RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part L Equipment

2017 AMENDMENT NO.1

Rule No.29 1st June 2017

Resolved by Technical Committee on 30th January 2017

Approved by Board of Directors on 20th February 2017

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Rule No.29 1st June 2017
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part L EQUIPMENT

Chapter 3 CHAINS

Title of Section 3.2 has been amended as follows.

3.2 Offshore Mooring Chains and Others

Paragraph 3.2.1 has been amended as follows.

3.2.1 Application

Offshore mooring chains (hereinafter referred to as "offshore chain") and shackles and swivels, etc. which are connected to the offshore chain (hereinafter referred to as "accessories for offshore chain") are to comply with the requirements in **3.2** or to be of equivalent quality.

Where, an offshore chain is used for mobile offshore drilling units and special purpose barges defined in **Part P**.

Paragraph 3.2.5 has been amended as follows.

3.2.5 Processes of Manufacture*

1 (Omitted)

2 Bar materials for links are to be heated by electric resistance, induction or in a furnace.

~~2~~3 In cases where the studs for Grade *R*3 offshore chains and Grade *R*3*S* offshore chains are welded, the following **(1)** to **(~~4~~7)** are to be complied with:

(1) Both ends of the stud are to be a good fit into the link and are not to be fitted on the flash butt weld of the link as far as practicable, and the full periphery of the stud end is to be welded. Welding of both ends of the stud is not permitted unless specially approved by the Society. The stud is to be fixed firmly to the link, and the fixed stud is not to cause any harmful notch effect or stress concentration in the link.

(2) The toes of the fillets are to have a smooth transition to the link.

(3) The size of the fillets is to be not less than the dimensions specified in *API* Specification 2F.

(~~2~~4) Welding position is to be flat as possible.

(~~3~~5) All welds are to be carried out before the final heat treatment of offshore chains.

(~~4~~6) The welds are to be free from defects such as clacks, lack of fusion, gross porosity and undercuts exceeding 1 *mm*.

(7) Welding is to be carried out according to an approved procedure, by a welder qualified by the Society, with approved low hydrogen electrodes.

~~3~~4 Welding of studs in ~~G~~grade *R*4 offshore chain, ~~G~~grade *R*4*S* offshore chain and ~~G~~grade *R*5 offshore chain is not permitted unless specially approved by the Society.

~~4~~5 Accessories ~~of~~for offshore chains are to be made by casting or forging. Their manufacturers are to obtain approval by the Society in advance concerning their manufacturing methods.

~~5~~6 Machining of kenter shackles is to result in fillet radius minimum 3% of nominal diameter.

~~6~~7 Connecting common links are to be substituted for defective common links of offshore chain without necessity for re-heat treatment of the whole length and with the method of heat treatment which is not to affect the properties of the adjoining links whose temperature is nowhere exceed 250˚C. However, an alternative procedure may be applied to this joining method where specially approved by the Society.

Title of Paragraph 3.2.7 has been amended as follows.

3.2.7 Heat Treatment and Grain Size*

Sub-paragraph -4 has been added as follows.

4 The austenitic grain size of an offshore chain is to be 6 or finer in accordance with *ASTM E*112 or an equivalent grain size index in accordance with *ISO* 643, or to be deemed as equivalent by the Society. Measurements of grain size are to be taken at the surface, at a depth of 1/3 radius and at the central region for welded material, base metals and heat-affected zones from the maximum sampling interval corresponding to the nominal diameter of the offshore chain specified in **Table L3.11**.

Paragraph 3.2.9 has been amended as follows.

3.2.9 Dimensional Tolerances

1 (Omitted)

2 The tolerances of offshore chains are to comply with the following requirements.

(1) The negative tolerance at the crown part of each kind of link is to comply with the requirements in accordance with its nominal diameter as given in **Table L3.9**.~~, and t~~The plus tolerance at the crown part of each kind of link may be up to 5% of its nominal diameter. ~~However, no negative tolerance of the cross sectional area of the crown part of the link is permitted.~~In cases where the diameter is less than 20 *mm*, the plus tolerance at the crown part of each kind of link is to be agreed upon by the Society and the purchaser at the time of approval.

