



**MARITIME AND PORT AUTHORITY OF
SINGAPORE
SHIPPING CIRCULAR TO SHIPOWNERS
NO. 12 OF 2010**

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Applicable to: This circular is for the attention of ship owners, managers, operators, agents, masters, crew members and surveyors

**RESOLUTIONS ADOPTED BY THE 87TH SESSION OF THE MARITIME
SAFETY COMMITTEE (MSC 87) OF IMO**

Related circular: Shipping circular no. 13 of 2010 – *Guidance on shipboard operational matters: Circulars approved by the 87th Session of the Maritime Safety Committee (MSC 87) of IMO*

1 This circular informs the Shipping Community of the resolutions adopted by MSC 87, held from 14–21 May 2010 and urges the Community to prepare for the implementation of these resolutions.

2 The resolutions include the following issues:

Amendments to SOLAS, Codes, Guidelines and Standards

- a. Goal-based Standards for new Ship Construction;
- b. Corrosion protection of cargo oil tanks of crude oil tankers;
- c. Gas measurement and detection;
- d. International Code for Fire Safety Systems (FSS);
- e. International Life-Saving Appliance (LSA) Code;
- f. International Maritime Dangerous Goods (IMDG) Code;
- g. Code of Safety for Special Purpose Ships, 2008 (SPS);
- h. Performance Standards for Bridge Alert Management;
- i. Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)

Safety of Navigation

- j. Mandatory Ship Reporting System “In The Strait Of Gibraltar” (GIBREP);
- k. Mandatory Ship Reporting System in “The Western European Particularly Sensitive Sea Area” (WETREP);
- l. Assuring Safety during Demonstrations, Protests or Confrontations on the High Seas

Unified Interpretations (UI)

- m. Various UI relating to provisions in SOLAS and other instruments.

3 The following summarised the key points relating to the resolutions:

Amendments to SOLAS, Codes, Guidelines and Standards

a. Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (GBS) (SOLAS regulation II-1/3-10)

- [MSC.287\(87\)](#) – Adoption of the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers
- [MSC.290\(87\)](#) – Adoption of Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS)

(i) The new SOLAS regulation II-1/3-10 ([MSC.290\(87\)](#)) enters into force on 1 January 2012 and applies to oil tankers of 150 m in length and above and to bulk carriers of 150 m in length and above (constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers):

- for which the building contract is placed on or after 1 July 2016;
- in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or
- the delivery of which is on or after 1 July 2020.

(ii) Ships shall be designed and constructed for a specified design life and meeting the functional requirements of the GBS ([MSC.287\(87\)](#)). This is achieved by satisfying applicable structural requirements of our ROs, which would be required to conform to the functional requirements.

(iii) In order to ensure that the structural requirements conform to the functional requirements, the rules of our ROs would be subjected to verification by a Panel of Experts appointed by the IMO. The method and criteria to be applied during the verification process is given in a separate MSC resolution: [MSC.296\(87\)](#) – *Adoption of the Guidelines*

for Verification of Conformity with Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers.

(iv) Shipowners should take note that a Ship Construction File (SCF) with specific information on how the functional requirements of GBS have been applied in the ship design and construction shall be provided upon delivery of a new ship, and kept on board the ship and/or ashore and updated as appropriate throughout the ship's service. Guidelines on the SCF and its contents are given in [MSC.1/Circ.1343](#) – *Guidelines for the information to be included in a Ship Construction File*.

(v) Although the GBS regulation will enter into force on 1 January 2012, the earliest application date is 1 July 2016. This is to allow sufficient time for the verification of rules. Further, in 2014, the MSC will review the progress on the implementation of GBS, in particular on verification, and if necessary, to adjust the application dates accordingly. Shipowners should take note that the regulation is applicable by ship length and not gross tonnage. They should liaise with the RO of their choice when planning to construct new vessels which fall within the application dates.

b. Corrosion Protection for Cargo Oil Tanks of Crude Oil Tankers (SOLAS regulation II-1/3-11)

- [MSC.288\(87\)](#) – Performance Standard for Protective Coatings for Cargo Oil Tanks of Crude Oil Tankers
- [MSC.289\(87\)](#) – Performance Standard for Alternative Means of Corrosion Protection for Cargo Oil Tanks of Crude Oil Tankers
- [MSC.291\(87\)](#) – Adoption of Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS)

(i) The new SOLAS regulation II-1/3-11 ([MSC.291\(87\)](#)) requires the under deck and the bottom of cargo oil tanks on new crude oil tankers, as defined in MARPOL Annex I, to be protected against corrosion. The means of protection are to be in accordance with one of the three following methods which were also adopted at this session of MSC:

- applying protective coatings which have been verified to comply with the new IMO Performance Standard, generally epoxy-based coatings ([MSC.288\(87\)](#));
- using an alternative (i.e. non-epoxy-based coatings) means of corrosion protection ([MSC.288\(87\)](#)); or
- using corrosion resistance material (e.g. corrosion-resistant steel) to maintain required structural integrity for 25 years in accordance with the Performance standard for alternative means of corrosion protection ([MSC.289\(87\)](#))

(ii) The regulation enters into force on 1 January 2012 and shall apply to crude oil tankers, as defined in regulation 1 of MARPOL Annex I, of 5,000 tonnes deadweight and above:

- for which the building contract is placed on or after 1 January 2013; or
- in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2013; or
- the delivery of which is on or after 1 January 2016.

(iii) Specification of the cargo oil tank coating system applied, record of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair are required to be documented. These are contained in:

- Coating Technical File (CTF) for epoxy-based and non-epoxy-based coatings; or
- Technical File (TF) for corrosion-resistant steel as alternative means of corrosion protection.

(iv) These files shall be delivered by the shipyard at the new ship construction stage and kept on board and maintained throughout the life of the ship.

(v) MPA delegates the ROs to carry out the approval, inspection and verification requirements of the Performance Standards as well as the review of the CTF or TF and issuance of the Type Approval Certificate.

c. Gas measurement and detection (SOLAS regulation II-2/4.5.7)

- [MSC.291\(87\)](#) – Adoption of Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS)

(i) Portable equipment: Currently, SOLAS requires all tankers to be equipped with at least one portable instrument for measuring flammable vapour concentrations onboard. Under the new amendment, new and existing tankers shall additionally be equipped with at least one portable instrument for measuring oxygen. Tanker owners are advised to place the necessary equipment on board their vessels before 1 January 2012 when the amendment enters into force.

(ii) Fixed hydrocarbon gas detection systems for oil tankers: Additionally, oil tankers of 20,000 tons deadweight and above, constructed on or after 1 January 2012, shall be provided with a fixed hydrocarbon gas detection system. The system is to comply with the mandatory provisions in the Fire Safety Systems Code ([MSC.292\(87\)](#))

and shall be capable of measuring hydrocarbon gas concentrations in all ballast tanks, including the forepeak tank, and voids in double-hull and double-bottom spaces that are adjacent to a cargo tank. Oil tankers provided with constant operative inerting systems for such spaces are exempted from this requirement.

d. International Code for Fire Safety Systems (FSS)

- [MSC.292\(87\)](#) – Adoption of Amendments to the International Code for Fire Safety Systems (FSS Code)

(i) The amendments include a new Chapter 16 – *Fixed Hydrocarbon Gas Detection Systems*, which provides the technical specifications of the new SOLAS amendment to regulation II-2/4/5/7 and enter into force at the same time (1 January 2012). Chapter 10 – *Sample Extraction Smoke Detection Systems* is also revised, primarily to reflect existing practices and is applicable to new ships constructed on or after 1 January 2012.

e. International Life-Saving Appliance (LSA) Code

- [MSC.293\(87\)](#) – Adoption of Amendments to the International Life-Saving Appliance (LSA) Code
- [MSC.295\(87\)](#) – Adoption of Amendments to the Revised Recommendation on Testing of Life-Saving Appliances (Resolution MSC.81(70))

(ii) The test weight of a person is amended to 82.5 kg. The amendment to the LSA Code enters into force on 1 January 2012, but the DE subcommittee may provide an interpretation on the application date in the future. The *Revised Recommendation on Testing of Life-Saving Appliances (Resolution MSC.81(70))* is consequentially amended.

f. International Maritime Dangerous Goods (IMDG) Code

- [MSC.294\(87\)](#) – Adoption of Amendments to the International Maritime Dangerous Goods (IMDG) Code (Amendment 53-10)

(iii) The amendments to the IMDG Code basically update it to the latest developments in the chemical industry. MPA will accept the application of the amendment 35-10 to the IMDG Code by shippers shipping dangerous goods with effect from 1 January 2011 on a voluntary basis, concurrent with the existing IMDG Code. The existing MPA (Dangerous Goods, Petroleum and Explosives) Regulations 2005, as amended, will be updated to give effect to the amendment 35-10 to the IMDG Code when it enters into force on 1 January 2012.

g. Code of Safety for Special Purpose Ships, 2008 (SPS)

- [MSC.299\(87\)](#) – Adoption of Amendments to the Code of Safety for Special Purpose Ships, 2008

(iv) The amendments clarify the provisions of paragraphs 5.1 (UMS) and 8.3 (LSA), and the Record of Equipment for the Special Purpose Ship Safety Certificate.

h. Performance Standards for Bridge Alert Management

- [MSC.302\(87\)](#) – Adoption of Performance Standards for Bridge Alert Management

(v) The purpose of the bridge alert management (BAM) is to enhance the handling, distribution and presentation of alerts and applying the *Guidelines on the application of SOLAS regulation V/15 to INS, IBS and bridge design* ([SN.1/Circ.265](#)), to enable the bridge team to devote full attention to the safe operation of the ship and to immediately identify any alert situation requiring action to maintain the safe operation of the ship.

(vi) Shipowners are encouraged to make use of Bridge Alert Management on board their ships. Any central alert management (CAM) and central alert management human-machine interface (CAM-HMI) installed on the bridge on or after 1 July 2014 should conform to performance standards not inferior to those set out in the Annex to the resolution. Shipowners are further encouraged to apply the general requirements of modules A and C of the performance standards to relevant bridge equipment presenting alerts on or after 1 July 2014.

i. Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)

- [MSC.304\(87\)](#) – Adoption of Amendments to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)

(vi) The purpose of the amendments is mainly to align the BLU Code to the recently adopted International Maritime Solid Bulk Cargoes (IMSBC) Code (see [Shipping circular no. 13 of 2009](#)), by replacing all references to the old Code for the Safe Practice for Solid Bulk Cargoes (BC Code) with references to the IMSBC Code.

Safety of Navigation

j. Mandatory Ship Reporting System “In The Strait Of Gibraltar” (GIBREP)

- [MSC.300\(87\)](#) – Adoption of Amendments to the existing Mandatory Ship Reporting System “In The Strait Of Gibraltar” (GIBREP)

Entry into force: 0000 hours UTC on 1 December 2010

k. Mandatory Ship Reporting System in “The Western European Particularly Sensitive Sea Area” (WETREP)

- [MSC.301\(87\)](#) – Adoption of Amendments to the existing Mandatory Ship Reporting System in “The Western European Particularly Sensitive Sea Area” (WETREP) (Resolution MSC.190(79))

Entry into force: 0000 hours UTC on 1 December 2010

l. Assuring Safety during Demonstrations, Protests or Confrontations on the High Seas

- [MSC.303\(87\)](#) – Assuring Safety during Demonstrations, Protests or Confrontations on the High Seas

(i) Shipowners are advised to note the adoption of amendments to the above two mandatory ship reporting systems GIBREP and WETREP (see also [Shipping circular no. 13 of 2010](#), section 9 “Safety of Navigation”) and the resolution adopted by the IMO condemning demonstrations on the high seas which intentionally imperil human life, property and the marine environment. They are reminded that vessels at all times are to comply with the applicable instruments adopted by the IMO directed at safety of navigation, security and safety of life at sea.

Unified Interpretations (UI)

(i) In addition to the adoption of resolutions, MSC 87 also approved the following Unified Interpretations of SOLAS and other instruments.

- [MSC.1/Circ.1345](#) – SOLAS regulation II-1/27.5
- [MSC.1/Circ.1346](#) – 2000 HSC Code
- [MSC.1/Circ.1350](#) – SOLAS regulation V/22.1.6 relating to navigation bridge visibility
- [MSC.1/Circ.1351](#) – Stowage and segregation requirements for BROWN COAL BRIQUETTES and COAL related to “hot areas” in the IMSBC Code
- [MSC.1/Circ.1362](#) – SOLAS chapter II-1

- [MSC.1/Circ.1368](#) – Interim Clarifications of SOLAS chapter II-2 requirements regarding interrelation between the central control station, navigation bridge and safety centre
- [MSC.1/Circ.1369](#) – Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty
- [LL.3/Circ.194](#) – 1966 LL Convention and the 1988 LL Protocol as modified by resolution MSC.143(77)

(ii) The Unified Interpretations and clarifications are acceptable to MPA and should be followed and applied in accordance with the recommended application dates mentioned in each of the circular. Shipowners are further advised to approach the nine approved classification societies to seek further guidance.

4 Queries relating to this circular should be directed to Mr Ong Hua Siong (Tel: 6375-6210). For queries on compliance with the respective resolutions, please contact the vessel's classification society.

CHEONG KENG SOON
DIRECTOR OF MARINE
MARITIME AND PORT AUTHORITY OF SINGAPORE

RESOLUTION MSC.287(87)
(adopted on 20 May 2010)

**ADOPTION OF THE INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION
STANDARDS FOR BULK CARRIERS AND OIL TANKERS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

BEING DESIROUS that the Organization should play a larger role in determining the structural standards to which new ships are built,

RECALLING ALSO that among the strategic directions of the Organization relating to developing and maintaining a comprehensive framework for safe, secure, efficient and environmentally sound shipping is the establishment of goal-based standards for the design and construction of ships,

CONSIDERING that ships should be designed and constructed for a specified design life to be safe and environmentally friendly, so that, if properly operated and maintained under specified operating and environmental conditions, they can remain safe throughout their service life,

NOTING regulations II-1/2.28 and II-1/3-10 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"), adopted by resolution MSC.290(87), concerning goal-based ship construction standards for bulk carriers and oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-10 requires that bulk carriers and oil tankers as defined therein satisfy the applicable structural requirements of a recognized organization, or national standards of an Administration, conforming to the functional requirements of the goal-based ship construction standards for bulk carriers and oil tankers,

HAVING CONSIDERED, at its eighty-seventh session, the proposed International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers,

1. ADOPTS the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, the text of which is set out in the Annex to the present resolution;
2. INVITES Contracting Governments to the Convention to note that the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers will take effect on 1 January 2012 upon entry into force of regulation II-1/3-10 of the Convention;
3. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, contained in the Annex, to all Contracting Governments to the Convention;
4. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

**INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION STANDARDS
FOR BULK CARRIERS AND OIL TANKERS****1 PREAMBLE**

1.1 The notion of "goal-based ship construction standards" was introduced in the Organization at the eighty-ninth session of the Council in November 2002 through a proposal by the Bahamas and Greece*, suggesting that the Organization should develop ship construction standards that would permit innovation in design but ensure that ships are constructed in such a manner that, if properly maintained, they remain safe for their entire economic life. The standards would also have to ensure that all parts of a ship can be easily accessed to permit proper inspection and ease of maintenance. The Council referred the proposal to the seventy-seventh meeting of the Maritime Safety Committee (MSC) in May/June 2003 for consideration.

1.2 The MSC, at its seventy-seventh session, considered the matter as requested and recommended that the ninetieth session of the Council should consider it further in the context of the development of the Organization's Strategic Plan. The Committee also agreed to include a new item on "Goal-based new ship construction standards" in its work programme and agenda for its next meeting.

1.3 The ninetieth session of the Council, in considering the strategy and policy of the Organization for the 2006 to 2011 period, approved strategic directions regarding the development of goal-based standards for the design and construction of new ships. Subsequently, at its twenty-second extraordinary session, the Council included in the strategic directions of the Organization a provision that "IMO will establish goal-based standards for the design and construction of new ships".

1.4 The Assembly, at its twenty-third session in November/December 2003, when adopting resolution A.944(23) on the Organization's Strategic plan for the six-year period 2004 to 2010, resolved, *inter alia*, that "the IMO would establish goal-based standards for the design and construction of new ships". This decision was also reflected in resolution A.943(23) on the Long-term work plan of the Organization, up to 2010, where the subject "Goal-based new ship construction standards" was introduced in the list of general subjects.

1.5 The MSC commenced detailed technical work on the development of goal-based ship construction standards at its seventy-eighth session in May 2004, when a comprehensive general debate of the issues involved took place and the Committee agreed to utilize a five-tier system initially proposed by the Bahamas, Greece and IACS, consisting of the following:

- .1 ***Tier I – Goals***
High-level objectives to be met.
- .2 ***Tier II – Functional requirements***
Criteria to be satisfied in order to conform to the goals.

* Document C 89/12/1 (Bahamas, Greece) – IMO Strategic Plan.

- .3 ***Tier III – Verification of conformity***
Procedures for verifying that the rules and regulations for ship design and construction conform to the goals and functional requirements.
- .4 ***Tier IV – Rules and regulations for ship design and construction***
Detailed requirements developed by IMO, national Administrations and/or recognized organizations and applied by national Administrations and/or recognized organizations acting on their behalf to the design and construction of a ship in order to conform to the goals and functional requirements.
- .5 ***Tier V – Industry practices and standards***
Industry standards, codes of practice and safety and quality systems for shipbuilding, ship operation, maintenance, training, manning, etc., which may be incorporated into, or referenced in, the rules and regulations for the design and construction of a ship.

1.6 Following deliberation on the subject at its eighty-first session, the Committee agreed to limit the scope of its consideration initially to bulk carriers and oil tankers and consider expansion to other ship types and areas of safety at a later time.

2 SCOPE

The International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (hereinafter referred to as "the Standards") describe the goals and establish the functional requirements that the rules for the design and construction of bulk carriers and oil tankers of an organization recognized by the Administration, or the national rules of an Administration, shall conform to, as defined in SOLAS regulations II-1/2.28 and II-1/3-10. Additionally, the Standards establish that the above mentioned rules shall be verified as conforming to the goals and functional requirements.

3 STRUCTURE

These Standards consist of the following three tiers:

- Tier I – Goals
- Tier II – Functional requirements
- Tier III – Verification of conformity.

4 TIER I – GOALS

The Tier I goals are as defined in SOLAS regulation II-1/3-10 and are reproduced here for ease of reference, as follows:

Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

- .1 *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimize the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

- .2 *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.
- .3 *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.
- .4 *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.
- .5 *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

5 TIER II – FUNCTIONAL REQUIREMENTS

(Applicable to bulk carriers and oil tankers in unrestricted navigation*)

DESIGN

II.1 Design life

The specified design life shall not be less than 25 years.

II.2 Environmental conditions

Ships shall be designed in accordance with North Atlantic environmental conditions and relevant long-term sea state scatter diagrams.

II.3 Structural strength

II.3.1 General design

The ship's structural members shall be of a design that is compatible with the purpose of the space and ensures a degree of structural continuity. The structural members of ships shall be designed to facilitate load/discharge for all contemplated cargoes to avoid damage by loading/discharging equipment, which may compromise the safety of the structure.

II.3.2 Deformation and failure modes

The structural strength shall be assessed against excessive deflection and failure modes, including but not limited to buckling, yielding and fatigue.

* Unrestricted navigation means that the ship is not subject to any geographical restrictions (i.e. any oceans, any seasons) except as limited by the ship's capability for operation in ice.

II.3.3 Ultimate strength

Ships shall be designed to have adequate ultimate strength. Ultimate strength calculations shall include ultimate hull girder capacity and related ultimate strength of plates and stiffeners, and be verified for a longitudinal bending moment based on the environmental conditions in functional requirement II.2.

II.3.4 Safety margins

Ships shall be designed with suitable safety margins:

- .1 to withstand, at net scantlings*, in the intact condition, the environmental conditions anticipated for the ship's design life and the loading conditions appropriate for them, which shall include full homogeneous and alternate loads, partial loads, multi-port and ballast voyage, and ballast management condition loads and occasional overruns/overloads during loading/unloading operations, as applicable to the class designation; and
- .2 appropriate for all design parameters whose calculation involves a degree of uncertainty, including loads, structural modelling, fatigue, corrosion, material imperfections, construction workmanship errors, buckling, residual and ultimate strength.

II.4 Fatigue life

The design fatigue life shall not be less than the ship's design life and shall be based on the environmental conditions in functional requirement II.2.

II.5 Residual strength

Ships shall be designed to have sufficient strength to withstand the wave and internal loads in specified damaged conditions such as collision, grounding or flooding. Residual strength calculations shall take into account the ultimate reserve capacity of the hull girder, including permanent deformation and post-buckling behaviour. Actual foreseeable scenarios shall be investigated in this regard as far as is reasonably practicable.

II.6 Protection against corrosion

Measures shall be applied to ensure that net scantlings required to meet structural strength provisions are maintained throughout the specified design life. Measures include, but are not limited to, coatings, corrosion additions, cathodic protection, impressed current systems, etc.

II.6.1 Coating life

Coatings shall be applied and maintained in accordance with manufacturers' specifications concerning surface preparation, coating selection, application and maintenance. Where coating is required to be applied, the design coating life shall be specified. The actual coating life may be longer or shorter than the design coating life, depending on the actual conditions

* The net scantlings should provide the structural strength required to sustain the design loads, assuming the structure is in intact condition and without any corrosion margin. However, when assessing fatigue and global strength of hull girder and primary supporting structures, a portion of the total corrosion margin may be added to the net scantlings to reflect the material thickness that can reasonably be expected to exist over the design life.

and maintenance of the ship. Coatings shall be selected as a function of the intended use of the compartment, materials and application of other corrosion prevention systems, e.g., cathodic protection or other alternatives.

II.6.2 Corrosion addition

The corrosion addition shall be added to the net scantling and shall be adequate for the specified design life. The corrosion addition shall be determined on the basis of exposure to corrosive agents such as water, cargo or corrosive atmosphere, or mechanical wear, and whether the structure is protected by corrosion prevention systems, e.g., coating, cathodic protection or by alternative means. The design corrosion rates (mm/year) shall be evaluated in accordance with statistical information established from service experience and/or accelerated model tests. The actual corrosion rate may be greater or smaller than the design corrosion rate, depending on the actual conditions and maintenance of the ship.

II.7 Structural redundancy

Ships shall be of redundant design and construction so that localized damage (such as local permanent deformation, cracking or weld failure) of any stiffening structural member will not lead to immediate consequential collapse of the complete stiffened panel.

II.8 Watertight and weathertight integrity

Ships shall be designed to have adequate watertight and weathertight integrity for the intended service of the ship and adequate strength and redundancy of the associated securing devices of hull openings.

II.9 Human element considerations

Ship's structures and fittings shall be designed and arranged using ergonomic principles to ensure safety during operations, inspection and maintenance. These considerations shall include, but not be limited to, stairs, vertical ladders, ramps, walkways and standing platforms used for means of access, the work environment, inspection and maintenance and the facilitation of operation.

II.10 Design transparency

Ships shall be designed under a reliable, controlled and transparent process made accessible to the extent necessary to confirm the safety of the new as-built ship, with due consideration to intellectual property rights. Readily available documentation shall include the main goal-based parameters and all relevant design parameters that may limit the operation of the ship.

CONSTRUCTION

II.11 Construction quality procedures

Ships shall be built in accordance with controlled and transparent quality production standards with due regard to intellectual property rights. The ship construction quality procedures shall include, but not be limited to, specifications for material, manufacturing, alignment, assembling, joining and welding procedures, surface preparation and coating.

II.12 Survey during construction

A survey plan shall be developed for the construction phase of the ship, taking into account the ship type and design. The survey plan shall contain a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards.

IN-SERVICE CONSIDERATIONS

II.13 Survey and maintenance

Ships shall be designed and constructed to facilitate ease of survey and maintenance, in particular avoiding the creation of spaces too confined to allow for adequate survey and maintenance activities. Areas shall be identified that need special attention during surveys throughout the ship's life. In particular, this shall include all necessary in-service survey and maintenance that was assumed when selecting ship design parameters.

II.14 Structural accessibility

The ship shall be designed, constructed and equipped to provide adequate means of access to all internal structures to facilitate overall and close-up inspections and thickness measurements.

RECYCLING CONSIDERATIONS

II.15 Recycling

Ships shall be designed and constructed of materials for environmentally acceptable recycling without compromising the safety and operational efficiency of the ship.

6 TIER III – VERIFICATION OF CONFORMITY

6.1 The rules for the design and construction of bulk carriers and oil tankers of an organization which is recognized by an Administration in accordance with the provisions of SOLAS regulation XI-1/1, or national rules of an Administration used as an equivalent to the rules of a recognized organization according to SOLAS regulation II-1/3-1, shall be verified as conforming to the Tier I goals and Tier II functional requirements, based on the guidelines developed by the Organization*. The final decision on verification of conformity shall be taken by the Maritime Safety Committee of the Organization which shall inform all Contracting Governments of the decision.

6.2 The term "verification" (and any variation of the word "verify") means that the rules for the design and construction of bulk carriers and oil tankers as described above have been compared to the Standards and have been found to be in conformity with or are consistent with the goals and functional requirements as set out in the Standards.

6.3 Once the rules for the design and construction of bulk carriers and oil tankers of an Administration or recognized organization have been verified as being in conformity with the Standards, this conformity shall be considered to remain in effect for rule changes, provided

* Refer to the Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers, adopted by the Organization by resolution MSC.296(87).

that no verification of rule changes has resulted in a non-conformity. Unless the Maritime Safety Committee decides otherwise, any rule changes introduced as a result of verification of conformity shall apply to ships for which the building contract is placed on or after the date on which the rule change enters into force.

RESOLUTION MSC.288(87)
(adopted on 14 May 2010)

**PERFORMANCE STANDARD FOR PROTECTIVE COATINGS
FOR CARGO OIL TANKS OF CRUDE OIL TANKERS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING regulation II-1/3-11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention") adopted by resolution MSC.291(87), concerning protective coatings for cargo oil tanks of crude oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-11 provides that the protective coatings referred to therein shall comply with the requirements of the Performance standard for protective coatings for cargo oil tanks of crude oil tankers (hereinafter referred to as "the Performance standard for protective coatings"),

RECOGNIZING that the Performance standard for protective coatings referred to above is not intended to inhibit the development of new or novel technologies which provide for alternative systems,

HAVING CONSIDERED, at its eighty-seventh session, the text of the proposed Performance standard for protective coatings,

1. ADOPTS the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, the text of which is set out in the Annex to the present resolution;
2. INVITES Contracting Governments to the Convention to note that the Performance standard for protective coatings will take effect on 1 January 2012 upon entry into force of SOLAS regulation II-1/3-11;
3. NOTES that, under the provisions of SOLAS regulation II-1/3-11.3.1, amendments to the Performance standard for protective coatings shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of that Convention concerning the amendment procedure applicable to the Annex to the Convention other than chapter I;
4. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention;

6. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results;

7. RESOLVES to keep the Performance standard for protective coatings under review and amend them as necessary, in light of experience gained in its application.

ANNEX

**PERFORMANCE STANDARD FOR PROTECTIVE COATINGS
FOR CARGO OIL TANKS OF CRUDE OIL TANKERS****1 PURPOSE**

This Standard provides technical requirements for the minimum standard for protective coatings to be applied in cargo oil tanks during the construction of new crude oil tankers.

