



**BUREAU
VERITAS**

Rules for the Classification of Steel Ships

NR 467

AMENDMENTS

January 2022

These sheets contain amendments within the following Sections of July 2021 issue of the *Rules for the Classification of Steel Ships*.

These amendments are effective from January 1st, 2022.

Part	Volume	Chapter	Section / Appendix
Part A	<i>NR 467 A1 DT R18 E</i>	Ch 1	Sec 1, Sec 2
		Ch 4	Sec 1, Sec 9, Sec 10
		Ch 5	Sec 10
Part B	<i>NR 467 B1 DT R13 E</i>	Ch 1	Sec 1, Sec 3
		Ch 2	Sec 1, Sec 2
		Ch 3	Sec 2, Sec 3, App 2
		Ch 4	Sec 2
		Ch 5	Sec 2
		Ch 8	Sec 10, Sec 12
		Ch 9	Sec 4, App 2

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1. INDEPENDENCE OF THE SOCIETY AND APPLICABLE TERMS

- 1.1 The Society shall remain at all times an independent contractor and neither the Society nor any of its officers, employees, servants, agents or subcontractors shall be or act as an employee, servant or agent of any other party hereto in the performance of the Services.
- 1.2 The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not, in any circumstances, involve monitoring or exhaustive verification.
- 1.3 The Society acts as a services provider. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty. The Society is not and may not be considered as an underwriter, broker in Unit's sale or chartering, expert in Unit's valuation, consulting engineer, controller, naval architect, designer, manufacturer, shipbuilder, repair or conversion yard, charterer or shipowner; none of the above listed being relieved from any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4 Only the Society is qualified to apply and interpret its Rules.
- 1.5 The Client acknowledges the latest versions of the Conditions and of the applicable Rules applying to the Services' performance.
- 1.6 Unless an express written agreement is made between the Parties on the applicable Rules, the applicable Rules shall be the Rules applicable at the time of entering into the relevant contract for the performance of the Services.
- 1.7 The Services' performance is solely based on the Conditions. No other terms shall apply whether express or implied.

2. DEFINITIONS

- 2.1 "Certificate(s)" means classification or statutory certificates, attestations and reports following the Society's intervention.
- 2.2 "Certification" means the activity of certification in application of national and international regulations or standards ("Applicable Referential"), in particular by delegation from different governments that can result in the issuance of a Certificate.
- 2.3 "Classification" means the classification of a Unit that can result or not in the issuance of a classification Certificate with reference to the Rules. Classification (or Certification as defined in clause 2.2) is an appraisalment given by the Society to the Client, at a certain date, following surveys by its surveyors on the level of compliance of the Unit to the Society's Rules and/or to Applicable Referential for the Services provided. They cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.
- 2.4 "Client" means the Party and/or its representative requesting the Services.
- 2.5 "Conditions" means the terms and conditions set out in the present document.
- 2.6 "Industry Practice" means international maritime and/or offshore industry practices.
- 2.7 "Intellectual Property" means all patents, rights to inventions, utility models, copyright and related rights, trade marks, logos, service marks, trade dress, business and domain names, rights in trade dress or get-up, rights in goodwill or to sue for passing off, unfair competition rights, rights in designs, rights in computer software, database rights, topography rights, moral rights, rights in confidential information (including know-how and trade secrets), methods and protocols for Services, and any other intellectual property rights, in each case whether capable of registration, registered or unregistered and including all applications for and renewals, reversions or extensions of such rights, and all similar or equivalent rights or forms of protection in any part of the world.
- 2.8 "Parties" means the Society and Client together.
- 2.9 "Party" means the Society or the Client.
- 2.10 "Register" means the public electronic register of ships updated regularly by the Society.
- 2.11 "Rules" means the Society's classification rules (available online on veristar.com), guidance notes and other documents. The Society's Rules take into account at the date of their preparation the state of currently available and proven technical minimum requirements but are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.
- 2.12 "Services" means the services set out in clauses 2.2 and 2.3 but also other services related to Classification and Certification such as, but not limited to: ship and company safety management certification, ship and port security certification, maritime labour certification, training activities, all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board. The Services are carried out by the Society according to the Rules and/or the Applicable Referential and to the Bureau Veritas' Code of Ethics. The Society shall perform the Services according to the applicable national and international standards and Industry Practice and always on the assumption that the Client is aware of such standards and Industry Practice.
- 2.13 "Society" means the classification society 'Bureau Veritas Marine & Offshore SAS', a company organized and existing under the laws of France, registered in Nanterre under number 821 131 844, or any other legal entity of Bureau Veritas Group as may be specified in the relevant contract, and whose main activities are Classification and Certification of ships or offshore units.
- 2.14 "Unit" means any ship or vessel or offshore unit or structure of any type or part of it or system whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

3. SCOPE AND PERFORMANCE

- 3.1 Subject to the Services requested and always by reference to the Rules, and/or to the Applicable Referential, the Society shall:
 - review the construction arrangements of the Unit as shown on the documents provided by the Client;
 - conduct the Unit surveys at the place of the Unit construction;
 - class the Unit and enter the Unit's class in the Society's Register;
 - survey the Unit periodically in service to note whether the requirements for the maintenance of class are met.The Client shall inform the Society without delay of any circumstances which may cause any changes on the conducted surveys or Services.
- 3.2 The Society will not:
 - declare the acceptance or commissioning of a Unit, nor its construction in conformity with its design, such activities remaining under the exclusive responsibility of the Unit's owner or builder;
 - engage in any work relating to the design, construction, production or repair checks, neither in the operation of the Unit or the Unit's trade, neither in any advisory services, and cannot be held liable on those accounts.

4. RESERVATION CLAUSE

- 4.1 The Client shall always: (i) maintain the Unit in good condition after surveys; (ii) present the Unit for surveys; and (iii) inform the Society in due time of any circumstances that may affect the given appraisalment of the Unit or cause to modify the scope of the Services.
- 4.2 Certificates are only valid if issued by the Society.
- 4.3 The Society has entire control over the Certificates issued and may at any time withdraw a Certificate at its entire discretion including, but not limited to, in the following situations: where the Client fails to comply in due time with instructions of the Society or where the Client fails to pay in accordance with clause 6.2 hereunder.
- 4.4 The Society may at times and at its sole discretion give an opinion on a design or any technical element that would 'in principle' be acceptable to the Society. This opinion shall not presume on the final issuance of any Certificate nor on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisalment made by the Society which shall not be held liable for it.

5. ACCESS AND SAFETY

- 5.1 The Client shall give to the Society all access and information necessary for the efficient performance of the requested Services. The Client shall be the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out. Any information, drawing, etc. required for the performance of the Services must be made available in due time.
- 5.2 The Client shall notify the Society of any relevant safety issue and shall take all necessary safety-related measures to ensure a safe work environment for the Society or any of its officers, employees, servants, agents or subcontractors and shall comply with all applicable safety regulations.

6. PAYMENT OF INVOICES

- 6.1 The provision of the Services by the Society, whether complete or not, involves, for the part carried out, the payment of fees thirty (30) days upon issuance of the invoice.
- 6.2 Without prejudice to any other rights hereunder, in case of Client's payment default, the Society shall be entitled to charge, in addition to the amount not properly paid, interest equal to twelve (12) months LIBOR plus two (2)

per-cent as of due date calculated on the number of days such payment is delinquent. The Society shall also have the right to withhold Certificates and other documents and/or to suspend or revoke the validity of Certificates.

- 6.3 In case of dispute on the invoice amount, the undisputed portion of the invoice shall be paid and an explanation on the dispute shall accompany payment so that action can be taken to resolve the dispute.

7. LIABILITY

- 7.1 The Society bears no liability for consequential loss. For the purpose of this clause consequential loss shall include, without limitation:
 - Indirect or consequential loss;
 - Any loss and/or deferral of production, loss of product, loss of use, loss of bargain, loss of revenue, loss of profit or anticipated profit, loss of business and business interruption, in each case whether direct or indirect.The Client shall defend, release, save, indemnify, defend and hold harmless the Society from the Client's own consequential loss regardless of cause.
- 7.2 Except in case of wilful misconduct of the Society, death or bodily injury caused by the Society's negligence and any other liability that could not be, by law, limited, the Society's maximum liability towards the Client is limited to one hundred and fifty per-cent (150%) of the price paid by the Client to the Society for the Services having caused the damage. This limit applies to any liability of whatsoever nature and howsoever arising, including fault by the Society, breach of contract, breach of warranty, tort, strict liability, breach of statute.
- 7.3 All claims shall be presented to the Society in writing within three (3) months of the completion of Services' performance or (if later) the date when the events which are relied on were first discovered by the Client. Any claim not so presented as defined above shall be deemed waived and absolutely time barred.

8. INDEMNITY CLAUSE

- 8.1 The Client shall defend, release, save, indemnify and hold harmless the Society from and against any and all claims, demands, lawsuits or actions for damages, including legal fees, for harm or loss to persons and/or property tangible, intangible or otherwise which may be brought against the Society, incidental to, arising out of or in connection with the performance of the Services (including for damages arising out of or in connection with opinions delivered according to clause 4.4 above) except for those claims caused solely and completely by the gross negligence of the Society, its officers, employees, servants, agents or subcontractors.

9. TERMINATION

- 9.1 The Parties shall have the right to terminate the Services (and the relevant contract) for convenience after giving the other Party thirty (30) days' written notice, and without prejudice to clause 6 above.
- 9.2 The Services shall be automatically and immediately terminated in the event the Client can no longer establish any form of interest in the Unit (e.g. sale, scrapping).
- 9.3 The Classification granted to the concerned Unit and the previously issued Certificates shall remain valid until the date of effect of the termination notice issued, or immediately in the event of termination under clause 9.2, subject to compliance with clause 4.1 and 6 above.
- 9.4 In the event where, in the reasonable opinion of the Society, the Client is in breach, or is suspected to be in breach of clause 16 of the Conditions, the Society shall have the right to terminate the Services (and the relevant contracts associated) with immediate effect.

10. FORCE MAJEURE

- 10.1 Neither Party shall be responsible or liable for any failure to fulfil any term or provision of the Conditions if and to the extent that fulfillment has been delayed or temporarily prevented by a force majeure occurrence without the fault or negligence of the Party affected and which, by the exercise of reasonable diligence, the said Party is unable to provide against.
- 10.2 For the purpose of this clause, force majeure shall mean any circumstance not being within a Party's reasonable control including, but not limited to: acts of God, natural disasters, epidemics or pandemics, wars, terrorist attacks, riots, sabotages, impositions of sanctions, embargoes, nuclear, chemical or biological contaminations, laws or action taken by a government or public authority, quotas or prohibition, expropriations, destructions of the worksite, explosions, fires, accidents, any labour or trade disputes, strikes or lockouts.

11. CONFIDENTIALITY

- 11.1 The documents and data provided to or prepared by the Society in performing the Services, and the information made available to the Society, will be treated as confidential except where the information:
 - is properly and lawfully in the possession of the Society;
 - is already in possession of the public or has entered the public domain, other than through a breach of this obligation;
 - is acquired or received independently from a third party that has the right to disseminate such information;
 - is required to be disclosed under applicable law or by a governmental order, decree, regulation or rule or by a stock exchange authority (provided that the receiving Party shall make all reasonable efforts to give prompt written notice to the disclosing Party prior to such disclosure).
- 11.2 The Parties shall use the confidential information exclusively within the framework of their activity underlying these Conditions.
- 11.3 Confidential information shall only be provided to third parties with the prior written consent of the other Party. However, such prior consent shall not be required when the Society provides the confidential information to a subsidiary.
- 11.4 Without prejudice to sub-clause 11.1, the Society shall have the right to disclose the confidential information if required to do so under regulations of the International Association of Classification Societies (IACS) or any statutory obligations.

12. INTELLECTUAL PROPERTY

- 12.1 Each Party exclusively owns all rights to its Intellectual Property created before or after the commencement date of the Conditions and whether or not associated with any contract between the Parties.
- 12.2 The Intellectual Property developed by the Society for the performance of the Services including, but not limited to drawings, calculations, and reports shall remain the exclusive property of the Society.

13. ASSIGNMENT

- 13.1 The contract resulting from to these Conditions cannot be assigned or transferred by any means by a Party to any third party without the prior written consent of the other Party.
- 13.2 The Society shall however have the right to assign or transfer by any means the said contract to a subsidiary of the Bureau Veritas Group.

14. SEVERABILITY

- 14.1 Invalidation of one or more provisions does not affect the remaining provisions.
- 14.2 Definitions herein take precedence over other definitions which may appear in other documents issued by the Society.
- 14.3 In case of doubt as to the interpretation of the Conditions, the English text shall prevail.

15. GOVERNING LAW AND DISPUTE RESOLUTION

- 15.1 These Conditions shall be construed in accordance with and governed by the laws of England and Wales.
- 15.2 Any dispute shall be finally settled under the Rules of Arbitration of the Maritime Arbitration Chamber of Paris ("CAM"), which rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three (3). The place of arbitration shall be Paris (France). The Parties agree to keep the arbitration proceedings confidential.
- 15.3 Notwithstanding clause 15.2, disputes relating to the payment of the Society's invoices may be submitted by the Society to the *Tribunal de Commerce de Nanterre*, France, or to any other competent local Court, at the Society's entire discretion.

16. PROFESSIONAL ETHICS

- 16.1 Each Party shall conduct all activities in compliance with all laws, statutes, rules, economic and trade sanctions (including but not limited to US sanctions and EU sanctions) and regulations applicable to such Party including but not limited to: child labour, forced labour, collective bargaining, discrimination, abuse, working hours and minimum wages, anti-bribery, anti-corruption, copyright and trademark protection, personal data protection (<https://personaldataprotection.bureauveritas.com/prv-acvpolicy>).
- Each of the Parties warrants that neither it, nor its affiliates, has made or will make, with respect to the matters provided for hereunder, any offer, payment, gift or authorization of the payment of any money directly or indirectly, to or for the use or benefit of any official or employee of the government, political party, official, or candidate.
- 16.2 In addition, the Client shall act consistently with the Bureau Veritas' Code of Ethics and, when applicable, Business Partner Code of Conduct both available at <https://group.bureauveritas.com/group/corporate-social-responsibility/operational-excellence>.

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Part	Volume	Chapter	Section / Appendix
Part C	<i>NR 467 C1 DTR13 E</i>	Ch 1	Sec 3, Sec 10, Sec 13
		Ch 2	Sec 3, Sec 4, Sec 11, Sec 12, Sec 14
		Ch 3	Sec 6
		Ch 4	Sec 1, Sec 2, Sec 5, Sec 11, Sec 15
Part D	<i>NR 467 D1 DTR13 E</i>	Ch 7	Sec 6, App 1
		Ch 9	Sec 1, Sec 3, Sec 4, Sec 6, Sec 10, Sec 11, Sec 16
		Ch 11	Sec 2
		Ch 12	Sec 2
		Ch 15	Sec 3
Part E	<i>NR 467 E1 DTR04 E</i>	Ch 11	Sec 4
Part F	<i>NR 467 F1 DTR13 E</i>	Ch 1	Sec 1
		Ch 3	Sec 1
		Ch 4	Sec 2
		Ch 7	Sec 1, Sec 2
		Ch 11	Sec 4, Sec 21, Sec 23, Sec 26, Sec 30, Sec 33, Sec 36

Amendments to PART A

Ch 1, Sec 1, [3.4.1]

Replace the first item of the bulleted list by:

- inform the Society immediately about any deficiency related to the class of the ship or to the statutory certificates issued by the Society on behalf of the flag Administration, and provide its action plan for rectification of

these deficiencies. It will be verified by next attending Surveyors that deficiencies are rectified and/or that the necessary repair work is carried out within due time.

Ch 1, Sec 2, [4.4.2]

Replace "1 April 2016" by "1 April 2006" in the first item of the bulleted list.