(2) The cross sectional area at the crown is to be calculated using the average of the diameters with negative tolerance and plus tolerance, measurements are to be taken from at least 2 locations approximately 90 degrees apart.

(~~2~~3) ~~The~~No negative tolerances other than the crown part and the flash butt weld of each kind of link are permitted and the plus tolerances are to be up to +5% in cases where deemed appropriate by the Society. In cases where the diameter is less than 20 *mm*, the plus tolerances are to be agreed upon by the Society and the purchaser at the time of approval.~~, but is not to be negative.~~

(~~3~~4) Notwithstanding to the requirements specified in **(1)** and **(~~2~~3)** above, no negative tolerance of the diameter at the flash butt weld~~ed part~~ is permitted. The ~~positive~~ plus tolerances thereof are left to the discretion of the Society.

(~~4~~5) The tolerances with regard to the location of stud set are left to the discretion of the Society.

(~~5~~6) The tolerances except for the requirements specified in **(1)** to **(~~4~~5)** above are to be ± 2.5%.

3 For all offshore chains, a length of ~~5~~five common links which are connected is to be measured. The measurement of a length of ~~5~~five links ~~are~~is to be carried out in accordance with the following procedures while the offshore chain is loaded to 5 - 10% of the minimum proof load.

(1) The first five links is to be measured.

(2) The next set of five links, at least two links from the previous five links are to be included, is

to be measured.

(3) The measurement procedure specified in **(2)** is to be followed for the entire offshore chain length.

(4) The links held in the end blocks may be excluded from this measurement.

4 The allowable manufacturing tolerance on a length of five links by measuring procedure specified in **-3** is to comply with the requirements as given in **Table L3.10**. Any deviations from link tolerances are to be agreed upon by the Society and the purchaser.

5 If a length of five links is shorter than allowable value, offshore chain may be stretched by tensile loading. In this case, however, tensile load is not to exceed ~~110% of minimum proof~~ approved load ~~required~~.

6 If links are found to be defective or not to meet the dimensional tolerance requirement specified in **-1**, defective links may be cut off and a connecting common link inserted in their place. In such cases, proof tests are to be carried out again after insertion of a connecting common link, and dimensions of a connecting common link are to be measured.

7 At least one accessory (of the same type, size and nominal strength) out of 25 is to be measured for dimensions after proof load testing. Dimensions are subjected to the manufacturing tolerances of the following **(1)** and **(2)**. These tolerances do not apply to machined surfaces.

(1) The tolerances of the diameter of accessories are to be up to +5% of their nominal diameters, but are not to be negative.

(2) The tolerances other than diameter of accessories are to be ± 2.5%.

8 The manufacturer of accessories for offshore chains is to provide a statement indicating compliance with the purchaser's requirements

~~8~~9 If link diameter, length, and stud alignment do not conform to the required dimensions, these are to be compared to the dimensions of 40 more links; on each side of the affected link. If a single of the aforementioned dimensions fails to meet the required dimensional tolerance in more than 2 of the sample links, all links are to be examined and comply with **-6** above.

Table L3.9 has been amended as follows.

Table L3.9 Negative Tolerances of Diameters

Nominal Diameter (*mm*)	Negative Tolerances (*mm*)
up to 40	1
over 40 up to 84	2
over 84 up to 122	3
over 122 up to 152	4
over 152 up to 184	6
over 184 up to ~~210~~222	7.5

3.2.11 Breaking Tests*

Sub-paragraph -1 has been amended as follows.

1 The breaking test for offshore chain is to be carried out by the following procedures after final heat treatment.

((1) to (3) are omitted.)

~~(4) Where the capacity of the testing machine does not reach the breaking test loads specified in **Table L3.10**, the breaking test may be substituted by a method approved by the Society.~~

(~~5~~4) If a breaking test fails, a thorough ~~examination~~test is to be carried out to identify the cause of failure. Tests to identify the cause of failure may be required where deemed necessary by the

Society.

