19-420

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part H Electrical Installations

Rules for the Survey and Construction of Steel Ships
Part H 2019 AMENDMENT NO.2
Guidance for the Survey and Construction of Steel Ships
Part H 2019 AMENDMENT NO.2

Rule No.103/ Notice No.70 27 December 2019
Resolved by Technical Committee on 22 July 2019

ClassNK
NIPPON KAIJI KYOKAI

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

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part H Electrical Installations

2019 AMENDMENT NO.2

Rule No.103 27 December 2019

Resolved by Technical Committee on 22 July 2019

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

Rule No.103 27 December 2019
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 H ELECTRICAL INSTALLATIONS

Amendment 2-1

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.9 Cables

2.9.9 Current Rating of Cables

The current rating of cables is to comply with the following **(1)** to **(5)**.

(1) The current rating of cables for continuous service is not to exceed the values given in **Table H2.13**.

(2) The current rating of cables for short-time services (30 *minutes* or 60 *minutes*) may be increased by multiplying the value given in **Table H2.13** by the following correction factor.

correction factor: $\sqrt{1.12/(1-exp(-ts/0.245/d^{1.35}))}$

ts : 30 or 60 (*min*)

d : overall diameter of the finished cable (*mm*)

(3) The current rating of cables for intermittent services (for periods of 10 *minutes*, of which 4 *minutes* are with constant loads and 6 *minutes* without any loads at all) may be increased by multiplying the value given in **Table H2.13** by the following correction factor.

correction factor: $\sqrt{\frac{1-exp(-10/0.245/d^{1.35})}{1-exp(-4/0.245/d^{1.35})}}$

d : overall diameter of the finished cable (*mm*)

The current rating for other intermittent ratings is to be deemed appropriate by the Society.

(4) In cases where more than 6 cables belonging to the same circuit are bunched together, a correction factor of 0.85 is to be applied.

(5) In cases where ambient temperatures are different from those specified in **(1)** to **(3)**, the correction factor in **Table H2.14** may be applied.

Table H2.13 has been amended as follows.

Table H2.13 Current Ratings of Cables (For Continuous Service)(1)
(Based on Ambient Temperatures of 45℃)

Nominal sectional area of conductor (mm^2)	Current rating in amperes											
	~~*PVC* insulation (general purpose) (70℃)~~			*PVC* insulation(2) (heat resisting) (75℃)			~~*EP* rubber insulation and~~ Cross-linked polyethylene Insulation(3) and *EP* rubber insulation (90℃)			Silicon rubber insulation and Mineral insulation (95℃)		
	~~1 core~~	~~2 cores~~	~~3 cores~~	1 core	2 cores	3 cores	1 core	2 cores	3 cores	1 core	2 cores	3 cores
1.5	~~12~~	~~13~~	~~11~~	17	14	12	23	20	16	26	22	18
2.5	~~17~~	~~18~~	~~15~~	24	20	17	30	26	21	32	27	22
4	~~22~~	~~25~~	~~20~~	32	27	22	40	34	28	43	37	30
6	~~29~~	~~31~~	~~26~~	41	35	29	52	44	36	55	47	39
10	~~51~~	~~43~~	~~36~~	57	48	40	72	61	50	76	65	53
16	~~68~~	~~58~~	~~48~~	76	65	53	96	82	67	102	87	71
25	~~90~~	~~77~~	~~63~~	100	85	70	127	108	89	135	115	95
35	~~111~~	~~94~~	~~78~~	125	106	88	157	133	110	166	141	116
50	~~138~~	~~117~~	~~97~~	150	128	105	196	167	137	208	177	146
70	~~171~~	~~145~~	~~120~~	190	162	133	242	206	169	256	218	179
95	~~207~~	~~176~~	~~145~~	230	196	161	293	249	205	310	264	217
120	~~239~~	~~203~~	~~167~~	270	230	189	339	288	237	359	305	251
150	~~275~~	~~234~~	~~193~~	310	264	217	389	331	272	412	350	288
185	~~313~~	~~266~~	~~219~~	350	298	245	444	377	311	470	400	329
240	~~369~~	~~314~~	~~258~~	415	353	291	522	444	365	553	470	387
300	~~424~~	~~360~~	~~297~~	475	404	333	601	511	421	636	541	445

Note:

(1) The values in this table are not applied to cables which do not satisfy the maximum rated conductor temperature of the concerned insulation.

