temperature

Table 2.5.1

Carbon equivalent ¹⁾	Recommended minimum preheat temperature (°C)		
	$t_{comb} \leq 50$ mm ²⁾	50 mm $< t_{comb} \leq 70$ mm ²⁾	$t_{comb} > 70$ mm ²⁾
$C_{eq} \leq 0.39$		50	50
$C_{eq} \leq 0.41$		75	75
$C_{eq} \leq 0.43$		50	100
$C_{eq} \leq 0.45$	50	100	125
$C_{eq} \leq 0.47$	100	125	150
$C_{eq} \leq 0.50$	125	150	175

References:

2.1 IACS Recommendation No.76 “Bulk Carriers - Guidelines for Surveys, Assessment and Repair of Hull Structure”

2.2 TSCF “Guidelines for the inspection and maintenance of double hull tanker structures”

2.3 TSCF “Guidance manual for the inspection and condition assessment of tanker structures”

2.4 IACS UR W 11 “Normal and higher strength hull structural steels”

2.5 IACS UR W 17 “Approval of consumables for welding normal and higher strength hull structural steels”

2.6 IACS Z 10.1 “Hull surveys of oil tankers”, Z 10.2 “Hull surveys of bulk carriers”, Z10.3 “Hull surveys of chemical tankers”, Z10.4 “Hull surveys of double hull oil tankers” and Z10.5 “Hull surveys of double skin bulk carriers” Annex I

- 2.7 IACS UR Z 13 “Voyage repairs and maintenance”
- 2.8 IACS UR W33 “Non-destructive testing of ship hull steel welds”
- 2.9 IACS Recommendation No.96 “Double Hull Oil Tankers - Guidelines for Surveys, Assessment and Repair of Hull Structures”
- 2.10 IACS Recommendation No.55 “General Dry Cargo Ships - Guidelines For Surveys, Assessment and Repair of Hull Structures”
- 2.11 IACS Recommendation No.84 “Container Ships - Guidelines for Surveys, Assessment and Repair of Hull Structures”
- [2.12 IACS UR W28 “Welding procedure qualification tests of steels for hull construction and marine structures”](#)
- [2.13 IACS UR W32 “Qualification scheme for welders of hull structural steels”](#)

Standards:

- [1 ANSI/AWS D1.1:2020 Structural Welding Code – Steel](#)
- [2 ASME BPVC, Section IX:2019 Boiler and Pressure Vessel Code, Section IX: Welding and Brazing Qualifications](#)
- [3 ASTM A 131:2019 Standard Specification for Structural Steel for Ships](#)
- [4 EN 10025-2:2019 Hot Rolled Products of Structural Steels - Part 2: Technical Delivery Conditions For Non-alloy Structural Steels](#)
- [5 EN 10025-3:2019 Hot Rolled Products of Structural Steels - Part 3: Technical Delivery Conditions For Normalized/normalized Rolled Weldable Fine Grain Structural Steels](#)
- [6 EN 10025-4:2019 Hot Rolled Products of Structural Steels - Part 4: Technical Delivery Conditions for Thermomechanical Rolled Weldable Fine Grain Structural Steels](#)
- [7 EN ISO 15607:2019 Specification and Qualification of Welding Procedures For Metallic Materials - General Rules](#)
- [8 GB 712:2011 Ship and ocean engineering structural steel](#)
- [9 ISO 4950-2:1995/Amd 1:2003 High yield strength flat steel products — Part 2: Products supplied in the normalized or controlled rolled condition — Amendment 1](#)
- [10 ISO 9606 -1:2012/COR2:2013 Qualification testing of welders — Fusion welding — Part 1: Steels — Technical Corrigendum 2](#)
- [11 ISO 15614-1:2017 Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys](#)
- [12 JIS G 3106:2015 /Amd 1:2017 Rolled steels for welded structure \(Amendment 1\)](#)

CCS Rule Change Notice For:
RULES FOR CLASSIFICATION OF SEA-GOING
STEEL SHIPS

PART TWO

CONTENTS

CHAPTER 3 EQUIPMENT AND OUTFITS..... 1
Section 8 ENERGY-SAVING APPENDAGES IN FRONT OF PROPELLERS..... 1

CHAPTER 3 EQUIPMENT AND OUTFITS

A new section is added as follows:

Section 8 ENERGY-SAVING APPENDAGES IN FRONT OF PROPELLERS

3.8.1 General

3.8.1.1 The provisions in this Section apply to energy-saving appendages installed onboard in front of propellers.

3.8.1.2 Appropriate vibration evaluation and control are recommended in the design and installation of energy-saving appendages in front of propellers. In general, the natural frequency of the energy-saving appendage and propeller excitation frequency are at least to guarantee 10% of the frequency reserve.