(~~6~~5) If a breaking test fails, two additional breaking test specimens representing the same sampling length of offshore chain are to be subjected to the breaking test. If two additional breaking test result satisfactorily, it will be decided what lengths of offshore chain can be accepted based upon the results of the failure investigation specified in **(~~5~~4)**.

(~~7~~6) If either or both results of the additional test and failure investigation specified in **(~~5~~4)** and **(~~6~~5)** fail, the sampling length of offshore chain represented will be rejected. If a single link is found to be defective or not to meet the requirement of breaking test, defective links may be cut out and connecting common link inserted in its place and ~~retest of~~ the breaking test may be carried out again. If the result of the retest is found satisfactory, the sampling length of offshore chain represented may be passed.

(~~8~~7) For chain diameters over 100 *mm*, alternative breaking test proposals to the above breaking test will be considered whereby a one link specimen is used. Alternatives are to be approved by the Society, every heat is to be represented, the test frequency is to be in accordance with **Table L3.11**, and it is to be demonstrated and proven that the alternative test represents an equivalent load application to the three link test.

Table L3.11 has been amended as follows.

Table L3.11 Number of Breaking Test

Nominal diameter of offshore chain d (*mm*)	Maximum sampling interval (m)
$d \leq 48$	91
$48 < d \leq 60$	110
$60 < d \leq 73$	131
$73 < d \leq 85$	152
$85 < d \leq 98$	175
$98 < d \leq 111$	198
$111 < d \leq 124$	222
$124 < d \leq 137$	250
$137 < d \leq 149$	274
$149 < d \leq 162$	297
$162 < d \leq 175$	322
$175 < d \leq 186$	346
$186 < d \leq$ ~~199~~ 198	370
~~199~~198 $< d \leq 210$	395
$210 < d \leq 222$	420

Sub-paragraph -2 has been amended as follows.

2 The breaking test for accessories of offshore chain and connecting common link is to be carried out by the following procedures after final heat treatment. A batch is defined as accessories made from the same charge and heat treated simultaneously in the same furnace.

(1) For accessories of offshore chain, the breaking test is to be carried out for the following frequency which is the least. However, for connecting common link and individually produced accessories, individually heat treated accessories or accessories produced in small batches, the frequency of the breaking test is at the discretion of the Society.

(a) ~~a~~One accessory from each manufacturing lot, which have the same grade, size, and heat treatment, of 25 units or less of accessories

(b) ~~a~~One accessory out of every batch

Paragraph 3.2.12 has been amended as follows.

3.2.12 Proof Tests

1 The proof test is to be carried out for the entire length of offshore chain by the following procedures after final heat treatment.

(1) Offshore chains are to withstand the proof test loads specified in **Table L3.10** without crack, breakage or any other defects. Proof test load is not to exceed 110% of the minimum proof load specified in **Table L3.10**.

(2) Notwithstanding the requirements of **(1)** above, where plastic straining is used to set studs, the applied proof load is not to be greater than that in approval tests for manufacturing.

(3) If a link fails during proof load testing, a thorough ~~examination~~failure investigation is to be carried out to identify the probable cause of failure of the proof test from the manufacturing records. Tests to identify the cause of failure may be required where deemed necessary by the Society. Where the cause of failure is identified and the presence in other lengths of factors or conditions thought to be causal to failure is not found from the ~~above failure~~ investigation, ~~this length of chain except a failure link may be accepted~~ a retest is to be carried out in accordance with the following **(a)** to **(c)** and where these results are found satisfactorily, it will be decided what length of offshore chain can be considered for acceptance based upon the results of that investigation.

   (a) A breaking test specimen is to be taken from each side of one failed link in accordance with **3.2.11-1(1)** and subjected to a breaking test.

   (b) The defective link is to be cut out, a connecting common link inserted in their place and the proof load test is to be carried out again.

   (c) Notwithstanding the requirements in **(a)** and **(b)** above, in cases where multiple chains having the same diameter and grade which produced at the same time are tested simultaneously, the chains connected with one failed link may be treated as being on an alternative chain length or the other end of the chain length. In such cases, breaking test specimens that include the link connected with one failed link may be taken in accordance with **3.2.11-1(1)** and subjected to a breaking test in cases where deemed necessary by the Society.

