IACS Unified Requirement for Monitoring and Safety Devices of Exhaust Gas Cleaning Systems

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part D

Reason for Amendment

As a measure to comply with regulation 14 of MARPOL Annex VI, which regulates the emission of sulphur oxides (SOx) and particulate matter from ships, the use of exhaust gas cleaning systems (EGCS) is accepted as an alternative means.

Recently, safety concerns regarding water leakage from EGCS installed in an engine room were raised within IACS. As a result of a discussion on the matter, IACS established Unified Requirement (UR) M86, a new UR which specifies comprehensive requirements for monitoring and safety devices for not only water leakage but also for other matters related to EGCS operation.

Accordingly, relevant requirements are amended based on UR M86.

Outline of Amendment

Amends Chapter 22, Part D of the Rules for the Survey and Construction of Steel Ships to incorporate the requirements of UR M86.

Effective Date and Application

This amendment applies to ships for which the date of contract for construction is on or after 1 January 2026.

ID:DD25-09

Amended-Original Requirements Comparison Table
(IACS Unified Requirement for Monitoring and Safety Devices of Exhaust Gas Cleaning Systems)

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part D MACHINERY INSTALLATIONS** **Chapter 22 EXHAUST GAS CLEANING SYSTEMS AND ASSOCIATED EQUIPMENT** **22.1 General** **22.1.1 Application** **1** (Omitted) **2** (Omitted) **3** In cases where exhaust gas cleaning systems which do not use chemical agents are used, the term "liquids containing chemical treatment fluid" is to be read as "liquids which have passed through scrubber chambers"; this, however, does not apply to **22.4.1-4**, **-9** and **-10**, **22.6.1,** **22.7.1-2** and **22.7.2-2(1)**. **22.1.3 Drawings and Data to be Submitted** Drawings and data to be submitted are generally as follows: (1) (Omitted) (2) Plans and documents for reference (a) (Omitted) (b) (Omitted) (c) Documents related to allowable back pressure	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part D MACHINERY INSTALLATIONS** **Chapter 22 EXHAUST GAS CLEANING SYSTEMS AND ASSOCIATED EQUIPMENT** **22.1 General** **22.1.1 Application** **1** (Omitted) **2** (Omitted) **3** In cases where exhaust gas cleaning systems which do not use chemical agents are used, the term "liquids containing chemical treatment fluid" is to be read as "liquids which have passed through scrubber chambers"; this, however, does not apply to **22.4.1-4**, **-9** and **-10**, **22.7.1-2** and **22.7.2-2(1)**. **22.1.3 Drawings and Data to be Submitted** Drawings and data to be submitted are generally as follows: (1) (Omitted) (2) Plans and documents for reference (a) (Omitted) (b) (Omitted) (c) Documents related to allowable back pressure	

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(where deemed necessary by the Society) (d) Documents related to any studies and corresponding results explaining cases where bypass pipes are not fitted for exhaust gas cleaning systems in accordance with **22.3.1-3(1)** (e) Engineering analysis such as Failure Mode Effect Analysis (FMEA) or equivalent (f) The results of risk assessments conducted to analyse the risks specified in **22.1.1-2** (g) Other drawings considered necessary by the Society	(d) Documents related to any studies and corresponding results explaining cases where bypass pipes are not fitted for exhaust gas cleaning systems in accordance with **22.3.1-3(1)** (e) Engineering analysis such as Failure Mode Effect Analysis (FMEA) (f) The results of risk assessments conducted to analyse the risks specified in **22.1.1-2** (g) Other drawings considered necessary by the Society	
22.2 Design	**22.2 Design**	
22.2.1 General Requirements (-1 and -3 are omitted.) **4** Appropriate means are to be provided to allow continuous proper operation of fuel oil combustion units such as reciprocating internal combustion engines and boilers which are connected to exhaust gas cleaning systems in case where a single component of the system or associated equipment fails or becomes otherwise inoperable. The system is to be designed such that a single fault will not lead to a potentially dangerous situation for the ship or its crew.	**22.2.1 General Requirements** (-1 and -3 are omitted.) **4** Appropriate means are to be provided to allow continuous proper operation of fuel oil combustion units such as reciprocating internal combustion engines and boilers which are connected to exhaust gas cleaning systems in case where a single component of the system or associated equipment fails or becomes otherwise inoperable.	

