Amendments for
Guidance for Prevention System of Pollution from ships

(For External opinion)

2022. 01.

Machinery Rule Development Team

- Main Amendments -

(1) Reflection of IACS URs
<ships contracted for construction on or an application for installation or after 2022/07/01>

◉ UR M77 (Rev.3 Dec 2020) : Ch. 2 Sec. 2

(2) Request for Establishment/Revision of Classification Technical Rules
<ships contracted for construction on or an application for installation or after 2022/07/01>

◉ Update Ch.2 Sec.3 306. 3 & Table 2.3.3 for EGR

◉ Update Ch.3 Sec.2 206. 4 & Table 3.2.4 for EGC

◉ Raising the status of guidelines to guidance for wind assisted propulsion systems and strengthening requirement about equipment and system for ES-Wind1 notation

Present	Amendment	Reason
CHAPTER 2 Nitrogen oxides Emission Abatement System **Section 2 Selective Catalytic Reduction system(SCR)** **205. Handling urea solution as reductant agent** 3. Piping system and venting system of urea solution storage tank *(Omitted)* (2) Reductant tanks are to be of steel or other equivalent material with a melting point above 925℃. Pipes/piping systems are to be of steel or other equivalent material with melting point above 925℃, except downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire; in such case, type approved plastic piping may be accepted even if it has not passed a fire endurance test. Reductant tanks and pipes/piping systems are to be made with a material compatible with reductant or coated with appropriate anti-corrosion coating. *(2020)* *(NEW)*	**CHAPTER 2 Nitrogen oxides Emission Abatement System** **Section 2 Selective Catalytic Reduction system(SCR)** **205. Handling urea solution as reductant agent** 3. Piping system and venting system of urea solution storage tank *(Omitted)* (2) Reductant tanks are to be of steel or other equivalent material with a melting point above 925℃. Pipes/piping systems are to be of steel or other equivalent material with melting point above 925℃, except downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire; in such case, type approved plastic piping may be accepted even if it has not passed a fire endurance test. Reductant tanks and pipes/piping systems are to be made with a material compatible with reductant or coated with appropriate anti-corrosion coating. *(2020)* (3) Material requirement “to be of steel or other equivalent material” in (2) with a melting point above 925 degrees C is not applicable for integral tanks on FRP vessels, provided that the integral tanks are coated and/or insulated with a self-extinguishing material. (4) FRP vessels complying with Regulation 17 of SOLAS Chapter II-2 based upon its associated IMO guidelines (MSC.1/Circ.1574). And FRP vessels exempted from the application of SOLAS e.g., yachts, fast patrol, navy vessels, etc.,, subject to yacht codes or flag regulations.	- UR M77 Rev.3 (Footnote to 2.9)

Present	Reason

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

306. EGR System Equipment

(Omitted)

3. Electrical System

For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply.

(1) Electrical Motors and Controllers

Motors and motor controllers, where class notation **CEmN-EGR(S)** is applied, are to be ceritified in accordance with the relevant requirements specified in **Pt 6** of the Rules. *(2020)*

(Omitted)

309. Survey and Test

1. General

(1) These requirements apply to shop test and onboard test of EGR systems and associated systems. Following tests may be incorporated with the tests required by **Pt 5, Ch 2, 211.** of the Rules.

(2) The components of the EGR are to be tested and inspected in accordance with **Table 2.3.3** below.

Table 2.3.3 Test and Survey for components of EGR

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Control panel/power panel[5]			●
2	Pumps(incl. motor)[1],[6]			●
3	Blowers(incl. motor)[1],[6]			●
4	Scrubber body[2],[6]			●
5	Heat exchanger[3],[6]			●
6	Storage tank for washwater treatment chemical[4],[6]			●

Note.
(Omitted)

Amendment	Reason

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

306. EGR System Equipment

(Omitted)

3. Electrical System

For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply.

(1) Electrical Motors and ~~Controllers~~ controlgears for motors
Motors and controlgears for motors ~~controllers~~, where class notation **CEmN-EGR(S)** is applied, are to be ceritified in accordance with the relevant requirements specified in **Pt 6** of the Rules. *(2020)*

(Omitted)

- To align expression to 'controlgears', taking into account KR Rule Pt.6 and IEC 60050-441

309. Survey and Test

1. General

(1) These requirements apply to shop test and onboard test of EGR systems and associated systems. Following tests may be incorporated with the tests required by **Pt 5, Ch 2, 211.** of the Rules.

(2) The components of the EGR are to be tested and inspected in accordance with **Table 2.3.3** below.

Table 2.3.3 Test and Survey for components of EGR

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Control panel for EGR~~/power panel~~[5]			●
2	Pumps(incl. motors and controlgears for motors)[1],[6]			●
3	Blowers(incl. motors and controlgears for motors)[1],[6]			●
4	Scrubber body[2],[6]			●
5	Heat exchanger[3],[6]			●
6	Storage tank for washwater treatment chemical[4],[6]			●
Note. *(Omitted)*				

Present	Reason

CHAPTER 3 Sulphur oxides Emission Abatement System

Section 2 Exhaust Gas Cleaning system (EGC)

206. EGC System Equipment

4. Electrical Systems

For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply.

(1) Electrical Motors and Controllers (*Applicable when only the* **"CEmS-EGC(S)"** *class notation of* **Table 3.2.1**)
Motors and motor controllers are to be certified in accordance with the relevant requirements specified in **Pt 6** of the Rules.

(Omitted)

209. Survey and Test

1. General

(1) These requirements apply to shop test and onboard test of EGC systems and associated systems. Following tests may be incorporated with the tests required by **Pt 5, Ch 2, 211.** of the Rules.
(2) SECC(SOx Emission Compliance Certificate) may be issued after inspection by the Administration or the Society.
(3) The components of the EGC are to be tested and inspected in accordance with **Table 3.2.4**.

Table 3.2.4. Test and Survey for components of EGC

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Exhaust gas emission monitoring system	●		
2	Washwater emission monitoring system		●	
3	Control panel/power panel[5]			●
4	Pumps(incl. motor)[1],[6]			●
5	Blowers(incl. motor)[1],[6]			●
6	Scrubber body[2],[6],[7]			●
7	Heat exchanger[3],[6]			●
8	Storage tank for washwater treatment chemical[4],[6]			●

Note.
(Omitted)

Amendment	Reason

CHAPTER 3 Sulphur oxides Emission Abatement System

Section 2 Exhaust Gas Cleaning system (EGC)

206. EGC System Equipment

4. Electrical Systems

For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply.

(1) Electrical Motors and ~~Controllers~~ control panel for motors ~~(*Applicable when only the* **"CEmS-EGC(S)"** *class notation of* **Table 3.2.1**)~~
When the "CEmS-EGC(S)" class notation is applied, motors and controlgears for motors ~~controllers~~ are to be certified in accordance with the relevant requirements specified in **Pt 6** of the Rules.

(Omitted)

- To align expression to 'controlgears', taking into account KR Rule Pt.6 and IEC 60050-441

209. Survey and Test

1. General

(1) These requirements apply to shop test and onboard test of EGC systems and associated systems. Following tests may be incorporated with the tests required by **Pt 5, Ch 2, 211.** of the Rules.
(2) SECC(SOx Emission Compliance Certificate) may be issued after inspection by the Administration or the Society.
(3) The components of the EGC are to be tested and inspected in accordance with **Table 3.2.4**.

Table 3.2.4. Test and Survey for components of EGC

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Exhaust gas emission monitoring system	●		
2	Washwater emission monitoring system		●	
3	Control panel for EGC~~/power panel~~[(5)]			●
4	Pumps(incl. motors and controlgears for motors)[(1),(6)]			●
5	Blowers(incl. motors and controlgears for motors)[(1),(6)]			●
6	Scrubber body[(2),(6),(7)]			●
7	Heat exchanger[(3),(6)]			●
8	Storage tank for washwater treatment chemical[(4),(6)]			●

Note.
(Omitted)

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 1 General ### 101. General **1.** This chapter applies to systems for assisting the propulsion performance of ships by using wind power. **1bis.** This ~~guideline~~ chapter focuses on two ~~primary~~ wind technologies assisted propulsion: Flettner rotors ~~and~~ or wing sails(including rigid sails and soft sails). The ships installed those systems are to comply with Section 3. **~~2.~~** ~~This Guideline provides classification requirements for wind assisted propulsion systems on ships. The Guideline is to be used in conjunction with for ship construction and registration.~~ **3.** The wind assisted propulsion system is considered to be a auxiliary propulsion system that supplements the main propulsion system. Therefore, the ship must be fully operable by main propulsion mean(s) and other than wind assisted propulsion systems are to comply ~~in compliance~~ with the requirements of the Society ~~for systems with main propulsion means. Other types of applications can be considered on a case-by-case.~~ **~~4.~~** ~~Ships equipped with wind assisted propulsion systems are to comply with the classification requirements for each applicable notation.~~ ### 102. Definitions The definitions of terms are to follow **Rules for the Classification of Steel Ships**, unless otherwise specified in this chapter. **1.** **"Wind assisted propulsion system"** means an assembly leveraging wind energy for generating thrust force to assist the propulsion of a ship. It includes support structure members, thrust generating members, and drive system. **2.** **"Drive System"** means the system that drives the operation motions of the wind assisted propulsion systems. Typical drive systems include electrical or hydraulic motors with control systems. **3.** **"Support Structure Member"** means the primary support member of the wind assisted propulsion systems that transfer the load from the thrust generating members to the foundation structures. Support structure members could be considered as part of the wind assisted propulsion systems or part of the hull structural foundation. **4.** **"Foundation Structure"** means the stationary part of the installation that is designed to transfer forces and moments experienced by the wind assisted propulsion systems to the deck structures on the vessel.	(*) Raising the status of guidelines to guidance for wind assisted propulsion systems - Deleting 101. 2. due to overlap with 3. - Deleting last sentence of 101. 3. due to overlap with 104.