2 DEFINITIONS

For the purpose of this Standard, the following definitions apply:

2.1 *Crude oil tanker* is as defined in Annex I of MARPOL 73/78.

2.2 *Dew point* is the temperature at which air is saturated with moisture.

2.3 *DFT* is dry film thickness.

2.4 *Dust* is loose particulate matter present on a surface prepared for painting, arising from blast-cleaning or other surface preparation processes, or resulting from the action of the environment.

2.5 *Edge grinding* is the treatment of the edge before secondary surface preparation.

2.6 "*GOOD*" *condition* is the condition with minor spot rusting as defined in resolution A.744(18) for assessing the ballast tank coatings for tankers.

2.7 *Hard coating* is a coating that chemically converts during its curing process or a non-convertible air drying coating which may be used for maintenance purposes. This can be either inorganic or organic.

2.8 *NDFT* is the nominal dry film thickness. 90/10 practice means that 90% of all thickness measurements shall be greater than or equal to NDFT and none of the remaining 10% measurements shall be below 0.9 x NDFT.

2.9 *Primer coat* is the first coat of the coating system applied in the shipyard after shop primer application.

2.10 *Shop primer* is the prefabrication primer coating applied to steel plates, often in automatic plants (and before the first coat of a coating system).

2.11 *Stripe coating* is painting of edges, welds, hard to reach areas, etc., to ensure good paint adhesion and proper paint thickness in critical areas.

2.12 *Target useful life* is the target value, in years, of the durability for which the coating system is designed.

2.13 *Technical Data Sheet* is the paint manufacturer's Product Data Sheet which contains detailed technical instruction and information relevant to the coating and its application.

3 GENERAL PRINCIPLES

3.1 The ability of the coating system to reach its target useful life depends on the type of coating system, steel preparation, operating environment, application and coating inspection and maintenance. All these aspects contribute to the good performance of the coating system.

3.2 Inspection of surface preparation and coating processes shall be agreed upon between the shipowner, the shipyard and the coating manufacturer and presented to the Administration for review. Clear evidence of these inspections shall be reported and included in the Coating Technical File (CTF) (see subsection 3.4).

3.3 When considering the Standard provided in section 4, the following is to be taken into account:

- .1 it is essential that specifications, procedures and the various different steps in the coating application process (including, but not limited to, surface preparation) are strictly applied by the shipbuilder in order to prevent premature decay and/or deterioration of the coating system;
- .2 the coating performance can be improved by adopting measures at the ship design stage such as reducing scallops, using rolled profiles, avoiding complex geometric configurations and ensuring that the structural configuration permits easy access for tools and to facilitate cleaning, drainage and drying of the space to be coated; and
- .3 the coating performance standard provided in this document is based on experience from manufacturers, shipyards and ship operators; it is not intended to exclude suitable alternative coating systems, providing a performance at least equivalent to that specified in this Standard is demonstrated. Acceptance criteria for alternative systems are provided in section 8.

3.4 Coating Technical File (CTF)

3.4.1 Specification of the cargo oil tank coating system applied, record of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair shall be included in the Coating Technical File required by resolution MSC.215(82).

3.4.2 *New construction stage*

The Coating Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

- .1 copy of Statement of Compliance or Type Approval Certificate;
- .2 copy of Technical Data Sheet, including:
 - .2.1 product name and identification mark and/or number;
 - .2.2 materials, components and composition of the coating system, colours;

- .2.3 minimum and maximum dry film thickness;
- .2.4 application methods, tools and/or machines;
- .2.5 condition of surface to be coated (de-rusting grade, cleanness, profile, etc.); and
- .2.6 environmental limitations (temperature and humidity);
- .3 shipyard work records of coating application, including:
 - .3.1 applied actual areas (in square metres) of coating in each cargo oil tank;
 - .3.2 applied coating system;
 - .3.3 time of coating, thickness, number of layers, etc.;
 - .3.4 ambient conditions during coating; and
 - .3.5 details of surface preparation;
- .4 procedures for inspection and repair of coating system during ship construction;
- .5 coating log issued by the coating inspector – stating that the coating was applied in accordance with the specifications to the satisfaction of the coating supplier representative and specifying deviations from the specifications (see annex 2);
- .6 shipyard's verified inspection report, including:
 - .6.1 completion date of inspection;
 - .6.2 result of inspection;
 - .6.3 remarks (if given); and
 - .6.4 inspector signature; and
- .7 procedures for in-service maintenance and repair of coating systems.*

3.4.3 ***In-service maintenance and repair***

In-service maintenance and repair activities shall be recorded in the Coating Technical File in accordance with the relevant section of the Guidelines for coating maintenance and repair.

3.4.4 The Coating Technical File shall be kept on board and maintained throughout the life of the ship.

*

Guidelines to be developed by the Organization.

3.5 Health and safety

The shipyard is responsible for implementation of national regulations to ensure the health and safety of individuals and to minimize the risk of fire and explosion.

4 COATING STANDARD

4.1 Performance standard

This Standard is based on specifications and requirements to provide a target useful coating life of 15 years, which is considered to be the time period, from initial application, over which the coating system is intended to remain in "GOOD" condition. The actual useful life will vary, depending on numerous variables including actual conditions encountered in service.

4.2 Standard application

Protective coatings for cargo oil tanks applied during the construction of new crude oil tankers shall at least comply with the requirements in this Standard.

4.3 Coating system

An epoxy-based system meeting test and physical properties (table 1.1.3) shall be documented, and a Type Approval Certificate or Statement of Compliance shall be provided.

4.4 Area of application

The following areas are the minimum areas that shall be protected according to this Standard:

- .1 Deckhead with complete internal structure, including brackets connecting to longitudinal and transverse bulkheads. In tanks with ring frame girder construction the underdeck transverse framing to be coated down to level of the first tripping bracket below the upper faceplate.
- .2 Longitudinal and transverse bulkheads to be coated to the uppermost means of access level. The uppermost means of access and its supporting brackets to be fully coated.
- .3 On cargo tank bulkheads without an uppermost means of access the coating to extend to 10% of the tanks height at centreline but need not extend more than 3 m down from the deck.
- .4 Flat inner bottom and all structure to height of 0.3 m above inner bottom to be coated.

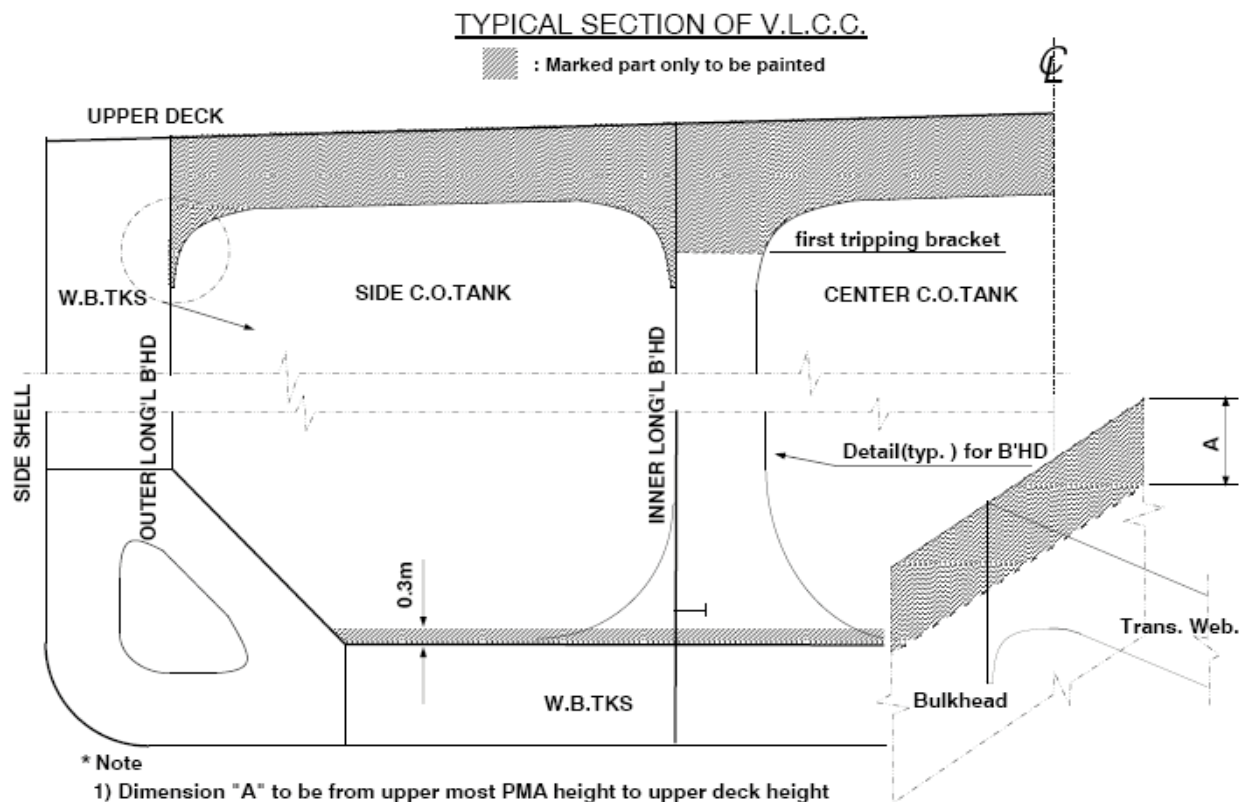


Figure 1

4.5 Special application

4.5.1 This Standard covers protective coating requirements for steel structure within cargo oil tanks. It is noted that there are other independent items that are fitted within the cargo oil tanks and to which coatings are applied to provide protection against corrosion.

4.5.2 It is recommended that this Standard is applied, to the extent practicable, to those portions of means of access provided for inspection within the areas specified in subsection 4.4 that are not integral to the ship structure, such as rails, independent platforms, ladders, etc. Other equivalent methods of providing corrosion protection for non-integral items may also be used, provided they do not impair the performance of the coatings of the surrounding structure. Access arrangements that are integral to the ship structure, such as stiffener depths for walkways, stringers, etc., are to fully comply with this Standard when located within the coated areas.

4.5.3 It is also recommended that supports for piping, measuring devices, etc., be coated as a minimum in accordance with the non-integral items indicated in paragraph 4.5.2.

4.6 Basic coating requirements

4.6.1 The requirements for protective coating systems to be applied at ship construction for the cargo oil tanks of crude oil tankers meeting the performance standard specified in paragraph 4.1 are listed in table 1.

4.6.2 Coating manufacturers shall provide a specification of the protective coating system to satisfy the requirements of table 1 and the operating environment.

4.6.3 The Administration shall verify the Technical Data Sheet and Statement of Compliance or Type Approval Certificate for the protective coating system.

4.6.4 The shipyard shall apply the protective coating in accordance with the verified Technical Data Sheet and its own verified application procedures.

4.7 The referenced standards listed in this Standard are acceptable to the Organization. Test equipment, test methods, preparation methods and/or test results shall conform to performance standards not inferior to those acceptable to the Organization.

Table 1 – Basic coating system requirements for cargo oil tanks of crude oil tankers

	Characteristic	Requirement
1	Design of coating system	
.1	Selection of the coating system	<p>The selection of the coating system shall be considered by the parties involved with respect to the service conditions and planned maintenance. The following aspects, among other things shall be considered:</p> <ul style="list-style-type: none"> .1 location of space relative to heated surfaces; .2 frequency of cargo operations; .3 required surface conditions; .4 required surface cleanliness and dryness; .5 supplementary cathodic protections, if any (where coating is supplemented by cathodic protection, the coating shall be compatible with the cathodic protection system); .6 permeability of the coating and resistance to inert gas and acids; and .7 appropriate mechanical properties (flexibility, impact resistance). <p>The coating manufacturer shall supply products with documented satisfactory performance records and technical data sheets. The manufacturer shall also be capable of rendering adequate technical assistance. Performance records, technical data sheet and any manufacturer's technical assistance provided shall be recorded in the Coating Technical File.</p> <p>Coatings for application underneath sun-heated decks or on bulkheads forming boundaries of heated spaces shall be able to withstand repeated heating and/or cooling without becoming brittle.</p>
.2	Coating type	<p>Epoxy-based systems.</p> <p>Other coating systems with performance according to the test procedure in the annex.</p> <p>A multi-coat system with each coat of a contrasting colour is recommended.</p> <p>The top coat shall be of a light colour to facilitate in-service inspection.</p> <p>Consideration should be given to the use of enhanced coatings in way of suction bellmouths and heating coil downcomers.</p> <p>Consideration should be given to the use of supplementary cathodic protection where there may be galvanic issues.</p>

	Characteristic	Requirement
.3	Coating test	<p>Epoxy-based systems tested prior to the date of entry into force of this Standard in a laboratory by a method corresponding to the test procedure in annex 1 or equivalent, which as a minimum meets the requirements for rusting and blistering, or which have documented field exposure for 5 years with a final coating condition of not less than "GOOD", may be accepted.</p> <p>For epoxy-based systems approved on or after entry into force of this Standard, testing according to the procedure in annex 1, or equivalent, is required.</p>
.4	Job specification	<p>There shall be a minimum of two stripe coats and two spray coats, except that the second stripe coat, by way of welded seams only, may be reduced in scope where it is proven that the NDFT can be met by the coats applied in order to avoid unnecessary over thickness. Any reduction in scope of the second stripe coat shall be fully detailed in the CTF.</p> <p>Stripe coat shall be applied by brush or roller. Roller shall be used for scallops, ratholes, etc., only.</p> <p>Each main coating layer shall be appropriately cured before application of the next coat, in accordance with the coating manufacturer's recommendations.</p> <p>Job specifications shall include the dry-to-recoat times and walk-on time given by the manufacturer.</p> <p>Surface contaminants such as rust, grease, dust, salt, oil, etc., shall be removed prior to painting. The method to be according to the paint manufacturer's recommendations. Abrasive inclusions embedded in the coating shall be removed.</p>
.5	NDFT (nominal total dry film thickness) ¹	<p>NDFT 320 µm with 90/10 rule for epoxy-based systems; other systems to the coating manufacturer's specifications.</p> <p>Maximum total dry film thickness according to the manufacturer's detailed specifications.</p> <p>Care shall be taken to avoid increasing the DFT in an exaggerated way. Wet film thickness shall be regularly checked during application.</p> <p>Thinners shall be limited to those types and quantities recommended by the manufacturer.</p>

¹ Type of gauge and calibration in accordance with SSPC-PA2:2004 Paint Application Specification No.2.

	Characteristic	Requirement
2 PSP (Primary surface preparation)		
.1	Blasting and profile ^{2,3}	<p>Sa 2½; with profiles between 30-75 µm.</p> <p>Blasting shall not be carried out when:</p> <ul style="list-style-type: none"> .1 the relative humidity is above 85%; or .2 the surface temperature of steel is less than 3°C above the dew point. <p>Checking of the steel surface cleanliness and roughness profile shall be carried out at the end of the surface preparation and before the application of the primer, and in accordance with the coating manufacturer's recommendations.</p>
.2	Water soluble salt limit equivalent to NaCl ⁴	≤ 50 mg/m ² of sodium chloride.
.3	Shop primer	<p>Zinc containing inhibitor free zinc silicate based or equivalent.</p> <p>Compatibility with main coating system shall be confirmed by the coating manufacturer.</p>
3 Secondary surface preparation		
.1	Steel condition ⁵	<p>The steel surface to be coated shall be prepared so that the coating selected can achieve an even distribution at the required NDFT and have an adequate adhesion by removing sharp edges, grinding weld beads and removing weld spatter and any other surface contaminant to grade P2.</p> <p>Edges to be treated to a rounded radius of minimum 2 mm, or subjected to three pass grinding or at least equivalent process before painting.</p>

² Refer to standard ISO 8501-1: 1988/Suppl: 1994. Preparation of steel substrate before application of paints and related products – Visual assessment of surface cleanliness.

³ Refer to standard ISO 8503-1/2: 1988. Preparation of steel substrate before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates.

⁴ Conductivity measured in accordance with the following standard ISO 8502-9: 1998. Preparation of steel substrate before application of paints and related products – Test for the assessment of surface cleanliness.

⁵ Refer to standard ISO 8501-3: 2001. Preparation of steel substrate before application of paints and related products – Visual assessment of surface cleanliness.

	Characteristic	Requirement
.2	Surface treatment ⁶	<p>Sa 2½ on damaged shop primer and welds.</p> <p>All surfaces to be coated shall be blasted to Sa 2, removing at least 70% of intact shop primer, which has not passed a pre-qualification certified by test procedures in table 1.3.</p> <p>If the complete coating system comprising epoxy-based main coating and shop primer has passed a pre-qualification certified by test procedures in table 1.3 intact shop primer may be retained provided the same epoxy-based system is used. Retained shop primer shall be cleaned by sweep blasting, high pressure water washing or equivalent method.</p> <p>If a zinc silicate shop primer has passed the pre-qualification test of table 1.3 as part of an epoxy coating system, it may be used in combination with other epoxy coatings certified under table 1.3, provided that the compatibility has been confirmed by the manufacturer by the test with reference to the immersion test of annex 1 or in accordance with the Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers (resolution MSC.215(82)).</p>
.3	Surface treatment after erection	<p>Erection joints St 3 or better or Sa 2½ where practicable.</p> <p><i>For inner bottom:</i></p> <ul style="list-style-type: none"> - Damages up to 20% of the area to be coated to be treated to minimum St 3. - Contiguous damages over 25 m² or over 20% of the area to be coated, Sa 2½ shall be applied. <p><i>For underdeck:</i></p> <ul style="list-style-type: none"> - Damages up to 3% of area to be coated to be treated to minimum St 3. - Contiguous damages over 25 m² or over 3% of the area to be coated, Sa 2½ shall be applied. <p>Coating in overlap to be feathered.</p>
.4	Profile requirements ⁷	In case of full or partial blasting 30-75 µm, otherwise as recommended by the coating manufacturer.
.5	Dust ⁸	<p>Dust quantity rating "1" for dust size class "3", "4" or "5".</p> <p>Lower dust size classes to be removed if visible on the surface to be coated without magnification.</p>

⁶ Refer to standard ISO 8501-1: 1988/Supplement: 1994. Preparation of steel substrate before application of paints and related products – Visual assessment of surface cleanliness.

⁷ Refer to standard ISO 8503-1/2: 1988. Preparation of steel substrate before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates.

⁸ Refer to standard ISO 8502-3:1993. Preparation of steel substrate before application of paints and related products – Test for the assessment of surface cleanliness.

	Characteristic	Requirement
.6	Water soluble salts limit equivalent to NaCl after blasting/grinding ⁹	$\leq 50 \text{ mg/m}^2$ of sodium chloride.
.7	Contamination	No oil contamination. Paint manufacturer's recommendations should be followed regarding any other contamination between coats.
4	Miscellaneous	
.1	Ventilation	Adequate ventilation is necessary for the proper drying and curing of coating. Ventilation should be maintained throughout the application process and for a period after application is completed, as recommended by the coating manufacturer.
.2	Environmental conditions	Coating shall be applied under controlled humidity and surface conditions, in accordance with the manufacturer's specifications. In addition, coating shall not be applied when: <ul style="list-style-type: none"> .1 the relative humidity is above 85%; or .2 the surface temperature is less than 3°C above the dew point; or .3 any other requirements of the paint manufacturer are not being met.
.3	Testing of coating ¹⁰	Destructive testing should be avoided. Sample dry film thickness shall be measured after each coat for quality control purposes and the total dry film thickness shall be confirmed after completion of the final coat, using appropriate thickness gauges.
.4	Repair	Any defective areas, e.g., pinholes, bubbles, voids, etc., shall be marked up and appropriate repairs effected. All such repairs shall be re-checked and documented.

⁹ Conductivity measured in accordance with standard ISO 8502-9: 1998 – Preparation of steel substrate before application of paints and related products – Test for the assessment of surface cleanliness.

¹⁰ Type of gauge and calibration in accordance with standard SSPC-PA2: 2004 – Paint Application Specification No.2.

5 COATING SYSTEM APPROVAL

Results from prequalification tests (table 1, paragraph 1.3) of the coating system shall be documented, and a Statement of Compliance or Type Approval Certificate shall be issued if found satisfactory by a third party, independent of the coating manufacturer.

6 COATING INSPECTION REQUIREMENTS

6.1 General

6.1.1 To ensure compliance with this Standard, the following shall be carried out by qualified coating inspectors certified to NACE Coating Inspector Level 2, FROSIO Inspector Level III or equivalent as verified by the Administration.

6.1.2 Coating inspectors shall inspect surface preparation and coating application during the coating process by carrying out, as a minimum, those inspection items identified in subsection 6.2 to ensure compliance with this Standard. Emphasis shall be placed on initiation of each stage of surface preparation and coatings application as improper work is extremely difficult to correct later in the coating progress. Representative structural members shall be non-destructively examined for coating thickness. The inspector shall verify that appropriate collective measures have been carried out.

6.1.3 Results from the inspection shall be recorded by the inspector and shall be included in the CTF (see annex 2).

6.2 Inspection items

Construction stage		Inspection items
Primary surface preparation	1	The surface temperature of steel, the relative humidity and the dew point shall be measured and recorded before the blasting process starts and at times of sudden changes in weather.
	2	The surface of steel plates shall be tested for soluble salt checked for oil, grease and other contamination.
	3	The cleanliness of the steel surface shall be monitored in the shop primer application process.
	4	The shop primer material shall be confirmed to meet the requirements of 2.3 of table 1. Verified by manufacturer.
Thickness		If compatibility with the main coating system has been declared, then the thickness and curing of the zinc silicate shop primer to be confirmed to conform to the specified values.
Block assembly	1	After completing construction of the block and before secondary surface preparation starts, a visual inspection for steel surface treatment including edge treatment shall be carried out. Any oil, grease or other visible contamination to be removed.

Construction stage		Inspection items
	2	After blasting/grinding/cleaning and prior to coating, a visual inspection of the prepared surface shall be carried out. On completion of blasting and cleaning and prior to the application of the first coat of the system, the steel surface shall be tested for levels of remaining soluble salts in at least one location per block.
	3	The surface temperature, the relative humidity and the dew point shall be monitored and recorded during the coating application and curing.
	4	Inspection to be performed of the steps in the coating application process mentioned in table 1.
	5	DFT measurements shall be taken to prove that the coating has been applied to the thickness as specified.
Erection	1	Visual inspection for steel surface condition, surface preparation and verification of conformance to other requirements in table 1, and the agreed specification to be performed.
	2	The surface temperature, the relative humidity and the dew point shall be measured and recorded before coating starts and regularly during the coating process.
	3	Inspection to be performed of the steps in the coating application process mentioned in table 1.

7 COATING VERIFICATION REQUIREMENTS

The following shall be carried out by the Administration prior to reviewing the Coating Technical File for the ship subject to this Standard:

- .1 check that the Technical Data Sheet and Statement of Compliance or Type Approval Certificate comply with the Standard;
- .2 check that the coating identification on representative containers is consistent with the coating identified in the Technical Data Sheet and Statement of Compliance or Type Approval Certificate;
- .3 check that the inspector is qualified in accordance with the qualification standards in paragraph 6.1.1;
- .4 check that the inspector's reports of surface preparation and the coating's application indicate compliance with the manufacturer's Technical Data Sheet and Statement of Compliance or Type Approval Certificate; and
- .5 monitor implementation of the coating inspection requirements.

8 ALTERNATIVE COATING SYSTEMS

8.1 All systems that are not an epoxy-based system applied according to table 1 of this Standard are defined as an alternative system.

8.2 This Standard is based on recognized and commonly used coating systems. It is not meant to exclude other, alternative, systems with proven equivalent performance, for example non-epoxy-based systems.

8.3 Acceptance of alternative systems shall be subject to documented evidence that they ensure a corrosion prevention performance at least equivalent to that indicated in this Standard, by either:

- .1 testing according to this standard; or
- .2 five years' field exposure with documentary evidence of continuous trading with crude oil cargoes.¹¹ The coating condition is not less than "GOOD" after five years.

¹¹ For field exposure the ship should be trading in varied trade routes and carrying substantial varieties of crude oils to ensure a realistic sample: for example, three ships on three different trade areas with different varieties of crude cargoes.

ANNEX 1

**TEST PROCEDURES FOR COATING QUALIFICATION FOR CARGO OIL TANKS OF
CRUDE OIL TANKERS****1 Scope**

This annex provides details of the test procedures for cargo tank coatings for crude oil carriers as referred to in paragraphs 4.6 and 8.3 of this Standard. Both the tank-top and deck-head should be applied with coating systems that have passed the full test protocol as described in this document.

2 Definitions

Coating specification means the specification of coating systems which include the type of coating system, steel preparation, surface preparation, surface cleanliness, environmental conditions, application procedure, inspection and acceptance criteria.

3 Background

It is acknowledged that a crude oil cargo tank on board a ship is exposed to two very different environmental conditions.

3.1 When the cargo tank is loaded there are three distinct vertical zones:

- .1 Lowest part, and horizontal parts on stringer decks, etc., exposed to water that can be acidic and sludge that can contain anaerobic bacteria.
- .2 Mid part where the oil cargo is in contact with all immersed steel.
- .3 Vapour space where the air is saturated with various vapours from the loaded cargo tank such as H₂S, CO₂, SO₂, water vapour and other gases and compounds from the inert gas system.

3.2 When the tank is in a ballast condition:

- .1 Lowest part and horizontal parts on stringer decks, etc., exposed to cargo residues and water that can be acidic and sludge that can contain anaerobic bacteria.
- .2 Tank space where the air contains various vapours from the crude oil residues such as H₂S, CO₂, SO₂, water vapour and other gases and compounds from the inert gas system.

4 Testing

The tests herein are designed to simulate, as far as practicable, the two main environmental conditions to which the crude oil cargo tank coating will be exposed. The coating shall be validated by the following tests: the test procedures shall comply with Appendix 1 (Gas-tight chamber simulating the vapour phase of the loaded tank) and Appendix 2 (Immersion test simulating the loaded condition of the crude oil tank¹²).

¹² Related test method is derived from, but not identical to, standard ISO 2812-1:2007 – Paints and varnishes – Determination of resistance to liquids – Part 1: Immersion in liquids other than water.

5 Test gas composition

The test gas is based on the composition of the vapour phase in crude oil tanks, except that the hydrocarbon components are not included as these have no detrimental effect on epoxy coatings such as those used in cargo oil tanks.

TEST GAS COMPOSITION

N ₂	83 ± 2 per cent by volume of dry gas
CO ₂	13 ± 2 per cent by volume of dry gas
O ₂	4 ± 1 per cent by volume of dry gas
SO ₂	300 ± 20 ppm
H ₂ S	200 ± 20 ppm

6 Test liquid

Crude oil is a complex chemical material which is not stable over time when stocked. Crude oils can also vary in composition over time. In addition the use of crude oil has proven to create practical and HSE barriers for the involved testing institutes. To overcome this, a model immersion liquid is used to simulate crude oil. The formulation of this crude oil model system is given below:

- .1 start with distillate Marine Fuel, DMA Grade¹³ density at 15°C: maximum 890 kg/m³, viscosity of maximum 6 mm²/s at 40°C;
- .2 add naphthenic acid up to an acid number¹⁴ of 2.5 ± 0.1 mg KOH/g;
- .3 add benzene/ toluene (1:1 ratio) up to a total of 8.0 ± 0.2% w/w of the DMA;
- .4 add artificial seawater¹⁵ up to a total of 5.0 ± 0.2% w/w to the mixture;
- .5 add H₂S dissolved in a liquid carrier (in order to get 5 ± 1 ppm w/w H₂S in the total test liquid);
- .6 thoroughly mix the above constituents immediately prior to use; and
- .7 once the mixture is completed, it should be tested to confirm the mixture is compliant with the test mixture concentrations.