Ch 1, Sec 2, [4.4.5]

Replace the first item of the first bulleted list by:

- [cargo type] to be taken as one of the following:
 - **LNG**, when carrying liquefied natural gas
 - **LEG**, when carrying liquefied ethane gas (C₂H₆)
 - **LPG**, when carrying liquefied petroleum gas
 - **LCO2**, when carrying liquefied carbon dioxide
 - **LNH3**, when carrying liquefied ammonia.

Ch 1, Sec 2, Tab 1

Replace reference to "NI547 or Part D, Chapter 9" by a reference to "NR547" in the row dedicated to "fuelcell" additional service feature.

Ch 1, Sec 2, [4.12.2]

Replace the second paragraph by:

The type of service may be specified after the service notation, e.g.:

light ship/fast passenger vessel

light ship/fast cargo vessel

light ship/fast patrol vessel.

Part A

Ch 1, Sec 2, [4.13.1]

Replace the first item of the second bulleted list by:

- **singlefuel** for ships fitted with engines, fuel cells or gas turbines using only the fuel considered

Add the following paragraph at the end of rule requirement:

Subject to compliance with the requirements of [4.13.2], the above additional service features are completed with **fuelcell**, when the ship is fitted with a fuel cell system.

Ch 1, Sec 2, [4.13.2]

Replace the second paragraph by the followings two paragraphs:

The requirements for the assignment and the maintenance of this additional service feature are given respectively in NR 547 Ship using Fuel Cells and in Ch 4, Sec 10.

Prior to the assignment of the additional service feature **fuelcell** and with respect to the primary fuel considered, granting of at least one of the additional service feature listed in [4.13.1] is mandatory.

The primary fuel or fuels used by the fuel cell are to be indicated in a memoranda.

Examples:

LNGfuel dualfuel fuelcell

LFPfuel singlefuel -aux fuelcell

Ch 1, Sec 2, Table 3

Insert the Row “VeriSTAR-Hull” as follows:

Table 3 : List of additional class notations

Additional class notation	Definition in	Reference in NR 467 or to other Rule Notes	Remarks
VeriSTAR-HULL	(1)	[6.2.2]	these notations may be completed by the notation FLM
VeriSTAR-HULL CM	(1)	Pt F, Ch 1, Sec 1	
VeriSTAR-HULL SIS	(1)	[6.2.3]	these notations may be complemented by FAT or FAT xx years , with $25 \leq xx \leq 40$ (3)

Ch 1, Sec 2, [6.2]

Replace requirement [6.2.2] by:

6.2.2 VeriSTAR-HULL CM and VeriSTAR-HULL

The additional class notation **VeriSTAR-HULL CM** may be assigned to new ships, contracted for construction on or after the 1st July 2015, the structural condition of which is checked with 3D FEM calculation program at design stage, according to the requirements of the Society for which the hull surveys for new construction are carried out according to the requirements of Ch 3, Sec 7 and for which the requirements of Pt F, Ch 1, Sec 1 are fulfilled.

Existing ships contracted for construction before the 1st July 2015 and for which the structural condition is checked with 3D FEM calculation program at design stage according to the requirements of the Society may be assigned with the notation **VeriSTAR-HULL**.

VeriSTAR-HULL CM and **VeriSTAR-HULL** encompass the fatigue assessment carried out on selected structural details as per the requirements of Part B.

The additional class notations **VeriSTAR-HULL CM** and **VeriSTAR-HULL** may be assigned to ships of less than 170 m in length, subject to special consideration by the Society.

The additional class notations **VeriSTAR-HULL CM** and **VeriSTAR-HULL** may be completed by the notation **FLM** when a complementary tridimensional structural analysis has been performed based on a full length finite elements model.

The requirements for the assignment of these notations are given in Pt F, Ch 1, Sec 1.

The additional class notations **VeriSTAR-HULL CM** and **VeriSTAR-HULL** may be completed by the notation **FAT** when a fatigue assessment has been carried on selected structural details in accordance with Pt B, Ch 7, Sec 4 and Part D or Part E when relevant.

The notation **FAT** may be completed by **xx years**, with xx having values between 25 and 40, when evaluated design fatigue life is not less than xx years.

For vessels contracted before 1st July 2016 the notation **DFL xx years** may have been assigned in lieu of **FAT xx years**.

Ch 1, Sec 2, [6.2.3]

Replace the last paragraph by the followings two paragraphs:

This notation may be completed by the notation **FLM** as detailed in [6.2.2].

This notation may be completed by the notation **FAT** or **FAT xx years** as detailed in [6.2.2].

Ch 4, Sec 1, Tab 1

Replace the last row by the followings two rows:

Service notations and/or additional service features for which specific requirements are applicable

Service notation and/or additional service feature assigned	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
LNGfuel, CNGfuel, LPGfuel methanolfuel ammoniafuel LFPfuel	Ch 4, Sec 9	annual survey intermediate survey class renewal survey	
fuelcell	Ch 4, Sec 10	annual survey intermediate survey class renewal survey	

Ch 4, Sec 9, [1.1.1]

Delete the second item of the bulleted list.

Chapter 4

Create a new Section 10 “Ships using fuel cells” as follows:

SECTION 10

SHIPS USING FUEL CELLS

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned the additional service feature **fuelcell**.

1.1.2 These requirements are in addition to the requirements applicable to the remainder of the ship, given in Part A, Chapter 3, and Ch 4, Sec 9, according to the relevant surveys.

2 Annual surveys

2.1 General

2.1.1 The logbooks and operating records are to be examined with regards to correct functioning of the gas detection systems, fuel systems, etc. The hours per day of the gas combustion unit, as applicable, and the fuel cell operation are to be considered together with gas detection records.

2.1.2 The manufacturer/builder instructions and manuals covering the operations, safety and maintenance requirements and occupational health hazards relevant to systems for the use of the fuel, are to be confirmed as being available on board the vessel.

2.2 Fuel cell spaces

2.2.1 The following requirements are to be examined, so far as applicable. Insulation need not to be removed, but any deterioration or evidence of dampness is to be investigated.

2.2.2 The survey is to include:

- confirmation of satisfactory operating condition of gas detection and other leakage detection equipment in fuel cell spaces or associated systems, including indicators and alarms as applicable
- verification of recalibration of the gas detection systems in accordance with the manufacturers' recommendations
- operational test, as far as practicable, of the emergency shutdown system
- examination of the ventilation system, including portable ventilating equipment where fitted, for fuel cell spaces and associated air locks. Where alarms, such as differential pressure and loss of pressure alarms, are fitted, these should be operationally tested as far as practicable

- examination of means for inerting
- examination of the required fire protection and fire extinguishing system contained in fuel cell spaces and operational test, as far as practicable
- examination of electrical equipment and bulkhead/deck penetrations including access openings in hazardous areas for continued suitability for their intended service and installation area
- examination of portable and fixed drip trays and insulation for the protection of the ship's structure in the event of leakage
- examination of electrical bonding arrangements in hazardous areas, including bonding straps where fitted
- examination and testing of installed bilge alarms and means of drainage of the fuel cell space
- testing of the remote and local closing of the master fuel valve for each fuel cell space.

2.3 Fuel cell installation system

2.3.1 The survey is to include:

- examination of the fuel cell system installation during working condition as far as practicable
- verification of satisfactory operation of the fuel cell system installation control, monitoring and shut-down systems
- examination of piping, hoses, emergency shut-down valves, remote operating valves, relief valves, machinery and equipment for handling the fuel, as far as practicable
- examination of means for inerting
- verification of stopping of reformer, pumps and compressors upon emergency shutdown of the system, as far as practicable.

3 Intermediate surveys

3.1 General

3.1.1 In addition to the applicable requirements of the annual surveys, the intermediate survey is also to include:

- random test of gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system, to confirm their satisfactory operating condition
- verification of the proper response of the fuel safety system upon fault conditions.

4 Class renewal surveys

4.1 General

4.1.1 The class renewal survey is to include, in addition to the requirements of the annual surveys, examinations, tests and checks of sufficient extent to ensure that the fuel installations are in satisfactory condition and fit for intended purpose for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

4.1.2 All fuel cell installation system piping are to be examined. Removal of insulation from the piping and opening for examination may be required. Where deemed suspect, a hydrostatic test to 1,25 times the Maximum Allowable Relief Valve Setting (MARVS) for the pipeline is to be carried out. After reassembly, the complete piping is to be tested for leaks. Where water cannot be tolerated and the piping cannot be dried prior to putting the system into service, the Surveyor may accept alternative testing fluids or alternative means of testing.

4.1.3 All emergency shut-down valves, check valves, block and bleed valves, master gas valves, remote operating valves, isolating valves for pressure relief valves in the fuel cell installation system are to be examined and proven operable. A random selection of valves is to be opened for examination.

4.1.4 The survey is to include:

- examination of electrical equipment to include the physical condition of electrical cables and supports, intrinsically safe, explosion proof, or increased safety features of electrical equipment
- functional testing of pressurized equipment and associated alarms
- testing of systems for de-energizing electrical equipment which is not certified for use in hazardous areas
- an electrical insulation resistance test of the circuits terminating in, or passing through, the hazardous zones and spaces.

4.1.5 Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition.

4.1.6 Proper response of the fuel safety system upon fault conditions is to be verified.

4.1.7 Pressure, temperature and level indicating equipment are to be calibrated in accordance with the manufacturer's requirements.

4.1.8 Fuel pumps, compressors, process pressure vessels, inert gas generators, heat exchangers and other components used in connection with fuel handling and parts of the fuel cell installation systems are to be examined according to the requirement of Part A, Chapter 3 or Ch 4, Sec 3, [7.3], as applicable.

Ch 5, Sec 10, [17.3.2]

Replace “air lock” by “airlock” in the first item of the bulleted list.

Ch 5, Sec 10

Replace the Article [19] as follows:

19 CYBER MANAGED and CYBER SECURE

19.1 General

19.1.1 The requirements of this Article apply to ships which have been assigned one of the following additional class notations related to cyber security as described in Ch 1, Sec 2, [6.14.44]:

- **CYBER MANAGED**
- **CYBER SECURE**

The surveys are to be systematically recorded along with all cyber security events, as set out in the Policy document: date, actors, tests performed, results and conclusions.

19.2 Annual surveys

19.2.1 Documents

Confirmation from Cyber Security Responsible, that any modification carried out on the approved documents as listed in NR659 has been declared to the Society.

19.2.2 Surveys

The annual survey is to include:

- confirmation that the cyber Handbook present onboard is the latest up to date and approved version
- confirmation that Cyber Security events are recorded (in a Cyber Registry or any equivalent "log" on paper/file)
- confirmation of records of crew cyber training and awareness in the Cyber Registry (if any) or equivalent "log"
- confirmation that the latest version of Cyber Policy (up to date and approved) is printed and available on board
- confirmation that, during the interview, the person in charge of Cyber answers the questions related to crew training described in the Policy
- confirmation that, during the interview, the person in charge of an equipment present in the Handbook is aware of the monitoring procedures described in the Handbook and knows how to implement them
- confirmation that, during the interview, the relevant crew demonstrates their complete understanding of the equipment maintenance procedures described in the Handbook for the equipment they use on a daily basis
- confirmation that, during the interview, the relevant crew demonstrates that they fully understand the incident response procedures described in the Handbook for the equipment they use on a daily basis.

19.3 Intermediate surveys

19.3.1 Documents to be updated

Regarding Level 3 equipment only, the following documents are to be updated:

- Cyber Risk Analysis
- Cyber Repository (system identification part).

19.3.2 Evidences to be submitted

Evidence of implementation of cyber security rules (from the Policy), crew training (as described in Policy), maintenance procedures (from the Handbook) and incident response procedures (from the Handbook) must be provided.

19.3.3 Surveys

In addition to the requirements given in [19.2.2] for annual surveys, the intermediate survey is to include:

- confirmation that, during the interview, the person in charge of Cyber demonstrates awareness on Cyber Policy and its implementation
- confirmation that, during the interview, the person in charge of Cyber answers the questions related to the responsibilities described in the Policy
- confirmation that any anti-virus usage and update is in accordance with the Cyber Policy
- confirmation that, during the interview, the person in charge of an equipment present in the Handbook is aware of the remote access monitoring procedures described in the Handbook and knows how to implement them.

19.4 Class renewal surveys

19.4.1 Documents to be updated

The following documents are to be updated:

- Cyber Risk Analysis.

Regarding Level 2 and Level 3 equipment only, the following documents are to be updated:

- Cyber Repository (system identification part).

19.4.2 Evidences to be submitted

Evidence of implementation of cyber security rules (from the Policy), crew training (as described in Policy), maintenance procedures (from the Handbook) and incident response procedures (from the Handbook) must be provided.

19.4.3 Surveys

In addition to the requirements given in [19.2.2] for annual survey and in [19.3.3] for intermediate survey, the class renewal survey is to include:

- confirmation that the password policy present in the Policy is effectively implemented on board

- confirmation that, during the interview, the person in charge of an equipment present in the Handbook is aware of the wireless monitoring procedures described in the Handbook and knows how to implement them
- confirmation that, during the interview, the relevant crew demonstrates their complete understanding of the software maintenance procedures described in the Handbook for the equipment they use on a daily basis.

Amendments to PART B

Ch 1, Sec 1, [1.1.1]

Replace Note 2 by:

Note 2: NR600 is not applicable for liquefied gas carriers and any cargo ships with alternate light and heavy cargo loading conditions.

Ch 1, Sec 3, Table 1

Replace the term “Contractual service speed” by “Maximum ahead service speed” in the first row of Table 1.

Ch 2, Sec 1, [6.2]

Replace requirement [6.2.7] by the following requirements [6.2.7] and [6.2.8]:

6.2.7 Signboard/instructions are to be placed in way of the door advising how to act when the door is closed.

6.2.8 For watertight doors, including sliding doors, operated by hydraulic door actuators, either a central hydraulic unit or an independent hydraulic unit for each door is to be

provided with a low fluid level alarm or low gas pressure alarm, as applicable or some other means of monitoring loss of stored energy in the hydraulic accumulators. This alarm is to be both audible and visible and is to be located at the navigation bridge.

Ch 2, Sec 1, Table 2

Replace table footnotes (2) and (4) as follows:

Table 2 : Doors in internal watertight bulkheads of cargo ships

Position relative to freeboard deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
(2) If hinged, this door is to be of single action type.						
(4) According to Ch 3, App 4, [3], doors separating a main machinery space from a steering gear compartment may be hinged single action type provided the lower sill of such doors is above the summer load line and the doors remain closed at sea whilst not in use.						

Ch 2, Sec 1, Table 3

Replace table footnote (3) as follows:

Table : Doors in external watertight boundaries below equilibrium or intermediate waterplane of cargo ships

Position relative to freeboard deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
(3) If hinged, this door is to be of single action type.						

Ch 2, Sec 1, [6.3.1]

Replace the last paragraph by:

Failure of the normal power supply of the required alarms is to be indicated by an audible and visual alarm at the navigation bridge.

