Revised Guidance Relating to the Rules for the Classification of Steel Ships

(Development Review : For external opinion inquiry)

Part 6 Electrical Equipment and Control Systems

2020. 1.

Machinery Rule Development Team

Effective Date : 1 July 2020

(The contract date for ship construction)

Present

CHAPTER 1 ELECTRICAL EQUIPMENT

Section 1 General

101. General

1. Application [See Rule]

(1) - (4) <same as the present Rules>

(5) Electrical equipment on board the ships specified in (4) above are to be in accordance with (1) through (3) above, and the following:

Mitigated requirements for ships described in (A) to (D)

	Relevant requirements[1] (mitigated requirements)		(A)	(B)	(C)	(D)
(a) - (p)	<same as the present Rules>					
(q)	Rule 401. 1 (2)	Installation of main switchboard	O			
NOTES) 1) - 4) <same as the present Rules>						

(A) - (B) <same as the present Rules>

(C) Ships specified in (4) (C) above

(a) The requirements in (A) (a), (b), (c), (d), (f), (g), (i), (j), (l), (o) and (p) above apply.

(b) - (d) <same as the present Rules>

(D) Ships specified in (4) (D) above

(a) The requirements in (A) (l), (o) and (p) above apply.

(6) - (8) <same as the present Rules>

Amendment

CHAPTER 1 ELECTRICAL EQUIPMENT

Section 1 General

101. General

1. Application [See Rule]

(1) - (4) <same as the present Rules>

(5) Electrical equipment on board the ships specified in (4) above are to be in accordance with (1) through (3) above, and the following:

Mitigated requirements for ships described in (A) to (D) *(2020)*

	Relevant requirements[1] (mitigated requirements)		(A)	(B)	(C)	(D)
(a) - (p)	<same as the present Rules>					
(q)	Rule 401. 1 (2)	Installation of main switchboard	O		O	O
NOTES) 1) - 4) <same as the present Rules>						

(A) - (B) <same as the present Rules>

(C) Ships specified in (4) (C) above

(a) The requirements in (A) (a), (b), (c), (d), (f), (g), (i), (j), (l), (o), ~~and~~ (p) and (q) above apply. *(2020)*

(b) - (d) <same as the present Rules>

(D) Ships specified in (4) (D) above

(a) The requirements in (A) (l), (o), ~~and~~ (p) and (q) above apply. *(2020)*

(6) - (8) <same as the present Rules>

Remark

(Amended)

- For ships restricted in service area, the requirements have been amended in order not to apply to the main switchboard installation requirements.

Present	Amendment	Remark
(9) The requirements for the emergency power of fishing vessels are to apply as follows; (A) - (B) <same as the present Rules> (C) The emergency source of electrical power installed according to above (A) is to be capable of supplying simultaneously at least the following services for the period of 3 hours (6 hours for the equipment of (a) to (c)) : (a) - (e) <same as the present Rules> (f) Emergency fire pump, sprinkler pump and emergency bilge pump (D) <same as the present Rules> (10) <same as the present Rules> **2. - 3. <same as the present Rules>** **102. - 103. <same as the present Rules>**	(9) The requirements for the emergency power of fishing vessels are to apply as follows; (A) - (B) <same as the present Rules> (C) The emergency source of electrical power installed according to above (A) is to be capable of supplying simultaneously at least the following services for the period of 3 hours (6 hours for the equipment of (a) to (c)) : *(2020)* (a) - (e) <same as the present Rules> ~~(f) Emergency fire pump, sprinkler pump and emergency bilge pump~~ (D) <same as the present Rules> (10) <same as the present Rules> **2. - 3. <same as the present Rules>** **102. - 103. <same as the present Rules>**	(Amended) - Since the requirements for the emergency power of fishing vessels are different from the emergency power requirements of the standard for Fishery vessel appliances, the requirements for the emergency power of fishing vessels have been amended in accordance with the standard for Fishery vessel appliances.