Present	Amendment	Reason
(NEW)	**CHAPTER 5 Wind Assisted Propulsion Systems** **Section 1 General** **102. Definitions** The definitions of terms are to follow **Rules for the Classification of Steel Ships**, unless otherwise specified in this guideline. **5. "Thrust Generating Member"** means the structural member for the thrust generation of a wind assisted propulsion systems. For example, the thrust generating member of a flettner rotor is the rotating cylinder. The thrust generating member of a wing sail is the sail itself. **6. "Shipboard Installation"** means the process of installing and integrating a wind assisted propulsion system on board the vessel. **7. "Apparent Wind"** means the wind measured from a moving object, which is the combination of the true wind and the wind induced by the vessel movement. **8. "True Wind"** means the wind measured from a motionless object fixed to the ground. ~~**9. "Magnus Effect"** means an observable phenomenon in which a lift force is generated on a rotating cylindrical or spherical object when in a fluid stream.~~ **9. "Flettner Rotor"** means ~~a type of wind assisted propulsion systems that usually features a rotating cylinder/rotor to generate thrust from wind force by the Magnus effect.~~ a rotating cylinder/rotor to generate thrust from wind force by the Magnus effect at wind assisted propulsion systems. **10. "Wing Sail"** means ~~a type of wind assisted propulsion systems that utilizes the pressure difference formed by the air flowing into and across the sail surface to propel the ship forward.~~ sails utilizing a pressure difference formed by the air flowing into and across the sail surface to propel the ship forward at wind assisted propulsion systems. By the type of material used, wing sails can be categorized into: (1) Soft Sails: Usually made of plastic fibers or similar (2) Rigid Sails: Usually made of metal or composite materials **103. Class notations** Ships equipped with wind assisted propulsion systems may be assigned one of the additional installations notation of **ES-Wind** or **ES-Wind1** according to the requirements applicable to the system.	- Deleting the 102. 9. which is not referred to in this chapter - Update the existing 102. 10. and 11. focusing on devices in lieu of a type of wind assisted propulsion system

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 1 General **104. Equivalency** The equivalence of alternative and novel features which deviate from or are not directly applicable to the guideline is to be in accordance with **Pt 1**, **Ch 1**, **105**. of **Rules for the Classification of Steel Ships**. ## Section 2 Survey **201. General** For ships in which the wind assisted propulsion systems are installed, the drawings and documents in **202.** and **203.** are to be submitted to the Society before commencing construction. In addition, if deemed necessary by the Society, additional drawings and data other than those specified below may be requested. **202. Drawings and documents to be submitted** **1.** For **ES-Wind** notation: (1) ~~As a minimum, t~~The following drawings and documents associated with the wind assisted propulsion systems and shipboard installation are to be submitted to the Society for approval. (A) Arrangement of wind assisted propulsion systems (B) Structural drawings of foundation structure (C) Material specification of foundation structure (D) Equipment number calculation (if applicable) (E) Stability data (F) Navigation bridge visibility (G) Operation and control diagram for mobile equipment and storage facilities (if applicable) (H) Details on the impact of the wind assisted propulsion system onboard power load (2) Drawings and data for reference (A) Wind assisted propulsion systems specifications (B) Applied loads for normal operating conditions and extreme conditions used in the design of the foundation structure in accordance with **Ch 3, Sec 2 203.** to **205.** (C) Strength evaluation report of foundation structure	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey **202. Drawings and documents to be submitted** **1.** For **ES-Wind** notation: (3) As a minimum, the following drawings and documents are to be submitted for review and kept on board for easy reference by the crew and the attending Surveyor: (A) Maintenance manual for wind assisted propulsion system (B) Operation manual for wind assisted propulsion system. As a minimum, the operation manual is to include: (a) Description of chain of command with general responsibilities during normal operation (b) All relevant operational conditions and operational window of the wind assisted propulsion system, including operation under different environmental conditions, and measures for emergency shut-off (c) Measures for vessel maneuvering both with and without the wind assisted propulsion system actively running under operating conditions representative of the vessel's operation, including the operation limits of the system and measures under extreme conditions (d) Description of any inherent operational limitations for each mode of operation and for each change in mode of operation (e) Procedure for emergency shutdown of the wind assisted propulsion system (f) Procedures and a list of tools to change the wind assisted propulsion system from normal operation mode to extreme mode(survival mode) in case of control system failure under severe environmental conditions (g) Procedures and a list of tools to restore the wind assisted propulsion system after power failure or emergency shutdown (h) Onboard personnel protection plan (C) Testing procedures of wind assisted propulsion system, including sea trial/commissioning procedures (D) Radar blind sector plan **2.** For **ES-Wind1** notation (1) In addition to the drawings and documents in **1**, the following are to be submitted for the **ES-Wind1** notation: (A) Structural drawings and details of the wind assisted propulsion systems assembly (including support structure members and thrust generating members) (B) Non-destructive inspection plans and records for the steel welding of the supporting structure member and the connection of the supporting structure member and the thrust generating member	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey ### 202. Drawings and documents to be submitted **2.** For **ES-Wind1** notation (1) In addition to the drawings and documents in **1**, the following are to be submitted for the **ES-Wind1** notation: (C) Drawings of slewing ring with strength calculation and details (if applicable) (D) Drawings and data for driving machinery including associated gears. (E) Dimensions, materials, welding details, as applicable, of all torque-transmitting components (shafts, gears, clutches, couplings, coupling bolts, etc.) and all load bearing components (shaft bearings, cable lifter, sheaves, drums, bed-frames, etc.) of the wind assisted propulsion system (F) Electrical system diagrams with components specification (G) Control, alarm, monitoring, and safety systems (H) Hydraulic piping system diagram including system design pressure, relief valve arrangement and settings, materials and typical pipe joint details, if applicable (2) Drawings and materials for reference (A) Material specifications for all structure members (B) Strength evaluation report and load of support structure members (C) Strength calculations for mobile equipment and storage facilities	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey ### 203. Production Survey **1. When the ES-Wind notation is applied:** (1) The inspection of the wind assisted propulsion system is to be carried out at each stage under the responsibility of the manufacturer, according to the manufacturer's own inspection plan, and the report is to be submitted to the Surveyor in charge. And, in accordance with the manufacturer's inspection plan, testing and inspection may be carried out on behalf of the manufacturer by an institution recognized by the manufacturer. (2) The qualifications of welding and non-destructive inspection personnel engaged in all construction and assembly steps are to be defined. (3) The materials used for the foundation structure of the wind assisted propulsion system are to comply with **Pt 2, Ch 1** of **Rules for the Classification of Steel Ships**. **2. When the ES-Wind1 notation is applied:** (1) ~~All wind assisted propulsion systems, including all load bearing support structure members are to be surveyed during construction. Surveys of the wind assisted propulsion system during construction are required to the extent necessary for the Surveyor to determine that the details, including structures, material, mechanical components, welding, and workmanship are acceptable to the Society and are in accordance with the approved drawings.~~ All structure members of wind assisted propulsion systems including load bearing support are to be surveyed during construction to determine that the details for structures, material, mechanical components, welding, and workmanship are acceptable to the Society. (2) The Surveyor is to have access to all material test certificates. All in-factory testing for structural components or assembled components of the wind assisted propulsion system is to be witnessed by the attending Surveyor. (3) The welding procedures are to be submitted to and approved by the Society. (4) Test and inspection of drive systems (A) Each electrical motor and related control gear of 100 kW and more are to be in accordance with **Table 5.2.1**. (B) Each hydraulic motor is to be inspected based on design review in accordance with **Table 5.2.1** and ~~routine tests performed in accordance with~~ **Pt 5, Ch 6, Sec 13** of **Rules for the Classification of Steel Ships** in the presence of a Surveyor. (C) Other components associated with drive systems are to be certified and tested in accordance with **Table 5.2.1**. Where a slewing ring is fitted, surveys at the factory of the slewing ring manufacturer are required.	- Updating sentence to clarify scope of ES-Wind1 notation

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey ### 203. Production Survey **2. When the ES-Wind1 notation is applied:** **Table 5.2.1 Equipment and system subject to the approval and test** (table below) **3. Non-destructive test** (1) When **ES-Wind** notation is applied, non-destructive testing is to be carried out at the welded joints of the foundation structure of wind assisted propulsion systems in accordance with **Pt 2, Ch 2, Annex 2-7** "Guidance for non-destructive testing of ship hull steel welds" of the **Rules for the Classification of Steel Ships** or other approved code. The non-destructive inspection scope and methods are to be submitted with the design drawings. (2) When ES-Wind1 notation is applied, non-destructive testing is to be carried out at the welded joints of the support structure member and the connection part of support structure members and thrust generating members of wind assisted propulsion systems in accordance with **Pt 2, Ch 2, Annex 2-7** "Guidance for non-destructive testing of ship hull steel welds" of the **Rules for the Classification of Steel Ships** or other approved code. The non-destructive inspection scope and methods are be submitted with the design drawings.	- Strengthening requirement about equipment and system for ES-Wind1 notation

No.	Equipment and system ~~subject to the approval and test~~	Drawing approval	Test and inspection
1	Motors~~(1)~~	O(1)	O
2	Control gears for Motors~~(1)~~	O(1)	O
3	Gears~~(2)~~	O(2)	O
4	HPU & Hydraulic equipment	O	O
5	Control, alarm and safety system	O	O

(Notes)
(1) Only applicable for motors of 100 kW and above.
(2) Only applicable for gears of rated output 100 kW and above.

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey ### 203. Production Survey **3. Non-destructive test** ~~(3) Non-destructive testing for identification of internal defects includes radiographic test(RT) and ultrasonic test(UT). Non-destructive testing for surface defects includes magnetic particle test(MT), dye penetration test(PT), eddy current(EC), or alternating current field measurement(AFCM).~~ (3) The method and scope of non-destructive testing for the slewing ring ~~should be specified by the slewing ring manufacturer~~ can be referred to by the manufacturer's recommendation. After hardening and finishing, the bearing ring raceway should be inspected along the entire length by non-destructive testing with surface defect identification. Bearing rings are to be inspected by 100% ultrasonic test for internal defects and the manufacturer is to demonstrate that the material is free of harmful defects that could impair the performance of the slewing ring. Records of non-destructive testing are to be provided to the Surveyor, and additional testing may be requested if deemed necessary. ### 204. Installation Survey The following items are to be verified by the attending Surveyor: **1. Installation and arrangement** (1) Wind assisted propulsion systems is to be installed according to the approved drawings, and attending Surveyor is to confirm the following items. (A) Visual inspection for welded connection of foundation structure and support structure members (B) Non-destructive testing in accordance with **203. 3** **2. Testing** Testing for wind assisted propulsion system is to follow the approved testing procedures and is to include at least the following items: (1) For **ES-Wind** notation: (A) Tests of all the alarms and safety functions (B) Automatic safety shutdown operation (C) Emergency shutdown operation (D) Correct operation of fire detection system and fire extinguishing systems, where provided (2) For **ES-Wind1** notation: (A) Tests for **ES-Wind** notation (B) General examination of machinery, piping, and electrical equipment (see **Ch 4**) (C) Operational tests of machinery, electrical units, and control systems	

Present	Amendment	Reason
(NEW)	**CHAPTER 5 Wind Assisted Propulsion Systems** **Section 2 Survey** **3.** Where the **ES-Wind1** notation is applied to the wind assisted propulsion system fitted with slewing rings: (1) Prior to mounting of the mast, the Surveyor is to witness flatness checks and surface finish requirements to verify compliance with the manufacturer's specifications for the following: (A) Attachment area for slewing ring (B) Slewing ring (C) Mounting flange on pedestal (2) Shimming or surface leveling compounds are not to be used to attain the required level of flatness of the mounting surfaces. (3) During installation, bolts are to be pretensioned by controllable means. Pretensioning, by bolt torque or hydraulic tensioning device, is to be in accordance with the bearing manufacturer's instructions, which are to be submitted for review. Elongation of the bolts is to be measured to verify pretensioning. (4) The Surveyor is to confirm that at least 10% of the bolts meet the bearing manufacturer's instructions. (5) Once wind assisted propulsion system has been mounted, a Rocking Test is to be conducted in accordance with the bearing manufacturer's instructions and the results are to be documented and made available to the attending Surveyor during a periodic survey. **205. Sea trials** The sea trial testing of the wind assisted propulsion system is to be carried out depending on the approved sea trial/commissioning procedures under a wind condition corresponding to the design wind speed in accordance with **Sec 3, 304. 3** (1). Where the wind condition is considered impractical, the wind condition for sea trial testing may be reduced but is subject to approval by the Society. 1. Where the **ES-Wind** notation is applied, the followings are to be verified. (1) The wind assisted propulsion system is able to respond to change of wind conditions as designed, including emergency situations. During the sea trial, installation of the entire wind assisted propulsion system is to be operated in the presence of the Surveyor to demonstrate its reliability and sufficiency to function satisfactorily under operating conditions and its freedom from dangerous vibrations and other detrimental operating phenomena at speeds within the operating range. Based on the sea trial, the following information of the vessel is to be updated and provided on board: (A) Stopping time at astern test (B) Ship headings and distances recorded on sea trials, and (C) For ships with multiple ~~propellers~~ propulsion systems, ability to navigate and maneuver with one ~~or more propellers~~ propulsion system inoperative	- Clarify the meaning of provision