Ch 2, Sec 2

Add the following Article [9]:

9 Tanks containing fuel for auxiliary vehicles**9.1 General**

9.1.1 Tanks containing fuel for auxiliary vehicles are to comply with the requirements of Pt C, Ch 4, Sec 11, [3.1].

Ch 3, Sec 2, [4.8.1]

Replace the first paragraph by:

Small tanks which satisfy the following condition corresponding to an angle of inclination of 30° need not be included in the correction:

Ch 3, Sec 3, [1.2]

Replace Requirement [1.2.1] by:

1.2.1 Ships having the additional class notation **SDS** and the additional service feature **SPxxx** or **SPxxx-capable** are to comply, in addition to the applicable requirements of this Section, with the requirements of Pt D, Ch 11, Sec 3, [2.3], considering the special personnel as passengers, where the attained subdivision index A (defined in Pt D, Ch 11, Sec 3, [2.3.3]) is not to be less than:

- R, where the ship is carrying 240 persons or more
- 0,8 R, where the ship is carrying not more than 60 persons
- R value to be calculated by linear interpolation between 0,8 R and R, where the ship is carrying more than 60 (but not more than 240) persons.

where:

Ch 3, App 2, [1.2]

Replace requirement [1.2.4] by:

1.2.4 Container ships

In addition to the standard loading conditions specified in [1.2.1], for ships with the service notation **container ship** the following loading cases are to be included in the trim and stability booklet:

- ship with a number of containers having a weight corresponding to the maximum permissible weight for each

9.2 Tank protection and segregation

9.2.1 Tanks containing fuel for auxiliary vehicles are to be located in accordance with the requirements of Pt C, Ch 4, Sec 11, [3.2].

$$R = 1 - \frac{5000}{L_s + 2,5N + 15225}$$

$$N = N_1 + 2 N_2$$

N_1 : Number of persons for whom lifeboats are provided

N_2 : Number of persons (including officers and crew) the ship is permitted to carry in excess of N_1

L_s : Subdivision length of the ship, as defined in Pt D, Ch 11, Sec 3, [2.1.4]

Where the conditions of service are such that compliance with Pt D, Ch 11, Sec 3, [2.3] on the basis of $N = N_1 + 2 N_2$ is impracticable and where the Society considers that a suitably reduced degree of hazard exists, a lesser value of N may be taken but in no case less than $N = N_1 + N_2$.

container at the summer load waterline when loaded with full stores and consumables

- same loading condition as above, but with 10% stores and consumables

The vertical location of the centre of gravity for each container is generally to be taken at one half of the container height. Different locations of the vertical centre of gravity may be accepted in specific cases, if documented.

Part B

Ch 4, Sec 2

Replace Table 2 by:

Table 2 : Corrosion additions t_c , in mm, for each exposed side

Compartment type		General (1)	Special cases
Ballast tank (2)		1,00	1,25 in upper zone (3)
Cargo oil tank and fuel oil tank (4) Independent or integral methanol fuel tank of ships with additional service feature methanol-fuel (5)	Plating of horizontal surfaces	0,75	1,00 in upper zone (3)
	Plating of non-horizontal surfaces	0,50	1,00 in upper zone (3)
	Ordinary stiffeners and primary supporting members	0,75	1,00 in upper zone (3)
Independent tank of ships with service notation liquefied gas carrier or LNG bunkering ship (6) Independent gas fuel tank of ships with the additional service feature LNGfuel, CNGfuel, LPGfuel or ammoniafuel (7)		0,00	
Cofferdam in cargo area of ships with the service notation liquefied gas carrier or LNG bunkering ship Cofferdam adjacent to the gas fuel tank on ships with the additional service feature LNGfuel, CNGfuel, LPGfuel or ammoniafuel		1,00	
Dry bulk cargo hold (8)	General	1,00	
	Inner bottom plating Side plating for single hull ship Inner side plating for double hull ship Sloping stool plate of hopper tanks and lower stool Transverse bulkhead plating	1,75	
Frames, ordinary stiffeners and primary supporting members		1,00	1,50 in lower zone (9)
Tanks for fresh water		0,50	
Tanks dedicated to water-based or oil-based process muds		1,25	
Tanks for drilling brines		1,25	
Moonpool		1,75	
Compartment located between independent tank and inner side of ships with the service notation asphalt carrier		1,00	
Hopper well of dredging ships		2,00	
Accommodation space (10)		0,00	
Compartments other than those mentioned above (10) Outside sea and air		0,50	
<p>(1) General: corrosion additions t_c are applicable to all members of the considered item with possible exceptions given for upper and lower zones</p> <p>(2) Ballast tank: does not include cargo oil tanks which may carry ballast according to Regulation 18 of MARPOL 73/78 as amended</p> <p>(3) Upper zone: area within 1,5 m below the top of the tank. This is to be applied only to tanks with weather deck as the tank top</p> <p>(4) For ships with the service notation chemical tanker ESP, the corrosion addition t_c may be taken equal to 0 for cargo tanks covered with a protective lining or coating (see IBC, 6)</p> <p>(5) The corrosion addition t_c may be taken equal to 0 for tanks covered with a protective lining or coating</p> <p>(6) The corrosion addition t_c specified for cargo tanks is to be applied when required in Pt D, Ch 9, Sec 4, [2.1.5]</p> <p>(7) The corrosion addition t_c specified for gas fuel tanks is to be applied when required in NR529, 6.4.1</p> <p>(8) Dry bulk cargo hold: includes holds, intended for the carriage of dry bulk cargoes, which may carry oil or water ballast</p> <p>(9) Lower zone: area within 3 m above the bottom of the tank or the hold</p> <p>(10) When not covered by any sheeting, AC Room, galleys, technical areas and crew staircases are to be considered as "other compartments"</p>			

Ch 5, Sec 2, [2.1.2]

Add the following Note 1 at the end of the second item of the bulleted list (ballast conditions):

Note 1: Annex 1 of IACS Unified Requirement UR S11, as amended, contains a guidance for partially filled ballast tanks in ballast loading conditions.

Ch 8, Sec 10, [3.3.8]

Replace the definition of “ $t_{eq,j}$ ” by:

$$t_{eq,j} = \sqrt{\frac{\sum_{j=1}^n E_{p,j} t_{p,j}^3}{E_{p,j} t_{p,j}}}$$

Ch 8, Sec 12, [5.1]

Replace requirement [5.1.3] by:

5.1.3 Watertight doors above the freeboard or bulkhead deck which are not immersed by an equilibrium or intermediate waterplane but become intermittently immersed at angles of heel in the required range of positive stability

beyond the equilibrium position may be only hose tested (required only to be weathertight according to Ch 3, Sec 3, [3.3.2]).

Ch 8, Sec 12, [5.2]

Replace requirement [5.2.5] by:

5.2.5 For doors on passenger ships which are used at sea or which become submerged by the equilibrium or intermediate waterplane, a prototype test shall be conducted, on

each side of the door, to check the satisfactory closing of the door against a force equivalent to a water height of at least 1 m above the sill on the centre line of the door.

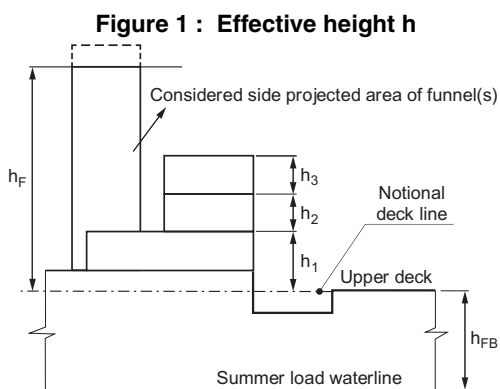
Ch 9, Sec 4, [1.2.1]

Replace the first paragraph by:

All ships are to be provided with equipment in anchors and chain cables, to be obtained from Tab 1, based on their Equipment Number EN.

Ch 9, Sec 4

Replace Figure 1 by:



Ch 9, Sec 4, [1.2]

Replace requirement [1.2.2] by:

1.2.2 Equipment Number formulae

The Equipment Number EN is to be obtained from the following formula:

$$EN = \Delta^{2/3} + 2 (h B + S_{fun}) + 0,1 A$$

where:

Δ : Moulded displacement of the ship, in t, to the summer load waterline

h : Effective height, in m, from the summer load waterline to the top of the uppermost house, to be obtained in accordance with the following formula:

$$h = a + \sum h_n$$

When calculating h , sheer and trim are to be disregarded

a : Vertical distance at hull side, in m, from the Summer Load waterline amidships to the upper deck

h_n : Height, in m, at the centreline of tier "n" of superstructures or deckhouses having a breadth greater than B/4. Where a house having a breadth greater than B/4 is above a house with a breadth of B/4 or less, the upper house is to be included and the lower ignored.

For the lowest tier, h_1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see Fig 1.

S_{fun} : Effective front projected area of the funnel, in m^2 , defined as:

$$S_{fun} = A_{FS} - S_{shield}$$

A_{FS} : In case a single funnel is fitted on the ship, front projected area of the funnel, in m^2 , calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F . A_{FS} is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height.

In case several funnels are fitted on the ship, sum of the front projected area of each funnel, in m^2 , calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F . A_{FS} is to be taken equal to zero if the sum of each funnel breadth is less or equal to B/4 at all elevations along the funnels height.

h_F : In case a single funnel is fitted on the ship, effective height of the funnel, in m, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in

the upper deck, to the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4.

In case several funnels are fitted on the ship, effective height of the funnel, in m, measured from the upper deck, or notional deck line where there is local discontinuity in the upper deck, to the top of the highest funnel. The top of the highest funnel may be taken at the level where the sum of each funnel breadth reaches B/4.

S_{shield} : The section of front projected area A_{FS} , in m^2 , which is shielded by all deck houses having breadth greater than B/4.

If there are more than one shielded section, the individual shielded sections i.e. $S_{shield1}$, $S_{shield2}$, etc., as shown in Fig A are to be added together.

To determine S_{shield} , the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in Fig A.

A : Side projected area, in m^2 , of the hull, superstructures houses and funnels above the summer load waterline which are within the length L_E and also have a breadth greater than B/4.

In case a single funnel is fitted on the ship, the side projected area is considered in A when A_{FS} is greater than zero. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F .

In case several funnels are fitted on the ship, the total side projected area of the funnels is to be considered in the side projected area A when A_{FS} is greater than zero.

In case of several funnels, the shielding effect of funnels in transverse direction may be considered in the total side projected area, i.e., when the side projected areas of two or more funnels fully or partially overlap, the overlapped area needs only to be counted once.

L_E : Equipment length, in m, equal to L without being taken neither less than 96% nor greater than 97% of the total length of the summer load waterline.

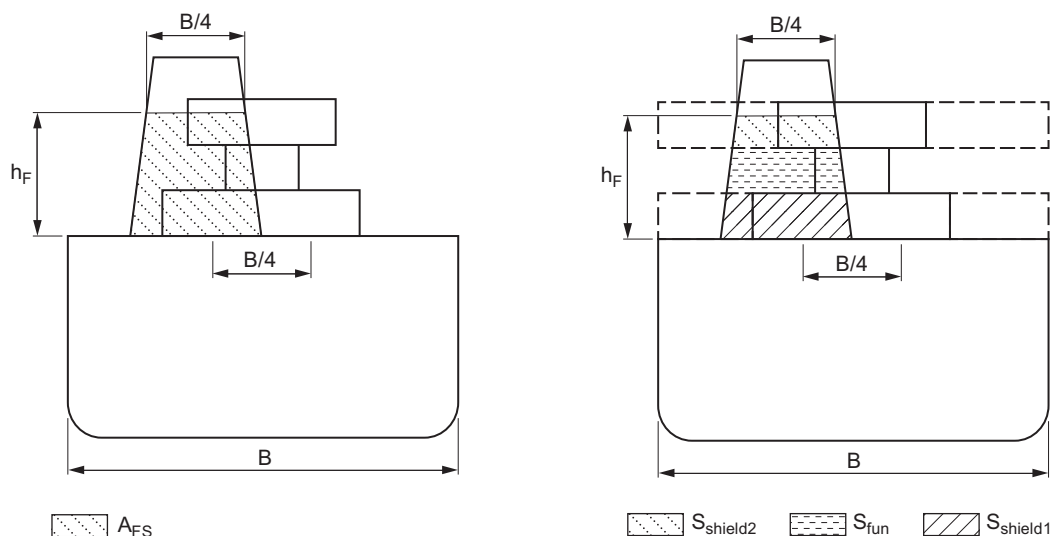
Fixed screens, fixed picture windows or bulwarks 1,5 m or more in height are to be regarded as parts of houses when determining h and A . In particular, the hatched area shown in Fig 2 is to be included. In case of non butt-jointed picture windows, only the efficient closed areas are to be included.

The height of hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A .

Ch 9, Sec 4

Insert the following new Figure A:

Figure A : Shielded sections

**Ch 9, Sec 4, [2.2]**

Delete requirement [2.2.5].

Ch 9, Sec 4, [2.5.2]

Replace the first paragraph by:

Based on mooring line arrangements with brakes engaged and cable lifter disengaged, the capacity HL (Holding Load), in kN, of the windlass brake is to be sufficient to withstand

the following design loads without any permanent deformation of the stressed parts and without brake slip:

Ch 9, Sec 4, [2.6.1]

Replace the first paragraph by:

A chain stopper is generally to be fitted between the windlass and the hawse pipe in order to relieve the windlass of the pull of the chain cable when the ship is at anchor. The

chain stopper is to comply with applicable requirements given in the Rule Note NR626 Anchor Windlass.

Ch 9, Sec 4, [4.2.1]

Add the following three paragraphs at the end of the requirement:

The “nominal capacity condition” is defined as the theoretical condition where the maximum possible deck cargoes are included in the ship arrangement in their respective positions. For ships carrying containers, the nominal capacity condition represents the theoretical condition where the maximum possible number of containers is included in the ship arrangement in their respective positions.

“Ship Design Minimum Breaking Load” (MBL_{SD}) means the minimum breaking load of new, dry mooring lines or tow

line for which shipboard fittings and supporting hull structures are designed in order to meet mooring restraint requirements or the towing requirements of other towing service.

“Line Design Break Force” (LDBF) means the minimum force that a new, dry, spliced, mooring line will break at. This is for all synthetic cordage materials.

Part B

Ch 9, Sec 4, [4.2.2]

Replace the last item of the second bulleted list by:

- canal transit towing: reference is to be made to local canal transit requirements.

Ch 9, Sec 4, [4.2.4]

Replace item b) and item d) by:

- b) Escort or other towing operations: the MBL_{SD} of the tow line according to Ch 9, App 2
- d) Mooring operations: the MBL_{SD} of the mooring line according to Ch 9, App 2

Ch 9, Sec 4, [4.2.5]

Replace item b) and item d) by:

- b) Escort or other towing operations:
the greater of the ship design minimum breaking load according to Ch 9, App 2 and 1,25 times the safe towing load TOW requested by the applicant, see [4.2.8]
- d) Mooring operations:
1,15 times the greater of the MBL_{SD} of the mooring line according to Ch 9, App 2 and the SWL of the shipboard fitting requested by the applicant, see [4.2.9].

Replace Note 1, Note 2 and Note 3 by the following Note 1, Note 2, Note 3 and Note 4:

Note 1: The maximum brake holding load of winches used for mooring operations is to be assumed not less than 80% of the MBL_{SD} of the mooring line according to Ch 9, App 2, [2].

Note 2: The MBL_{SD} of tow and mooring lines taken in Ch 9, App 2, Tab 1 are to be based on an Equipment Number calculated according to [1.2.2] with a side projected area A including deck cargoes as given by the ship nominal capacity condition defined in [4.2.1].

Note 3: The increase of the LDBF of tow and mooring lines for synthetic ropes as required in Ch 9, App 2, [2.5] needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structure.

Note 4: For fittings intended to be used for both towing and mooring operations, the corresponding design loads are to be considered independently.

Ch 9, Sec 4, [4.2]

Replace requirement [4.2.6] by:

4.2.6 Allowable stresses

Allowable stresses under the design load conditions as specified in [4.2.5] are as follows:

- a) For strength assessment by means of beam theory or grillage analysis:
- normal stress: $1,0 R_{eH}$
 - shear stress: $0,6 R_{eH}$
- b) For strength assessment by means of finite element analysis:
- Von Mises stress: $1,0 R_{eH}$

Note1: Normal stress is to be considered as the sum of bending stress and axial stress, with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors are to be taken into account.

Note 2: For strength assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry as realistically as possible. The aspect ratios of elements are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs is not to exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modelled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.

