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.1**
**Guidance for the Survey and Construction of Steel Ships**
**Part H 2019 AMENDMENT NO.1**

Rule No.39 / Notice No.26 14 June 2019
Resolved by Technical Committee on 30 January 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.1**

Rule No.39 14 June 2019

Resolved by Technical Committee on 30 January 2019

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

Rule No.39 14 June 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 1-1

## Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

### 2.4 Rotating Machines

### 2.4.5 Overload Capability*

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

Rotating machines are to withstand the following excess current or torque tests by maintaining their voltage, rotating speed and frequency as near to their rated values as possible. In the case of special types of deck machinery motors (winch, windlass, capstan, etc.), overload scaling may be dealt with as considered appropriate by the Society.

(1) Excess current capability

(a) *A.C.* generators
150 % of rated current for ~~*2 minutes*~~30 *seconds*

(b) *A.C.* motors
150 % of rated current for 2 *minutes*.
However, in the case of *A.C.* motors having rated outputs exceeding 315 *kW* or rated voltages exceeding 1 *kV*, the load and time of excess current capability may be increased or decreased in consideration of use conditions and the like.

(~~b~~c) *D.C.* generators
150 % of rated current
Rated output (*kW*) / Rated rotating speed (*rpm*) $\leq 1$ for 45 *seconds*
Rated output (*kW*) / Rated rotating speed (*rpm*) $> 1$ for 30 *seconds*

((2) is omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

**1.** The effective date of the amendments is 14 June 2019.

**2.** Notwithstanding the amendments to the Rules, the current requirements apply to the surveys for which the application is submitted to the Society before the effective date.

Amendment 1-2

# Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

## 2.9 Cables

### 2.9.11 Precaution against Fire*

Sub-paragraph -2 has been amended as follows.

**2** All cables for power, lighting, internal communications, signals and navigational aids of essential and emergency services are to be, as far as practicable, routed clear of high fire risk areas and ~~all machinery spaces of category *A* as well as their~~ casings of all machinery spaces of category *A*~~, all galleys, all laundries and any other high fire risk areas~~. In addition, ~~C~~cables connecting fire pumps to emergency switchboards are to be fire resistant types complying with standards deemed appropriate by the Society in cases where they pass through high fire risk areas. All such cables are to be, as far as practicable, run in such a manner as to preclude their being rendered unserviceable by any heating of bulkheads that may be caused by fires in adjacent spaces.

Sub-paragraph -3 has been renumbered to Sub-paragraph -5, and Sub-paragraphs -3 and -4 have been added as follows.

**3** Where cables used for the services specified in the following **(1)** to **(11)**, including their power supplies, pass through high fire risk areas other than those which they serve, they are to be so arranged that a fire in any of these areas or zones does not affect the operation of the service in any other area or zone.

(1) General alarm systems
(2) Fire alarm systems
(3) Fixed fire-extinguishing systems and their medium release alarms
(4) Fire detection systems
(5) Control and power systems to power operated fire doors and status indication for all fire doors
(6) Control and power systems to power operated watertight doors and their status indication
(7) Emergency lighting
(8) Public address systems or other equivalent means of communication
(9) Remote emergency stop/shutdown of equipment specified in **2.2.13-1**
(10) Emergency fire pump
(11) Low location lighting systems

**4** In addition to the requirements given in **-3** above, the installation of cables connected to emergency fire pumps is to comply with the following **(1)** and **(2)**:

(1) The cables are not to pass through machinery spaces containing main fire pumps or their respective power sources and prime movers; and
(2) The cables may pass through other high fire risk areas mentioned in **-3** above only if they are fire resistant types which comply with standards deemed appropriate by the Society, and run continuous through such areas so as to maintain fire integrity.

Sub-paragraph -5 has been amended as follows.

~~3~~**5** Interconnecting cables between generators and main switchboards are to be routed clear of fuel oil purifier spaces, above other generator engines and fuel oil purifiers except in any of the following **(1)** to **(3)**:

(1) Cables connected to multiple generators or main switchboards which are separated into at least two groups throughout their length as far apart as practicable;

(2) Fire resistant cables which comply with the standards deemed appropriate by the Society ~~have passed the following tests: *IEC* 60331-1 for cables whose diameters exceed 20 *mm*, and *IEC* 60331-21 or *IEC* 60331-2 for cables whose diameters do not exceed 20 *mm*~~; or

(3) Cables protected by fire prevention measures deemed appropriate by the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

**1.** The effective date of the amendments is 14 June 2019.

**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.

# GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

## Part H Electrical Installations

**2019 AMENDMENT NO.1**

Notice No.26 14 June 2019

Resolved by Technical Committee on 30 January 2019

Notice No.26 14 June 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 1-1

## H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

### H2.9 Cables

Paragraph H2.9.11 has been amended as follows.