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey **205. Sea trials** The sea trial testing of the wind assisted propulsion system is to be carried out depending on the approved sea trial/commissioning procedures under a wind condition corresponding to the design wind speed in accordance with **Sec 3, 304. 3** (1). Where the wind condition is considered impractical, the wind condition for sea trial testing may be reduced but is subject to approval by the Society. 1. Where the **ES-Wind** notation is applied, the followings are to be verified. (2) The normal operation of the ship is not adversely impacted by the operation of the wind assisted propulsion system, including maneuverability and stability. For the details of recording the maneuvering information from the sea trial, IMO Resolution A.601(15) may be referred to. 2. Where the **ES-Wind1** notation is applied, the control system interaction trials are to be verified. (1) The interactions between the wind assisted propulsion system and the main propulsion and steering systems, and the control system response is to be conducted following the submitted trial plan from the manufacturer. **206. Annual survey** **1.** Where the **ES-Wind** notation is applied, the followings are to be included in the annual survey. (1) Visual inspection of foundation structure of wind assisted propulsion systems for deformation, excessive wear, corrosion, fracture or damage (2) Function test of the safety systems for the wind assisted propulsion system, including emergency stops, locks or release systems for extreme conditions, alarms, and fire detection systems, where fitted **2.** Where the **ES-Wind1** notation is applied, in addition to **1**, the followings are to be included in the annual survey. (1) Visual inspection of support structure members and other structural members of wind assisted propulsion systems for deformation, excessive wear, corrosion, fracture or damage (2) Operation test of the wind assisted propulsion system and the associated control system(s) (3) Where applicable, slewing rings are to be inspected for loose bolts, damaged bearings and deformed or damaged weldments. ~~Locking~~ Rocking tests are performed every 6 months according to the bearing manufacturer's instructions. The results of this test are to be recorded for review by the Surveyor at each annual survey (4) Visual examination and operational test for machinery and gears of wind assisted propulsion system including drive, clutches, brakes and slewing machinery.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 2 Survey **207. Special Surveys** In addition to the annual survey items in **206**, special survey shall include the following items. **1.** For foundation structure of wind assisted propulsion systems with built-up sections with multi-layered plates, sufficient non-destructive testing for surface is to be conducted on any laminated sections to ensure that the sections are firmly attached to prevent buckling and interlayer corrosion. Welding repairs are be conducted only in accordance with the manufacturer's welding procedures. 2. Where **ES-Wind1** notation is applied, the support structure members of wind assisted propulsion systems equipped with a slewing ring, if applicable, are to be undergo following tests and inspections. (1) Inspection for slewing ring including bolt arrangements and foundation for slack bolts, damaged bearings and deformed or damaged weldments. (A) The pretension of the slewing ring bolt is to be checked as required by the manufacturer's onboard documentation. (B) All slewing ring bolts are to be tested (such as hammer test or torque verification) to ensure integrity and tightness. (C) Dismantling and drawing out the slewing ring bolt need not be carried out for inspection, unless considered suspect by Surveyor. (D) All bolts suspected by the Surveyor are to be removed and examined by non-destructive testing. (2) Rocking test (A) The ~~locking~~ rocking test is to be performed in accordance with the bearing manufacturer's recommendations or procedures. If the results of the ~~locking~~ rocking test or grease sample indicate potential bearing wear in excess of manufacturer's recommendations, the bearing is to be replaced. (3) A grease sample is to be taken from the slewing ring bearing for analysis. (A) The grease sample is to be obtained and analyzed in accordance with the manufacturer’s recommendations for the slewing ring bearing. (B) In the absence of other methods, grease analysis for particulate is to be performed in accordance with ASTM D1404.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 301. General **1.** This ~~chapter~~ section provides the minimum requirements for ships with wind assisted propulsion systems installed. Ships in ~~full~~ compliance with the requirements of this ~~chapter~~ section may be assigned an additional notation **ES-Wind**. ### 302. Materials **1.** Materials are to be in accordance with **Pt.2** of the **Rules for the Classification of Steel Ships**. ### 303. Environmental conditions **1.** The design is to take into account the weather conditions, humidity, dust, aggressive media, oil and salt-containing air, exhaust gases and exhaust gas heat, vibrations and other relevant environmental conditions. **2.** Wind assisted propulsion systems including auxiliary machinery and electrical installations, are to be dimensioned with respect to temperature and humidity as listed below: (1) Enclosed spaces (A) Air temperature: 0°C ~ +45°C (B) Relative air humidity: 80% (2) Open deck (A) Air temperature (a) Wind assisted propulsion systems in operation: -10°C ~ +45°C (b) Wind assisted propulsion systems out of operation: -25°C ~ +45°C (B) Relative air humidity (a) 80% and influence of salt spray and green sea ### 304. Design loads **1.** General (1) **2.** and **3.** define the design loads for wind assisted propulsion systems and the ship foundation structure. In addition, the interference effect between the hull of the ship and the global structural behavior of wind assisted propulsion systems is specified. (2) For the structural design, all loads acting on the wind assisted propulsion systems in operation and out of operation state are to be considered.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 304. Design loads **1. General** (3) Wind assisted propulsion systems is affected by aerostatic and aerodynamic forces. In addition, gyroscopic and other inertial effects (e.g. weight imbalance during rotation and due to ship motion) are to be reflected in the rotor design. (A) In operation: Wind assisted propulsion systems is deployed to generate auxiliary propulsion. (B) Out of operation: Wind assisted propulsion systems is not generating auxiliary propulsion (e.g., port mode or extreme conditions). (4) The loads acting on structure of wind assisted propulsion systems and foundation structure are categorized as follows. (A) Normal operating loads (B) Extreme loads **2. Normal operating loads** (1) Wind loads (A) Wind loads is converted into thrust that supports the ship' propulsion, which will be one of the main design characteristics. Wind loads should be considered for wind assisted propulsion systems in operation and out of operation as well as extreme weather conditions. (B) Loads on wind assisted propulsion systems categorized as normal operating loads are derived from the wind speed reflecting the gust effect when wind assisted propulsion systems is in operation (eg, auxiliary propulsion generation). The maximum design wind speed for normal operation should be determined by the designer. (C) The wind load is to be determined using the aerodynamic relationship associated with the actual wind assisted propulsion systems. (D) The wind load acting on wind assisted propulsion systems is to be calculated as the apparent wind speed including the gust effect in which the actual wind speed increases by 25% or more. (E) Technical evidence of adequate lift and drag coefficients and the method used to convert airflow into structural loads is to be provided. (F) Onboard anemometers and vanes that measure the apparent wind speed (and direction) should be in a position that represents the highest sail element with the airflow as unobstructed as possible. (2) Inertia loads (A) Load effects arising from self-weight(mass) and dynamic forces on wind assisted propulsion systems, excited by ship motions in nautical conditions are to be considered. For the installed ship, an appropriate acceleration value is to be determined in accordance with the **Rules for the Classification and Steel Ships**.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS **304. Design loads** **2. Normal operating loads** (3) Other (A) Other loads are as follows, but are not limited thereto. (a) Special operating conditions (b) Global ship vibrations (c) Global ship deformation **3. Extreme load** (1) Wind load (A) When wind assisted propulsion systems is out of operation, extreme wind loads exceeding the normal operating load are generated at the maximum actual wind speed. (B) The maximum actual wind speed is determined by the correlation between the design wind speed and the height. In no case should the design wind speed be less than 51.5 m/s. (C) Wind pressure is based on the drag acting on wind assisted propulsion systems, and can be determined according to the shape of elements of wind assisted propulsion systems subjected to extreme wind loads. (D) The wind pressure acting on the side area of the exposed elements of wind assisted propulsion system is to be applied in the most unfavorable direction and is to be calculated in accordance with **Pt 9, Ch 2, 402, 5** (1) of the **Rules for the Classification of Steel Ships**. (2) Snow and ice load (A) Snow and ice loads are to be considered where applicable. (B) When ice loads are included in the load considerations, the impact of freezing on structural design is to be determined and submitted by the manufacturer. (3) Green sea load Green sea load is to be calculated in accordance with **Pt 13, Ch 4, Sec 5, 4.3** of the **Rules for the Classification of Steel Ships**. (4) Other extreme loads Wind directional instability (magnitude and rate) can be important for some types of wind assisted propulsion systems and is to be addressed where applicable.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS **305. Load combination** **1.** The load to be used in the strength analysis of the structural part is to be the combined load in consideration of the load specified in **304. 2** and **3** so as to be the most severe load on the structural part. **306. Strength and structure** **1.** Structural parts are to be designed to withstand the load combination of **305.** using allowable stress and buckling strength as defined in **Pt 9, Ch 2, 403.** of the **Rules for the Classification of Steel Ships**. **2.** When requested by the Society, fatigue strength evaluation is to be carried out and submitted. **307. Stability** **1.** In the case of existing ships, data on the projected side area that is changed according to the installation of wind assisted propulsion systems is to be submitted, and if necessary, a revision of data related to stability may be requested. **2.** For new ships, it is to be in accordance with **Pt 1, Ch 1, 307.** of the **Rules for the Classification of Steel Ships**. **3.** Additional data may be required for similar wind assisted propulsion systems such as wing sails. **308. Navigation bridge visibility** **1.** Ships equipped with wind assisted propulsion systems are to demonstrate that they meet the bridge visibility requirements in all operating situations in accordance with SOLAS V/Reg.22. If compliance is impractical, alternatives are to be approved by the flag state on a case-by-case basis. **309. Radar blind area** **1.** When the Society issues a cargo ship SE certificate (or equivalent according to the ship type) on behalf of the flag state, it is to demonstrate compliance with the radar blind area requirements. If this certificate is not issued by the Society, radar blind area information is to be provided to the flag state and evidence of acceptance of the flag state is to be provided to the Society. More information on radar blind areas can be found in IMO SN.1/Circ.271 and MSC.192(79).	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 310. Navigation light **1.** The installation of wind assisted propulsion systems is not to violate the requirements for blockage of navigation light and is to comply with the latest COLREG convention requirements. If compliance is impractical, alternative is to be approved by the flag state administration on a case-by-case basis. ### 311. Equipment Number and Equipment **1.** The additional lateral projected area and weight increased by the installation of wind assisted propulsion systems are to be considered when determining the equipment number for anchoring and mooring equipment. **2.** For new ships, the equipment number is to be calculated in accordance with **Pt 4, Ch 8** of the **Rules for the Classification of Steel Ships**. **3.** For ships being converted or modified, the required equipment is to comply with the following. (1) If the equipment letter is increased by one level due to an increase in equipment number, no change is required. (2) If the equipment letter is increased by two levels, the existing equipment can be used if an additional chain of the existing diameter is installed. This additional chain must meet the length requirement of the new equipment number, and the mass of the additional chain must compensate for the increase in the mass of the anchor required for the new equipment number. (Alternatively, the size and length of the existing anchor chain may be allowed as a replacement if worn down to the limit permitted for the size by the new equipment number. However, in this case, new bow anchors are be fitted.) (3) If the equipment letter is increased by three or more levels, new equipment is required. If the anchor catcher can withstand increased loads and chain sizes, or if new anchor catcher equipment is required to meet the revised requirements, it is to be confirmed by the Society. ### 312. Electrical Equipment and Control Systems **1.** It is to be demonstrated that the ship can provide sufficient electrical power for the operation, control, and monitoring of the wind assisted propulsion systems without compromising the safety and operation of the ship. The requirements of electrical systems and electrical equipment for the wind assisted propulsion system installation are to be applied according to **Pt 6, Ch 1** of **Rules for the Classification of Steel Ships**.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 3 BASIC REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 313. Arrangement of control, monitoring, alarm and safety system **1.** The installation of the automated control systems is to be in accordance to **Pt 6, Ch 2** of **Rules for the Classification of Steel Ships**. **2.** The control, monitoring, alarm and safety systems are to be designed to counteract the different operational and environmental conditions to which the ship is subjected. A manually-operated emergency shutdown system is to be provided for the wind assisted propulsion system in case of control system failure. **3.** If the wind assisted propulsion system has additional survival arrangements for extreme environmental conditions besides system shutdown, the control, monitoring, alarm and safety systems are to provide enough warning ahead of time to allow the wind assisted propulsion system to transition from the operating arrangement into the survival arrangement. A manually operated system is to be provided to transition the wind assisted propulsion system from the operating arrangement to the survival arrangement in case of control system failure. **4.** The safety system is to be designed to limit the consequence of failures and the wind assisted propulsion system is to be constructed based on the fail-safe principle. ### 314. Installation in Hazardous Areas **1.** When the wind assisted propulsion systems are installed in a hazardous area, the requirements in **Pt 6**, **Ch 1**, **Sec 1** of **Rules for the Classification of Steel Ships** are to be complied with. ### 315. Crew safety **1.** The crew is to be protected from the potential hazards of moving and rotating parts of the Wind assisted propulsion systems by providing safe passage. ### 316. Fire safety **1.** The space where the drive units for the wind assisted propulsion systems are installed is considered “Other machinery space” and the fire protection arrangements are to be in accordance with **Pt 8** of **Rules for the Classification of Steel Ships**.	