Amended-Original Requirements Comparison Table
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Amended	Original	Remarks
22.4 Requirements for Construction and Arrangements, etc.	**22.4 Requirements for Construction and Arrangements, etc.**	
22.4.4 Safety Devices and Alarm Devices **1** Monitoring devices and alarm devices fitted to exhaust gas cleaning systems are to be as follows: (1) Monitoring devices that indicate the information listed in **Table D22.1** are to be provided at control stations of exhaust gas cleaning systems. (2) Alarm devices that activate at the alarm points for abnormal events listed in **Table D22.1** are to be provided at control stations of exhaust gas cleaning systems. **2** Safety shutdown systems and bypass pipes fitted to exhaust gas cleaning systems are to be as follows: (1) Safety shutdown systems are to be capable of automatically stopping exhaust gas washwater supply pumps and chemical treatment fluids pumps for the abnormal events listed in **Table D22.1**. Furthermore, in cases where the safety shutdown system is activated, bypass sides of the changeover devices specified in **22.3.1-3(1)** are to be opened automatically. (2) Upon activation of the safety shutdown systems specified in **(1)** above, visual and audible alarms are to be indicated at both the local and remote control positions of exhaust gas cleaning systems. Visual alarms are to include a means of indicating the parameters causing shutdown.	**22.4.4 Safety Devices and Alarm Devices** **1** Exhaust gas cleaning systems are to be fitted with safety devices which are capable of automatically stopping exhaust gas washwater supply pumps and chemical treatment fluids pumps in the event of any of the following failures: (1) Abnormal increase of the liquid level in the scrubber (2) Abnormal increase of the pressure at the inlet or the differential pressure across the scrubber chamber (in cases where changeover devices for exhaust gas pipes are not fitted) **2** In cases where changeover devices for exhaust gas pipes are fitted, devices capable of automatically opening bypass sides of changeover devices in the event of any of the following failures are to be fitted. (1) Abnormal increase of the liquid level in the scrubber (2) Abnormal increase of the exhaust gas pressure at the inlet or the differential pressure across the scrubber chamber (3) Abnormal increase of the exhaust gas temperature at the outlet	

Amended-Original Requirements Comparison Table
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Amended	Original	Remarks
(3) In addition to the automatic shutdown system specified in **(1)** above, manual emergency shutdown arrangements are to be provided at both the local and remote control positions of exhaust gas cleaning systems. (4) In cases where the safety shutdown systems specified in **(1)** and **(3)** above initiate a shutdown, a restart should not occur automatically until after the system is manually reset.		
(Deleted)	**3** Alarm devices, to be activated in the event of any of the abnormal conditions given in **Table D22.1**, are to be provided at control stations of exhaust gas cleaning systems.	
(Deleted)	**4** Exhaust gas cleaning systems are to be fitted with monitoring devices at control stations for exhaust gas cleaning systems, and these devices are to indicate the information listed in **(1)** to **(5)**: (1) Liquid levels in scrubber chambers (2) Liquid levels in tanks for chemical treatment fluids (3) Temperatures in tanks for chemical treatment fluids (where the heating and/or cooling systems specified in **-6** are provided) (4) Exhaust gas temperatures at outlets (5) Pressures at inlets or differential pressures across scrubber chambers	
3 In addition to the requirements given in **-1** to **-2** above, additional safety, alarm and monitoring systems may be required to be fitted based upon engineering analysis results, such as Failure Mode Effect Analysis (FMEA), for exhaust gas cleaning systems.	**5** In addition to the requirements given in **-1** to **-3** above, additional safety, alarm and monitoring systems may be required to be fitted based upon engineering analysis results, such as Failure Mode Effect Analysis (FMEA), for exhaust gas cleaning systems.	
4 Each storage tank for chemical treatment fluids is to be provided with level monitoring arrangements and high/low level alarms that activate at the alarm points for	**6** 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	