(2) Polyvinylchlorid insulated wires for control equipment wiring, etc.

(3) Single core, flame retardant cross-linked polyethylene insulated flexible switchboard wire, etc.

2.9.13 Earthing of Metallic Coverings*

Sub-paragraph -3 has been deleted.

1 (Omitted)
2 (Omitted)
~~**3** Lead sheaths of lead-sheathed cables are not to be used as the sole means of earthing any non-current carrying parts of electrical equipment.~~

Paragraph 2.9.18 has been amended as follows.

2.9.18 Cables in Refrigerated Spaces*

Cables installed in refrigerated spaces are to comply with the following **(1)** to **(5)**:

(1) (Omitted)
(2) Cables are to have ~~lead sheaths or~~ sheaths made out of materials with good water resistant properties and be capable of withstanding the low temperatures of refrigerated spaces.
(3) (Omitted)
(4) (Omitted)

(5) (Omitted)

Chapter 4 ADDITIONAL REQUIREMENTS FOR SHIPS CARRYING SPECIAL CARGOES

4.2 Tankers, Ships Carrying Liquefied Gases in Bulk and Ships Carrying Dangerous Chemicals in Bulk

4.2.4 Electrical Installations in Hazardous Areas*

Sub-paragraph -5 has been amended as follows.

5 All cables are to be one of the following types. In cases where some corrosion is to be expected, *PVC* or chloroprene sheaths are to be applied over any armour or metallic sheaths of cables for corrosion protection.
(1) Mineral insulated and copper sheathed
~~(2) Lead alloy sheathed and metal armoured~~
(~~3~~2) Non-metallic sheathed and metal armoured

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 27 December 2019.

Amendment 2-2

Chapter 1 GENERAL

1.1 General

1.1.6 Drawings and Data*

Sub-paragraph (2) has been amended as follows.

The drawings and data to be submitted are as follows. In cases where the Society deems it to be necessary, the submission of drawings and data other than those specified below may be requested.

(1) (Omitted)

(2) Data:

((a) to (e) are omitted.)

(f) The following data in cases of ships where harmonic filters are installed on the main busbars of ~~the~~ electrical distribution systems ~~on board a ship includes harmonic filters~~, except in cases where the filters are installed for single application frequency devices such as pump motors.

i) Total Harmonic Distortion (THD) calculation report

ii) Harmonic filter operation guide

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.12 Semiconductor Converters for Power

2.12.4 Harmonic Filters

Sub-paragraph -1 has been amended as follows.

1 Where harmonic filters are installed on the main busbars of ~~the~~ electrical distribution systems ~~on board a ship includes harmonic filters~~, except when the harmonic filters are installed for single application frequency drives such as pump motors, the ship is to be fitted with facilities to continuously monitor the Total Harmonic Distortion (THD) values experienced ~~on~~by the main busbars as well as to alert the crew in cases where the value exceeds the upper limits given in **2.1.2-4**. The Total harmonic distortion (THD) value is to be recorded in the engine log book, but this reading may be logged electronically in cases where the engine room is provided with systems which automatically log such values.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction* is before the effective date and that are not newly fitted with harmonic filters on or after the effective date.

* "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.

Amendment 2-3

Chapter 1 GENERAL

1.1 General

1.1.7 Ambient Conditions*

Sub-paragraph -2 has been amended as follows.

1 The ambient conditions given in **Table H1.1** and **Table H1.2** are to be applied, unless otherwise specified, to the design, selection and arrangement of electrical installations in order to ensure their proper operation.
2 All electrical equipment ~~are~~is to be designed sufficiently enough to withstand any vibrations that occur under normal conditions.

Table H1.2 has been amended as follows.

