



# CIRCULAR

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To : All Surveyors and who it may concern

No : 2023-13-E  
Date : 2023.09.18

Subject	9.181 Notice for Amendments to the KR Technical Rules - Guidance for Prevention Systems of Pollution from Ships
Application	(Refer to Effective date for each KR Technical Rules specified in Par.1 and the attachment)

1. Please be informed that the amendments have been made to the following KR Technical Rule 2023 as attachment to reflect Requests for Establishment/Revision of Classification Technical Rules. And you are kindly requested to apply the amendments on the relevant works according to effective date.

Amended KR Technical Rule	Effective Date	Amendments
Guidance for Prevention Systems of Pollution from Ships	1 Jan. 2024 (Date of contract for ship construction or the application date for survey)	UR M77 (Rev.4) & UR M81 (Rev.1) To reflect result of internal review <ul style="list-style-type: none"><li>● Adding the requirement about arrangement of Wind Assisted Propulsion Systems</li><li>● Updating the requirements for Onboard carbon capture and storage system</li><li>● Others</li></ul>

2. Furthermore, please be informed that the amendments will be included in 2023 edition for Rules and Guidance on KR Classification Technical Rules which is provided on the website after the effective/implementation date.

Attachments :

Amendment for Guidance for Prevention Systems of Pollution from Ships. (The end)

Amendments to KR Tech. Rule  
Guidance for Prevention Systems of Pollution  
from Ships

2023. 09.



Machinery Rule Development Team

## - Main Amendments -

### (1) Request for Establishment/Revision of Classification Technical Rules

〈ships contracted for construction on or an application for survey or after 2024/01/01〉

- Reflecting UR M77 (Rev.4) (Relaxation for SCR reductants tanks with volume below of 500 L)
- Simplifying monitoring system for pollution abatement system of exhaust gas (SCR, EGR, EGC)
- Requiring survey of heat exchangers to mandatory regardless of class notation (EGR, EGC, ALS)
  - Updating the table for equipment survey by adding the column of drawing approval
- Revising the requirements for distance piece of ship overboard discharge in EGC
- Adding the requirement about arrangement of Wind Assisted Propulsion Systems to avoid heated parts in hazardous area and stating operation test after installation
- Updating the requirements for Onboard carbon capture and storage system
  - Adding the requirement for survey of pressure vessels like heat exchangers
  - Adding the requirements about CO<sub>2</sub> liquefaction system
  - Adding the requirements about portable CO<sub>2</sub> storage tank
  - Adding the fire protection and extinction for CO<sub>2</sub> storage system
  - Deleting the eyewasher and safety shower on CO<sub>2</sub> manifold and (absorbent) transfer pump
- Editorial improvement of Onboard Carbon capture and storage system Ready Ships

Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p style="text-align: center;"><b>Section 2 Selective Catalytic Reduction(SCR) system</b></p> <p><b>205. Handling urea solution as reductant agent</b></p> <p><b>1. Urea solution storage tank</b> <i>(Omitted)</i></p> <p>(5) Each urea storage tank is to be provided with temperature and level monitoring arrangements. High and low level alarms together with high and low temperature alarms are also to be provided.</p> <p>(6) Urea storage tanks are to be arranged so that they can be emptied of urea, and ventilated by means of portable or permanent systems. <i>(2020)</i> <i>(New)</i></p>	<p style="text-align: center;"><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p style="text-align: center;"><b>Section 2 Selective Catalytic Reduction(SCR) system</b></p> <p><b>205. Handling urea solution as reductant agent</b></p> <p><b>1. Urea solution storage tank</b> <i>(Omitted)</i></p> <p>(5) Each urea storage tank is to be provided with temperature and level monitoring arrangements. High and low level alarms together with high and low temperature alarms are also to be provided.</p> <p>(6) Urea storage tanks are to be arranged so that they can be emptied of urea, and ventilated by means of portable or permanent systems. <i>(2020)</i></p> <p><u>(7) The Society may consider the acceptance of relaxations of requirements on 205. for additionally installed SCR reductants tanks for the operation of SCR with volume below of 500 L.</u></p>	<p>(*) Reflection of UR M77 (Rev.4)</p>

Existing	Amendment	Remark
<p><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p><b>Section 3 Exhaust Gas Recirculation(EGR) System</b></p> <p><b>208. System Design</b></p> <p><b>2. Control and Monitoring System</b></p> <p><i>(Omitted)</i></p> <p>(3) <del>Where power supply is electric,</del> each <del>of the</del> control, monitoring and safety systems <del>is</del> to be supplied by a separate circuit. Each of these circuits is to be protected <del>for</del> short circuit and monitored for voltage failure.</p> <p><i>(Omitted)</i></p>	<p><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p><b>Section 3 Exhaust Gas Recirculation(EGR) System</b></p> <p><b>308. System Design</b></p> <p><b>2. Control and Monitoring System</b></p> <p><i>(Omitted)</i></p> <p>(3) <del>Where power supply is electric, Each of the</del> control, monitoring and safety systems <del>is</del><u>are</u> to be supplied by a separate circuit. Each of these circuits is to be protected <del>for</del><u>from</u> short circuits and monitored for voltage failure.</p> <p><i>(Omitted)</i></p>	<p>(*) Editorial improvement</p>

Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p style="text-align: center;"><b>Section 3 Exhaust Gas Recirculation(EGR) System</b></p> <p><b>306. EGR System Equipment</b></p> <p><b>1. Pumps/Blowers</b></p> <p>(1) Where <b>provided</b>, blowers and pumps used in EGR SOx scrubber washwater, dosing, discharge systems which are essential for the continual operation of the EGR exhaust emission abatement system, are to be tested and certified in accordance with the relevant requirements of <b>Pt 5, Ch 1, 210 &amp; Ch 6. (2020)</b></p> <p><b>2. Heat Exchangers/EGR Exhaust Gas Coolers</b></p> <p>(1) Where provided, heat exchangers are to comply with the requirements specified in <b>Ch 5, Sec. 3</b> of the <b>Rules for the Classification of Steel Ships</b>.</p> <p><i>(Omitted)</i></p>	<p style="text-align: center;"><b>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</b></p> <p style="text-align: center;"><b>Section 3 Exhaust Gas Recirculation(EGR) System</b></p> <p><b>306. EGR System Equipment</b></p> <p><b>1. Pumps/Blowers</b></p> <p>(1) Where <del>provided</del>the notation "<b>CEmN-EGR(S)</b>" is <b>applied</b>, blowers and pumps used in EGR SOx scrubber washwater, dosing, discharge systems which are essential for the continual operation of the EGR exhaust emission abatement system, are to be tested and certified in accordance with the relevant requirements of <b>Pt 5, Ch 1, 210 &amp; Ch 6. (2020)</b></p> <p><b>2. Heat Exchangers/EGR Exhaust Gas Coolers</b></p> <p>(1) Where provided, heat exchangers are to comply with the requirements specified in <b>Ch 5, Sec. 3</b> of the <b>Rules for the Classification of Steel Ships</b>.</p> <p><i>(Omitted)</i></p>	<p>(*) To be in consistency with Korean version</p>

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(1) For the applicable class notation 'CEmN-EGR(S)' in Table 2.3.1 (2) Components for the continual operation of the EGR are to be tested in accordance with the requirements specified in Pt 5, Ch 6 &amp; Pt 6 of the Rules for the Classification of Steel Ships. (3) The entire length of both longitudinal and circumferential welded joints and exhaust gas pipe or wash water pipe joints on scrubber body are to be subjected to liquid penetrant testing(PT). Where considered necessary by the Surveyor, additional non-destructive examinations may be required. (2022) (4) It shall be inspected based on the Rules for the Classification of Steel Ships of Pt 5 Ch 5 Sec 3. (2022) (5) Storage tank that do not form part of the hull are to be subjected to a hydraulic test at a head pressure of 2.5 m on the tank top plate, together with the attachment after manufacture. (6) Where equipment specified in Guidance relating to the Rules for the Classification of Steel Ships 6, Ch 1 and Ch 2, 301.1 is installed, Regardless of class notation, the type approval product is to be installed in the control panel.</div>	No.	Components	Type approval	Test and Survey	1	Control panel for EGR	● <sup>(6)</sup>	●	2	Pumps(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	3	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	4	Scrubber body <sup>(1),(3)</sup>		●	5	Heat exchanger <sup>(1),(3)</sup>		●	6	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>		●	<div>CHAPTER 2 Nitrogen oxide Emission Abatement Systems</div> <div>Section 3 Exhaust Gas Recirculation(EGR) System</div> <div>309. 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(6) Where equipment specified in Guidance relating to the Rules for the Classification of Steel Ships 6, Ch 1 and Ch 2, 301.1 is installed, Regardless of class notation, the type approval product is to be installed in the control panel. (7) Only applicable for rated output 100kW and above (8) Only applicable for PV-1 and PV-2</div>	No.	Components	Type approval	Drawing approval	Test and Survey	1	Control panel for EGR	● <sup>(6)</sup>	● <sup>(7)</sup>	●	2	Pumps(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(7)</sup>	●	3	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(7)</sup>	●	4	Scrubber body <sup>(1),(3)</sup>			●	5	Heat exchanger <sup>(1),(3),(4)</sup>		● <sup>(8)</sup>	●	6	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>			●	<div>(*) Adding the drawing approval</div> <div>(*) Requiring test and survey to heat exchangers taking into account the Pt.5 Ch.1 and Ch.5 Sec.3 of Rules for the Classification of Steel Ships which is required to be installed irrespective of usage of them</div>
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Existing	Amendment	Remark
<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b></p> <p><b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>2. Washwater piping</b></p> <p><i>(Omitted)</i></p> <p>(3) Overboard Discharges</p> <p>(A) The overboard discharges of any EGC system are not to be interconnected to other systems. However, if backflow prevention means are provided, seawater from other systems used for dilution is acceptable.</p> <p><i>(New)</i></p> <p>(C) Special attention is to be paid to the corrosion resistivity of EGC washwater overboard discharge piping. Where applicable, adequate arrangements are to be provided to prevent galvanic corrosion due to the use of dissimilar metals and the welding oxides of piping are to be removed. <i>(2020)</i></p>	<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b></p> <p><b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>2. Washwater piping</b></p> <p><i>(Omitted)</i></p> <p>(3) Overboard Discharges</p> <p>(A) The overboard discharges of any EGC system are not to be interconnected to other systems. However, if backflow prevention means are provided, seawater from other systems used for dilution is acceptable.</p> <p><u>(B) Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters or propellers to prevent any discharge water onto survival craft during abandonment.</u></p> <p>(C) Special attention is to be paid to the corrosion resistivity of EGC washwater overboard discharge piping. Where applicable, adequate arrangements are to be provided to prevent galvanic corrosion due to the use of dissimilar metals and the welding oxides of piping are to be removed. <i>(2020)</i></p>	<p>(*) When arranging the overboard discharge, prevention from survival craft as well as propulsion features of ships. Part of the newly added clause come from the previous version of (D)</p> <p>(*) UR M81 (Rev.1) 3.2</p>

Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b>  <b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>2. Washwater piping</b>  <i>(following the previous page)</i></p> <p>(3) Overboard Discharges  (C) The distance piece between the outboard discharge valve and the shell plating is not to be less than Sch.160 or 15mm, whichever is smaller and it is to be used or coated with high corrosion-resistant materials established to be suitable for the application such as acidity and temperature. Instead of coating, high corrosive resistant steel (ex. super duplex stainless steel) may be fitted internally such as sleeve or lining. In the case of a welding that may damage the passive film, the welding parts are to be passivated. Application of alternative methods is to be agreed by the Society. When considered necessary by the Society, data for suitability of coating or high corrosion resistant materials is to be submitted additionally. <i>(2020)</i></p> <p>(D) Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters or propellers.  <i>(Omitted)</i></p>	<p style="text-align: center;"><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b>  <b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>2. Washwater piping</b>  <i>(following the previous page)</i></p> <p>(3) Overboard Discharges  <del>(C) The distance piece between the outboard discharge valve and the shell plating is not to be less than Sch.160 or 15mm, whichever is smaller and it is to be used or coated with high corrosion-resistant materials established to be suitable for the application such as acidity and temperature. Instead of coating, high corrosive resistant steel (ex. super duplex stainless steel) may be fitted internally such as sleeve or lining. In the case of a welding that may damage the passive film, the welding parts are to be passivated. Application of alternative methods is to be agreed by the Society. When considered necessary by the Society, data for suitability of coating or high corrosion resistant materials is to be submitted additionally. <i>(2020)</i></del></p> <p><u>(D) In case distance piece is fitted between the outboard discharge valve and the shell plating, it shall be made of corrosion resistant material steel or be coated with an anti-corrosive material suitable for the operating environment. The thickness of the distance piece shall be at least the minimum values specified in (a) and (b) as below; otherwise Sch.160 thickness specified in piping standards shall, as far as practicable, be used.</u></p> <p><u>(a) 12 mm in cases where complete pipe is made of corrosion resistant material steel(ex. super duplex stainless steel); or</u>  <u>(b) 15 mm of mild steel in cases where the inside the pipe is treated with an anticorrosive coating or fitted with a sleeve of corrosion resistant material.</u></p> <p><del>(D) Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters or propellers.</del>  <i>(Omitted)</i></p>	<p>(*) Updating the requirement for distance piece to mitigate the required thickness than existing versions depending on material</p> <p>(*) UR M81 (Rev.1) 3.5</p>

Existing	Amendment	Remark
<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b>  <b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>3. Chemical Storage Tank (2022)</b>  <i>(Omitted)</i>  (7) Storage tanks for chemical treatment fluids are to be arranged so that they can be emptied of the fluids and ventilated by means of portable or permanent systems.  <i>(Omitted)</i></p> <p><b>4. Chemical Treatment Piping Systems</b>  (6) Ventilation  (A) If a <b>NaOH</b> storage tank is installed in a closed compartment, the area is to be served by an effective mechanical supply and exhaust ventilation system providing not less than 6 air changes per hour which is independent from the ventilation system of <b>accommodation, service spaces, or control stations</b>. Warning notices requiring the ventilation of spaces prior to entrance shall be provided outside the compartment adjacent to each point of entry and inside the compartment. <i>(2023)</i>  (B) Where a <b>urea</b> storage tank is located within an engine room a separate ventilation system is not required when the general ventilation system for the space <b>providing not less than 6 air changes per hour</b> is arranged so as to provide an effective movement of air in the vicinity of the storage tank and is to be maintained in operation continuously except when the storage tank is empty and has been thoroughly air purged.  (C) <b>In cases where NaOH solution is transferred to a tank which forms part of the ship's hull, the enclosed spaces(excluding water tanks and oil tanks) adjacent to the NaOH solution tanks are to be provided with the mechanical ventilation which can be operated from outside the spaces.</b>  (D) The requirements specified in (A) also apply to closed compartments normally entered by persons: <i>(2022)</i>  <i>(Omitted)</i></p>	<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b>  <b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>207. EGC System Piping</b></p> <p><b>3. Chemical Storage Tank (2022)</b>  <i>(Omitted)</i>  (7) Storage tanks for chemical treatment fluids are to be arranged so that they can be <b>safely</b> emptied of the fluids and ventilated by means of portable or permanent systems.  <i>(Omitted)</i></p> <p><b>4. Chemical Treatment Piping Systems</b>  (6) Ventilation  (A) If a <b>NaOH</b> storage tank <b>for chemical treatment fluid</b> is installed in a closed compartment, the area is to be served by an effective mechanical supply and exhaust ventilation system providing not less than 6 air changes per hour which is independent from the ventilation system of <b>other space-saccommodation, service spaces, or control stations</b>. Warning notices requiring the ventilation of spaces prior to entrance shall be provided outside the compartment adjacent to each point of entry and inside the compartment. <i>(2023)</i>  (B) Where a <b>urea</b> storage tank is located within an engine room a separate ventilation system is not required when the general ventilation system for the space <b>providing not less than 6 air changes per hour</b> is arranged so as to provide an effective movement of air in the vicinity of the storage tank and is to be maintained in operation continuously except when the storage tank is empty and has been thoroughly air purged.  (C) <b>In cases where NaOH solution is transferred to a tank which forms part of the ship's hull, the enclosed spaces(excluding water tanks and oil tanks) adjacent to the NaOH solution tanks are to be provided with the mechanical ventilation which can be operated from outside the spaces.</b>  (D) The requirements specified in (A) also apply to closed compartments normally entered by persons: <i>(2022)</i>  <i>(Omitted)</i></p>	<p>(*) Editorial improvement nt</p> <p>(*) Editorial improvement (NaOH → chemical treatment fluid) (*) UR M81 (Rev.1) 2.3</p> <p>(*) UR M81 (Rev.1) 2.4 (*) Deleting overlapped clause with (D) (a) (UR M81 2.8.1)</p>

Existing	Amendment	Remark
<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b></p> <p><b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>208. System Design</b></p> <p><b>2. Control and Monitoring System</b></p> <p><i>(Omitted)</i></p> <p>(3) Where power supply is electric, each of the control, monitoring and safety systems is to be supplied by a separate circuit. Each of these circuits is to be protected for short circuit and monitored for voltage failure.</p> <p><i>(Omitted)</i></p>	<p><b>CHAPTER 3 Sulphur oxide Emission Abatement Systems</b></p> <p><b>Section 2 Exhaust Gas Cleaning(EGC) system</b></p> <p><b>208. System Design</b></p> <p><b>2. Control and Monitoring System</b></p> <p><i>(Omitted)</i></p> <p>(3) <del>Where power supply is electric, Each of the</del> control, monitoring and safety systems <del>is</del>are to be supplied by a separate circuit. Each of these circuits is to be protected <del>for</del>from short circuits and monitored for voltage failure.</p> <p><i>(Omitted)</i></p>	<p>(*) Editorial improvement</p>

