



Rules on Materials and Welding for the Classification of Marine Units

NR 216

AMENDMENTS

January 2021

These sheets contain amendments to the July 2019 issue of the *Rules on Materials and Welding for the Classification of Marine Units*. These amendments are cumulative with amendments July 2020.

These amendments are effective from January 1st, 2021.

Volume	Chapter	Section
<i>NR 216 R11 E</i>	Ch 1	Sec 1
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GENERAL CONDITIONS

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 them above listed being relieved of any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4 The Society only 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, 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 is an appraisal 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 or to the documents of reference 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 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 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, 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 appraisal 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 or on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisal 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, involve, 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, interests 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 solve 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-cents (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 In such a case, 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, subject to compliance with clause 4.1 and 6 above.
- 9.3 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 fulfilment 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, are 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, otherwise 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 Classifications 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 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 Invalidity 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 and governed by the laws of England and Wales.
- 15.2 The Parties shall make every effort to settle any dispute amicably and in good faith by way of negotiation within thirty (30) days from the date of receipt by either one of the Parties of a written notice of such a dispute.
- 15.3 Failing that, the dispute shall finally be settled under the Rules of Arbitration of the Maritime Arbitration Chamber of Paris ("CAMP"), 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.

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 UN 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/privacypolicy>).
- 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. <https://group.bureauveritas.com/group/corporate-social-responsibility>

Amendments to NR 216

Ch 1, Sec 1, [3.6] (Amendments July 2020)

Replace requirement [3.6.4] as follows:

3.6.4 Non-destructive examination is to be performed by skilled and qualified personnel, using calibrated equipment of suitable type and according to approved procedures, recognised standards and the requirements of the Society.

In case of non-destructive testing carried out by an independent company from the manufacturer or shipyard, such company has to comply with the requirements set out in NR669 "Recognition of non-destructive testing suppliers".

The Manufacturer's laboratory or other organisation responsible for the non-destructive examination is required to issue, on its own responsibility, a certificate illustrating the results and, where requested, an opinion concerning the acceptability of the product; in the latter case, the certificate is to be countersigned by the Manufacturer.

The various steps of the examinations are to be witnessed by the Surveyor when required.

Ch 1, Sec 1, [4.2.1] (Amendments July 2020)

Replace requirement [4.2.1] as follows:

4.2.1 Society's certificate

For products tested with satisfactory results, the Society issues a certificate signed by the Surveyor stating that the products have been tested in accordance with the Society's Rules.

This certificate is identified by the letter C for ease of reference in the various relevant Society's Rules.

A certificate issued by the Manufacturer is to be attached to the Society's certificate and is to include, as applicable, the following particulars:

- a) Manufacturer's name
- b) purchaser's name, order number and hull number
- c) description of the product, dimensions and weight
- d) results of all specified inspections and tests
- e) identification and testing marks stamped on the products.

In the case of testing of materials, the following particulars are also to be included:

- a) identification of specification or grade of material
- b) identification of the heat and relevant chemical analysis
- c) supply condition and details of heat treatment, including temperatures and holding times
- d) working and manufacturing procedure (for rolled products intended for hull, boilers and pressure vessels only)
- e) declaration that the material has been made by an approved process, as applicable, and that it has been subjected to the tests required by the Rules with satisfactory results.

For products manufactured in large quantities and tested by heats or by lot, the Manufacturer is to further state, for the individual supplies, that the products have been produced according to the Society's Rules.

Ch 2, Sec 1, [1.5.1] (Amendments July 2020)

Replace the second paragraph by:

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6].

Ch 2, Sec 1

Replace the Article title [4] by the following one:

4 EH47 and crack arrest steel plates for container carriers

Ch 2, Sec 1, [4.1]

Replace requirements [4.1.1] and [4.1.2] by:

4.1.1 The requirements of this Article apply to hot rolled plates in EH47 and crack arrest steels intended for longitudinal structural members in the upper deck region of container carriers, when required by the applicable rules.

4.1.2 Provisions are given for EH47 and crack arrest steels in thickness greater than 50mm and not greater than 100mm. Outside the scope of that thickness range, special consideration is to be given by the Society.

Ch 2, Sec 1, [4.2.1]

Replace the last paragraph by:

For crack arrest steels, the suffix CAS1 or CAS2 is added to the grade.

Ch 2, Sec 1, [4.3.1]

Delete the last paragraph.

Ch 2, Sec 1

Replace Table 11 by:

Table 11 : Plates - Condition of supply and number of impact tests

Steel grade	Grain refining elements	Condition of supply (1)
EH36CAS1, EH36CAS2	Any	N (each piece), TM (each piece)
EH40CAS1, EH40CAS2	Any	N (each piece), TM (each piece), QT (each piece as heat treated)
EH47, EH47CAS1, EH47CAS2	Any	TM (each piece)
FH36CAS1, FH36CAS2 FH40CAS1, FH40CAS2	Any	N (each piece), TM (each piece), QT (each piece as heat treated)
(1) Abbreviations:		
N : Normalised Condition (heat treatment)		
TM : Thermo-Mechanical Rolling		
QT : Quenched and Tempered Condition.		