Table H1.2 Angle~~s~~ of Inclination

Installation Components	Athwartships(~~1~~2)		~~Bow~~Fore-and-~~stern~~aft (~~1~~2)	
	Static inclination (List)	Dynamic inclination (Rolling)	Static inclination (Trim)	Dynamic inclination (Pitching)
Electrical installations excluding those items started below	15°	22.5°	5°(~~3~~4)	7.5°
Emergency electrical installations, switch gears (circuit breakers, etc.), electric appliances and electronic appliances(1)	22.5°(~~2~~3)	22.5°(~~2~~3)	10°	10°

Notes:
1. No undesired switching operations or operational changes are to occur.
~~1~~2. Athwartships and ~~bow~~fore-and-~~stern~~aft inclinations may occur simultaneously ~~occur~~.
~~2~~3. In ships intended for the carriage of ~~carrying~~ liquefied gases ~~in bulk~~ and of~~ships carrying~~ dangerous chemicals ~~in bulk,~~ the emergency power ~~supplies~~supply is to also ~~are to~~ remain operable with the ship flooded to a final athwartships inclination up to a maximum of 30°.
~~3~~4. Where the length of the ship exceeds 100 *m*, the fore-and-aft static angle of inclination may be taken as follows:
$\theta = 500/L$
θ : The static angle of inclination (°)
L : Length of the ship specified in **2.1.2, Part A** (*m*)

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.6 Circuit-breakers, Fuses and Electromagnetic Contactors

2.6.1 Circuit-breakers

Sub-paragraph -2(4) has been amended as follows.

2 The construction of circuit-breakers is to comply with the following **(1)** to **(6)**:
((1) to (3) are omitted.)
(4) Circuit-breakers are to be such that no accidental opening and closing occur due to ship vibrations~~,~~; ~~and,~~ furthermore, there are to be no malfunctions caused by ~~lists of angles of 30°~~ an inclination in any direction under the conditions given in **Table H1.2**.
((5) and (6) are omitted.)

2.6.3 Electromagnetic Contactors

Sub-paragraph -2(1) has been amended as follows.

2 The construction of electromagnetic contactors is to comply with the following **(1)** to **(3)**:
(1) Electromagnetic contactors are to be such that no accidental opening and closing occur~~s~~ due to ship vibrations; furthermore, there are to be no malfunctions ~~is to be~~ caused by ~~any list of an angle of 30 degrees~~ an inclination in any direction under the conditions given in **Table H1.2**.
((2) and (3) are omitted.)

2.7 Control Appliances

2.7.2 Ambient Conditions

Sub-paragraph -2 has been amended as follows.

2 Control appliances are not to cause any malfunctions such as undesired switching motions or change ~~in status in cases where they are inclined to angles of 45°~~ in an inclination in any direction under the conditions given in **Table H1.2**. ~~However, electromagnetic contactors are to comply with **2.6.3-2(1).**~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction* is before the effective date.

* "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.

Amendment 2-4

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

Paragraph 2.4.2 has been amended as follows.

2.4.2 Characteristics of Governors*

1 The characteristics of governors on prime movers for main generators are that such governors be capable of maintaining speeds within the following limits:

(1) Momentary speed variations are, in principle, to be 10% or less of the maximum rated speed when the rated loads of generators are suddenly thrown off. However, ~~I~~in cases where it is difficult to meet the above requirements, the characteristics of such governors ~~are to be deemed appropriate by the Society~~ may be acceptable in the following cases.

(a) In cases where momentary variations are 10% or less of the rated speed when the maximum load on board is suddenly thrown off and the speed is returned to within 1% of the final steady speed in not more than 5 *seconds*, momentary variations in excess of 10% of rated speeds may be acceptable in cases where rated loads of such generators are suddenly thrown off.

(b) The momentary variations given in **(a)** above, in cases where rated loads of generator are suddenly thrown off are less than any adjusted values of the intervention of overspeed devices as required by **2.4.1-4, Part D**.

