

Guidance for Battery Systems on Board of Ships

(Development Review : For internal opinion inquiry)

2021. 1.



Machinery Rule Development Team

Effective Date : 1 July 2021

(The contract date for ship construction)

Present	Amendment	Remark
<p style="text-align: center;">CHAPTER 1 GENERAL</p> <p style="text-align: center;">Section 1 General</p> <p>101. Application</p> <p>1. – 3. <same as the present Rules></p> <p>4. Since the battery system has different characteristics depending on the classification of the battery being constructed, this Guidance applies when a battery system with a capacity of 50 kWh or more using lithium secondary battery is used for the following applications. <i>(2019)</i></p> <p>(1) <u>Battery system used for main source of electrical power</u> (2) <u>Battery system used for purposes other than main source of electrical power</u></p> <p>5. <same as the present Rules></p> <p>102. <same as the present Rules></p>	<p style="text-align: center;">CHAPTER 1 GENERAL</p> <p style="text-align: center;">Section 1 General</p> <p>101. Application</p> <p>1. – 3. <same as the present Rules></p> <p>4. Since the battery system has different characteristics depending on the classification of the battery being constructed, this Guidance applies when a battery system with a capacity of 50 kWh or more using lithium secondary battery is used for the following applications. <i>(2019)</i> on ships. <i>(2021)</i></p> <p>(1) Battery system used for main source of electrical power (2) Battery system used for purposes other than main source of electrical power</p> <p>5. <same as the present Rules></p> <p>102. <same as the present Rules></p>	<p>(Amended)</p> <p>- The requirements for the application of the battery system have been clarified.</p>

Present	Amendment	Remark
<p>103. Class notations <i>(2019)</i></p> <p>(1) Ships using the battery system complying with the requirements of this guidance for purposes other than main source of electrical power may be assigned with the additional installations notation Battery-A.</p> <p>(2) Ships using the battery system complying with the requirements of this guidance as main source of electrical power may be assigned with the additional installations notation Battery-M. Basically, the requirements corresponding to the Battery-A notation shall be satisfied.</p> <p>104. – 105. <same as the present Rules></p> <p>Section 2 <same as the present Rules></p>	<p>103. Class notations <i>(2019) (2021)</i></p> <p>(1) Ships using the battery system complying with the requirements of this guidance for purposes other than main source of electrical power may be assigned with the additional installations notation Battery-A. In all other cases, except for cases where the requirements for main source of electrical power of the ship are satisfied by only the battery system complying with the requirements of this guidance, the ship may be assigned with the additional installations notation Battery-A.</p> <p>(2) Ships using the battery system complying with the requirements of this guidance as main source of electrical power may be assigned with the additional installations notation Battery-M. If only the battery system in accordance with the requirements of this guidance satisfies the requirements for main source of electrical power of the ship, the ship may be assigned with the additional installations notation Battery-M. Basically, the requirements corresponding to the Battery-A notation shall be satisfied.</p> <p>104. – 105. <same as the present Rules></p> <p>Section 2 <same as the present Rules></p>	<p>(Amended)</p> <p>- The requirements for the designation of notation have been clarified.</p>