(4) In the event that two or more links in the proof loaded length fail, that section of proof loaded length of offshore chain is to be rejected, a thorough failure investigation is to be carried out to identify the probable cause of failure of the proof test from the manufacturing records. Tests to identify the cause of failure may be required where deemed necessary by the Society. In cases where the cause of failure is identified and the presence in other lengths of factors or conditions thought to be causal to failure is not found from the investigation, ~~An investigation and~~ a retest ~~are~~is to be carried out in accordance with the following **(a)** to **(c)** and where these results are found satisfactorily, ~~this length of offshore chain may be accepted~~it will be decided what length of offshore chain can be considered for acceptance based upon the results of that investigation.

   ~~(a) A thorough examination is to be carried out to identify the probable cause of failure of the proof test from the manufacturing records. The tests in order to identify the cause of failure may be required where deemed necessary by the Society.~~

   (~~b~~a) A breaking test specimen is to be taken from each side of the ~~one~~ failed ~~link~~section ~~according to~~in accordance with **3.2.11-1(1)**~~,~~ and subjected to ~~the~~ a breaking test.

   (~~c~~b) ~~Defective links may~~The failed section is to be cut out~~,~~ ~~and~~ a connecting common link inserted in its place and ~~retest of~~the proof load test is to be carried out again.

   (c) Notwithstanding the requirements in **(a)** and **(b)** above, in cases where multiple chains having the same diameter and grade which produced at the same time are tested

simultaneously, the chains connected with the failed section may be treated as being on an alternative chain length or the other end of the chain length. In such cases, breaking test specimens that include the link connected with the failed section may be taken in accordance with **3.2.11-1(1)** and subjected to a breaking test in cases where deemed necessary by the Society.

(5) If the investigation identifies defects in the flash butt weld or a lower strength flash weld is found from the investigations in **(3)** and **(4)** above, an additional non-destructive test is to be carried out to identify if other links are affected. A full assessment of the flash butt welding machine is to be carried out together with assessment of the condition of the bar ends prior to welding.

Paragraph 3.2.13 has been amended as follows.

3.2.13 Mechanical Tests*

1 Mechanical tests for offshore chains are to be carried out in accordance with following manner after final heat treatment.

(1) One tensile test specimen and 3 sets (9 pieces) impact test specimens are to be taken from the maximum sampling interval corresponding to the nominal diameter of offshore chain specified in **Table L3.11**. Test specimens are to be taken from the location given in **Fig. L3.3** of the part specified in the followings.
   (a) The tensile test specimen is to be taken in the side opposite the flash weld.
   (b) One set (3 pieces) impact test specimens are to be taken across the flash butt weld with the notch centered in the middle, one set are to be taken across the unwelded side and one set are to be taken from the bent region.

(2) Test procedures and form of test specimen are to comply with the requirements in **Chapter 2, Part K**.

(3) Mechanical properties are to comply with the requirements specified in **Table L3.12**.

(4) If the tensile test results do~~es~~ not conform to the requirements, a retest of two further specimens selected from the same sample may be carried out. ~~Where~~If the results of both additional tensile tests ~~show satisfactory results~~comply with the requirements specified in **Table L3.12**, the sampling length of offshore chain is considered acceptable. If the retest results do not comply with the requirements, the sampling length of offshore chain is to be cut out, a connecting common link inserted in its place and the proof load test is to be carried out again.

(5) If the impact test results do~~es~~ not conform to the requirements, a retest of three further 1 set (3 pieces) specimens selected from the same sample may be carried out. The results of a retest are to be added to those previously obtained to form a new average. If the results of a retest comply with the requirements specified in **Table L3.12** and the new average comply with the requirements specified in **Table L3.12**, the sampling length of offshore chain is considered acceptable. If the retest results do not comply with the requirements, the sampling length of offshore chain is to be cut out, a connecting common link inserted in its place and the proof load test is to be carried out again.

(6) Hardness tests for offshore chains are to be carried out in the following manner:
   (a) One hardness test specimen is to be taken at a depth of 1/3 radius for flash butt weld with base metal from the maximum sampling interval corresponding to the nominal diameter of offshore chain specified in **Table L3.11**.
   (b) The results of hardness tests are reference values. However, hardness is to be a maximum of 330 *HBW* at the base metal for grade *R*4*S* and 340 *HBW* at the base metal for grade *R*5.