(2) Momentary speed variations are, in principle, to be 10% or less of the maximum rated speed when 50% of the rated loads of generators are suddenly thrown on followed by the remaining 50% of such loads suddenly being thrown on after an interval to restore the steady state. Speeds are to return to within 1% of final steady speeds in not more than 5 *seconds*. In cases where it is difficult to meet the above requirements or in cases where certain installations require different characteristics~~, the characteristics of such governors are to be as deemed appropriate by the Society.~~ and the prime movers have mean effective pressures of 1.35 *MPa* or more, the following methods of throwing-in-steps may be acceptable:

Total throw-on loads at the 1st power stage (%) = $80/P_{me}$
Total throw-on loads at the 2nd power stage (%) = $135/P_{me}$
Total throw-on loads at the 3rd power stage (%) = $180/P_{me}$
Total throw-on loads at the 4th power stage (%) = $225/P_{me}$
Total throw-on loads at the 5th power stage (%) = $270/P_{me}$
Total throw-on loads at the 6th power stage (%) = 100

P_{me} : Declared power mean effective pressure (*MPa*)

However, in cases where the above throwing on methods apply, manufacturers or shipyards are requested to submit throw-on power calculation sheets to the Society for approval, and such sheets are to demonstrate that the throw-on loads and base loads at each step of the operation do not exceed those values determined by the formulae above under any of the **(a)** to **(d)** circumstances given below;

(a) at times of power restoration after blackout,
(b) at times of sequential starting,
(c) at times of starting with large start-up loads, or
(d) at times of instantaneous load transfers in cases where one set of generators fails (during parallel running).

(3) At all loads in ranges between no loads and rated loads, any permanent speed variations are to be within ±5% of the maximum rated speed.

2 The characteristics of governors on prime movers driving emergency generators are that such governors be capable of maintaining speeds with the following limits:

(1) Momentary speed variations are not to exceed those values specified in **-1(1)** in cases where total emergency consumer loads are suddenly thrown off.

(2) Momentary speed variations are, in principle, not to exceed those values specified in **-1(2)** and speeds are to return to within 1% of final steady speeds in not more than 5 *seconds* in cases where total emergency consumer loads are suddenly thrown on. ~~Furthermore~~However, if it is difficult to meet the above requirements~~, the characteristics of such governors are to be as deemed appropriate by the Society~~ and in cases where the following **(a)** through **(c)** requirements are to be adopted, and a method of throwing-in-steps may be used.

(a) Total emergency consumer loads are to be thrown on within 45 *seconds* after blackout.

(b) Prime movers are to be designed so that the maximum step loads in emergency consumer loads are to be thrown on at one time.

(c) Documents, such as thrown power calculations, declaring the adoption of throwing-on in steps, are to be submitted.

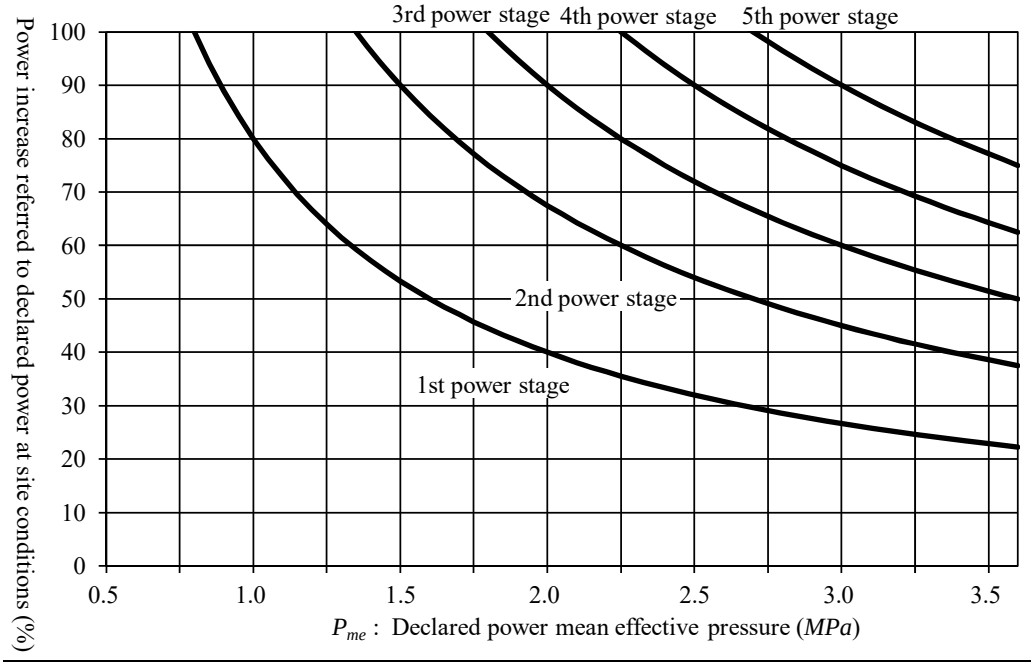
(3) At all loads in ranges between no loads and total emergency consumer loads, any permanent speed variations are not to exceed those values specified in **-1(3)**.