3.8.2 Plans and documents

3.8.2.1 The following plans and documents are to be submitted for approval. Where they are already included in the plans and documents required to be submitted for the ship, there is no need to submit them repeatedly:

(1) Structural plan for the energy-saving appendage in front of the propeller.

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

(1) Arrangement for the energy-saving appendage in front of the propeller;

(2) Profile for energy-saving appendages in front of the propeller (where applicable);

(3) Structural strength calculation report (including loads for calculation) for the energy-saving appendage in front of the propeller;

(4) Vibration frequency calculation report for the energy-saving appendage in front of the propeller.

3.8.3 Structural strength assessment

3.8.3.1 Structural strength calculation analysis is to be carried out for the energy-saving appendage in front of the propeller. Structural strength analysis for various conditions is to be carried out considering possible loads on the energy-saving appendage in front of the propeller in actual operation.

3.8.3.2 Explanatory notes to the calculation model:

(1) Local three-dimensional structure model is generally used in modeling and analysis of the energy-saving appendage structure to reasonably simulate their shapes;

(2) The general principles for element selection, characteristics and meshing of the energy-saving appendage structure model are to be in accordance with the requirements of 1.5.6, Section 5, Chapter 1, PART TWO of the Rules. In order to better simulate its shape, the calculation model is to adopt appropriate element mesh size, which is recommended not to exceed 200 mm×200 mm.

3.8.3.3 The extent and boundary conditions of the model are as follows:

(1) For the calculation model, the longitudinal extent is generally to include the entire energy-saving appendage in front of the propeller and extends to the aft end wall of the hull engine room; the vertical extent is from the baseline up to the first platform structure near the standard height above the propeller centerline, where the standard height is 1.5 times the distance between the propeller centerline and the highest point of the energy-saving appendage in front of the propeller;

(2) The assumption of boundary conditions is to be based on the principle of not affecting the calculation results of the energy-saving appendage in front of the propeller and its reinforcement structure. Generally free support or fixed support is provided.

3.8.3.4 The loads on the energy-saving appendage in front of the propeller may be obtained from hydrodynamic calculation or model test or obtained as follows; the following loads are to be included as a minimum:

(1) the hydrodynamic wave pressure, calculated according to 1.5.3.3(4), Section 5, Chapter 1, PART TWO of the Rules;

(2) Inertia force of ship motion, calculated according to 1.5.2.2, Section 5, Chapter 1, PART TWO of the Rules;

(3) Lateral rotating force, calculated according to 3.1.2.1(1), Section 1, Chapter 3, PART TWO of the Rules.

3.8.3.5 The calculation conditions are to include the most unfavorable stress condition of the energy-saving appendage structure in front of the propeller, or they can be selected according to experience and actual operation situation, and are to include the following conditions as a minimum:

(1) navigation condition: inertia force of ship motion + hydrostatic pressure + hydrodynamic wave pressure (the wave direction is same as the navigation direction);

(2) rotating condition: inertia force of ship motion + hydrostatic pressure + lateral rotating force.

3.8.3.6 See Table 3.8.3.6 for permissible stress.

Permissible stress		Table 3.8.3.6
Type of element	Permissible stress	
Plate element	$[\sigma_e]=0.5R_{eH}$	

Note: R_{eH} —yield stress of material, in N/mm².

3.8.4 Welding

3.8.4.1 The steels used in weldment of the energy-saving appendage in front of the propeller are to comply with the relevant provisions in Chapters 3, 5 and 6, PART ONE of CCS Rules for Materials and Welding for hull structural steels, steel forgings, steel castings respectively. Alternative materials may be adopted subject to CCS agreement.

3.8.4.2 Welding is to be performed by welders approved by CCS using welding consumables approved by CCS according to welding procedures approved by CCS. For relevant requirements, see Chapters 2, 3, 4 and 5, PART THREE of CCS Rules for Materials and Welding.