Ch 2, Sec 1, [4]

Replace sub-article [4.5] by:

4.5 Chemical composition

4.5.1 The chemical composition on ladle analysis is to comply with the requirements specified in Tab A.

4.5.2 For steel produced by thermo-mechanical rolling, C_{EQ} and Pcm value are to comply with the requirement of Tab C.

The value of C_{EQ} is calculated by the following formula:

$$C_{EQ} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15} \quad \%$$

The Pcm value is to be calculated from the ladle analysis in accordance with the following formula:

$$P_{cm} = C + \frac{Si}{30} + \frac{Mn}{20} + \frac{Cu}{20} + \frac{Ni}{60} + \frac{Cr}{20} + \frac{Mo}{15} + \frac{V}{10} + 5B \quad \%$$

Insert the following new sub-article [4.7]:

4.7 Crack arrest properties

4.7.1 The crack arrest properties for crack arrest steels are to be verified by either the crack arrest toughness K_{ca} or Crack Arrest Temperature (CAT) as specified in Tab B.

Ch 2, Sec 1

Insert the following new Table A, Table B and Table C:

Table A : EH47 and crack arrest steels - Chemical composition and deoxidation practice

Steel grade	EH47	EH36CAS1, EH36CAS2 EH40CAS1, EH40CAS2 FH36CAS1, FH36CAS2 FH40CAS1, FH40CAS2	EH47CAS1, EH47CAS2
Deoxidation practice	killed and fine grain treated	Killed and fine grain treated	killed and fine grain treated
Chemical composition (%) (3) (4)			
C max.	0,18	0,18	0,18
Mn	0,90 - 2,00	0,90 - 2,00	0,90 - 2,00
Si max.	0,55	0,50	0,55
P max.	0,020	0,020	0,020
S max.	0,020	0,020	0,020
Al (acid soluble) min (1) (2)	0,015	0,015	0,015
Nb (2)	0,02 - 0,05	0,02 - 0,05	0,02 - 0,05
V (2)	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10
Ti max. (2)	0,02	0,02	0,02
Cu max.	0,35	0,50	0,50
Cr max.	0,25	0,25	0,50
Ni max.	1,00	2,00	2,00
Mo max.	0,08	0,08	0,08
<p>(1) The total aluminium content may be determined instead of the acid soluble content. In such cases the total aluminium content is to be not less than 0,020%.</p> <p>(2) The steel is to contain aluminium, niobium, vanadium or other suitable grain refining elements, either singly or in any combination. When used singly, the steel is to contain the specified minimum content of the grain refining element. When used in combination, the specified minimum content of a fine graining element is not applicable; the sum of Nb + V + Ti is not to exceed 0,12%.</p> <p>(3) Where additions of any other element have been made as part of the steelmaking practice subject to approval by the Society, the content is to be indicated on product inspection certificate</p> <p>(4) Variations in the specified chemical composition may be allowed or required by the Society and are to be stated at the approval.</p>			

Table B : Requirements for crack arrest steels

Suffix to the steel grade	Thickness range (mm)	Crack arrest properties	
		Crack arrest toughness K_{ca} at -10°C ($\text{N}/\text{mm}^{3/2}$) (1)	Crack arrest temperature CAT ($^{\circ}\text{C}$) (2)
CAS1	$t \leq 100$	6000 min	-10 or below
CAS2	$80 < t \leq 100$ (4)	8000 min	(3)

(1) K_{ca} value is to be obtained by the crack arrest test specified in ISO 20064-2019 and Appendix 1 of NR480
(2) CAT is to be obtained by the test method specified in Appendix 2 of NR480
(3) Criterion of CAT for crack arrest steels corresponding to $K_{ca}=8000\text{N}/\text{mm}^{3/2}$ is to be approved by the Society
(4) Lower thicknesses may be approved at the discretion of the Society.

Table C : Carbon equivalent and Pcm value for EH47 and crack arrest steels produced by TM process

Steel grade	Carbon equivalent C_{EQ} max. (%)	Pcm value max. (%)
EH36CAS1, EH36CAS2, FH36CAS1, FH36CAS2	0,47	(1)
EH40CAS1, EH40CAS2, FH40CAS1, FH40CAS2	0,49	(1)
EH47	0,49	0,22
EH47CAS1, EH47CAS2	0,55	0,24

(1) As per the approved specification.

Delete the existing Table 12.