**H2.9.11 Precaution against Fire**
(-1 and -2 are omitted.)
**3** ~~Those~~ The "cables for power, lighting, internal communications, signals and navigational aids of essential and emergency services" ~~to which the requirements given~~ specified in **2.9.11-2, Part H of the Rules** ~~are to apply~~ are generally those used for the ~~following~~ equipment specified in the following **(1)** to **(5)**:
(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 **H2.2.8-1**;
(4) Emergency sources of electrical power, lighting, internal communications, signals and navigational aids required by **3.3.2-2, Part H of the Rules**; and
~~(5) The equipment specified in **(1)** to **(4)** above includes the following **(a)** to **(i)** which are required to be operable under fire conditions:~~
~~(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~~
~~(f) Control and power systems to power-operated watertight doors and their status indication~~
~~(g) Emergency lighting~~
~~(h) Public address systems or other equivalent means of communication~~
~~(i) Remote emergency stop/shutdown of equipment specified in **2.2.13-1**, **Part H of the Rules**~~
(~~6~~5) Other equipment as deemed necessary by the Society.
**4** (Omitted)
**5** The wording "high fire risk areas" in case of **2.9.11-2** and **-3, Part H of the Rules** generally means those places as specified below:
(1) Machinery spaces of category *A*.
(2) Galleys.
(3) Laundries (however, only laundries containing drying equipment in the case of **2.9.11 -3, Part**

**H of the Rules**).

(~~1~~4) Cargo holds specified in **4.8, Part H of the Rules**.

(~~2~~5) 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~~6) 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.

(7) The following **(a)** and **(b)**, in case of **2.9.11-3, Part H of the Rules**:

(a) Spaces containing fuel treatment equipment and other highly flammable substances; and

(b) Pantries containing cooking appliances (except devices specified in **R3.2.1(1)** and **(2), Part R**).

**6** The wording "standards deemed appropriate by the Society" in **2.9.11-2**, **-4** and **-5, Part H of the Rules** means the current standards of the *IEC* as listed below:

(1) *IEC* 60331-1 for cables whose diameters exceed 20 *mm*; and

(2) *IEC* 60331-21 or *IEC* 60331-2 for cables whose diameters do not exceed 20 *mm*.

**~~6~~7** ~~In cases where installation of the cables specified in **H2.9.11-3** in the spaces specified in **2.9.11-2**, **Part H of the Rules** is unavoidable, such cables may be any of the following: fire resistant cables whose diameters exceed 20 *mm* which have passed the tests in *IEC* 60331-1; fire resistant cables whose diameters do not exceed 20 *mm* which have passed the tests in *IEC* 60331-21 or *IEC* 60331-2; or cables laid in insulated steel pipes or steel ducts whose fire protection is equivalent to **A-60** or more. (*See* **Fig. H2.9.11-1**)~~

~~The above, however, does not apply to cases where the "services which are required to be operable under fire conditions" specified in **-3(5)** can be maintained by means of one of the following **(1)**, **(2)** or **(3)**:~~ Installation of the cables in high fire risk areas in order not to "affect the operation of the service in any other area or zone" in accordance with **2.9.11-3, Part H of the Rules** may be achieved by employing the means specified in either the following **(1)** or **(2)**. However, with regard to electrical cables to emergency fire pumps listed in **2.9.11-3(10), Part H of the Rules**, attention is to be paid to the requirement of **2.9.11-4, Part H of the Rules**.

(1) In cases where cables are installed in the high fire risk areas specified in **-5**, fire resistant cables which comply with the "standards deemed appropriate by the Society" specified in **-6** are to be installed and run continuously so as to maintain fire integrity (*See* **Fig. H2.9.11-1**); otherwise, cables are to be laid within insulated steel pipes or steel ducts whose fire protection is equivalent to ***A*-60** or more.

(2) The measures specified in either the following **(a)**, **(b)** or **(c)** are taken:

(~~1~~a) Self-monitoring of short-circuits and line open faults;

(~~2~~b) Preservation of the function against short-circuits and line open faults; or

(~~3~~c) Duplication with the cable runs separated as widely ~~separated~~ as is practicable.

