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 2014 AMENDMENT NO.1
Guidance for the Survey and Construction of Steel Ships
Part H 2014 AMENDMENT NO.1

Rule No.9 / Notice No.10 26th February 2014
Resolved by Technical Committee on 29th July 2013
Approved by Board of Directors on 24th September 2013

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NIPPON KAIJI KYOKAI

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part H Electrical Installations

2014 AMENDMENT NO.1

Rule No.9 26th February 2014

Resolved by Technical Committee on 29th July 2013

Approved by Board of Directors on 24th September 2013

Rule No.9 26th February 2014
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

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.1 General

2.1.2 Voltage and Frequency

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

1 System voltages are not to exceed:
(1) ~~500~~1,000*V* for generators, power equipment, and heating and cooking equipment connected to fixed wiring.
(2) 250*V* for lighting, heaters in cabins and public rooms, equipment other than those specified in **(1)** above.
(3) 15,000*V a.c.* and 1,500*V d.c.* for installations for electric propulsion.
(4) 15,000*V a.c.* for *a.c.* generators and *a.c.* power equipment which meets the requirements given in **2.17**.

2.4 Rotating Machines

2.4.12 Clearances and Creepage Distances inside Terminal Boxes

Sub-paragraph -1 has been amended as follows.

1 Clearances and creepage distances inside terminal boxes of rotating machines are not to be less than the values given in **Table H2.4**. Furthermore, the clearances and creepage distances for the terminal boxes of rotating machines with rated voltages exceeding 500*V* are to be adequate for the working voltage and to give consideration to the specifications of the terminal boxes.
2 The requirements specified in -1 above are not to be applied in cases where insulating barriers are used and also they are not to be applied to small motors such as controlling motors, synchros, etc.

2.5 Switchboards, Section Boards and Distribution Boards

2.5.4 Busbars

Sub-paragraph -5 has been amended as follows.

(-1 to -4 are omitted)

5 ~~Clearance distances between live parts of different polarity or between live parts and earthed metals~~Air clearances (phase-to-phase, pole-to-pole and phase-to-earth) of non-insulated busbars are not to be less than the values given in **Table H2.7**.

Table H2.7 has been amended as follows.

Table H2.7 Minimum Air Clearances ~~Distances~~ for Busbars

Rated voltage (*V*) ~~between poles or phases (*V*)~~	~~Minimum clearance (*mm*)~~	
	~~Between phases or poles of live Parts~~ Air clearance (*mm*)	~~Between live parts and earthed metals~~
~~125 or less~~	~~13~~	~~13~~
~~over 125 to~~ 250 or less ~~inclusive~~	~~16~~15	~~13~~
over 250 to ~~500~~690 inclusive	~~23~~20	~~23~~
over 690 to 1,000 inclusive	35	

2.7 Control Appliances

2.7.1 Clearances and Creepage Distances

Table H2.11 has been amended as follows.

Table H2.11 Minimum Clearances and Creepage Distances for Control Appliances

Rated insulating voltage (*V*) (*d.c* & *a.c.*)	Clearance (*mm*)						Creepage[3][4] (*mm*)					
	Less than 15 *A*[5]		15 *A* or over and 63 *A* or under[5]		Exceeding 63 *A*[5]		Less than 15 *A*[5]		15 *A* or over and 63 *A* or under[5]		Exceeding 63 *A*[5]	
	L-L[1]	*L-A*[2]	*L-L*[1]	*L-A*[2]	*L-L*[1]	*L-A*[2]	*a*	*b*	*a*	*b*	*a*	*b*
Not exceeding 60	2	3	2	3	3	5	2	3	2	3	3	4
Exceeding 60 and 250 or under	3	5	3	5	5	6	3	4	3	4	5	8
Exceeding 250 and 380 or under	4	6	4	6	6	8	4	6	4	6	6	10
Exceeding 380 and 500 or under	6	8	6	8	8	10	6	10	6	10	8	12
Exceeding 500 and 660 or under	6	8	6	8	8	10	8	12	8	12	10	14
Exceeding 660 and 800 or under	10	14	10	14	10	14	10	14	10	14	14	20
Exceeding 800 and 1,000 or under	14	20	14	20	14	20	14	20	14	20	20	28

(Notes are omitted)

2.17 High Voltage Electrical Installations

2.17.1 General

Sub-paragraph -1 has been amended as follows.