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 4 ADDITIONAL REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 401. General **1.** This ~~chapter~~ section provides additional requirements to be applied to ships that are assigned the **ES-Wind1** notation. **2.** A wind assisted propulsion systems are considered a non-essential service in accordance with **Pt 6, Ch 1, 101.** of **Rules for the Classification of Steel Ships**. The criteria for wind assisted propulsion systems in this ~~chapter~~ section are applicable to features that are permanent and can be verified by plan review, calculation, physical survey, or other appropriate means. **3.** When ships are assigned the ES-Wind1 notation, equipment and systems for wind assisted propulsion systems are to be certified by the Society in accordance with Table 5.2.1. ### 402. Structure design **1.** The structural drawings of wind assisted propulsion systems are to be reviewed by the Society. **2.** The manufacturer is to submit the loads used in the design of all structural members of the wind assisted propulsion systems. The structure of the wind assisted propulsion systems is to be designed to withstand all ship operating conditions and extreme conditions in accordance with **Sec 3. 303.** to **305.** **3.** As a minimum, the load case is to include the cases in **Sec 3, 304. 3** (1) for all structural members. A detailed load analysis report showing the calculation steps for each load component should be submitted for review. **4.** The possibility of fatigue damage due to cyclic loading is to be taken into account in the design of the support structure members of the wind assisted propulsion systems in accordance with the **Rules for the Classification of Steel Ships** or other recognized standards. ### 403. Material *(Omitted)* ### 404. Flettner rotor drive systems **1.** Electrical drive systems delivering rotation torque to ~~the wind assisted propulsion system~~ flettner rotor are to be designed in accordance with **Pt 6, Ch 1, Sec 3** of **Rules for the Classification of Steel Ships**. ~~When gears are fitted, they~~ Gears are to meet the requirements of **Pt 5** of **Rules for the Classification of Steel Ships**. ~~Gears rated 100 kW or more are to be certified by the Society in accordance with **Table 5.2.1**.~~	- Move to 401. 3. (New)

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 4 ADDITIONAL REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS **404. Flettner rotor drive systems** **2.** When hydraulic drive systems transmitted rotating torque to ~~the wind assisted propulsion system~~ flettner rotor are to be certified by the Surveyor in accordance with **Pt 5, Ch 6, Sec 13** of **Rules for the Classification of Steel Ships**. ~~In addition to the required tests from the Classification Technical Rules, hydraulic motors are to be designed based on applicable pressure vessel and piping standards for pressure retaining components, allowable stress for torque components, and recognized standards for seals. The certification requirements are to be in accordance with **Table 5.2.1**.~~ **3.** The drive capability of the wind assisted propulsion systems is to be maintained even after a single failure to the hydraulic drive units. **4.** **Table 5.2.1** provides details for approval of machinery components of a wind assisted propulsion systems. The components are to be reviewed and surveyed based on each specification if not type approved. **5.** Materials used for shafts and gears in power transmission system with a rated output of 100 kW or more are to comply with the relevant requirements in **Pt 2, Ch 1** and **Pt 5, Ch 3** of **Rules for the Classification of Steel Ships**. **6.** When a calculation method other than the method specified in **5**, strength calculation is to be submitted and reviewed by the Society. In this case, the safety factor of the shaft is to be 1.5 of yield strength and 2.0 of minimum tensile strength of the material. And, the safety factor of the gear is applied values for auxiliary gears in **6** (12) and **7** (13) in **Pt 5** of **Annex 5-4**. **405. ~~Swing(Slewing) mechanism~~ Wing sail swing systems** **1.** Where ~~the swing mechanism~~ wing sail swing systems are ~~is~~ installed in the wind assisted propulsion system, it is to be capable of rotating the mast at the maximum wind loads specified in **Sec 3, 304.** The operating method of ~~the swing mechanism~~ wing sail swing systems is to be included in the operation manual of the wind assisted propulsion system. ~~(**See Sec 2, 202. 1** (3) (B) (d))~~ **2.** Materials used for shafts and gears in power transmission system with a rated output of 100 kW or more are to comply with the relevant requirements in **Pt 2, Ch 1** of **Rules for the Classification of Steel Ships**. **3.** One static brake is to be provided for ~~swing(slewing) mechanisms~~ wing sail swing systems at least. **4.** The capacity of installed static brake system is to be capable of holding the mast at the maximum wind direction load.	- Distinguishing 'Drive systems' and 'Swing mechanism' A. Flettner rotor : drive system -> rotating cylinder B. Wing sail : Swing mechanism

Present	Amendment	Reason
(NEW)	# CHAPTER 5 Wind Assisted Propulsion Systems ## Section 4 ADDITIONAL REQUIREMENTS FOR WIND ASSISTED PROPULSION SYSTEMS ### 406. Mobile Equipment and Storage Facilities **1.** Driving parts(hinge, pin, roller, etc.) for mobile equipment and storage facilities are to be had sufficient strength to enable and operate the wind assisted propulsion system when maximum load is applied. The manufacturer is to be submitted a strength calculation for driving parts for reference. **2.** Where mobile equipment and storage facilities are arranged by hydraulic system, it is to have complied with **Pt 5, Ch 6, Sec 13** of **Rules for the Classification of Steel Ships**. **3.** The measures of mobile equipment and storage facilities are to be provided to keep the position. **4.** Suitable arrangements are to be provided for the operation of mobile equipment and storage facilities in the event of an emergency. ### 407. Control, Monitoring, Alarm and Safety System **1.** Control, monitoring, alarm and safety systems are to comply with the requirements of **Pt 6, Ch 2** of **Rules for the Classification of Steel Ships**, as applicable for Category I systems, in accordance with **Pt 6, Ch 2, Table 6.2.2** of **Rules for the Classification of Steel Ships**. **2.** Certification of the control, alarm and safety systems is to be in accordance with **Table 5.2.1**. ⚓	

Amendments for KR Tech. Rule

Guidance for Prevention System of Pollution from ships

2021. 10.

- Main Amendments -

(1) Reflection of IACS URs
<ships contracted for construction on or an application for installation or after 2022/01/01>

◉ UR M77 (Rev.2 Dec 2020) : Ch. 2 Sec. 2 (Addition of published year of referred standards)

◉ UR M81 (New Jan 2021) : Ch. 3 Sec. 2

(2) Request for Establishment/Revision of Classification Technical Rules
<ships contracted for construction on or an application for installation or after 2022/01/01>

◉ Oil filtering equipment for CLEAN3 notation :
Acceptance of Statement of Compliance in lieu of Type approval

◉ Scrubber body inspection : Extension of inspection scope of Scrubber body
(Scrubber which is capable of operating without by-pass arrangement to be inspected regardless of notation)

(3) Etc. <ships contracted for construction on or an application for installation or after 2022/01/01>

◉ Updated texts for clarification meaning of requirements.

Present

CHAPTER 1 Environmental Protection System

Section 4 Environmental Protection System (Ph.3)

401. General

1. For applying phase 3 of environmental protection system, in addition to those in Sec.3, it shall be complied with requirements in this section.
2. The "**CLEAN3**" notation can be applied to the ships when it is complied with this section.
3. Ships applied **CLEAN3** notation are to be available the documents of **Table 1.4.1** onboard.

(Omitted)

Table 1.4.1 Additional documentation requirements for CLEAN3 notation

Items		Plans and documents to be submitted		Certificate/ Statement of Compliance
		For approval	For review	
Marine pollution prevention	Oil	Arrangements of tanks which are to be protected in accordance with **402. 2** of Oil item		Type approval certificate of oil filtering equipment in accordance with **402. 1** of Oil item
Air pollution prevention	Emission to air			Type approval certificate of incinerator in accordance with **403. 3** of Emission to air item

Amendment

CHAPTER 1 Environmental Protection System

Section 4 Environmental Protection System (Ph.3)

401. General

1. For applying phase 3 of environmental protection system, in addition to those in Sec.3, it shall be complied with requirements in this section.
2. The "**CLEAN3**" notation can be applied to the ships when it is complied with this section.
3. Ships applied **CLEAN3** notation are to be available the documents of **Table 1.4.1** onboard.