Note: To prevent the risk of H₂S release into the test facility, it is recommended to use a stock solution for steps 1 to 4, then fill the test containers and complete the test solution with steps 5 and 6.

¹³ Refer to standard ISO 8217:2005 – Petroleum products – Fuels (class F) – Specifications of marine fuels.

¹⁴ Refer to standard ISO 6618:1997 – Petroleum products and lubricants – Determination of acid or base number – Colour-indicator titration method.

¹⁵ Refer to standard ASTM D1141 – 98(2008) – Standard Practice for the Preparation of Substitute Ocean Water.

APPENDIX 1

GAS-TIGHT CABINET TEST**1 Test condition**

The vapour test shall be carried out in a gas-tight cabinet. The dimensions and design of the air tight gas cabinet are not critical, provided the requirements of subparagraphs .6 to .10 below are met. The test gas is designed to simulate the actual crude oil cargo tank environment in ballast condition as well as the vapour conditions of the loaded tank.

- .1 The exposure time is 90 days.
- .2 Testing shall be carried out using duplicate panels; a third panel shall be prepared and stored at ambient conditions to act as a reference panel during final evaluation of the test panels.
- .3 The size of each test panel is 150 mm x 100 mm x 3 mm.
- .4 The panels shall be treated according to the Performance standard table 1, 1.2 and the coating system applied according to table 1, 1.4 and 1.5.
- .5 The zinc silicate shop primer, when used, shall be weathered for at least 2 months and cleaned by low pressure fresh water washing. The exact method of shop primer preparation before being over coated shall be reported, and the judgement issued for that specific system. The reverse side and edges of the test piece shall be coated appropriately, in order not to influence the test results.
- .6 Inside the gas-tight cabinet a trough shall be present. This trough shall be filled with 2 ± 0.2 l of water. The water in the trough shall be drained and renewed prior to each time the test gas is refreshed.
- .7 The vapour spaces inside the gas-tight cabinet shall be filled with a mixture of test gas as per item 5 of the Standard. The cabinet atmosphere shall be maintained over the period of the test. When the gas is outside the scope of the test method, it shall be refreshed. The monitoring frequency and method, and the date and time for refreshing the test gas, shall be in the test report.
- .8 The atmosphere in the test cabinet shall at all times be $95 \pm 5\%$ relative humidity.
- .9 Temperature of the test atmosphere shall be $60 \pm 3^{\circ}\text{C}$.
- .10 A stand for the test panels shall be made of a suitable inert material to hold the panels vertically spaced at least 20 mm between panels. The stand shall be positioned in the cabinet to ensure the lower edge of the panels is at least 200 mm above the height of the water and at least 100 mm from the walls of the cabinet. If two shelves are in the cabinet, care shall be taken to ensure solution does not drip on to the lower panels.

2 Test results

2.1 Prior to testing, the following measured data of each coating composing the coating system, including the zinc silicate shop primer when used under the coating system, shall be reported:

- .1 infrared (IR) identification of the base and hardener components of the coating;
- .2 specific gravity¹⁶ of the base and hardener components of the paint; and
- .3 mean dry film thickness (DFT) (by using a template).¹⁷

2.2 After completion of the test duration, the panels shall be removed from the cabinet and rinsed with warm tap water. The panels shall be dried by blotting with absorbent paper and, then, evaluated for rust and blistering within 24 h of the end of the test.

2.3 After testing, the following measured data shall be reported: blisters and rust.¹⁸

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria, the poorest performing of the duplicate test panels shall be used in the report:

Item	Acceptance criteria for epoxy-based systems	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)

3.2 When evaluating test panels, blistering or rusting within 5 mm of the panel edge shall be ignored.

4 Test report

The test report shall include the following information:

- .1 coating manufacturers' name and manufacturing site;¹⁹
- .2 dates of test;

¹⁶ Refer to standard ISO 2811-1/4:1997 – Paints and varnishes. Determination of density.

¹⁷ Six equally distributed measuring points are used on panels size 150 mm x 100 mm.

¹⁸ Refer to the following standards:

- .1 ISO 4628-1:2003 – Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1: General introduction and designation system;
- .2 ISO 4628-2:2003 – Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 2: Assessment of degree of blistering; and
- .3 ISO 4628:2003 – Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of common types of defect – Part 3: Designation of degree of rusting.

¹⁹ It should be noted that the test is valid irrespective of production site, meaning that no individual testing of product from different production sites is required.

- .3 product name/identification of each coat and, where applicable, zinc silicate shop primer;
- .4 batch numbers of each component of each product;
- .5 details of surface preparation of steel panels, before shop primer application, and treatment of the shop primer before over coating where relevant and at a minimum including the following:
 - .5.1 surface treatment, or treatment of weathered shop primer, and any other important information on treatment influencing the performance; and
 - .5.2 water soluble salt level measured on the steel prior to application of the shop primer;²⁰
- .6 details of coating system, including the following:
 - .6.1 zinc silicate shop primer if relevant, its secondary surface pre-treatment and condition under which applied, weathering period;
 - .6.2 number of coats, including the shop primer, and thickness of each;
 - .6.3 mean dry film thickness (DFT) prior to testing;²¹
 - .6.4 thinner if used;²²
 - .6.5 humidity;²²
 - .6.6 air temperature;²² and
 - .6.7 steel temperature;²²
- .7 details of schedule for refreshing the test gas;
- .8 test results according to section 2; and
- .9 results according to section 3.

²⁰

Refer to the following standards:

- .1 ISO 8502-6:2006. Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method; and
- .2 ISO 8502-9:1998. Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 9: Field method for the conductometric determination of water-soluble salts.

²¹

Both of actual specimen data and manufacturer's requirement/recommendation.

APPENDIX 2

IMMERSION TEST**1 Test condition**

The immersion test²² is developed to simulate the conditions in a crude oil tank in loaded condition.

- .1 The exposure time is 180 days.
- .2 The test liquid should be made as per item 6 in the Standard.
- .3 The test liquid should be added to a container with an inside flat bottom until a column of the test liquid of height of 400 mm is reached, resulting in an aqueous phase of 20 mm. Any other alternative test set-up, using an identical test liquid, which will also result in the immersion of the test panel in 20 mm of the aqueous phase, is also accepted. This can be achieved by using, for instance, inert marbles.
- .4 The temperature of the test liquid should be $60 \pm 2^{\circ}\text{C}$ and should be uniform and maintained constant with recognized methods such as water or oil bath or air circulation oven capable of keeping the immersion liquid within the required temperature range.
- .5 Test panels shall be positioned vertically and fully immersed during the test.
- .6 Testing shall be carried out using duplicate panels.
- .7 Inert spacers which do not cover the test area shall be used to separate test panels.
- .8 The size of each test panel is 150 mm x 100 mm x 3 mm.
- .9 The panels shall be treated according to the Performance Standard table 1, 1.2 and the coating system applied according to table 1, 1.4 and 1.5.
- .10 The zinc silicate shop primer, when used, shall be weathered for at least 2 months and cleaned by low pressure fresh water washing. The exact method of shop primer preparation before being over coated shall be reported, and the judgement issued for that specific system. The reverse side, and edges, of the test piece shall be coated appropriately, in order not to influence the test results.
- .11 After the full immersion test period is completed the panels shall be removed from the test liquid and wiped with dry clean cloth before evaluation of the panels.
- .12 Evaluation of the test panels shall be done within 24 h after completion of the test.

²²

Related test method is derived from, but not identical to, standard ISO 2812-1:2007 – Paints and varnishes – Determination of resistance to liquids – Part 1: Immersion in liquids other than water.

2 Test results

2.1 Prior to testing, the following measured data of each coating composing the coating system, including the zinc silicate shop primer when used under the coating system, shall be reported:

- .1 infrared (IR) identification of the base and hardener components of the coating;
- .2 specific gravity of the base and hardener components of the paint;²³ and
- .3 mean dry film thickness (DFT) (by using a template).²⁴

2.2 After testing, the following measured data shall be reported: blisters and rust.²⁵

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria, the poorest performing of the duplicate test panels shall be used in the report:

Item	Acceptance criteria for epoxy-based systems	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)

3.2 When evaluating test panels, blistering or rusting within 5 mm of the panel edge should be ignored.

4 Test report

The test report shall include the following information:

- .1 coating manufacturers' name and manufacturing site;²⁶
- .2 dates of test;

²³ Refer to standard ISO 2811-1/4:1997 – Paints and varnishes. Determination of density.

²⁴ Six equally distributed measuring points are used on panels size 150 mm x 100 mm.

²⁵ Refer to the following standards:

- .1 ISO 4628-1:2003. Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1: General introduction and designation system;
- .2 ISO 4628-2:2003. Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 2: Assessment of degree of blistering; and
- .3 ISO 4628:2003. Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of common types of defect – Part 3: Designation of degree of rusting.

²⁶ It should be noted that the test is valid irrespective of production site, meaning that no individual testing of product from different production sites is required.

- .3 product name/identification of each coat and, where applicable, zinc silicate shop primer;
- .4 batch numbers of each component of each product;
- .5 details of surface preparation of steel panels, before shop primer application, and treatment of the shop primer before over coating where relevant and at a minimum including the following:
 - .5.1 surface treatment, or treatment of weathered shop primer, and any other important information on treatment influencing the performance; and
 - .5.2 water soluble salt level measured on the steel prior to application of the shop primer;²⁷
- .6 details of coating system, including the following:
 - .6.1 zinc silicate shop primer if relevant, its secondary surface pre-treatment and condition under which applied, weathering period;
 - .6.2 number of coats, including the shop primer, and thickness of each;
 - .6.3 mean dry film thickness (DFT) prior to testing;²⁸
 - .6.4 thinner if used;²⁹
 - .6.5 humidity;²⁹
 - .6.6 air temperature;²⁹ and
 - .6.7 steel temperature;²⁹
- .7 test results according to section 2; and
- .8 results according to section 3.

²⁷ Refer to the following standards:

- .1 ISO 8502-6:2006. Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method; and
- .2 ISO 8502-9:1998. Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 9: Field method for the conductometric determination of water-soluble salts.

²⁸ Both of actual specimen data and manufacturer's requirement/recommendation.

APPENDIX 3

PRECAUTIONS REGARDING THE USE OF DANGEROUS MATERIALS

1 The test methods involve the use of materials that may be hazardous to health as follows:

- .1 Sulphur Dioxide: Corrosive when wet, toxic if inhaled, causes burns, and is an irritant to the eyes and respiratory system.
- .2 Hydrogen Sulphide: Highly flammable (Flash point of -82°C), can form an explosive mixture with air, corrosive when wet, causes burns, has to be kept away from sources of ignition, irritant and asphyxiant, LTEL 5 ppm, STEL 10 ppm, higher concentrations can be fatal and have no odour. Repeated exposure to low concentrations can result in the sense of smell for the gas being diminished.
- .3 Benzene: Highly flammable (Flash point of -11°C), can form an explosive mixture with air, toxic, carcinogenic, acute health risk.
- .4 Toluene: Highly flammable (Flash point of 4°C), can form an explosive mixture with air, irritant, acute health risk, reprotoxin.

2 Special test apparatus and precautions may be required depending on the regulations in force in the country where the tests are carried out.

3 Although some countries have no specific requirements preventing either of the tests being carried out, it shall anyhow be required that:

- .1 a risk assessment of the working conditions is carried out;
- .2 during the test period, the system shall be enclosed; and
- .3 the environment shall be controlled, particularly at the start and end of the tests, suitable air exhaust shall be available and personal protective equipment shall be worn.

ANNEX 2

EXAMPLE OF DAILY LOG AND NON-CONFORMITY REPORT

DAILY LOG

Sheet No:

Ship:		Tank/Hold No:		Database:					
Part of structure:									
SURFACE PREPARATION									
Method:					Area (m²):				
Abrasive:					Grain size:				
Surface temperature:					Air temperature:				
Relative humidity (max):					Dew point:				
Standard achieved:									
Rounding of edges:									
Comments:									
Job No.:		Date:			Signature:				
COATING APPLICATION:									
Method:									
Coat No.	System	Batch No.	Date	Air temp.	Surf temp.	RH%	Dew point	DFT* Meas.	Specified
* Measured minimum and maximum DFT. DFT readings to be attached to daily log.									
Comments:									
Job No:		Date:			Signature:				

NON-CONFORMITY REPORT

Sheet No:

Ship:	Tank/Hold No:	Database:
Part of structure:		
DESCRIPTION OF THE INSPECTION FINDINGS TO BE CORRECTED		
Description of findings:		
Reference document (daily log):		
Action taken:		
Job No.:	Date:	Signature:

RESOLUTION MSC.289(87)
(adopted on 14 May 2010)

**PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION
PROTECTION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING regulation II-1/3-11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention") adopted by resolution MSC.291(87), concerning alternative means of corrosion protection for cargo oil tanks of crude oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-11 provides that the alternative means of corrosion protection referred to therein shall comply with the requirements of the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers (hereinafter referred to as "the Performance standard for alternative means of corrosion protection"),

HAVING CONSIDERED, at its eighty-seventh session, the text of the proposed Performance standard for alternative means of corrosion protection,

1. ADOPTS the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers, the text of which is set out in the Annex to the present resolution;
2. INVITES Contracting Governments to the Convention to note that the Performance standard for alternative means of corrosion protection will take effect on 1 January 2012 upon entry into force of SOLAS regulation II-1/3-11;
3. NOTES that, under the provisions of chapter II-1 of the SOLAS Convention, amendments to the Performance standard for alternative means of corrosion protection shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of that Convention concerning the amendment procedure applicable to the annex to the Convention other than chapter I;
4. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention;
6. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results;

7. RESOLVES to keep the Performance standard for alternative means of corrosion protection under review and amend it as necessary, in light of experience gained in its application.

ANNEX

**PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION
PROTECTION FOR CARGO OIL TANKS OF OIL TANKERS****1 PURPOSE**

This Standard provides technical requirements for the minimum standard for means of corrosion protection or utilization of corrosion resistant material other than protective coating to be used for cargo oil tanks during construction of crude oil tankers.

2 DEFINITION

2.1 *Alternative means* is a means that is not a utilization of protective coating applied according to the Performance standard for protective coating for cargo oil tanks of crude oil tankers (resolution MSC.288(87)).

2.2 *Corrosion resistant steel* is steel whose corrosion resistance performance in the bottom or top of the internal cargo oil tank is tested and approved to satisfy the requirements in this Standard in addition to other relevant requirements for ship material, structure strength and construction.

2.3 *Target useful life* is the target value, in years, of the durability for which the means of corrosion protection or utilization of corrosion resistance material is designed.

3 APPLICATION

3.1 As of the date of the development of this Standard, corrosion resistant "steel" is the only recognized possible means for corrosion protection or utilization of corrosion resistant material to maintain the required structural integrity for 25 years, as an alternative to protective coating. If corrosion resistant steel is to be used as alternative means, it shall comply with the Performance Standard for corrosion resistant steel as set out in the annex.

3.2 When a novel type of alternative means to which the provisions in the annex are not applicable has been developed, and recognized by the Organization, a specific performance standard including testing procedure(s) should be developed by the Organization by adding a new annex to this Standard, taking into account experience gained through field tests for the novel prototype alternative conducted in accordance with SOLAS regulation II-1/3-11.4.

ANNEX

PERFORMANCE STANDARD FOR CORROSION RESISTANT STEEL

1 PURPOSE

This Standard provides technical requirements for the minimum standard for corrosion resistant steel to be used for cargo oil tanks during construction of crude oil tankers.

2 GENERAL PRINCIPLES

2.1 The ability of corrosion resistant steel to reach its target useful life depends on the type of steel, application and survey. All these aspects contribute to the good performance of corrosion resistant steel.

2.2 Technical File

2.2.1 Documents and information stipulated in 2.2.3 and 2.2.4 shall be documented in the Technical File. The Technical File shall be verified by the Administration.

2.2.2 The Technical File shall be kept on board and maintained throughout the life of the ship.

2.2.3 *New construction stage*

The Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

- .1 copy of a Type Approval Certificate;
- .2 technical data, including:
 - .2.1 approved welding methods and welding consumables; and
 - .2.2 repairing methods recommended by the manufacturer (if any); and
- .3 records of the application, including:
 - .3.1 applied actual space and area of each compartment; and
 - .3.2 applied product and its thickness.

2.2.4 *In-service maintenance, repair and partial renewal*

In-service maintenance, repair and renewal activities shall be recorded in the Technical File.

3 CORROSION RESISTANT STEEL STANDARD

3.1 Performance standard

This Standard is based on specifications and requirements which intend to provide a target useful life of 25 years, which is considered to be the time period, from initial application, over which the thickness diminution of the steel is intended to be less than the diminution allowance and watertight integrity is intended to be maintained in cargo oil tanks. The actual useful life will vary, depending on numerous variables including actual conditions encountered in service.

3.2 Standard application

Corrosion resistant steel for cargo oil tanks applied to the area specified in 3.4 during the construction of crude oil tankers shall at least comply with the requirements in this Standard and this should be considered as a minimum.

3.3 Special application

3.3.1 This Standard covers corrosion resistant steel requirements for ship's steel structures. It is noted that other independent items are fitted within the tanks to which measures are applied to provide protection against corrosion.

3.3.2 It is recommended that this Standard or the Performance standard for protective coating for cargo oil tanks is applied, to the extent possible, to those portions of permanent means of access provided for inspection within the area specified in 3.4 that are not integral to the ship's structure, such as rails, independent platforms, ladders, etc. Other equivalent methods of providing corrosion protection for the non-integral items may also be used, provided they do not impair the performance of the corrosion resistant steel of the surrounding structure. Access arrangements that are integral to the ship structure, such as increased stiffener depths for walkways, stringers, etc., are to fully comply with this Standard or the Performance standard for protective coating for cargo oil tanks, when located within the areas specified in 3.4.

3.3.3 It is also recommended that supports for piping, measuring devices, etc., be provided with corrosion protection in accordance with the non-integral items indicated in 3.3.2.

3.4 Area of application

The following areas are the minimum areas that shall be protected according to this Standard:

- .1 Deckhead with complete internal structure, including brackets connecting to longitudinal and transverse bulkheads. In tanks with ring frame girder construction the underdeck transverse framing to be protected down to level of the first tripping bracket below the upper faceplate.
- .2 Longitudinal and transverse bulkheads to be protected to the uppermost means of access level. The uppermost means of access and its supporting brackets to be fully protected.

- .3 On cargo tank bulkheads without an uppermost means of access the protection to extend to 10% of the tanks height at centreline but need not extend more than 3 m down from the deck.
- .4 Flat inner bottom and all structure to height of 0.3 m above inner bottom to be protected.

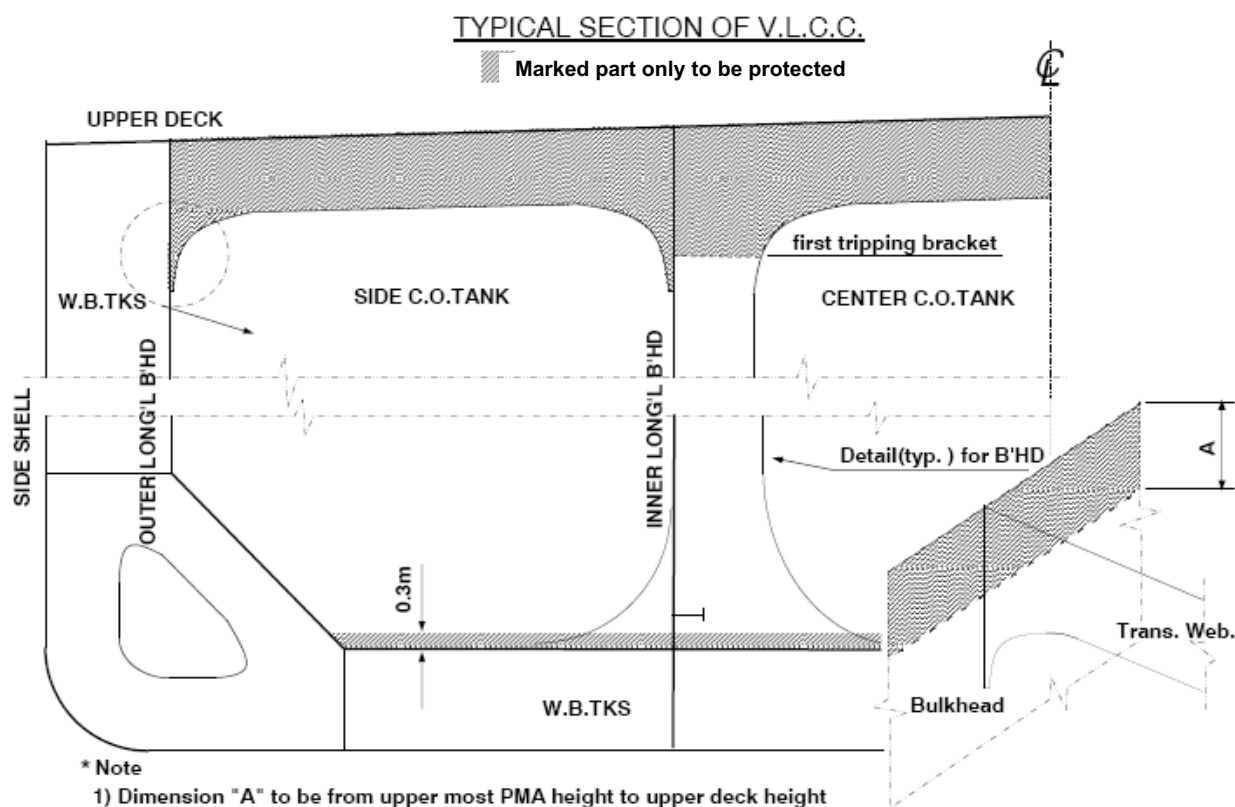


Figure 1

3.5 Basic requirements

The requirements for corrosion resistant steel to be applied at ship construction for cargo tanks in crude oil tankers meeting the performance standard specified in 3.1 are to use approved corrosion resistant steels according to the conditions specified in the Type Approval Certificate and the Technical File to protect the area of application indicated in 3.4.

4 APPROVAL

4.1 Corrosion resistant steel shall be tested according to the appendix, or equivalent, for approval. Corrosion resistant steel tested prior to entry into force of this Standard may be accepted, provided that the steel is tested according to the test procedure in the appendix, or equivalent.

4.2 Results from prequalification tests (4.1) of corrosion resistant steel shall be documented, and a Type Approval Certificate shall be issued if found satisfactory by the Administration.

4.3 The Type Approval Certificate shall include following information:

- .1 product name and identification mark and/or number;
- .2 materials, components and corrosion resistance process of the steel;
- .3 steel thickness;
- .4 welding methods and welding consumables; and
- .5 applicable area (upper and/or inner bottom plate).

5 INSPECTION AND VERIFICATION REQUIREMENTS

To ensure compliance with this Standard, the Administration shall carry out survey(s) during the construction process and verify that approved corrosion resistant steel has been applied to the area required.

APPENDIX

TEST PROCEDURES FOR QUALIFICATION OF CORROSION RESISTANT STEEL FOR CARGO TANKS IN CRUDE OIL TANKERS**1 Scope**

These Procedures provide details of the test procedure referred to in 4.1 of this Standard.

2 Testing

Corrosion resistant steel shall be verified by the following tests.

2.1 Test on simulated upper deck conditions**2.1.1 Test condition**

Tests on simulated upper deck conditions in cargo oil tank (COT) shall satisfy each of the following conditions:

- .1 Corrosion resistant steel and conventional steel shall be tested at the same time.
- .2 The chemical composition of conventional steel shall comply with the requirements of table 1. The mechanical properties of the test specimen should be representative of steel used in its intended shipboard application.

Table 1 – Chemical composition for conventional steel (%)

C	Mn	Si	P	S
0.13-0.17	1.00-1.20	0.15-0.35	0.010-0.020	0.002-0.008
Al(acid soluble min)	Nb max.	V max	Ti max	Nb+V+Ti max.
0.015	0.02	0.10	0.02	0.12
Cu max.	Cr max.	Ni max.	Mo max.	Others max.
0.1	0.1	0.1	0.02	0.02 (each)

- .3 The tests for corrosion resistant steel shall be carried out for 21, 49, 77 and 98 days. The tests for conventional steel shall be carried out for 98 days. The tests for welded joints shall be carried out for 98 days.
- .4 There are to be five test pieces for each test period.
- .5 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm. The surface of the test piece shall be polished with an emery paper #600. The size of the test piece for a welded joint is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm, including 15 ± 5 mm width of the weld metal part.
- .6 The surface of the test piece, except for the tested surface, shall be protected from corrosive environment in order not to affect the test results.
- .7 The test apparatus consists of a double chamber, and the temperature of the outer chamber is to be controlled.

- .8 Simulating the condition of the actual upper deck, the test cycle runs with distilled water and simulated COT gas ($4 \pm 1\% \text{ O}_2$ - $13 \pm 2\% \text{ CO}_2$ - $100 \pm 10 \text{ ppm SO}_2$ - $500 \pm 50 \text{ ppm H}_2\text{S}$ - $83 \pm 2\% \text{ N}_2$). A sufficient distance between the surface of the test piece and the distilled water is to be kept to avoid splashing of distilled water. The minimum gas flow rate is 100 cc per minute for the first 24 h and 20 cc per minute after 24 h.
- .9 The test pieces shall be heated for $19 \pm 2 \text{ h}$ at $50 \pm 2^\circ\text{C}$ and $3 \pm 2 \text{ h}$ at $25 \pm 2^\circ\text{C}$ and the transition time is to be at least 1 h. The time for 1 cycle is 24 h. The temperature of the distilled water is to be kept at not higher than 36°C , while the temperature of the test pieces is 50°C .