Present	Amendment	Remark
Section 2 System design **201. General** **1. Construction and installation** (1) <same as the present Rules> (2) Installation and protective enclosure **【See Rule】** (A) In a case where the characteristic letter IP showing the protection type of enclosures in accordance with the IEC 60529 is used for the protective enclosures of electrical equipment, the following requirements are to be complied with. (a) - (b) <same as the present Rules> (c) Application of degree of protection As a guide for the selection of degree of protection for the electrical equipment on the basis of the circumstances of the place of installation, the requirements given in **Table 6.1.6** of the Guidance are to be taken into consideration. (B) - (D) <same as the present Rules> (3) <same as the present Rules> **2. - 4. <same as the present Rules>** **202. - 205. <same as the present Rules>** **Section 3 - 18 <same as the present Rules>** **CHAPTER 2 <same as the present Ruels>**	**Section 2 System design** **201. General** **1. Construction and installation** (1) <same as the present Rules> (2) Installation and protective enclosure **【See Rule】** (A) In a case where the characteristic letter IP showing the protection type of enclosures in accordance with the IEC 60529 is used for the protective enclosures of electrical equipment, the following requirements are to be complied with. (a) - (b) <same as the present Rules> (c) Application of degree of protection As a guide for the selection of degree of protection for the electrical equipment on the basis of the circumstances of the place of installation, the requirements given in **Table 6.1.6** of the Guidance are to be taken into consideration. (B) - (D) <same as the present Rules> (3) <same as the present Rules> **2. - 4. <same as the present Rules>** **202. - 205. <same as the present Rules>** **Section 3 - 18 <same as the present Rules>** **CHAPTER 2 <same as the present Ruels>**	(Amended) - Note (7) has been added in Table 6.1.6 so that the IP grade of propulsion transformers applied to electric propulsion unit is to comply with Pt 6, Ch 1, Sec 16 of the Rules.

<Amendment>

Table 6.1.6 Application of Degree of Protection *(2020)*

Example of location	Condition of location	Switchboard, etc[1]	Gener-ators	Motors	Transformers[7], Converters	Lighting fixtures	Heating appli-ances	Accessories[2]
Dry accommodation space	Danger of touching live parts only	IP 20	-	IP 20	IP 20	IP 20	IP 20	IP 20
Dry control rooms[4]		IP 20	-	IP 20	IP 20	IP 20	IP 20	IP 20
Control rooms	Danger of dripping water and(or) moderate mechanical damage	IP 22	-	IP 22	IP 22	IP 22	IP 22	IP 22
Engine rooms and boiler rooms above floor plates[5]		IP 22	IP 22	IP 22	IP 22	IP 22	IP 22	IP 44
Steering gear rooms		IP 22	IP 22	IP 22	IP 22	IP 22	IP 22	IP 44
Refrigerating machinery rooms		IP 22	-	IP 22	IP 22	IP 22	IP 22	IP 44
Emergency machinery rooms		IP 22	IP 22	IP 22	IP 22	IP 22	IP 22	IP 44
General store rooms		IP 22	-	IP 22	IP 22	IP 22	IP 22	IP 22
Pantries		IP 22	-	IP 22	IP 22	IP 22	IP 22	IP 44
Provision rooms		IP 22	-	IP 22	IP 22	IP 22	IP 22	IP 22
Bathrooms and showers	Danger of spraying water and(or) increased danger of mechanical damage	-	-	-	-	IP 34	IP 44	IP 55
Engine rooms and boiler rooms below floor plates		-	-	IP 44	-	IP 34	IP 44	IP 55[3]
Closed fuel oil or lubricating oil separator rooms		IP 44	-	IP 44	-	IP 34	IP 44	IP 55[3]
Ballast pump rooms, bow thruster rooms and similar spaces below load line		IP 44	-	IP 44[6]	IP 44	IP 34	IP 44	IP 55
Refrigerated rooms		-	-	IP 44	-	IP 34	IP 44	IP 55
Galleys and laundries		IP 44	-	IP 44	IP 44	IP 34	IP 44	IP 44
Shaft or pipe tunnels in double bottom	Danger of jet water, existence of cargo dust particle, serious mechanical damage and(or) aggressive fumes	IP 55	-	IP 55	IP 55	IP 55	IP 55	IP 56
Holds for general cargo		-	-	-	-	IP 55	-	IP 55
Open decks	Exposure to heavy seas	IP 56	-	IP 56	-	IP 56	IP 56	IP 56
Bilge wells	Exposure to submersion	-	-	-	-	IP X8	-	IP X8

(NOTES)

(1) - (6) <same as the present Rules>

(7) When applied to an electric propulsion unit, it is to be in accordance with **Ch 1, 1605.** of the Rules.

* "-" marks indicate installation of electrical equipment is not recommended., selection for explosion-protected construction is to be in accordance with the relevant requirements of **Pt 6, Ch 1** of the Rules.

Rules for the Classification of Steel Ships

(Final)

Part 6 Electrical Equipment and Control Systems

2019. 12.

Machinery Rule Development Team

Effective Date : 1 January 2020

(The contract date for ship construction or the application date for a periodical or occasional machinery survey after the retrofit of harmonic filters)

◉ reflected IACS UR E24(Rev.1 Dec 2018)

- The requirements have been amended to clarify the application range of harmonic distortion for on-board distribution systems where harmonic filters are installed on main busbars.