3.8.4.3 The fillet welds inside the energy-saving appendage in front of the propeller are generally to be continuous at both sides and the welding coefficient is to be taken as 0.2. When the surface shell cannot be connected to the internal web by fillet welds directly, a flat bar may be lined between the surface shell and the web. The surface shell and the flat bar can be connected by plug welding and the welding coefficient is to be taken as 0.44, or a groove can be opened on the surface shell, and the flat bar can be butt welded as a liner. Alternatively, other CCS approved welding connection methods may be adopted.

3.8.4.4 As shown in Figure 3.8.4.4, the fillet welds of the connection between the energy-saving appendage in front of the propeller (including the external supporting structure) and the hull as well as the fillet welds of the connection between the guide wheel and guide vane are to be full penetration fillet welds. Where welding at both sides is not possible, single-sided groove can be opened and welded with steel liner inside.

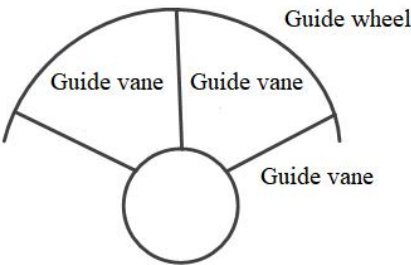


Figure 3.8.4.4 Energy-saving Appendage in Front of the Propeller

3.8.4.5 The joint weld of the energy-saving appendage in front of the propeller and the hull is to be ground smooth and the toes are to have a smooth transition.

3.8.4.6 100% external and at least 80% internal NDT is to be performed in the joint weld of surface shell of the energy-saving appendage in front of the propeller (including the external supporting structure) and the hull.

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CHAPTER 2 FIRE EXTINCTION SYSTEMS

Section 2 FIXED GAS FIRE-EXTINGUISHING SYSTEMS

2.2.3 Low-pressure carbon dioxide systems

2.2.3.1 Where a low-pressure CO₂ system is fitted, the piping system is to be designed in such a way that the CO₂ pressure at the nozzles should not be less than 1N/mm².

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PART EIGHT

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CHAPTER 33 SHIP COMMUNICATION NETWORKS SATISFYING SPECIFIC NEEDS

Section 1 GENERAL PROVISIONS

33.1.1 General requirements

33.1.1.1 The provisions of this Chapter apply to ships of which the communication networks satisfy specific needs.

33.1.1.2 The specific needs mentioned in this Chapter refer to communication needs such as passenger using Internet and remote survey.

33.1.1.3 The ship communication networks mentioned in this Chapter refer to the communication networks which realize the specific needs in 33.1.1.2 through ship communication network equipment, based on hosting modes of communication networks such as satellite broadband communication network and 4G or 5G cellular communication network.

33.2.1.4 The applicant is to be responsible for whether the operator of the ship communication network services meets the requirements of relevant laws and regulations.

33.2.1.5 The applicant is to ensure that the management and operation of the ship communication network meet the requirements of relevant laws and regulations, such as real-name registration for network users.

33.1.2 Class notations

33.1.2.1 Upon its application, a ship the ship communication network of which has undergone plan approval and survey by CCS and satisfied the relevant requirements of this Chapter, may be assigned class notations as follows:

Specific Communication Network (Px, Rx)

where the letters P and R in the parentheses stand for the specific needs of the ship communication network, which may be assigned according to the actual function of the ship and are defined as follows:

P - network provided for passengers to satisfy the daily communication needs of passengers to use the Internet.

R - network provided for crew to satisfy the communication needs for ship remote survey.

x - additional notations for hosting modes of ship communication networks. Each small letter indicates one hosting mode. The ship communication network satisfying one specific need may be realized by one or more hosting modes, which may be assigned one or more additional notations where:

s - ship communication network realized by satellite broadband communication network.

c - ship communication network realized by 4G or 5G cellular communication network.

If the ship realizes the needs for daily use of the Internet by passengers and ship remote survey in accordance with the requirements of this Chapter, based on satellite broadband communication network and 4G or 5G cellular communication network respectively, it may be assigned Specific Communication Network (Ps, Pc, Rs, Rc).

Section 2 TECHNICAL REQUIREMENTS

33.2.1 Hosting modes

33.2.1.1 The hosting modes of ship communication networks may be satellite broadband communication network, 4G or 5G cellular communication network, etc.