(Omitted)

Table 1.4.1 Additional documentation requirements for CLEAN3 notation

Items		Plans and documents to be submitted		Certificate/ Statement of Compliance
		For approval	For review	
Marine pollution prevention	Oil	Arrangements of tanks which are to be protected in accordance with **402. 2** of Oil item		Type approval certificate of oil filtering equipment in accordance with **402. 1** of Oil item(1)
Air pollution prevention	Emission to air			Type approval certificate of incinerator in accordance with **403. 3** of Emission to air item

Note
(1) When oil filtering equipment is not applied Type approval in accordance with 402.1, it should get the Statement of Compliance published by this Society after confirmation compliance with requirements. (2022)

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 2 Selective Catalytic Reduction system (SCR) ### 201. General **1. Application** (1) This Guidance applies to the SCR systems, reductant agent tanks and piping systems of reductant agents, etc. using urea or ammonia solutions as the reductant agents to reduce NOx emission from diesel engines. In cases where agents other than those mentioned above are used, they are to be as deemed appropriate by the Society. (2) This Guidance covers only the safety requirements for the installation of SCR systems, the performance and tests, etc. related to SCR systems to reduce NOx emission are to comply with MARPOL Annex VI and Marine Environment Management Act. ~~(3) The requirements in this Guidance are to apply in addition to the other requirements of the Rules.~~ (4) Where a ship designed for the reduction of NOx emissions by the use of Selective Catalytic Reduction system is designed, is to be constructed and tested in accordance with this Guidance, the **CEmN-SCR** notation is to be assigned.	# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 2 Selective Catalytic Reduction system (SCR) ### 201. General **1. Application** (1) This Guidance applies to the SCR systems, reductant agent tanks and piping systems of reductant agents, etc. using urea (e.g. AUS 40 - aqueous urea solution specified in ISO 18611-1:2014) or ammonia solutions as the reductant agents to reduce NOx emission from diesel engines. In cases where agents other than those mentioned above are used, they are to be as deemed appropriate by the Society in a viewpoint of corrosion, fire, and human safety. (2) This Guidance covers only the safety requirements for the installation of SCR systems, the performance and tests, etc. related to SCR systems to reduce NOx emission are to comply with MARPOL Annex VI and Marine Environment Management Act. ~~(3) The requirements in this Guidance are to apply in addition to the other requirements of the Rules.~~ (4) Where a ship designed for the reduction of NOx emissions by the use of Selective Catalytic Reduction system is designed, is to be constructed and tested in accordance with this Guidance, the **CEmN-SCR** notation is to be assigned.

Present	Amendment
CHAPTER 2 Nitrogen oxides Emission Abatement System	**CHAPTER 2 Nitrogen oxides Emission Abatement System**
Section 2 Selective Catalytic Reduction system (SCR)	**Section 2 Selective Catalytic Reduction system (SCR)**
204. System design	**204. System configuration**
2. SCR system	**2. SCR system**
(1) SCR chamber	(1) SCR chamber
(A) SCR chamber is to be arranged so that the back pressure of the exhaust pipes connecting exhaust pipe end of the stack to the engine does not exceed the allowable back pressure recommended by the engine manufacturer.	(A) SCR chamber is to be arranged so that the back pressure of the exhaust pipes connecting exhaust pipe end of the stack to the engine does not exceed the allowable back pressure recommended by the engine manufacturer.
(B) Changeable device of exhaust gas piping	(B) Changeable device of exhaust gas piping (By-pass arrangement for Selective Catalytic Reduction system)
(a) In cases where exhaust gas piping system of the engines can be changed over from ordinary exhaust gas piping to piping connected to the SCR system, dampers are to be provided for each pipes.	(a) In cases where exhaust gas piping system of the engines can be changed over from ordinary exhaust gas piping to piping connected to the SCR system, by-pass arrangements are to be provided for Selective Catalytic Reduction system. *(2022)*
(b) The changeable damper is to be fitted with interlock devices, etc. to prevent the closing of both the exhaust gas piping of ordinary use and the piping supplying exhaust gas to the SCR chamber in the same time.	(b) The changeable damper is to be fitted with interlock devices, etc. to prevent the closing of both the exhaust gas piping of ordinary use and the piping supplying exhaust gas to the SCR chamber in the same time.
(c) The changeable damper is to be fitted with the indicators showing the exhaust gas piping being used.	(c) The changeable damper is to be fitted with the indicators showing the exhaust gas piping being used.
(2) Reductant injection system	(2) Reductant injection system
(A) Injection control system	(A) Injection control system
(b) The amount of injected reductant is to be appropriately controlled depending upon the load of the engines or quantity of NOx emissions in consideration of the temperature of the exhaust gas at the inlet of the SCR chamber and the sulphur content concentration in the fuel oil.	(b) The amount of injected reductant is to be appropriately controlled depending upon the load of the engines or quantity of NOx emissions in consideration of the temperature of the exhaust gas at the inlet of the SCR chamber ~~and the sulphur content concentration in the fuel oil~~.

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System	# CHAPTER 2 Nitrogen oxides Emission Abatement System
## Section 2 Selective Catalytic Reduction system (SCR)	## Section 2 Selective Catalytic Reduction system (SCR)
205. Handling urea solution as reductant agent	**205. Handling urea solution as reductant agent**
1. Urea solution storage tank	**1. Urea solution storage tank**
(1) The storage tank is to be arranged so that any leakage will be contained and prevented from making contact with heated surfaces. All pipes or other tank penetrations are to be provided with manual closing valves attached to the tank. (2) The storage tank may be located within the engine room. (3) The storage tank is to be protected from excessively high or low temperatures applicable to the particular concentration of the solution. Depending on the operational area of the ship, this may necessitate the fitting of heating and/or cooling systems. The physical conditions recommended by applicable recognized standards (such as ISO 18611-3) are to be taken into account to ensure that the contents of the aqueous urea tank are maintained to avoid any impairment of the urea solution during storage.	(1) The storage tank is to be arranged so that any leakage will be contained and prevented from making contact with heated surfaces. All pipes or other tank penetrations are to be provided with manual closing valves attached to the tank. (2) The storage tank may be located within the engine room. (3) The storage tank is to be protected from excessively high or low temperatures applicable to the particular concentration of the solution. Depending on the operational area of the ship, this may necessitate the fitting of heating and/or cooling systems. The physical conditions recommended by applicable recognized standards (such as ISO 18611-3:2014) are to be taken into account to ensure that the contents of the aqueous urea tank are maintained to avoid any impairment of the urea solution during storage.
(Omitted)	*(Omitted)*
4. Safety & Protective equipment	**4. Safety & Protective equipment**
(1) For the protection of crew members, the ship is to have on board suitable protective equipment consisting of large aprons, rubber gloves with long sleeves, rubber boots, coveralls of chemical-resistant material, and tight-fitting chemical safety goggles or face shields or both. And, the quantity to be supplied is to be at least two sets.	(1) For the protection of crew members, the ship is to have on board suitable protective equipment such as large aprons, rubber gloves with long sleeves, rubber boots, coveralls of chemical-resistant material, and tight-fitting chemical safety goggles or face shields or both. And, the quantity to be supplied is to be at least two sets. Eyewash are to be provided, the location and number of these eyewash stations are to be derived from the detailed installation arrangements. *(2022)*

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System	# CHAPTER 2 Nitrogen oxides Emission Abatement System
## Section 2 Selective Catalytic Reduction system (SCR)	## Section 2 Selective Catalytic Reduction system (SCR)
206. Handling ammonia solution as reductant agent	**206. Handling ammonia solution as reductant agent**
1. General	**1. General**
(1) Ammonia is not to be used as a reductant in a SCR except where it can be demonstrated that it is not practicable to use a urea based reductant. Where an application is made to use aqueous ammonia as the reductant then the arrangements for its loading, carriage and use are to be derived from a risk based analysis.	(1) Aqueous ammonia (28% or less concentration of ammonia) is not to be used as a reductant in a SCR except where it can be demonstrated that it is not practicable to use a urea based reductant. (2) Anhydrous ammonia (99.5% or greater concentration of ammonia by weight) is not to be used as a reductant in a SCR except where it can be demonstrated that it is not practicable to use a urea based reductant and where the Flag Administration agrees to its use. Where it is not practicable to use a urea reductant then it is also to be demonstrated that it is not practicable to use aqueous ammonia. *(2022)* (3) Where an application is made to use ~~aqueous~~ ammonia as the reductant then the arrangements for its loading, carriage and use are to be derived from a risk based analysis.
(Omitted)	*(Omitted)*
6. Drain tanks	**6. Drain tanks**
(1) Drain tanks which comply with the following are to be installed at a lower position than ammonia solution installation compartments. (A) In cases where the drainage accumulated in the tank is to be discharged overboard, it is to be diluted or neutralized before discharge. (B) An drain trap is to be arranged to prevent the reverse flow of the gas from the tanks. (C) All the vent pipes of the tank are to be connected to the exhaust pipe of the ventilation system.	(1) Drain tanks which comply with the following are to be installed at a lower position than ammonia solution installation compartments. (A) In cases where the drainage accumulated in the tank is to be discharged overboard, it is to be diluted or neutralized before discharge. (B) An drain trap is to be arranged to prevent the reverse flow of the gas from the tanks. (2) All the vent pipes of the tank are to be connected to the exhaust pipe of the ventilation system.

Present	Amendment
CHAPTER 2 Nitrogen oxides Emission Abatement System	**CHAPTER 2 Nitrogen oxides Emission Abatement System**
Section 2 Selective Catalytic Reduction system (SCR)	**Section 2 Selective Catalytic Reduction system (SCR)**
206. Handling ammonia solution as reductant agent	**206. Handling ammonia solution as reductant agent**
8. Ammonia solution supply system	**8. Ammonia solution supply system**
(1) Ammonia solution supply piping is not to pass through accommodation spaces, service spaces or control stations. Ammonia solution supply piping may pass through or extend into spaces other than ones in spaces above provided they comply with the following:	(1) Ammonia solution supply piping is not to pass through accommodation spaces, service spaces or control stations. Ammonia solution supply piping may pass through ~~or extend into~~ spaces other than ones in spaces above provided they comply with the following: *(2022)*
(Omitted)	*(Omitted)*
(C) The ventilation system may double as the one required for ammonia solution installation compartments. In this case, the capacity of the system is to be of 30 air changes per hour for both the ammonia solution installation compartment and the space specified in (a) above.	(C) The ventilation system may double as the one required for ammonia solution installation compartments. In this case, the capacity of the system is to be of 30 air changes per hour for both the ammonia solution installation compartment and the space specified in (A) above.
(Omitted)	*(Omitted)*
(G) Ammonia solution leaked from ammonia solution supply pipes is to be led to drain tanks. This drain tank can double as tanks which accumulate ammonia solution leaked from ammonia solution installation compartments.	(G) Ammonia solution leaked from ammonia solution supply pipes is to be led to drain tanks in 6. This drain tank can double as tanks which accumulate ammonia solution leaked from ammonia solution installation compartments.