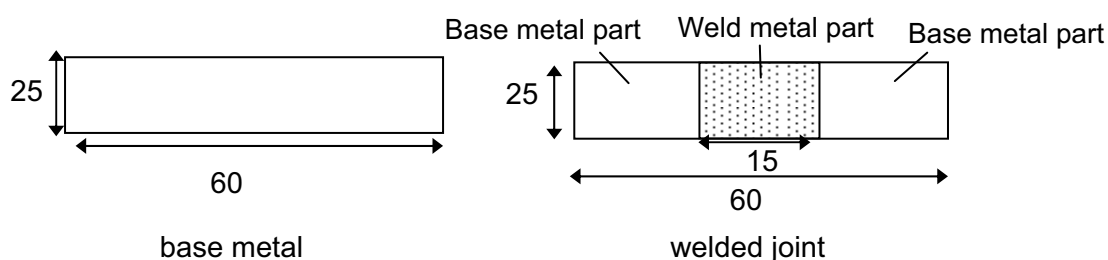


Figure 1 –Test piece of this test

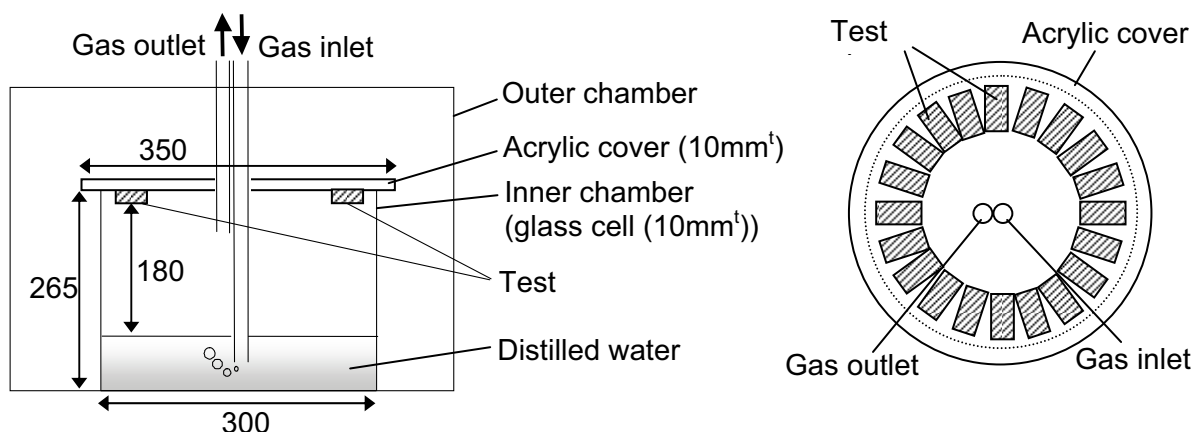


Figure 2 – An example of simulated corrosion test apparatus for upper deck

2.1.2 Test results of base metal

Prior to the testing, the following measured data shall be reported:

- .1 size and weight of the test piece;

and, after the testing, the following measured data shall be reported:

- .2 weight loss (difference between initial weight and weight after testing) of conventional steel (W_C) and corrosion resistant steel (W_{21} , W_{49} , W_{77} and W_{98});

- .3 corrosion loss of conventional steel (CL_C) and corrosion resistant steel (CL_{21} , CL_{49} , CL_{77} and CL_{98}), calculated by the following formulae:

$$CL_C(mm) = \frac{10 \times W_C}{S \times D}$$

$$CL_{21}(mm) = \frac{10 \times W_{21}}{S \times D}$$

$$CL_{49}(mm) = \frac{10 \times W_{49}}{S \times D}$$

$$CL_{77}(mm) = \frac{10 \times W_{77}}{S \times D}$$

$$CL_{98}(mm) = \frac{10 \times W_{98}}{S \times D}$$

whereby:

W_C : weight loss of conventional steel (g) (average of five test pieces)

W_{21} : weight loss of corrosion resistant steel after 21 days (g) (average of five test pieces)

W_{49} : weight loss of corrosion resistant steel after 49 days (g) (average of five test pieces)

W_{77} : weight loss of corrosion resistant steel after 77 days (g) (average of five test pieces)

W_{98} : weight loss of corrosion resistant steel after 98 days (g) (average of five test pieces)

S : surface area (cm^2)

D : density (g/cm^3).

The test is considered to be carried out appropriately if CL_C is between 0.05 and 0.11 (corrosion rate is between 0.2 and 0.4 mm/year). The concentration of H_2S in simulated COT gas may be increased for adjusting CL_C ;

- .4 coefficients A and B of corrosion resistant steel, calculated from the test results for 21, 49, 77 and 98 days by least square method.

Corrosion loss of corrosion resistant steel is described as follows:

$$CL = A \times t^B$$

A(mm) and B: coefficient
t: test period(days);

- .5 estimated corrosion loss after 25 years (ECL) calculated by the following formula:

$$ECL(mm) = A \times (25 \times 365)^B.$$

2.1.3 *Test results of welded joint*

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.1.4 *Acceptance criteria*

The test results based on provisions of 2.1.2 and 2.1.3 shall satisfy the following criteria:

- .1 $ECL(mm) \leq 2$ (for base metal); and
- .2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.1.5 *Test report*

The test report shall include the following information:

- .1 name of the manufacturer;
- .2 date of tests;
- .3 chemical composition and corrosion resistant process of steel;
- .4 test results according to 2.1.2 and 2.1.3; and
- .5 judgement according to 2.1.4.

2.2 ***Test on simulated inner bottom conditions***

2.2.1 *Test condition*

Tests on simulated inner bottom conditions in cargo oil tanks (COT) should satisfy each of the following conditions:

- .1 The test shall be carried out for 72 h for base metal, and 168 h for welded joint.
- .2 There are to be at least five test pieces of corrosion resistant steel for base metal and welded joint, respectively. For comparison, at least five test pieces of base metal of conventional steel should be tested in the same condition.
- .3 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with base metal only, and is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with welded joint including 15 ± 5 mm width of

weld metal part as shown in figure 3. The surface of the test pieces shall be polished with an emery paper #600, except a hole for hanging.

- .4 The samples are hung in a solution from a fishing line (0.3 mm to 0.4 mm in diameter, made of nylon) to avoid crevice-like and/or localized corrosion. An example of a corrosion test configuration is shown in figure 4.
- .5 The test solution contains 10 mass% NaCl and its pH is 0.85 adjusted by HCl solution. The test solution should be changed to a new one every 24 h to minimize pH change of the test solution. The volume of the solution is more than 20 cc/cm² (surface area of test piece). The temperature of the test solution is to be kept at $30 \pm 2^\circ\text{C}$.

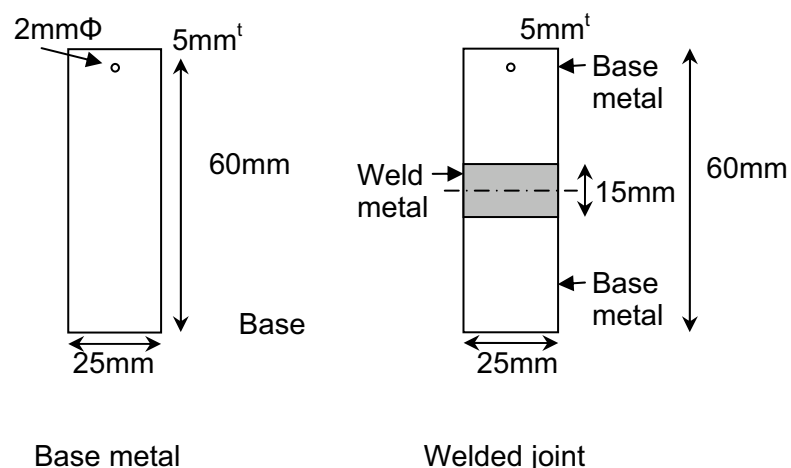


Figure 3 – Test piece for this test

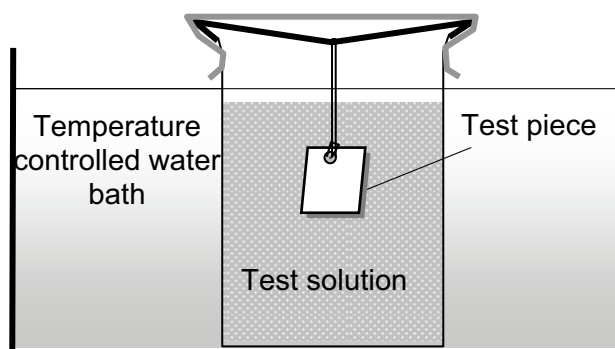


Figure 4 – Simulated corrosion test apparatus for inner bottom

2.2.2 Test results of base metal

Prior to the testing, the following data shall be measured and reported:

- .1 size and weight of test piece;

and, after the testing, the following measured data shall be reported:

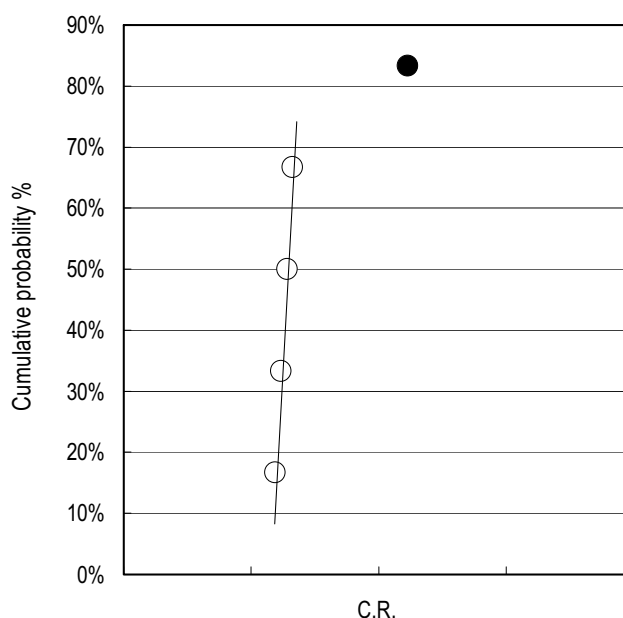
- .2 weight loss (difference between initial weight and weight after testing);
- .3 corrosion rate (C.R.) calculated by the following formula:

$$C.R.(mm / year) = \frac{365(days) \times 24(hours) \times W \times 10}{S \times 72(hours) \times D}$$

whereby:

W : weight loss(g), S : surface area(cm²), D : density(g/cm³);

- .4 to identify specimen which hold crevice and/or localized corrosion, the C.R. is to be plotted on a normal distribution statistic chart. C.R. data which deviate from the normal statistical distribution must be eliminated from the test results. An example is shown in figure 5 for reference;
- .5 calculation of average of C.R.'s data ($C.R._{ave}$):



**Figure 5 – An example of plot of C.R.s on a normal distribution chart
(In this case C.R. data • should be abandoned and eliminated.)**

2.2.3 Test results of welded joint

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.2.4 Acceptance criterion

The test results based on sections 2.2.2 and 2.2.3 shall satisfy the following criteria:

- .1 $C.R._{ave}(mm / year) \leq 1.0$ (for base metal); and
- .2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.2.5 *Test report*

The test report shall include the following information:

- .1 name of the manufacturer;
- .2 date of tests;
- .3 chemical composition and corrosion resistant process of steel;
- .4 test results according to 2.2.2 and 2.2.3; and
- .5 judgement according to 2.2.4.

RESOLUTION MSC.290(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR
THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

RECALLING FURTHER that among the strategic directions of the Organization relating to developing and maintaining a comprehensive framework for safe, secure, efficient and environmentally sound shipping is the establishment of goal-based standards for the design and construction of new ships,

CONSIDERING that ships should be designed and constructed for a specified design life to be safe and environmentally friendly, so that, if properly operated and maintained under specified operating and environmental conditions, they can remain safe throughout their service life,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization which are not Contracting Governments to the Convention;

6. RESOLVES to review the progress towards the implementation of SOLAS regulation II-1/3-10 in 2014 and, if proven necessary, to adjust the time periods set forth in paragraph 1 of the regulation.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY,
MACHINERY AND ELECTRICAL INSTALLATIONS****Part A
General****Regulation 2 – Definitions**

- 1 The following new paragraph 28 is added after the existing paragraph 27:

"28 *Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers* means the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by the Maritime Safety Committee by resolution MSC.287(87), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I thereof."

**Part A-1
Structure of ships**

- 2 The following new regulation 3-10 is added after the existing regulation 3-9:

**"Regulation 3-10
Goal-based ship construction standards for bulk carriers and oil tankers**

1 This regulation shall apply to oil tankers of 150 m in length and above and to bulk carriers of 150 m in length and above, constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers:

- .1 for which the building contract is placed on or after 1 July 2016;
- .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or
- .3 the delivery of which is on or after 1 July 2020.

2 Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

2.1 *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimize the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

2.2 *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.

2.3 *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.

2.4 *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

2.5 *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

3 The requirements of paragraphs 2 to 2.5 shall be achieved through satisfying applicable structural requirements of an organization which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or national standards of the Administration, conforming to the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers.

4 A Ship Construction File with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction shall be provided upon delivery of a new ship, and kept on board the ship and/or ashore* and updated as appropriate throughout the ship's service. The contents of the Ship Construction File shall, at least, conform to the guidelines developed by the Organization.*

* Refer to the Guidelines for the information to be included in a Ship Construction File (MSC.1/Circ.1343)."

RESOLUTION MSC.291(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE
SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

**CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY
AND ELECTRICAL INSTALLATIONS**

**Part A-1
Structure of ships**

- 1 The following new regulation 3-11 is added after regulation 3-10:

**"Regulation 3-11
Corrosion protection of cargo oil tanks of crude oil tankers**

1 Paragraph 3 shall apply to crude oil tankers*, as defined in regulation 1 of Annex I to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, of 5,000 tonnes deadweight and above:

- .1 for which the building contract is placed on or after 1 January 2013; or
- .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2013; or
- .3 the delivery of which is on or after 1 January 2016.

2 Paragraph 3 shall not apply to combination carriers or chemical tankers as defined in regulations 1 of Annexes I and II, respectively, to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto. For the purpose of this regulation, chemical tankers also include chemical tankers certified to carry oil.

3 All cargo oil tanks of crude oil tankers shall be:

- .1 coated during the construction of the ship in accordance with the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by the Maritime Safety Committee by resolution MSC.288(87), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than chapter I; or

- .2 protected by alternative means of corrosion protection or utilization of corrosion resistance material to maintain required structural integrity for 25 years in accordance with the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers, adopted by the Maritime Safety Committee by resolution MSC.289(87), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than chapter I.
- 4 The Administration may exempt a crude oil tanker from the requirements of paragraph 3 to allow the use of novel prototype alternatives to the coating system specified in paragraph 3.1, for testing, provided they are subject to suitable controls, regular assessment and acknowledgement of the need for immediate remedial action if the system fails or is shown to be failing. Such exemption shall be recorded on an exemption certificate.
- 5 The Administration may exempt a crude oil tanker from the requirements of paragraph 3 if the ship is built to be engaged solely in the carriage of cargoes and cargo handling operations not causing corrosion**. Such exemption and conditions for which it is granted shall be recorded on an exemption certificate.

* Refer to items 1.11.1 or 1.11.4 of the Supplement to the International Oil Pollution Prevention Certificate (Form B).

** Refer to the guidelines to be developed by the Organization."

CHAPTER II-2

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A

General

Regulation 1 – Application

2 In paragraph 2.2, in subparagraph .4, the word "and" is deleted; in subparagraph .5 the word "and" is added at the end; and the following new subparagraph .6 is added after the existing subparagraph .5:

".6 regulation 4.5.7.1."

Part B
Prevention of fire and explosion

Regulation 4 – Probability of ignition

3 The existing paragraph 5.7 is replaced by the following:

"5.7 Gas measurement and detection

5.7.1 *Portable instrument*

Tankers shall be equipped with at least one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

5.7.2 *Arrangements for gas measurement in double-hull spaces and double-bottom spaces*

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations in double-hull spaces and double-bottom spaces shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in paragraph 5.7.2.2.

5.7.2.2 Where the atmosphere in double-hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of gas sampling lines shall be adapted to the design of such spaces.

5.7.2.3 The materials of construction and dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

5.7.3 *Arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers*

5.7.3.1 In addition to the requirements in paragraphs 5.7.1 and 5.7.2, oil tankers of 20,000 tonnes deadweight and above, constructed on or after 1 January 2012, shall be provided with a fixed hydrocarbon gas detection system complying with the Fire Safety Systems Code for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

5.7.3.2 Oil tankers provided with constant operative inerting systems for such spaces need not be equipped with fixed hydrocarbon gas detection equipment.

5.7.3.3 Notwithstanding the above, cargo pump-rooms subject to the provisions of paragraph 5.10 need not comply with the requirements of this paragraph."

RESOLUTION MSC.292(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE
FOR FIRE SAFETY SYSTEMS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.98(73) by which it adopted the International Code for Fire Safety Systems (hereinafter referred to as "the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

HAVING CONSIDERED, at its eighty- seventh session, amendments to the FSS Code, proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code for Fire Safety Systems, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CODE
FOR FIRE SAFETY SYSTEMS (FSS CODE)**

**CHAPTER 1
GENERAL**

Section 1 – Application

- 1 The following new sentence is added to the end of paragraph 1.2:

"However, amendments to the Code adopted after 1 July 2002 shall apply only to ships the keels of which are laid or which are at a similar stage of construction, on or after the date on which the amendments enter into force, unless expressly provided otherwise."

**CHAPTER 10
SAMPLE EXTRACTION SMOKE DETECTION SYSTEMS**

- 2 The existing text of chapter 10 is replaced by the following:

"1 APPLICATION

This chapter details the specification of sample extraction smoke detection systems in cargo spaces as required by chapter II-2 of the Convention. Unless expressly provided otherwise, the requirements of this chapter shall apply to ships constructed on or after 1 January 2012.

2 ENGINEERING SPECIFICATIONS

2.1 General requirements

2.1.1 Wherever in the text of this chapter the word "system" appears, it shall mean "sample extraction smoke detection system".

2.1.1.1 A sample extraction smoke detection system consists of the following main components:

- .1 smoke accumulators: air collection devices installed at the open ends of the sampling pipes in each cargo hold that perform the physical function of collecting air samples for transmission to the control panel through the sampling pipes, and may also act as discharge nozzles for the fixed-gas fire-extinguishing system, if installed;
- .2 sampling pipes: a piping network that connects the smoke accumulators to the control panel, arranged in sections to allow the location of the fire to be readily identified;

- .3 three-way valves: if the system is interconnected to a fixed-gas fire-extinguishing system, three-way valves are used to normally align the sampling pipes to the control panel and, if a fire is detected, the three-way valves are re-aligned to connect the sampling pipes to the fire-extinguishing system discharge manifold and isolate the control panel; and
- .4 control panel: the main element of the system which provides continuous monitoring of the protected spaces for indication of smoke. It typically may include a viewing chamber or smoke sensing units. Extracted air from the protected spaces is drawn through the smoke accumulators and sampling pipes to the viewing chamber, and then to the smoke sensing chamber where the airstream is monitored by electrical smoke detectors. If smoke is sensed, the repeater panel (normally on the bridge) automatically sounds an alarm (not localized). The crew can then determine at the smoke sensing unit which cargo hold is on fire and operate the pertinent three-way valve for discharge of the extinguishing agent.

2.1.2 Any required system shall be capable of continuous operation at all times except that systems operating on a sequential scanning principle may be accepted, provided that the interval between scanning the same position twice gives a maximum allowable interval determined as follows:

The interval (I) should depend on the number of scanning points (N) and the response time of the fans (T), with a 20% allowance:

$$I = 1.2 \times T \times N$$

However, the maximum allowable interval should not exceed 120 s ($I_{\max} = 120$ s).

2.1.3 The system shall be designed, constructed and installed so as to prevent the leakage of any toxic or flammable substances or fire-extinguishing media into any accommodation space, service space, control station or machinery space.

2.1.4 The system and equipment shall be suitably designed to withstand supply voltage variations and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships and to avoid the possibility of ignition of a flammable gas-air mixture.

2.1.5 The system shall be of a type that can be tested for correct operation and restored to normal surveillance without the renewal of any component.

2.1.6 An alternative power supply for the electrical equipment used in the operation of the system shall be provided.

2.2 Component requirements

2.2.1 The sensing unit shall be certified to operate before the smoke density within the sensing chamber exceeds 6.65% obscuration per metre.

2.2.2 Duplicate sample extraction fans shall be provided. The fans shall be of sufficient capacity to operate with the normal conditions or ventilation in the

protected area and the connected pipe size shall be determined with consideration of fan suction capacity and piping arrangement to satisfy the conditions of paragraph 2.4.2.2. Sampling pipes shall be a minimum of 12 mm internal diameter. The fan suction capacity should be adequate to ensure the response of the most remote area within the required time criteria in paragraph 2.4.2.2. Means to monitor airflow shall be provided in each sampling line.

2.2.3 The control panel shall permit observation of smoke in the individual sampling pipes.

2.2.4 The sampling pipes shall be so designed as to ensure that, as far as practicable, equal quantities of airflow are extracted from each interconnected accumulator.

2.2.5 Sampling pipes shall be provided with an arrangement for periodically purging with compressed air.

2.2.6 The control panel for the smoke detection system shall be tested according to standards EN 54-2 (1997), EN 54-4 (1997) and IEC 60092-504 (2001). Alternative standards may be used as determined by the Administration.

2.3 Installation requirements

2.3.1 *Smoke accumulators*

2.3.1.1 At least one smoke accumulator shall be located in every enclosed space for which smoke detection is required. However, where a space is designed to carry oil or refrigerated cargo alternatively with cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments for the system. Such means shall be to the satisfaction of the Administration.

2.3.1.2 Smoke accumulators shall be located on the overhead or as high as possible in the protected space, and shall be spaced so that no part of the overhead deck area is more than 12 m measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators shall be considered having regard to the effects of ventilation. At least one additional smoke accumulator is to be provided in the upper part of each exhaust ventilation duct. An adequate filtering system shall be fitted at the additional accumulator to avoid dust contamination.

2.3.1.3 Smoke accumulators shall be positioned where impact or physical damage is unlikely to occur.

2.3.1.4 Sampling pipe networks shall be balanced to ensure compliance with paragraph 2.2.4. The number of accumulators connected to each sampling pipe shall ensure compliance with paragraph 2.4.2.2.

2.3.1.5 Smoke accumulators from more than one enclosed space shall not be connected to the same sampling pipe.

2.3.1.6 In cargo holds where non-gastight "tween deck panels" (movable stowage platforms) are provided, smoke accumulators shall be located in both the upper and lower parts of the holds.

2.3.2 Sampling pipes

2.3.2.1 The sampling pipe arrangements shall be such that the location of the fire can be readily identified.

2.3.2.2 Sampling pipes shall be self-draining and suitably protected from impact or damage from cargo working.

2.4 System control requirements

2.4.1 Visual and audible fire signals

2.4.1.1 The detection of smoke or other products of combustion shall initiate a visual and audible signal at the control panel and indicating units.

2.4.1.2 The control panel shall be located on the navigation bridge or in the fire control station. An indicating unit shall be located on the navigation bridge if the control panel is located in the fire control station.

2.4.1.3 Clear information shall be displayed on or adjacent to the control panel and indicating units designating the spaces covered.

2.4.1.4 Power supplies necessary for the operation of the system shall be monitored for loss of power. Any loss of power shall initiate a visual and audible signal at the control panel and the navigating bridge which shall be distinct from a signal indicating smoke detection.

2.4.1.5 Means to manually acknowledge all alarm and fault signals shall be provided at the control panel. The audible alarm sounders on the control panel and indicating units may be manually silenced. The control panel shall clearly distinguish between normal, alarm, acknowledged alarm, fault and silenced conditions.

2.4.1.6 The system shall be arranged to automatically reset to the normal operating condition after alarm and fault conditions are cleared.

2.4.2 Testing

2.4.2.1 Suitable instructions and component spares shall be provided for the testing and maintenance of the system.

2.4.2.2 After installation, the system shall be functionally tested using smoke generating machines or equivalent as a smoke source. An alarm shall be received at the control unit in not more than 180 s for vehicle decks, and not more than 300 s for container and general cargo holds, after smoke is introduced at the most remote accumulator."

- 3 The following new chapter 16 is added after the existing chapter 15:

"CHAPTER 16 FIXED HYDROCARBON GAS DETECTION SYSTEMS

1 APPLICATION

1.1 This chapter details the specifications for fixed hydrocarbon gas detection systems as required by chapter II-2 of the Convention.

1.2 A combined gas detection system required by regulations II-2/4.5.7.3 and II-2/4.5.10 may be accepted in cases where the system fully complies with the requirement of regulation II-2/2 of the Convention.

2 ENGINEERING SPECIFICATIONS

2.1 General

2.1.1 The fixed hydrocarbon gas detection system referred to in chapter II-2 of the Convention shall be designed, constructed and tested to the satisfaction of the Administration based on performance standards developed by the Organization*.

2.1.2 The system shall be comprised of a central unit for gas measurement and analysis and gas sampling pipes in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

2.1.3 The system may be integrated with the cargo pump-room gas detection system, provided that the spaces referred to in paragraph 2.1.2 are sampled at the rate required in paragraph 2.2.3.1. Continuous sampling from other locations may also be considered provided the sampling rate is complied with.

2.2 Component requirements

2.2.1 *Gas sampling lines*

2.2.1.1 Common sampling lines to the detection equipment shall not be fitted, except the lines serving each pair of sampling points as required in paragraph 2.2.1.3.

2.2.1.2 The materials of construction and the dimensions of gas sampling lines shall be such as to prevent restriction. Where non-metallic materials are used, they shall be electrically conductive. The gas sampling lines shall not be made of aluminium.

*

Refer to the Guidelines for the design, construction and testing of fixed hydrocarbon gas detection system (MSC.1/Circ.1370).

2.2.1.3 The configuration of gas sampling lines shall be adapted to the design and size of each space. Except as provided in paragraphs 2.2.1.4 and 2.2.1.5, the sampling system shall allow for a minimum of two hydrocarbon gas sampling points, one located on the lower and one on the upper part where sampling is required. When required, the upper gas sampling point shall not be located lower than 1 m from the tank top. The position of the lower located gas sampling point shall be above the height of the girder of bottom shell plating but at least 0.5 m from the bottom of the tank and it shall be provided with means to be closed when clogged. In positioning the fixed sampling points, due regard should also be given to the density of vapours of the oil products intended to be transported and the dilution from space purging or ventilation.

2.2.1.4 For ships with deadweight of less than 50,000 tonnes, the Administration may allow the installation of one sampling location for each tank for practical and/or operational reasons.

2.2.1.5 For ballast tanks in the double-bottom, ballast tanks not intended to be partially filled and void spaces, the upper gas sampling point is not required.

2.2.1.6 Means shall be provided to prevent gas sampling lines from clogging when tanks are ballasted by using compressed air flushing to clean the line after switching from ballast to cargo loaded mode. The system shall have an alarm to indicate if the gas sampling lines are clogged.

2.2.2 Gas analysis unit

2.2.2.1 The gas analysis unit shall be located in a safe space and may be located in areas outside the ship's cargo area; for example, in the cargo control room and/or navigation bridge in addition to the hydraulic room when mounted on the forward bulkhead, provided the following requirements are observed:

- .1 sampling lines shall not run through gas safe spaces, except where permitted under subparagraph .5;
- .2 the hydrocarbon gas sampling pipes shall be equipped with flame arresters. Sample hydrocarbon gas is to be led to the atmosphere with outlets arranged in a safe location, not close to a source of ignitions and not close to the accommodation area air intakes;
- .3 a manual isolating valve, which shall be easily accessible for operation and maintenance, shall be fitted in each of the sampling lines at the bulkhead on the gas safe side;
- .4 the hydrocarbon gas detection equipment including sample piping, sample pumps, solenoids, analysing units etc., shall be located in a reasonably gas-tight cabinet (e.g., fully enclosed steel cabinet with a door with gaskets) which is to be monitored by its own sampling point. At a gas concentration above 30% of the lower flammable limit inside the steel enclosure the entire gas analysing unit is to be automatically shut down; and

- .5 where the enclosure cannot be arranged directly on the bulkhead, sample pipes shall be of steel or other equivalent material and without detachable connections, except for the connection points for isolating valves at the bulkhead and analysing unit, and are to be routed on their shortest ways.

2.2.3 Gas detection equipment

2.2.3.1 The gas detection equipment shall be designed to sample and analyse from each sampling line of each protected space, sequentially at intervals not exceeding 30 min.

2.2.3.2 Means shall be provided to enable measurements with portable instruments, in case the fixed system is out of order or for system calibration. In case the system is out of order, procedures shall be in place to continue to monitor the atmosphere with portable instruments and to record the measurement results.