(The contract date for ship construction or the application date for certification of the device)

◉ reflected IACS UR M3(Rev.6 Nov 2018)

- In addition to governors, the requirements for overspeed protective device have been added. And the requirement to refer to Part 5 has been changed to refer to (5).

Present	Amendment	Remark
CHAPTER 1 ELECTRICAL EQUIPMENT **Section 1 <same as the present Rules>** **Section 2 System Design** **201. General** **1. - 7. <same as the present Rules>** **8. Harmonic distortion *(2017)*** (1) **General** (A) <same as the present Rules> (B) This limit may be exceeded where all installed equipment and systems have been designed for a higher specified limit and this relaxation on limits is to be documented (harmonic distortion calculation report) and made available on board as a reference for the surveyor at each periodical survey. <Newly added>	**CHAPTER 1 ELECTRICAL EQUIPMENT** **Section 1 <same as the present Rules>** **Section 2 System Design** **201. General** **1. - 7. <same as the present Rules>** **8. Harmonic distortion ~~*(2017)*~~*(2020)*** (1) General (A) <same as the present Rules> (B) This limit may be exceeded where all installed equipment and systems have been designed for a higher specified limit and this relaxation on limits is ~~to be~~ documented (harmonic distortion calculation report) and made available on board as a reference for the surveyor at each periodical survey. (2) Harmonic distortion for ship electrical distribution system including harmonic filters (A) Application The these requirements apply to ships where harmonic filters are installed on main busbars of electrical distribution system, other than those installed for single application frequency drives such as pump motors.	(Amended) - Reflecting IACS UR E24(Rev.1), the requirements for harmonic distortion have been amended to clarify the application of harmonic distortion to the distribution system of the ship on which the harmonic filters are installed.

Present	Amendment	Remark
(2) **Monitoring of harmonic distortion levels for a ship including harmonic filters** (A) Where the electrical distribution system on board a ship includes harmonic filters, such ships are to be fitted with facilities to continuously monitor the levels of harmonic distortion experienced on the main busbar as well as alerting the crew should the level of harmonic distortion exceed the acceptable limits. Where the engine room is provided with automation systems, this reading is to be logged electronically, otherwise it is to be recorded in the engine log book for future inspection by the surveyor. However, harmonic filters installed for single application frequency drives such as pump motors may be excluded from requirements in **8**. (3) **Mitigation of the effects of harmonic filter failure on a ship's operation** (A) - (C) <same as the present Rules> (4) **Protection arrangements for harmonic filters** (A) - (C) <same as the present Rules>	(B) Monitoring of harmonic distortion levels for a ship ~~including~~ where harmonic filters are installed (a) ~~Where the electrical distribution system on board a ship includes harmonic filters, such~~ The ships are to be fitted with facilities to continuously monitor the levels of harmonic distortion experienced on the main busbar as well as alerting the crew should the level of harmonic distortion exceed the acceptable limits. Where the engine room is provided with automation systems, this reading is to be logged electronically, otherwise it is to be recorded in the engine log book for future inspection by the surveyor. ~~However, harmonic filters installed for single application frequency drives such as pump motors may be excluded from requirements in **8**.~~ (C) Mitigation of the effects of harmonic filter failure on a ship's operation (a) - (c) <same as the present Rules> (D) Protection arrangements for harmonic filters (a) - (c) <same as the present Rules>	
Section 3 Rotating Machinery **301. <same as the present Rules>** **302. Prime movers for generators** **1. <same as the present Rules>**	**Section 3 Rotating Machinery** **301. <same as the present Rules>** **302. Prime movers for generators** **1. <same as the present Rules>**	