(c) Based upon the results of hardness tests, it is to be verified that the heat treatment process has been stable during chain production.

2 Mechanical tests for accessories of offshore chains and connecting common links are to be carried out in accordance with following manner after final heat treatment and proof loaded.

(1) One tensile test specimen and one set (3 pieces) impact test specimen are to be taken at the frequency specified in **3.2.11-2(1)** and in the locations specified in **Fig. L3.4** of accessories of offshore chains and connecting common links and mechanical tests are to be carried out. The locations of mechanical tests of other accessories with complex geometries are to be ~~approved by~~ at the discretion of the Society.

((a) to (c) are omitted.)

((2) to (5) are omitted.)

(6) Hardness tests for offshore chains are to be carried out in the following manner:

(a) One hardness test specimen is to be taken at a depth of 1/3 radius from surface and the frequency specified in **3.2.11-2(1)**.

(b) The results of hardness tests are reference values. However, hardness is to be a maximum of 330 *HBW* at the base metal for grade *R*4*S* and 340 *HBW* at the base metal for grade *R*5.

(c) Based upon the results of hardness tests, it is to be verified that the heat treatment process has been stable during chain production.

Paragraph 3.2.14 has been amended as follows.

3.2.14 Non-destructive Test*

1 (Omitted)

2 All offshore chains are to be subjected to the non-destructive test specified in the following **(1)** and **(2)** after proof tests. Prior to test, offshore chains are to have a suitably prepared surface by sanding or be shot blasted in accordance with the applicable non-destructive test standard.

(1) Visual ~~examination~~Inspection

All surfaces of every link are to be examined visually. Chains are to be positioned in order to have good access to all surfaces.

(2) Magnetic Particles ~~t~~Test ~~or Dye Penetrant Test~~

(a) ~~Magnetic particles test or dye penetrant test for every link, is to be employed to examine the f~~Flash butt welded areas, including the area gripped by the clamping dies, of each link are to be subjected to magnetic particle tests in accordance with standards deemed appropriate by the Society. A fluorescent magnetization technique is to be used and the links are to be free from defects exceeding the following values. However, a non-fluorescent magnetization technique may be accepted in cases where deemed appropriate by the Society for special cases where standard test procedures are impractical.

i) Linear defects in transverse direction of links: 1.6 *mm*

ii) Linear defects in longitudinal direction of links: 3.2 *mm*

iii) Non-linear defects: 4.8 *mm*

(b) For 10% of the links, magnetic particles test are to be carried out on all accessible surfaces.

(c) At least 10% of all studs welds within each length of offshore chain~~s~~ are to be examined by a magnetic particles test or dye penetrant test in accordance with standards deemed appropriate by the Society where studs are set to links by welding. If any harmful defects such as cracks or lack of fusion are found, all welded parts of the studs are to be examined.

(3) Ultrasonic Test

All links are to be subjected to ~~U~~ultrasonic tests ~~for all links is to be employed~~ to examine ~~the~~ flash weld fusion in accordance with standards deemed appropriate by the Society.

3 ~~Visual examinations and magnetic particles test or dye penetrant test for every~~ All accessories ~~of~~for offshore chain and connecting common links~~, is to be employed to examine after proof tests~~are to be subjected to the non-destructive test specified in the following **(1)** to **(3)** after proof tests. Prior to test, the accessories for offshore chains and connecting common links are to have a suitably prepared surface in accordance with the applicable non-destructive test standard. All non-machined surfaces are to be sanded or shot blasted. In cases where applicable, accessories for offshore chains are to be dismantled for inspection of internal surfaces. In the event of a failure of the above tests, the entire batch represented is to be rejected unless the cause of failure has been determined and it can be demonstrated to the Surveyor's satisfaction that the condition causing the failure is not present in any of the remaining accessories.

(1) Visual Inspection

All surfaces of each accessory for an offshore chain and connecting common link are to be examined visually. Special attention is to be paid to machined surfaces and high stress regions.