Ch 9, Sec 4, [4.2.8]

Replace the first paragraph by:

The safe towing load (TOW) is the safe load limit of shipboard fittings used for towing purpose.

Replace item b) of the alphanumeric list by:

- b) Escort or other towing operations: 80% of the MBL_{SD} of the tow line according to Ch 9, App 2

Ch 9, Sec 4, [4.2.9]

Replace the first two paragraphs by:

The safe working load (SWL) is the safe load limit of shipboard fittings used for mooring purpose.

Unless a greater SWL is requested by the applicant, the SWL is not to exceed the MBL_{SD} of the mooring line as given in Ch 9, App 2, Tab 1.

Ch 9, Sec 4, [4.2.10]

Replace item e) by:

- e) manner of applying towing and mooring lines including limiting fleet angle i.e. angle of change in direction of a line at the fitting.

Replace the last paragraph by:

Furthermore, following information is to be clearly indicated on the plan:

- the arrangement of mooring lines showing the number of lines
- the MBL_{SD} of each mooring line
- the acceptable environmental conditions as given in Ch 9, App 2, [2.7.3] for the MBL_{SD} of mooring lines for ships with Equipment Number EN > 2000:
 - 30 second mean wind speed from any direction (v_w or v_w^* according to Ch 9, App 2, [2.7.3])
 - maximum current speed acting on bow or stern ($\pm 10^\circ$)

Note 1: The SWL and TOW for the intended use for each shipboard fitting is to be noted in the towing and mooring arrangements plan available on board for the guidance of the Master. It is to be noted that TOW is the load limit for towing purpose and SWL that for mooring purpose. If not otherwise chosen, for towing bits it is to be noted that TOW is the load limit for a towing line attached with eye-splice.

Note 2: The information as listed above is to be incorporated into the pilot card in order to provide the pilot proper information on harbour, escort and other towing operations.

Ch 9, App 2, [1]

Insert the following new sub-article [1.2]:

1.2 Definition

1.2.1 For symbols and definitions not defined in this Section, refer to Ch 9, Sec 4.

Part B

Ch 9, App 2, [1.2]

Replace (existing) requirement [1.2.4] by:

1.2.4 Mooring lines are to have as straight a lead as is practicable from the mooring drum to the fairlead.

Ch 9, App 2, [1.3]

Replace (existing) requirement [1.3.3] by:

1.3.3 Towing lines are to have a straight lead from the towing bitt or bollard to the chock.

Ch 9, App 2, [2]

Replace sub-article [2.1] by:

2.1 General

2.1.1 The equipment in tow line and mooring lines (length, MBL_{SD} and number of lines) is obtained from Tab 1 and Tab 2 based on an Equipment Number EN calculated according to Ch 9, Sec 4, [1.2.2] with a side projected area A including deck cargoes at ship nominal capacity, as defined in Ch 9, Sec 4, [4.2.1].

2.1.2 For mooring lines for ships with $EN > 2000$, length, breaking load and number of lines are defined in [2.7].

2.1.3 The breaking load given in Tab 1, Tab 2 or in [2.7.4] is used to determine the maximum design load applied to shipboard fittings as defined in Ch 9, Sec 4, [4.2.5].

2.1.4 The tow lines having the characteristics defined in Tab 1, Tab 2 and [2.7] are intended as those belonging to the ship to be towed by a tug or another ship under normal towing conditions (calm water / harbour).

2.1.5 The Designer is to verify the adequacy of towing lines based on assessments carried out for the individual towing arrangement.

2.1.6 The designer is to verify the adequacy of mooring lines based on assessments carried out for the individual mooring arrangement, expected shore-side mooring facilities and design environmental conditions for the berth.

Ch 9, App 2, [2.2]

Replace requirement [2.2.2] by:

2.2.2 The breaking loads defined in Tab 1, Tab 2 and [2.7.4] refer to steel wires.

Ch 9, App 2, [2.5.3]

Replace the first paragraph by:

The line design break force of synthetic fibre ropes B_{LS} is to be not less than that obtained, in kN, from the following formula:

Replace the definition of " B_{L0} " by:

B_{L0} : MBL_{SD} , in kN, for the line, defined in Tab 1, Tab 2 and [2.7.4]

Ch 9, App 2, [2.7]

Replace requirement [2.7.2] by:

2.7.2 Side projected area A_1

The strength of mooring lines and the number of head, stern, and breast lines for ships with an Equipment Number $EN > 2000$ are based on the side-projected area A_1 .

Side projected area A_1 is to be calculated similar to the side-projected area A according to Ch 9, Sec 4, [1.2.2] but considering the following conditions:

- the ballast draft is to be considered for the calculation of the side projected area A_1 . For ship types having small variation in the draft, like e.g. passenger and RO/RO ships, the side projected area A_1 may be calculated using the summer load waterline.
- deck cargoes at ship nominal capacity condition as defined in Ch 9, Sec 4, [4.2.1] are to be included for the

determination of side-projected area A_1 . For the condition with cargo on deck, the summer load waterline may be considered.

Note 1: Wind shielding of the pier can be considered for the calculation of the side-projected area A_1 unless the ship is intended to be regularly moored to jetty type piers. A height of the pier surface of 3 m over waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A_1 .

Note 2: Deck cargoes may not need to be considered if ballast draft condition generates a larger side-projected area A_1 than the full load condition with cargoes on deck. The larger of both side-projected areas is to be chosen as side-projected area A_1 .

Replace requirement [2.7.4] by:

2.7.4 Ship design minimum breaking load

The ship design minimum breaking load MBL_{SD} , in kN, of the mooring lines is to be taken as:

$$MBL_{SD} = 0,1 A_1 + 350$$

The ship design minimum breaking load MBL_{SD} may be limited to 1275 kN (130 t).

However, in this case the moorings are to be considered as not sufficient for environmental conditions given in [2.7.3].

For these ships, the acceptable wind speed v_w^* , in m/s, can be estimated as follows:

$$v_w^* = v_w \sqrt{\frac{MBL_{SD}^*}{MBL_{SD}}}$$

where v_w as defined in [2.7.3], MBL_{SD} as defined above and MBL_{SD}^* the ship design minimum breaking load of the mooring lines intended to be supplied.

However, the ship design minimum breaking load is not to be taken less than corresponding to an acceptable wind speed of 21 m/s:

$$MBL_{SD}^* \geq \left(\frac{21}{v_w}\right)^2 MBL_{SD}$$

If lines are intended to be supplied for an acceptable wind speed v_w^* higher than v_w as defined in [2.7.3], the ship design minimum breaking load MBL_{SD}^* is to be taken as:

$$MLB_{SD}^* = \left(\frac{v_w^*}{v_w}\right)^2 MBL_{SD}$$

Replace requirements [2.7.6] and [2.7.7] by:

2.7.6 Head, stern and breast lines

The total number of head, stern and breast lines is to be taken as:

- for ships with one of the service notations **oil tanker**, **chemical tanker**, **bulk carrier** or **ore carrier**:

$$n = 8,3 \cdot 10^{-4} A_1 + 4$$

- for other ships:

$$n = 8,3 \cdot 10^{-4} A_1 + 6$$

This number n is to be rounded to the nearest whole number and may be increased or decreased in conjunction with an adjustment to the strength of the lines. The adjusted ship design minimum breaking load MBL_{SD}^{**} , should be taken as:

- for increased number of lines:

$$MBL_{SD}^{**} = 1,2 \cdot MBL_{SD} \cdot \frac{n}{n^{**}} \leq MBL_{SD}$$

- for reduced number of lines:

$$MBL_{SD}^{**} = MBL_{SD} \cdot \frac{n}{n^{**}}$$

where MBL_{SD} is MBL_{SD} or MBL_{SD}^* specified in [2.7.4], as appropriate, n^{**} is the increased or decreased total number of head, stern and breast lines and n the number of lines for the considered ship type as calculated by the above formulas without rounding.

Vice versa, the ship design minimum breaking load of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines.

Part B

2.7.7 Spring lines

The total number of spring lines is to be taken not less than:

- for ship with EN < 5000: two lines
- for ships with EN ≥ 5000: four lines

The ship design minimum breaking load of spring lines is to be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the ship design minimum

breaking load of the lines, the number of spring lines should be taken as follows, but rounded up to the nearest even number:

$$n_s^* = \frac{MBL_{SD}}{MBL_{SD}^{**}} \cdot n_s$$

where MBL_{SD} is MBL_{SD} or MBL_{SD}^* specified in [2.7.4], as appropriate, n_s is the number of spring lines as given above and n_s^* is the increased number of spring lines.

Ch 9, App 2, Table 1

Replace the table header and table footer as follows:

Table 1 : Tow line and mooring lines for EN ≤ 2000

Equipment number EN A < EN ≤ B		Tow line		Mooring lines		
A	B	Minimum length, in m	MBL_{SD} , in kN (1)	N (2)	Length of each line, in m	MBL_{SD} , in kN (1)
(1) Refer to Ch 9, Sec 4, [4.2.1]						
(2) Refer to [2.6].						

Ch 9, App 2, Table 2

Replace the table header as follows:

Table 2 : Tow line for EN > 2000

Equipment number EN A < EN ≤ B		Tow line	
A	B	Minimum length, in m	MBL_{SD} , in kN (1)

Amendments to PART C

CHAPTER 1

Ch 1, Sec 3, Figure 10

Replace “ $\geq 30^\circ$ ” by “ $\leq 30^\circ$ ”

Ch 1, Sec 10, Table 16

Replace table footnote (5), (6) and (7) as follows:

Table 16 : Use of metallic flange connections in piping systems (types as shown in Fig 1)

Type of media conveyed	Class of piping (see Tab 3)		
	I	II	III
(5) Type E2: only for design pressure $p \leq 1,6$ MPa and design temperature $T \leq 150^\circ\text{C}$.			
(6) Types D and E2: only for design temperature $T \leq 250^\circ\text{C}$.			
(7) Type E1: only for water pipelines and for open ended lines (e.g. drain, overflow, air vent piping, etc.).			

Ch 1, Sec 10, [9.3.4]

Replace item c) of the alphanumeric list by:

- c) The cross-sectional area of the overflow main is to be sufficient to allow the two largest pipes to discharge simultaneously into the main.

Ch 1, Sec 10, [19.3.3]

Replace the second item of the bulleted list in item a) by:

- acetylene piping is to be of stainless steel or copper alloy containing less than 65% copper and seamless drawn

Ch 1, Sec 13, [2.3.2]

Replace the title by:

2.3.2 Ammonia plant located in the engine room

CHAPTER 2

Ch 2, Sec 3, [2.2]

Replace the requirement [2.2.8] by:

2.2.8 Where the electrical power is normally supplied by one generator, provision is to be made, upon loss of power, for automatic starting and connecting to the main switchboard of stand-by generator(s) of sufficient capacity to supply the primary essential services and to ensure the safety of the ship, with automatic restarting of the essential auxiliaries, in sequential operation if required. Starting and con-

nection to the main switchboard of the stand-by generator is to be preferably within 30 seconds, but in any case not more than 45 seconds after loss of power.

Where prime movers with longer starting time are used, this starting and connection time may be exceeded upon approval from the Society.

Ch 2, Sec 3, [10.1]

Replace the requirement [10.1.4] by:

10.1.4 Electrical installations in hazardous areas are to be inspected by skilled personnel at their initial installation. The requirements of IEC 60079-17 apply.

Ch 2, Sec 3, [10]

Replace sub-article [10.5] by:

10.5 Electrical installations in paint stores or enclosed spaces leading to paint stores

10.5.1 General

Electrical equipment is to be installed in paint stores and in ventilation ducts serving such spaces only when it is essential for operational services.

Certified safe type equipment of the following type is acceptable:

- certified intrinsically-safe apparatus Ex(i)
- certified flameproof Ex(d)
- certified pressurised Ex(p)
- certified increased safety Ex(e)
- certified specially Ex(s).

Cables (through runs or termination cables) of armoured type or installed in metallic conduits are to be used.

10.5.2 In the areas on open deck within 1 m of inlet and exhaust ventilation openings of paint stores or 3 m of exhaust mechanical ventilation outlets of such spaces, the following electrical equipment may be installed:

- electrical equipment with the type of protection as permitted in paint stores
- equipment of protection class Ex(n)

- appliances which do not generate arcs in service and whose surface does not reach unacceptably high temperature
- appliances with simplified pressurised enclosures or vapour-proof enclosures (minimum class of protection IP55) whose surface does not reach unacceptably high temperature; or
- cables as specified in [10.5.1].

10.5.3 Minimum requirements

The minimum requirements for the certified safe type equipment are as follows:

- explosion group II B
- temperature class T3.

10.5.4 Switches, protective devices and motor control gear of electrical equipment installed in a paint store are to interrupt all poles or phases and are preferably to be located in a non hazardous space.

10.5.5 Hazardous area classification

- a) The paint stores and supply and exhaust ventilation ducts serving such spaces are to be classified as Zone 1, as defined in Sec 1 [3.24].
- b) Areas on open deck within 1 m of inlet and exhaust ventilation openings of paint stores or within 3 m of exhaust mechanical ventilation outlets of such spaces are to be classified as Zone 2, as defined in Sec 1 [3.24].

- c) Enclosed spaces giving access to paint stores may be considered as non-hazardous, provided that:
- the door to the paint store is a gastight door with self-closing devices without holding back arrangements. A watertight door may be considered as being gastight
 - the paint store is provided with an acceptable, independent, natural ventilation system ventilated from a safe area, and
 - warning notices are fitted adjacent to the paint store entrance stating that the store contains flammable liquids

Ch 2, Sec 4, [3.1.4]

Replace the first paragraph of the requirement by:

All electric motors rated at or above 100 kW and alternators rated at or above 100 kVA intended for essential services are to be type approved or case-by-case approved and surveyed by the Society during testing and, if appropriate, during manufacturing. Tested machines are to be individually certified by the Society.

Ch 2, Sec 4, [3.1]

Replace the requirement [3.1.5] by:

3.1.5 All electric motors rated below 100 kW and alternators rated below 100 kVA intended for essential services are to be type approved or case-by-case approved. Individual works' certificate is to be issued by the manufacturer and detailed test report submitted to the Society.

Ch 2, Sec 11, [6.5.2]

Add the following paragraph at the end of requirement [6.5.2]:

In any case, the quantity of air expelled (by natural or forced ventilation) is to be at least equal to 6 air changes per hour.

Ch 2, Sec 11, [6.5]

Insert the following new requirements [6.5.3], [6.5.4] and [6.5.5]:

6.5.3 Fans starters cabinet is to be located outside of the energy electric storage system (ESS) room.

6.5.4 Ventilation fans are not to produce a source of vapor ignition in either the ventilated space or the ventilation system associated with the space. A non-sparking exhaust fan is to be provided. Equipment (including fan

motors) installed within the duct are to be suitable for installation in Zone 2 as given in Ch 2, Sec 2, [6] and Ch 2, Sec 3, [10].

6.5.5 Areas on open deck within 1,5 m of inlet or exhaust openings of battery rooms are to be classified as hazardous area Zone 2.

Ch 2, Sec 12, [7.3]

Replace the requirement [7.3.6] by:

7.3.6 When cables are fixed by means of clips or straps made from a material other than metal and these cables are not laid on top of horizontal cable supports (e.g. in the case of vertical installation or suspended cables), suitable metal

clips or saddles spaced not more than 1 metre apart are to be used in addition in order to prevent the release of cables during a fire.

Delete the requirement [7.3.7].

Part C

Ch 2, Sec 12, [7.15]

Replace the requirement [7.15.3] by:

7.15.3 Cables of intrinsically safe circuits are to be separated from cables of non-intrinsically safe circuits by a physical distance of at least 50 mm between the bare conducting parts of terminals, or by earthed metallic partitions.

