

Amended Rules for the Classification of Steel Ships

(Part 6 Electrical Equipment and Control Systems)

Dec. 2019



KR

Effective Date : 1 January 2020

(1) 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.

(2) 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
<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 <same as the present Rules></p> <p style="text-align: center;">Section 2 System Design</p> <p>201. General</p> <p>1. - 7. <same as the present Rules></p> <p>8. Harmonic distortion <u>(2017)</u></p> <p>(1) General</p> <p>(A) <same as the present Rules></p> <p>(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 <u>to be</u> documented (harmonic distortion calculation report) and made available on board as a reference for the surveyor at each periodical survey.</p> <p><Newly added></p>	<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 <same as the present Rules></p> <p style="text-align: center;">Section 2 System Design</p> <p>201. General</p> <p>1. - 7. <same as the present Rules></p> <p>8. Harmonic distortion (2017)<u>(2020)</u></p> <p>(1) General</p> <p>(A) <same as the present Rules></p> <p>(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.</p> <p>(2) Harmonic distortion for ship electrical distribution system including harmonic filters</p> <p>(A) Application</p> <p><u>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.</u></p>

Present	Amendment
<p>(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.</p> <p>(3) Mitigation of the effects of harmonic filter failure on a ship's operation (A) - (C) <same as the present Rules></p> <p>(4) Protection arrangements for harmonic filters (A) - (C) <same as the present Rules></p> <p style="text-align: center;">Section 3 Rotating Machinery</p> <p>301. <same as the present Rules></p> <p>302. Prime movers for generators 1. <same as the present Rules></p>	<p>(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.</p> <p>(C) Mitigation of the effects of harmonic filter failure on a ship's operation (a) - (c) <same as the present Rules></p> <p>(D) Protection arrangements for harmonic filters (a) - (c) <same as the present Rules></p> <p style="text-align: center;">Section 3 Rotating Machinery</p> <p>301. <same as the present Rules></p> <p>302. Prime movers for generators 1. <same as the present Rules></p>

Present	Amendment
<p>2. Governors</p> <p>Governors on prime movers driving main or emergency electric generators are to be capable of automatically maintaining the speed within the following limits:</p> <p>(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 $\pm 10\%$ 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).</p> <p>(2) - (4) <same as the present Rules> <Newly added></p> <p>3. - 4. <same as the present Rules></p> <p>303. - 309. <same as the present Rules></p> <p>Section 4 - 18 <same as the present Rules></p> <p>CHAPTER 2 <same as the present Rules></p>	<p>2. Governors</p> <p>Governors on prime movers driving main or emergency electric generators are to be capable of automatically maintaining the speed within the following limits:</p> <p>(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 $\pm 10\%$ 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).</p> <p>(2) - (4) <same as the present Rules></p> <p><u>(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%.</u></p> <p>3. - 4. <same as the present Rules></p> <p>303. - 309. <same as the present Rules></p> <p>Section 4 - 18 <same as the present Rules></p> <p>CHAPTER 2 <same as the present Rules></p>

Amended Guidances for the Classification of Steel Ships

(Part 6 Electrical Equipment and Control Systems)

Dec. 2019



KR

Effective Date : 1 January 2020

(1) 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
<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 General</p> <p>101. General</p> <p>1. <same as the present Rules></p> <p>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 <u>Guidance</u>. [See Rule]</p> <p>3. <same as the present Rules></p> <p>102. Drawings and data [See Rule]</p> <p>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 <u>Guidance</u>.</p> <p>103. Testing and inspection</p> <p>1. - 5. <same as the present Rules></p> <p>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 <u>Guidance</u>. [See Rule]</p> <p>7. <same as the present Rules></p> <p style="text-align: center;">Section 2 - 18 <same as the present Rules></p>	<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 General</p> <p>101. General</p> <p>1. <same as the present Rules></p> <p>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 <u>Guidance: Rules</u>. [See Rule]</p> <p>3. <same as the present Rules></p> <p>102. Drawings and data [See Rule]</p> <p>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 <u>Guidance: Rules</u>.</p> <p>103. Testing and inspection</p> <p>1. - 5. <same as the present Rules></p> <p>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 <u>Guidance: Rules</u>. [See Rule]</p> <p>7. <same as the present Rules></p> <p style="text-align: center;">Section 2 - 18 <same as the present Rules></p>

Present	Amendment
<p style="text-align: center;">CHAPTER 2 CONTROL SYSTEMS</p> <p style="text-align: center;">Section 1 <same as the present Rules></p> <p style="text-align: center;">Section 2 System and Control</p> <p>201. System design (2017) [See Rule]</p> <p>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 <u>Guidance.</u></p> <p>202. <same as the present Rules></p> <p>203. Automatic and remote control of boilers</p> <p>1. General [See Rule]</p> <p>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 <u>Guidance.</u></p> <p>2. Automatic combustion control systems</p> <p>(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 <u>Guidance.</u> [See Rule]</p> <p>(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 <u>Guidance.</u> [See Rule]</p>	<p style="text-align: center;">CHAPTER 2 CONTROL SYSTEMS</p> <p style="text-align: center;">Section 1 <same as the present Rules></p> <p style="text-align: center;">Section 2 System and Control</p> <p>201. System design (2017) [See Rule]</p> <p>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 <u>Guidance: Rules.</u></p> <p>202. <same as the present Rules></p> <p>203. Automatic and remote control of boilers</p> <p>1. General [See Rule]</p> <p>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 <u>Guidance: Rules.</u></p> <p>2. Automatic combustion control systems</p> <p>(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 <u>Guidance: Rules.</u> [See Rule]</p> <p>(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 <u>Guidance: Rules.</u> [See Rule]</p>