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Safety Shutdown System</div> <div>(Omitted)</div> <div>Table 3.2.3 Monitoring and Safety System Functions for EGC Systems (2020)</div> <table><tr><th>Parameters</th><th>Display</th><th>Alarm activated</th><th>Automatic Shutdown</th></tr><tr><td>EGC exhaust fan/blower motors</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>EGC exhaust bypass, isolation, mixing valves, where provided</td><td>Position</td><td></td><td></td></tr><tr><td>Exhaust gas temperature after EGC unit(except if dry running can be used)</td><td>●</td><td>H</td><td></td></tr><tr><td>Differential pressure across EGC scrubber unit or EGC circuit or pressure before EGC unit(except if dry running can be used)</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>EGC washwater pumps, alkali system pumps or dry system supply device</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>EGC washwater and alkali system supply pressure</td><td>●</td><td>L</td><td></td></tr><tr><td>EGC washwater system supply temperature(Closed/Hybrid type)</td><td>●</td><td>H</td><td></td></tr><tr><td>EGC alkali system supply temperature</td><td>●</td><td>L/H</td><td></td></tr><tr><td>Water level in EGC scrubber</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>Alkali storage tank temperature</td><td>●</td><td>L/H</td><td></td></tr><tr><td>Alkali storage tank level</td><td>●</td><td>L/H</td><td></td></tr><tr><td>Alkali system drip tray level</td><td>●</td><td>H</td><td></td></tr><tr><td>EGC residue tank level</td><td>●</td><td>H</td><td></td></tr><tr><td>EGC residue tank temperature</td><td>●</td><td></td><td></td></tr><tr><td>power supply fail of control, alarm, monitoring or safety device</td><td>-</td><td>Fail</td><td></td></tr></table> <div>(Omitted)</div>	Parameters	Display	Alarm activated	Automatic Shutdown	EGC exhaust fan/blower motors	Run	Stop		EGC exhaust bypass, isolation, mixing valves, where provided	Position			Exhaust gas temperature after EGC unit(except if dry running can be used)	●	H		Differential pressure across EGC scrubber unit or EGC circuit or pressure before EGC unit(except if dry running can be used)	●	H	●(HH)	EGC washwater pumps, alkali system pumps or dry system supply device	Run	Stop		EGC washwater and alkali system supply pressure	●	L		EGC washwater system supply temperature(Closed/Hybrid type)	●	H		EGC alkali system supply temperature	●	L/H		Water level in EGC scrubber	●	H	●(HH)	Alkali storage tank temperature	●	L/H		Alkali storage tank level	●	L/H		Alkali system drip tray level	●	H		EGC residue tank level	●	H		EGC residue tank temperature	●			power supply fail of control, alarm, monitoring or safety device	-	Fail		<div>CHAPTER 3 Sulphur oxide Emission Abatement Systems</div> <div>Section 2 Exhaust Gas Cleaning(EGC) system</div> <div>208. 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Test and Survey for components of EGC (2022)</div> <table><tr><th>No.</th><th>Components</th><th>Type approval</th><th>Test and Survey</th></tr><tr><td>1</td><td>Exhaust gas emission monitoring system</td><td>●<sup>(6)</sup></td><td></td></tr><tr><td>2</td><td>Washwater emission monitoring system</td><td>●<sup>(6)</sup></td><td></td></tr><tr><td>3</td><td>Control panel for EGC</td><td>●<sup>(6)</sup></td><td>●</td></tr><tr><td>4</td><td>Pumps(incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●</td></tr><tr><td>5</td><td>Blowers(incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●</td></tr><tr><td>6</td><td>Scrubber body<sup>(1),(3),(7)</sup></td><td></td><td>●</td></tr><tr><td>7</td><td>Heat exchanger<sup>(4),(4)</sup></td><td></td><td>●</td></tr><tr><td>8</td><td>Storage tank for washwater treatment chemical<sup>(1),(5)</sup></td><td></td><td>●</td></tr></table> <div>Note.</div> <div>(1) For the applicable class notation 'CEmS-EGC(S)' in Table 3.2.1</div> <div>(2) Components for the continual operation of the EGC are to be tested in accordance with the requirements specified in Pt 5, Ch 6 &amp; Pt 6 of the Rules for the Classification of Steel Ships.</div> <div>(3) The entire length of both longitudinal and circumferential welded joints and exhaust gas pipe or wash water pipe joints on scrubber body are to be subjected to liquid penetrant testing(PT). Where considered necessary by the Surveyor, additional non-destructive test may be required. (2022)</div> <div>(4) It shall be inspected based on the Rules for the Classification of Steel Ships of Pt 5 Ch 5 Sec 3. (2022)</div> <div>(5) Storage tank that do not form part of the hull are to be subjected to a hydraulic test at a head pressure of 2.5 m on the tank top plate, together with the attachment after manufacture.</div> <div>(6) Where equipment specified in Guidance relating to the Rules for the Classification of Steel Ships Pt 6, Ch 1 and Ch 2, 301.1 is installed, Regardless of class notation, the type approval product is to be installed.</div> <div>(7) When ships install scrubber without exhaust gas by-pass arrangement required in 205. 4, scrubber body is to be performed non-destructive examinations irrespective of notation in 202. (2022)</div>	No.	Components	Type approval	Test and Survey	1	Exhaust gas emission monitoring system	● <sup>(6)</sup>		2	Washwater emission monitoring system	● <sup>(6)</sup>		3	Control panel for EGC	● <sup>(6)</sup>	●	4	Pumps(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	5	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	6	Scrubber body <sup>(1),(3),(7)</sup>		●	7	Heat exchanger <sup>(4),(4)</sup>		●	8	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>		●	<div>CHAPTER 3 Sulphur oxide Emission Abatement Systems</div> <div>Section 2 Exhaust Gas Cleaning(EGC) system</div> <div>209. Survey and Test</div> <div>2. Onboard tests</div> <div>(Omitted)</div> <div>Table 3.2.4. 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(2022)</div> <div>(8) Only applicable for rated output 100kW and above</div> <div>(9) Only applicable for PV-1 and PV-2</div>	No.	Components	Type approval	Drawing approval	Test and Survey	1	Exhaust gas emission monitoring system	● <sup>(6)</sup>			2	Washwater emission monitoring system	● <sup>(6)</sup>			3	Control panel for EGC	● <sup>(6)</sup>	● <sup>(8)</sup>	●	4	Pumps(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●	5	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●	6	Scrubber body <sup>(1),(3),(7)</sup>			●	7	Heat exchanger <sup>(4),(4)</sup>		● <sup>(9)</sup>	●	8	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>			●	<div>(*) Adding the drawing approval</div> <div>(*) Requiring test and survey to heat exchangers taking into account the Pt.5 Ch.1 and Ch.5 Sec.3 of Rules for the Classification of Steel Ships which is required test irrespective of usage of them</div>
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5	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●																																																																																
6	Scrubber body <sup>(1),(3),(7)</sup>		●																																																																																
7	Heat exchanger <sup>(4),(4)</sup>		●																																																																																
8	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>		●																																																																																
No.	Components	Type approval	Drawing approval	Test and Survey																																																																															
1	Exhaust gas emission monitoring system	● <sup>(6)</sup>																																																																																	
2	Washwater emission monitoring system	● <sup>(6)</sup>																																																																																	
3	Control panel for EGC	● <sup>(6)</sup>	● <sup>(8)</sup>	●																																																																															
4	Pumps(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●																																																																															
5	Blowers(incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●																																																																															
6	Scrubber body <sup>(1),(3),(7)</sup>			●																																																																															
7	Heat exchanger <sup>(4),(4)</sup>		● <sup>(9)</sup>	●																																																																															
8	Storage tank for washwater treatment chemical <sup>(1),(5)</sup>			●																																																																															
(Omitted)	(Omitted)																																																																																		



Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 4 Ships satisfying Energy Efficiency Design Index(EEDI) Phase 3</b></p> <p style="text-align: center;"><b>Section 1 General</b></p> <p><b>101. General</b></p> <ol style="list-style-type: none"> <li>1. This Chapter applies to the ships whose verified attained EEDI are less than or equal to the required EEDI for phase 3 in <b>MARPOL Annex VI, Regulation 21</b> as amended by <b>IMO Res.MEPC.324(75)</b>.</li> <li>2. Ships applying the EEDI notation in accordance with this Chapter are to comply with the applicable requirements of <b>MARPOL Annex VI, Regulations 19, 20 and 21</b>, and are to hold a valid IEE Certificate.</li> </ol> <p><b>102. Definitions</b></p> <ol style="list-style-type: none"> <li>1. <b>Required EEDI</b> means a value determined in accordance with <b>MARPOL Annex VI, Regulation 21</b> as amended by <b>IMO Res.MEPC.324(75)</b>, using a phase 3 reduction factor as applicable to the ship type and ship size.</li> <li>2. <b>Attained EEDI</b> means a value calculated in accordance with <b>MARPOL Annex VI, Regulation 20</b>, in consideration of the guidelines developed by IMO.</li> <li>3. <b>Verification</b> means an activity of confirming that the attained EEDI in 2 is not greater than the required EEDI specified in 1, and confirming the extra reduction rate in comparison with phase 3 reduction factor in 1.</li> </ol>	<p style="text-align: center;"><b>CHAPTER 4 Ships satisfying Energy Efficiency Design Index(EEDI) Phase 3</b></p> <p style="text-align: center;"><b>Section 1 General</b></p> <p><b>101. General</b></p> <ol style="list-style-type: none"> <li>1. This Chapter applies to the ships whose verified attained EEDI are less than or equal to the required EEDI for phase 3 in <b>MARPOL Annex VI, Regulation 2124</b> as amended by <b>IMO Res.MEPC.324(75)328(76)</b>.</li> <li>2. Ships applying the EEDI notation in accordance with this Chapter are to comply with the applicable requirements of <b>MARPOL Annex VI, Regulations 19, 2022 and 2124</b>, and are to hold a valid IEE Certificate.</li> </ol> <p><b>102. Definitions</b></p> <ol style="list-style-type: none"> <li>1. <b>Required EEDI</b> means a value determined in accordance with <b>MARPOL Annex VI, Regulation 2124</b> as amended by <b>IMO Res.MEPC.324(75)328(76)</b>, using a phase 3 reduction factor as applicable to the ship type and ship size.</li> <li>2. <b>Attained EEDI</b> means a value calculated in accordance with <b>MARPOL Annex VI, Regulation 2022</b>, in consideration of the guidelines developed by IMO.</li> <li>3. <b>Verification</b> means an activity of confirming that the attained EEDI in 2 is not greater than the required EEDI specified in 1, and confirming the extra reduction rate in comparison with phase 3 reduction factor in 1.</li> </ol>	<p>(*) Reflecting the latest referred convention and regulations @MEPC.324(75) Reg.20 : Attained EEDI Reg.21 : Required EEDI</p> <p>@ MEPC.328(76) Reg.22 : Attained EEDI Reg.24 : Required EEDI</p>