3 (Omitted)

4 (Omitted)

Fig. H2.1 has been added as follows.

Fig. H2.1 Reference values for maximum possible sudden power increases as a function of brake mean effective pressure (P_{me}) at declared power (four-stroke diesel engines)



EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to governors whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction* is before the effective date.

* "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.

Amendment 2-5

Chapter 3 DESIGN OF INSTALLATIONS

3.3 Emergency Sources of Electrical Power

3.3.2 Capacities of Emergency Sources of Power*

Sub-paragraph -2(4) has been amended as follows.

2 Emergency sources of electrical power are to be capable, having regard for starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for those periods specified hereinafter, if they depend upon electrical sources for operation:
((1) to (3) are omitted.)
(4) For a period of 18 *hours*:
(a) (Omitted)
(b) ~~VHF radio installations, MF radio installations, *INMARSAT* Ship Earth Stations and MF/HF radio i~~Installations <u>listed in the following **i)** to **iv)**</u> as required by Chapter IV, the Annex to the *SOLAS* Convention and installed on ships. However, in cases where these radio installations are installed in duplicate, it is not necessary to consider duplicated installations are operated simultaneously in determining the capacities of emergency sources of electrical power.
<u>i) *VHF* radio installations</u>
<u>ii) *MF* radio installations</u>
<u>iii) Recognized mobile satellite service ship earth stations</u>
<u>iv) *MF/HF* radio installations</u>
((c) to (f) are omitted.)
((5) to (10) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 2-5)

1. The effective date of the amendments is 1 January 2020.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part H Electrical Installations

2019 AMENDMENT NO.2

Notice No.70 27 December 2019

Resolved by Technical Committee on 22 July 2019

Notice No.70 27 December 2019
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:

Part H ELECTRICAL INSTALLATIONS

Amendment 2-1

H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

H2.1 General

H2.1.4 Earthing

Sub-paragraph -2 has been amended as follows.

2 Earthing may be made under the requirements specified below:
(1) (Omitted)
(2) (Omitted)
~~(3) Lead cable sheaths are not to be used as the sole earthing means under any circumstances.~~
(~~4~~3) Nominal cross-sectional areas of all copper earthing conductors are to be as given in **Table H2.1.4-1**. In cases where earthing conductors other than copper are used, their conductance is to be of more than that of those copper conductors given in this table.
(~~5~~4) Connections between earthing conductors and hull structures are to be made in accessible positions, and to be secured by screws made of brass or some other corrosion-resistant-materials that have a diameter not less than 4 *mm* and which are to be used for this purpose only. In any case, contact faces are to have glossy metal surfaces when these screws are tightened.

Table H2.1.4-1 has been amended as follows.

Table H2.1.4-1 Sizes of Earthing Conductors

Types of earthing conductors		Cross-sectional areas of current-carrying conductors	Minimum cross-sectional areas of copper earthing conductors
Earthing conductors in flexible cables or flexible cords		Up to and including 16 mm^2	100% cross-sectional area of current-carrying conductors
		Exceeding 16 mm^2	50 % cross-sectional area of current-carrying conductors (at least 16 mm^2)
Insulated ~~E~~earthing conductors incorporated in fixed cables	~~Insulated earthing conductors~~	Up to and including 16 mm^2	100% cross-sectional area of current-carrying conductors (at least 1.5 mm^2)
		Exceeding 16 mm^2	50 % cross-sectional area of current-carrying conductors (at least 16 mm^2)
	~~Bare earthing wires in direct contact with lead sheaths~~	~~1 – 2.5 mm^2~~	~~1 mm^2~~
		~~4 – 6 mm^2~~	~~1.5 mm^2~~
Separate earthing conductors		Up to and including 3 mm^2	100% cross-sectional area of current-carrying conductors (at least 1.5 mm^2 for stranded earthing connections or 3 mm^2 for unstranded earthing connections)
		Exceeding 3 mm^2 Up to and including 125 mm^2	50% cross-sectional area of current-carrying conductors (at least 3 mm^2)
		Exceeding 125 mm^2	64 mm^2