2.2.3.3 Audible and visual alarms are to be initiated in the cargo control room, navigation bridge and at the analysing unit when the vapour concentration in a given space reaches a pre-set value, which shall not be higher than the equivalent of 30% of the lower flammable limit.

2.2.3.4 The gas detection equipment shall be so designed that it may readily be tested and calibrated."

RESOLUTION MSC.293(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE
INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.48(66), by which it adopted the International Life-Saving Appliance Code (hereinafter referred to as "the LSA Code"), which has become mandatory under chapter III of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation III/3.10 of the Convention concerning the procedure for amending the LSA Code,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the LSA Code, proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the LSA Code, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2011, unless prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL
LIFE-SAVING APPLIANCE (LSA) CODE**

**CHAPTER IV
SURVIVAL CRAFT**

In paragraphs 4.2.2.1, 4.2.3.3 and 4.3.3.3, the figure "75 kg" is replaced by the figure "82.5 kg".

RESOLUTION MSC.294(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS
GOODS (IMDG) CODE**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.122(75) by which it adopted the International Maritime Dangerous Goods Code (hereinafter referred to as "the IMDG Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation VII/1.1 of the Convention concerning the amendment procedure for amending the IMDG Code,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the IMDG Code, proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IMDG Code, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;
4. AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis as from 1 January 2011;
5. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
6. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL MARITIME
DANGEROUS GOODS (IMDG) CODE**

Contents

3.1.3 Amend the title as follows:

"Mixtures or solutions".

3.4.7 "Exemptions" is deleted and "3.4.8" Marine Pollutants" is renumbered as "3.4.7".

5.4.1 Amend the title as follows:

"Dangerous goods transport information".

Insert the following:

"Chapter 5.5 – Special provisions

5.5.1 (Reserved).

5.5.2 Special provisions applicable to fumigated cargo transport units (UN 3359)".

Replace in 7.2.8 "Segregation provisions for goods of class 4.1 and class 5.2" with "(Reserved)".

Replace in 7.4.3 "Fumigated units" with "(Reserved)".

Insert "7.5.4 Tracking and monitoring equipment".

Preamble

In paragraph 12 quarter of the preamble, in the first sentence, after the words "IMDG Code which" the words "will enter" are replaced by the word "entered" and in the second sentence, after the word "Governments", the word "are" is replaced by the word "were".

A new paragraph 12quinquies is inserted as follows:

"12quinquies At its eighty-seventh session in May 2010, the MSC adopted Amendment 35 to the mandatory IMDG Code, which will enter into force on 1 January 2012 without any transitional period. However, in accordance with resolution MSC.294(87), Governments are encouraged to apply this Amendment in whole or part on a voluntary basis from 1 January 2011."

In paragraph 16 of the preamble, the text between brackets "(see MSC/Circ.1025 and MSC/Circ.1025/Add.1)" is replaced by "(see MSC/Circ.1025 as amended by MSC.1/Circ.1025/Add.1, MSC.1/Circ.1262 and MSC.1/Circ.1360)".

PART 1 – GENERAL PROVISIONS, DEFINITIONS AND TRAINING

Chapter 1.1 – General provisions

1.1.3.1 In the last sentence, in the word "provision" add the letter "s", and in the word "lists" delete the second letter "s". Before "900" insert "349, 350, 351, 352, 353 and".

Chapter 1.2 – Definitions, units of measurements and abbreviations

1.2.1 Definitions

Approval

Multilateral approval Delete the last sentence ("The term ... "through or into" specifically excludes ... that country").

Pressure receptacle Before "and bundles" insert ", metal hydride storage systems".

Repaired IBC In the second sentence, "manufacturer's specification" is replaced with "design type from the same manufacturer".

Tank At the end of the sentence, "substances of class 2" is replaced with "gases as defined in 2.2.1.1".

Cargo transport unit is replaced by the following:

"*Cargo transport unit* means a road transport tank or freight vehicle, a railway transport tank or freight wagon, a multimodal freight container or portable tank, or a MEGC;".

Closed cargo transport unit is replaced by the following:

"*Closed cargo transport unit*, with the exception of class 1, means a cargo transport unit which totally encloses the contents by permanent structures with complete and rigid surfaces. Cargo transport units with fabric sides or tops are not considered closed cargo transport units; for definition of class 1 *cargo transport unit* see 7.1.7.1.1."

GHS In the first sentence "second" is replaced with "third" and the reference "Rev.2" is replaced with "Rev.3".

Liquids After "(ADR)" insert ", as amended" and the footnote is deleted.

Tank Insert a hyphen between "tank" and "wagon" and between "tank" and "vehicle".

The following new definitions are inserted in alphabetical order:

"*Fuel cell* means an electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products.

Fuel cell engine means a device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfil its function.

Manual of test and criteria means the fifth revised edition of the United Nations publication entitled "*Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*" (ST/SG/AC.10/11/Rev.5).

Metal hydride storage system means a single complete hydrogen storage system, including a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only.

Open cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas.

Remanufactured large packaging means a metal or rigid plastics large packaging that:

- (a) Is produced as a UN type from a non-UN type; or
- (b) Is converted from one UN design type to another UN design type. Remanufactured large packagings are subject to the same provisions of this Code that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2).

Reused large packaging means a large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product.

Through or into means through or into the countries in which a consignment is transported but specifically excludes countries "over" which a consignment is carried by air, provided that there are no scheduled stops in those countries."

1.2.3 List of Abbreviations

BC Code "BC Code" is replaced with "IMSBC Code", and its definition is replaced with "International Maritime Solid Bulk Cargoes Code".

ISO The address of ISO is replaced with "1, ch. de la Voie-Creuse, CH-1211 Geneva 20, Switzerland".

Chapter 1.3 – Training

1.3.1 Training of shore-side personnel

1.3.1.1 In the first sentence, replace "shall receive training" with "shall be trained" and a new second sentence is inserted as follows:

"Employees shall be trained in accordance with the provisions of 1.3.1 before assuming responsibilities and shall only perform functions, for which

required training has not yet been provided, under the direct supervision of a trained person."

1.3.1.2 At the end of the introductory text, replace "shall receive the following training" with "shall be trained in the following".

1.3.1.2.1 Replace "shall receive training designed to provide familiarity" with "shall be trained in order to be familiar".

1.3.1.2.2 Replace "shall receive detailed training concerning" with "shall be trained in".

1.3.1.3 The existing paragraph is replaced by the following:

"1.3.1.3 Records of training received according to this chapter shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority."

1.3.1.4 In the first sentence, replace "should receive training on" with "should be trained in".

Chapter 1.4 – Security provisions

1.4.2 General provisions for shore-side personnel

1.4.2.3 Security Training

1.4.2.3.4 The existing paragraph is replaced by the following:

"1.4.2.3.4 Records of all security training received should be kept by the employer and made available to the employee or competent authority, upon request. Records should be kept by the employer for a period of time established by the competent authority."

1.4.3 Provisions for high consequence dangerous goods

1.4.3.5 The existing paragraph is replaced by the following:

"1.4.3.5 For radioactive material, the provisions of this chapter are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material¹ and the IAEA circular on The Physical Protection of Nuclear Material and Nuclear Facilities² are applied."

¹ IAEACIRC/274/Rev.1, IAEA, Vienna (1980).

² IAEACIRC/225/Rev.4 (Corrected), IAEA, Vienna (1999). See also "Guidance and Considerations for the Implementation of INFCIRC/225/Rev.4, the Physical Protection of Nuclear Material and Nuclear Facilities, IAEA-TECDOC-967/Rev.1.

Chapter 1.5 – General provisions concerning class 7

1.5.1 Scope and application

- 1.5.1.1 In the second sentence, replace "2005" with "2009" (twice). And the last sentence is replaced by the following:

"Explanatory material can be found in "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2005 Edition)", Safety Standard Series No. TS-G-1.1 (Rev.1), IAEA, Vienna (2008)"

and the footnote is deleted.

- 1.5.1.2 The first sentence is replaced by the following:

"The objective of this Code is to establish provisions that shall be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of radioactive material."

- 1.5.1.3 In the third sentence, replace "that is characterized" with "that are characterized".

- 1.5.1.5.1 The first paragraph is replaced by the following:

"1.5.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles and empty packagings as specified in 2.7.2.4.1 shall be subject only to the following provisions of Parts 5 to 7:"

and subparagraph .1 is replaced by the following:

.1 The applicable provisions specified in 5.1.2, 5.1.3.2, 5.1.4, 5.1.5.4, 5.2.1.5.2, 5.2.1.7, 7.1.14.1, 7.1.14.3 and 7.3.4.2;"

- 1.5.1.5.2 The existing paragraph is replaced by the following:

"1.5.1.5.2 Excepted packages shall be subject to the relevant provisions of all other parts of this Code."

1.5.2 Radiation protection programme

- 1.5.2.3 At the end of the second sentence, replace "and 1.5.2.4" with ", 1.5.2.4 and 7.2.9".

PART 2 – CLASSIFICATION

Chapter 2.0 – Introduction

2.0.2 UN Numbers and Proper Shipping Names

- 2.0.2.2 The existing first paragraph is replaced by the following:

"2.0.2.2 Dangerous goods commonly transported are listed in the Dangerous Goods List in chapter 3.2. Where an article or substance is specifically listed by name, it shall be identified in transport by the

proper shipping name in the Dangerous Goods List. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect their classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a mixture or solution (see 2.0.2.5). For dangerous goods not specifically listed by name "generic" or "not otherwise specified" entries are provided (see 2.0.2.7) to identify the article or substance in transport."

2.0.2.5 The existing paragraph is replaced by the following:

"2.0.2.5 A mixture or solution composed of a single predominant substance identified by name in the Dangerous Goods List and one or more substances not subject to the provisions of this Code and/or traces of one or more substances identified by name in the Dangerous Goods List, shall be assigned the UN number and proper shipping name of the predominant substance named in the Dangerous Goods List unless:

- .1 The mixture or solution is identified by name in the Dangerous Goods List;
- .2 The name and description of the substance named in the Dangerous Goods List specifically indicate that they apply only to the pure substance;
- .3 The hazard class or division, subsidiary risk(s), packing group, or physical state of the mixture or solution is different from that of the substance named in the Dangerous Goods List; or
- .4 The hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in the Dangerous Goods List.

In those other cases, except the one described in (.1), the mixture or solution shall be treated as a dangerous substance not specifically listed by name in the Dangerous Goods List."

2.0.2.10 Add a new paragraph 2.0.2.10 with the following:

"2.0.2.10 A mixture or solution meeting the classification criteria of this Code that is not identified by name in the Dangerous Goods List and that is composed of two or more dangerous goods shall be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary risk(s) and packing group that most precisely describe the mixture or solution."

2.0.3 Classification of substances, mixtures and solutions with multiple hazards (precedence of hazards characteristics)

2.0.3.5 At the end of the paragraph, insert the following new sentence:

"For radioactive material in excepted packages, special provision 290 of chapter 3.3 applies."

Chapter 2.1 – Explosives

2.1.1.3 Definitions

2.1.1.3 A new subparagraph .5 is added as follows:

".5 *Phlegmatized* means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and transport. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: wax, paper, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin)."

2.1.2 Compatibility groups and classification codes

2.1.2.2 Add the following new notes under the table:

"NOTE 1: Articles of compatibility groups D and E may be fitted or packed together with their own means of initiation provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages shall be assigned to compatibility groups D or E.

NOTE 2: Articles of compatibility groups D and E may be packed together with their own means of initiation, which do not have two effective protective features when, in the opinion of the competent authority of the country of origin, the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of transport. Such packages shall be assigned to compatibility groups D or E."

2.1.3 Classification Procedures

2.1.3.5.5 Default fireworks classification table**

2.1.3.5.5 In **Note 1** replace "all pyrotechnic composition" with "all pyrotechnic substances" and the existing **Note 2** is replaced by the following:

"NOTE 2: "Flash composition" in this table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks, that are used to produce an aural effect, or used as a bursting charge or lifting charge, unless the time taken for the pressure rise is

*

[Footnote text is unchanged.]

demonstrated to be more than 8 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test in Appendix 7 of the United Nations Manual of Tests and Criteria."

- 2.1.3.5.5 Within the **Default fireworks classification table**, replace "pyrotechnic composition" with "pyrotechnic substance" whenever it appears.

Chapter 2.2 – Class 2 Gases

2.2.0 Introductory notes

- 2.2.0 **Note 2** is deleted.

- 2.2.0 Delete the words "Note 1:" and in the title of 2.2.0 delete "s" in the word "notes".

2.2.2 Class subdivisions

- 2.2.2.2 In subparagraph .2, delete the second sentence ("The oxidizing ability ... 10156-2:2005")

and the following new note is added:

"NOTE: In 2.2.2.2.2, "gases which cause or contribute to the combustion of other material more than air does" means pure gases or gas mixtures with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156:1996 or 10156-2:2005."

- 2.2.2.6 A new paragraph 2.2.2.6 is added as follows:

"2.2.2.6 Gases of class 2.2 are not subject to the provisions of this Code when contained in the following:

- .1 Foodstuffs (except UN 1950), including carbonated beverages;
- .2 Balls intended for use in sports;
- .3 Tyres (except for air transport); or
- .4 Light bulbs provided they are packaged so that the projectile effects of any rupture of the bulb will be contained within the package."

2.2.3 Mixture of gases

- 2.2.3.4 The reference "(see ISO 10156:1996 and ISO 10156-2:2055)" is replaced with "(see note in 2.2.2.2)".

Chapter 2.3 – Class 3 Flammable liquids

2.3.3 Determination of flash point

2.3.3.6 The existing section is replaced by the following:

"2.3.3.6 Determination of flash point

The following methods for determining the flash point of flammable liquids may be used:

International standards:

ISO 1516
ISO 1523
ISO 2719
ISO 13736
ISO 3679
ISO 3680

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D3828-07a, Standard Test Methods for Flash Point by Small Scale Closed Cup Tester

ASTM D56-05, Standard Test Method for Flash Point by Tag Closed Cup Tester

ASTM D3278-96(2004)e, Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus

ASTM D93-08, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.

Association française de normalisation, AFNOR, 11, rue de Pressensé, 93571 La Plaine Saint-Denis Cedex:

French Standard NF M 07 – 019

French Standards NF M 07 – 011/NF T 30 – 050/NF T 66 – 009

French Standard NF M 07 – 036

Deutsches Institut für Normung, Burggrafenstr. 6, D-10787 Berlin:

Standard DIN 51755 (flash points below 65°C)

State Committee of the Council of Ministers for Standardization, 113813, GSP, Moscow, M-49 Leninsky Prospekt, 9:

GOST 12.1.044-84".

2.3.4 Add a new section 2.3.4 with the following:

"2.3.4 Determination of initial boiling point

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards:

ISO 3924
ISO 4626
ISO 3405

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure

ASTM D1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids

Further acceptable methods:

Method A.2 as described in Part A of the Annex to Commission Regulation (EC) No.440/2008¹."

Chapter 2.4 – Class 4 Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases

2.4.3 Class 4.2 – Substances liable to spontaneous combustion

2.4.3.1 Definitions and properties

2.4.3.1.2 The existing paragraph is replaced with the following:

"2.4.3.1.2 Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion."

¹

Commission Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union, No. L 142 of 31.05.2008, p.1-739 and No. L 143 of 03.06.2008, p.55).

Chapter 2.5 – Class 5 Oxidizing substances and organic peroxides**2.5.3 Class 5.2 – Organic peroxides**

2.5.3.2.4 In the table, amend the entries listed below as follows:

Organic peroxide		Column	Amendment
UN No.3105 tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE		Subsidiary risks and remarks	Delete "3"
UN No 3106 DI-(2-tert-BUTYLPEROXYISOPROPYL)BENZENE(S)		Organic peroxide	Amend to read "DI-(tert-BUTYLPEROXYISOPROPYL)BENZENE(S)"
UN No.3105 2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE (Concentration > 52 – 100)	(1 st row)	Delete	

and amend the index accordingly.

Insert the following new entries:

Numbers (generic entry)	Organic peroxide	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3103	2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	> 90 – 100					OP5			
3105	2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	> 52 – 90	≥ 10				OP7			

and amend the index accordingly.

Chapter 2.6 – Toxic and infectious substances**2.6.0 Introductory notes**

NOTE 2: In the paragraph, before "an infectious" insert the words "a toxic or".

2.6.2 Class 6.1 – Toxic substances

2.6.2.2.4.2 At the end of the NOTE, the reference "2.8.2.2" should be replaced with "2.8.2.3". And move the note to 2.6.2.2.4.1.

2.6.3 Class 6.2 – Infectious substances

2.6.3.1.5 The existing paragraph is deleted and "(reserved)" is added.

2.6.3.6.2 Amend to read: "Animal material affected by pathogens of category A or which would be assigned to category A in cultures only, shall be assigned to UN 2814 or UN 2900 as appropriate. Animal material affected by pathogens of category B other than those which would be assigned to category A if they were in cultures shall be assigned to UN 3373".

Chapter 2.7 – Radioactive material

2.7.1.3 Definitions or specific terms

Fissile material The paragraph before subparagraphs .1 and .2 is replaced with the following:

"*Fissile nuclides* means uranium-233, uranium-235, plutonium-239 and plutonium-241. Fissile material means a material containing any of the fissile nuclides. Excluded from the definition of fissile material are:"

2.7.2 Classification

2.7.2.2 Determination of activity level

2.7.2.2.1 In the table, under "Krypton (36)", add the following new entry:

" Kr-79	4×10^0	2×10^0	1×10^3	1×10^5 "
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2.7.2.3 Determination of other material characteristics

2.7.2.3.1 *Low specific activity (LSA) material*

2.7.2.3.1.2.1 In subparagraph (ii) replace "providing they" with "that".

2.7.2.3.1.2.1 In subparagraphs (iii) and (iv) replace "excluding material classified as fissile according to 2.7.2.3.5" with "excluding fissile material not excepted under 2.7.2.3.5".

2.7.2.3.1.2.3 At the beginning and after "excluding powders," insert "meeting the requirements of 2.7.2.3.1.3,".

2.7.2.3.3.2.1 Replace ", or" with "and".

2.7.2.3.4.1 In the second sentence after "package", insert ", taking into account the provisions of 6.4.8.14,".

2.7.2.3.5 *Fissile material*

The introductory sentence is replaced with the following:

"Packages containing fissile material shall be classified under the relevant entry of Table 2.7.2.1.1, the description of which includes the words "FISSILE" or "fissile-excepted". Classification as "fissile-excepted" is allowed only if one of the conditions (a) to (d) of this paragraph is met. Only one type of exception is allowed per consignment (see also 6.4.7.2).".

2.7.2.3.5.1 Replace by the following:

- ".1 A mass limit per consignment, provided that the smallest external dimension of each package is not less than 10 cm, such that:

$$\frac{\text{mass of uranium} - 235 \text{ (g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$$

where X and Y are the mass limits defined in Table 2.7.2.3.5, provided that either:

- (i) each individual package contains not more than 15 g of fissile nuclides; for unpackaged material, this quantity limitation shall apply to the consignment being carried in or on the conveyance; or
- (ii) the fissile material is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass; or
- (iii) there are not more than 5 g of fissile nuclides in any 10 litre volume of material.

Beryllium shall not be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 2.7.2.3.5 except where the concentration of beryllium in the material does not exceed 1 gram beryllium in any 1000 grams.

Deuterium shall also not be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 2.7.2.3.5 except where deuterium occurs up to natural concentration in hydrogen."

2.7.2.3.5.2 Replace "fissile material is" with "fissile nuclides are".

2.7.2.3.5.4 The paragraph is replaced by the following:

- ".4 Plutonium containing not more than 20% of fissile nuclides by mass up to a maximum of 1 kg of plutonium per consignment. Shipments under this exception shall be under exclusive use."

2.7.2.4.1 Classification as excepted package

2.7.2.4.1.1.2 At the end of the sentence add "as specified in Table 2.7.2.4.1.2".

2.7.2.4.1.1.4 At the end of the sentence add "as specified in Table 2.7.2.4.1.2".

2.7.2.4.1.3 In the first sentence of the first paragraph replace "provided that" with "only if".

2.7.2.4.1.4 In the first sentence of the first paragraph, replace "Radioactive material with an activity not exceeding the limit" with "Radioactive material in forms other than as specified in 2.7.2.4.1.3 and with an activity not exceeding the limits".

2.7.2.4.1.5 In the first sentence, delete "with an activity not exceeding the limit specified in column 4 of Table 2.7.2.4.1.2" and replace "provided that" with "only if".

2.7.2.4.1.6 At the end, replace "provided that" with "only if".

2.7.2.4.2 Classification as Low specific activity (LSA) material

2.7.2.4.2 Replace "if the conditions of 2.7.2.3.1 and 4.1.9.2 are met" with "if the definition of LSA in 2.7.1.3 and the conditions of 2.7.2.3.1, 4.1.9.2 and 7.1.14.2 are met".

2.7.2.4.3 Classification as Surface contaminated object (SCO)

2.7.2.4.3 Replace "if the conditions of 2.7.2.3.2.1 and 4.1.9.2 are met" with "if the definition of SCO in 2.7.1.3 and the conditions of 2.7.2.3.2, 4.1.9.2 and 7.1.14.2 are met".

Chapter 2.8 – Corrosive substances

2.8.2 Assignments to packing groups

2.8.2.4 At the end of the paragraph, replace "OECD Guideline 404^{*}." with "OECD Test Guideline 404¹ or 435². A substance which is determined not to be corrosive in accordance with OECD Test Guideline 430³ or 431⁴ may be considered not to be corrosive to skin for the purposes of this Code without further testing." And the footnote "^{*}" is deleted.

Chapter 2.9 – Miscellaneous dangerous goods substances and articles (Class 9) and environmentally hazardous substances

2.9.1 Definitions

2.9.1.2 The existing paragraph is deleted.

2.9.2 Assignment to class 9

2.9.2.1 Subparagraphs .3 and .4 are deleted.

2.9.2.2 Insert a new paragraph 2.9.2.2 with the following:

"2.9.2.2 The substances and articles of Class 9 are subdivided as follows:

Substances which, on inhalation as fine dust, may endanger health

2212	BLUE ASBESTOS (crocidolite) or
2212	BROWN ASBESTOS (amosite, myosorite)
2590	WHITE ASBESTOS (chrysotile, actinolite, anthophyllite, tremolite)

¹ OECD Guideline for the testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 2002.

² OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2006.

³ OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)" 2004.

⁴ OECD Guideline for the testing of chemicals No. 431 "In Vitro Skin Corrosion: Human Skin Model Test" 2004.

Substances evolving flammable vapour

- 2211 POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour
- 3314 PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour

Lithium batteries

- 3090 LITHIUM METAL BATTERIES (including lithium alloy batteries)
- 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) or
- 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)
- 3480 LITHIUM ION BATTERIES (including lithium ion polymer batteries)
- 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or
- 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)

Life-saving appliances

- 2990 LIFE-SAVING APPLIANCES, SELF-INFLATING
- 3072 LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment
- 3268 AIR BAG INFLATORS or
- 3268 AIR BAG MODULES or
- 3268 SEAT-BELT PRETENSIONERS

Substances and articles which, in the event of fire, may form dioxins

This group of substances includes:

- 2315 POLYCHLORINATED BIPHENYLS, LIQUID
- 3432 POLYCHLORINATED BIPHENYLS, SOLID
- 3151 POLYHALOGENATED BIPHENYLS, LIQUID or
- 3151 POLYHALOGENATED TERPHENYLS, LIQUID
- 3152 POLYHALOGENATED BIPHENYLS, SOLID or
- 3152 POLYHALOGENATED TERPHENYLS, SOLID

Examples of articles are transformers, condensers and apparatus containing those substances.

Substances transported or offered for transport at elevated temperatures

3257 ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100°C and below its flashpoint (including molten metal, molten salts, etc.)

3258 ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240°C

Environmentally hazardous substances

3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

These entries are used for substances and mixtures which are dangerous to the aquatic environment that do not meet the classification criteria of any other class or another substance within Class 9. These entries may also be used for wastes not otherwise subject to the provisions of this Code but which are covered under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and for substances designated to be environmentally hazardous substances by the competent authority of the country of origin, transit or destination which do not meet the criteria for an environmentally hazardous substance according to the provisions of this Code or for any other hazard Class. The criteria for substances which are hazardous to the aquatic environment are given in section 2.9.3.

Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)

3245 GENETICALLY MODIFIED MICRO-ORGANISMS or
3245 GENETICALLY MODIFIED ORGANISMS

GMMOs and GMOs which do not meet the definition of toxic substances (see 2.6.2) or infectious substances (see 2.6.3) shall be assigned to UN 3245.

GMMOs or GMOs are not subject to the provisions of this Code when authorized for use by the competent authorities of the countries of origin, transit and destination.

Genetically modified live animals shall be transported under terms and conditions of the competent authorities of the countries of origin and destination.

Other substances or articles presenting a danger during transport, but not meeting the definitions of another class:

1841 ACETALDEHYDE AMMONIA
 1845 CARBON DIOXIDE, SOLID (DRY ICE)
 1931 ZINC DITHIONITE (ZINC HYDROSULPHITE)
 1941 DIBROMODIFLUOROMETHANE
 1990 BENZALDEHYDE
 2071 AMMONIUM NITRATE BASED FERTILISER
 2216 FISH MEAL (FISH SCRAP), STABILIZED
 2807 MAGNETIZED MATERIAL*
 2969 CASTOR BEANS or
 2969 CASTOR MEAL or
 2969 CASTOR POMACE or
 2969 CASTOR FLAKE
 3166 ENGINE, INTERNAL COMBUSTION or
 3166 VEHICLE, FLAMMABLE GAS POWERED or
 3166 VEHICLE, FLAMMABLE LIQUID POWERED or
 3166 ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or
 3166 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or
 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or
 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED
 3171 BATTERY-POWERED VEHICLE or
 3171 BATTERY-POWERED EQUIPMENT
 3316 CHEMICAL KIT or
 3316 FIRST AID KIT
 3334 AVIATION REGULATED LIQUID, N.O.S.*
 3335 AVIATION REGULATED SOLID, N.O.S.*
 3359 FUMIGATED CARGO TRANSPORT UNIT
 3363 DANGEROUS GOODS IN MACHINERY or
 3363 DANGEROUS GOODS IN APPARATUS
 3496 BATTERIES, NICKEL-METAL HYDRIDE".

2.9.3 Environmentally hazardous substances (aquatic environment)

2.9.3.1 General definitions

2.9.3.1.1 The definition of "Substance" is replaced by the following:

"Substance means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition".

2.9.3.2 Definitions and data requirements

2.9.3.2.2 In the second sentence, before the word "freshwater", insert the words "it has been agreed that".

* Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes (see also special provision 960).

2.9.3.2.3 Replace second and third sentence with the following:

"These species are considered as surrogate for all aquatic organisms and data on other species such as Lemna, may also be considered if the test methodology is suitable".

2.9.3.2.5 In the third sentence, delete the word "aquatic".

2.9.3.2.5 The fourth sentence is replaced by the following:

"These are fresh water tests and thus the use of the results from OECD Test Guideline 306, which is more suitable for marine environments, has also been included".

2.9.3.4 Mixtures classification categories and criteria

2.9.3.4.3.2 In the first paragraph, the last sentence is replaced by the following:

"When chronic (long term) toxicity data (NOEC) are also available, they shall be used as well".