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System	# CHAPTER 2 Nitrogen oxides Emission Abatement System
## Section 2 Selective Catalytic Reduction system (SCR)	## Section 2 Selective Catalytic Reduction system (SCR)
206. Handling ammonia solution as reductant agent	**206. Handling ammonia solution as reductant agent**
11. Gas detection and alarm system (1) Gas detection and alarm systems are to be provided in ammonia solution installation compartments, spaces adjacent to ammonia solution storage tanks which form part of the ship's hull and the empty spaces in the double wall pipes or ducts specified in **8.** (1) (A) above complying with the following requirements : (A) The gas detector complying with the requirements given below, is to be installed on the upper-side of each ammonia solution installation compartment and at the ventilation outlet of the double wall pipes or ducts. (a) The detectors are to activate an alarm when the gas concentration exceeds 25 *ppm*. (b) When the gas concentration exceeds 300 *ppm*, the detector is to automatically stop the ammonia solution supply pumps, automatically close the main valves of ammonia solution storage tanks, and activate the alarm. (B) Regardless of (a) above, in cases where mechanical ventilation system for double wall pipes or ducts doubles as the one for the ammonia solution installation compartment, the gas detection and alarm system required for the double wall pipes or ducts may double as the one for the ammonia solution installation compartment.	**11. Gas detection and alarm system** (1) Gas detection and alarm systems are to be provided in ammonia solution installation compartments, spaces adjacent to ammonia solution storage tanks which form part of the ship's hull and the empty spaces in the double wall pipes or ducts specified in **8.** (1) (A) above complying with the following requirements : (A) The gas detector complying with the requirements given below, is to be installed on the upper-side of each ammonia solution installation compartment and at the ventilation outlet of the double wall pipes or ducts. (a) The detectors are to activate an alarm when the gas concentration exceeds 25 *ppm*. (b) When the gas concentration exceeds 300 *ppm*, the detector is to automatically stop the ammonia solution supply pumps, automatically close the main valves of ammonia solution storage tanks, and activate the alarm. (B) Regardless of (A) above, in cases where mechanical ventilation system for double wall pipes or ducts doubles as the one for the ammonia solution installation compartment, the gas detection and alarm system required for the double wall pipes or ducts may double as the one for the ammonia solution installation compartment.

Present

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

302. Notation

1. Where a ship designed for the reduction of NOx emissions by the use of Exhaust Gas Recirculation system is designed, constructed and tested in accordance with this Guidance, the **CEmN-EGR** notation of **Table 2.3.1** is to be assigned.

Table 2.3.1. Class Notation of EGR

No.	Notation	relevant requirements
1	**CEmN-EGR**	All requirements of **Section 3 EGR** Excluding the relevant requirements of No. **2** and **3** of this table
2	**CEmN-EGR(R)**	In addition to relevant requirements of **CEmN-EGR**, provisions of **304. 3**(redundancy requirements)
3	**CEmN-EGR(S)**	In addition to relevant requirements of **CEmN-EGR**, paragraphs **2~6** of **Table 2.3.3**(Type approval or test/survey requirements)

Amendment

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

302. Notation

1. Where a ship designed for the reduction of NOx emissions by the use of Exhaust Gas Recirculation system is designed, constructed and tested in accordance with this Guidance, the **CEmN-EGR** notation of **Table 2.3.1** is to be assigned.

Table 2.3.1. Class Notation of EGR

No.	Notation	relevant requirements
1	**CEmN-EGR**	All requirements of **Section 3 EGR** Excluding the relevant requirements of No. **2** and **3** of this table
2	**CEmN-EGR(R)**	In addition to relevant requirements of **CEmN-EGR**, provisions of **305. 3**(redundancy requirements)
3	**CEmN-EGR(S)**	In addition to relevant requirements of **CEmN-EGR**, paragraphs **2~6** of **Table 2.3.3**(Type approval or test/survey requirements)

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) **307. EGR System Piping** **2. Washwater Piping** (1) Piping and Connections (from ... to) (D) Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters or propellers.	# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) **307. EGR System Piping** **2. Washwater Piping** ~~(1) Piping and Connections~~ ~~(from ... to)~~ ~~(D) Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters or propellers.~~ Washwater piping shall comply with 207. 2 of Chapter 3 of the Guidance. *(2022)*

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) **307. EGR System Piping** *(New)* **3. Chemical Treatment Piping Systems** The requirements for the washwater chemical treatment system detailed in this paragraph are based on the use of Caustic Soda (NaOH) in the EGR scrubber water treatment system, as applicable. If other chemicals are to be used, the requirements should be consistent with the intent of the requirements for Caustic Soda but would need to be assessed on a case-by-case basis. (from ... to) (C) Eyewasher and safety showers are to be provided near the bunker manifold and the process fluid transfer pump. If several bunker manifolds are installed on the same deck, one could be installed if the bunker manifold can be easily accessed to eyewasher and safety shower from the bunker manifold. The treatment fluid transfer pump can be applied in the same manner as the bunker manifold.	# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) **307. EGR System Piping** **3. Chemical Storage Tank** ***(2022)*** Chemical storage tank for washwater system shall comply with 207. 3 of Chapter 3 of the Guidance. *(2022)* **4. Chemical Treatment Piping Systems** Chemical Treatment Piping Systems using NaOH or Ca(OH)2 in water treatment system shall comply with 207. 4 of Chapter 3 of the Guidance. *(2022)* ~~The requirements for the washwater chemical treatment system detailed in this paragraph are based on the use of Caustic Soda (NaOH) in the EGR scrubber water treatment system, as applicable. If other chemicals are to be used, the requirements should be consistent with the intent of the requirements for Caustic Soda but would need to be assessed on a case-by-case basis.~~ ~~(from ... to)~~ ~~(C) Eyewasher and safety showers are to be provided near the bunker manifold and the process fluid transfer pump. If several bunker manifolds are installed on the same deck, one could be installed if the bunker manifold can be easily accessed to eyewasher and safety shower from the bunker manifold. The treatment fluid transfer pump can be applied in the same manner as the bunker manifold.~~

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) ### 307. EGR System Piping **4. Residue System** (1) The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities in accordance with **MARPOL Annex I, Ch III, Reg.13**. The EGR residue tank is to be so designed as to facilitate cleaning. Where EGR residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of **206.(3)** of this Guidance are to be applied. (from ... to) (5) Sounding arrangements are to be provided for the EGR residue tank in accordance with **Pt 5, Ch 6, 203.** and **Pt 8, Ch 2, Sec 1** of the Rules.	# CHAPTER 2 Nitrogen oxides Emission Abatement System ## Section 3 Exhaust Gas Recirculation system (EGR) ### 307. EGR System Piping **5. Residue System** Residue system shall comply with 207. 5 of Chapter 3 of the Guidance. *(2022)* ~~(1) The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities in accordance with **MARPOL Annex I, Ch III, Reg.13**. The EGR residue tank is to be so designed as to facilitate cleaning. Where EGR residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of **206.(3)** of this Guidance are to be applied.~~ ~~(from ... to)~~ ~~(5) Sounding arrangements are to be provided for the EGR residue tank in accordance with **Pt 5, Ch 6, 203.** and **Pt 8, Ch 2, Sec 1** of the Rules.~~

Present	Amendment
# CHAPTER 2 Nitrogen oxides Emission Abatement System	# CHAPTER 2 Nitrogen oxides Emission Abatement System
## Section 3 Exhaust Gas Recirculation system (EGR)	## Section 3 Exhaust Gas Recirculation system (EGR)
308. Control, Alarm, and Monitoring System	308. System Design
2. Control and Monitoring System	2. Control and Monitoring System
(2) The temperatures, pressures and flows in the EGR system and associated systems are to be controlled and monitored as follows:	(2) The temperatures, pressures and flows in the EGR system and associated systems are to be controlled and monitored as follows:
(C) Indications of parameters necessary for the safe and effective operation of the exhaust emission abatement process are to be provided at the local and, as applicable, remote control stations, as per **Table 2.3.2 of this Guidance and are to include the following parameters:**	(C) Indications of parameters necessary for the safe and effective operation of exhaust gas recirculation system are to be provided at the local and, as applicable, remote control stations, as per **Table 2.3.2 of this Guidance and are to include the following parameters:**
(Omitted)	*(Omitted)*
3. Safety Shutdown System	3. Safety Shutdown System
(1) An independent shutdown system is to be provided. This safety shutdown system is to be based on the following: (A) Means are to be provided to indicate the parameters causing shutdown. (B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is reset.	(1) An independent shutdown system is to be provided. The automatic safety shutdown system is to be based on the following: (A) Means are to be provided to indicate the parameters causing shutdown. (B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is reset manually.

Present

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

Table 2.3.3 Test and Survey for components of EGR

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Control panel/power panel(4)			●
2	Pumps(incl. motor)(1),(5)			●
3	Blowers(incl. motor)(1),(5)			●
4	Scrubber body(2),(5)			●
5	Heat exchanger(2),(5)			●
6	Storage vessels for washwater treatment medium(3),(5)			●

Note.
(1) Components for the continual operation of the EGR are to be tested in accordance with the requirements specified in **Pt 5, Ch 6 & Pt 6** of the Rules.
(2) Non-destructive testing is to be carried out on the welded parts of the equipment constituting the following exhaust gas cleaning system, and the hydrostatic test is to be carried out at a pressure 1.5 times the design pressure.

(New)
(3) Storage vessels 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.
(4) Where equipment specified in Guidance **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/power panel. (See Guidance **Pt 6, Ch 1 and Ch 2, 301.1**)
(5) For the applicable class notation '**CEmN-EGR(S)**' in **Table 2.3.1**

Amendment

CHAPTER 2 Nitrogen oxides Emission Abatement System

Section 3 Exhaust Gas Recirculation system (EGR)

Table 2.3.3 Test and Survey for components of EGR

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Control panel/power panel(5)			●
2	Pumps(incl. motor)(1),(6)			●
3	Blowers(incl. motor)(1),(6)			●
4	Scrubber body(2),(6)			●
5	Heat exchanger(3),(6)			●
6	Storage tank for washwater treatment chemical(4),(6)			●

Note.
(1) Components for the continual operation of the EGR are to be tested in accordance with the requirements specified in **Pt 5, Ch 6 & Pt 6** of the Rules.
(2) 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)*
(3) It shall be inspected based on the Rule of Pt 5 Ch 5 Sec 3. *(2022)*
(4) 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.
(5) Where equipment specified in Guidance **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/power panel. (See Guidance **Pt 6, Ch 1 and Ch 2, 301.1**)
(6) For the applicable class notation '**CEmN-EGR(S)**' in **Table 2.3.1**