Amended	Original	Remarks
abnormal events listed in **Table D22.1**. In cases where heating and/or cooling systems are provided, high and/or low temperature alarms that activate at the alarm points for abnormal events listed in **Table D22.1** or temperature monitoring are also to be provided accordingly.	systems are provided, high and/or low temperature alarms or temperature monitoring are also to be provided accordingly.	

Amended-Original Requirements Comparison Table
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Amended	Original	Remarks

Table D22.1 Indication, Safety and Alarm Devices for Exhaust Gas Cleaning System (1)

	Monitoring devices	Alarm devices	Safety shutdown system and bypass pipes
Monitored parameters	Indication at control position	Alarm points	Automatic exhaust gas cleaning system shutdown and bypass opening (2)
Exhaust gas temperature after exhaust gas cleaning unit	X	H	X (HH)
Pressure before exhaust gas cleaning unit or differential pressure across exhaust gas cleaning unit (3)	X	H	X (HH)
Water level in wet exhaust gas cleaning unit	–	H	X (HH)
Exhaust gas cleaning unit exhaust fan/blower motors (4)	Running	Stop	–
Exhaust gas cleaning unit exhaust bypass, isolation, mixing valves, where provided	Position (5)	–	–
Operation of exhaust gas cleaning washwater pumps or Washwater system supply pressure	Running X	Stop L	–
Chemical treatment fluid storage tank temperature (6)	–	H/L	–
Chemical treatment fluid storage tank level (6)	–	H/L	–
Chemical treatment fluid leakage detection in system drip tray or drain/residue tank	–	X (7)	–
Temperature of washwater supply (in cases where the washwater includes chemical treatment fluids) (8)	–	H	–
Power loss of control, alarm, monitoring or safety devices	–	X	–

Notes:

(1) "H" and "L" mean "high" and "low" respectively and "X" means indication/detection/activation is required.

(2) Automatic stopping of all exhaust gas cleaning system pumps. Automatic bypass of the exhaust gas cleaning unit is required when the exhaust gas cleaning unit is not suitable for operation in the dry condition.

(3) As applicable in accordance with the specific exhaust gas cleaning system design and installation.

(4) If applicable

(5) Refer to 22.3.1-3(2), if installed

(6) Refer to 22.4.4-4

(7) Refer to 22.4.1-4

(8) To detect high washwater temperatures due to an abnormality in the heating system. This alarm is not required when a heating system is not provided.

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Amended	Original	Remarks

~~Table D22.1 Alarm points for exhaust gas cleaning system~~[(1)]

~~Monitored Variables~~	
~~Liquid level in scrubber chamber~~	~~H~~
~~Temperature of washwater supply (in cases where the washwater includes sodium hydroxide solutions)~~[(2)]	~~H~~
~~Liquid levels in tank for sodium hydroxide solution~~	~~H L~~
~~Temperature in tank for sodium hydroxide solution~~[(3)]	~~H L~~
~~Exhaust gas pressure at the inlet~~[(4)]	~~H~~
~~Exhaust gas temperature at the outlet~~	~~H~~
~~Power loss of control, alarm, monitoring or safety devices~~	~~○~~

~~Notes~~

~~(1) "H" and "L" mean "high" and "low". "○" means abnormal condition occurred.~~

~~(2) Differential pressure across scrubber chamber may be accepted in lieu.~~

~~(3) This alarm is not required when heating and/or cooling systems are not provided.~~

~~(4) Differential pressure across scrubber chamber may be accepted in lieu.~~

EFFECTIVE DATE AND APPLICATION

1. This amendment applies to ships for which the date of contract for construction is on or after 1 January 2026.