Present	Amendment	Remark
2. Governors Governors on prime movers driving main or emergency electric generators are to be capable of automatically maintaining the speed within the following limits: (1) Prime movers for driving generators of the main and emergency sources of electrical power are to be fitted with a speed governor which will prevent transient frequency variations in the electrical network in excess of ±10% of the rated frequency with a recovery time to steady state conditions not exceeding 5 seconds, when the maximum electrical step load is switched on or off. In the case when a step load equivalent to the rated output of a generator is switched off, a transient speed variation in excess of 10% of the rated speed may be acceptable, provided this does not cause the intervention of the overspeed device specified in **Pt 5, Ch 2, 203. 1** (1). (2) - (4) <same as the present Rules> <Newly added>	**2. Governors** Governors on prime movers driving main or emergency electric generators are to be capable of automatically maintaining the speed within the following limits: (1) Prime movers for driving generators of the main and emergency sources of electrical power are to be fitted with a speed governor which will prevent transient frequency variations in the electrical network in excess of ±10% of the rated frequency with a recovery time to steady state conditions not exceeding 5 seconds, when the maximum electrical step load is switched on or off. In the case when a step load equivalent to the rated output of a generator is switched off, a transient speed variation in excess of 10% of the rated speed may be acceptable, provided this does not cause the intervention of the overspeed device specified in ~~**Pt 5, Ch 2, 203. 1** (1)~~ (5). (2) - (4) <same as the present Rules> (5) In addition to the speed governor, each prime mover driving an electric generator and having a rated power of 220 kW and above must be fitted with a separate overspeed protective device so adjusted that the speed cannot exceed the rated speed by more than 15%.	(Amended) - Reflecting the IACS UR M3(Rev.6), in addition to governors, requirements for overspeed protective device have been added. And the requirement to refer to Part 5 has been changed to refer to (5).
3. - 4. <same as the present Rules>	**3. - 4. <same as the present Rules>**	
303. - 309. <same as the present Rules>	**303. - 309. <same as the present Rules>**	
Section 4 - 18 <same as the present Rules>	**Section 4 - 18 <same as the present Rules>**	
CHAPTER 2 <same as the present Rules>	**CHAPTER 2 <same as the present Rules>**	

Effective Date : 1 July 2020

(The contract date for ship construction)

현 행	개 정 안	개 정 사 유
CHAPTER 1 ELECTRICAL EQUIPMENT **Section 1 - 2 <same as the present Rules>** **Section 3 Rotating Machinery** **301. - 308. <same as the present Rules>** **309. Testing and inspection** **1. - 15. <same as the present Rules>** **16. Tests** The tests of rotating machinery are as following table according to its kinds.	**CHAPTER 1 ELECTRICAL EQUIPMENT** **Section 1 - 2 <same as the present Rules>** **Section 3 Rotating Machinery** **301. - 308. <same as the present Rules>** **309. Testing and inspection** **1. - 15. <same as the present Rules>** **16. Tests** The tests of rotating machinery are as following table according to its kinds. <refer to next page table>	(Amended) - Amended the requirement of Notes for Verification of degree of protection

<Amendment>

No.	Tests	A.C. Generator		A.C. Motors		D.C. Machines	
		Type test*	Routine test(1)	Type test*	Routine test(1)	Type test*	Routine test(1)
1	Drawing approval(9)	X	X	X	X	X	X
2	Visual inspection	X	X	X	X	X	X
3	Material test of shaft	X(2)	X(2)	X(2)	X(2)	X(2)	X(2)
4	Temperature test	X	X(8)	X	X(8)	X	X(8)
5	Overcurrent or excess torque test	X	X(3)	X	X(3)	X	X(3)
6	Overspeed test	X	X	X(4)	X(4)	X(4)	X(4)
7	Insulation resistance test	X	X	X	X	X	X
8	High voltage test	X	X	X	X	X	X
9	Voltage regulation test	X	X(5)				
10	Winding resistance measurement	X	X	X	X	X	X
11	Commutation test					X(6)	
12	Verification of steady short-circuit condition (7)	X	X(8)				
13	No load test	X	X	X	X	X	X
14	Verification of bearings	X	X	X	X	X	X
15	Verification of degree of protection	X(8)	X(8)	X(8)	X(8)	X(8)	X(8)

(Notes)

* Type tests on prototype machine or tests on at least the first batch of machines.

(1) Test report of machines routine tested is to contain the manufacturer's serial number of the machine which has been type tested and the test result.

(2) Only applicable for rotating machines of 100kW(100 kVA for Generator) and more (except emergency generators).

(3) Only applicable for rotating machines of essential services rated 100kW(100 kVA for Generator) and more.

(4) Not applicable for squirrel cage motors.

(5) Only functional test of voltage regular system.

(6) Only applicable for rotating machines with commutators.

(7) Only applicable for synchronous generators.

(8) Where accepted by the Society, test ~~and verification~~ may be omitted. **【See Guidance】**

(9) Only applicable for rotating machines of 100kW(100 kVA for Generator) and more. And where accepted by the Society, drawing approval may be omitted. **【See Guidance】**

Present	Amendment	Remark
Section 4 Switchboards, Section Boards and Distribution Boards	**Section 4 Switchboards, Section Boards and Distribution Boards**	
401. General [See Guidance]	**401. General** [See Guidance]	
1. - 2. <same as the present Rules>	**1. - 2. <same as the present Rules>**	
3. Safety precautions to operators	**3. Safety precautions to operators**	
Where the live parts of switchboards face a passageway, the following means are to be provided. (1) <same as the present Rules> (2) Insulated mats are to be provided on the floor of passageway.	Where the live parts of switchboards face a passageway, the following means are to be provided. (1) <same as the present Rules> (2) ~~Insulated mats are~~ Insulating matting is to be provided on the floor of passageway.	(Amended) - The term of the insulating matting has been amended with reference to IEC 61111.
402. - 406. <same as the present Rules>	**402. - 406. <same as the present Rules>**	