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<p>CHAPTER 2 CLASSIFICATION SURVEYS</p> <p>Section 1 – 2 <same as the present Rules></p> <p>Section 3 Tests and Inspections</p> <p>301. <same as the present Rules></p> <p>302. Test and Inspection</p> <p>1. The battery system shall be subjected to the test and inspection in accordance with the following tables.</p> <p>2. The battery system shall be subjected to the type approval <u>or</u> test and inspection listed in Table 3 below before installation on board. However, some test items may be added or changed at the request of the Society. <i>(2019)</i></p> <p>3. <same as the present Rules></p> <p>Table 1 Battery cell <i>(2019)</i></p> <table border="1"> <thead> <tr> <th>No.</th> <th>Tests</th> <th>Test Standard</th> <th>Test Subject</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Temperature Cycling Test⁽¹⁾</td> <td>IEC 62281 / UN38.3 T-2</td> <td>Cell</td> <td>Type Approval</td> </tr> <tr> <td>2-7</td> <td colspan="4"><same as the present Rules></td> </tr> <tr> <td colspan="5">(Notes) <same as the present Rules></td> </tr> </tbody> </table>	No.	Tests	Test Standard	Test Subject	Classification	1	Temperature Cycling Test ⁽¹⁾	IEC 62281 / UN38.3 T-2	Cell	Type Approval	2-7	<same as the present Rules>				(Notes) <same as the present Rules>					<p>CHAPTER 2 CLASSIFICATION SURVEYS</p> <p>Section 1 – 2 <same as the present Rules></p> <p>Section 3 Tests and Inspections</p> <p>301. <same as the present Rules></p> <p>302. Test and Inspection</p> <p>1. The battery system shall be subjected to the test and inspection in accordance with the following tables.</p> <p>2. The battery system shall be subjected to the type approval <u>or</u> <u>and</u> test and inspection listed in Table 3 below before installation on board. However, some test items may be added or changed at the request of the Society. <i>(2019)</i> <i>(2021)</i></p> <p>3. <same as the present Rules></p> <p>Table 1 Battery cell <i>(2019)</i> <i>(2021)</i></p> <table border="1"> <thead> <tr> <th>No.</th> <th>Tests</th> <th>Test Standard</th> <th>Test Subject</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Temperature Cycling Test⁽¹⁾</td> <td>IEC 62281 <u>6.4.2</u> / UN38.3 T-2</td> <td>Cell</td> <td>Type Approval</td> </tr> <tr> <td>2-7</td> <td colspan="4"><same as the present Rules></td> </tr> <tr> <td colspan="5">(Notes) <same as the present Rules></td> </tr> </tbody> </table>	No.	Tests	Test Standard	Test Subject	Classification	1	Temperature Cycling Test ⁽¹⁾	IEC 62281 <u>6.4.2</u> / UN38.3 T-2	Cell	Type Approval	2-7	<same as the present Rules>				(Notes) <same as the present Rules>					<p>(Amended)</p> <p>- The requirements for battery systems have been amended to carry out “type approval” and “test and inspection”.</p> <p>- The item number of test standard for the temperature cycling test of battery cell have been clarified.</p>
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<p style="text-align: center;">CHAPTER 3 CONSTRUCTION AND 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. – 203. <same as the present Rules></p> <p><Newly added></p> <p>204. <same as the present Rules></p>	<p style="text-align: center;">CHAPTER 3 CONSTRUCTION AND 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. – 203. <same as the present Rules></p> <p>204. Application of Hybrid System (2021)</p> <p><u>1. Rotating machinery used as generating sources are to comply with the requirements in Pt 6, Ch 1, Sec 3 of Rules for the Classification of Steel Ships.</u></p> <p><u>2. Generally, power generation sources may include fixed speed and variable speed generators, fuel cells, batteries, and other types of energy sources. These energy sources can be used as independent power sources or as main power sources in combination with other energy sources.</u></p> <p>204. 205. <same as the present Rules></p>	<p>(Newly added)</p> <p>- Requirements have been newly added for hybrid systems to allow the use of other types of energy sources.</p>

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<p><u>205.</u> Battery management systems</p> <p>1. <same as the present Rules></p> <p>2. Design</p> <p>The battery management system shall have the following functions.</p> <p>(1) – (2) <same as the present Rules></p> <p>(3) It shall be able to monitor the status of battery voltage, current, temperature, etc. in real time to maintain the optimal state.</p> <p>(4) – (6) <same as the present Rules></p> <p><u>206.</u> <same as the present Rules></p> <p>Section 3 <same as the present Rules></p>	<p>205. <u>206.</u> Battery management systems</p> <p>1. <same as the present Rules></p> <p>2. Design</p> <p>The battery management system shall have the following functions.</p> <p>(1) – (2) <same as the present Rules></p> <p>(3) It shall be able to monitor the status of battery voltage, current, temperature, etc. in real time to maintain the optimal state. <u>The battery system shall be monitored even when the battery system is not operating. (2021)</u></p> <p>(4) – (6) <same as the present Rules></p> <p>206. <u>207.</u> <same as the present Rules></p> <p>Section 3 <same as the present Rules></p>	<p>(Newly added)</p> <p>- A requirement for constant monitoring of the battery system has been added to prepare for accidents such as battery leakage when the battery is not in use.</p>

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<p style="text-align: center;">Section 4 Fire Protection and Fire Extinction</p> <p>401. – 402. <same as the present Rules></p> <p>403. Ventilation</p> <p>If there is a possibility of generating flammable gas in the battery room through a risk assessment, the ventilation system shall comply with the following requirements.</p> <p>1. – 2. <same as the present Rules></p> <p>3. The power supplied to the ventilation system shall be supplied from outside the battery room.</p> <p>4. <same as the present Rules></p> <p>404. – 405. <same as the present Rules></p> <p style="text-align: center;">Section 5 – 7 <same as the present Rules></p>	<p style="text-align: center;">Section 4 Fire Protection and Fire Extinction</p> <p>401. – 402. <same as the present Rules></p> <p>403. Ventilation</p> <p>If there is a possibility of generating flammable gas in the battery room through a risk assessment, the ventilation system shall comply with the following requirements.</p> <p>1. – 2. <same as the present Rules></p> <p>3. The power supplied to the ventilation system shall be supplied from outside the battery room. <u>For the Battery-M notation, the power supply to the ventilation system in the battery room is to be redundant. (2021)</u></p> <p>4. <same as the present Rules></p> <p>404. – 405. <same as the present Rules></p> <p style="text-align: center;">Section 5 – 7 <same as the present Rules></p>	<p>(Amended)</p> <p>- In the case of ships assigning the Battery-M notation, which supplies power only with batteries, the requirements have been amended to require redundancy for the power supply of the ventilation system.</p>