Reductant Agent Tanks for Selective Catalytic Reduction Systems

Amended Rules

Rules for the Survey and Construction of Steel Ships Part D

Reason for Amendment

IACS Unified Requirement (UR) M77 specifies requirements related to the storage and use of reductants for selective catalytic reduction (SCR) systems. These requirements have already been incorporated into the NK Rules.

IACS considered whether the requirements of this unified requirement are to be applied to small capacity tanks (service tanks, buffer tanks, etc.) handling reducing agents. As a result, it was concluded that tanks of less than 500 *l* using urea-based ammonia as a reductant agent are left to the discretion of individual classification societies. Therefore, IACS adopted UR M77 (Rev.4) in February 2023 to clarify relevant tank capacity.

Accordingly, relevant requirements are amended based upon UR M77 (Rev.4). In addition, the requirements for SCR systems, exhaust gas cleaning systems (EGCS) and exhaust gas recirculation (EGR) were reviewed due to some unclear points, and relevant requirements are also amended.

Outline of Amendment

The main contents of this amendment are as follows:

(1) Clarifies the tank capacities subject to requirements for reductant storage tanks.
(2) Clarifies safety devices for exhaust gas outlet temperatures may be omitted for SCR systems adopting soot fire damage prevention measures.

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part D MACHINERY INSTALLATIONS

Chapter 21 SELECTIVE CATALYTIC REDUCTION SYSTEMS AND ASSOCIATED EQUIPMENT

21.1 General

Paragraph 21.1.1 has been amended as follows.

21.1.1 Application

1 The requirements in this ~~C~~chapter apply to selective catalytic reduction systems (hereinafter referred to as "SCR systems") and associated equipment.

2 Urea based ammonia (e.g. AUS 40 (a 40 % urea ~~–~~and 60 % water aqueous urea solution) specified in *ISO* 18611-1:2014) is to be used as reductant agent in SCR systems. In cases where another reductant agent is used, however, special consideration is to be given to such systems in accordance with their respective designs as well as the following **(1)** and **(2)**:

(1) Aqueous ammonia (28 % or less concentration of ammonia by weight) is not to be used as a reductant agent in SCR systems except in cases where it can be demonstrated that it is not practicable to use a urea based reductant agent.

(2) Anhydrous ammonia (99.5 % or greater concentration of ammonia by weight) is not to be used as a reductant agent in SCR systems except in cases where the flag administration agrees to its use and the following **(a)** and **(b)** can be demonstrated:
   (a) It is not practicable to use an aqueous urea solution.
   (b) It is not practicable to use an aqueous ammonia.

3 In cases where a reductant agent specified in **(1)** or **(2)** of **-2** above is used, arrangements for its loading, carriage and use are to be derived from a risk based analysis.

4 When reductant agent tanks with volume below of 500 *litres* and urea based ammonia (e.g. AUS 40 (a 40 % urea and 60 % water aqueous urea solution) specified in *ISO* 18611-1:2014) specified in **-2** above is used as a reductant agent, the requirements for the reducing agent tanks are to be as deemed appropriate by the Society.

~~4~~5 In addition to the requirements in this ~~C~~chapter, the Society may apply special requirements as instructed by the flag administration of the ship or the governments of sovereign nations whose waters the ship navigates.

21.4 Requirements for Construction and Arrangements, etc.

21.4.5 Safety Devices and Alarm Devices

Sub-paragraph 1 has been amended as follows.

1 In cases where changeover devices for exhaust gas pipes are fitted, devices which automatically open bypass sides of the changeover devices in the event of any of the following **(1)** and **(2)** failures are to be fitted. The above changeover devices are also to be operated within allowable limits of engine back pressure.

(1) Abnormal increases of the exhaust gas pressures at the inlet or the differential pressures across the catalyst blocks

(2) Abnormal increase of the exhaust gas temperature at the outlet (However, alarms may be omitted in cases where means are provided to prevent damage by soot fire.)

2 Alarm devices, to be activated in the event of any of the abnormal conditions given in **Table D21.1**, are to be provided at control stations of SCR systems.

(-3 and -4 are omitted.)

Chapter 22 EXHAUST GAS CLEANING SYSTEMS AND ASSOCIATED EQUIPMENT

22.4 Requirements for Construction and Arrangements, etc.

22.4.1 Construction and Arrangement

Sub-paragraph -17 has been amended as follows.

17 The following connections on piping systems only for chemical treatment fluids are to be screened or provided with other appropriate means, and fitted with drip trays to prevent the spread of any spillage where they are installed:

(1) Detachable connections between pipes (flanged connections ~~and~~, mechanical joints, etc.);

(2) Detachable connections between pipes and equipment such as pumps, strainers, heaters, valves; and

(3) Detachable connections between equipment mentioned in **(1)** and **(2)** above.

Chapter 23 EXHAUST GAS RECIRCULATION SYSTEMS AND ASSOCIATED EQUIPMENT

23.4 Requirements for Construction and Arrangements, etc.

Paragraph 23.4.3 has been amended to Paragraph 23.4.4, and Paragraph 23.4.3 has been added as follows.

23.4.3 Venting Systems of Storage Tanks for Chemical Treatment Fluids

The requirements of **22.4.3** are to be applied.

Paragraph 23.4.4 has been amended as follows.

23.4.~~3~~4 Safety Devices and Alarm Devices

The requirements of **22.4.~~3~~4** are to be applied.