Existing	Amendment	Remark
<p><b>CHAPTER 5 Wind Assisted Propulsion Systems</b></p> <p><b>Section 2 Survey</b></p> <p><b>204. Installation Survey</b></p> <p><b>2. Testing</b></p> <p>Testing for wind assisted propulsion system is to follow the approved testing procedures and is to include at least the following items:</p> <p>(1) For <b>ES-Wind</b> notation:</p> <p><i>(New)</i></p> <p>(A) Tests of all the alarms and safety functions</p> <p>(B) Automatic safety shutdown operation</p> <p>(C) Emergency shutdown operation</p> <p>(D) Correct operation of fire detection system and fire extinguishing systems, where provided</p> <p><i>(Omitted)</i></p> <p><b>Section 3 Basic Requirements for Wind Assisted Propulsion Systems</b></p> <p><i>(Omitted)</i></p> <p><b>314. Installation in Hazardous Areas</b></p> <p>1. When the wind assisted propulsion systems are installed in a hazardous area, the requirements in <b>Pt 6, Ch 1, Sec 1</b> of <b>Rules for the Classification of Steel Ships</b> are to be complied with.</p> <p><i>(New)</i></p>	<p><b>CHAPTER 5 Wind Assisted Propulsion Systems</b></p> <p><b>Section 2 Survey</b></p> <p><b>204. Installation Survey</b></p> <p><b>2. Testing</b></p> <p>Testing for wind assisted propulsion system is to follow the approved testing procedures and is to include at least the following items:</p> <p>(1) For <b>ES-Wind</b> notation:</p> <p><u>(A) Operation test of Wind Assisted Propulsion Systems (314. 2)</u></p> <p>(B) Tests of all the alarms and safety functions</p> <p>(C) Automatic safety shutdown operation</p> <p>(D) Emergency shutdown operation</p> <p>(E) Correct operation of fire detection system and fire extinguishing systems, where provided</p> <p><i>(Omitted)</i></p> <p><b>Section 3 Basic Requirements for Wind Assisted Propulsion Systems</b></p> <p><i>(Omitted)</i></p> <p><b>314. Installation in Hazardous Areas</b></p> <p>1. When the wind assisted propulsion systems are installed in a hazardous area, the requirements in <b>Pt 6, Ch 1, Sec 19</b> of <b>Rules for the Classification of Steel Ships</b> are to be complied with.</p> <p><u>2. When wind assisted propulsion systems are located in hazardous areas, measure(s) prevent from fire or explosion is/are to be provided for the following cases regarded as ignition sources:</u></p> <p><u>(1) Higher temperature than flash point of cargoes during operation;</u></p> <p><u>or,</u></p> <p><u>(2) Sparking construction during operation</u></p>	<p>(*) Adding the operation test after installation in order to confirmation whether the heated part exists</p> <p>(*) Typo</p> <p>(*) The heated parts shall be avoided during the operation</p>



Existing	Amendment	Remark
<p><b>CHAPTER 6 Hull Air Lubrication System</b></p> <p><b>Section 2 Basic Requirements for Hull Air Lubrication System</b></p> <p><b>204. Auxiliaries and Piping Arrangement</b>  <i>(Omitted)</i></p> <p>3. Power operated air injection valves are to be arranged for manual operation in the event of failure of the power supply.</p> <p>4. Distance pieces connected an air chamber to an air injection valve are to comply with <b>301. 2 of Pt 5, Ch 6 of Rules for the Classification of Steel Ships</b>. Where applicable, adequate arrangements are to be provided to prevent galvanic corrosion due to the use of dissimilar metals.</p> <p><i>(New)</i></p> <p><i>(Omitted)</i></p> <p><b>Section 3 Additional Requirements for Hull Air Lubrication System</b></p> <p><i>(Omitted)</i></p> <p><b>302. Auxiliaries and Piping Arrangement</b></p> <p>1. Construction, materials, and strength of air compressors for hull air lubrication system are to comply with the requirements specified in <b>Pt 5, Ch 6, Sec 11 of Rules for the Classification of Steel Ships</b>. Where deemed appropriate by the Society, international/national Standards may be applied as equivalent instead of requirements of the aforementioned.</p> <p><del>2. Pressure vessels including heat exchangers are to comply with the requirements specified in Pt 5, Ch 5, Sec 3 of Rules for the Classification of Steel Ships.</del></p>	<p><b>CHAPTER 6 Hull Air Lubrication System</b></p> <p><b>Section 2 Basic Requirements for Hull Air Lubrication System</b></p> <p><b>204. Auxiliaries and Piping Arrangement</b>  <i>(Omitted)</i></p> <p>3. Power operated air injection valves are to be arranged for manual operation in the event of failure of the power supply.</p> <p>4. Distance pieces connected an air chamber to an air injection valve are to comply with <b>301. 2 of Pt 5, Ch 6 of Rules for the Classification of Steel Ships</b>. Where applicable, adequate arrangements are to be provided to prevent galvanic corrosion due to the use of dissimilar metals.</p> <p><del>5. Pressure vessels including heat exchangers are to comply with the requirements specified in Pt 5, Ch 5, Sec 3 of Rules for the Classification of Steel Ships. (403. Table 6.4.1)</del></p> <p><i>(Omitted)</i></p> <p><b>Section 3 Additional Requirements for Hull Air Lubrication System</b></p> <p><i>(Omitted)</i></p> <p><b>302. Auxiliaries and Piping Arrangement</b></p> <p>1. Construction, materials, and strength of air compressors for hull air lubrication system are to comply with the requirements specified in <b>Pt 5, Ch 6, Sec 11 of Rules for the Classification of Steel Ships</b>. Where deemed appropriate by the Society, international/national Standards may be applied as equivalent instead of requirements of the aforementioned.</p> <p><del>2. Pressure vessels including heat exchangers are to comply with the requirements specified in Pt 5, Ch 5, Sec 3 of Rules for the Classification of Steel Ships.</del></p>	<p>(*) Moving the requirement 302. 2 to 204. 5, taking into account the Pt.5 Ch.1 and Ch.5 Sec.3 of Rules for the Classification of Steel Ships which is required test irrespective of usage of them.</p>

Existing	Amendment	Remark																																																								
<div>CHAPTER 6 Hull Air Lubrication System</div> <div>Section 4 Survey</div> <div>403. Production Survey</div> <div>2. For ES-ALS1 notation</div> <div>(Omitted)</div> <div>Table 6.4.1 Test and Survey for components of Hull air lubrication system</div> <table><tr><th>No</th><th>Equipment and system</th><th>Drawing approval</th><th>Test and inspection</th></tr><tr><td>1</td><td>Air compressor for hull air lubrication system</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>2</td><td>Control panel for hull air lubrication system<sup>(2)</sup></td><td>O</td><td>O</td></tr><tr><td>3</td><td>Controlgears for air compressor or cooling system</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>4</td><td>Cooling pump (if installed)</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>5</td><td>Heat exchanger or pressure vessel<sup>(3)</sup></td><td>O</td><td>O</td></tr><tr><td>6</td><td>Control, alarm and safety system</td><td>O</td><td>O</td></tr></table> <div>Note. (1) Only applicable for rated output 100kW and above (2) Where equipment specified in <b>Guidance relating to the Rules for the Classification of Steel Ships Pt 6, Ch 1 and Pt 6, Ch 2, 301. 1</b> is installed, Regardless of class notation, the type approval product is to be installed. (3) It shall be inspected based on the <b>Pt 5, Ch 5, Sec 3</b> of <b>Rules for the Classification of Steel Ships</b>.</div>	No	Equipment and system	Drawing approval	Test and inspection	1	Air compressor for hull air lubrication system	O <sup>(1)</sup>	O	2	Control panel for hull air lubrication system <sup>(2)</sup>	O	O	3	Controlgears for air compressor or cooling system	O <sup>(1)</sup>	O	4	Cooling pump (if installed)	O <sup>(1)</sup>	O	5	Heat exchanger or pressure vessel <sup>(3)</sup>	O	O	6	Control, alarm and safety system	O	O	<div>CHAPTER 6 Hull Air Lubrication System</div> <div>Section 4 Survey</div> <div>403. Production Survey</div> <div>2. For ES-ALS1 notation</div> <div>(Omitted)</div> <div>Table 6.4.1 Test and Survey for components of Hull air lubrication system</div> <table><tr><th>No</th><th>Equipment and system</th><th>Drawing approval</th><th>Test and inspection</th></tr><tr><td>1</td><td>Air compressor for hull air lubrication system</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>2</td><td>Control panel for hull air lubrication system<sup>(2)</sup></td><td>O</td><td>O</td></tr><tr><td>3</td><td>Controlgears for air compressor or cooling system</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>4</td><td>Cooling pump (if installed)</td><td>O<sup>(1)</sup></td><td>O</td></tr><tr><td>5</td><td>Heat exchanger or pressure vessel<sup>(3)</sup></td><td><u>O<sup>(4)</sup></u></td><td>O</td></tr><tr><td>6</td><td>Control, alarm and safety system</td><td>O</td><td>O</td></tr></table> <div>Note. (1) Only applicable for rated output 100kW and above (2) Where equipment specified in <b>Guidance relating to the Rules for the Classification of Steel Ships Pt 6, Ch 1 and Pt 6, Ch 2, 301. 1</b> is installed, Regardless of class notation, the type approval product is to be installed. (3) <u>Regardless of the Class notation, it</u> shall be inspected based on the <b>Pt 5, Ch 5, Sec 3</b> of <b>Rules for the Classification of Steel Ships</b>. (4) <u>Only applicable for PV-1 and PV-2</u></div>	No	Equipment and system	Drawing approval	Test and inspection	1	Air compressor for hull air lubrication system	O <sup>(1)</sup>	O	2	Control panel for hull air lubrication system <sup>(2)</sup>	O	O	3	Controlgears for air compressor or cooling system	O <sup>(1)</sup>	O	4	Cooling pump (if installed)	O <sup>(1)</sup>	O	5	Heat exchanger or pressure vessel <sup>(3)</sup>	<u>O<sup>(4)</sup></u>	O	6	Control, alarm and safety system	O	O	<div>(*) Updating the table to adding description for heat exchanger, taking into account the Pt.5 Ch.1 and Ch.5 Sec.3 of Rules for the Classification of Steel Ships which is required test irrespective of usage of them.</div>
No	Equipment and system	Drawing approval	Test and inspection																																																							
1	Air compressor for hull air lubrication system	O <sup>(1)</sup>	O																																																							
2	Control panel for hull air lubrication system <sup>(2)</sup>	O	O																																																							
3	Controlgears for air compressor or cooling system	O <sup>(1)</sup>	O																																																							
4	Cooling pump (if installed)	O <sup>(1)</sup>	O																																																							
5	Heat exchanger or pressure vessel <sup>(3)</sup>	O	O																																																							
6	Control, alarm and safety system	O	O																																																							
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1	Air compressor for hull air lubrication system	O <sup>(1)</sup>	O																																																							
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3	Controlgears for air compressor or cooling system	O <sup>(1)</sup>	O																																																							
4	Cooling pump (if installed)	O <sup>(1)</sup>	O																																																							
5	Heat exchanger or pressure vessel <sup>(3)</sup>	<u>O<sup>(4)</sup></u>	O																																																							
6	Control, alarm and safety system	O	O																																																							

Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p style="text-align: center;"><b>Section 3 Configuration</b></p> <p><b>301. General</b></p> <ol style="list-style-type: none"> <li>1. OCCS system are to be arranged that the pressure in exhaust gas pipes does not exceed the allowable back pressure recommended by fuel consumers manufacturer.</li> <li>2. When a pre-scrubber is provided to adjust the temperature and humidity fitting to the optimal conditions of the absorption process and to remove SO2 in the exhaust gas, the chemical treatment piping, washwater piping and residue systems shall be complied with <b>207. of Ch 3 Sec.2</b> of this guidance. Unless regulations or conventions specified otherwise, washwater from pre-scrubber shall be complied with <b>Res.MEPC.307(73)</b> and <b>Res.MEPC.340(77)</b>.</li> </ol>	<p style="text-align: center;"><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p style="text-align: center;"><b>Section 3 Configuration</b></p> <p><b>301. General</b></p> <ol style="list-style-type: none"> <li>1. OCCS system are to be arranged that the pressure in exhaust gas pipes does not exceed the allowable back pressure recommended by fuel consumers manufacturer.</li> <li>2. When a pre-scrubber is provided to adjust the temperature and humidity fitting to the optimal conditions of the absorption process and to remove SO2 in the exhaust gas, the chemical treatment piping, washwater piping and residue systems, <u>and control and monitoring system</u> shall be complied with <b>207. and 208. of Ch 3 Sec.2</b> of this guidance <u>respectively</u>. Unless regulations or conventions specified otherwise, washwater from pre-scrubber shall be complied with <b>Res.MEPC.307(73)</b> and <b>Res.MEPC.340(77)</b>.</li> </ol>	<p>(*) Clarifying requirements on control and monitoring system of pre-scrubber</p>

Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 3 Configuration</b></p> <p><b>302. Risk Assessment</b></p> <ol style="list-style-type: none"> <li>1. Risk assessment shall be conducted to determine whether the risks arising from the handling of absorbents and the storage of CO<sub>2</sub> in OCCS system have dealt with effect on personnel, environment, and structural strength or integrity.</li> <li>2. The risks shall be evaluated using acceptable and recognized risk assessment techniques. The evaluated risks shall be reduced to a reasonable level through elimination or mitigation measures.</li> <li>3. The subject of risk assessment shall include at least: <ol style="list-style-type: none"> <li>(1) Supply, storage, handling and unloading system(if installed) of absorbent</li> <li>(2) Compression, liquefaction, storage and unloading system of carbon storage system (if installed)</li> </ol> <i>(New)</i> </li> <li>4. Expected risks shall include at least: <ol style="list-style-type: none"> <li>(1) Leakage of absorbent</li> <li>(2) Leakage of CO<sub>2</sub></li> </ol> <i>(New)</i> <ol style="list-style-type: none"> <li>(3) Failure and malfunction of components of carbon capture and storage system</li> </ol> </li> <li>5. When assessing the expected risks, those should be considered at least: <ol style="list-style-type: none"> <li>(1) Toxicity, flammability, and explosive properties of absorbent</li> <li>(2) The asphyxiation of CO<sub>2</sub>, especially when personnel on board are exposed</li> </ol> <i>(New)</i> </li> </ol>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 3 Configuration</b></p> <p><b>302. Risk Assessment</b></p> <ol style="list-style-type: none"> <li>1. Risk assessment shall be conducted to determine whether the risks arising from the handling of absorbents and the storage of CO<sub>2</sub> in OCCS system have dealt with effect on personnel, environment, and structural strength or integrity.</li> <li>2. The risks shall be evaluated using acceptable and recognized risk assessment techniques. The evaluated risks shall be reduced to a reasonable level through elimination or mitigation measures.</li> <li>3. The subject of risk assessment shall include at least: <ol style="list-style-type: none"> <li>(1) Supply, storage, handling and unloading system(if installed) of absorbent</li> <li>(2) Compression, liquefaction, storage and unloading system of carbon storage system (if installed)</li> <li>(3) <u>Supply, storage, and handling of refrigerant for carbon dioxide liquefaction system</u></li> </ol> </li> <li>4. Expected risks shall include at least: <ol style="list-style-type: none"> <li>(1) Leakage of absorbent</li> <li>(2) Leakage of CO<sub>2</sub></li> <li>(3) <u>Leakage of refrigerant for carbon dioxide liquefaction system</u></li> <li>(4) Failure and malfunction of components of carbon capture and storage system</li> </ol> </li> <li>5. When assessing the expected risks, those should be considered at least: <ol style="list-style-type: none"> <li>(1) Toxicity, flammability, <del>and explosive</del> properties of absorbent</li> <li>(2) The asphyxiation of CO<sub>2</sub>, especially when personnel on board are exposed</li> <li>(3) <u>Toxicity, flammability properties of refrigerant</u></li> </ol> <ol style="list-style-type: none"> <li>6. <u>The Society may consider the acceptance of relaxations of requirements from Ch.3 to Ch.7 based on the risk assessment.</u></li> </ol> </li> </ol>	<p>(*) Adding items concerning CO<sub>2</sub> liquefaction system</p> <p>(*) Adding a clause to accept the result of risk assessment</p>



Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 4 Carbon Capture System</b></p> <p><b>404. Absorbent Piping System</b></p> <p><b>1. General</b> (Omitted)</p> <p>(5) Absorbent piping systems are to be classified into Class I piping specified in <b>Pt 5, Ch 6 of the Rules for the Classification of Steel Ships</b> regardless of temperature and pressure of working media. However, vent and drain pipes can be regarded as Class III.</p> <p><b>405. Absorbent Storage Tank</b> (Omitted)</p> <p><b>2.</b> The storage tank is to be located within the engine room or the enclosed compartments except for locating on open deck. (New)</p> <p><b>3.</b> The material of absorbent storage tank is to be complied with <b>404. 2.</b> (Omitted)</p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 4 Carbon Capture System</b></p> <p><b>404. Absorbent Piping System</b></p> <p><b>1. General</b> (Omitted)</p> <p>(5) Absorbent piping systems are to be classified into Class I <u>or Class II</u> piping specified in <b>Pt 5, Ch 6 of the Rules for the Classification of Steel Ships, taking into account the toxicity and corrosive,</b> regardless of temperature and pressure of working media. However, vent and drain pipes can be regarded as Class III.</p> <p><b>405. Absorbent Storage Tank</b> (Omitted)</p> <p><b>2.</b> The storage tank is to be located within the engine room or the enclosed compartments except for locating on open deck.</p> <p><b>3.</b> <u>For portable absorbent storage tanks whose support structure (container frame or truck chassis) is standardized as a container for international transport, the storage tanks are to be in accordance with requirements for the Guidance for Freight Containers. In addition, the storage tanks are to be arranged in compliance with the International Maritime Dangerous Goods (IMDG) code and Pt 8, Ch 12 of the Rules for the Classification of Steel Ships. Absorbents are to be classified depending on risks by toxicity and flammability of them.</u></p> <p><b>4.</b> The material of absorbent storage tank is to be complied with <b>404. 2.</b> (Omitted)</p>	<p>(*) Adding piping system for absorbent to accept Class II depending on the corrosive</p>

Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>501. General</b></p> <p>1. Equipment for CO2 storage system such as compressors, coolers, separators, and dryers is to be located in a dedicated space or compartment.</p> <p>2. Spaces where CO2 <del>liquefaction</del> system or piping systems are arranged <del>which are located below deck or where access from the open deck is not provided</del>, are to be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and to be sized to provide at least 30 air changes per hour.</p> <p>(New)</p> <p>(New)</p> <p>3. Devices for continuously monitoring of CO2 accumulation is to be installed in spaces or compartment where CO2 liquefaction system or piping systems pass.</p> <p>4. It should be provided to monitor the purity of collected CO2 as possible.</p> <p>(New)</p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>501. General</b></p> <p>1. Equipment for CO2 storage system such as compressors, coolers, separators, and dryers is to be located in a dedicated space or compartment.</p> <p>2. Spaces where CO2 <del>liquefaction</del><u>storage</u> system or piping systems are arranged <del>which are located below deck or where access from the open deck is not provided</del>, are to be fitted with <u>an extraction type of</u> mechanical ventilation system designed to take <del>exhaust</del> air from the bottom of the space and to be sized to provide at least <del>306</del> air changes per hour.</p> <p><u>3. Enclosed spaces where CO2 liquefaction systems with flammable refrigerant are arranged are to be fitted with an extraction type of mechanical ventilation system capable of at least 30 air changes per hour. But, the capacity of ventilation system may be adjusted depending on the risk assessment in 302.</u></p> <p><u>4. Where the spaces or compartments arranged CO2 liquefaction system with flammable refrigerent are to be regarded as hazardous spaces, electric equipments installed in the spaces or compartments are to be complied with Pt 6, Ch1, Sec 1 of the Rules for the Classification of Steel Ships</u></p> <p>5. Devices for continuously monitoring of CO2 accumulation is to be installed in spaces or compartment where CO2 liquefaction system or piping systems pass.</p> <p>6. It should be provided to monitor the purity of collected CO2 as possible.</p> <p><u>7. CO2 storage tank and piping systems are to satisfy Pt 7, Ch 5, 1721. and 1722. of Rules for the Classification of Steel Ships.</u></p>	<p>(*) Mitigating the ventilation requirements for CO2 piping system, taking into account the inflammability of CO2 (30 → 6)</p> <p>(*) Adding requirements for portable CO2 storage tank as 503.3. separately (See the next page)</p>

Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>502. CO2 Piping System</b></p> <p>1. ~ 6. <i>(Omitted)</i></p> <p>7. The CO2 pipings are to be at least 0.8 m inboard.</p> <p><i>(New)</i></p> <p><b>503. CO2 storage tanks</b></p> <p><i>(Omitted)</i></p> <p><b>2. Design of CO2 storage tanks</b></p> <p>(1) Liquefied CO2 storage tanks are to be independent tank type C designed in accordance with <b>Ch 6 of Rules for the Classification of Ships Using Low-flashpoint Fuels.</b></p> <p>(2) Portable liquefied CO2 storage tanks are to comply with Ch 6, Sec 5 of Rules for the Classification of Ships Using Low-flashpoint Fuels as well as (1) above.</p> <p>(3) The CO2 storage tanks and pressure relief devices are to be designed to prevent venting of CO2 except in emergency situations.</p> <p><i>(Omitted)</i></p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>502. CO2 Piping System</b></p> <p>1. ~ 6. <i>(Omitted)</i></p> <p>7. The CO2 pipings are to be at least 0.8 m inboard <u>from the ship's sides.</u></p> <p><b>503. CO2 liquefaction system</b></p> <p><u>1. The liquefaction system to store captured CO2 is to comply with requirements for refrigerating machinery Pt 6, Ch 1 of the Rules for the Classification of Steel Ships. However, Pt 6, Ch 1 301. 2 of the Rules for the Classification of Steel Ships is only applied to ships assigned "CEmC-OCCS(R)" notation.</u></p> <p><u>2. When using a refrigerant other than the one determined in the rules of 1., the liquefaction system is to be designed in consideration of the toxicity and flammability of the refrigerant.</u></p> <p><b>504. CO2 storage tanks</b></p> <p><i>(Omitted)</i></p> <p><b>2. Design of CO2 storage tanks</b></p> <p>(1) Liquefied CO2 storage tanks are to be independent tank type C designed in accordance with <b>Ch 6 of Rules for the Classification of Ships Using Low-flashpoint Fuels.</b></p> <p><del>(2) Portable liquefied CO2 storage tanks are to comply with Ch 6, Sec 5 of Rules for the Classification of Ships Using Low-flashpoint Fuels as well as (1) above.</del></p> <p><u>(2) The CO2 storage tanks and pressure relief devices are to be designed to prevent venting of CO2 except in emergency situations.</u></p> <p><i>(Omitted)</i></p>	<p>(*) To clarifying the requirement</p> <p>(*) Adding requirements for CO2 liquefaction system</p> <p>(*) Adding requirements for portable CO2 storage tank as 503. 3. separately (See the next page)</p>



Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>503. CO2 storage tanks</b></p> <p><b>2. Design of CO2 storage tanks</b></p> <p><i>(Omitted)</i></p> <p>(10) The CO2 storage system design is to take into account the composition of CO2, impurities and water content, including the effect on the “triple point” of CO2 and corrosiveness.</p> <p>(11) Detailed operating and maintenance manuals are to be provided with overall operating procedures between dry-docking of CO2 storage tanks and associated compression, cooling and liquefaction system. Operating procedures are to include at least cooling down, unloading, gas freeing, pressure/temperature control, emergency shutdown, maintenance and inspection.</p> <p><i>(New)</i></p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>503. CO2 storage tanks</b></p> <p><b>2. Design of CO2 storage tanks</b></p> <p><i>(Omitted)</i></p> <p>(9) The CO2 storage system design is to take into account the composition of CO2, impurities and water content, including the effect on the “triple point” of CO2 and corrosiveness.</p> <p>(10) Detailed operating and maintenance manuals are to be provided with overall operating procedures between dry-docking of CO2 storage tanks and associated compression, cooling and liquefaction system. Operating procedures are to include at least cooling down, unloading, gas freeing, pressure/temperature control, emergency shutdown, maintenance and inspection.</p> <p><b>3. Design of portable CO2 storage tanks</b></p> <p>(1) <u>Portable CO2 storage tanks are to comply with the follows as well as the requirements in 2 above.</u></p> <p>(2) <u>For portable CO2 tanks whose support structure (container frame or truck chassis) is standardized as container for international transport, tanks are to be in accordance with requirements for thermal container and/or tank container specified in <b>Guidance for Freight Containers</b>. Where the support structure is not standardized for international transport, the applicable tests specified in <b>Guidance for Freight Containers</b> can be appropriately adjusted or omitted in consideration of the load that can occur during stacking and loading/unloading operations of the portable CO2 storage tank.</u></p>	<p>(*) Updating the paragraph numbers by deleting the (2) (Find the previous page)</p> <p>(*) Adding requirements for portable CO2 storage tanks</p>

Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><i>(New)</i></p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>3. Design of portable CO2 storage tanks</b></p> <p><i>(Following the previous page)</i></p> <p>(3) Portable CO2 tanks are to be located in dedicated areas fitted with:</p> <p>(A) mechanical protection of the tanks depending on location and cargo operations; and</p> <p>(B) if located on open deck: spill protection and measures to prevent the temperature rise of the storage tanks in case of fire in adjacent area.</p> <p>(4) Portable CO2 tanks are to be secured to the deck while connected to the ship systems. The arrangement for supporting and fixing the tanks are to be designed for the maximum expected static and dynamic inclinations, as well as the maximum expected values of acceleration, taking into account the ship characteristics and the position of the tanks.</p> <p>(5) Consideration is to be given to the strength and the effect of the portable CO2 tanks on the ship's stability.</p> <p>(6) Connections to the ship's fuel piping systems are to be made by means of approved flexible hoses or other suitable means designed to provide sufficient flexibility.</p> <p>(7) Arrangements are to be provided to limit the quantity of fuel spilled in case of inadvertent disconnection or rupture of the non-permanent connections.</p> <p>(8) The pressure relief system of portable CO2 tanks is to be connected to a fixed venting system.</p> <p>(9) Control and monitoring systems for portable CO2 tanks are to be integrated in the ship's control and monitoring system. Safety system for portable CO2 tanks is to be integrated in the ship's safety system (e.g. shutdown systems for tank valves, leak/gas detection systems).</p> <p>(10) Safe access to tank connections for the purpose of inspection and maintenance is to be ensured.</p>	<p>(*) MSC.527(106), Pt III, 2.3.2</p> <p>(*) MSC.527(106), Pt III, 2.1.9</p>

Existing	Amendment	Remark
<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>504. CO<sub>2</sub> Leakage Detection</b></p> <ol style="list-style-type: none"> <li>1. At least two sets of CO<sub>2</sub> detectors are to be arranged in an enclosed space where there is a possibility of leakage of CO<sub>2</sub></li> <li>2. If carbon dioxide is detected in excess of 1%, an alarm is to be initiated at the remote control location such as bridge control system and engine control room and at the local control location.</li> <li>3. At least two sets of portable CO<sub>2</sub> detection devices are to be provided on board.</li> </ol> <p>(New)</p> <p>(New)</p>	<p><b>CHAPTER 7 Onboard Carbon Capture and Storage system</b></p> <p><b>Section 5 Carbon Storage System</b></p> <p><b>504. CO<sub>2</sub>–Leakage Detection</b></p> <ol style="list-style-type: none"> <li>1. At least two sets of CO<sub>2</sub> detectors are to be arranged in an enclosed space where there is a possibility of leakage of CO<sub>2</sub></li> <li>2. If carbon dioxide is detected in excess of 1%, an alarm is to be initiated at the remote control location such as bridge control system and engine control room and at the local control location.</li> <li>3. At least two sets of portable CO<sub>2</sub> detection devices are to be provided on board.</li> <li>4. <u>Where flammable refrigerants are used for CO<sub>2</sub> liquefaction system, leakage detection systems are to be arranged in the space installed CO<sub>2</sub> liquefaction system.</u></li> </ol> <p><b>505. Fire Protection and Extinction</b></p> <ol style="list-style-type: none"> <li>1. <u>Where carbon storage system including CO<sub>2</sub> liquefaction system are installed in spaces other than engine-room, in determining fire integrity of divisions to adjacent spaces, the each space is to be categorized and applied Pt 8, Ch 7, Sec. 1 of the Rules for the Classification of Steel Ships, taking into account the flammability of refrigerants.</u></li> <li>2. <u>Where flammable refrigerants are used for CO<sub>2</sub> liquefaction system, spaces where the CO<sub>2</sub> liquefaction system are installed is to be provided with fixed fire extinguishing systems suitable for the refrigerants.</u></li> <li>3. <u>Where flammable refrigerants are used for CO<sub>2</sub> liquefaction system, spaces where the CO<sub>2</sub> liquefaction system is installed are to be provided with a fixed fire detection and fire alarm system.</u></li> </ol>	<p>(*) Adding the leakage detection of refrigerants</p> <p>(*) Adding the paragraph to determine requirements in a viewpoint of fire protection and extinction aspect</p>