1 The requirements given in this **2.17** are to be applied to those high voltage electrical installations with system voltages above *a.c.* ~~500~~1,000*V* up to *a.c.* 15,000*V*.
2 The high voltage electrical installations are to meet the requirements given in this **2.17** and also those in other applicable chapters of this Part.

2.17.3 Construction and Location

Table H2.16 has been amended as follows.

Table H2.16 Minimum Air Clearances

Rated voltage (*V*)	Non-insulated busbars (*mm*)	High voltage control equipment (*mm*)
~~above 500 and 1,000 or below~~	~~35~~	~~20~~
above 1,000 and 3,600 or below	55	30
above 3,600 and 7,200 or below	90	60
above 7,200 and 12,000 or below	120	100
above 12,000	160	--

2.17.6 Testing

Sub-paragraph -3 has been amended as follows.

1 High voltage electrical equipment and cables are to be tested in accordance with all applicable requirements of **Part H of the Rules**. High voltage test, however, is also to comply with the following requirements in this **2.17.6**.

2 Internal arc fault tests on high voltage switchboards, in accordance with the standards deemed appropriate by the Society, are to be carried out at the place of manufacturer, etc. However, the subsequent testing of identical units of the same series may be omitted subject to the approval of the Society.

3 The following high voltage tests on high voltage electrical equipment and cables are to be carried out at the place of manufacturer, etc.:

(1) Test voltages for high voltage switchboards and control boards of the following values.
~~Rated voltages above 500*V* and 1,000*V* or below: twice the rated voltage + 1,000*V*~~
Rated voltages above 1,000*V* and 3,600*V* or below: 10,000*V*
Rated voltages above 3,600*V* and 7,200*V* or below: 20,000*V*
Rated voltages above 7,200*V* and 12,000*V* or below: 28,000*V*
Rated voltages above 12,000*V*: 38,000*V*

(2) Test voltages for high voltage transformers of the following values.
Maximum voltages above ~~500~~1,000*V* and 1,100*V* or below: 3,000*V*
Maximum voltages above 1,100*V* and 3,600*V* or below: 10,000*V*
Maximum voltages above 3,600*V* and 7,200*V* or below: 20,000*V*
Maximum voltages above 7,200*V* and 12,000*V* or below: 28,000*V*
Maximum voltages above 12,000*V*: 38,000*V*

(3) At least five impulses are to be applied to the stator coils for high voltage rotating machines. The peak value of the test voltage is $\sqrt{6}$ times the rated voltage.

(4) Test voltages for high voltage cables of the following values.
~~Rated voltages above 500*V* and 1,000*V* or below: 3,500*V*~~
Rated voltages above 1,000*V* and 3,600*V* or below: 6,500*V*
Rated voltages above 3,600*V* and 7,200*V* or below: 12,500*V*
Rated voltages above 7,200*V* and 12,000*V* or below: 21,000*V*
Rated voltages above 12,000*V*: 30,500*V*

4 (omitted)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 26 February 2014.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part H Electrical Installations

2014 AMENDMENT NO.1

Notice No.10 26th February 2014

Resolved by Technical Committee on 29th July 2013

Notice No.10 26th February 2014
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

H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

H2.5 Switchboards, Section Boards and Distribution Boards

H2.5.4 Busbars

1 Busbars, contact faces of busbars and linking conductors are to be protected against any corrosion or oxidization by means of silver plating, tin plating or dippling in solder baths, etc.

2 Current ratings of busbars may generally be determined by **Table H2.5.4-1**.

3 The wording "in cases where deemed appropriate by the Society" in **2.5.4-4**, **Part H of the Rules** refers to cases where documents which show that there are no adverse effects on any of the following **(1)** to **(5)** are submitted to and approved by the Society in cases where the temperature rises of any busbars, connecting conductors and their connections that are carrying full-load currents exceed $45K$ at an ambient temperature of $45^{\circ}C$.

(1) Mechanical strength of the conducting material
(2) Possible effect on adjacent equipment
(3) Permissible temperature limits of the insulating materials in contact with the conductor
(4) Effect of the temperature of the conductor on the apparatus connected to busbars
(5) For plug-in contacts, the nature and surface treatment of the contact material

Table H2.5.4-1 has been amended as follows.

