Expressions Used for Standards Referred to in IACS Unified Interpretations and Recommendations (Electrical Equipment)

Amended Rules and Guidance

Rules for the Survey and Construction of Steel Ships Part R
Guidance for the Survey and Construction of Steel Ships Parts D, H, and R
Guidance for the Safety Equipment
Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use

Reason for Amendment

IACS recently reviewed its unified interpretations (UI) and recommendations (Rec.) related to machinery and electricity in order to unify the expressions used for the standards and conventions referred to therein. For this reason, IACS adopted UIs SC10 (Rev.3), SC42(Rev.3), SC57(Rev.2), SC70(Rev.4), SC79(Rev.5), SC179(Rev.3), SC180(Rev.4) and SC194(Rev.1) as well as Rec.73(Rev.1) in February 2021.

Accordingly, relevant requirements are amended based upon UIs SC10 (Rev.3), SC42(Rev.3), SC57(Rev.2), SC70(Rev.4), SC79(Rev.5), SC179(Rev.3), SC180(Rev.4) and SC194(Rev.1) as well as Rec.73(Rev.1).

Outline of Amendment

Adds the publication year for standards referred to in the aforementioned UIs and recommendation.

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

Part R FIRE PROTECTION, DETECTION AND EXTINCTION

Chapter 29 FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

29.2 Engineering Specifications

29.2.3 Component Requirements*

Sub-paragraph -3 has been amended as follows.

3 Cables

Cables used in the electrical circuits are to be flame retardant according to standard *IEC* 60332-1-2:2004+AMD1:2015.

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

Part D MACHINERY INSTALLATIONS

D13 PIPING SYSTEMS

D13.5 Bilge and Ballast Piping

D13.5.10 Dewatering Arrangements for Bulk Carriers, etc.

Sub-paragraph -2(4) has been amended as follows.

2 With respect to the provisions of **13.5.10, Part D of the Rules**, bilge and ballast systems for the dewatering arrangements (hereinafter, referred to as "the dewatering systems") are to comply with the following requirements:
((1) to (3) are omitted.)
(4) Enclosures of electrical equipment for the dewatering systems installed in spaces where the systems are to be installed, are to provide protection to the IP68 standard as defined in *IEC* 60529:1989/AMD2:2013/COR1:2019 for a water head equal to the height of the space in which the electrical equipment is installed for a time duration of at least 24 *hours*.
((5) and (6) are omitted.)

D13.8 Sounding Pipes

D13.8.5 Water Level Detection and Alarm Systems for Bulk Carriers, etc.

Sub-paragraph -3(3) has been amended as follows.

3 The wording "the systems to have constructions and functions deemed appropriate by the Society" in **13.8.5-1(4), Part D of the Rules** means those systems complying with the following requirements and being of a type approved by the Society in accordance with the provisions of **Chapter 5, Part 7 of the Approval and Type Approval of Materials and Equipment for Marine Use** or those systems approved by an organization deemed appropriate by the Society in accordance with the Resolution *MSC.*188(79).
((1) and (2) are omitted.)
(3) Electrical installations for the systems installed in the following areas are to be of an intrinsically safe type of *Exib* complying at least with *IEC* 60079-11:2011 and the maximum surface temperature of the installations is not to exceed 85 ºC, except electrical installations installed in ships designed only to carry cargo which are not combustible or explosive atmosphere. In addition, in cases where a ship is designed to carry only limited kinds of cargo, the maximum surface temperature may be appropriately relaxed depending on the kind of cargo. In this case, such limitations relating to cargo are to be documented in booklets for cargo operations. Finally, those electric installations installed at the edges of the following areas are to be approved at the discretion of the Society with due consideration being given to their design with respect to gas-tightness, etc.

(a) Cargo holds
(b) Enclosed spaces adjacent to cargo holds having openings without a gas-tight or watertight door/hatch and the like into a hold
(c) Areas within 3 *m* of any cargo hold mechanical exhaust ventilation outlet

((4) to (8) are omitted.)

Part H ELECTRICAL INSTALLATIONS

H2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

H2.9 Cables

H2.9.11 Precaution against Fire

Sub-paragraph -1(2) has been amended as follows.

1 In cases where the installation work of cables in enclosed spaces or semi-enclosed spaces of ships meet either of the following requirements, such work may be regarded as complying with the requirements given in **2.9.11-1, Part H of the Rules**. However, item **(2)(c)** below is to be approved by the Society in accordance with the requirements given in **Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**. Furthermore, in cases where the use of cables is limited to specific applications, approval by the Society may be given on a case-by-case basis.

((1) is omitted.)

(2) In cases where bunched cables are installed, the following requirements are to be complied with:

(a) In cases where flame retardant cables in a bunched condition which have passed the test of Category *A*, *IEC* 60332-3-22:2018 are to be used.

((b) and (c) are omitted.)