2.9.3.4.4.1 In the first sentence, replace the words "this data" with "these data".

2.9.3.4.5.1 In the first sentence, the words "classification of its ingredients" are replaced with "concentrations of its classified ingredients".

2.9.3.4.5.2 The first sentence is replaced with the following:

"Mixtures may be made of a combination of both ingredients that are classified (as Acute 1 and/or Chronic 1, 2) and those for which adequate test data are available."

and in the second sentence replace "toxicity data is available" with "toxicity data are available".

2.9.3.4.6.1.1 In the last sentence, the words "and it is not necessary therefore to undergo the further classification procedure" are replaced with "; therefore, it is not necessary to pursue the classification procedure further".

2.9.3.4.6.4.1 The first sentence is replaced with the following:

"Category acute 1 ingredients with toxicities well below 1 mg/l may influence the toxicity of the mixture and are given increased weight in applying the summation method."

and the second sentence is replaced by the following:

"When a mixture contains ingredients classified as acute 1 or chronic 1, the tiered approach described in 2.9.3.4.6.2 and 2.9.3.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of acute 1 ingredients by a factor, instead of merely adding up the percentages".

PART 3 – DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND EXEMPTIONS

Chapter 3.1 – General

3.1.2 Proper Shipping Names

3.1.2 Delete **Note 2** and renumber **Note 3** as **Note 2**.

3.1.2.8 Generic or "not otherwise specified" (N.O.S.) entries

3.1.2.8.1 In the first sentence after "special provision 274" insert "or 318".

3.1.2.8.1.1 In the first sentence after "recognized chemical", insert "or biological name,".

3.1.3 Mixtures and solutions containing one dangerous substance

3.1.3 The existing section "3.1.3" and the title are replaced with the following:

"3.1.3 Mixtures or solutions

NOTE: Where a substance is specifically listed by name in the Dangerous Goods List, it shall be identified in transport by the proper shipping name in the Dangerous Goods List. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a mixture or solution (see 2.0.2.2 and 2.0.2.5).

3.1.3.1 A mixture or solution is not subject to the provisions of this Code if the characteristics, properties, form or physical state of the mixture or solution are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

3.1.3.2 A mixture or solution composed of a single predominant substance identified by name in the Dangerous Goods List and one or more substances not subject to the provisions of this Code and/or traces of one or more substances identified by name in the Dangerous Goods List, shall be assigned the UN number and proper shipping name of the predominant substance named in the Dangerous Goods List unless:

- .1 The mixture or solution is identified by name in the Dangerous Goods List;
- .2 The name and description of the substance named in the Dangerous Goods List specifically indicate that they apply only to the pure substance;
- .3 The hazard class or division, subsidiary risk(s), packing group, or physical state of the mixture or solution is different from that of the substance named in the Dangerous Goods List; or

- .4 The hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in the Dangerous Goods List.

3.1.3.3 Qualifying words such as "MIXTURE" or "SOLUTION", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE 75% SOLUTION".

3.1.3.4 A mixture or solution meeting the classification criteria of this Code that is not identified by name in the Dangerous Goods List and that is composed of two or more dangerous goods shall be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary risk(s) and packing group that most precisely describe the mixture or solution."

3.1.4 Segregation groups

3.1.4.4 The segregation groups are amended as follows:

8 Hypochlorites

Add the following entries:

UN 3485 Calcium hypochlorite, dry, corrosive or calcium hypochlorite mixture, dry, corrosive with more than 39% available chlorine (8.8% available oxygen)

UN 3486 Calcium hypochlorite mixture, dry, corrosive with more than 10% but not more than 39% available chlorine

UN 3487 Calcium hypochlorite, hydrated, corrosive or calcium hypochlorite, hydrated mixture, corrosive, with not less than 5.5% but not more than 16% water

18 Alkalis

Add the following entry:

UN 3484 Hydrazine aqueous solution, flammable, with more than 37% hydrazine, by mass

Chapter 3.2 – Dangerous Goods List

For UN Nos. 0323, 0366, 0441, 0445, 0455, 0456, 0460 and 0500, add "347" in column (6).

For UN Nos. 1002 and 1956, delete "292" in column (6).

For UN Nos. 1092, 1098, 1135, 1143, 1163, 1182, 1185, 1238, 1239, 1244, 1251, 1510, 1541, 1580, 1595, 1605, 1647, 1670, 1695, 1752, 1809, 1810, 1834, 1838, 1892, 1994, 2232, 2334, 2337, 2382, 2407, 2474, 2477, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2521, 2605, 2606, 2644, 2646, 2668, 3023, 3079 and 3246 add "354" in column (6).

For UN Nos. 1092, 1098, 1135, 1143, 1163, 1182, 1185, 1238, 1239, 1244, 1251, 1541, 1580, 1595, 1605, 1647, 1670, 1695, 1752, 1809, 1810, 1838, 1892, 1994, 2232, 2334, 2337, 2382, 2407, 2474, 2477, 2480, 2482, 2484, 2485, 2486, 2487, 2488, 2521, 2606, 2644, 2646, 2668, 3023, 3246 and 3381 to 3390 amend the code in column (7b) to read "E0".

For UN Nos. 1135, 1143, 1695, 1752, 1809, 1810, 2232, 2337, 2382, 2474, 2477, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2521, 2605, 2606, 2644, 2646, 3023, 3079 and 3246 replace "P001" with "P602" in column (8).

For UN Nos. 1135, 1182, 1541, 1605, 1670, 1810, 1838, 1892, 2232, 2382, 2474, 2477, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2521, 2605, 2606, 2644, 2668, 3079 and 3246 amend the code in column (13) to read "T20".

For UN Nos. 1135, 1182, 1251, 1541, 1580, 1605, 1670, 1810, 1838, 1892, 2232, 2382, 2474, 2477, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2521, 2605, 2606, 2644, 2668, 3079 and 3246 add "TP37" in column (14).

For UN Nos. 1194, 1222, 1261, 1865, 3094 (PG I) and 3301 (PG I), replace "P099" with "P001" in column (8).

For UN Nos. 1251 and 1580 replace "T14" with "T22" in column (13).

For UN Nos. 1378, 1450, 1461, 1462, 1482 (PG II and III), 1549, 1556 (PG I, II and III), 1557 (PG I, II and III), 1564 (PG II and III), 1566 (PG II and III), 1583 (PG I, II and III), 1655 (PG I, II and III), 1707, 1935 (PG I, II and III), 2024 (PG I, II and III), 2025 (PG I, II and III), 2026 (PG I, II and III), 2291, 2570 (PG I, II and III), 2627, 2630, 2742, 2856, 2881 (PG I, II and III), 3141, 3144 (PG I, II and III), 3210 (PG II and III), 3212, 3213 (PG II and III), 3214, 3219 (PG II and III), 3256, 3257, 3258, 3283 (PG I, II and III), 3284 (PG I, II and III), 3285 (PG I, II and III), 3361, 3362 and 3440 (PG I, II and III) add "274" in column (6).

For UN Nos. 1391, 1649 and 2030 (PG I), delete "329" in column (6).

For UN Nos. 1450 and 3213 (PG II and III), add "350" and delete "900" in column (6).

For UN Nos. 1461 and 3210 (PG II and III), add "351" and delete "900" in column (6).

For UN Nos. 1482 (PG II and III) and 3214, add "353" and delete "900" in column (6).

For UN Nos. 1748 (PG II), 2208 and 2880 (PG II and III), delete "313" in column (6).

For UN Nos. 1810, 1834 and 1838, replace "8" with "6.1" in column (3) and add "8" in column (4).

For UN Nos. 1810, 1838, 2474, 2486 and 2668, replace "II" with "I" in column (5).

For UN Nos. 1810, 1834, 2474 and 2668 add "TP13" in column (14).

For UN Nos. 1950 and 2037, add "344" in column (6).

For UN 1040 Add "342" in column (6).

For UN 1072 Add "355" in column (6).

For UN 1131 in column (16) delete "see also SP 953".

For UN Nos. 1259, 2845, 3194, 3392, 3394 in column (16) replace "Prohibited on any ship carrying goods of class 1 with exceptions as in 7.2.7.1.3.2" with "Separated longitudinally by an intervening complete compartment or hold from Class 1".

For UN 1266 (PG II and III) Add "163" in column (6).

For UN 1267 (PG I, II and III) Add "357" in column (6).

For UN 1267 (PG I) Delete "Boiling range: 14°C upwards" in column (17).

For UN 1268 (PG I) Delete "Boiling range: 14°C upwards" in column (17).

For UN 1462 Add "352" and delete "900" in column (6).

For UN 1510 Replace "5.1" with "6.1" in column (3) and replace "6.1" with "5.1" in column (4).

For UN 1580 Replace "P602" with "P601" in column (8).

For UN 1838 Replace "P001" with "P602" in column (8) and delete "IBC02" in column (10).

For UN 1845 Delete "III" in column (5).

For UN 1977 Add "345 346" in column (6).

For UN 1999 (PG II and III) In column (2), amend the name and description to read "TARS, LIQUID, including road oils, and cutback bitumens". Amend the alphabetical index accordingly.

For UN Nos. 2078, 2206, 2236, 2250, 2281, 2285, 2290, 2328, 2478, 2480, 2482, 2484, 2485, 2487, 2488, 3080 and 3428, insert in column (17) "Irritating to skin, eyes and mucous membranes".

For UN 2315 Delete "908" in column (6).

For UN Nos. 2474, 2486 and 2668 amend the value in column (7a) to read "0".

For UN Nos. 2481, 2483, 2486, 2605 and 3079, replace "3" with "6.1" in column (3) and replace "6.1" with "3" in column (4).

For UN Nos. 2910, 2916, 2917, 2919 and 3323, add "325" in column (6).

For UN 2481 Replace "P601" with "P602" in column (8).

For UN 2668 Replace "P001 IBC99" with "P602" in column (8) and delete "IBC99" in column (10).

For UN Nos. 3077 and 3082, delete "179" and "909" in column (6).

For UN Nos. 3095 (PG I), 3096 (PG I) and 3124 (PG I), replace "P099" with "P002" in column (8).

For UN 3151 Delete "908" in column (6).

For UN 3212 Add "349" in column (6).

For UN Nos. 3328, 3329, 3330 and 3331, add "326" in column (6).

For UN Nos. 3391 to 3394, 3395 to 3399 (PG I, II and III) and 3400 (PG II and III), add "TP36" in column (14).

For UN 3468 Add "356" in column (6) and replace "P099" with "P205" in column (8).

For UN 3474 In column (2), amend the name and description to read "1-HYDROXYBENZOTRIAZOLE MONOHYDRATE" and in column (6), delete "28". Amend the alphabetical index accordingly.

For UN Nos. 3480 and 3481, add "348" in column (6).

For UN 3126 (PGII), 3127 (PGII), 3128 (PGII), 3131 (PGII) and 3132 (PGII) insert "T3" in column (13) and "TP33" in column (14).

For UN 3126 (PGIII), 3127 (PGIII), 3128 (PGIII), 3131 (PGIII) and 3132 (PGIII) insert "T1" in column (13) and "TP33" in column (14).

For UN 0020, 0021, 0243, 0244, 0245, 0246, 0248, 0249, 0250, 0301, 0303, 0322, 0354, 0355, 0356, 0357, 0358, 0359, 0380 insert in column (17) ", " after "under deck" in the last sentence.

For UN 0501 replace "S-X" with "S-Y" in column (15).

For UN 0216, Amend column (2) to read "TRINITRO-m-CRESOL". Amend the alphabetical index accordingly.

For UN 1110, Amend column (2) to read "n-AMYL METHYL KETONE". Amend the alphabetical index accordingly.

For UN 1125, Amend column (2) to read "n-BUTYLAMINE". Amend the alphabetical index accordingly.

For UN 1128, Amend column (2) to read "n-BUTYL FORMATE". Amend the alphabetical index accordingly.

For UN 1131, Delete "953" in column (6) and replace in column (16) "Prohibited on any ship carrying goods of class 1 with exceptions as in 7.2.7.1.3.2" with "Separated longitudinally by an intervening complete compartment or hold from Class 1".

For UN 1143, Replace "Category B" with "Category D" in column (16).

For UN 1274, Amend column (2) to read "n-PROPANOL (PROPYL ALCOHOL, NORMAL)". Amend the alphabetical index accordingly.

For UN 1276, Amend column (2) to read "n-PROPYL ACETATE". Amend the alphabetical index accordingly.

For UN 1348, Amend column (2) to read "SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass". Amend the alphabetical index accordingly.

For UN 1391, Replace "e.g., metallic sodium, suspended in a flammable liquid such as toluene, xylene, naphta, kerosene, etc" with "suspended in a liquid" in column (17).

For UN 1471 (PG II) amend column (2) to read "LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE" and amend the alphabetical index accordingly.

For UN 1486, 1498 and 1499, add "964" in column (6).

For UN 1510, Replace in column (17) "Toxic if swallowed, by skin contact or by vapour inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 1512, Delete "B2" in column (11).

For UN 1579, Amend column (2) to read "4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLID". Amend the alphabetical index accordingly.

For UN 1591, Amend column (2) to read "o-DICHLOROBENZENE". Amend the alphabetical index accordingly.

For UN 1598, Amend column (2) to read "DINITRO-o-CRESOL". Amend the alphabetical index accordingly.

For UN 1647, Replace "Category C" with "Category D" in column (16).

For UN 1649, Delete "" in column (15) and delete "May have a flashpoint within the range of flammable liquids." and ""If flammable : F-E, S-D" in column (17).

For UN 1661, Amend column (2) to read "NITROANILINES (o-, m-, p-)". Amend the alphabetical index accordingly.

For UN 1663, Amend column (2) to read "NITROPHENOLS (o-, m-, p-)". Amend the alphabetical index accordingly.

For UN 1673, Amend column (2) to read "PHENYLENEDIAMINES (o-, m-, p-)". Amend the alphabetical index accordingly.

For UN 1810, Replace "Category C" with "Category D" in column (16) and add in column (17) "Highly toxic if swallowed, by skin contact or by inhalation."

For UN 1834, Replace "Category C" with "Category D" in column (16) and add in column (17) "Highly toxic if swallowed, by skin contact or by inhalation."

For UN 1838, Replace "Category C" with "Category D" in column (16) and replace in column (17) "Vapour irritates mucous membranes" with "Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes."

For UN 1865, Amend column (2) to read "n-PROPYL NITRATE". Amend the alphabetical index accordingly.

For UN 1913, Replace "Category B" with "Category D" in column (16).

For UN 1951, Replace "Category B" with "Category D" in column (16).

For UN 1963, Replace "Category B" with "Category D" in column (16).

For UN 1970, Replace "Category B" with "Category D" in column (16).

For UN 1977, Delete in column (17) in the second sentence "of the gas".

For UN 2030, Delete "*" in column (15) and delete "*If flammable : F-E, S-C (S-C is a special case)" in column (17).

For UN 2187, Replace "Category B" with "Category D" in column (16).

For UN 2201, Replace "Category B" with "Category D" in column (16).

For UN 2227, Amend column (2) to read "n-BUTYL METHACRYLATE, STABILIZED". Amend the alphabetical index accordingly.

For UN 2247, Amend column (2) to read "n-DECANE". Amend the alphabetical index accordingly.

For UN 2278, Amend column (2) to read "n-HEPTENE". Amend the alphabetical index accordingly.

For UN 2337, Replace "Category B" with "Category D" in column (16).

For UN 2364, Amend column (2) to read "n-PROPYLBENZENE". Amend the alphabetical index accordingly.

For UN 2384, Amend column (2) to read "DI-n-PROPYL ETHER". Amend the alphabetical index accordingly.

For UN 2398, Amend column (2) to read "METHYL tert-BUTYL ETHER". Amend the alphabetical index accordingly.

For UN 2455, Delete "F-C, S-V" in column (15).

For UN 2474, Replace "Category B" with "Category D" in column (16) and replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2477, Add "Clear of living quarters." in column (16).

For UN 2481, Replace in column (17) "Toxic by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2482, Amend column (2) to read "n-PROPYL ISOCYANATE". Amend the alphabetical index accordingly.

For UN 2483, Replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2485, Amend column (2) to read "n-BUTYL ISOCYANATE". Amend the alphabetical index accordingly.

For UN 2486, Replace in column (17) "Toxic by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2591, Replace "Category B" with "Category D" in column (16).

For UN 2605, Replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2606, Replace "Category E" with "Category D" in column (16).

For UN 2644, Replace "Category C" with "Category D" in column (16).

For UN 2668, Replace "Category A" with "Category D" in column (16) and replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 2671, Amend column (2) to read "AMINOPYRIDINES (o-, m-, p-)". Amend the alphabetical index accordingly.

For UN 2740, Amend column (2) to read "n-PROPYL CHLOROFORMATE". Amend the alphabetical index accordingly.

For UN 2743, Amend column (2) to read "n-BUTYL CHLOROFORMATE". Amend the alphabetical index accordingly.

For UN 2949, Insert "," after "HYDROSULPHIDE" in column (2).

For UN 3056, Amend column (2) to read "n-HEPTALDEHYDE". Amend the alphabetical index accordingly.

For UN 3065 (PG II and III), Insert "," after "BEVERAGES" in column (2).

For UN 3079, Replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN Nos 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119 and 3120, Add at the end of current text in column (17) "May evolve irritant or toxic fumes."

For UN 3124, Replace in column (17) "Toxic if swallowed, by skin contact or by inhalation" with "Highly toxic if swallowed, by skin contact or by inhalation".

For UN 3166:

Amend column (2) to read "ENGINE, INTERNAL COMBUSTION or VEHICLE, FLAMMABLE GAS POWERED or VEHICLE, FLAMMABLE LIQUID POWERED or ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED".

Amend column (6) to read "312 356 961 962".

Amend column (15) to read "**".

Amend column (16) to read "Category A".

Amend column (17) to read "Type of articles transported under this entry include internal combustion engines, compression/ignition engines, fuel cell powered engines, motor vehicles, hybrid vehicles, motorcycles and boats. *F-D, S-U for gases or F-E, S-E for liquids.".

Amend the alphabetical index accordingly.

For UN 3171:

Amend column (6) to read "240 961 962".

Amend column (15) to read "F-I, S-I".

Amend column (16) to read "Category A".

Amend column (17) to read "Type of articles transported under this entry include vehicles or equipment powered by wet batteries, sodium batteries or lithium batteries with the batteries installed, such as electrically-powered cars, lawnmowers, wheelchairs and other mobility aids.".

For UN 3359 In column (2), amend the proper shipping name to read "FUMIGATED CARGO TRANSPORT UNIT". Delete "910" in column (6). In column (17), amend "FUMIGATED UNIT" to read "FUMIGATED CARGO TRANSPORT UNIT", delete "Fumigants shall not be applied to the contents of a cargo transport unit once it has been loaded aboard the ship. A closed cargo transport unit that has been fumigated is not subject to the provisions of this Code if it has been completely ventilated either by opening the doors of the unit or by mechanical ventilation after fumigation and if the date of ventilation is marked on the fumigation warning sign (see also special provision 910)" and add "See also 5.5.2.". Amend the proper shipping name in the index accordingly.

For UN Nos. 3381, 3382, 3383, 3385, 3387 and 3389 Replace in column (17) "Highly toxic by inhalation. Toxic if swallowed or by skin contact." with "Highly toxic if swallowed, by skin contact or by inhalation." and "significant" with "highly".

For UN Nos. 3384, 3386, 3388 and 3390 Replace in column (17) "Toxic by inhalation, if swallowed or by skin contact." with "Highly toxic if swallowed, by skin contact or by inhalation." and "significant" with "highly".

Add the following new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
0509	POWDER, SMOKELESS	1.4C	-	-	-	0	E0	P114(b)	PP48	-	-	-	-	F-B, S-Y	Category 09.	Substances based on nitrocellulose used as a propellant.
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1	-	III	223	5 kg	E1	P002 LP02	-	IBC08	B3	T1	TP33	F-H, S-Q	Category A. Ventilation may be required. The possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency, and the consequent risk to the stability of the ship through flooding of the cargo spaces, shall be considered before loading. "Separated from" ammonium compounds, acids, cyanides, hydrogen peroxide and liquid organic substances. "Away from" sources of heat.	See entry above.
3482	ALKALI METAL DISPERSION, FLAMMABLE or ALKALINE EARTH METAL DISPERSION, FLAMMABLE	4.3	3	I	182 183	0	E0	P402	PP31	-	-	-	-	F-G, S-N	Category D. "Separated from" acids.	Finely divided alkali or alkaline earth metal suspended in a flammable liquid. Reacts violently with moisture, water or acids, evolving hydrogen, which may be ignited by the heat of the reaction.
3483	MOTOR FUEL ANTI-KNOCK MIXTURE, FLAMMABLE	6.1	3 P	I	-	0	E5	P602	-	-	-	T14	TP2 TP13	F-E, S-D	Category D. Clear of living quarters. Shaded from radiant heat.	Volatile flammable liquids evolving toxic vapour. Mixture of tetraethyllead or tetramethyllead with ethylene dibromide and ethylene dichloride. Insoluble in water. Highly toxic if swallowed, by skin contact or by inhalation.
3484	HYDRAZINE AQUEOUS SOLUTION, FLAMMABLE with more than 37% hydrazine, by mass	8	3 6.1	I	-	0	E0	P001	-	-	-	T10	TP2 TP13	F-E, <u>S-C</u>	Category D. Clear of living quarters. Segregation as for class 3, but "away from" class 4.1. "Separated from" acids.	Colourless flammable liquid. Powerful reducing agent, burns readily. Toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes. Reacts violently with acids.

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
3485	CALCIUM HYPOCHLORITE, DRY, CORROSIVE or CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	5.1	8	II	314	1 kg	E2	P002	PP85	-	-	-	-	F-H, S-Q	Category D. Cargo transport units shall be shaded from direct sunlight and stowed away from sources of heat. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo. "Separated from" ammonium compounds, acids, cyanides, hydrogen peroxides and liquid organic substances.	White or yellowish corrosive solid (powder, granules or tablets) with chlorine-like odour. Soluble in water. May cause fire in contact with organic material or ammonium compounds. Substances are liable to exothermic decomposition at elevated temperatures. This condition may lead to fire or explosion. Decomposition can be initiated by heat or by impurities (e.g., powdered metals (iron, manganese, cobalt, magnesium) and their compounds). Liable to heat slowly. Reacts with acids, evolving chlorine, an irritating, corrosive and toxic gas. In the presence of moisture, corrosive to most metals. Causes burns to skin, eyes and mucous membranes.
3486	CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 10% but not more than 39% available chlorine	5.1	8	III	314	5 kg	E1	P002	PP85	-	-	-	-	F-H, S-Q	Category D. Cargo transport units shall be shaded from direct sunlight and stowed away from sources of heat. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo. "Separated from" ammonium compounds, acids, cyanides, hydrogen peroxides and liquid organic substances.	White or yellowish corrosive solid (powder, granules or tablets) with chlorine-like odour. Soluble in water. May cause fire in contact with organic material or ammonium compounds. Substances are liable to exothermic decomposition at elevated temperatures. This condition may lead to fire or explosion. Decomposition can be initiated by heat or by impurities (e.g., powdered metals (iron, manganese, cobalt, magnesium) and their compounds). Liable to heat slowly. Reacts with acids, evolving chlorine, an irritating, corrosive and toxic gas. In the presence of moisture, corrosive to most metals. Causes burns to skin, eyes and mucous membranes.
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE,	5.1	8	II	314 322	1 kg	E2	P002	PP85	-	-	-	-	F-H, S-Q	Category D. Cargo transport units shall be shaded from direct sunlight and stowed away from	White or yellowish corrosive solid (powder, granules or tablets) with chlorine-like odour. Soluble in water. May cause fire in contact with

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
	CORROSIVE with not less than 5.5% but not more than 16% water														sources of heat. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo. "Separated from" ammonium compounds, acids, cyanides, hydrogen peroxides and liquid organic substances.	organic material or ammonium compounds. Substances are liable to exothermic decomposition at elevated temperatures. This condition may lead to fire or explosion. Decomposition can be initiated by heat or by impurities (e.g., powdered metals (iron, manganese, cobalt, magnesium) and their compounds). Liable to heat slowly. Reacts with acids, evolving chlorine, an irritating, corrosive and toxic gas. In the presence of moisture, corrosive to most metals. Causes burns to skin, eyes and mucous membranes.
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	5.1	8	III	223 314	5 kg	E1	P002	PP85	-	-	-	-	F-H, S-Q	Category D. Cargo transport units shall be shaded from direct sunlight and stowed away from sources of heat. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo. "Separated from" ammonium compounds, acids, cyanides, hydrogen peroxides and liquid organic substances.	See entry above.
3488	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀	6.1	3 8	I	274	0	E0	P601	-	-	-	T22	TP2 TP13	F-E, S-D	Category D. Clear of living quarters. Segregation as for class 3 but "away from" class 4.1.	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being flammable and corrosive. Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes.
3489	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀	6.1	3 8	I	274	0	E0	P602	-	-	-	T20	TP2 TP13	F-E, S-D	Category D. Clear of living quarters. Segregation as for class 3 but "away from" class 4.1.	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being flammable and corrosive. Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes.
3490	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an	6.1	4.3 3	I	274	0	E0	P601	-	-	-	T22	TP2 TP13	F-G, S-N	Category D. Clear of living quarters. Segregation as for class 3 but "away from"	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being water-

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
	inhalation toxicity lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀														classes 3 and 8.	reactive and flammable. Highly toxic if swallowed, by skin contact or by inhalation.
3491	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀	6.1	4.3 3	I	274	0	E0	P602	-	-	-	T20	TP2 TP13	F-G, S-N	Category D. Clear of living quarters. Segregation as for class 3 but "away from" classes 3 and 8.	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being water-reactive and flammable. Highly toxic if swallowed, by skin contact or by inhalation.
3492	TOXIC BY INHALATION LIQUID, CORROSIVE, FLAMMABLE, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀	6.1	8 3	I	274	0	E0	P601	-	-	-	T22	TP2 TP13	F-E, S-D	Category D. Clear of living quarters. Segregation as for class 3 but "away from" class 4.1.	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being flammable and corrosive. Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes.
3493	TOXIC BY INHALATION LIQUID, CORROSIVE, FLAMMABLE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀	6.1	8 3	I	274	0	E0	P602	-	-	-	T20	TP2 TP13	F-E, S-D	Category D. Clear of living quarters. Segregation as for class 3 but "away from" class 4.1.	A variety of toxic liquids which present a highly toxic inhalation hazard as well as being flammable and corrosive. Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes.
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	6.1	I	343	0	E0	P001	-	-	-	T14	TP2 TP13	F-E, S-E	Category D. Clear of living quarters.	Immiscible with water. Evolves hydrogen sulphide, which is a flammable, toxic gas with a foul odour, heavier than air (1.2). Toxic if swallowed, by skin contact or by inhalation.
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	6.1	II	343	1 l	E2	P001	-	IBC02	-	T7	TP2	F-E, S-E	Category D. Clear of living quarters.	See entry above.
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	6.1	III	343	5 l	E1	P001	-	IBC03	-	T4	TP1	F-E, S-E	Category C. Clear of living quarters.	See entry above.
3495	IODINE	8	6.1	III	279	5 kg	E1	P002	-	IBC08	B3	T1	TP33	F-A, S-B	Category B. Clear of living quarters. "Separated from" ammonia.	Bluish-black solid with a metallic lustre and a pungent odour. Melting point: 114°C. Below its melting point, may evolve vapours which are irritating to skin, eyes and mucous membranes. Slightly soluble in water but soluble in most organic solvents. Corrosive to most metals.