Ch 2, Sec 14, [2.2]

Insert the following requirement [2.2.2]:

2.2.2 When an energy storage system (ESS) is used to supply the electric propulsion and when this ESS is necessary to maintain the voltage and frequency variations of power supply between the limits of the rules defined in Pt C, Ch 2, Sec 2 (for instance the peak power load during ice breaking of the pods), the requirements of Pt F, Ch 11, Sec 22 are to be complied with.

CHAPTER 3

Ch 3, Sec 6, Table 1

Delete the table footnote (10) and references to this footnote in rows 5, 14 and 19.

Ch 3, Sec 6

Delete Table 2.

CHAPTER 4

Ch 4, Sec 1, [2.5.1]

Replace alphanumeric list by:

- | | |
|---|---|
| a) A, B class fire divisions (bulkheads or decks) and associated openings | m) Fixed foam fire-extinguishing systems and associated foam-forming liquids |
| b) C-class divisions | n) Fixed powder fire-extinguishing systems, including the powder |
| c) Materials for pipes penetrating A or B class divisions (where they are not of steel or other equivalent material) | o) Equivalent water-mist fire-extinguishing systems |
| d) Bulkhead or deck penetrations for electrical cables passing through A or B class divisions | p) Equivalent fixed gas fire-extinguishing systems |
| e) Fire dampers | q) Fixed water-based local application fire-extinguishing systems |
| f) Prefabricated sanitary units | r) Equivalent water-mist automatic sprinkler systems |
| g) Prefabricated window casings | s) Fixed fire-extinguishing systems for protection of galley cooking equipment |
| h) Fire door control systems | t) Portable fire-fighting device for stacked containers (according to Pt F, Ch 11, Sec 30, [5.1]) |
| i) Flexible pipes and expansion bellows of non-conventional material for any type of fluid | u) Portable fire-extinguishers |
| j) Materials with low flame spread characteristic including paints, varnishes and similar, when they are required to have such characteristic | v) Non-portable and transportable extinguishers |
| k) Non-combustible materials | w) Fire hoses |
| l) Non-readily igniting materials for primary deck coverings | x) Portable foam applicators |
| | y) Water and foam monitor |

- z) Foam proportioner/inductor
- aa) Sprinkler heads for automatic sprinkler systems
- ab) Nozzles for fixed pressure water-spraying fire-extinguishing systems for machinery spaces, boiler rooms, deep fat cooking equipment fire-extinguishing systems, and spaces intended for the carriage of vehicles and for hangars
- ac) Sensing heads for automatic fire alarm and fire detection systems
- ad) Fixed fire detection and fire alarm systems
- ae) Flammable gas detection system
- af) Explosive mixture detecting systems
- ag) Portable explosive mixture detecting apparatus
- ah) Fixed instruments for measuring the oxygen content for inert gas systems serving cargo tanks
- ai) Portable instruments for measuring the oxygen content for inert gas systems serving cargo tanks
- aj) Upholstered furniture, excluding the frame (for spaces defined in [3.33])
- ak) Textile and non-textile materials suspended vertically, for example curtains (for spaces defined in [3.33])
- al) Bedding components (for spaces defined in [3.33])
- am) Low location lighting systems
- an) Inert gas systems serving cargo tank.

Ch 4, Sec 2, [2.1.3]

Replace the first paragraph by:

The following requirements apply to closable ventilation louvers and ventilator closing appliances serving emergency generator rooms, where fitted:

Replace item c) of the alphanumeric list by:

- c) Power-operated ventilation louvers and closing appliances shall be of a fail-to-open type. Closed power-operated ventilation louvers and closing appliances are acceptable during normal operation of the vessel.
Power-operated ventilation louvers and closing appliances shall open automatically whenever the emergency generator is starting/in operation.

Ch 4, Sec 5, [1.3.3]

Replace in item b), 2), the paragraph "(5) Open deck spaces" by:

- (5) *Open deck spaces*

Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition,

such spaces are to be naturally ventilated through permanent openings, having a combined area of at least 30% of the total area of the space boundaries adjacent to the outside.

Air spaces (the space outside superstructures and deck-houses).

Ch 4, Sec 5, [1.3.4]

Replace in item b), 2), the paragraph "(10) Open decks" by:

- (10) *Open decks*

Open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishing shall be restricted to deck furniture. In addition, such spaces are to be naturally venti-

lated through permanent openings, having a combined area of at least 30% of the total area of the space boundaries adjacent to the outside.

Air spaces (the space outside superstructures and deck-houses).

Part C

Ch 4, Sec 5, [1.4.3]

Replace in item b), 2), the paragraph “(10) Open decks” by:

- (10) Open decks

Open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces are to be naturally venti-

lated through permanent openings, having a combined area of at least 30% of the total area of the space boundaries adjacent to the outside.

Air spaces (the space outside superstructures and deck-houses).

Ch 4, Sec 5, [1.5.2]

Replace in item b), 2), the paragraph “(10) Open decks” by:

- (10) Open decks

Open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces are to be naturally venti-

lated through permanent openings, having a combined area of at least 30% of the total area of the space boundaries adjacent to the outside.

Air spaces (the space outside superstructures and deck-houses).

Ch 4, Sec 11, [3.2]

Replace the requirement [3.2.2] by:

3.2.2 Protection against collision and grounding

Fuel tanks are to be located as follows, with respect to the rule length L defined in Pt B, Ch 1, Sec 2, [3.1] and ship's moulded breadth B defined in Pt B, Ch 1, Sec 2, [3.4]:

- inboard from the ship's side:

B/5 or 11,5 m, whichever is less, measured inboard from the ship side at right angles to the centreline at the level of the summer load line draught. Alternatively, the calculation methodology given in Rule Note NR529, 5.3.4, as amended, may be used to determine the acceptable location of the fuel tanks.

Note 1: NR529 Gas fuelled ships

- inboard from the shell plating or from aft terminal of the ship:

the greater of B/10 or 0,8 m. However, this distance need not be greater than B/15 or 2 m, whichever is less, where the shell plating is located inboard of B/5 or 11,5 m, whichever is less, as required above.

- above the bottom shell plating:

B/15 or 2,0 m, whichever is less, measured from the moulded line of the bottom shell plating at the centreline.

- abaft a transverse plane at 0,08L measured from the forward perpendicular.

Note 2: These distances are to be measured considering the most restrictive between the outermost and the lowermost boundary of the fuel tank.

Ch 4, Sec 11, [3.8.3]

Replace the second paragraph as follows:

Recognized standards for refuelling hoses include, but are not limited to, ISO 1825:2017 type C and EI 1529:2015.

Ch 4, Sec 15, [4.1.4]

Replace reference to “item b) 3) above” by a reference to “item b) 2) above” in item e) 1) of the alphanumeric list.

Amendments to PART D

Ch 7, Sec 6, [3.2.2]

Replace item a) 3) in the alphanumeric list as follows:

3) 3 l/min per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but in no case should the output of any monitor be less than 1,250 l/min.

Ch 7, Sec 6, [3.2.3]

Replace item a) of the alphanumeric list by:

a) *Prototype tests of the monitors and foam applicators shall be performed to ensure the foam expansion and drainage time of the foam produced does not differ more than 10 per cent of that determined in [3.2.2], item c). When medium expansion ratio foam (between*

21 to 1 and 200 to 1 expansion ratio) is employed, the application rate of the foam and the capacity of a monitor installation shall be to the satisfaction of the Society. At least 50 per cent of the foam solution supply rate required shall be delivered from each monitor

Ch 7, App 1, [1.1.3]

Replace “IEC - publication 79-1” by “IEC 60079-1” in Note 1.

Ch 7, App 1, [4.2.2]

Replace “IEC - publication 79/1” by “IEC 60079-1” in the first sentence of item a).

Ch 9, Sec 1, [1.1.1]

Add the following Note 1 at the end of the requirement:

Note 1: The service notation is to be completed by the additional service feature, as defined in Pt A, Ch 1, Sec 2, [4.4.5], indicating the cargo type, the IMO code ship type, the cargo tank design pressure P_{design} and minimum temperature T_{min} .

Ch 9, Sec 3, [1.6.5]

Replace “air lock” by “airlock” in the first paragraph of requirement [1.6.5]

Ch 9, Sec 4, [3.4]

Replace requirement [3.4.4] by the following one:

3.4.4 Sloshing loads

The sloshing loads on a cargo containment system and internal components shall be evaluated based on allowable filling levels.

When significant sloshing-induced loads are expected to be present, special tests and calculations shall be required covering the full range of intended filling levels.

For type C tanks where suitable wash bulkheads are installed, sloshing loads may be disregarded.

Guidance for calculation of sloshing pressure for integral and membrane tanks is given in Ch 9, App 1, [2.2].

Ch 9, Sec 6

Replace Table 2, Table 3 and Table 4 as follows:

Table 2 : Plates, pipes (seamless and welded) -see Note 1 and Note 2-, sections and forgings for cargo tanks and process pressure vessels for design temperatures not lower than 0°C

CHEMICAL COMPOSITION AND HEAT TREATMENT	
• Carbon-manganese steel	
• Fully killed fine grain steel	
• Small additions of alloying elements by agreement with the Society	
• Composition limits to be approved by the Society	
• Normalized, or quenched and tempered (1)	

TENSILE AND TOUGHNESS (IMPACT) TEST REQUIREMENTS				
Sampling frequency	• Plates	Each "piece" to be tested		
	• Sections and forgings	Each "batch" to be tested		
Mechanical properties	• Tensile properties	Specified minimum yield stress not to exceed 410 N/mm ² (2)		
Toughness (Charpy V-notch test)	• Plates	Transverse test pieces. Minimum average energy value (KV) 27 J		
	• Sections and forgings	Longitudinal test pieces. Minimum average energy value (KV) 41 J		
	• Test temperature (3)	Thickness t (mm)	Test temperature	
		t ≤ 20	0°C	
		20 < t ≤ 40	-20°C	
		40 < t ≤ 50 (4)	-20°C (5)	
40 < t ≤ 50 (4)	-30°C (6)			

- (1)** A controlled rolling procedure or TMCP may be used as an alternative.
 - (2)** Materials with specified minimum yield stress exceeding 410 N/mm² may be approved by the Society. For these materials, particular attention shall be given to the hardness of the welded and heat affected zones.
 - (3)** This Table is generally applicable for material thicknesses t up to 40 mm. Proposals for greater thicknesses shall be approved by the Society.
 - (4)** A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in IACS UR W11 or IACS UR W16.
 - (5)** Applies to type C independent tanks and process pressure vessels. In addition, post-weld stress relief heat treatment shall be performed. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by the Classification Society or shall be to recognized standards.
 - (6)** Applies to cargo tank other than type C.
- Note 1:** For seamless pipes and fittings normal practice applies. The use of longitudinally and spirally welded pipes shall be specially approved by the Society.
- Note 2:** Charpy V-notch impact tests are not required for pipes.

Table 3: Plates, sections and forgings -see Note 1- for cargo tanks, secondary barriers and process pressure vessels for design temperatures below 0°C and down to -55°C

CHEMICAL COMPOSITION AND HEAT TREATMENT	
• Carbon-manganese steel	
• Fully killed, aluminium treated fine grain steel	
• Chemical composition (ladle analysis): C: 0,16% max (1) ; Mn: 0,70-1,60% ; Si: 0,10-0,50% ; S: 0,025% max ; P: 0,025% max	
• Optional additions: Alloys and grain refining elements may be generally in accordance with the following: Ni: 0,80% max ; Cr: 0,25% max ; Mo: 0,08% max ; Cu:0,35% max ; Nb: 0,05% max ; V: 0,10% max Al content total: 0,020% min (acid soluble: 0,015% min)	
• Normalized, or quenched and tempered (2)	

TENSILE AND TOUGHNESS (IMPACT) TEST REQUIREMENTS		
Sampling frequency	• Plates	Each "piece" to be tested
	• Sections and forgings	Each "batch" to be tested
Mechanical properties	• Tensile properties	Specified minimum yield stress not to exceed 410 N/mm ² (3)
Toughness (Charpy V-notch test)	• Plates	Transverse test pieces. Minimum average energy value (KV) 27 J
	• Sections and forgings	Longitudinal test pieces. Minimum average energy value (KV) 41 J
	• Test temperature, t ≤ 25 mm (4)	5°C below the design temperature or -20°C, whichever is lower

- (1)** By special agreement with the Society, the carbon content may be increased to 0,18% maximum, provided the design temperature is not lower than -40°C.
- (2)** A controlled rolling procedure or TMCP may be used as an alternative.
- (3)** Materials with specified minimum yield stress exceeding 410 N/mm² may be approved by the Society. For these materials, particular attention shall be given to the hardness of the welded and heat affected zones.
- (4)** This Table is applicable for material thicknesses t up to 25 mm. For material thicknesses of more than 25 mm, Charpy V-notch tests shall be conducted at the following temperatures:

Thickness t (mm)	Test temperature
25 mm < t ≤ 30 mm	10°C below the design temperature or -20°C, whichever is lower
30 mm < t ≤ 35 mm	15°C below the design temperature or -20°C, whichever is lower
35 mm < t ≤ 40 mm	20°C below the design temperature
40 mm < t ≤ 50 mm (a)	5°C below the design temperature or -20°C, whichever is lower (b)
40 mm < t ≤ 45 mm (a)	25°C below the design temperature (c)
45 mm < t ≤ 50 mm (a)	30°C below the design temperature (c)

The impact energy value shall be in accordance with the Table for the applicable type of test specimen.

Materials for tanks and parts of tanks which are completely thermally stress relieved after welding may be tested at a temperature 5°C below design temperature or -20°C, whichever is lower.

For thermally stress relieved reinforcements and other fittings, the test temperature shall be the same as that required for the adjacent tank-shell thickness.

- (a)** A further set of impact test at mid thickness for products with t > 40 mm is required except rolled steels specified in IACS UR W11 or IACS UR W16.
- (b)**
- For design temperatures below 0°C and strictly down to -10°C:
Applies to type C independent tanks and process pressure vessels. In addition, post-weld stress relief heat treatment shall be performed. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by the Classification Society or shall be to recognized standards.
 - For design temperatures below -10°C and down to -55°C:
[6.2.2] applies with regards to post-weld stress relief heat treatment. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by the Classification Society or shall be to recognized standards.
- (c)** Applies to cargo tank other than type C.

Note 1: The Charpy V-notch and chemistry requirements for forgings may be specially considered by the Society.

Note 2: For materials exceeding 25 mm in thickness for which the test temperature is -60°C or lower, the application of specially treated steels or steels in accordance with Table 4 may be necessary.