Present	Amendment	Remark
Section 5 Cables **501. <same as the present Rules>** **502. Application of cables** **1. Insulating materials** Insulating materials are to be as given in **Table 6.1.11.** **2. - 3. <same as the present Rules>** **Table 6.1.11 Permissible Temperature of Insulating Materials** **<refer to the next page>** **503. Current rating of cable** **1. - 4. <same as the present Rules>** **5. Current rating of cables** The current rating of cables is to comply with the following (1) to (5). (1) Current rating of cables for continuous services The current rating of cables for continuous services is not to exceed the values given in **Table 6.1.12.** (2) - (5) <same as the present Rules> **Table 6.1.12 Current Rating of Cables (for continuous services)** **<refer to the next page>** **504. - 512. <same as the present Rules>** **Section 6 - 18 <same as the present Rules>**	**Section 5 Cables** **501. <same as the present Rules>** **502. Application of cables** **1. Insulating materials** Insulating materials are to be as given in **Table 6.1.11.** **2. - 3. <same as the present Rules>** **Table 6.1.11 Permissible Temperature of Insulating Materials** **<refer to the next page>** **503. Current rating of cable** **1. - 4. <same as the present Rules>** **5. Current rating of cables** The current rating of cables is to comply with the following (1) to (5). (1) Current rating of cables for continuous services The current rating of cables for continuous services is not to exceed the values given in **Table 6.1.12.** (2) - (5) <same as the present Rules> **Table 6.1.12 Current Rating of Cables (for continuous services)** **<refer to the next page>** **504. - 512. <same as the present Rules>** **Section 6 - 18 <same as the present Rules>**	(Amended) - Reflecting the international standard IEC 60092-360, the requirements for PVC insulation in Table 6.1.11 and Table 6.1.12 have been deleted to prevent the use of PVC as insulation for cables.

<Amendment>

Table 6.1.11 Permissible Temperature of Insulating Materials *(2020)*

Insulating material	Abbreviated designation	Maximum rated conductor temp.(℃)	
		Normal operation	Short-circuit
~~Polyvinyl chloride~~	~~PVC~~	~~70~~	~~150~~
Ethylene propylene rubber	EPR	90	250
High modulus or hard grade ethylene propylene rubber	HEPR	90	250
Cross-linked polyethylene	XLPE	90	250
Halogen free ethylene propylene rubber	HF EPR	90	250
High modulus or hard grade Halogen-free ethylene propylene rubber	HF HEPR	90	250
Halogen-free cross-linked polyethylene	HF XLPE	90	250
Cross-linked polyolefin for halogen-free cables	HF 90	90	250
Silicon rubber	S 95	95	350*
Halogen-free silicone rubber	HF S 95	95	350*
* : This temperature is applicable only to power cables and not appropriate for tinned copper conductors.			

<Amendment>

Table 6.1.12 Current Rating of Cables (for continuous services) ***(2020)***

(Based on ambient temperature 45℃)

Nominal sectional area of conductor (mm^2)	Current rating (A)								
	~~PVC insulation (70℃)~~			Ethylene propylene rubber, High modulus or hard grade ethylene propylene rubber, Cross-linked polyethylene, Halogen free ethylene propylene rubber, High modulus or hard grade Halogen-free ethylene propylene rubber, Halogen-free cross-linked polyethylene, Cross-linked polyolefin for halogen-free cables insulation (90℃)			Silicon rubber, Halogen-free silicone rubber insulation (95℃)		
	~~1 core~~	~~2 core~~	~~3 core~~	1 core	2 core	3 core	1 core	2 core	3 core
1	~~11~~	~~9~~	~~8~~	18	15	13	20	17	14
1.5	~~15~~	~~13~~	~~11~~	23	20	16	24	20	17
2.5	~~22~~	~~19~~	~~15~~	30	26	21	32	27	22
4	~~29~~	~~25~~	~~20~~	40	34	28	42	36	29
6	~~37~~	~~31~~	~~26~~	52	44	36	55	47	39
10	~~51~~	~~43~~	~~36~~	72	61	50	75	64	53
16	~~69~~	~~59~~	~~48~~	96	82	67	100	85	70
25	~~91~~	~~77~~	~~64~~	127	108	89	135	115	95
35	~~112~~	~~95~~	~~78~~	157	133	110	165	140	116
50	~~140~~	~~119~~	~~98~~	196	167	137	200	170	140
70	~~173~~	~~147~~	~~121~~	242	206	169	255	217	179
95	~~210~~	~~179~~	~~147~~	293	249	205	310	264	217
120	~~243~~	~~207~~	~~170~~	339	288	237	360	306	252
150	~~279~~	~~237~~	~~195~~	389	331	272	410	349	287
185	~~318~~	~~270~~	~~223~~	444	377	311	470	400	329
240	~~374~~	~~318~~	~~262~~	-	-	-	-	-	-
300	~~430~~	~~366~~	~~301~~	-	-	-	-	-	-