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
3496	BATTERIES, NICKEL-METAL HYDRIDE	9	-	-	117 963	0	E0	See SP963	-	-	-	-	-	F-A, S-I	Category A. "Away from" sources of heat.	Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in equipment are not subject to the provisions of this Code.

and amend the alphabetical index and Appendix A accordingly.

Chapter 3.3 – Special provisions applicable to certain substances, materials or articles

3.3.1 Special Provisions

SP172 Amend to read as follows:

"Radioactive material with a subsidiary risk shall:

- (a) be labelled with subsidiary risks labels corresponding to each subsidiary risk exhibited by the material; corresponding placard shall be affixed to transport units in accordance with the relevant provisions of 5.3.1;
- (b) be allocated to packing groups I, II or III, as and if appropriate, by application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk.

The description required in 5.4.1.5.7.1.2 shall include a description of these subsidiary risks (e.g., "Subsidiary risk: 3, 6.1"), the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s), and where applicable, the packing group. For packing, see also 4.1.9.1.5."

SP179 Delete.

SP188 At the end of the second sentence in subparagraph .2, after "case", add the following text:

", except those manufactured before 1 January 2009"

and at the beginning of subparagraph .6, after "Except for packages containing", insert "button cell batteries installed in equipment (including circuit boards), or".

SP198 Insert after "paints" the words ", perfumery products" and after "1263" insert ", 1266".

SP219 Replace the existing text with the following:

"219 Genetically modified microorganisms (GMMOs) and genetically modified organisms (GMOs) packed and marked in accordance with packing instruction P904 are not subject to any other provisions of this Code.

If GMMOs or GMOs meet the definition in Chapter 2.6 of a toxic substance or an infectious substance and the criteria for inclusion in Class 6.1 or 6.2 the provisions of this Code for transporting toxic substances or infectious substances apply."

SP240 Insert SP240 with the following:

"240 This entry only applies to vehicles and equipment powered by wet batteries, sodium batteries or lithium batteries and transported with these batteries installed. Examples of such vehicles and equipment are electrically-powered cars, lawnmowers, wheelchairs and other mobility aids. Hybrid electric vehicles powered by both an internal combustion

engine and wet batteries, sodium batteries or lithium batteries, transported with the batteries installed shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. Vehicles which contain a fuel cell shall be consigned under the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate."

SP290 Replace the existing text with the following:

"290 When this radioactive material meets the definitions and criteria of other classes or divisions as defined in Part 2, it shall be classified in accordance with the following:

.1 Where the substance meets the criteria for dangerous goods in excepted quantities as set out in chapter 3.5, the packagings shall be in accordance with 3.5.2 and meet the testing requirements of 3.5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1.5.1.5 shall apply without reference to the other class or division;

.2 Where the quantity exceeds the limits specified in 3.5.1.2 the substance shall be classified in accordance with the predominant subsidiary risk. The dangerous goods transport document shall describe the substance with the UN number and proper shipping name applicable to the other class supplemented with the name applicable to the radioactive excepted package according to column 2 in the Dangerous Goods List of chapter 3.2, and shall be transported in accordance with the provisions applicable to that UN number. An example of the information shown on the dangerous goods transport document is:

UN 1993, Flammable liquid, N.O.S. (ethanol and toluene mixture),
Radioactive material, excepted package – limited quantity of
material, class 3, PG II.

In addition, the provisions of 2.7.2.4.1 shall apply;

.3 The provisions of chapter 3.4 for the transport of dangerous goods packed in limited quantities shall not apply to substances classified in accordance with subparagraph .2;

.4 When the substance meets a special provision that exempts this substance from all dangerous goods provisions of the other classes it shall be classified in accordance with the applicable UN number of class 7 and all requirements specified in 1.5.1.5 shall apply."

SP292 Delete.

SP302 Amend to read as follows:

"302 Fumigated cargo transport units containing no other dangerous goods are only subject to the provisions of 5.5.2."

SP304 Amend to read as follows:

"This entry may only be used for the transport of non-activated batteries which contain dry potassium hydroxide and which are intended to be activated prior to use by the addition of an appropriate amount of water to the individual cells."

SP 310 In the first sentence the word "lithium" is deleted.

SP312 Insert SP312 with the following:

"312 Vehicles or machinery powered by a fuel cell engine shall be consigned under the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, or UN 3166 ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed."

Other vehicles which contain an internal combustion engine shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the batteries installed.

SP313 Delete.

SP329 Delete.

SP900 In the text, delete the following substances:

AMMONIUM BROMATE
AMMONIUM BROMATE SOLUTION
AMMONIUM CHLORATE
AMMONIUM CHLORATE SOLUTION
AMMONIUM CHLORITE
AMMONIUM PERMANGANATE
AMMONIUM PERMANGANATE SOLUTION

and replace:

"CHLORIC ACID AQUEOUS SOLUTION with a concentration exceeding 10%" with
"CHLORIC ACID, AQUEOUS SOLUTION with more than 10% chloric acid"

"HYDROCYANIC ACID with more than 20% acid, by mass" with "HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION) with more than 20% hydrogen cyanide"

"HYDROGEN CYANIDE SOLUTION with more than 45% HYDROGEN CYANIDE" with "HYDROGEN CYANIDE SOLUTION IN ALCOHOL with more than 45% hydrogen cyanide".

SP908 Delete.

SP909 Delete.

SP910 Delete.

SP 953 Delete.

Insert the following new special provisions:

"342 Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 ml of ethylene oxide per inner packaging with not more than 300 ml per outer packaging, may be transported in accordance with the provisions in chapter 3.5, irrespective of the indication of "E0" in column 7b of the Dangerous Goods List provided that:

- .1 After filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test shall not be transported under the terms of this special provision;
- .2 In addition to the packaging required by 3.5.2, each glass inner receptacle is placed in a sealed plastics bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and
- .3 Each glass inner receptacle is protected by a means of preventing puncture of the plastics bag (e.g., sleeves or cushioning) in the event of damage to the packaging (e.g., by crushing).

343 This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned shall be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.

344 The provisions of 6.2.4 shall be met.

345 This gas contained in open cryogenic receptacles with a maximum capacity of 1 litre constructed with glass double walls having the space between the inner and outer wall evacuated (vacuum insulated) is not subject to the provisions of this Code provided each receptacle is transported in an outer packaging with suitable cushioning or absorbent materials to protect it from impact damage.

346 Open cryogenic receptacles conforming to the requirements of packing instruction P203 and containing no dangerous goods except for UN 1977, nitrogen, refrigerated liquid, which is fully absorbed in a porous material are not subject to any other provisions of this Code.

- 347** This entry shall only be used if the results of Test series 6 (d) of Part I of the United Nations Manual of Tests and Criteria have demonstrated that any hazardous effects arising from functioning are confined within the package.
- 348** Batteries manufactured after 31 December 2011 shall be marked with the Watt-hour rating on the outside case.
- 349** Mixtures of a hypochlorite with an ammonium salt are not to be accepted for transport. UN No. 1791 hypochlorite solution is a substance of class 8.
- 350** Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are not to be accepted for transport.
- 351** Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are not to be accepted for transport.
- 352** Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are not to be accepted for transport.
- 353** Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are not to be accepted for transport.
- 354** This substance is toxic by inhalation.
- 355** Oxygen cylinders for emergency use transported under this entry may include installed actuating cartridges (cartridges, power device of Class 1.4, Compatibility Group C or S), without changing the classification of Class 2.2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for transport shall have an effective means of preventing inadvertent activation.
- 356** Metal hydride storage system(s) installed in conveyances or in completed conveyance components or intended to be installed in conveyances shall be approved by the competent authority before acceptance for transport. The transport document shall include an indication that the package was approved by the competent authority or a copy of the competent authority approval shall accompany each consignment.
- 357** Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard shall be consigned under the entry UN 3494 PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC.
- 961** Vehicles and equipment are not subject to the provisions of this Code if they are stowed on a roll-on/roll-off ship or in another cargo space designated by the Administration (flag State) as specifically designed and approved for the carriage of vehicles and equipment and there are no signs of leakage from the battery, engine, fuel cell, compressed gas cylinder or accumulator, or fuel tank when applicable.

In addition, vehicles and equipment are not subject to the provisions of this Code if any of the following conditions are met:

- .1 The fuel tank(s) of the vehicle or equipment powered by a flammable liquid fuel is empty and installed batteries are protected from short circuit;
- .2 The fuel tank(s) of the vehicle or equipment powered by a flammable gas is emptied of liquefied or compressed gas, the positive pressure in the tank does not exceed 2 bar, the fuel shut-off or isolation valve is closed and secured, and installed batteries are protected from short circuit; or
- .3 The vehicle or equipment is solely powered by a wet or dry electric storage battery or a sodium battery, and the battery is protected from short circuit.

962 Vehicles or equipment powered by internal combustion engines, fuel cells or batteries not meeting the conditions of special provision 961 shall be assigned to class 9 and shall meet the following requirements:

- .1 vehicles and equipment shall not show signs of leakage from batteries, engines, fuel cells, compressed gas cylinders or accumulators, or fuel tank(s) when applicable;
- .2 for flammable liquid powered vehicles and equipment, the fuel tank(s) containing the flammable liquid shall not be more than one-fourth full and in any case the flammable liquid shall not exceed 250 l;
- .3 for flammable gas powered vehicles and equipment, the fuel shut-off valve of the fuel tank(s) shall be securely closed;
- .4 installed batteries shall be protected from damage, short circuit, and accidental activation during transport. Lithium ion or lithium metal batteries shall meet the requirements of the United Nations Manual of Tests and Criteria, Part III, subsection 38.3, unless otherwise approved by the competent authority; and
- .5 dangerous goods required for the operation of the vehicle or equipment such as fire extinguishers, compressed gas accumulators, airbag inflators, etc., shall be securely mounted in the vehicle or equipment.

The marking, labelling and placarding provisions of this Code shall not apply."

963 Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in equipment are not subject to the provisions of this Code.

All other nickel-metal hydride cells or batteries shall be securely packed and protected from short circuit. They are not subject to other provisions of this Code provided that they are loaded in a cargo transport unit in a

total quantity of less than 100 Kg gross mass. When loaded in a cargo transport unit in a total quantity of 100 Kg gross mass or more, they are not subject to other provisions of this Code except those of 5.4.1, 5.4.3 and column (16) of the dangerous good list in Chapter 3.2.

- 964** This substance is not subject to the provisions of this Code when transported in non friable prills or granules form and if it passes the test for oxidizing solid substances as reflected in the United Nations *Manual of Test and Criteria* (see 34.4.1) and is accompanied by a certificate from a laboratory accredited by a competent authority, stating that the product has been correctly sampled by trained staff from the laboratory and that the sample was correctly tested and has passed the test.

Chapter 3.4 – Limited quantities

3.4.2 Packing

3.4.2.1 Add a new second sentence to read as follows: "Intermediate packagings may be used."

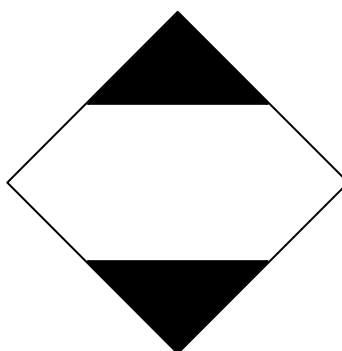
3.4.2.2 The end of the first sentence, after "with these special provisions", is replaced with the following:

"Inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, shall be placed in suitable intermediate packagings meeting the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8, and be so designed that they meet the construction requirements of 6.1.4."

3.4.5 Marking and labelling

3.4.5.1 and 3.4.5.2 are replaced with the following:

- "3.4.5.1 Packages containing dangerous goods in limited quantities need not be labelled nor marked with the marine pollutant mark, proper shipping name or UN number of the contents, but shall bear the marking shown below. The marking shall comply with 5.2.1.9.

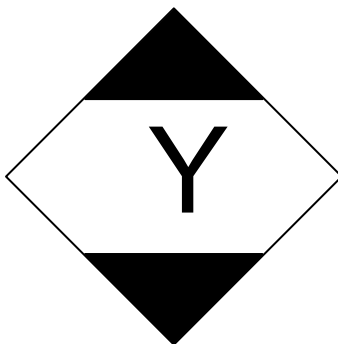


Marking for packages containing limited quantities

Top and bottom portions and line shall be black, centre area white or suitable contrasting background. Minimum dimensions: 100 mm x 100 mm. Minimum width of line forming diamond: 2 mm. If the size of the

package so requires, the dimension may be reduced, to be not less than 50 mm x 50 mm provided the marking remains clearly visible.

- 3.4.5.2 Packages containing dangerous goods consigned for air transport in conformity with the provisions of Part 3, Chapter 4 of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air shall bear the marking shown below. The marking shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.



Marking for packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air

Top and bottom portions and line shall be black, centre area white or suitable contrasting background. Minimum dimensions: 100 mm x 100 mm. Minimum width of line forming diamond: 2 mm. The symbol "Y" shall be placed in the centre of the mark and shall be clearly visible. If the size of the package so requires, the dimension may be reduced, to be not less than 50 mm x 50 mm provided the marking remains clearly visible.

- 3.4.5.3 Packages containing dangerous goods bearing the marking shown in 3.4.5.2 shall be deemed to meet the provisions of sections 3.4.1, 3.4.2 and 3.4.4 of this chapter and need not bear the marking shown in 3.4.5.1.
- 3.4.5.4 When packages containing dangerous goods in limited quantities are placed in an overpack or in a unit load, the overpack or the unit load shall be marked with the marking required by this chapter unless the markings representative of all dangerous goods in the overpack or the unit load are visible. In addition, an overpack shall be marked with the word "OVERPACK" unless markings representative of all dangerous goods, as required by this chapter, in the overpack are visible.
- 3.4.5.5 Cargo transport units containing dangerous goods in only limited quantities shall not be placarded nor marked according to 5.3.2.0 and 5.3.2.1. They shall, however, be suitably marked on the exterior with the mark in 3.4.5.1 which shall have minimum dimensions of 250 mm x 250 mm in locations indicated in 5.3.1.1.4.1."

3.4.7 Exceptions

3.4.7 Delete paragraph.

3.4.8 Marine pollutants

3.4.8 Renumbered as 3.4.7

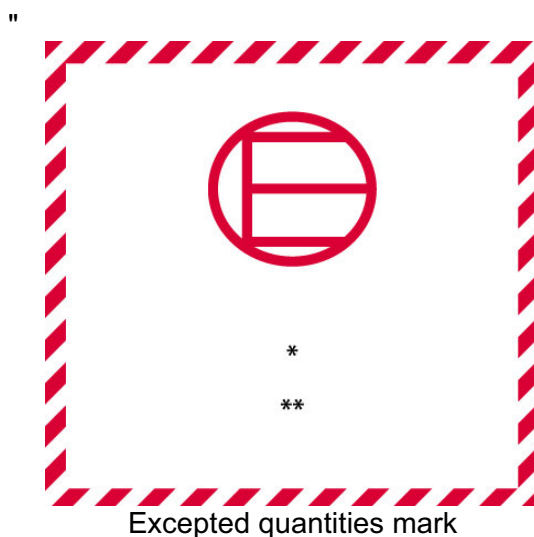
Chapter 3.5 – Dangerous goods packed in excepted quantities

3.5.3 Tests of packages

3.5.3.1.2 In the last paragraph delete the word "drop".

3.5.4 Marking of packages

3.5.4.1 Amend the mark as follows:



Hatching and symbol of the same colour, black or red,
on white or suitable contrasting background

* *The Class or, when assigned, the Division number(s) shall be shown in this location.*

** *The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package."*

PART 4 – PACKING AND TANK PROVISIONS

Chapter 4.1 – Use of packagings, including intermediate bulk containers (IBCs) and large packagings

4.1.1 General provisions for the packing of dangerous goods in packagings including IBCs and large packagings

4.1.1.1 At the end, replace "or reused" with ", reused or remanufactured".

4.1.1.2 Add a new subparagraph .3 to read as follows:

".3 shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of transport."

4.1.1.3 Replace the second sentence with the following:

"However, IBCs manufactured before 1 January 2011 and conforming to a design type which has not passed the vibration test of 6.5.6.13 or which was not required to meet the criteria of 6.5.6.9.5.4 at the time it was subjected to the drop test, may still be used."

4.1.4 List of packing instructions

4.1.4.1 Amend the following provisions:

P001 Delete the asterisk in the PG I column against the authorized maximum capacity (250 l) specified for 6HA1 and 6HB1 composite packagings.

P002 In special packing provision PP85, replace "For UN Nos. 1748, 2208 and 2880" with "For UN Nos. 1748, 2208, 2880, 3485, 3486 and 3487,".

P114 (b) Amend special packing provision PP48 to read as follows:

"PP48 For UN Nos. 0508 and 0509, metal packagings shall not be used."

P200 (4) In special packing provision "k:", amend the first sentence to read as follows:

"Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads that match those of the valve outlets.". Amend the seventh paragraph ("Each valve shall have a taper threaded connection ...") to read as follows:

Each valve shall be capable of withstanding the test pressure of the pressure receptacle and be connected directly to the pressure receptacle by either a taper thread or other means which meets the requirements of ISO 10692-2:2001."

In special packing provision "q:", in the first sentence, replace "The valves" with "Valve outlets". In the second sentence, at the end, replace "manifold outlet valve" with "outlet of the manifold valve" and add "pressure retaining" before "gas-tight plug". Add a new third sentence to read as follows:

"Gas-tight plugs or caps shall have threads that match those of the valve outlets."

and add the following new special packing provision "ra" below "r":

"ra: This gas may also be packed in capsules under the following conditions:

(i) The mass of gas shall not exceed 150 g per capsule;

- (ii) The capsules shall be free from faults liable to impair the strength;
- (iii) The leakproofness of the closure shall be ensured by an additional device (cap, crown, seal, binding, etc.) capable of preventing any leakage of the closure during transport;
- (iv) The capsules shall be placed in an outer packaging of sufficient strength. A package shall not weigh more than 75 kg."

P200 In Table 2, against UN 1037, add "ra" in column "Special packing provisions".

P203 Replace the existing "P203" with the following:

P203	PACKING INSTRUCTION	P203
This instruction applies to class 2 refrigerated liquefied gases.		
Requirements for closed cryogenic receptacles:		
(1)	The general requirements of 4.1.6.1 shall be met.	
(2)	The requirements of chapter 6.2 shall be met.	
(3)	The closed cryogenic receptacles shall be so insulated that they do not become coated with frost.	
(4)	Test pressure Refrigerated liquids shall be filled in closed cryogenic receptacles with the following minimum test pressures: <ul style="list-style-type: none"> (a) For closed cryogenic receptacles with vacuum insulation, the test pressure shall not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar); (b) For other closed cryogenic receptacles, the test pressure shall be not less than 1.3 times the maximum internal pressure of the filled receptacle, taking into account the pressure developed during filling and discharge. 	
(5)	Degree of filling For non-flammable, non-toxic refrigerated liquefied gases the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) shall not exceed 98% of the water capacity of the pressure receptacle. For flammable refrigerated liquefied gases the degree of filling shall remain below the level at which, if the contents were raised to the temperature at which the vapour pressure equalled the opening pressure of the relief valve, the volume of the liquid phase would reach 98% of the water capacity at that temperature.	
(6)	Pressure-relief devices Closed cryogenic receptacles shall be fitted with at least one pressure-relief device.	
(7)	Compatibility Materials used to ensure the leakproofness of the joints or for the maintenance of the closures shall be compatible with the contents. In the case of receptacles intended for the transport of oxidizing gases, (i.e. with a subsidiary risk of 5.1) these materials shall not react with these gases in a dangerous manner.	

P203	PACKING INSTRUCTION	P203
Requirements for open cryogenic receptacles:		
Only the following non oxidizing refrigerated liquefied gases of class 2.2 may be transported in open cryogenic receptacles: UN 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158.		
Open cryogenic receptacles shall be constructed to meet the following requirements:		
<ol style="list-style-type: none"> (1) The receptacles shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of transport. (2) The capacity shall be not more than 450 litres. (3) The receptacle shall have a double wall construction with the space between the inner and outer wall being evacuated (vacuum insulation). The insulation shall prevent the formation of hoar frost on the exterior of the receptacle. (4) The materials of construction shall have suitable mechanical properties at the service temperature. (5) Materials which are in direct contact with the dangerous goods shall not be affected or weakened by the dangerous goods intended to be transported and shall not cause a dangerous effect, e.g., catalysing a reaction or reacting with the dangerous goods. (6) Receptacles of glass double wall construction shall have an outer packaging with suitable cushioning or absorbent materials which withstand the pressures and impacts liable to occur under normal conditions of transport. (7) The receptacle shall be designed to remain in an upright position during transport, e.g., have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals. (8) The openings of the receptacles shall be fitted with devices allowing gases to escape, preventing any splashing out of liquid, and so configured that they remain in place during transport. (9) Open cryogenic receptacles shall bear the following marks permanently affixed, e.g., by stamping, engraving or etching: <ul style="list-style-type: none"> - The manufacturer's name and address; - The model number or name; - The serial or batch number; - The UN number and proper shipping name of gases for which the receptacle is intended; - The capacity of the receptacle in litres. 		

P402 In PP 31, insert "3148," after "1422," and replace "and 3399 (PG I)" with ", 3399 (PG I) and 3482".

P601 In special packing provision (1) in the first indent, replace "quantity of 1 litre" with "net quantity of 1 litre".

P602 In special packing provision (1) in the first indent, replace "quantity of 1 litre" with "net quantity of 1 litre".

P620 Add the following new additional requirement:

- "4. Other dangerous goods shall not be packed in the same packaging as class 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances. These small quantities of dangerous goods of Classes 3, 8 or 9 are not subject to any additional provisions of this Code when packed in accordance with this packing instruction."

and renumber remaining provision "4." as "5." accordingly.

P621 In the second sentence, insert ", except 4.1.1.15," after "4.1.1".

P804 (1) Replace the existing paragraph in the table with the following:

"(1) Combination packagings with a maximum gross mass of 25 kg, consisting of one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to no more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during transport, individually placed in:

- metal or rigid plastics receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in;
- 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, or 4H2 outer packagings."


P901 Replace "Maximum quantity of dangerous goods per outer packaging: 10 kg." with "The quantity of dangerous goods per outer packaging shall not exceed 10 kg, excluding the mass of any carbon dioxide, solid, (dry ice) used as a refrigerant."

and at the end of the additional provision, add the following new text:

"Dry ice

When carbon dioxide, solid, (dry ice) is used as a refrigerant, the packaging shall be designed and constructed to permit the release of the gaseous carbon dioxide to prevent the build up of pressure that could rupture the packaging."

P904 Replace the existing "P904" with the following:

P904	PACKING INSTRUCTION	P904
This instruction applies to UN 3245.		
<p>The following packagings are authorized:</p> <p>(1) Packagings meeting the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.8 and 4.1.3 and so designed that they meet the construction requirements of 6.1.4. Outer packagings constructed of suitable material of adequate strength and designed in relation to the packaging capacity and its intended use shall be used. Where this packing instruction is used for the transport of inner packagings of combination packagings the packaging shall be designed and constructed to prevent inadvertent discharge during normal conditions of transport.</p> <p>(2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:</p> <p>(a) An inner packaging comprising:</p> <ul style="list-style-type: none"> (i) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging shall be leakproof for liquids or siftproof for solids; (ii) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging; (iii) if multiple fragile primary receptacles are placed in a single secondary packaging they shall be individually wrapped or separated to prevent contact between them; <p>(b) An outer packaging shall be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.</p> <p>For transport, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line shall be at least 2 mm and the letters and numbers shall be at least 6 mm high.</p> <div style="text-align: center;">  </div>		
<p>Additional provision:</p> <p><u>Ice, dry ice and liquid nitrogen</u></p> <p>When dry ice or liquid nitrogen is used, all applicable provisions of this Code shall be met. When used, ice or dry ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack shall be leakproof. If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings and the package (the outer packaging or the overpack) shall be marked "Carbon dioxide, solid" or "Dry ice".</p> <p>The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</p>		

Add the following new packing instruction:

P205	PACKING INSTRUCTION	P205
This instruction applies to UN 3468.		
(1)	For metal hydride storage systems, the general packing requirements of 4.1.6.1 shall be met.	
(2)	Only pressure receptacles not exceeding 150 litres in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.	
(3)	Metal hydride storage systems meeting the applicable requirements for the construction and testing of pressure receptacles containing gas of chapter 6.2 are authorized for the transport of hydrogen only.	
(4)	When steel pressure receptacles or composite pressure receptacles with steel liners are used, only those bearing the "H" mark, in accordance with 6.2.2.9.2(j) shall be used.	
(5)	Metal hydride storage systems shall meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 and their conformity and approval shall be assessed in accordance with 6.2.2.5.	
(6)	Metal hydride storage systems shall be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent markings on the system as specified by ISO 16111:2008.	
(7)	The periodic test requirements for a metal hydride storage system shall be in accordance with ISO 16111:2008 and carried out in accordance with 6.2.2.6, and the interval between periodic inspections shall not exceed five years.	

4.1.4.2 Packing instructions concerning the use of IBCs

4.1.4.2 Amend the following packing instructions:

IBC04 Replace ", 21N, 31A, 31B and 31N" with "and 21N".

IBC05 In (1), replace ", 21N, 31A, 31B and 31N" with "and 21N".
In (2), replace ", 21H2, 31H1 and 31H2" with "and 21H2".
In (3), replace ", 21HZ1 and 31HZ1" with "and 21HZ1".

IBC06, IBC07 and IBC08

In (1), replace ", 21N, 31A, 31B and 31N" with "and 21N".
In (2), replace ", 21H2, 31H1 and 31H2" with "and 21H2".
In (3), replace ", 21HZ2, 31HZ1 and 31HZ2" with "and 21HZ2".

IBC06 Replace the additional provision with the following:

"Additional provision:

Where the solid may become liquid during transport see 4.1.3.4."

IBC07 Amend the additional provision to read as follows:

"Additional provision:

1. Where the solid may become liquid during transport see 4.1.3.4.
2. Liners of wooden IBCs shall be siftproof."

IBC08 Add the following new additional provision:

"Additional provision:

Where the solid may become liquid during transport see 4.1.3.4."

IBC520 For UN No. 3109, in the entry for Peroxyacetic acid, stabilized, not more than 17% (last entry), add "31H2" in column "Type of IBC". And in the eleventh row, "Isopropyl cumyl" should read "Isopropylcumyl" without a space,

and amend the index accordingly.

IBC620 In the second sentence, insert ", except 4.1.1.15" after "4.1.1".

4.1.5 Special packing provisions for goods of class 1

4.1.5.5 Replace the existing paragraph with the following:

"4.1.5.5 Unless otherwise specified in this Code, packagings, including IBCs and large packagings, shall conform to the requirements of chapters 6.1, 6.5 or 6.6, as appropriate, and shall meet their test provisions for packing group II."

4.1.6 Special packing provisions for goods of class 2

4.1.6.1 General provisions

4.1.6.1.8 In the last paragraph, replace "the requirements of annex B of ISO 10297:1999" with "the requirements of annex A of ISO 10297:2006". At the end, add the following new paragraph:

"For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 shall be met."