Part D

Table 4: Plates, sections and forgings -see Note 1- for cargo tanks, secondary barriers and process pressure vessels for design temperatures below -55°C and down to -165°C

Minimum design temperature (1)	CHEMICAL COMPOSITION (2) AND HEAT TREATMENT	Impact test temperature	
-60°C	1,5% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP (5)	t ≤ 25 mm (3)	-65°C
-65°C	2,25% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP (5) (6)		-70°C
-90°C	3,5% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP (5) (6)		-95°C
-105°C	5,0% nickel steel – normalized or normalized and tempered or quenched and tempered (5) (6) (7)		-110°C
-165°C	9,0% nickel steel – double normalized and tempered or quenched and tempered (5)	(4)	-196°C
-165°C	Austenitic steels, such as types 304, 304L, 316, 316L, 321 and 347. Solution treated (8)		-196°C
-165°C	Aluminium alloys, such as type 5083 annealed		Not required
-165°C	Austenitic Fe-Ni alloy (36% nickel). Heat treatment as agreed		Not required

TENSILE AND TOUGHNESS (IMPACT) TEST REQUIREMENTS														
Sampling frequency	• Plates	Each "piece" to be tested												
	• Sections and forgings	Each "batch" to be tested												
Toughness (Charpy V-notch test)	• Plates	Transverse test pieces. Minimum average energy value (KV) 27 J												
	• Sections and forgings	Longitudinal test pieces. Minimum average energy value (KV) 41 J												
<p>(1) The requirements for design temperatures below -165°C shall be specially agreed with the Society.</p> <p>(2) The chemical composition limits shall be in accordance with recognized standards.</p> <p>(3) This Table is applicable for material thicknesses t up to 25 mm. For materials 1,5% Ni, 2,25% Ni, 3,5% Ni and 5,0% Ni, with thicknesses greater than 25 mm, the impact tests shall be conducted at the following temperatures:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Thickness t (mm)</th> <th>Test temperature</th> </tr> </thead> <tbody> <tr> <td>25 mm < t ≤ 30 mm</td> <td>10°C below the design temperature</td> </tr> <tr> <td>30 mm < t ≤ 35 mm</td> <td>15°C below the design temperature</td> </tr> <tr> <td>35 mm < t ≤ 40 mm</td> <td>20°C below the design temperature</td> </tr> <tr> <td>40 mm < t ≤ 45 mm (a)</td> <td>25°C below the design temperature</td> </tr> <tr> <td>45 mm < t ≤ 50 mm (a)</td> <td>30°C below the design temperature</td> </tr> </tbody> </table> <p>The energy value shall be in accordance with the Table for the applicable type of test specimen.</p> <p>(a) A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in IACS UR W11 or IACS UR W16.</p> <p>(4) For 9,0% Ni steels, austenitic stainless steels and aluminium alloys, thickness greater than 25 mm may be used.</p> <p>(5) TMCP nickel steels will be subject to acceptance by the Society.</p> <p>(6) A lower minimum design temperature for quenched and tempered steels may be specially agreed with the Society.</p> <p>(7) A specially heat treated 5,0% nickel steel, for example triple heat treated 5,0% nickel steel, may be used down to -165°C, provided that the impact tests are carried out at -196°C.</p> <p>(8) The impact test of austenitic stainless steel is required only for service temperature less than -105°C.</p> <p>Note 1: The impact test required for forgings used in critical applications shall be subject to special consideration by the Society.</p>			Thickness t (mm)	Test temperature	25 mm < t ≤ 30 mm	10°C below the design temperature	30 mm < t ≤ 35 mm	15°C below the design temperature	35 mm < t ≤ 40 mm	20°C below the design temperature	40 mm < t ≤ 45 mm (a)	25°C below the design temperature	45 mm < t ≤ 50 mm (a)	30°C below the design temperature
Thickness t (mm)	Test temperature													
25 mm < t ≤ 30 mm	10°C below the design temperature													
30 mm < t ≤ 35 mm	15°C below the design temperature													
35 mm < t ≤ 40 mm	20°C below the design temperature													
40 mm < t ≤ 45 mm (a)	25°C below the design temperature													
45 mm < t ≤ 50 mm (a)	30°C below the design temperature													

Ch 9, Sec 10, Table 1

Replace "air lock" by "airlock" in row 20 of Table 1.

Ch 9, Sec 11, [1.3]

Replace the requirement [1.3.4] by:

1.3.4 On vertical surfaces, spacing of nozzles protecting lower areas may take account of anticipated rundown from higher areas. Stop valves shall be fitted in the main supply line(s) in the water-spray system, at intervals not exceeding 40 m, for the purpose of isolating damaged sections. Alternatively, the system may be divided into two or more sections that may be operated independently, provided the necessary controls are located together in a readily accessi-

ble position outside the cargo area. A section protecting any area included in [1.3.2], items a) and b), shall cover at least the entire athwartship tank grouping in that area. Any gas process unit(s) included in [1.3.2] may be served by an independent section.

The number and location of spray nozzles are to be suitable to spread the sprayed water uniformly on areas to be protected.

Ch 9, Sec 16, [4.1.6]

Replace item b) of the alphanumeric list by:

b) Determination of the classes of piping systems

Piping classes I, II and III are to be determined in accordance with the provisions of:

- Tab 1 for gas fuel piping
- Tab 2 for all vent pipes and open ended lines, including:

- discharge lines from thermal relief valves (see Ch 9, Sec 5, [5.3.3])
- vent lines from the gas supply lines to consumers (see [4.6.1])
- purging lines from engines and other gas consumers.

Ch 9, Sec 16

Replace Table 1 by the following Table 1 and Table 2:

Table 1 : Classes of gas fuel piping systems

Design conditions		Class of the gas piping		
Design pressure	Design temperature	Single wall arrangement	Double wall arrangement	
			Inner pipe	Outer pipe (1)
p = 10 bar (2)	any	Class I	Class II	Class II
p > 10 bar	any	Class I	Class I	Class II

(1) The design pressure of the outer pipe or duct of fuel systems is to comply with Ch 9, Sec 5, [4.1.4]
(2) The design pressure is not to be taken less than 10 bar. See Ch 9, Sec 5, [4.1.1]

Table 2 : Classes of vent pipes and bleed lines

Design conditions		Class of the gas vent piping		
Vent pipe design pressure	Vent pipe design temperature	Single wall arrangement	Double wall arrangement	
			Inner pipe	Outer pipe (1)
p = 5 bar (2)	any	Class III	Class III	Class III
p > 5 bar and p ≤ 10 bar (3)	any	Class II	Class III	Class III
P > 10 bar (3)	any	Class I	Class II	Class III

(1) The design pressure of the outer pipe or duct of vent pipes or open ended lines is to comply with Ch 9, Sec 5, [4.1.4]
(2) The design pressure of the vent pipes or open ended lines is not to be taken less than 5 bar. See Ch 9, Sec 5, [4.1.1]
(3) The design pressure of the vent pipes or open ended lines is not to be less than the maximum expected pressure, which is to be justified

Part D

Ch 11, Sec 2

Replace Table 1 by:

Table 1: Doors in internal watertight bulkheads of passenger ships

Position relative to bulkhead deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
Below	Used (2)	POS	X	X	X (local)	
	Permanently closed (3) (4)	S, H				X
At or above	Used	POS, POH	X	X	X (local)	
	Used (5)	S, H		X		X
	Used (Doors giving access to below ro-ro deck)	S, H		X	X (remote)	X
	Permanently closed (3) (5)	S, H		X	X (remote)	X
<p>(1) POS : Power operated, sliding or rolling POH : Power operated, hinged S : Sliding or rolling H : Hinged</p> <p>(2) See SOLAS II-1/22.3 and IMO MSC.1/Circ.1564</p> <p>(3) Doors are to be fitted with a device which prevents unauthorized opening</p> <p>(4) Passenger ships which have to comply with [2.1.3] require an indicator on the navigation bridge to show automatically when each door is closed and all doors fastenings are secured.</p> <p>(5) If hinged, this door is to be of single action type</p>						

Ch 11, Sec 2, Table 2

Replace the table footnote (3) as follows:

Table 2: Doors in external watertight boundaries below equilibrium or intermediate waterplane

Position relative to bulkhead deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
(3) If hinged, this door is to be of single action type						

Ch 11, Sec 2, [2.3.3]

Replace item m) of the alphanumeric list by:

m) Failure of the normal power supply of the required alarms are to be indicated by an audible and visual alarm at the central operating console at the navigation bridge.

Ch 11, Sec 2, [2.3.3]

Add the following items r) and s) at the end of the alphanumeric list:

r) All watertight doors, including sliding doors, operated by hydraulic door actuators, either a central hydraulic unit or an independent hydraulic unit for each door is to be provided with a low fluid level alarm or low gas pressure alarm, as applicable or some other means of monitoring loss of stored energy in the hydraulic accumulators. This

alarm is to be both audible and visible and is to be located on the central operating console at the navigation bridge.

s) Signboard/instructions are to be placed in way of the door advising how to act when the door closed.

Ch 11, Sec 2, [2.3.4]

Replace item a) of the alphanumeric list by:

a) General

Doors are to be capable of being opened and closed by hand locally from both sides of the doors with the ship listed to 15° to either side.

Position indicators are to be provided on the bridge to show that the doors are open or closed and that the dogs are fully and properly engaged.

Where the doors also serve as fire doors they are to be provided with position indicators at the fire control station and audible alarms as required for fire doors, as well as for weathertight doors. Where two doors are fitted they must be capable of independent operation remotely and from both sides of each door.

Add the following items e) and f) at the end of the alphanumeric list:

e) All watertight doors, including sliding doors, operated by hydraulic door actuators, either a central hydraulic unit or an independent hydraulic unit for each door is to be provided with a low fluid level alarm or low gas pressure alarm, as applicable or some other means of monitoring loss of stored energy in the hydraulic accumulators. This

alarm is to be both audible and visible and is to be located on the central operating console at the navigation bridge.

f) Signboard/instructions are to be placed in way of the door advising how to act when the door closed.

Ch 12, Sec 2, [2.4.3]

Replace item m) of the alphanumeric list by:

m) Failure of the normal power supply of the required alarms are to be indicated by an audible and visual alarm at the central operating console at the navigation bridge.

Add the following items r) and s) in the alphanumeric list:

r) All watertight doors, including sliding doors, operated by hydraulic door actuators, either a central hydraulic unit or an independent hydraulic unit for each door is to be provided with a low fluid level alarm or low gas pressure alarm, as applicable or some other means of monitoring loss of stored energy in the hydraulic accumulators. This

alarm is to be both audible and visible and is to be located on the central operating console at the navigation bridge.

s) Signboard/instructions are to be placed in way of the door advising how to act when the door closed.

Ch 12, Sec 2, [2.4.4]

Replace item a) in the alphanumeric list by:

a) General

Doors are to be capable of being opened and closed by hand locally from both sides of the doors with the ship listed to 15° to either side.

Position indicators are to be provided on the bridge to show that the doors are open or closed and that the dogs are fully and properly engaged.

Where the doors also serve as fire doors they are to be provided with position indicators at the fire control station and audible alarms as required for fire doors, as well as for weathertight doors. Where two doors are fitted they must be capable of independent operation remotely and from both sides of each door.

Part D

Ch 12, Sec 2, [2.4.4]

Add the following items f) and g) in the alphanumeric list:

- f) All watertight doors, including sliding doors, operated by hydraulic door actuators, either a central hydraulic unit or an independent hydraulic unit for each door is to be provided with a low fluid level alarm or low gas pressure alarm, as applicable or some other means of monitoring loss of stored energy in the hydraulic accumulators. This alarm is to be both audible and visible and is to be located on the central operating console at the navigation bridge.
- g) Signboard/instructions are to be placed in way of the door advising how to act when the door closed.

Ch 12, Sec 2

Replace Table 1 by:

Table 1: Doors in internal watertight bulkheads of passenger ships

Position relative to bulkhead deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
Below	Used (2)	POS	X	X	X (local)	
	Permanently closed (3) (4)	S, H				X
At or above	Used	POS, POH	X	X	X (local)	
	Used (5)	S, H		X		X
	Used (doors giving access to below ro-ro deck)	S, H		X	X (remote)	X
	Permanently closed (3) (5)	S, H		X	X (remote)	X

(1) POS : Power operated, sliding or rolling
 POH : Power operated, hinged
 S : Sliding or rolling
 H : Hinged

(2) See SOLAS II-1/22.3 and IMO MSC.1/Circ.1564

(3) Doors are to be fitted with a device which prevents unauthorized opening

(4) Passenger ships which have to comply with [2.2.3] require an indicator on the navigation bridge to show automatically when each door is closed and all doors fastenings are secured.

(5) If hinged, this door is to be of single action type.

Ch 12, Sec 2, Table 2

Replace the table footnote (3) as follows:

Table 2: Doors in external watertight boundaries below equilibrium or intermediate waterplane

Position relative to bulkhead deck	Frequency of use while at sea	Type (1)	Remote closure	Remote indication	Audible or visual alarm	Notice
(3) If hinged, this door is to be of single action type.						

Ch 15, Sec 3, Table 3

Replace the table header as follows:

Table 3: Equipment

Equipment number EN A < EN ≤ B		Stockless bower anchors		Stud link chain cables for bower anchors			Mooring lines (1)		
A	B	N	Mass per anchor, in kg	Total length, in m	Diameter, in mm		N	Length of each line, in m	Ship design minimum breaking load, in kN
					mild steel	high strength steel			

Amendments to PART E

Ch 11, Sec 4, Table 1

Replace the row “Stability” as follows:

Table 1 : Applicable requirements for notation SPxxx-capable

Item	Reference requirement	Provisions to be applied depending on the total number of persons on board (POB) (1)	
		POB < 240	240 ≤ POB
Stability	Pt B, Ch 3, Sec 1, [1.2]	<ul style="list-style-type: none"> Part B, Chapter 3 Pt D, Ch 11, Sec 3, [2.3.14] considering the industrial personnel as crew 	<ul style="list-style-type: none"> Part B, Chapter 3 Pt D, Ch 11, Sec 3 considering the industrial personnel as passengers
	<ul style="list-style-type: none"> Pt B, Ch 3, Sec 3, [1.2.1] Pt B, Ch 3, Sec 3, [4.1.2] Pt B, Ch 3, App 2, [1.2.15] 	<ul style="list-style-type: none"> Pt B, Ch 3, Sec 3 Pt D, Ch 11, Sec 3, [2.3] (except Pt D, Ch 11, Sec 3, [2.3.12]), considering the industrial personnel as passengers, and where R is taken as defined in Pt B, Ch 3, Sec 3, [1.2.1] 	<ul style="list-style-type: none"> Pt B, Ch 3, Sec 3 Pt D, Ch 11, Sec 3, [2.3] considering the industrial personnel as passengers, and where R is taken as defined in Pt B, Ch 3, Sec 3, [1.2.1]

Amendments to PART F

Ch 1, Sec 1, [1.2]

Replace requirements [1.2.1], [1.2.2] and [1.2.3] by:

1.2.1 The additional class notation **VeriSTAR-HULL** is assigned to a ship in order to reflect the that a structural tridimensional analysis has been performed for the hull structures, as defined in:

- Pt B, Ch 7, App 1 or Pt B, Ch 7, App 2, or in
- NR625, Ch 7, Sec 2 and NR625, Ch 7, Sec 3, or in
- NR606 (Common structural rules for bulk carriers and oil tankers),

as applicable.

The additional class notation **VeriSTAR-HULL** may be completed by the notation **FLM** when a complementary structural tridimensional analysis has been performed for the hull structures based on a full length finite elements model, as defined in:

- NR625, Ch 7, Sec 4 for ships granted the service notation **container ship**
- NI 640 for ships granted the service notation **passenger ship, ro-ro passenger ship, ro-ro cargo ship** or **PCT carrier**
- Pt B, Ch 7, App 3 for ships granted other service notations.

Note 1: For ships granted the service notation **passenger ship, ro-ro passenger ship, ro-ro cargo ship** or **PCT carrier**, the additional class notation **VeriSTAR-HULL FLM** is to be considered in lieu of the additional class notation **VeriSTAR-HULL** and requirements

defined in Pt B, Ch 7, App 1 and Pt B, Ch 7, App 2 may be disregarded.

1.2.2 The additional class notation **VeriSTAR-HULL CM** is assigned to a ship in order to reflect the following:

- the ship fulfils requirements of additional class notation **VeriSTAR-HULL** as given in [1.2.1]
- a hot spot map has been made available for construction surveys and is kept on board the ship after delivery.

The additional class notation **VeriSTAR-HULL CM** may be completed by the notation **FLM** when the complementary requirements for the assignment of the notation **VeriSTAR-HULL FLM** are complied with.

1.2.3 The additional class notation **VeriSTAR-HULL SIS** is assigned to a ship in order to reflect the following:

- the ship fulfils requirements of additional class notation **VeriSTAR-HULL CM** as given in [1.2.2]
- the hull structure condition is periodically assessed, usually at the class renewal survey, using the results of the inspections and thickness measurements performed during the survey. The results of this assessment is made available to the Owner.