(2) Magnetic Particles Test or Dye Penetrant Test

A magnetic particles test or dye penetrant test for each accessory of an offshore chain and connecting common link is to be employed in accordance with standards deemed appropriate by the Society. In cases where magnetic particles test is employed, a fluorescent magnetization technique is to be used and the accessories and links are to be free from defects exceeding following values.

(a) Linear defects in transverse direction of accessories: 1.6 *mm*

(b) Linear defects in longitudinal direction of accessories: 3.2 *mm*

(c) Non-linear defects: 4.8 *mm*

(3) Ultrasonic Test

All accessories for offshore chains and connecting common links are to be subjected to ultrasonic tests in accordance with standards deemed appropriate by the Society. The acceptance/rejection criteria of the ultrasonic test established for the design is to be met.

4 Non-destructive test procedures together with rejection/acceptance criteria are to be submitted to the Society for approval.

~~4~~5 Non-destructive ~~examination~~test operators are to be appropriately qualified in performing non-destructive ~~examination~~tests.

3.2.15 Repair of Defects

Sub-paragraph -3 has been added as follows.

3 For offshore chains, accessories for offshore chains and connecting common links, repairs by welding are not permitted.

Paragraph 3.2.16 has been amended as follows.

3.2.16 Markings

1 Where offshore chains and accessories of offshore chains have satisfactorily passed the tests and inspections required by **3.2**, they are to be marked as follows.

(1) Places of markings

(a) At stud of each end of offshore chains

(b) At stud of each end at intervals not exceeding 100 *m*

(c) On connecting common link (Stud links are marked at the stud. Studless links are marked at the outside of straight parts without flash butt welds.)
(d) On stud of common links next to connecting common links or shackles~~, all kind of accessories of offshore chains~~
(e) All kinds of accessories for offshore chains

(2) Kinds of markings
(a) Society's stamp
(b) The grade of offshore chains and accessories of offshore chains (e.g. *NK-R*3, *NK-R*3*S*, *NK-R*4, *NK-R*4*S* and *NK-R*5)
(c) The nominal diameter of offshore chains and accessories ~~of~~for offshore chain~~s~~ Manufacturer's number
(d) The certificate number (an abbreviation or equivalent is to be indicated on certificates.)

2 In addition to **-1** above, markings are to be make it possible to determine the individual charge of all links in an offshore chain. However, such markings need only be provided for the first and last common link of each individual charge in cases where links from the same charge are continuously connected. For the ends of a chain, markings are to be make it possible to differentiate the lead and tail ends.

Paragraph 3.2.19 has been amended as follows.

3.2.19 Test Certificate

1 The Society issues certificates, which contain the following particulars, for the offshore Chains which have passed the specified test and inspection. All relevant documents, appendices and reports are to reference the original certificate number.
((1) to (6) are omitted.)
(7) Marks applied to chain and the locations of marked links
((8) to (10) are omitted.)
(11) Number and locations of any connecting common links (an abbreviation or equivalent is to indicate on certificates.)

2 The Society issues certificates, which contain the following particulars, for the Accessories for offshore chain which have passed the specified test and inspection. All relevant documents, appendices and reports are to reference the original certificate number.
((1) to (10) are omitted.)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 July 2017.

2. Notwithstanding the amendments to the Rules, the current requirements apply to offshore mooring chains and accessories for offshore mooring chains (hereinafter referred to as "offshore chains and accessories") for which the application for survey is submitted to the Society before 1 July 2017 or offshore chains and accessories being used on offshore structures and single-point mooring systems for which the date of contracts for construction* is before 1 July 2017.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part L Equipment

2017 AMENDMENT NO.1

Notice No.27 1st June 2017
Resolved by Technical Committee on 30th January 2017

Notice No.27 1st June 2017
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

L3 CHAINS

Title of Section L3.2 has been amended as follows.

L3.2 Offshore Mooring Chains and Others

L3.2.5 Processes of Manufacture

Sub-paragraph -2 has been amended as follows.