Part R FIRE PROTECTION, DETECTION AND EXTINCTION

R4 PROBABILITY OF IGNITION

R4.5 Cargo Areas of Tankers

R4.5.3 Cargo Tank Venting

Sub-paragraph -5 has been amended as follows.

5 The area around the vent outlets specified in **4.5.3-4(1)(c)** and **(d)**, **Part R of the Rules** is defined as a hazardous area in accordance with ~~**4.3.1(2)(h) and 4.3.1(3)(b), Part H of the Rules**~~ *IEC* 60092-502:1999. ~~In addition, electrical equipment fitted in compliance with the applicable provisions of **4.2.4, Part H of the Rules** is not considered as a source of ignition or ignition hazard.~~

(1) Areas on open deck, or semi-enclosed spaces on open deck, within a vertical cylinder of unlimited height and 6 *m* radius upon the centre of the outlet, and within a hemisphere of 6 *m* radius below the outlet which permit the flow of large volumes of vapour, or gas mixtures during loading, discharging, or ballasting are defined as Zone 1 as specified by *IEC* 60092-502:1999 para 4.2.2.8.

(2) Area within 4 *m* beyond the zone specified in **(1)** above are defined as Zone 2 as specified by *IEC* 60092-502:1999 para 4.2.2.8.

(3) Electrical equipment or cables are not normally to be installed in hazardous areas. Where essential for operational purposes, electrical equipment may be installed in accordance with *IEC* 60092-502:1999 (*see* **4.2.4**, **Part H**).

(4) Electrical equipment fitted in compliance with *IEC* 60092-502:1999 is not considered as a source of ignition or ignition hazard (*see* **4.2.4**, **Part H**).

R11 STRUCTURAL INTEGRITY

R11.6 Protection of Cargo Tank Structure against Pressure or Vacuum

Paragraph R11.6.2 has been amended as follows.

R11.6.2 Openings for Small Flow by Thermal Variations

The area around the air intakes and openings specified in **11.6.2(2)**, **Part R of the Rules** is defined as a hazardous area in accordance with ~~**4.3.1(2)(g) and 4.3.1(3)(a), Part H of the Rules**~~ *IEC* 60092-502:1999. ~~In this case, the "1.5 *m*" in **4.3.1(3)(a), Part H of the Rules** is to be read as "2 *m*". Furthermore, electrical equipment fitted in compliance with the applicable provisions of **4.2.4, Part R of the Rules** is not considered as a source of ignition or ignition hazard.~~

(1) Areas on open deck, or semi-enclosed spaces on open deck, within 3 *m* of cargo tank ventilation outlets which permit the flow of small volumes of vapor or gas mixtures caused by thermal variation are defined as Zone 1 as specified by *IEC* 60092-502:1999 para 4.2.2.7.

(2) Area within 2 *m* beyond the zone specified in **(1)** above are to be considered Zone 2 (as opposed to 1.5 *m as* specified by *IEC* 60092-502:1999 para 4.2.3.1).

(3) Electrical equipment or cables are not normally to be installed in hazardous areas. Where essential for operational purposes, electrical equipment may be installed in accordance with *IEC* 60092-502:1999 (*see* **4.2.4**, **Part H**).

R19 CARRIAGE OF DANGEROUS GOODS

R19.3 Special Requirements

R19.3.2 Sources of Ignition

Sub-paragraph -1(3) has been amended as follows.

1 Applying to the requirements in **19.3.2, Part R of the Rules**, permitted electrical installations are to be in accordance with the followings.
((1) and (2) are omitted.)
(3) For ships carrying solid dangerous goods in bulk specified in **19.2.3(12), Part R of the Rules** which may create explosive gas and ships carrying dangerous goods in a packaged form specified in **19.2.3(3)**, **(7)** (except the liquids of which flash point is less than -18 *°C*), **(15)** or **(19), Part R of the Rules,** the requirements in **Table R19.3.2-3** (Classified as hazardous area by *IEC* 60092-506:2003) and **Table R19.3.2-4** (Classified as extended hazardous area by *IEC* 60092-506:2003) are to apply.
The hazardous areas specified in **Table R19.3.2-4(d)** for ships carrying flammable liquid substances having flashpoints of less than 23 *°C*, as specified in **19.2.3(7), (15)** or **(19), Part R of the Rules**, are to apply. However, enclosed spaces served by continuously forced mechanical ventilation capable of at least 6 air changes per hour may be considered as non-hazardous areas if they satisfy the following **(a)** and **(b)**:
((a) and (b) are omitted.)

R20 PROTECTION OF VEHICLE AND RO-RO SPACES

R20.3 Precaution against Ignition of Flammable Vapours in Closed Vehicle Spaces and Closed Ro-ro Spaces

Paragraph R20.3.2 has been amended as follows.