The additional class notation **VeriSTAR-HULL SIS** may be completed by the notation **FLM** when the complementary requirements for the assignment of the notation **VeriSTAR-HULL CM FLM** are complied with.

Ch 1, Sec 1, [2.1.1]

Replace the bulleted list by:

- Plans and documents necessary to carry out the structural analysis, listed in Pt B, Ch 1, Sec 3 or in the Common Structural Rules (NR606), as applicable
- Results of the analysis of the longitudinal strength and local scantlings of the plating and secondary stiffeners located in the cargo area in compliance with the requirements of:
 - Part B, Chapter 6 and Pt B, Ch 7, Sec 1 and Pt B, Ch 7, Sec 2 respectively, or
 - NR625, Ch 6, Sec 3 and NR625, Ch 6, Sec 4 and NR625, Ch 6, Sec 5, or
 - the Common Structural Rules (NR606), as applicable
- Results of the tridimensional analysis of the hull structure described in Pt B, Ch 7, Sec 3 or in NR625, Ch 7 or in the Common Structural Rules (NR606), as applicable
- Results of the fatigue analysis of the hull structure described in Pt B, Ch 7, Sec 4 or NR625, Ch 8 or in the Common Structural Rules (NR606), as applicable.

Ch 1, Sec 1, [2.2.2]

Replace the reference to "Pt B, Ch 11, App 2 or NR606, Chapter 9" by a reference to "Pt B, Ch 11, App 2 or NR625, Chapter 9 or NR606, Chapter 9"

Ch 3, Sec 1, [4.9]

Replace requirement [4.9.1] by:

4.9.1 Following a blackout, automatic connection of a standby generating set is to be followed by an automatic restart of the primary essential services. If necessary, time delay sequential steps are to be provided to allow satisfactory operation.

In case of failure of the emergency generator, manual restart of a main generating set is admitted. Refer to Pt C, Ch 2, Sec 3, [2.3.9].

Ch 4, Sec 2, [1.3]

Replace requirement [1.3.17] by:

1.3.17 Passage execution: the function of passage execution in an Integrated Bridge System (IBS) may be performed by an INS, as defined in IEC 61924.

Ch 4, Sec 2, [3.1.2]

Replace the first sentence by:

Each part of an integrated bridge system is to meet the relevant requirements of IMO Resolution A.694(17) as detailed in IEC 60945.

Ch 7, Sec 1

Replace Article [1] by:

1 General**1.1 Application**

1.1.1 The following additional class notations are assigned, in accordance with Pt A, Ch 1, Sec 2, [6.9], to ships with refrigerating installations complying with the applicable requirements of this Chapter:

- **REF-CARGO** for installations related to carriage of cargo
- **REF-CONT** for installations related to carriage of refrigerated containers
- **REF-STORE** for installations related to preservation of ship's domestic supplies.

1.1.2 The requirements of this Chapter apply to refrigerating installations on ships, including fixed and permanently installed mechanical refrigerating installations and cargo holds in different types of ships and services rendered on board, such as precooling of cargo, storage of cargo, air

conditioning, conservation of consumable goods on board, and cold preservation of other substances etc. These requirements apply only to ships having one of the additional class notations listed in [1.1.1] and are related to the capability of the installation to keep the required temperature of the stored products, including the precooling of the product when so required.

1.1.3 The additional class notations listed in [1.1.1] may be completed by the following:

- **PRECOOLING** for refrigerating plants having enough cooling capabilities for lowering the temperature of the embarking cargo, reaching the required temperature for its preservation in a time lapse agreed with the Society as suitable for the specific product, reducing to the minimum practically possible the impact on the refrigerated space temperature or to any cargo already stored in the refrigerated space.

Part F

- **QUICKFREEZE** for refrigerating plants of fishing vessels and fish factory ships where the design and equipment of such plants have been recognised as suitable to permit quick-freezing of fish in specified conditions.

The additional class notations **REF-CARGO** and **REF-CONT** may be completed by **AIRCONT** for ships fitted with a controlled atmosphere plant on board.

1.1.4 The additional class notation **REF-CONT** may be completed by **(A)** or **(E)** as defined in Ch 7, Sec 3, [1.1.2].

1.2 Temperature conditions

1.2.1 Cargo space conditions

The minimum internal temperature or the temperature range for which the notation is granted is to be mentioned in the notation. For design temperatures to be considered for designing the plant, see [2.1.1] and [2.1.2].

This indication is to be completed by the mention of any operational restriction such as maximum sea water temperature, geographical or seasonal limitations, etc., as applicable.

1.2.2 Container conditions

For refrigerating plants on board container ships complying with the provisions of Ch 7, Sec 3, in addition to the data listed in [1.2.1], the notation is to specify the maximum number of containers liable to be served, and the value of their heat transfer coefficient

k : in $W/(m^2 \text{ } ^\circ C)$, or

U : $k S$, in $W/^\circ C$,

where S is the surface through which the heat is transferred, in m^2 , as determined by type tests.

1.3 Definitions

1.3.1 Direct cooling system

Direct cooling system is a system where the refrigeration is obtained by direct expansion of the refrigerant in coils fitted on the walls and ceilings of the refrigerated chambers.

1.3.2 Indirect cooling system

Indirect cooling system is a system where the refrigeration is obtained by brine or other secondary refrigerant, circulating through pipe grids or coils fitted on the walls and ceilings of the refrigerated chambers. The secondary refrigerant is

cooled down in a closed loop transferring the heat through a heat exchanger comprised in the refrigerant gas compression / condensing unit.

1.3.3 Air cooling system

Air cooling system is a system where air is circulated by mechanical means through a direct or indirect cooled heat exchanger.

1.3.4 Refrigerant

Refrigerant is a compound fluid in a liquid or gaseous state which can absorb heat from the environment or products when evaporated, thus being capable to move heat from one place to another in a closed loop or system, with the use of mechanical components such as compressors, condensers and evaporators.

Note 1: Absorption systems are not considered for the purpose of **REF** notations.

1.3.5 Brine

Brine is a cooling media constituted by a liquid solution of industrial salts or other elements, normally used for removing heat from closed spaces through an indirect cooling system. In general, the word brine is also used in this Chapter to cover other types of secondary refrigerants, such as those refrigerants based on glycol/water mixtures.

1.3.6 Refrigerating unit

A refrigerating unit includes the compression / condensing unit considered as an integral part of a refrigeration system whose purpose is to lower air and/or product temperatures.

When the installation includes a secondary refrigerant (brine), the refrigerating unit is also to include a brine cooler (evaporator) and a pump.

Special requirements may apply for refrigerating installations arranged in cascade using two refrigerant gases with different saturation temperatures.

1.3.7 Refrigerated chamber

A refrigerated chamber is any space which is directly or indirectly refrigerated by one or more refrigerating units such as a cargo space, a quickfreeze tunnel, or other refrigerated service spaces such as those used for storing goods in galleys or other locations on board. Spaces cooled by HVAC refrigerating systems are not considered as refrigerated chambers.

Ch 7, Sec 1, [3]

Add the following sub-article [3.3]:

3.3 Ships assigned with the notation **QUICKFREEZE**

3.3.1 For the ships assigned with the notation **QUICKFREEZE**, the heat balance calculation report of the quick freezing plant is to be submitted for approval. It is to include the following information:

- the number of quick freeze tunnels or cells,
- their capacities,
- the power required, and
- the justification of the suitability of the plant for the temperature ranges and time stipulated to cool down the product.

Ch 7, Sec 1, Table 2

Replace rows 1 and 2 as follows.

Insert the following row 4.

Add the following row 18.

Table 2 : Documents to be submitted

No.	A/I (1)	Document
1	I	Detailed specification of the plant (refrigerating machinery and insulation) including the design parameters and ambient conditions
2	I	General arrangement of refrigerated spaces including: <ul style="list-style-type: none"> • the intended purpose of spaces adjacent to refrigerated spaces • the arrangement of air ducts passing through refrigerated spaces • the arrangement of steelwork located in refrigerated spaces or in insulated walls • the individual volume and the total volume of the refrigerated spaces
4	A	Drawing showing the arrangement of the draining system, size of the pipes and syphon sealing means
18	I	Type and specification of the pressure relief valves

Ch 7, Sec 1, Table 3

Delete row 2.

Replace row 3 as follows:

Table 3 : Calculations to be submitted

No	A/I (1)	Item
3	I	Result of duct air flow calculations

Ch 7, Sec 1, Table 4

Replace rows 4, 6 and 8 as follows:

Table 4 : Documents to be submitted

No	A/I (1)	Item
4	A	Details and arrangement of inert gas generating equipment for atmosphere control when applicable
6	A	Details and arrangement of ventilation and gas-freeing system for controlled atmosphere zone
8	I	Instruction manual for inert gas generation, ventilation and gas-freeing equipment

Ch 7, Sec 1, [4.5]

Replace requirement [4.5.3] by:

4.5.3 Dry dock conditions

In order to keep the refrigerating plant running when the ship is in dry dock, means are to be provided to supply cooling water from an external source permanently flanged and duly identified in the circuit drawings.

Part F

Ch 7, Sec 1, [5.6]

Replace requirement [5.6.2] by:

5.6.2 Refrigerated chambers adjacent to high temperature spaces

The insulation of the walls adjacent to fuel bunker tanks or to any space where an excessive temperature may arise, by accident or otherwise, is to be made of mineral wool or any equivalent material and suitable for the refrigerated space or chamber and adjacent spaces.

Ch 7, Sec 1, [6]

Replace sub-article [6.1] by:

6.1 General

6.1.1 Permissible refrigerants

Refrigerants are to comply with the requirements of Pt C, Ch 1, Sec 13, [2.2] and with applicable international and national regulations.

For restrictions on the selection of refrigerants, see Pt C, Ch 1, Sec 13, [2.2.1] and Pt C, Ch 1, Sec 13, [2.2.2].

Chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) are not to be used as refrigerants.

6.1.2 Use of ammonia as refrigerant

In general, ammonia (R717) may be used only in indirect system refrigerating plants.

The use of direct cooling with ammonia may however be accepted in specific cases subject to special approval by the Society.

For specific requirements relative to the use of ammonia as refrigerant, see Pt C, Ch 1, Sec 13, [2.3].

Ch 7, Sec 1

Delete Table 5.

Ch 7, Sec 1, [6.2.1]

Replace item a) of the alphanumeric list:

- a) The design pressure of the installation or parts thereof is not to be less than their maximum working pressure, either in operation or at rest, whichever is the greater. No safety valve is to be set at a pressure higher than the maximum working pressure.

Replace item c) of the alphanumeric list:

- c) The design pressure of the high pressure side of the installation is to be taken as the maximum of:
 - 1) the pressure setting of the pressure relieving device at the compressor discharge (whether the device is

integral or not) when the compressor is running at a dead head or shut off discharge condition

- 2) the condenser maximum allowable working pressure, or the effective saturated vapour pressure at 50°C, whichever is the highest.

Ch 7, Sec 1, [6.2]

Replace requirement [6.2.2] by:

6.2.2 Design pressure

In general, the design pressure for high and low pressure parts of refrigerating systems is to be taken not less than the values indicated in Tab 6.

For refrigerants not listed in Tab 6, the design pressure will be considered on a case-by-case basis by the Society.

Ch 7, Sec 1, [7.2]

Replace requirement [7.2.1] by:

7.2.1 Casings

The casings of compressors are to be designed for the design pressure of the high pressure side of the system indicated in Tab 6.

Ch 7, Sec 1, [7.2.2]

Replace item b) of the alphanumeric list by:

- b) For sea water cooling, a minimum inlet temperature of 32°C is to be applied. Unless provided with a free outlet, the cooling water spaces are to be protected against excessive overpressure by safety valves or equivalent overpressure protecting devices.

Ch 7, Sec 1, [7.2.3]

Replace items b), c), and d), of the alphanumeric list by:

- b) A safety valve or equivalent overpressure protecting device is to be arranged between the compressor and the delivery stop valve.
- c) Overpressure protection is to consist of both a pressure relief valve and a pressure control device which automatically stops the machine in the event of overpressure.
- d) Compressors arranged in parallel are to be provided with check valves in addition to the isolation valve in the discharge line of each compressor. Alternatively, the discharge valve is to be of the non-return type and provided with positive means for closing.
- sure. Details of the design of this device are to be submitted to the Society.

Ch 7, Sec 1, [7.3.1]

Replace item a) of the alphanumeric list by:

- a) When subjected to refrigerant pressure, compressor crankcases are to be either:
- designed to withstand the rated working pressure of the high pressure side; or
 - fitted with safety valves designed to lift at a pressure not exceeding 0,8 times the crankcase test pressure including seals. In this case, arrangements are to be made for the refrigerant to discharge to a safe place; or
 - protected against overpressure by means of devices ensuring a similar protection.

Ch 7, Sec 1, [7.5.2]

Replace item a) of the alphanumeric list by:

- a) The receivers are to have sufficient capacity to accumulate liquid refrigerant during maintenance and repairing.

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Ch 7, Sec 1, [7.5.3]

Replace item c) of the alphanumeric list by:

- c) Condensers connected to more than one circulating water pump capable of delivering a pressure which may exceed the design pressure of the condenser are to be duly protected by a safety valve.

Flooded evaporators served by a pump are to be protected by a safety valve opening at a pressure not higher than:

- the “Shut In” condition of the pump, and
- the maximum pressure that may occur in the evaporator when shut off from the circuit. This pressure is to be determined based on the refrigerant thermodynamic characteristics.

Ch 7, Sec 1, [7.5.4]

Replace item a) of the alphanumeric list by:

- a) Brine tanks which are not atmospheric tanks and can be shut off are to be protected against excessive pressure due to thermal expansion of the brine by safety valves or by an interlocking device blocking the shut-off valves in open position.

Ch 7, Sec 1, [7.7.2]

Replace item a) of the alphanumeric list by:

- a) Efficient filters are to be fitted at the suction of positive displacement compressors and on the high pressure side of reducing valves. The filters of compressors may be incorporated in the crankcases, provided their filtering area is sufficient.

Ch 7, Sec 1, [7.7]

Replace requirement [7.7.3] by

7.7.3 Dehydrators

An efficient dehydrator is to be fitted on systems using authorized halocarbon refrigerants.

The dehydrator is to be so designed and arranged that the drying product can be replaced without any disassembling of the pipes.

Ch 7, Sec 1, [7.8.1]

Replace items a) and b) of the alphanumeric list by:

- a) The refrigerant circuits and associated pressure vessels are to be protected against overpressure by safety valves or equivalent arrangement. However, inadvertent discharge of refrigerant to the atmosphere is to be prevented.

Rupture discs are not allowed for flammable or toxic refrigerants.

- b) The safety devices are to be in such number and so located that there is no possibility that any part of the system may be isolated from a safety device. Where it is necessary to be able to isolate one of these devices from the system for maintenance purposes, the valves may be duplicated provided a change-over valve is arranged in such a way that when one device is isolated it is not possible to shut off the other. Due attention has to be paid to the discharge of the isolated safety device when connected to a common manifold.

Ch 7, Sec 1, [7.8.2]

Replace item a) of the alphanumeric list by:

- a) Safety valve discharges are to be led to a safe place above the deck. Discharge pipes are to be designed in such a way that the ingress of water, snow, dirt or debris affecting the operation of the system can be prevented. In the case of the refrigerant R717 (ammonia), the dis-

charge pipe outlet is to be as high as possible on the ship and fitted with an automatic water spray system, which is to be automatically activated when the presence of ammonia is detected. An alarm is to be provided on deck to warn of the ammonia discharge.

Ch 7, Sec 1, [8.1.2]

Insert the following new item f) in the alphanumeric list:

- f) Plastic pipes may be used for brine systems in accordance with the provisions of Pt C, Ch 1, App 3.