2 The wording "where specially approved by the Society" specified in **3.2.5-7, Part K of the Rules**, means that it is verified that any part of common links which are connected with connecting common link under the proposed connecting method has not been adversely affected and that such connecting method is approved by the Society and the purchaser.

Paragraph L3.2.7 has been amended as follows.

L3.2.7 Heat Treatment and Grain Size

~~Where length of~~ For the offshore chains specified in **3.9.1-2, Part PS of the Rules**, ~~is shorter than 55 *m* and the heat treatment can be conducted for whole of them at the same time,~~ batch heat treatment may be permitted in cases where the heat treatment can be conducted for whole of them at the same time.

Paragraph L3.2.11 has been amended as follows.

L3.2.11 Breaking Tests

~~**1** Where the alternative test is carried out in lieu of the breaking test due to the shortage of capacity of testing machine, the following **(1)** and **(2)** are to be complied with.~~

~~(1) Procedure of the alternative test is to be submitted to the Society for approval, and the results of breaking test which were carried out at the approval of manufacturing methods are also to be submitted to the Society.~~

~~(2) Where the alternative test is carried out, tests are to include the test for approval of manufacturing method of this chain except breaking test.~~

~~**2** Where the breaking test is omitted, "alternative breaking test has been applied" is to be indicated in the certificate.~~

~~**3**~~**1** With respect to **3.2.11-2(1), Part L of the Rules,** ~~a batch is defined as accessories that originate from the same heat treatment charge and the same heat of steel.~~ offshore chain manufacturers are to obtain approval of a test plan containing information on the casting or forging method, heat treatment method (position of products in furnace and quenching method are included) and details of product inspection (proof test, breaking test, mechanical test and non-destructive test are included) in cases where an alternative test is carried out. Documents related to the following **(1)** to **(3)** may be required in cases where deemed necessary by the Society.

(1) The results of demonstrations showing that the accessory has a safety margin over and above

the break load of the chain by finite element analysis provided at the break load

(2) The results of strain age testing carried out by approved procedures on the material grade produced to the same parameters at the time of qualification

(3) Reports which demonstrate that strain gauges during production are comparable with strain gauges during the proof and breaking tests during initial qualification in cases where an accessory is of a large size which makes heat treating in batches unfeasible or has a unique design.

~~4~~2 The wording "at the discretion of the Society" specified in **3.2.11-2(4), Part L of the Rules** is where the accessories are manufactured in accordance with the following **(1)** ~~and~~ to **(~~2~~4)**.

(1) The accessories or connecting common link are successfully tested at the breaking load appropriate to the offshore chain for which they are intended.

(2) It is verified by breaking test carried out by the manufacturer of accessories for offshore chain that such accessories are so designed that breaking strength is not less than 1.4 times the breaking test load of the offshore chain for which they are intended.

(3) Strain age properties have been verified according to the material grade produced to the same parameters.

(4) Strain gauges are applied during the break load test at high stress locations to verify that the strains stay within allowable limits.

~~5~~3 Where the accessories for offshore chains complied with requirement in ~~-4~~2 have not been passed the breaking test specified in **3.2.11-2(1)** and **3.2.11-2(2), Part L of the Rules**, the requirement of **3.2.11-2(3), Part L of the Rules** is not to be applied thereto.

Paragraph L3.2.13 has been amended as follows.

L3.2.13 Mechanical Tests

1 (Omitted)

2 The wording "at the discretion of the Society" specified in **3.2.13-2(1), Part L of the Rules** means the following **(1)** and **(2)**.

(1) For non-circular sections, at a depth of 1/4 thickness from the surface

(2) For production from rolled plates, the manufacturer's standard

~~2~~3 With respect to **3.2.13-2(4), Part L of the Rules,** ~~a batch is defined as accessories that originate from the same heat treatment charge and the same heat of steel.~~ an alternative test means the following **(1)** and **(2)**.

(1) In cases where separately forged or cast coupons are used, they are to have the same cross-section and are to be heat treated in the same furnace and quenched in the same tank at the same time, as the actual forgings or castings. Thermocouples are to be attached to the coupon and to the accessories. For forged coupons, a reduction ratio is to be similar to that of the accessories represented.