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **205. EGC System Configuration** **3. Redundancy** *(Applicable when only the* **"CEmS-EGC(R)"** *class notation of* **Table 3.2.1***)* (1) Redundancy of equipment is to be provided for those rotating and reciprocating components that form part of the EGC essential supplementary systems, such as pumps, fans, blowers, etc. (2) Consideration will be given to alternative means of compliance or operation to meet above (A) on a case-by-case basis. As applicable, documentation is to be submitted demonstrating that the reliability of the system or component provides continued serviceability of the exhaust gas cleaning system or the alternative means of operation provides continued compliance with the statutory environmental requirements, without compromising the vessel propulsion and maneuvering capability.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **205. EGC System Configuration** **3. Redundancy** *(Applicable when only the* **"CEmS-EGC(R)"** *class notation ~~of~~* **~~Table 3.2.1~~***)* (1) Redundancy of equipment is to be provided for those rotating and reciprocating components that form part of the EGC essential supplementary systems, such as pumps, fans, blowers, etc. (2) Consideration will be given to alternative means of compliance or operation to meet above (1) on a case-by-case basis. As applicable, documentation is to be submitted demonstrating that the reliability of the system or component provides continued serviceability of the exhaust gas cleaning system or the alternative means of operation provides continued compliance with the statutory environmental requirements, without compromising the vessel propulsion and maneuvering capability.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **206. EGC System Equipment** **4. Electrical Systems** For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply. (1) Electrical Motors and Controllers (*Applicable when only the* **"CEmS-EGC(S)"** *class notation of* **Table 3.2.1**) Motors and motor controllers are to be certified in accordance with the relevant requirements specified in **Pt 6** of the Rules. (2) Standby Pump/Fan The standby pumps and blowers, where redundancy is provided according to the **205. 3. (1)**, are to be automatically started and put into service. This failure is to be alarmed at the local and remote control stations. (3) Circuit Protection Devices Circuit breakers are to be installed for miscellaneous EGC system electrical loads and are to be compatible with the prospective short circuit current level calculated at the switchboards.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **206. EGC System Equipment** **4. Electrical Systems** For items not specified in this Guidance, the relevant requirements specified in **Pt 6** of the Rules apply. (1) Electrical Motors and Controllers (*Applicable when only the* **"CEmS-EGC(S)"** *class notation of* ~~**Table 3.2.1**~~) Motors and motor controllers are to be certified in accordance with the relevant requirements specified in **Pt 6** of the Rules. (2) Standby Pump/Fan The standby pumps and blowers, where redundancy is provided according to the **205. 3.** ~~**(1)**~~, are to be automatically started and put into service. This failure is to be alarmed at the local and remote control stations. (3) Circuit Protection Devices Circuit breakers are to be installed for miscellaneous EGC system electrical loads and are to be compatible with the prospective short circuit current level calculated at the switchboards.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) ### 207. EGC System Piping **1. Exhaust Gas Piping Systems** (1) Exhaust Gas Piping/Scrubber Materials (A) Exhaust gas piping materials located before the EGC SOx scrubber, where fitted, may be of the same material specification as the standard fuel oil combustion machinery exhaust gas piping. (B) The sections of the scrubber that are subjected to washwater (e.g. the interior reaction chamber or washwater piping/nozzles, etc.) are to be constructed of suitable corrosion resistant materials. (C) Exhaust gas piping materials used after the SOx scrubber unit are to be of a corrosion resistant material such as stainless steel or a corrosion resistant material suitable for application. (D) Exhaust gas pipings are to comply with **Sec 1** and **Sec 6** in **Ch 6 Pt 5** of the Rules. (New)	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) ### 207. EGC System Piping **1. Exhaust Gas Piping Systems** (1) Exhaust Gas Piping/Scrubber Materials (A) Exhaust gas piping materials located before the EGC SOx scrubber, where fitted, may be of the same material specification as the standard fuel oil combustion machinery exhaust gas piping. (B) The sections of the scrubber that are subjected to washwater (e.g. the interior reaction chamber or washwater piping/nozzles, etc.) are to be constructed of suitable corrosion resistant materials. (C) Exhaust gas piping systems after the SOx scrubber unit are to be of a corrosion resistant material such as stainless steel or to be coated with a suitable corrosion resistant materials. (D) Exhaust gas pipings are to comply with **Sec 1** and **Sec 6** in **Ch 6 Pt 5** of the Rules. **3. Chemical Storage Tank** ***(2022)*** (1) The storage tank for chemical treatment fluids is to be arranged so that any leakage will be contained and prevented from making contact with heated surfaces. All pipes or other tank penetrations are to be provided with manual closing valves attached to the tank. In cases where such valves are provided below top of tank, they are to be arranged with quick acting shutoff valves which are to be capable of being remotely operated from a position accessible even in the event of chemical treatment fluid leakages. Tank and piping arrangements are to be approved. (2) The storage tank may be located within the engine room.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** (New)	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** **3. Chemical Storage Tank *(2022)*** (3) The storage tank is to be protected from excessively high or low temperatures applicable to the particular concentration chemical treatment fluids. Depending on the operational area of the ship, this may necessitate the fitting of heating and/or cooling systems. (4) Each storage tank for chemical treatment fluids is to be provided with level monitoring arrangements and high/low level alarms. In cases where heating and/or cooling systems are provided, high and/or low temperature alarms or temperature monitoring are also to be provided accordingly. (5) The storage tanks are to have sufficient strength to withstand a pressure corresponding to the maximum height of a fluid column in the overflow pipe, with a minimum of 2.4 m above the top plate taking into consideration the specific density of the treatment fluid. (6) Where chemical treatment fluid is stored in integral tanks, the following are to be considered during the design and construction: (A) These tanks may be designed and constructed as integral part of the hull, (e.g. double bottom, wing tanks). (B) These tanks are to be coated with appropriate anti-corrosion coating and are to be segregated by cofferdams, void spaces, pump rooms, empty tanks or other similar spaces so as to not be located adjacent to accommodation, cargo spaces containing cargoes which react with chemical treatment fluids in a hazardous manner as well as any food stores, oil tanks and fresh water tanks. (C) These tanks are to be designed and constructed as per the structural requirements applicable to hull and primary support members for a deep tank construction. (D) These tanks are to be included in the ship’s stability calculation.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** (New) **3. Chemical Treatment Piping Systems** The requirements for the washwater chemical treatment system detailed in this paragraph are based on the use of Caustic Soda (NaOH) in the EGC scrubber water treatment system, as applicable. If other chemicals are to be used, the requirements should be consistent with the intent of the requirements for Caustic Soda but would need to be assessed on a case-by-case basis.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** **3. Chemical Storage Tank *(2022)*** (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. (8) Arrangement of Tank (A) The NaOH storage and EGC residue/NaOH overflow tank are not to be situated where spillage or leakage therefrom can constitute a hazard by falling onto combustibles or heated surfaces. In particular, these tanks are not to be located over boilers or in close proximity to steam piping. **4. Chemical Treatment Piping Systems** The requirements are for the washwater chemical treatment system detailed in this paragraph are based on the use of using NaOH or Ca(OH)2 in the EGC scrubber water treatment system~~, as applicable.~~ If other chemicals are to be used, ~~the requirements should be consistent with the intent of the requirements for taking equivalent safety level of human life Caustic Soda but would need to be assessed on a case-by-case basis.~~ measures are to be derived from a risk based analysis for equivalent safety level with requirements in 4 to diminish hazardous to human life.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System	# CHAPTER 3 Sulphur oxides Emission Abatement System
## Section 2 Exhaust Gas Cleaning system (EGC)	## Section 2 Exhaust Gas Cleaning system (EGC)
207. EGC System Piping	**207. EGC System Piping**
3. Chemical Treatment Piping Systems	**4. Chemical Treatment Piping Systems**
(1) Material (New)	(1) General (A) Regardless of design pressure and temperature, piping systems containing chemical treatment fluids only are to comply with the requirements applicable to Class I piping systems as per the Rule of Part 5 Chapter 6. As far as practicable, e.g. except for the flange connections that connect to tank valves, the piping systems are to be joined by welding. *(2022)*
(A) The material of the NaOH related piping systems, NaOH storage tank, EGC residue/NaOH overflow tanks, drip trays, and any other components which may come into contact with the NaOH solution or sludge is to be of a suitable grade of stainless steel or products coated with corrosion-resistant materials established to be suitable for the application. Aluminum, zinc, brass, or galvanized steel components are not to be used.	(B) The material of the NaOH related piping systems, NaOH storage tank, EGC residue/NaOH overflow tanks, drip trays, and any other components which may come into contact with the NaOH solution or sludge is to be of steel or other equivalent material with a melting point above 925 degrees C. Storage tanks and pipes/piping systems for chemical treatment fluids are to be made with a material compatible with chemical treatment fluids, or coated with appropriate anti-corrosion coating. Aluminum, zinc, brass, or galvanized steel components are not to be used. *(2022)*
(Omitted)	*(Omitted)*
(3) Arrangement of Tank (A) The NaOH storage and EGC residue/NaOH overflow tank are not to be situated where spillage or leakage therefrom can constitute a hazard by falling onto combustibles or heated surfaces. In particular, these tanks are not to be located over boilers or in close proximity to steam piping.	~~(3) Arrangement of Tank~~ ~~(A) The NaOH storage and EGC residue/NaOH overflow tank are not to be situated where spillage or leakage therefrom can constitute a hazard by falling onto combustibles or heated surfaces. In particular, these tanks are not to be located over boilers or in close proximity to steam piping.~~

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** **3. Chemical Treatment Piping Systems** (4) Air Pipes, Overflow Pipes and Sounding Devices (B) The NaOH storage and EGC residue/NaOH overflow tanks are to be provided with air pipes complying with **Pt 5, Ch 6, Sec. 2** of the Rules, and the outlets are to terminate in a safe location on weather deck . *(Omitted)* (5) Spill Trays (B) Either drainage arrangements for the spill tray that lead to the dedicated EGC residue/ NaOH overflow tank are to be provided or arrangements to activate an alarm in the event of spillage are to be provided. Where drainage arrangements are provided, the drain line to the EGC residue/NaOH overflow tank is to be fitted with a non-return valve.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) **207. EGC System Piping** **4. Chemical Treatment Piping Systems** (4) Air Pipes, Overflow Pipes and Sounding Devices (B) The NaOH storage and EGC residue/NaOH overflow tanks are to be provided with air pipes complying with **Pt 5, Ch 6, Sec. 2** of the Rules, and the outlets are to terminate in a safe location on weather deck and the tank venting system is to be arranged to prevent entrance of water into the tank for chemical treatment fluids. *(2022)* *(Omitted)* (5) Spill Trays (B) Either drainage arrangements for the spill tray that lead to the dedicated EGC residue/ NaOH overflow tank which are fitted with high level alarm are to be provided or arrangements to activate an alarm in the event of spillage are to be provided. Where drainage arrangements are provided, the drain line to the EGC residue/NaOH overflow tank is to be fitted with a non-return valve.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 3. Chemical Treatment Piping Systems (6) Miscellaneous Piping (E) Supply, bunkering, and transfer lines for NaOH systems are not to be located over boilers or in close proximity to steam piping, exhaust systems, hot surfaces required to be insulated, or other sources of ignition. (New)	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 4. Chemical Treatment Piping Systems (6) Miscellaneous Piping (E) Supply, bunkering, and transfer lines for NaOH systems are not to be located over boilers or in close proximity to steam piping, exhaust systems, hot surfaces required to be insulated, or other sources of ignition. (F) The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities in accordance with MARPOL Annex I, Ch III, Reg.13. *(2022)*