H2.9 Cables

H2.9.3 Choice of Protective Coverings

Sub-paragraph -1 has been amended as follows.

1 The term “metallic sheath” represents ~~lead alloy metals,~~ stainless steel and copper sheaths. In cases where the use of ordinary steel or light metal alloy sheaths is intended, adequate protection against corrosion is to be provided.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 27 December 2019.

Amendment 2-2

H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

H2.4 Rotating Machines

Sub-paragraph H2.4.2 has been deleted.

~~**H2.4.2 Characteristics of Governors**~~

~~**1** The wording "to be deemed appropriate by the society" in **2.4.2-1(1)**, **Part H of the Rules** means as follows:~~

~~(1) In cases where momentary variations are 10% or less of the rated speed when the maximum load on board is suddenly thrown off and the speed is returned to within 1% of the final steady speed in not more than 5 *seconds*, momentary variations in excess of 10% of rated speeds may be acceptable in cases where rated loads of such generators are suddenly thrown off.~~

~~(2) The momentary variations given in **-1(1)** above, in cases where rated loads of generator are suddenly thrown off are to be less than any adjusted values of the intervention of overspeed devices as required by **2.4.1-1, Part D of the Rules**.~~

~~**2** For prime movers with mean effective pressures of 1.35 *MPa* or more to which the application of those methods of throwing on rated loads of generators specified in **2.4.2-1(2)**, **Part H of the Rules** are impossible, the following three or four steps throwing on method in accordance with the formulae below is to be used notwithstanding the above-mentioned requirements:~~

~~Total throw-on loads at the 1st step (%) = 80/*BMEP*~~
~~Total throw-on loads at the 2nd step (%) = 135/*BMEP*~~
~~Total throw-on loads at the 3rd step (%) = 180/*BMEP*~~
~~Total throw-on loads at the 4th step (%) = 100~~
~~*BMEP*: Brake mean effective pressure (*MPa*)~~

~~However, in cases where the above throwing on method apply, manufacturers or shipyards are requested to submit throw-on power calculation sheets to the Society for approval which demonstrate that the throw-on loads and base loads at each step of the operation do not exceed those values determined by the formulae above under any circumstances.~~

~~(1) At times of power restoration after blackout~~
~~(2) At times of sequential starting~~
~~(3) At times of starting with large start-up loads~~
~~(4) At times of instantaneous load transfers in cases where one set of generators fails (during parallel running)~~

~~**3** For gas-fuelled engines to which the application of those methods of throwing on rated loads of generators specified in **2.4.2-1(2)**, **Part H of the Rules** are impossible, three or more steps throwing on method may be used notwithstanding the above-mentioned requirements in cases where throw-on power calculation sheets which demonstrate that the throw-on loads and base loads at each step of the operation under the circumstances listed in **-2(1)** through **(4)** are submitted by manufacturers or shipyards to the Society and approved.~~

~~**4** The wording "to be as deemed appropriate by the Society" in **2.4.2-2(2)**, **Part H of the Rules** means that throwing-on in steps to those prime movers, which this Rule is applied, are to be used. In such cases, the following requirements **(1)** through **(3)** are to be adopted:~~

~~(1) Total emergency consumer loads are to be thrown on within 45 *seconds* after blackout.~~
~~(2) Prime movers are to be designed so that maximum step loads in emergency consumer loads~~

~~are to be thrown on at one time.~~

~~(3) Documents, such as thrown power calculations, declaring the adoption of throwing-on in steps, are to be submitted.~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to governors whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction* is before the effective date.

* "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.