Table H2.5.4-1 Current Rating of Busbars

Type			Current rating
For generators	In cases where only one generator is feeding power to the busbars.		100% or more of the rated current of the generator.
	In cases where two or more generators are feeding power at their full capacities to the busbars.	Subdivided busbar arrangement (distribution systems consisting of multiple busbars)	For each busbar (including spare circuits), ((100% of the large capacity rated currents (e.g. bow thrusters, etc.)) + (75% of the sum of the rated currents of the rest of the feeding circuits)) or more
		Single busbar arrangement (distribution system consisting of a single busbar)	((100% of the rated current of one generator of the largest capacity) + (80% of the sum of the rated currents of generators)) or more
For power feeding	In the case of general power feeding circuits.		75% or more of the sum of the rated currents of the feeding circuits (including spare circuits). However, there is no need of exceeding the capacity of the generator busbars.
	In cases where feeding circuits have only one load circuit, or where power is fed to groups of motors under continuous service.		The total load current or more.

H2.9 Cables

H2.9.11 Precaution against Fire

Sub-paragraphs -3 and -5 have been amended as follows.

(-1 and -2 are omitted)

3 Those cables to which the requirements given in **2.9.11-2**, **Part H of the Rules** are to apply are generally those used for the following equipment:

(1) Motors of auxiliary machinery used for steering gears and main propulsion
(2) All the lighting systems on board ship
(3) Internal communications, signals and navigational aids specified in **2.2.8**, **Part H of the Rules**
(4) Emergency sources of electrical power, lighting, internal communications, signals and navigational aids required by **3.3.2-2**, **Part H of the Rules**
(5) The equipment specified in **(1)** to **(4)** above includes ~~Those services~~ the following **(a)** to **(i)** which are required to be operable under fire conditions ~~means the following **(a)** to **(h)**~~:
  (a) General alarm systems
  (b) Fire alarm systems
  (c) Fixed fire-extinguishing systems and their medium release alarms
  (d) Fire detection systems
  (e) Control and power systems to power operated fire doors and status indication for all fire doors
  (~~e~~f) Control and power systems to power operated watertight doors and their status indication
  (~~f~~g) Emergency lighting
  (~~g~~h) Public address systems or other equivalent means of communication
  (~~h~~i) Remote emergency stop/shutdown of equipment specified in **2.2.13-1**, **Part H of the**

Rules

(6) Other equipment as deemed necessary by the Society

4 (Omitted)

5 The wording "high fire risk areas" in **2.9.11-2**, **Part H of the Rules** generally means those places as specified below:

(1) Cargo holds specified in **4.8**, **Part H of the Rules**.

(2) Spaces specified in **9.2.3-2(9)** and **9.2.4-2(9)**, **Part R of the Rules**. However, lockers and store-rooms are to be excluded.

(3) Machinery spaces as defined in **3.2.30**, **Part R of the Rules**, except spaces containing generators and major electrical units, refrigerating, stabilizing, ventilation and air conditioning machinery and trunk to such spaces, provided they are not handling or using flammable liquids.

(-6 and -7 are omitted)

H2.17 High Voltage Electrical Installation

Paragraph H2.17.3 has been amended as follows.

H2.17.3 Construction and Location

1 ~~In the case of any of the high voltage electrical equipment listed below whose rated voltages are above 1,000*V*, t~~The wording "standards deemed appropriate by the Society" in **2.17.3-1**, **Part H of the Rules** means the current standards of the *International Electrotechnical Commission* (*IEC*) listed below or any equivalent thereto.

((1) to (7) are omitted)

2 The wording "suitably designed to avoid any excessive circulating currents" in **2.17.3-6, Part H of the Rules** means that generators in which the third harmonic content of waveforms does not exceed 5% may be considered adequate.

~~**3** In cases where it is not practicable for high voltage electrical equipment whose rated voltage is above 500*V* and 1,000*V* or below to comply with the appropriate requirements, or where it is irrational or impossible to apply the requirements of **2.17, Part H of the Rules**, documentation regarding the type, principal components and the installation location of the equipment is to be submitted to the Society for approval. Air clearances between control boards may be in accordance with **Table H2.17.3-1**.~~

~~**4**~~**3** (omitted)

~~**5**~~**4** (omitted)

~~**6**~~**5** (omitted)

~~**7**~~**6** (omitted)

Table H2.17.3-1 has been deleted.

~~Table H2.17.3-1 Minimum Air Clearances and Creepage Distances~~

~~Rated voltage (*V*)~~	~~Air clearance (*mm*)~~	~~Creepage distance (*mm*)~~
~~above 500 and 660 or below~~	~~10~~	~~14~~
~~above 660 and 750 or below~~	~~12~~	~~16~~
~~above 750 and 1,000 or below~~	~~14~~	~~22~~

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 26 February 2014.