R20.3.2 Electrical Equipment and Wiring

1 The wording "electrical equipment of a type suitable for use in explosive petrol and air mixture" in **20.3.2-1, Part R of the Rules** means those generally meeting the requirements in **2.16, Part H of the Rules**, having an intrinsically safe, flameproof, pressurized, increased safety, encapsulation, powder filling or oil immersion construction certified as Apparatus Group II*A* and Temperature Class *T*3 or higher as specified in *IEC* ~~Publication~~ 60079-10-1:2015 or Explosion Class *d*3 and Ignition Group *G*3 or higher as specified in the Recommended Practices for Explosion-Protected Electrical Installations in General Industries (NIIS-TR-NO.39 (2006)) issued by National Institute of Industrial Safety in Japan, or equivalent thereto. Further, cables complying with the requirements in **4.2.4-5, Part H of the Rules** may generally be regarded as wiring of a type suitable for use in explosive petrol and air mixture.

2 The wording "electrical equipment of a type so enclosed and protected as to prevent the escape of sparks" in **20.3.2-2, Part R of the Rules** means the following **(1)** or **(2)**.

(1) The electrical equipment with a protection degree of at least *IP*55 as defined in **H2.1.3-4**.

(2) The electrical equipment suitable for use in the area of zone 2 as specified in *IEC* 60079-14:2013 (*e.g.* type of protection "*n*") and with a Temperature class of at least *T*3 as defined in *IEC* 60079-10-1:2015.

(-3 and -4 are omitted.)

“Guidance for the safety equipment” has been partly amended as follows:

Chapter 3 ARRANGEMENTS AND PERFORMANCE

3.1 General

3.1.1 General

Sub-paragraph -6 has been amended as follows.

6 All electrical and electronic appliances installed on the bridge and vicinity of the bridge other than the ones specified in **3.1.1-2(1)** and **(3) of the Rules**, are to be tested on board for electromagnetic compatibility under their working conditions in accordance with the requirements in **Regulation 17, Chapter V of the Annex to the Convention**. In this case, the following manners are to be applied.

(1) (Omitted)

(2) The wording “all electrical and electronic equipment” in **Regulation 17.1, Chapter V of the Annex to the Convention** generally means the equipment other than mobile equipment supplied by ship builders or ship owners, specified in the Appendix C.2.1 of the standard *IEC*60533~~(1999) published by International Electrical Commission~~ :2015.

(3) The following equipment is not necessary to carry out the above confirmation test on board for electromagnetic compatibility (refer to *IEC* 60945:2002 and *IEC* 60533:2015).

(a) The automatic or remote controlled equipment which passed the shop tests specified in **18.7.1, Part D of the Rules for the Survey and Construction of Steel Ships**

(b) The equipment certified not liable to cause electromagnetic disturbances by manufacturer

(c) The equipment taken internal protection measures for electromagnetic disturbances such as filtering or shielding

"Guidance for the approval and type approval of materials and equipment for marine use" has been partly amended as follows:

Part 7 CONTROL AND INSTRUMENTATION EQUIPMENT AND ELECTRICAL INSTALLATIONS

Chapter 1 APPROVAL OF USE OF AUTOMATIC DEVICES AND EQUIPMENT

1.3 Environmental Test

1.3.1 Approval Test

Sub-paragraph (2) has been amended as follows.

(2) Where tests which do not fully comply with the testing condition and methods, and the criteria of **Table7.1-1,** they may comply with a standard deemed appropriate by the Society such as *IEC* 60092-504 (*Electrical installations in ships - Special features, Control and instrumentation, Section* 3: *Environmental and supply conditions and testing*), *IEC* 60945 (*Maritime Navigation and Radiocommunication Equipment and Systems - General Requirements - Methods of Testing and Required Test Results*), *IEC* 60533 (*Electrical and electronic installations in ships - Electromagnetic compatibility*), *JIS F* ~~0807 (*General Rules for Environmental Tests of Control and Instrumentation Equipment for Marine Use*)~~8076 (*Electrical installations in ship – Part 504: Automation, control and instrumentation*).

Chapter 3 APPROVAL OF CABLE LAYING

3.4 Approval Test

Paragraph 3.4.2 has been amended as follows.

3.4.2 Approval Test of Non-metallic Cable Supports

The test is to include any of the following items which the Society considers necessary, depending upon the purpose and kind of the non-metallic cable supports.

(1) flame-retardant test in accordance with **H2.5.3-2, Part H of the Guidance for the Survey and Construction of Steel Ships**
(2) smoke and toxicity test based upon Part 2, Annex 1 of the International Code for Application of Fire Test Procedures
(3) safe working load test based upon 2.2 of the IACS Recommendation No.73
(4) impact resistance test based upon *IEC* 60068-2-75:2014
(5) electrical conductivity test based upon *IEC* ~~60093~~62631-3-1:2016 and *IEC* 62631-3-2:2015