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 3. Chemical Treatment Piping Systems (7) Ventilation (A) If a NaOH 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 accommodation, service spaces, or control stations. The ventilation system is to be capable of being controlled from outside the compartment and is to be maintained in operation continuously except when the storage tank is empty and has been thoroughly air purged. If the ventilation stops, an audible and visual alarm shall be provided outside the compartment adjacent to each point of entry and inside the compartment, together with a warning notice requiring the use of such ventilation. Alternatively, where a urea storage tank is located within an engine room a separate ventilation system is not required when the general ventilation system for the space 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.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 4. Chemical Treatment Piping Systems (7) Ventilation (A) If a NaOH 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 accommodation, service spaces, or control stations. The ventilation system is to be capable of being controlled from outside the compartment and is to be maintained in operation continuously except when the storage tank is empty and has been thoroughly air purged. If the ventilation stops, an audible and visual alarm shall be provided outside the compartment adjacent to each point of entry and inside the compartment, together with a warning notice requiring the use of such ventilation. (B) Where a urea storage tank is located within an engine room a separate ventilation system is not required when the general ventilation system for the space providing not less than 6 air changes per hour 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.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System	# CHAPTER 3 Sulphur oxides Emission Abatement System
## Section 2 Exhaust Gas Cleaning system (EGC)	## Section 2 Exhaust Gas Cleaning system (EGC)
207. EGC System Piping	207. EGC System Piping
3. Chemical Treatment Piping Systems	4. Chemical Treatment Piping Systems
(7) Ventilation	(7) Ventilation
(New)	(D) The requirements specified in (A) also apply to closed compartments normally entered by persons: *(2022)* (a) when they are adjacent to the integral storage tank for chemical treatment fluids and there are possible leak points (e.g. manhole, fittings) from these tanks; or (b) when the treatment fluid piping systems pass through these compartments, unless the piping system is made of steel or other equivalent material with melting point above 925 degrees C and with fully welded joints.
(8) Personnel Protection (A) For the protection of crew members, the vessel shall have on board suitable protective equipment consisting of large aprons, rubber gloves with long sleeves, rubber boots, coveralls of chemical-resistant material, and tight-fitting chemical safety goggles or face shields or both. And, the quantity to be supplied is to be at least two sets.	(8) Personnel Protection (A) For the protection of crew members, the vessel shall have on board suitable protective equipment consisting of ~~large~~ aprons, ~~rubber~~ gloves with long sleeves, ~~rubber~~ boots, coveralls of chemical-resistant material, and ~~tight-fitting~~ chemical safety goggles or face shields or both. And, the quantity to be supplied is to be at least two sets.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 3. Chemical Treatment Piping Systems (8) Personnel Protection (C) Eyewasher and safety showers are to be provided near the bunker manifold and the process fluid transfer pump. If several bunker manifolds are installed on the same deck, one could be installed if the bunker manifold can be easily accessed to eyewasher and safety shower from the bunker manifold. The treatment fluid transfer pump can be applied in the same manner as the bunker manifold. And, if the treatment fluid transfer pump is shielded by a structure capable of visual surveillance, one eyewasher and safety showers could be installed in the installation area.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) 207. EGC System Piping 4. Chemical Treatment Piping Systems (8) Personnel Protection (C) Eyewasher and safety showers are to be provided near the bunker manifold and the process fluid transfer pump. If several bunker manifolds are installed on the same deck, one could be installed if the bunker manifold can be easily accessed to eyewasher and safety shower from the bunker manifold. (D) An eyewash station and safety shower is to be provided in the vicinity of a chemical bunkering station on-deck. If the bunkering connections are located on both port and starboard sides, then consideration is to be given to providing two eyewash stations and safety showers, one for each side. *(2022)* (E) The treatment fluid transfer pump can be applied in the same manner as the bunker manifold. And, if the treatment fluid transfer pump is shielded by a structure capable of visual surveillance, one eyewasher and safety showers could be installed in the installation area. (F) An eyewash station and safety shower is to be provided in the vicinity of any part of the system where a spillage/drainage may occur and in the vicinity of system connections/components that require periodic maintenance. *(2022)*

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) ### 207. EGC System Piping 4. Residue System (1) The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities in accordance with **MARPOL Annex I, Ch III, Reg.13**. The EGC residue tank is to be so designed as to facilitate cleaning. Where EGC residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of **306. 3.** of this Guidance are to be applied. (2) The material of the EGC residue tank is to be selected based on the corrosive nature of the EGC residue. (New) (3) The capacity of the EGC residue tank is to be based on the expected residue volumes applicable to the exhaust gas cleaning process and the maximum period of voyage between ports where EGC residue can be discharged. (4) The EGC residue tank is to be provided with air pipes complying with **Pt 5, Ch 6, 201.** of the Rules. The residue tank is to be arranged with a high level alarm. (5) Sounding arrangements are to be provided for the EGC residue tank in accordance with **Pt 5, Ch 6, 203.** and **Pt 8, Ch 2, Sec 1** of the Rules.	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 2 Exhaust Gas Cleaning system (EGC) ### 207. EGC System Piping 5. Residue Tank (1) ~~The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities in accordance with **MARPOL Annex I, Ch III, Reg.13**. The EGC residue tank is to be so designed as to facilitate cleaning. Where EGC residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of **306. 3.** of this Guidance are to be applied.~~ (1) The material of the EGC residue tank is to be selected based on the corrosive nature of the EGC residue. (2) The tanks are to be independent from other tanks, except in cases where these tanks are also used as the over flow tanks for chemical treatment fluids storage tank. *(2022)* (3) The capacity of the EGC residue tank is to be based on the expected residue volumes applicable to the exhaust gas cleaning process and the maximum period of voyage between ports where EGC residue can be discharged. In the absence of precise data, a figure of 30 days is to be used. *(2022)* (4) The EGC residue tank is to be provided with air pipes complying with **Pt 5, Ch 6, 201.** of the Rules. The residue tank is to be arranged with a high level alarm. (5) Sounding arrangements are to be provided for the EGC residue tank in accordance with **Pt 5, Ch 6, 203.** and **Pt 8, Ch 2, Sec 1** of the Rules.

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System	# CHAPTER 3 Sulphur oxides Emission Abatement System
## Section 2 Exhaust Gas Cleaning system (EGC)	## Section 2 Exhaust Gas Cleaning system (EGC)
207. EGC System Piping	207. EGC System Piping
4. Residue System	5. Residue Tank
	(6) The EGC residue tank is to be so designed as to facilitate cleaning. (7) Where EGC residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of **206. 3.** of this Guidance are to be applied.
208. Control, Alarm, and Monitoring System	208. System Design
3. Safety Shutdown System (1) An independent shutdown system is to be provided. This safety shutdown system is to be based on the following: (A) Means are to be provided to indicate the parameters causing shutdown. (B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is reset. (2) Monitoring and safety shutdowns are to be in accordance with **Table 3.2.3** of this Guidance.	3. Safety Shutdown System (1) An independent shutdown system is to be provided. The automatic safety shutdown system is to be based on the following: (A) Means are to be provided to indicate the parameters causing shutdown. (B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is reset manually. (2) Monitoring and safety shutdowns are to be in accordance with **Table 3.2.3** of this Guidance.

Present	Amendment

CHAPTER 3 Sulphur oxides Emission Abatement System

Section 2 Exhaust Gas Cleaning system (EGC)

Table 3.2.4. Test and Survey for components of EGC

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Exhaust gas emission monitoring system	●		
2	Washwater emission monitoring system		●	
3	Control panel/power panel(4)			●
4	Pumps(incl. motor)(1),(5)			●
5	Blowers(incl. motor)(1),(5)			●
6	Scrubber body(2),(5)			●
7	Heat exchanger(2),(5)			●
8	Storage vessels for washwater treatment medium(3),(5)			●

Note.
(1) Components for the continual operation of the EGC are to be tested in accordance with the requirements specified in **Pt 5, Ch 6 & Pt 6** of the Rules.
(2) Non-destructive testing is to be carried out on the welded parts of the equipment constituting the following exhaust gas cleaning system, and the hydrostatic test is to be carried out at a pressure 1.5 times the design pressure.
(3) Storage vessels 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.
(4) Where equipment specified in **Guidance 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/power panel. (See **Guidance Pt 6, Ch 1 and Ch 2, 301.1**)
(5) For the applicable class notation **'CEmS-EGC(S)'** in **Table 3.2.1**

(Refer to the next page)

Present	Amendment
(Refer to the previous page)	

CHAPTER 3 Sulphur oxides Emission Abatement System

Section 2 Exhaust Gas Cleaning system (EGC)

Table 3.2.4. Test and Survey for components of EGC

No.	Components	Approval of Administration or Class Type approval	Class Type approval	Test and Survey
1	Exhaust gas emission monitoring system	●		
2	Washwater emission monitoring system		●	
3	Control panel/power panel(5)			●
4	Pumps(incl. motor)(1),(6)			●
5	Blowers(incl. motor)(1),(6)			●
6	Scrubber body(2),(6),(7)			●
7	Heat exchanger(3),(6)			●
8	Storage tank for washwater treatment chemical(4),(6)			●

Note.
(1) Components for the continual operation of the EGC are to be tested in accordance with the requirements specified in **Pt 5, Ch 6 & Pt 6** of the Rules.
(2) 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)*
(3) It shall be inspected based on the Rule of Pt 5 Ch 5 Sec 3. *(2022)*
(4) 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.
(5) Where equipment specified in **Guidance 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/power panel. (See **Guidance Pt 6, Ch 1 and Ch 2, 301.1**)
(6) For the applicable class notation '**CEmS-EGC(S)**' in **Table 3.2.1**
(7) When vessels 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)*

Present	Amendment
# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 4 Ships using low sulphur fuel **401. General** **1.** This Section applies to ships using fuel oil complied with **Reg.14 of MARPOL Annex VI** without exhaust gas cleaning system. **2.** It is applied the "**LSF**" notation for ships arranged fuel oil system in **402.**, without exhaust gas cleaning system. *(Omitted)*	# CHAPTER 3 Sulphur oxides Emission Abatement System ## Section 4 Ships using low sulphur fuel **401. General** **1.** This Section applies to ships using fuel oil complied with **Reg.14 of MARPOL Annex VI** without exhaust gas cleaning system. **2.** It is applied the "**CEmS-LSF**" notation for ships arranged fuel oil system in **402.**, without exhaust gas cleaning system. *(Omitted)*

Amendments of the Classification Technical Rules

(External Inquiry)

Guidance for the Prevention System of Pollution from Ships

2021. 08.

Hull Rule Development Team

Present	Amendment	Note
〈newly added〉	**CHAPTER 4 Ships satisfying Energy Efficiency Design Index(EEDI) Phase 3** **Section 1 General** **101. General** **1.** This Guidance applies to the ships whose verified attained EEDI are less than or equal to the required EEDI for phase 3 in **MARPOL Annex VI, Regulation 21** as amended by **IMO Res.MEPC.324(75)**. **2.** Ships applying the **EEDI** notation in accordance with this Guidance are to comply with the applicable requirements of **MARPOL Annex VI, Regulations 19, 20** and **21**, and are to hold a valid IEE Certificate. **102. Definitions** **1. Required EEDI** means a value determined in accordance with **MARPOL Annex VI, Regulation 21** as amended by **IMO Res.MEPC.324(75)**, using a phase 3 reduction factor as applicable to the ship type and ship size. **2. Attained EEDI** means a value calculated in accordance with **MARPOL Annex VI, Regulation 20**, in consideration of the guidelines developed by IMO. **3. Verification** 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**.	

Present	Amendment	Note
〈newly added〉	**103. Document submission** **1. Classification survey** (1) Ships applying to be assigned an EEDI notation should submit the following documents to the Society for approval and/or reference. (A) Calculation for required EEDI specified in **102. 1** (B) EEDI technical file (C) IEE certificate **2. Alteration survey** (1) Documents specified in **1** is to be submitted to the Society, when attained EEDI is to be recalculated after major alteration specified in **MARPOL Annex VI, Regulation 2.** **104. Class notation** **1. "EEDI-P3"** notation is to be assigned to ships whose attained EEDI specified in **102. 2** is less than or equal to the required EEDI specified in **102. 1**. **2. "EEDI-ER[x]"** notation can be assigned to ships satisfying the requirement of **1** and requesting to record the extra reduction rate of the attained EEDI in comparison with phase 3 reduction factor. Where ER means Extra Reduction, and [x] means the extra reduction rate expressed in percent (%). For example, EEDI-ER[12] is assigned to a ship when the extra reduction rate of attained EEDI is 12%.	