Replace the existing Table 13 by:

Table 13 : Mechanical properties

Steel grade	Yield stress R_{eH} (N/mm^2) min.	Tensile strength R_m (N/mm^2)	Elong. A_5 (%) min.	Average impact energy (J) min. for thickness t (mm)								
				Testtemp. ($^{\circ}\text{C}$)	$t \leq 50$		$50 < t \leq 70$		$70 < t \leq 85$		$85 < t \leq 100$	
					KVL	KVT	KVL	KVT	KVL	KVT	KVL	KVT
EH36CAS1, EH36CAS2 FH36CAS1, FH36CAS2	355	490/630	21	- 40	34	24	41	27	50	34	50	34
				- 60	34	24	41	27	50	34	50	34
EH40CAS1, EH40CAS2 FH40CAS1, FH40CAS2	390	510/660	20	- 40	39	26	46	31	55	37	55	37
				- 60	39	26	46	31	55	37	55	37
EH47 EH47CAS1, EH47CAS2	460	570/720	17	- 40	53		53		64		75	

Ch 2, Sec 2, [1.5.1] (Amendments July 2020)

Replace the second paragraph by:

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6].

Ch 2, Sec 3, [1.10.1] (Amendments July 2020)

Replace the second paragraph by:

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6].

Ch 2, Sec 4, [1.10.1] (Amendments July 2020)

Replace the second paragraph by:

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6].

Ch 2, Sec 5, [1.5] (Amendments July 2020)

Insert the following new requirement [1.5.1]:

1.5.1 Reference is made to the general provisions given in Ch 1, Sec 1, [3.6].

Ch 3, Sec 1, [1.2] (Amendments July 2020)

Insert the following new requirement [1.2.3]:

1.2.3 Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 3, Sec 2, [1.2] (Amendments July 2020)

Replace requirement [1.2.2] as follows:

1.2.2 All products are to be free from internal and surface defects prejudicial to the use of the concerned material for the intended application.

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 4, Sec 1, [1.5] (Amendments July 2020)

Replace requirement [1.5.1] as follows:

1.5.1 All types of anchors are not to be painted until all tests and inspections have been completed.

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 4, Sec 1, [2.1] (Amendments July 2020)

Replace requirement [2.1.1] as follows:

2.1.1 The requirements of this Article apply to the materials, design, manufacture and testing of stud link anchor chain cables and accessories used for ships.

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 4, Sec 1, [3.1] (Amendments July 2020)

Replace requirement [3.1.1] as follows:

3.1.1 The requirements of this Article apply to the materials and testing of studless chain cables used for ships.

Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 4, Sec 2, [1.1] (Amendments July 2020)

Insert the following new requirement [1.1.3]:

1.1.3 Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 4, Sec 3, [2.3] (Amendments July 2020)

Replace requirement [2.3.1] as follows:

2.3.1 Reference is made to the general provisions given in Ch 1, Sec 1, [3.6] for visual, dimensional and non destructive examination.

Ch 5, Sec 1, [2.2] (Amendments July 2020)

Insert the following new requirement [2.2.6]:

2.2.6 In case of non-destructive testing carried out by an independent company from the manufacturer or shipyard, such company has to comply with the requirements set out in NR669 "Recognition of non-destructive testing suppliers.

Ch 5, Sec 2

Replace Table 20 by:

Table 20: Mechanical properties

Grade	Tensile test on deposited metal			Tensile test on butt weld	Charpy V-notch impact test		Bend ratio and angle
	Yield stress R_{eH} (N/mm ²)	Tensile strength R_m (N/mm ²)	Elong. A_5 (%) min.	Tensile strength R_m (N/mm ²) min.	Test Temp. (°C)	Minimum average energy (J)	D/ t $\alpha \geq 120^\circ$
3Y47	460	570 - 720	19	570	-20	64	4

Ch 5, Sec 4

Replace Article 8 by:

8 Welding procedures for EH47 and crack arrest steels**8.1 General**

8.1.1 Test pieces, tests and requirements for approval of the welding procedures are specified in [2.1] to [2.6], unless otherwise specified in this Article.

8.1.2 Where Welding Procedure Specification (WPS) for the non-crack arrest steels has been approved by the Society, the said WPS is applicable to the same welding procedure

applied to the same grade with suffix CAS1 or CAS2 specified in Ch 2, Sec 1, Tab 14 except high input processes over 50KJ/cm.

8.2 Parent metal

8.2.1 For EH47, the welding procedure is qualified for the parent metal tested.

8.3 Impact tests

8.3.1 For EH47, the test temperature and absorbed energy for Charpy V-notch impact tests are to be in accordance with Tab 9.

8.4 Hardness tests

8.4.1 An additional row of indentations is to be carried out at mid-thickness.

The results of hardness tests are not to exceed 350HV for EH47 and 380 HV for EH47CAS1 or EH47CAS2.

8.5 Brittle fracture initiation test

8.5.1 Deep notch test or CTOD test may be required for parent metals. Tests are to be in accordance with recognised standards acceptable to the Society.

Replace Table 9 by:

Table 9 : Impact test requirements for butt joints ($t \leq 100\text{mm}$)

Grade of steel	Testing temperature (°C)	Value of minimum average absorbed energy (J)		
		For manually or semi-automatically welded joints		For automatically welded joints
		Downhand, Horizontal, Overhead	Vertical upward, Vertical downward	
EH47, EH47CAS1, EH47CAS2	- 20	64		



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