Present	Amendment
<p style="text-align: center;">Section 3 Tests (2017)</p> <p>301. Shop tests [See Rule]</p> <p>1. <same as the present Rules></p> <p>2. Shop tests of automation system</p> <p>(1) - (2) <same as the present Rules></p> <p>(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 <u>Guidance</u>.</p> <p>302. - 303. <same as the present Rules></p>	<p style="text-align: center;">Section 3 Tests (2017)</p> <p>301. Shop tests [See Rule]</p> <p>1. <same as the present Rules></p> <p>2. Shop tests of automation system</p> <p>(1) - (2) <same as the present Rules></p> <p>(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 <u>Guidance: Rules</u>.</p> <p>302. - 303. <same as the present Rules></p>

Effective Date : 1 January 2020

(2) 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
<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 - 2 <same as the present Rules></p> <p style="text-align: center;">Section 3 Rotating Machinery</p> <p>302. Prime movers for generators [See Rule]</p> <p><u>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:</u></p> <p style="margin-left: 40px;"><u>Total throw-on load at the 1st step(%) = 80/BMEP</u></p> <p style="margin-left: 40px;"><u>Total throw-on load at the 2nd step(%) = 135/BMEP</u></p> <p style="margin-left: 40px;"><u>Total throw-on load at the 3rd step(%) = 180/BMEP</u></p> <p style="margin-left: 40px;"><u>Total throw-on load at the 4th step(%) = 100</u></p> <p style="margin-left: 40px;"><u>Where, BMEP : Brake mean effective pressure(MPa)</u></p>	<p style="text-align: center;">CHAPTER 1 ELECTRICAL EQUIPMENT</p> <p style="text-align: center;">Section 1 - 2 <same as the present Rules></p> <p style="text-align: center;">Section 3 Rotating Machinery</p> <p>302. Prime movers for generators [See Rule]</p> <p>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:</p> <p style="margin-left: 40px;">Total throw-on load at the 1st step(%) = 80/BMEP</p> <p style="margin-left: 40px;">Total throw-on load at the 2nd step(%) = 135/BMEP</p> <p style="margin-left: 40px;">Total throw-on load at the 3rd step(%) = 180/BMEP</p> <p style="margin-left: 40px;">Total throw-on load at the 4th step(%) = 100</p> <p style="margin-left: 40px;">Where, BMEP : Brake mean effective pressure(MPa)</p> <p><u>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.</u></p>

Present	Amendment
<p data-bbox="360 300 663 331"><Newly added Fig 6.1.2></p> <p data-bbox="367 496 1128 679">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.</p> <p data-bbox="367 679 822 711">(1) - (4) <same as the present Rules></p> <p data-bbox="304 756 909 788">303. - 309. <same as the present Rules></p> <p data-bbox="342 887 1090 919">Section 4 - 18 <same as the present Rules></p>	<p data-bbox="1167 300 1917 400">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)</p> <p data-bbox="1189 408 1485 440"><Refer to the next page></p> <p data-bbox="1196 496 1957 679">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.</p> <p data-bbox="1196 679 1650 711">(1) - (4) <same as the present Rules></p> <p data-bbox="1128 756 1733 788">303. - 309. <same as the present Rules></p> <p data-bbox="1167 887 1915 919">Section 4 - 18 <same as the present Rules></p>

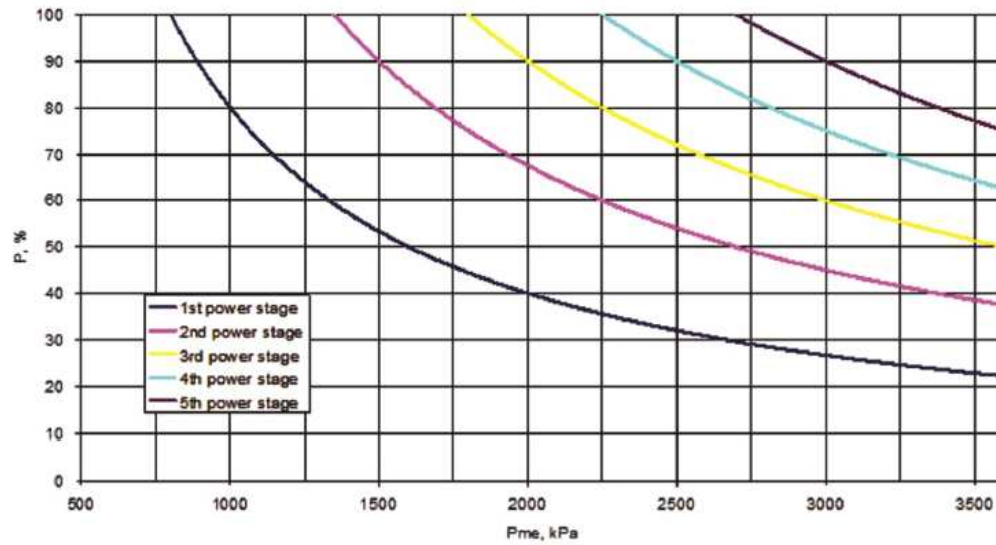


Fig 6.1.2 Reference values for maximum possible sudden power increases as a function of brake mean effective pressure, P_{me} , at declared power (four-stroke diesel engines)

Note)

P_{me} : declared power mean effective pressure

P : power increase referred to declared power at site conditions