Ch 7, Sec 1, [8.2.2]

Replace item d) of the alphanumeric list by:

- d) The coils are to be divided into two sections, each capable of being easily shut off (see Ch 7, Sec 2, [1.2.1]). As an alternative, two fin fan cooler modules may be accepted.

Replace items i) and j) of the alphanumeric list by:

- i) The air capacity and the power of the fans are to be in proportion to the total heat to be extracted from the refrigerated chamber, due regard being given to the nature of the service.
- j) When excess cooling capacity is required in order to cool or freeze all or part of the cargo from the ambient temperature to the minimum anticipated temperature, the air capacity is to be adequate to the increased heat to be extracted, in accordance with the specifications approved by the Owner.

Ch 7, Sec 1, [9.1]

Replace requirement [9.1.1] by:

9.1.1 Automation safety equipment

The automation safety equipment is to be of the fail-safe type and is to be so designed and installed as to permit manual operation. In particular, manual operation of the compressors is to be ensured in the event that any of the equipment is inoperable.

In this regard, the installation, including its automatic control system, is to be designed so that the automatic operation of the installation can be safely overridden. The capability of the installation to run in manual mode is to be clearly indicated in the design and operational philosophy and duly verified on board.

Ch 7, Sec 1, [10.2]

Replace requirement [10.2.2] by:

10.2.2 Refrigerating unit

- a) At least one refrigerating unit of each type installed on board is to be subjected to shop tests in order to ascertain its refrigerating capacity in the most unfavourable ambient/environmental temperature conditions given in
- Pt C, Ch 1, Sec 1, Tab 1 and Pt C, Ch 1, Sec 1, Tab 2, and/or in other temperature conditions when so required by the Society.
- b) Where the complete unit cannot be shop tested the compressors may be tested detached from the installation according to procedures approved by the Society.

Part F

Ch 7, Sec 1, [10.3]

Replace requirement [10.3.1] by:

10.3.1 Strength and leak tests

Upon completion, all parts included in the suction and delivery branches of the refrigerant circuit are to be subjected to a strength and leak test.

The strength test is the resistance test of a pressure retaining item or section of piping tested between two pipe or tube

connections carried out with a suitable fluid. The leak test is a test carried out with a gaseous fluid on the circuit after being assembled at room temperature.

The components to be tested and the test pressure are indicated in Tab 9.

Ch 7, Sec 1, [10.5.3]

Replace items b) and c) of the alphanumeric list by:

- b) Before starting the actual test, the Surveyor will check at random that thermometers, pressure gauges and other instruments are in good working order, calibrated and arranged as directed in each case by the Society.
- c) All the refrigerating machinery is to be put into service and all chambers, closed and empty, are to be simultaneously cooled to the minimum expected temperature, i.e. the temperature required to be entered in the notation, or a lower temperature determined so that a differ-

ence of at least 20°C can be maintained between the average external temperature and the temperature in the refrigerated spaces. The expected temperature is to be maintained for a period of time sufficient to remove all the heat from the insulation. Further, cooling is to be continued until the chamber temperature can be maintained substantially constant without any adjustment of the output of the machinery or with regular on-off operation of the working compressors.

Replace the second item of the bulleted list in item g) by:

- Absorbed power and speed of the compressors and the temperatures and pressures which determine the running conditions of the refrigerating machinery. The recorded data, through comparison with the thermodynamic cycle considered for the preparation

of the cold production curves of the compressors, are to enable the corrections (superheating, undercooling) necessary for determination of the actual refrigerating capacity F.

Ch 7, Sec 2, [1.2]

Replace requirement [1.2.1] by:

1.2.1 Cooling appliances, including brine coils, if any, are to be divided into two distinct systems capable of working separately in each refrigerated space; each of them is to be able to keep the cargo in a satisfactory cold condition. Each section is to be fitted with valves or cocks or similar devices so that it can be shut off.

All manually operated valves, whether shut off valves, redundant expansion valves, solenoid valves or thermostatic expansion valves, are to be located outside of the refrigerated chamber.

Ch 7, Sec 2, [4.1.1]

Delete item b) of the alphanumeric list.

Ch 7, Sec 2, [4.1.2]

Replace item b) of the alphanumeric list by:

- b) The oxygen content in air controlled spaces is to be maintained between 10% and 2% of the volume, with an accuracy of at least 0,2%, unless otherwise specified and agreed with the Society.

Replace the first paragraph of item d) as follows:

- d) Where nitrogen (N₂) is used to control the atmosphere, and unless otherwise specified and agreed with the Society, the generating plant is to be capable of supplying at least:

Ch 7, Sec 2, [4.2.1]

Replace item c) of the alphanumeric list by:

- c) The liquid sealed traps from bilges and drains from the cooler trays are to be deep enough, so that, when filled with an anti-freeze mixture, the liquid will neither evaporate nor freeze.

The liquid column is to be capable of withstanding the design pressure in each controlled atmosphere zone taking account of the ship motion and angles of trim mentioned in Pt C, Ch 1, Sec 1, Tab 1.

Ch 7, Sec 2, [4.2.2]

Replace item d) of the alphanumeric list by:

- d) Pressure/vacuum valve discharges are to be located at least 2 m above the open deck and 10 m away from any ventilation inlet and opening to accommodation spaces, service spaces, machinery spaces and other similar manned spaces. Connecting piping is to be arranged to preclude the ingress of water, dirt or debris which may cause the equipment to malfunction.

Ch 7, Sec 2, [4.3.1]

Replace item c) of the alphanumeric list by:

- c) Gas systems utilising compressors are to be provided with two or more compressors and prime movers. Each compressor is to be sized so that, with one compressor out of operation, the system is able to maintain the O₂ content in all designated cargo spaces within the specified range. Alternatively, one compressor and prime mover may be accepted provided that:

- the compressor is capable of delivering the rated capacity, and
- spares for the compressor and prime mover are carried to enable any failure of the compressor and prime mover to be rectified on board.

Replace item e) of the alphanumeric list by:

- e) Where it is intended to supply gas by means of stored gas bottles, the arrangements are to be such that depleted bottles may be readily and safely disconnected and replaced by charged bottles.

Ch 7, Sec 2, [4.3.4]

Replace the second item of the bulleted list in item e) by:

- the nitrogen delivery line is to be fitted with a safety valve capable of discharging the rated capacity of the nitrogen generation unit at shut-in conditions with maximum discharge pressure/no flow.

Part F

Ch 7, Sec 2, [4.3.6]

Replace the second item of the bulleted list in item a) by:

- a vent valve, connected to the cargo hold inlet valve, ensuring that the inlet of nitrogen is allowed when the vent valve is open.

Ch 7, Sec 2, [5.1]

Replace requirement [5.1.2] by:

5.1.2 Conditions of assignment

The notations **PRECOOLING** and **QUICKFREEZE** are assigned in connection with the maximum time necessary to cool the products loaded from the ambient temperature down to the storage temperature mentioned in the class certificate. This time is to be indicated in the contract specification and entered in the notation after approval of the heat balance of the installation for the specified temperatures.

Number of tunnels or cells to be in service is to be noted in the class certificate along with:

- refrigeration capacity
- electric power supply capacity.

Ch 11, Sec 4, [5.1.3]

Insert the following paragraph after the first paragraph:

Smit type towing bracket fittings are not to be used as bow chain stoppers.

Ch 11, Sec 4, [5.1.7]

Replace the first paragraph by:

Where the chain stopper is bolted to a seating welded to the deck, the bolts are to be relieved from shear force by efficient thrust chocks capable of withstanding a horizontal force equal to the required working strength and, in such condition, meeting the strength criteria specified in Article [7].

Ch 11, Sec 4, [6.1]

Replace requirement [6.1.1] by:

6.1.1 The bulwark plating and stays as well as the deck structure are to be reinforced in the region of the fairleads to withstand the force defined in [5.2.3] and meet the strength criteria specified in Article [7].

Ch 11, Sec 4, [6.1.2]

Replace the first paragraph by:

Deck structures in way of bow chain stoppers, including deck seatings and deck connections, are to be suitably reinforced to resist a horizontal load equal to the required working strength and, in such condition, to meet the strength criteria specified in Article [7].

Ch 11, Sec 21, Table 1

Replace reference to “[3.2.5]” by a reference to “[3.2.6]”.

Ch 11, Sec 21, [3.1.1]

Replace reference to “[3.2.5]” by a reference to “[3.2.6]”.

Ch 11, Sec 21, [3.2.2]

Replace the bulleted list by:

- IP 4X for battery packs with nominal voltages in excess of 500 V DC
- Not less than IP 44 for battery packs located within areas protected by fixed water-based local application fire-fighting systems (FWBLAFFS).

Ch 11, Sec 21, [3.2.4]

Delete the first paragraph in requirement [3.2.4].

Ch 11, Sec 21, [3.2]

Replace requirements [3.2.5] by the following new requirements [3.2.5] and [3.2.6]:

3.2.5 Other types of batteries

Other types of batteries may be accepted by the Society on a case-by-case basis and subject to risk analysis as per [3.2.6].

3.2.6 Risk analysis

A risk analysis is to be conducted and submitted to the Society for review.

An HAZID study is to be carried out for battery system installation. It is to cover at least the following spaces, zones and systems:

- Battery Room (Location and adjacent spaces)
- Battery system and auxiliaries
- An additional vibration analysis of the battery system may be required, taking into account the type of ship and its operational activity.

The risks identified by the HAZID study may be mitigated by operational procedures.

The following risks, at least, are to be covered:

- risk of thermal runaway
- risk of emission of combustion gases
- risk of internal short-circuit
- risk of external short-circuit
- risk of sensor failure (voltage, temperature, gas sensor...)
- risk of high impedance (cell, connectors, ...)
- risk of loss of cooling
- risk of leakage (electrolyte, cooling system)
- risk of failure of BMS (error on manoeuvring breakers, overloading, over discharge ...)
- risk for external ingress (fire, fluid leakage, fire-fighting water...).

Adequation of fire-extinguishing system to battery type is to be documented.

Appropriate alarms and shutdown are to be described (for example, default on the cooling system when necessary to proper operation of the battery system).

Ch 11, Sec 23

Replace Table 1 by:

Table 1 : Anchoring equipment for ships in unsheltered water with depth up to 120 m

Equipment number EN ₁ A ≤ EN ₁ < B		High Holding Power (HHP) stockless bower anchors		Stud link chain cables for bower anchors		
		Number of anchors	Mass per anchor (m _a), in kg	Total length, in m	Diameter (d), in mm	
A	B				Q2	Q3
–	1790	2	14150	1017,5	105	84
1790	1930	2	14400	990	105	84
1930	2080	2	14800	990	105	84
2080	2230	2	15200	990	105	84
2230	2380	2	15600	990	105	84
2380	2530	2	16000	990	105	84
2530	2700	2	16300	990	105	84
2700	2870	2	16700	990	105	84
2870	3040	2	17000	990	105	84
3040	3210	2	17600	990	105	84
3210	3400	2	18000	990	105	84
3400	3600	2	18300	990	106	84
3600	3800	2	19000	990	107	85
3800	4000	2	19700	962,5	108	87
4000	4200	2	20300	962,5	111	90
4200	4400	2	21100	962,5	114	92
4400	4600	2	22000	962,5	117	95
4600	4800	2	22900	962,5	119	97
4800	5000	2	23500	962,5	122	99
5000	5200	2	24000	935	125	102
5200	5500	2	24500	907,5	130	105
5500	5800	2	25000	907,5	133	107
5800	6100	2	25500	880	137	111
6100	6500	2	25700	880	140	113
6500	6900	2	26000	852,5	143	115
6900	7400	2	26500	852,5	147	118
7400	7900	2	27000	825	152	121
7900	8400	2	27500	825	154	123
8400	8900	2	28000	797,5	158	127
8900	9400	2	28900	770	162	132
9400	10000	2	29400	770	–	135
10000	10700	2	29900	770	–	139
10700	11500	2	30600	770	–	143
11500	12400	2	31500	770	–	147
12400	13400	2	33200	770	–	152
13400	14600	2	35000	770	–	157
14600	–	2	38000	770	–	162

Ch 11, Sec 26

Replace Table 2 by:

Table 2 : Maximum emission levels for ULEV additional class notation

Engine power range P (kW)	CO (g/kWh)	HC (1) (g/kWh)	NO _x (g/kWh)	PM mass (g/kWh)	PN (g/kWh)
19 ≤ P < 75	5,00	(HC + NO _x ≤ 4,70)		0,30	–
75 ≤ P < 130	5,00	(HC + NO _x ≤ 5,40)		0,14	–
130 ≤ P < 300	3,50	1,00	2,10	0,10	–
P ≥ 300	3,50	0,19	1,80	0,015	10 ¹²
<p>(1) For gas fuelled engines and dual fuel engines in gas mode, the maximum allowable HC emission level is to be taken as the lower of:</p> <ul style="list-style-type: none"> • 6,19 and • 0,19 + (9 × GER) <p>Where GER is the average gas energy ratio over the test cycle defined in [4.2.5].</p>					

Ch 11, Sec 30, [2.2]

Replace requirement [2.2.2] by:

2.2.2 Portable fire-fighting device for stacked containers

In addition to the water mist lance required in [2.2.1], the ship is to be provided with a portable fire-extinguishing device of a type approved by the Society according to [5.1], capable to reach the highest level of containers or the 5th

tier of containers above the upper lashing bridge, whichever is the lowest. This device is to be able to pierce the wall of a standard container and of spraying water inside the container when connected to the fire main and raised at this level.

Ch 11, Sec 30, [4.3.3]

Replace item a) of the alphanumeric list by:

- a) The system is to include heat detector cables the output of which is retrieved and analyzed by an energy flow analysis software at least every 5 seconds.

Replace item f) of the alphanumeric list by:

- f) All the data retrieved from the heat detector cables is to be recorded in a mass storage medium and retained for at least 30 days.

Ch 11, Sec 33, [7.2.1]

Add the following Note 1 at the end of the requirement:

Note 1: The Society may exempt open hatch cargo holds from this requirement if constructed and solely intended for the carriage of non-combustible cargoes. When such exemptions are granted, this will be reported on the Certificate of Classification

Ch 11, Sec 36, [1.2.1]

Replace item a) of the alphanumeric list by:

- a) Prevention of sea and air pollution:
 - **CLEANSHIP**
 - For ships having an aggregate fuel oil tank capacity of less than 600 m³:
PROTECTED FO TANK
 - For ships fitted with scrubber:
EGCS SCRUBBER
with the additional requirement that the scrubber is to be of a closed-loop type
- **VCS**, for ships which are assigned at least one of the service notations **oil tanker, FLS tanker, chemical tanker, liquefied gas carrier, combination carrier/OOC, combination carrier/OBO**

Ch 11, Sec 36, [1.3.1]

Replace item a) of the alphanumeric list by:

- a) Prevention of sea and air pollution
 - **CLEANSHIP SUPER** completed between brackets by three additional class notations among those referred to as “eligible” for assignment of the notation **CLEANSHIP SUPER** in Ch 9, Sec 1
 - For ships having an aggregate fuel oil tank capacity of less than 600 m³:
PROTECTED FO TANK
 - **NDO-x days**, which is an eligible class notation for **CLEANSHIP SUPER**
 - **OWS-x ppm**, which is an eligible class notation for **CLEANSHIP SUPER**
- For ships fitted with scrubber:
EGCS SCRUBBER
with the additional requirement that the scrubber is to be of a closed-loop type.
- **VCS**, for ships which are assigned at least one of the service notations **oil tanker, FLS tanker, chemical tanker, liquefied gas carrier, combination carrier/OOC, combination carrier/OBO**
- For ships fitted with internal combustion engine(s):
TIER III



**BUREAU
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