33.2.2 Network bandwidth

33.2.2.1 The communication network bandwidth is to satisfy the actual needs through the estimation of communication traffic and network capacity load test.

33.2.2.2 For ships applying for class notation "Ps", the theoretical bandwidth of the communication network is not to be less than 2 Mbps for upstream rate and 4 Mbps for downstream rate, which is to be confirmed by relevant supporting documents provided by the ship communication network service provider. The measured bandwidth is not to be less than 1 Mbps for upstream momentary rate and 2 Mbps for downstream momentary rate. For ships applying for class notation "Pc", the measured bandwidth is not to be less than 5 Mbps for upstream momentary rate and 25 Mbps for downstream momentary rate.

33.2.2.3 For ships applying for class notation "Rs", the theoretical bandwidth of communication network is not to be less than 2 Mbps for upstream rate and 2 Mbps for downstream rate, which is to be confirmed by relevant supporting documents provided by the ship communication network service provider. The measured bandwidth is not to be less than 1 Mbps for upstream momentary rate and 1 Mbps for downstream momentary rate. For ships applying for class notation "Rc", the measured bandwidth is not to be less than 4 Mbps for upstream momentary rate and 4 Mbps for downstream momentary rate.

33.2.3 Equipment arrangements

33.2.3.1 Local area network (LAN) is to be arranged to realize the network coverage of relevant spaces.

33.2.3.2 For ships applying for class notation "P", the network is to be arranged by fixed LAN devices. The network is to cover the living areas of passengers, including primary accommodation spaces as a minimum, such as public spaces, corridors, cabins, cinemas, game and hobby rooms.

33.2.3.3 For ships applying for class notation "R", the network may be arranged by fixed LAN devices and/or portable network relay equipment which are readily deployed. The network is to cover the survey areas of remote survey including spaces falling in the scope of annual survey as a minimum, such as engine room, steering gear room, other machinery spaces, accommodation spaces, service spaces, control station, forecabin and cargo area (where applicable).

33.2.4 Equipment requirements

33.2.4.1 The ship communication network is to be isolated from the networks related to the normal operation and safety of the ship, such as navigation equipment network, machinery control system network, alarm system network, etc.

33.2.4.2 Ship communication network equipment, which generally contains receiving unit, signal amplification unit, hub, switch, network bridge, router, gateway, network

access point, modem, portable network equipment (including customer terminal equipment (CPE), network relay equipment), etc., is to meet the relevant requirements of Sections 2 and 3, Chapter 1, PART FOUR of the Rules.

33.2.4.3 The cables provided for the ship communication network equipment are to meet the relevant requirements of Section 12, Chapter 2, PART FOUR of the Rules.

33.2.4.4 The ship communication network equipment may be powered by main source of electrical power. For ships applying for class notation "R", there is to be a standby power to supply the network for not less than 0.5 hours (for portable equipment, not less than 4 hours), such as UPS or accumulator batteries, etc.

33.2.4.5 Manufacture's supporting documents of the ship communication network equipment are to be provided for check. System and equipment installed in places with explosion risk are to be explosion-proof, or corresponding measures are to be taken to avoid explosion risks during use at least.

33.2.4.6 The construction, operation, maintenance and security assessment of the ship communication network system and equipment may be implemented with reference to the relevant requirements in CCS Guidelines for Requirement and Security Assessment of Ship Cyber System.

33.2.4.7 The procedures for daily inspection and maintenance of the ship communication network equipment are to be implemented onboard, including inspection for equipment working status and power supply status, connection identifier for cables, network connectivity, etc., and the results are to be recorded.

Section 3 PLANS AND DOCUMENTS

33.3.1 Plans and documents

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

- (1) Arrangement of ship communication network equipment;
- (2) Power supply plan of ship communication network equipment.

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

- (1) Topology diagram of ship communication network system;
- (2) Estimation of communication traffic for ship communication network;
- (3) Specification of cables for ship communication network equipment;
- (4) Specification of working conditions for ship communication network equipment;
- (5) List of ship communication network equipment, including brand, model, quantity and function description as a minimum;
- (6) Operation manual of ship communication network equipment.

33.3.1.3 The following plans and documents are to be submitted to CCS surveyor for approval and/or confirmation:

- (1) Test program including test procedures, acceptance criteria and records of test results;
- (2) Procedures for daily inspection and maintenance of ship communication network equipment.