Existing	Amendment	Remark																																																																																																																																								
<div>CHAPTER 7 Onboard Carbon Capture and Storage system</div> <div>Section 6 System Design</div> <div>603. Emergency Stop System</div> <div>(Omitted)</div> <div>Table 7.6.1 Monitoring and safety functions for OCCS system</div> <table><tr><th>Parameters</th><th>Display</th><th>Alarm activated</th><th>Automatic Shutdown</th></tr><tr><td>Fan/blower motors for OCCS system (when installed)</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>By-pass or changeover valve of carbon capture system(when installed)</td><td>Position</td><td></td><td></td></tr><tr><td>Exhaust gas temperature after absorber (except if dry running can be used)</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>Differential pressure across absorber</td><td></td><td>H</td><td>●(HH)</td></tr><tr><td>Pump for carbon capture system</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>Pressure for carbon capture system</td><td></td><td>L</td><td></td></tr><tr><td>Level in absorber</td><td></td><td>H</td><td>●(HH)</td></tr><tr><td>Temperature of absorbent storage tank</td><td>●</td><td>H</td><td></td></tr><tr><td>Level of absorbent storage tank</td><td>●</td><td>L/H</td><td></td></tr><tr><td>Level of drip tray for onboard carbon capture ans storage system</td><td></td><td>H</td><td></td></tr><tr><td>Level of absorbent overflow tank</td><td></td><td>H</td><td></td></tr><tr><td>Pump/Compressor for carbon storage system</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>Level of CO2 storage tank</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>Pressure for liquefied CO2 storage tank</td><td>●</td><td>L/H</td><td>●(LL/HH)</td></tr><tr><td>Temperature for liquefied CO2 storage tank</td><td>●</td><td>L/H</td><td>●(LL/HH)</td></tr><tr><td>power supply fail of control, alarm, monitoring or safety device</td><td>—</td><td>Fail</td><td></td></tr></table> <div>(Omitted)</div>	Parameters	Display	Alarm activated	Automatic Shutdown	Fan/blower motors for OCCS system (when installed)	Run	Stop		By-pass or changeover valve of carbon capture system(when installed)	Position			Exhaust gas temperature after absorber (except if dry running can be used)	●	H	●(HH)	Differential pressure across absorber		H	●(HH)	Pump for carbon capture system	Run	Stop		Pressure for carbon capture system		L		Level in absorber		H	●(HH)	Temperature of absorbent storage tank	●	H		Level of absorbent storage tank	●	L/H		Level of drip tray for onboard carbon capture ans storage system		H		Level of absorbent overflow tank		H		Pump/Compressor for carbon storage system	Run	Stop		Level of CO2 storage tank	●	H	●(HH)	Pressure for liquefied CO2 storage tank	●	L/H	●(LL/HH)	Temperature for liquefied CO2 storage tank	●	L/H	●(LL/HH)	power supply fail of control, alarm, monitoring or safety device	—	Fail		<div>CHAPTER 7 Onboard Carbon Capture and Storage system</div> <div>Section 6 System Design</div> <div>603. Emergency Stop System</div> <div>(Omitted)</div> <div>Table 7.6.1 Monitoring and safety functions for OCCS system</div> <table><tr><th>Parameters</th><th>Display</th><th>Alarm activated</th><th>Automatic Shutdown</th></tr><tr><td>Fan/blower motors for OCCS system (when installed)</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>By-pass or changeover valve of carbon capture system(when installed)</td><td>Position</td><td></td><td></td></tr><tr><td>Exhaust gas temperature after absorber (except if dry running can be used)</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>Differential pressure across absorber</td><td></td><td>H</td><td>●(HH)</td></tr><tr><td>Pump for carbon capture system</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>Pressure for carbon capture system</td><td></td><td>L</td><td></td></tr><tr><td>Level in absorber, <u>Regenerator</u></td><td></td><td>H</td><td>●(HH)</td></tr><tr><td>Temperature of absorbent storage tank</td><td>●</td><td>H</td><td></td></tr><tr><td>Level of absorbent storage tank</td><td>●</td><td>L/H</td><td></td></tr><tr><td>Level of drip tray for onboard carbon capture ans storage system</td><td></td><td>H</td><td></td></tr><tr><td>Level of absorbent overflow tank</td><td></td><td>H</td><td></td></tr><tr><td>Pump/Compressor for carbon storage system</td><td>Run</td><td>Stop</td><td></td></tr><tr><td>Level <u>or Loading rate</u> of CO2 storage tank</td><td>●</td><td>H</td><td>●(HH)</td></tr><tr><td>Pressure for liquefied CO2 storage tank</td><td>●</td><td>L/H</td><td>●(LL/HH)</td></tr><tr><td>Temperature for liquefied CO2 storage tank</td><td>●</td><td>L/H</td><td>●(LL/HH)</td></tr><tr><td>power supply fail of control, alarm, monitoring or safety device</td><td>—</td><td>Fail</td><td></td></tr></table> <div>(Omitted)</div>	Parameters	Display	Alarm activated	Automatic Shutdown	Fan/blower motors for OCCS system (when installed)	Run	Stop		By-pass or changeover valve of carbon capture system(when installed)	Position			Exhaust gas temperature after absorber (except if dry running can be used)	●	H	●(HH)	Differential pressure across absorber		H	●(HH)	Pump for carbon capture system	Run	Stop		Pressure for carbon capture system		L		Level in absorber, <u>Regenerator</u>		H	●(HH)	Temperature of absorbent storage tank	●	H		Level of absorbent storage tank	●	L/H		Level of drip tray for onboard carbon capture ans storage system		H		Level of absorbent overflow tank		H		Pump/Compressor for carbon storage system	Run	Stop		Level <u>or Loading rate</u> of CO2 storage tank	●	H	●(HH)	Pressure for liquefied CO2 storage tank	●	L/H	●(LL/HH)	Temperature for liquefied CO2 storage tank	●	L/H	●(LL/HH)	power supply fail of control, alarm, monitoring or safety device	—	Fail		<div>(*) Simplify the Display parameter taking into account effectiveness</div>
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<div>CHAPTER 7 Onboard Carbon Capture and Storage system</div> <div>Section 7 Safety and Personnel Protective Equipment.</div> <div>(Omitted)</div> <div>702. Eyewasher and safety showers are to be provided near the manifold for loading absorbent and unloading CO2 and the process fluid transfer pump. If several manifolds are installed on the same deck, one could be installed if the manifold can be easily accessed to eyewasher and safety shower from the manifold.</div> <div>(Omitted)</div> <div>Section 8 Survey</div> <div>(Omitted)</div> <div>Table 7.8.1 Test and Survey for components of OCCS system</div> <table><tr><th>No.</th><th>Components</th><th>Type approval</th><th>Test and Survey</th></tr><tr><td>1</td><td>Carbon-dioxide emission monitoring system</td><td>●<sup>(9)</sup></td><td></td></tr><tr><td>2</td><td>Control panel for OCCS system</td><td>●<sup>(9)</sup></td><td>●</td></tr><tr><td>3</td><td>Pump (incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●</td></tr><tr><td>4</td><td>Compressor/Blower (incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●</td></tr><tr><td>5</td><td>Absorber, Regenerator body<sup>(1),(3),(7)</sup></td><td></td><td>●</td></tr><tr><td>6</td><td>Heat exchanger<sup>(4)</sup></td><td></td><td>●</td></tr><tr><td>7</td><td>Abosbent storage tank, absorbent waste tank, overflow tank<sup>(1),(5)</sup></td><td></td><td>●</td></tr></table> <div>Note. (1) For the applicable class notation 'CEmC-OCCS(S)' in Table 7.1.1 (2) Components for the continual operation of the OCCS system are to be tested in accordance with the requirements specified in Pt 5, Ch 6 &amp; Pt 6 of the Rules for the Classification of Steel Ships. (3) The entire length of both longitudinal and circumferential welded joints and exhaust gas pipe or wash water pipe joints on scrubber body are to be subjected to liquid penetrant testing(PT). Where considered necessary by the Surveyor, additional non-destructive test may be required. (4) It shall be inspected based on the Rules for the Classification of Steel Ships of Pt 5 Ch 5 Sec 3. (5) Storage tank that do not form part of the hull are to be subjected to a hydraulic test at a head pressure of 2.5 m on the tank top plate, together with the attachment after manufacture. (6) Where equipment specified in Guidance relating to the Rules for the Classification of Steel Ships Pt 6, Ch 1 and Ch 2, 301.1 is installed, Regardless of class notation, the type approval product is to be installed. (7) When ships install scrubber without by-pass arrangement of carbon capture system required in 305, pre-scrubber body(when applied) is to be performed non-destructive examinations irrespective of notation in 105.</div>	No.	Components	Type approval	Test and Survey	1	Carbon-dioxide emission monitoring system	● <sup>(9)</sup>		2	Control panel for OCCS system	● <sup>(9)</sup>	●	3	Pump (incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	4	Compressor/Blower (incl. motors and controlgears for motors) <sup>(1),(2)</sup>		●	5	Absorber, Regenerator body <sup>(1),(3),(7)</sup>		●	6	Heat exchanger <sup>(4)</sup>		●	7	Abosbent storage tank, absorbent waste tank, overflow tank <sup>(1),(5)</sup>		●	<div>CHAPTER 7 Onboard Carbon Capture and Storage system</div> <div>Section 7 Safety and Personnel Protective Equipment.</div> <div>(Omitted)</div> <div>702. Eyewasher and safety showers are to be provided near the manifold for loading absorbent and unloading CO2 and the process fluid transfer pump. If several manifolds are installed on the same deck, one could be installed if the manifold can be easily accessed to eyewasher and safety shower from the manifold.</div> <div>(Omitted)</div> <div>Section 8 Survey</div> <div>(Omitted)</div> <div>Table 7.8.1 Test and Survey for components of OCCS system</div> <table><tr><th>No.</th><th>Components</th><th>Type approval</th><th>Drawing approval</th><th>Test and Survey</th></tr><tr><td>1</td><td>Carbon-dioxide emission monitoring system</td><td>●<sup>(9)</sup></td><td></td><td></td></tr><tr><td>2</td><td>Control panel for OCCS system</td><td>●<sup>(9)</sup></td><td>●<sup>(9)</sup></td><td>●</td></tr><tr><td>3</td><td>Pump (incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●<sup>(9)</sup></td><td>●</td></tr><tr><td>4</td><td>Compressor/Blower (incl. motors and controlgears for motors)<sup>(1),(2)</sup></td><td></td><td>●<sup>(9)</sup></td><td>●</td></tr><tr><td>5</td><td>Absorber, Regenerator body<sup>(1),(3),(7)</sup></td><td></td><td></td><td>●</td></tr><tr><td>6</td><td>Heat exchanger<sup>(4)</sup></td><td></td><td>●<sup>(9)</sup></td><td>●</td></tr><tr><td>7</td><td>Abosbent storage tank, absorbent waste tank, overflow tank<sup>(1),(5)</sup></td><td></td><td></td><td>●</td></tr></table> <div>Note. (1) For the applicable class notation 'CEmC-OCCS(S)' in Table 7.1.1 (2) Components for the continual operation of the OCCS system are to be tested in accordance with the requirements specified in Pt 5, Ch 6 &amp; Pt 6 of the Rules for the Classification of Steel Ships. (3) The entire length of both longitudinal and circumferential welded joints and exhaust gas pipe or wash water pipe joints on scrubber body are to be subjected to liquid penetrant testing(PT). Where considered necessary by the Surveyor, additional non-destructive test may be required. (4) It shall be inspected based on the Rules for the Classification of Steel Ships of Pt 5 Ch 5 Sec 3. (5) Storage tank that do not form part of the hull are to be subjected to a hydraulic test at a head pressure of 2.5 m on the tank top plate, together with the attachment after manufacture. (6) Where equipment specified in Guidance relating to the Rules for the Classification of Steel Ships Pt 6, Ch 1 and Ch 2, 301.1 is installed, Regardless of class notation, the type approval product is to be installed. (7) When ships install carbon capture and storage system without by-pass arrangement of required in 305, pre-scrubber body(when applied) and absorber is to be performed non-destructive examinations irrespective of notation in 105. (8) Only applicable for rated output 100kW and above (9) Only applicable for PV-1 and PV-2</div>	No.	Components	Type approval	Drawing approval	Test and Survey	1	Carbon-dioxide emission monitoring system	● <sup>(9)</sup>			2	Control panel for OCCS system	● <sup>(9)</sup>	● <sup>(9)</sup>	●	3	Pump (incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●	4	Compressor/Blower (incl. motors and controlgears for motors) <sup>(1),(2)</sup>		● <sup>(9)</sup>	●	5	Absorber, Regenerator body <sup>(1),(3),(7)</sup>			●	6	Heat exchanger <sup>(4)</sup>		● <sup>(9)</sup>	●	7	Abosbent storage tank, absorbent waste tank, overflow tank <sup>(1),(5)</sup>			●	<div>(*) Typo</div> <div>(*) Deleting the requirements of eyewasher and safety shower on CO2 manifold taking into account the effectiveness of them</div> <div>(*) It would be superfluous to require eyewasher and safety shower when a transfer pump is installed alone.</div> <div>(*) Adding the 'Drawing approval' column</div> <div>(*) Correcting the typo</div>
No.	Components	Type approval	Test and Survey																																																																							
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Existing	Amendment	Remark
<p style="text-align: center;"><b>CHAPTER 8 Onboard Carbon capture and storage system Ready Ships</b></p> <p style="text-align: center;"><b>Section 1 General</b></p> <p><b>102. Class Notation</b> (Omitted)</p> <p><b>4. OCCS Ready I</b></p> <p>(1) <b>OCCS Ready I</b> as an additional special feature notation may be assigned to ships for which parts of the systems are installed with the detailed design in addition to the generic design.</p> <p>(2) In assignment of the <b>OCCS Ready I</b>, the characters corresponding to the installed items may be assigned in the bracket one or a combination of them in addition to <b>OCCS Ready I</b>. The characters corresponding to the installed items are as follows:</p> <p>(A) Absorbent storage Tank - AT  (B) Structural Reinforcement for AT - SRat  (C) CO2 storage Tank - CT  (D) Structural Reinforcement for CT - SRct  (E) Absorbent System - AS  (F) Absorber - AB  (G) Regenerator - RG  (H) Pre-scrubber - PS  (I) CO2 system - CX  (J) Risk Assessment - RA</p> <p>(Omitted)</p>	<p style="text-align: center;"><b>CHAPTER 8 Onboard Carbon capture and storage system Ready Ships</b></p> <p style="text-align: center;"><b>Section 1 General</b></p> <p><b>102. Class Notation</b> (Omitted)</p> <p><b>4. OCCS Ready I</b></p> <p>(1) <b>OCCS Ready I</b> as an additional special feature notation may be assigned to ships for which parts of the systems are installed with the detailed design in addition to the generic design.</p> <p>(2) In assignment of the <b>OCCS Ready I</b>, the characters corresponding to the installed items may be assigned in the bracket one or a combination of them in addition to <b>OCCS Ready I</b>. The characters corresponding to the installed items are as follows:</p> <p>(A) Absorbent storage Tank - AT  (B) Structural Reinforcement for AT - SRat  (C) CO2 storage Tank - CT  (D) Structural Reinforcement for CT - SRct  (E) Absorbent System - AS  (F) <del>Absorber</del> - <u>AB Absorbent Loading system - ASI</u>  (G) <del>Regenerator</del> - <u>RG CO2 piping System - CS</u>  (H) <del>Pre-scrubber</del> - <u>PS CO2 Unloading system - CSu</u>  (I) <del>CO2 system</del> - <u>CX Absorber - AB</u>  (J) Risk Assessment - RA <u>Regenerator - RG</u>  (K) <u>Pre-scrubber - PS</u>  (L) <u>CO2 Liquefaction system - LQ</u>  (M) <u>Exhaust gas system - EX</u></p> <p>(Omitted)</p>	<p>(*) To correct the text to be consistent with the Korean version</p>