Present	Amendment	Remark
CHAPTER 2 CONTROL SYSTEMS	**CHAPTER 2 CONTROL SYSTEMS**	
Section 1 <same as the present Rules>	**Section 1 <same as the present Rules>**	
Section 2 System and Control	**Section 2 System and Control**	
201. - 203. <same as the present Rules>	**201. - 203. <same as the present Rules>**	
204. Control system of electric generating sets **1. <same as the present Rules>** **2. Emergency Source of Electric Power** Automatic or remote control devices for diesel engines to drive emergency generators for non-emergency purposes are to be complied with the following requirements: (1) - (5) <same as the present Rules>	**204. Control system of electric generating sets** **1. <same as the present Rules>** **2. Emergency Source of Electric Power** Automatic or remote control devices for diesel engines to drive emergency generators ~~for non-emergency purposes~~ are to be complied with the following requirements: (1) - (5) <same as the present Rules>	(Amended) - Reflecting the IACS UR M63, the requirements for emergency source of electric power have been amended.
205. - 206. <same as the present Rules>	**205. - 206. <same as the present Rules>**	
Section 3 - 4 <same as the present Rules>	**Section 3 - 4 <same as the present Rules>**	

Revised Guidance Relating to the Rules for the Classification of Steel Ships

(Final)

Part 6 Electrical Equipment and Control Systems

2020. 1.

Machinery Rule Development Team

Effective Date : 1 January 2020

(The contract date for ship construction)

◉ The requirement for equivalence has been amended in accordance with the amendment to Part 1 of the Rules.

Present	Amendment	Remark
CHAPTER 1 ELECTRICAL EQUIPMENT **Section 1 General** **101. General** **1. <same as the present Rules>** **2.** In application to **101. 2** of the Rules, the term "as deemed appropriate by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **【See Rule】** **3. <same as the present Rules>** **102. Drawings and data** **【See Rule】** **1.** In application to **102. 1** (14) of the Rules, the term "Drawings and data as deemed necessary by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **103. Testing and inspection** **1. - 5. <same as the present Rules>** **6.** In application to **103. 4** of the Rules, the term "when it deems necessary" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **【See Rule】** **7. <same as the present Rules>** **Section 2 - 18 <same as the present Rules>**	**CHAPTER 1 ELECTRICAL EQUIPMENT** **Section 1 General** **101. General** **1. <same as the present Rules>** **2.** In application to **101. 2** of the Rules, the term "as deemed appropriate by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **【See Rule】** **3. <same as the present Rules>** **102. Drawings and data** **【See Rule】** **1.** In application to **102. 1** (14) of the Rules, the term "Drawings and data as deemed necessary by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **103. Testing and inspection** **1. - 5. <same as the present Rules>** **6.** In application to **103. 4** of the Rules, the term "when it deems necessary" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **【See Rule】** **7. <same as the present Rules>** **Section 2 - 18 <same as the present Rules>**	(Amended) - The article number has been amended in accordance with the amendment to Part 1 of the Guidance that incorporates the requirements for equivalence.

Present	Amendment	Remark
CHAPTER 2 CONTROL SYSTEMS **Section 1 <same as the present Rules>** **Section 2 System and Control** **201. System design *(2017)*** **[See Rule]** **1.** In application to **201. 4** (7) of the Rules, the term "other measures considered appropriate by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **202. <same as the present Rules>** **203. Automatic and remote control of boilers** **1. General** **[See Rule]** In application to **203. 1** (3) of the Rules, the term "considered in each case" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **2. Automatic combustion control systems** (1) In application to **203. 2** (2) (F) of the Rules, the term "where approved by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **[See Rule]** (2) In application to **203. 2** (4) of the Rules, the term "considered in each case by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **[See Rule]**	**CHAPTER 2 CONTROL SYSTEMS** **Section 1 <same as the present Rules>** **Section 2 System and Control** **201. System design *(2017)*** **[See Rule]** **1.** In application to **201. 4** (7) of the Rules, the term "other measures considered appropriate by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **202. <same as the present Rules>** **203. Automatic and remote control of boilers** **1. General** **[See Rule]** In application to **203. 1** (3) of the Rules, the term "considered in each case" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **2. Automatic combustion control systems** (1) In application to **203. 2** (2) (F) of the Rules, the term "where approved by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **[See Rule]** (2) In application to **203. 2** (4) of the Rules, the term "considered in each case by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **[See Rule]**	(Amended) - The article number has been amended in accordance with the amendment to Part 1 of the Guidance that incorporates the requirements for equivalence.