Section 4 SURVEY AND TESTS

33.4.1 Initial surveys

33.4.1.1 The surveyor is to confirm the actual installation layout of the ship communication network equipment onboard according to the reviewed plans and documents, and confirm the function and working status of the communication network equipment according to the approved test program. Where necessary, the surveyor is to review the relevant documents provided by the service provider required in 33.2.2.

33.4.1.2 The test for ship communication network is to be carried out under the witness of the surveyor according to the test program, including:

- (1) The connectivity test of system and equipment;
- (2) The network coverage test: for the network coverage spaces indicated in the plan referred to in 33.3.1.1 (1), at least one representative network access point is to be selected for each space for test;
- (3) Communication network capacity load test, bandwidth test, network transmission delay test and network stability test, which are to be carried out simultaneously with the test referred to in 33.4.1.2 (2);
- (4) The functional tests of the communication network, such as real-time video communication, document transmission, etc., which are to be carried out simultaneously with the test referred to 33.4.1.2 (2).

33.4.2 Annual surveys

33.4.2.1 After assigned with the class notation specified in this Chapter, as the condition of maintenance of the notation, the following survey is to be carried out during the subsequent class periodical survey:

- (1) Relevant plans and documents are to be kept onboard, and no unconfirmed changes by CCS have been made;
- (2) The system and equipment are in normal working condition, and no unconfirmed changes by CCS which affect the realization of specific needs specified in this Chapter have been made;
- (3) Records for relevant daily inspection and maintenance are checked;
- (4) If necessary, some or all tests may be carried out according to 33.4.1.

33.4.3 Intermediate surveys

- (1) The requirements for intermediate surveys are the same as those for annual surveys.

33.4.4 Special surveys

- (1) The requirements for special surveys are the same as those for annual surveys.

33.4.5 Occasional surveys

33.4.5.1 In case of any change, fault or damage to the approved plans and documents, systems and equipment, which affect the realization of specific needs of the communication network specified in this Chapter, CCS is to be notified in time for occasional surveys to

maintain the validity of the class notation.

33.4.6 Maintenance, cancellation and withdrawal of the class notation

33.4.6.1 The ship is to meet the requirements of this Chapter to maintain the validity of the class notation. Otherwise, CCS will cancel the relevant class notation as appropriate.

33.4.6.2 The ship company can apply for cancellation of the relevant class notation specified in this Chapter in written form.

CHAPTER 34 EVALUATION OF COLLISION RESISTANCE CAPABILITY OF SHIPS

Section 1 GENERAL PROVISIONS

34.1.1 General requirements

34.1.1.1 This Chapter applies to ships applying for the class notation related to evaluation of collision resistance capability on a voluntary basis.

34.1.1.2 Ships applying for evaluation of collision resistance capability generally are subject to, but not limited to the following three critical situations:

- (1) Structural damage to cargo tanks with subsequent leakage of, e.g., oil, chemicals, etc.;
- (2) Structural damage leading to water ingress into dry cargo holds during carriage of particularly valuable or dangerous cargo;
- (3) Structural damage to fuel oil tanks with subsequent leakage of fuel oil.

34.1.1.3 Evaluation of collision resistance capability of ships is intended to calculate the deformation energy absorbed by the hull structure and critical striking speed of striking ships of different magnitude that the hull structure can bear when the ship structure is struck by another ship and the hull structure shell plate (inner hull plate for a double hull ship) is in the critical damaged state, and to give the displacement – critical striking speed curve of the struck ship, so as to guide the operation of the ship.

34.1.1.4 The simplified method or FE method may be used for evaluation of collision resistance capability. For the FE method, the general FE analysis procedure may be used. If non-general procedures are used, the explanatory documents on the reliability of the calculation procedures are to be provided by the unit applying for the notation.

34.1.2 Definitions

34.1.2.1 The **critical damaged state** refers to the state when the maximum plastic deformation of the hull structure shell plate (inner hull plate for a double hull ship) of the struck ship occurs without rupture.

34.1.2.2 The **initial striking speed** V_0 , in knots, refers to the speed of the striking ship when striking occurs.

34.1.2.3 The **critical striking speed** V_{cr} , in knots, refers to the maximum striking speed that the struck ship can bear in the critical situation. If the speed of the striking ship exceeds this value, the expected critical state will occur.