(2) In cases where the separately forged or cast coupons in **(1)** above are used, it is to be verified that coupon properties are representative of the accessory properties.

Paragraph L3.2.14 has been amended as follows.

L3.2.14 Non-destructive Test

~~**1** With respect to the visual examinations specified in **3.2.14-3, Part L of the Rules,** special attention is to be paid to machined surfaces and high stress regions. All non machined surfaces are to be sand or shot blasted.~~

1 In applying the requirements in **3.2.14-2(1), Part L of the Rules**, it is recommended that the chain be hung in a vertical position in order to allow optimal access to the surface area. Access to inspect the interlink area, however, may only be possible with the chain in the horizontal position.

2 The wording "standards deemed appropriate by the Society" specified in **3.2.14-2(2)(a), Part L of the Rules** means the wet continuous fluorescent magnetization techniques specified in *ASTM E*709 or *ISO* 9934, or the equivalent thereto.

3 The wording "standards deemed appropriate by the Society" specified in **3.2.14-2(2)(c), Part L of the Rules** means the following standards or the equivalent thereto.

(1) Magnetic particle test: *ASTM E*1444

(2) Dye penetrant test: *ASTM E*1417

4 The wording "standards deemed appropriate by the Society" specified in **3.2.14-3(2), Part L of the Rules** is conform to *ASTM E*587 or the equivalent thereto using single probe, angle-beam shear waves in the range from 45 to 70 degrees. A tandem technique, TOFD or phased array may be used in cases where deemed necessary by the Society.

5 The wording "standards deemed appropriate by the Society" specified in **3.2.14-3(2), Part L of the Rules** means the following standards or the equivalent thereto.

(1) Castings:

(a) Magnetic particle test: the wet continuous magnetization techniques specified in *ASTM E*709

(b) Ultrasonic test: *ASTM A*609 or *ISO* 13588

(2) Forgings:

(a) Magnetic particle test: the wet continuous magnetization techniques specified in *ASTM E*709 or *EN* 10228-1 or equivalent standards such as *ISO* 4986 or *IACS Rec.* 69

(b) Ultrasonic test: *ASTM A*609, *EN* 10228-3 or *IS* 13588

~~2~~6 The wording "to be appropriately qualified in performing non-destructive ~~examination~~tests" specified in **3.2.14-~~4~~5, Part L of the Rules**, means those qualified ~~Level~~*Level* II or higher in accordance with *ISO* 9712, *ACCP* or an equivalent qualification deemed appropriate by the Society.

7 Non-destructive test operator qualification according to an employer or responsible agency qualification scheme based on SNT-TC-1A may be accepted if the employer's written practice is reviewed and found acceptable and the Level III is *ASNT Level* III, *ISO* 9712 *Level* III or *ACCP* Professional *Level* III and certified in the applicable method. In such cases, notwithstanding the requirements in **-6** above, the wording "to be appropriately qualified in performing non-destructive tests" specified in **3.2.14-5, Part L of the Rules**, means those qualified Level II or higher.

Paragraph L3.2.18 has been amended as follows.

L3.2.18 Records

1 Records of manufacturing processes such as heating of bar materials, flush butt welding, heat treatment are to include the followings.

(1) Process of heating of bar materials

(a) For electric resistance heating or induction heating
The heating phase ~~are~~is to be controlled by an optical heat sensor. The controller is to be checked at least once every 8 *hours* and records made.

(b) For furnace heating
The heat is to be controlled and temperature continuously recorded using thermocouples in close proximity to the bars. The controls are to be checked at least once every 8 *hours* and records made.

(2) (Omitted)

(3) (Omitted)

2 Records of test~~ing~~s and inspections are to indicate~~s~~ the following **(1)** to **(~~4~~5)**.

((1) to (4) are omitted.)

(5) Example photographs of components positioned in furnaces.

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 July 2017.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to offshore mooring chains and accessories for offshore mooring chains (hereinafter referred to as "offshore chains and accessories") for which the application for survey is submitted to the Society before 1 July 2017 or offshore chains and accessories being used on offshore structures and single-point mooring systems for which the date of contracts for construction* is before 1 July 2017.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.