Present	Amendment	Remark
Section 3 Tests (2017) **301. Shop tests** [See Rule] **1. <same as the present Rules>** **2. Shop tests of automation system** (1) - (2) <same as the present Rules> (3) In application to **301. 2** (1) (E) of the Rules, the term "other tests considered necessary by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** or **105.** of the Guidance. **302. - 303. <same as the present Rules>**	**Section 3 Tests** (2017) **301. Shop tests** [See Rule] **1. <same as the present Rules>** **2. Shop tests of automation system** (1) - (2) <same as the present Rules> (3) In application to **301. 2** (1) (E) of the Rules, the term "other tests considered necessary by the Society" means the acceptance in accordance with **Pt 1, Ch 1, 104.** ~~or **105.**~~ of the ~~Guidance.~~ Rules. **302. - 303. <same as the present Rules>**	(Amended) - The article number has been amended in accordance with the amendment to Part 1 of the Guidance that incorporates the requirements for equivalence.

Effective Date : 1 January 2020

(The contract date for ship construction or the application date for certification of the device)

◉ reflected IACS UR M3(Rev.6 Nov 2018)

- The requirements for throwing-on method have been amended to apply up to 5 levels of throwing-on methods for prime movers.

Present	Amendment	Remark
CHAPTER 1 ELECTRICAL EQUIPMENT **Section 1 - 2 <same as the present Rules>** **Section 3 Rotating Machinery** **302. Prime movers for generators [See Rule]** For prime movers with a brake mean effective pressure of 1.35 MPa or more to which the application of the method of throwing on the rated load of a generator specified in **302. 2** (2) of the Rules is impossible, the throwing-on method in three or four steps in accordance with the formulae below is to be used notwithstanding the requirements of the Rules: Total throw-on load at the 1st step(%) = 80/BMEP Total throw-on load at the 2nd step(%) = 135/BMEP Total throw-on load at the 3rd step(%) = 180/BMEP Total throw-on load at the 4th step(%) = 100 Where, BMEP : Brake mean effective pressure(MPa)	**CHAPTER 1 ELECTRICAL EQUIPMENT** **Section 1 - 2 <same as the present Rules>** **Section 3 Rotating Machinery** **302. Prime movers for generators [See Rule]** ~~For prime movers with a brake mean effective pressure of 1.35 MPa or more to which the application of the method of throwing on the rated load of a generator specified in **302. 2** (2) of the Rules is impossible, the throwing-on method in three or four steps in accordance with the formulae below is to be used notwithstanding the requirements of the Rules:~~ ~~Total throw-on load at the 1st step(%) = 80/BMEP~~ ~~Total throw-on load at the 2nd step(%) = 135/BMEP~~ ~~Total throw-on load at the 3rd step(%) = 180/BMEP~~ ~~Total throw-on load at the 4th step(%) = 100~~ ~~Where, BMEP : Brake mean effective pressure(MPa)~~ In application to **302. 2** (2) of the Rules Application of electrical load in more than 2 load steps can only be permitted, if the conditions within the ship's mains permit the use of such prime movers which can only be loaded in more than 2 load steps (see Fig. 1 for guidance on 4-stroke diesel engines expected maximum possible sudden power increase) and provided that this is already allowed for in the designing stage. This is to be verified in the form of system specifications to be approved and to be demonstrated at ship's trials. In this case, due consideration is to be given to the power required for the electrical equipment to be automatically switched on after black-out and to the sequence in which it is connected. This applies analogously also for generators to be operated in parallel and where the power has to be transferred from one generator to another in the event of any one generator has to be switched off.	(Amended) - Reflecting IACS UR M3(Rev.6), the requirements for throwing-on method have been amended to apply up to 5 levels of throwing-on methods for prime movers.