34.1.2.4 The **critical deformation energy** E_{cr} , in MJ, refers to the plastic deformation energy absorbed by the hull structure when large plastic deformation occurs in the hull structure shell plate (inner hull plate for a double hull ship) of the struck ship without rupture in case of a collision. When that amount of energy is exceeded, the expected critical state will occur.

34.1.3 Class notation

34.1.3.1 Ships that have undergone evaluation of collision resistance capability according to the requirements of this Chapter may be assigned with the notation “COLL”.

34.1.4 Plans and documents

34.1.4.1 The following plans and documents are to be submitted for approval in addition to the plans and documents required by relevant chapters and PARTS of the Rules:

(1) Critical striking speed curve.

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

(1) Strength analysis report, including structural collision deformation energy analysis and critical speed analysis.

(2) List of critical situations in which the ship is involved.

34.1.5 Document retention

34.1.5.1 The shipowner is to keep the plans and documents required by 34.1.4.1 onboard the ship and make them accessible to the operator in case of a collision.

Section 2 EVALUATION METHODS

34.2.1 Evaluation conditions

34.2.1.1 The bow of the striking ship meets the side of the struck ship at 90°, and the struck ship has no speed and remains upright.

34.2.1.2 The impact area is to be taken as the side structure between the two transverse bulkheads of the cargo hold area within 0.4L amidships.

34.2.1.3 The location of collision is to be the most dangerous collision point selected according to the relative draft of the striking ship and the struck ship.

34.2.1.4 The most dangerous bulbous bow form is to be selected according to the ship type and displacement, and the structure is assumed to be rigid.

34.2.2 Critical deformation energy of the side structure

34.2.2.1 The Minorsky method or a validated analytical method may be accepted to calculate critical deformation energy of the side structure. Assuming that the structural response is quasi-static and the material is ideal elastic plastic, the structural plastic deformation energy is calculated when the side structure in the impact area of the struck ship is damaged to the critical state.

34.2.2.2 When the FE method is adopted, the dynamic response of the structure is to be calculated. The bow of the striking ship ramming into the struck ship at the initial striking velocity V_0 , and the kinetic energy loss of the striking ship is all transformed into the kinetic energy of the struck ship and the plastic deformation energy absorbed by the structure, until the critical damaged state of the side structure is reached. For the impact on the attached water mass of the ship, the total mass of the striking ship is to be 1.1 times its own displacement, and the total mass of the struck ship is to be 2 times its own displacement.

34.2.3 Critical striking speed of the ship

34.2.3.1 The critical striking speed V_{cr} of the ship is to be calculated according to the

following formula:

$$V_{cr} = 19.41 \left\{ \frac{10E_{cr}}{\Delta} \left(1 + 1.815 \frac{\Delta}{\Delta_0} \right) \right\}^{0.5} \text{ — kn}$$

where: Δ —displacement of the striking ship, in t;

Δ_0 —displacement of the struck ship, in t;

E_{cr} —critical deformation energy of the struck ship, in MJ, see 34.2.2 of this Chapter.

Section 3 EVALUATION CRITERIA

34.3.1 Evaluation criteria collision resistance capability

34.3.1.1 Ships of approximately equal displacement and with design draughts approximately identical to that of the struck ship to be examined are to be assumed as striking ships. The critical striking speed, V_{cr} , of the ship is not to be less than 7 kn.

Section 4 CRITICAL STRIKING SPEED CURVE

34.4.1 Critical striking speed curve

34.4.1.1 According to the analysis results of collision of ships with different levels of displacement, the relationship curve between the critical striking speed and the displacement of the striking ship is drawn to provide guidance for navigation operation.

34.4.1.2 The range of the struck ship displacement required to draw the critical striking speed curve is to include but not be limited to 0.5~1.5 times the striking ship displacement.

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PART TEN

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CHAPTER 1 SURVEYS AFTER CONSTRUCTION OF SHIPS ENGAGED ON NON-INTERNATIONAL VOYAGES

Section 2 HULL AND EQUIPMENT SURVEYS

1.2.1 General provisions

[1.2.1.5 The inspection of Watertight Cable Transits is to be carried out in accordance with Chapter 5, PART ONE of the Rules.](#)