Existing	Amendment	Remark
<p><b>CHAPTER 8 Onboard Carbon capture and storage system Ready Ships</b></p> <p><b>Section 2 Requirements for Ready Levels</b></p> <p><b>204. Level that fits the Installation of Parts of Systems (OCCS Ready I)</b></p> <p><b>1. Plans and documents</b></p> <p>(1) OCCS Ready I includes the approval of the detailed drawings and the installation of the specific equipment mounted on the ship and is classified as a separate system as shown below. However, if approved by the Society, the some modifications may be made depending on the type of equipment. <i>(Omitted)</i></p> <p>(E) Absorbent System - AS - Detailed drawings of carbon capture system and related equipment including piping diagram and fittings and tank(s) <i>(New)</i></p> <p>(F) Absorber - AB (G) Regenarator - RG (H) Pre-scrubber - PS (I) CO2 system - EX - Detailed drawings of CO2 storage system and related equipment including piping diagram and fittings and tank(s) (J) Risk Assessment - RA - Documents of risk assessment</p> <p><i>(Omitted)</i></p>	<p><b>CHAPTER 8 Onboard Carbon capture and storage system Ready Ships</b></p> <p><b>Section 2 Requirements for Ready Levels</b></p> <p><b>204. Level that fits the Installation of Parts of Systems (OCCS Ready I)</b></p> <p><b>1. Plans and documents</b></p> <p>(1) OCCS Ready I includes the approval of the detailed drawings and the installation of the specific equipment mounted on the ship and is classified as a separate system as shown below. However, if approved by the Society, the some modifications may be made depending on the type of equipment. <i>(Omitted)</i></p> <p>(E) Absorbent System - AS - Detailed drawings of carbon capture system and related equipment including piping diagram and fittings and tank(s)</p> <p><u>(F) CO2 piping System - CS</u> - <u>Detailed drawings of CO2 storage system and related equipment including piping diagram and fittings and tank(s)</u></p> <p>(G) Absorber - AB (H) Regenarator - RG (I) Pre-scrubber - PS <del>(I) CO2 system - EX</del> <del>- Detailed drawings of CO2 storage system and related equipment including piping diagram and fittings and tank(s)</del></p> <p><del>(J) Risk Assessment - RA</del> <del>- Documents of risk assessment</del></p> <p><u>(J) CO2 Liquefaction system</u> - <u>Detailed drawings of CO2 Liquefaction system and related equipment including piping diagram and fittings and tank(s)</u></p> <p><i>(Omitted)</i></p>	<p>(*) To correct the text to be consistent with the Korean version</p>