Present	Amendment	Remark
<Newly added Fig 6.1.2>	Fig 6.1.2 Reference values for maximum possible sudden power increases as a function of brake mean effective pressure, Pme, at declared power (four-stroke diesel engines) <Refer to the next page>	
However, in case where the above throwing-on method applies, the manufacturers or shipyards are requested to submit a throw-on power calculation sheet demonstrating that the thrown load and base load at each step of operation do not exceed the value determined by the formulae above under any circumstances, to the Society for approval. (1) - (4) <same as the present Rules>	However, in case where the above throwing-on method applies, the manufacturers or shipyards are requested to submit a throw-on power calculation sheet demonstrating that the thrown load and base load at each step of operation do not exceed the value determined by the formulae above under any circumstances, to the Society for approval. (1) - (4) <same as the present Rules>	
303. - 309. <same as the present Rules>	**303. - 309. <same as the present Rules>**	
Section 4 Switchboards, Section Boards and Distribution Boards	**Section 4 Switchboards, Section Boards and Distribution Boards**	
401. General [See Rule]	**401. General [See Rule]**	
1. - 3. <same as the present Rules>	**1. - 3. <same as the present Rules>**	
4. Safety precautions to operators In application to **401. 3** of the Rules, insulation mats are to be in accordance with the dielectric tests according to IEC 61111 or equivalent. *(2019)*	**4. Safety precautions to operators** In application to **401. 3** of the Rules, ~~insulation mats are~~ insulating matting is to be in accordance with the dielectric tests according to IEC 61111 or equivalent. *~~(2019)~~(2020)*	(Amended) - The term of the insulating matting has been amended with reference to IEC 61111.
402. - 406. <same as the present Rules>	**402. - 406. <same as the present Rules>**	
Section 5 - 18 <same as the present Rules>	**Section 5 - 18 <same as the present Rules>**	

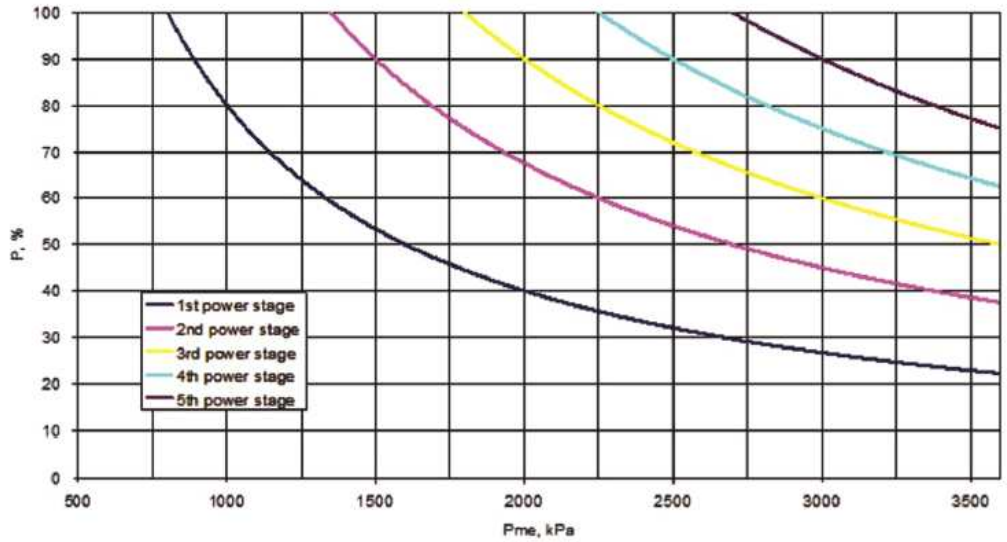

Fig 6.1.2 Reference values for maximum possible sudden power increases as a function of brake mean effective pressure, P_{me}, at declared power (four-stroke diesel engines)

Note)
P_{me} : declared power mean effective pressure
P : power increase referred to declared power at site conditions

Effective Date : 1 July 2020

(The contract date for ship construction)

Present	Amendment	Remark
CHAPTER 2 CONTROL SYSTEMS **Section 1 - 2 <same as the present Rules>** **Section 3 Tests** *(2017)* **301. Shop tests** [See Rule] **1. Type approval** (1) In application to **301. 1** of the Rules, "automatic equipment" to be type-approved are , in principle, as follows: (A) - (L) <same as the present Rules> (M) Electric power converters for electric propulsion unit (N) - (O) <same as the present Rules> **2.** <same as the present Rules> **302. - 303. <same as the present Rules>**	**CHAPTER 2 CONTROL SYSTEMS** **Section 1 - 2 <same as the present Rules>** **Section 3 Tests** *(2017)* **301. Shop tests** [See Rule] **1. Type approval** (1) In application to **301. 1** of the Rules, "automatic equipment" to be type-approved are , in principle, as follows: (A) - (L) <same as the present Rules> (M) Electric power converters(including frequency converter) for electric propulsion unit and essential auxiliary *(2020)* (N) - (O) <same as the present Rules> **2.** <same as the present Rules> **302. - 303. <same as the present Rules>**	(Amended) - Clarify the requirements for the converter among the target devices that must be type approved.