

Requirements for the Storage and Use of Reductants in Selective Catalytic Reduction (SCR) Systems

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part D

Reason for Amendment

IACS Unified Requirement (UR) M77 (Rev.4), which sets out the requirements for the storage and use of Selective Catalytic Reduction (SCR) reductants, specifies that a urea-based reductant is, in principle, to be used, and further specifies that the use of aqueous ammonia or anhydrous ammonia as an SCR reductant is, in principle, not permitted unless it can be demonstrated that the use of a urea-based reductant is not practicable.

At the 109th session of the IMO Maritime Safety Committee (MSC 109), amendments to the IGC Code were adopted to permit the use of toxic cargo, including anhydrous ammonia, as fuel. Furthermore, taking into account ongoing developments related to the use of aqueous ammonia and anhydrous ammonia as SCR reductants for ammonia-fuelled ships, IACS reviewed UR M77 and revised it as IACS UR M77 (Rev.5).

As a result of this revision, aqueous ammonia and anhydrous ammonia may now, subject to certain conditions, be used as SCR reductants instead of only just in cases where it is not practicable to use a urea-based reductant.

Accordingly, relevant requirements are amended in accordance with IACS UR M77 (Rev.5)

Outline of the Amendment

Amends requirements for the storage and use of aqueous ammonia and anhydrous ammonia as SCR reductants.

Effective Date and application

This amendment applies to SCR systems that fall under the following:

- i) SCR systems for which the application for approval is submitted to the Society on or after 1 January 2027.
- ii) SCR systems installed on ships for which the date of the contract for construction is on or after 1 January 2027.

ID:DD26-02

Amended-Original Requirements Comparison Table
(Requirements for the Storage and Use of Reductants in Selective Catalytic Reduction (SCR) Systems)

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS Part D MACHINERY INSTALLATIONS Chapter 21 SELECTIVE CATALYTIC REDUCTION SYSTEMS AND ASSOCIATED EQUIPMENT 21.1 General 21.1.1 Application 1 The requirements in this 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 <i>ISO 18611-1:2014</i>) 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) <u>may</u> be used as a reductant in an SCR, <u>provided that the arrangements for its loading, where applicable, as well as its carriage and use, are assessed through a risk-based analysis in order to ensure an equivalent level of safety to a</u>	RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS Part D MACHINERY INSTALLATIONS Chapter 21 SELECTIVE CATALYTIC REDUCTION SYSTEMS AND ASSOCIATED EQUIPMENT 21.1 General 21.1.1 Application 1 The requirements in this 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 <i>ISO 18611-1:2014</i>) 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) <u>is not to</u> be used as a reductant agent in SCR systems <u>except in cases where it can be demonstrated that it is not practicable to use a urea based reductant agent.</u>	Alignment with IACS UR M77 (Rev. 5). This allows the use of aqueous ammonia solutions (28% or less concentration of ammonia by weight) and anhydrous ammonia (99.5% or greater concentration of ammonia by weight), not only in cases where the use of urea-based ammonia as reductant agent in SCR systems is impracticable.

Amended-Original Requirements Comparison Table
(Requirements for the Storage and Use of Reductants in Selective Catalytic Reduction (SCR) Systems)

Amended	Original	Remarks
<u>urea-based installation, taking into account MSC.1/Circ.1687.</u> (2) Anhydrous ammonia (99.5 % or greater concentration of ammonia by weight) <u>may</u> be used as a reductant in <u>an SCR</u>, <u>subject to agreement with the Flag Administration</u>. <u>The arrangements for its loading, carriage, and use are to be in accordance with the requirements set out in MSC.1/Circ.1687, as applicable for the intended service</u>. <u>In addition, the risk-based analysis as set out in MSC.1/Circ.1687 should be carried out to ensure an equivalent level of safety to a urea-based installation.</u> (Omitted) <u>3</u> When reductant agent tanks with volume below of 500 <i>litres</i> and urea based ammonia (e.g. AUS 40 (a 40 % urea and 60 % water aqueous urea solution) specified in <i>ISO 18611-1:2014</i>) 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. <u>4</u> In addition to the requirements in this 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.	(2) Anhydrous ammonia (99.5% or greater concentration of ammonia by weight) <u>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:</u> <u>(a) It is not practicable to use an aqueous urea solution.</u> <u>(b) It is not practicable to use an aqueous ammonia.</u> <u>3</u> 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. <u>4</u> When reductant agent tanks with volume below of 500 <i>litres</i> and urea based ammonia (e.g. AUS 40 (a 40 % urea and 60 % water aqueous urea solution) specified in <i>ISO 18611-1:2014</i>) 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. <u>5</u> In addition to the requirements in this 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.	Omitted Moved to 21.1.1-3. Moved from 21.1.1-4. Moved to 21.1.1-4. Moved from 21.1.1-5.
EFFECTIVE DATE AND APPLICATION		
1. This amendment applies to SCR systems that fall under the following: i) SCR systems for which the application for approval is submitted to the Society on or after 1 January 2027. ii) SCR systems installed on ships for which the date of the contract for construction is on or after 1 January 2027.		