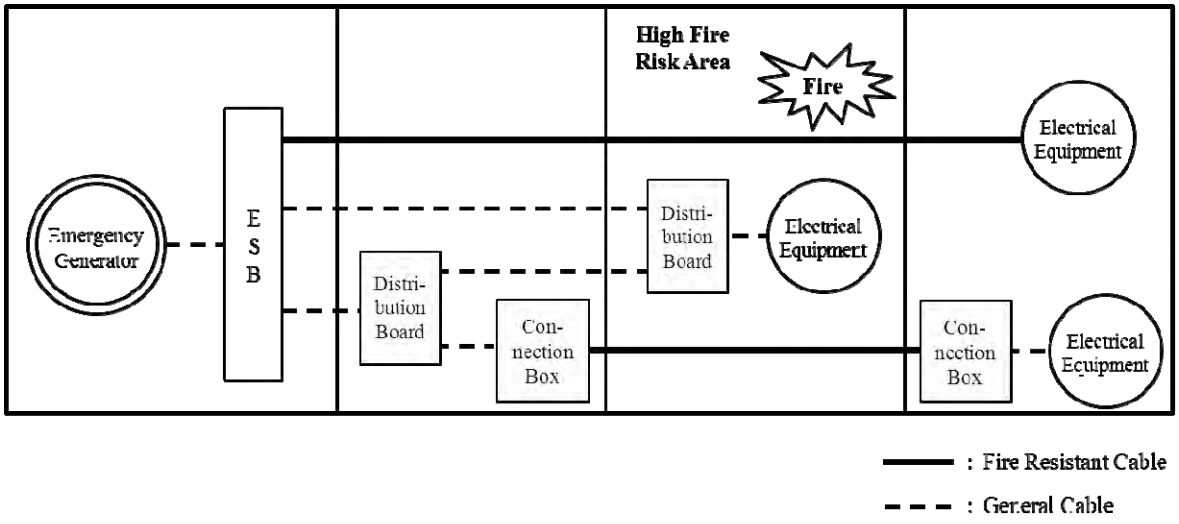
~~**7** Notwithstanding the requirements given in **-6** above, the installation of cables connected to emergency fire pumps is to comply with the following **(1)** and **(2)**:~~

~~(1) The cables do not pass through the machinery spaces containing main fire pumps or their respective power sources and prime movers; and~~

~~(2) The cables may pass through other high fire risk areas only if they are fire resistant and have passed the tests given in **-6** above.~~

**8** (Omitted)

Fig. H2.9.11-1 Example of Potential Fire Hazards and ~~Application Ranges~~Installation of Fire Resistant Cables




~~Note:~~

~~In the event of any fire in high fire risk areas, cables are to be of fire resistant type in such areas so as to not allow any negative impact on the use of any connected electrical equipment.~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

**1.** The effective date of the amendments is 14 June 2019.

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

Amendment 1-2

# H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

## H2.16 Explosion-protected Electrical Equipment

### H2.16.1 General

Sub-paragraph -2(3) has been amended as follows.

**2** Explosion-protected electrical equipment listed below may be treated as equivalent to those complying with *IEC* 60079.
((1) and (2) are omitted.)
(3) Explosion-protected electrical equipment complying with the "Recommended Practices for Explosion-Protected Electrical Installations in General Industries (JNIOSH-TR-NO.43 (~~2008~~2018))" issued by National Institute of Occupational Safety and Health in Japan.
((4) is omitted.)

# H4 ADDITIONAL REQUIREMENTS FOR SHIPS CARRYING SPECIAL CARGOES

## H4.2 Tankers, Ships Carrying Liquefied Gases in Bulk and Ships Carrying Dangerous Chemicals in Bulk

### H4.2.4 Electrical Installations in Hazardous Areas

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

**2** The wording "other electrical equipment deemed appropriate by the Society" in **4.2.4-1(3)(b)**, **Part H of the Rules** means one of the following:
(1) Electrical equipment of type "n" protection in accordance with *IEC* 60079-15~~(2001)~~ (the latest edition)
((2) and (3) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

**1.** The effective date of the amendments is 14 June 2019.
**2.** Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships for which the application for Classification Survey during Construction is submitted to the Society on or after the effective date.

Amendment 1-3

# H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

## H2.4 Rotating Machines

Paragraph H2.4.2 has been amended as follows.

### H2.4.2 Characteristics of Governors

**1** (Omitted)

**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.

~~**3**~~**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 1-3)

**1.** The effective date of the amendments is 1 July 2019.

**2.** Notwithstanding the amendments to the Guidance, the current requirements apply to gas-fuelled engines for which the application for approval is submitted to the Society before the effective date.