4.1.6.1.10 In the first sentence, insert "or P205, as applicable" after "P200".

4.1.7 Special packing provisions for organic peroxides (class 5.2) and self-reactive substances of class 4.1

4.1.7.1 Use of packagings

4.1.7.1 Amend the heading to read "**Use of packagings (except IBCs)**".

4.1.7.1.1 Replace existing paragraph with the following:

"4.1.7.1.1 Packagings for organic peroxides and self-reactive substances shall conform to the provisions of chapter 6.1 and shall meet its test provisions for packing group II."

4.1.7.2 Use of intermediate bulk containers

4.1.7.2.1 At the end, add the following new sentence: "IBCs shall conform to the requirements of chapter 6.5 and shall meet its test provisions for packing group II."

4.1.9 Special packing provisions for class 7

4.1.9.1 General

4.1.9.1.3 In the first sentence, after "package", insert ", other than an excepted package,".

4.1.9.1.5 Replace existing paragraph with the following:

"4.1.9.1.5 For radioactive material having other dangerous properties the package design shall take into account those properties. Radioactive material with a subsidiary risk, packaged in packages that do not require competent authority approval, shall be transported in packagings, IBCs, tanks or bulk containers fully complying with the provisions of the relevant chapters of Part 6 as appropriate, as well as applicable provisions of chapters 4.1, 4.2 or 4.3 for that subsidiary risk.".

4.1.9.2 Provisions and controls for transport of LSA material and SCO

4.1.9.2.3.2 Replace "2.7.2.3.2" with "2.7.1.2".

4.1.9.3 Packages containing fissile material

4.1.9.3.1 Insert "(or mass of each fissile nuclide for mixtures when appropriate)" after "a mass of fissile material".

Chapter 4.2 – Use of portable tanks and multiple-element gas containers (MEGCs)

4.2.0 Transitional provisions

4.2.0.3 A new paragraph "4.2.0.3" is added with the following:

"4.2.0.3 Portable tanks and MEGCs manufactured before 1 January 2012, that conform to the marking provisions of 6.7.2.20.1, 6.7.3.16.1, 6.7.4.15.1 or 6.7.5.13.1 of the IMDG Code in force on 1 January 2010 (amendment 34-08), as relevant, may continue to be used if they comply with all other relevant provisions of the current edition of the Code including, when applicable, the requirement of 6.7.2.20.1 (g) for marking the symbol "S" on the plate when the shell or the compartment is divided by surge plates into sections of not more than 7,500 litres capacity. When the shell, or the compartment, was already divided by surge plates into sections of not more than 7,500 litres capacity before 1 January 2012, the capacity of the shell, or respectively of the compartment, need not be supplemented with the symbol "S" until the next periodic inspection or test according to 6.7.2.19.5 is performed.

Portable tanks manufactured before 1 January 2014 need not be marked with the portable tank instruction as required in 6.7.2.20.2, 6.7.3.16.2 and 6.7.4.15.2 until the next periodic inspection and test.".

4.2.5 Portable tank instructions and special provisions

4.2.5.2 Portable tank instructions

4.2.5.2.6 In the table for portable tank instructions T1-T22, add a new footnote "b" in the heading of the last column after "Bottom-opening provisions". The footnote shall read as follows:

"^b When this column indicates "not allowed", bottom openings are not permitted when the substance to be transported is a liquid (see 6.7.2.6.1). When the substance to be transported is a solid at all temperatures encountered under normal conditions of transport, bottom openings conforming to the provisions of 6.7.2.6.2 are authorized."

4.2.5.3 Portable tank special provisions

4.2.5.3 Add the following new special provisions accordingly:

"TP36 Fusible elements in the vapour space may be used on portable tanks.

TP37 Portable tank provision T14 may continue to be applied until 31 December 2016 except:

- .1 for UN 1810, 2474 and 2668, T7 may be applied;
- .2 for UN 2486, T8 may be applied; and
- .3 for UN 1838, T10 may be applied."

PART 5 – CONSIGNMENTS PROCEDURES

Chapter 5.1 – General provisions

5.1.1.3 Insert a new subsection 5.1.1.3 with the following:

"5.1.1.3.1 A carrier shall not accept dangerous goods for transport unless:

- (a) A copy of the dangerous goods transport document and other documents or information as required by the provisions of this Code are provided; or
- (b) The information applicable to the dangerous goods is provided in electronic form.

5.1.1.3.2 The information applicable to the dangerous goods shall accompany the dangerous goods to final destination. This information may be on the dangerous goods transport document or may be on another document. This information shall be given to the consignee when the dangerous goods are delivered.

5.1.1.3.3 When the information applicable to the dangerous goods is given to the carrier in electronic form, the information shall be available to the carrier at all times during transport to final destination. The information shall be able to be produced without delay as a paper document."

Re-number (current) 5.1.1.3 as 5.1.1.4

5.1.5 General provisions for class 7

5.1.5.1.4 Notifications

5.1.5.1.4.1 Insert "the competent authority of the country of origin of the shipment and to" after "have been submitted to".

5.1.5.1.4.2 At the end, insert "the competent authority of the country of origin of the shipment and" after "shall notify".

5.1.5.1.4.4 In subparagraph .5, insert "(or of each fissile nuclide for mixtures when appropriate)" after "the mass of fissile material".

5.1.5.3 Determination of transport index (TI) and criticality safety index (CSI)

5.1.5.3.4.4 Replace "when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2.7.2.4.6)" with "under the provisions of 5.1.5.3.5".

5.1.5.3.4.5 Replace "when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2.7.2.4.6)" with "under the provisions of 5.1.5.3.5".

5.1.5.3.5 Add a new paragraph 5.1.5.3.5 to read as follows:

"5.1.5.3.5 In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, the categorization shall be in accordance with the certificate of the country of origin of design".

5.1.5.4 Add a new subsection 5.1.5.4 to read as follows:

"5.1.5.4 Specific provisions for excepted packages

5.1.5.4.1 Excepted packages shall be legibly and durably marked on the outside of the packaging with:

- .1 The UN number preceded by the letters "UN";
- .2 An identification of either the consignor or consignee, or both; and
- .3 The permissible gross mass if this exceeds 50 kg.

5.1.5.4.2 The documentation provisions of chapter 5.4 do not apply to excepted packages of radioactive material, except that the UN number preceded by the letters "UN", and the name and address of the consignor and the consignee shall be shown on a transport document such as a bill of lading, air waybill or other similar document."

Chapter 5.2 – Marking and labelling of packages including IBCs

5.2.1 Marking of packages including IBCs

5.2.1.5 Special marking provisions for class 7

5.2.1.5.2 Replace existing paragraph with the following:

"The marking of excepted packages shall be as required by 5.1.5.4.1."

5.2.1.5.8 Replace existing paragraph with the following:

"5.2.1.5.8 In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, marking shall be in accordance with the certificate of the country of origin of the design."

5.2.1.6 Special marking provisions for marine pollutants

5.2.1.6.1 Replace existing paragraph with the following:

"5.2.1.6.1 Packages containing marine pollutants meeting the criteria of 2.9.3 shall be durably marked with the environmentally hazardous substance mark with the exception of single packagings and combination packagings where such single packagings or inner packagings of such combination packagings have:

- a net quantity of 5 l or less for liquids; or
- a net mass of 5 kg or less for solids."

5.2.1.6.3 The marine pollutant mark is amended as follows:



5.2.1.7

5.2.1.7 Replace "ISO 780:1985" with "ISO 780:1997".

5.2.1.7.1 (d) Delete "or" at the end.

5.2.1.7.1 (e) Add "or" at the end.

5.2.1.7.1 Add a new subparagraph (f) with the following:

"(f) dangerous goods in hermetically sealed inner packagings each containing not more than 500 ml."

5.2.1.9 Limited quantity mark

5.2.1.9 A new section "5.2.1.9 – Limited quantity mark" is added as follows:

"5.2.1.9 Limited quantity mark

5.2.1.9.1 Packages containing dangerous goods in limited quantities shall be marked according to 3.4.5. The provisions of 5.2.1.2.1 and 5.2.1.2.2 shall be met."

5.2.2.1.12 *Special provisions for the labelling of radioactive material*

5.2.2.1.12.2.2 In the second sentence, insert "(or mass of each fissile nuclide for mixtures when appropriate)" after "the mass of fissile material".

5.2.2.1.12.5 Amend to read as follows:

"5.2.2.1.12.5 In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, labelling shall be in accordance with the certificate of the country of origin of design."

Chapter 5.3 – Placarding and marking of cargo transport units

5.3.1.2 Specifications for placards

5.3.1.2.1.1 At the end of the second sentence after the words "bottom corner" delete the "." and insert a semi-colon ";".

5.3.1.3 Fumigated units

5.3.1.3 Delete.

5.3.2 Marking of cargo transport units

5.3.2.0 Display of Proper Shipping Name

5.3.2.0 Replace the existing text with the following:

"5.3.2.0.1 The Proper Shipping Name of the contents shall be durably marked on at least both sides of:

- .1 tank transport units containing dangerous goods;
- .2 bulk containers containing dangerous goods; or

- .3 any other cargo transport unit containing packaged dangerous goods of a single commodity for which no placard, UN Number or marine pollutant mark is required. Alternatively, the UN Number may be displayed.

5.3.2.0.2 The proper shipping name for the goods shall be displayed in characters not less than 65 mm high. The proper shipping name shall be of the contrasting colour with the background."

5.3.2.1 Display of UN Numbers

5.3.2.1.1.4 Amend to read as follows:

- ".4 packaged radioactive material with a single UN number in or on a vehicle, or in a freight container, when required to be transported under exclusive use."

5.3.2.4 Limited quantities

5.3.2.4 The existing text is replaced with the following:

- "5.3.2.4 Cargo transport units containing dangerous goods in only limited quantities shall not be placarded nor marked according to 5.3.2.0 and 5.3.2.1. They shall, however, be suitably marked on the exterior with the mark in 3.4.5.1 which shall have minimum dimensions of 250 mm x 250 mm in locations indicated in 5.3.1.1.4.1."

5.3.2.5 Fumigated units

5.3.2.5 Delete.

Chapter 5.4 – Documentation

Replace existing Note 1 with the following:

- "NOTE 1** The provisions of this Code do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an alternative to paper documentation. All references to "dangerous goods transport document" in this chapter also include provision of the required information by use of EDP and EDI transmission techniques."

and a new "NOTE 5" is inserted with the following:

- "NOTE 5** In addition to the provisions of this chapter other additional information may be included. However, this information shall not:
 - .1 divert attention from the safety information required by this chapter or by the competent authority;
 - .2 contradict the safety information required by this chapter or by the competent authority; or

.3 duplicate information already provided.".

5.4.1 Dangerous goods transport documentation

Amend the title to read **"5.4.1 Dangerous goods transport information"**.

5.4.1.1 General

5.4.1.1 Replace with the following:

"5.4.1.1 General

5.4.1.1.1 Except as otherwise provided, the consignor who offers dangerous goods for transport shall give to the carrier the information applicable to those dangerous goods, including any additional information and documentation as specified in this Code. This information may be provided on a dangerous goods transport document or, with the agreement of the carrier, by EDP or EDI techniques.

5.4.1.1.2 When the dangerous goods transport information is given to the carrier by EDP or EDI techniques, the consignor shall be able to produce the information without delay as a paper document, with the information in the sequence required by this chapter."

5.4.1.2.5 Example of a dangerous goods transport document

5.4.1.2.5 In the footnote, replace "Recommendation No.11 (Documentary aspects of international Transport of Dangerous Goods) (ECE/TRADE/204, edition 96.1 – currently under revision)", with the following:

"Revised Recommendations No.11 (Documentary aspects of international Transport of Dangerous Goods) (ECE/TRADE/C/CEFACT/2008/8)".

5.4.1.4 Information required on the dangerous goods transport document

5.4.1.4.3 Information which supplements the Proper Shipping Name in the dangerous goods description

5.4.1.4.3.2 At the end of the sentence, replace "Proper Shipping Name" with "dangerous goods description specified in 5.4.1.4.1.1 to .5".

5.4.1.5 Information required in addition to the dangerous goods description

5.4.1.5.1 After the existing paragraph, add the following new note:

"NOTE: The number, type and capacity of each inner packaging within the outer packaging of a combination packaging is not required to be indicated."

5.4.1.5.7 *Radioactive material*

5.4.1.5.7.1.3 In the second sentence, after "the mass of fissile material" insert "(or mass of each fissile nuclide for mixtures when appropriate)".

5.4.1.5.7.1.10 After the existing sentence, add "For radioactive material for which the A_2 value is unlimited, the multiple of A_2 shall be zero."

5.4.1.5.7.3 Replace the existing paragraph with the following:

"5.4.1.5.7.3 In all cases of international transport of packages requiring competent authorities design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 5.4.1.4.1 shall be in accordance with the certificate of the country of origin of design."

5.4.1.5.11 *Special provisions for segregation*

5.4.1.5.11.1 In the last sentence, after "Phosphoric acid", insert ", acetic acid".

5.4.1.6 *Certification*

5.4.1.6.2 Replace the existing paragraph with the following:

"5.4.1.6.2 If the dangerous goods documentation is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign."

5.4.1.6.3 A new paragraph 5.4.1.6.3 is added with the following:

"5.4.1.6.3 When the dangerous goods transport information is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper dangerous goods transport document, the carrier shall ensure that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters."

5.4.2 *Container/vehicle packing certificate*

5.4.2.3 Replace the existing paragraph with the following:

"5.4.2.3 If the dangerous goods documentation is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign."

5.4.2.4 A new paragraph 5.4.2.4 is added with the following:

"5.4.2.4 When the dangerous goods transport information is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper dangerous goods transport document, the carrier shall ensure

that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters."

5.4.4 Other required information and documentation

5.4.4.2 Fumigated units

5.4.4.2 Delete.

5.4.6 Retention of dangerous goods transport information

5.4.6 A new section 5.4.6 is added with the following:

"5.4.6 Retention of dangerous goods transport information

5.4.6.1 The consignor and the carrier shall retain a copy of the dangerous goods transport document and additional information and documentation as specified in this Code, for a minimum period of three months.

5.4.6.2 When the documents are kept electronically or in a computer system, the consignor and the carrier shall be able to reproduce them in a printed form."

Chapter 5.5 – Special provisions

5.5 A new "Chapter 5.5 – Special provisions" is added with the following:

"Chapter 5.5 – Special provisions

5.5.1 (Reserved).

5.5.2 Special provisions applicable to fumigated cargo transport units (UN 3359)

5.5.2.1 General

5.5.2.1.1 Fumigated cargo transport units (UN 3359) containing no other dangerous goods are not subject to any provisions of this Code other than those of this section.

5.5.2.1.2 When the fumigated cargo transport unit is loaded with dangerous goods in addition to the fumigant, any provision of this Code relevant to these goods (including placarding, marking and documentation) applies in addition to the provisions of this section.

5.5.2.1.3 Only cargo transport units that can be closed in such a way that the escape of gas is reduced to a minimum shall be used for the transport of cargo under fumigation.

5.5.2.1.4 The provisions of 3.2 and 5.4.3 apply to all fumigated cargo transport units (UN 3359).

5.5.2.2 Training

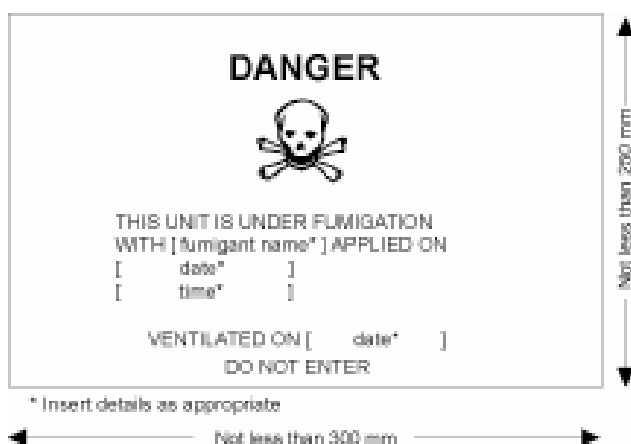
Persons engaged in the handling of fumigated cargo transport units shall be trained commensurate with their responsibilities.

5.5.2.3 Marking and placarding

5.5.2.3.1 A fumigated cargo transport unit shall be marked with a warning mark, as specified in 5.5.2.3.2, affixed at each access point in a location where it will be easily seen by persons opening or entering the cargo transport unit. This mark shall remain on the cargo transport unit until the following provisions are met:

- (a) The fumigated cargo transport unit has been ventilated to remove harmful concentrations of fumigant gas; and
- (b) The fumigated goods or materials have been unloaded.

5.5.2.3.2 The fumigation warning mark shall be rectangular and shall not be less than 300 mm wide and 250 mm high. The markings shall be in black print on a white background with lettering not less than 25 mm high. An illustration of this mark is given below.



5.5.2.3.3 If the fumigated cargo transport unit has been completely ventilated either by opening the doors of the unit or by mechanical ventilation after fumigation, the date of ventilation shall be marked on the fumigation warning mark.

5.5.2.3.4 When the fumigated cargo transport unit has been ventilated and unloaded, the fumigation warning mark shall be removed.

5.5.2.3.5 Class 9 placards (Model No.9, see 5.2.2.2.2) shall not be affixed to a fumigated cargo transport unit except as required for other Class 9 substances or articles packed therein.

5.5.2.4 Documentation

5.5.2.4.1 Documents associated with the transport of cargo transport units that have been fumigated and have not been completely ventilated before transport shall include the following information:

- .1 UN 3359, fumigated cargo transport unit, 9, or UN 3359, fumigated cargo transport unit, class 9;
- .2 The date and time of fumigation; and
- .3 The type and amount of the fumigant used.

5.5.2.4.2 The transport document may be in any form, provided it contains the information required in 5.5.2.4.1. This information shall be easy to identify, legible and durable.

5.5.2.4.3 Instructions for disposal of any residual fumigant including fumigation devices (if used) shall be provided.

A document is not required when the fumigated cargo transport unit has been completely ventilated and the date of ventilation has been marked on the warning mark (see 5.5.2.3.3 and 5.5.2.3.4)."

5.5.2.5 Additional provisions

5.5.2.5.1 Cargo transport units shall be fumigated and handled taking into account the provisions of the MSC.1/Circ.1361 on Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo transport units.

5.5.2.5.2 When fumigated cargo transport units are stowed under deck, equipment for detecting fumigant gas(es) shall be carried on the ship with instructions for their use.

5.5.2.5.3 Fumigants shall not be applied to the contents of a cargo transport unit once it has been loaded aboard the ship.

5.5.2.5.4 A fumigated cargo transport unit shall not be allowed on board until a sufficient period has elapsed to attain a reasonable uniform gas concentration throughout the cargo in it. Because of variations due to types and amounts of fumigants and commodities and temperature levels, the period between fumigant application and loading of the fumigated cargo transport unit on board the ship shall be determined by the competent authority. Twenty-four hours is normally sufficient for this purpose. Unless the doors of a fumigated cargo transport unit have been opened to allow the fumigant gas(es) and residues to be completely ventilated or the unit has been mechanically ventilated, the shipment shall conform to the provisions of this Code concerning UN 3359. Ventilated cargo transport units shall be marked with the date of ventilation on the fumigated warning mark. When the fumigated goods or materials have been unloaded, the fumigation warning mark shall be removed.

5.5.2.5.5 The master shall be informed prior to the loading of a fumigated cargo transport unit."

PART 6 – CONSTRUCTION AND TESTING OF PACKAGINGS, INTERMEDIATE BULK CONTAINERS (IBCs), LARGE PACKAGINGS, PORTABLE TANKS, MULTIPLE-ELEMENT GAS CONTAINERS (MEGCs) AND ROAD TANK VEHICLES

Chapter 6.1 – Provisions for the construction and testing of packagings (other than for class 6.2 substances)

6.1.3 Marking

6.1.3.1 (a) Replace the second sentence with the following: "This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7."

6.1.4.0 Add a new subsection 6.1.4.0 with the following:

"6.1.4.0 General provisions

Any permeation of the substance contained in the packaging shall not constitute a danger under normal conditions of transport."

6.1.5 Test provisions for packagings

6.1.5.3 Drop test

6.1.5.3.6 *Criteria for passing the test*

6.1.5.3.6.3 Replace with the following:

"6.1.5.3.6.3 The packaging or outer packaging of a composite or combination packaging shall not exhibit any damage liable to affect safety during transport. Inner receptacles, inner packagings, or articles shall remain completely within the outer packaging and there shall be no leakage of the filling substance from the inner receptacle(s) or inner packaging(s)."

Chapter 6.2 – Provisions for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas

After the heading of the chapter, add the following new note:

"Note: *Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the provisions of 6.2.1 to 6.2.3.*"

6.2.1 General provisions

6.2.1 The note after the heading is deleted.

6.2.1.1.5 At the end of the existing paragraph, add a new sentence with the following:

"The test pressure of a metal hydride storage system shall be in accordance with packing instruction P205."

6.2.1.1.9 Delete the "s" on the word "receptacles".

6.2.1.2 Materials

6.2.1.2.1 After the word "intended", insert the words "to be transported".

6.2.1.3 Service equipment

6.2.1.3.4 After "P200 (1)" insert ", P205".

6.2.1.5 Initial inspection and test

6.2.1.5.1 After "cryogenic receptacles" insert "and metal hydride storage systems".

6.2.1.5.3 Add a new paragraph 6.2.1.5.3 to read as follows:

"6.2.1.5.3 For metal hydride storage systems, it shall be verified that the inspections and tests specified in 6.2.1.5.1 .1, .2, .3, .4, .5 if applicable, .6, .7, .8 and .9 have been performed on an adequate sample of the receptacles used in the metal hydride storage system. In addition, on an adequate sample of metal hydride storage systems, the inspections and tests specified in 6.2.1.5.1 .3 and .6 shall be performed, as well as 6.2.1.5.1 .5, if applicable, and inspection of the external conditions of the metal hydride storage system.

Additionally, all metal hydride storage systems shall undergo the initial inspections and tests specified in 6.2.1.5.1 .8 and .9, as well as a leakproofness test and a test of the satisfactory operation of the service equipment."

6.2.1.6 Periodic inspection and test

6.2.1.6.1.4 After the existing paragraph insert the following three **NOTES** with the following:

"Note 1: With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

Note 2: With the agreement of the competent authority, the hydraulic pressure test of cylinders or tubes may be replaced by an equivalent method based on acoustic emission testing or a combination of acoustic emission testing and ultrasonic examination. ISO 16148:2006 may be used as a guide for acoustic emission testing procedures.

Note 3: The hydraulic pressure test may be replaced by ultrasonic examination carried out in accordance with ISO 10461:2005+A1:2006 for seamless aluminium alloy gas cylinders and in accordance with ISO 6406:2005 for seamless steel gas cylinders."

6.2.1.6.1 At the end, after the subparagraphs, replace the existing "**Note 1** and **Note 2**" with the following:

"Note: *For the periodic inspection and test frequencies, see packing instruction P200 of 4.1.4.1.*"

6.2.2 Provisions for UN pressure receptacles

6.2.2.1 Design, construction and initial inspection and test

6.2.2.1.1 In the table, add the following three new entries after ISO 7866:1999 standard:

"

ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below
ISO 18172-1:2007	Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below
ISO 20703:2006	Gas cylinders – Refillable welded aluminium-alloy cylinders – Design, construction and testing

"

6.2.2.1.5 Add a new paragraph 6.2.2.1.5 with the following:

"6.2.2.1.5 The following standards apply for the design, construction, and initial inspection and test of UN metal hydride storage systems, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
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"

6.2.2.2 Materials

6.2.2.2 At the beginning, in the text between brackets and after "P200", insert "or P205".

6.2.2.3 Service equipment

6.2.2.3 Replace "ISO 10297:1999" with "ISO 10297:2006"

and at the end of 6.2.2.3, add the following new paragraph:

"For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
----------------	---

"

6.2.2.4 Periodic inspection and test

6.2.2.4 At the beginning after "UN cylinders" insert "and UN metal hydride storage systems" and in the table, add the following new entry at the end:

"

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
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"

6.2.2.7 Marking of refillable UN pressure receptacles

6.2.2.7 After the heading, add the following new note:

"Note: *Marking provisions for UN metal hydride storage systems are given in 6.2.2.9.*"

6.2.2.7.1 Assign paragraph number 6.2.2.7.1 to the first unnumbered paragraph under 6.2.2.7. Renumber subsequent paragraphs and cross-references accordingly.

6.2.2.7.2 (a) (existing 6.2.2.7.1 (a)) Replace the second sentence with the following:

"This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;"

6.2.2.7.9 Add a new paragraph 6.2.2.7.9 to read as follows:

"6.2.2.7.9 For bundles of cylinders, pressure receptacle marking provisions shall only apply to the individual cylinders of a bundle and not to any assembly structure."

6.2.2.8 Marking of non-refillable UN pressure receptacles

6.2.2.8 Assign paragraph number 6.2.2.8.1 to the first unnumbered paragraph under 6.2.2.8, and renumber the following paragraphs accordingly.


6.2.2.9 Add a new subsection 6.2.2.9 with the following:

"6.2.2.9 Marking of UN metal hydride storage systems

6.2.2.9.1 UN metal hydride storage systems shall be marked clearly and legibly with the marks listed below. These marks shall be permanently affixed (e.g., stamped, engraved, or etched) on the metal hydride storage system. The marks shall be on the shoulder, top end or neck of the metal hydride storage system or on a permanently affixed component of the metal hydride storage system. Except for the United Nations packaging symbol, the minimum size of the marks shall be 5 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 2.5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

The minimum size of the United Nations packaging symbol shall be 10 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

6.2.2.9.2 The following marks shall be applied:

- (a) The United Nations packaging symbol  ;

This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;

- (b) "ISO 16111" (the technical standard used for design, manufacture and testing);
- (c) The character(s) identifying the country of approval as indicated by the distinguishing signs of motor vehicles in international traffic;
- (d) The identity mark or stamp of the inspection body that is registered with the competent authority of the country authorizing the marking;
- (e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/");
- (f) The test pressure of the receptacle in bar, preceded by the letters "PH" and followed by the letters "BAR";
- (g) The rated charging pressure of the metal hydride storage system in bar, preceded by the letters "RCP" and followed by the letters "BAR";
- (h) The manufacturer's mark registered by the competent authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer's mark shall be separated by a space or slash;
- (i) The serial number assigned by the manufacturer;
- (j) In the case of steel receptacles and composite receptacles with steel liner, the letter "H" showing compatibility of the steel (see ISO 11114-1:1997); and,

- (k) In the case of metal hydride storage systems having limited life, the date of expiry, denoted by the letters "FINAL" followed by the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/").

The certification marks specified in (a) to (e) above shall appear consecutively in the sequence given. The test pressure (f) shall be immediately preceded by the rated charging pressure (g). The manufacturing marks specified in (h) to (k) above shall appear consecutively in the sequence given.

6.2.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required marks.

6.2.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic and test requirements of 6.2.2.4 shall be marked indicating:

- (a) The character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign of motor vehicles in international traffic. This marking is not required if this body is approved by the competent authority of the country approving manufacture;
- (b) The registered mark of the body authorized by the competent authority for performing periodic inspection and test;
- (c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "/"). Four digits may be used to indicate the year.

The above marks shall appear consecutively in the sequence given."

6.2.4 Provisions for aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas

6.2.4.3 Replace with the following:

"6.2.4.3 With the approval of the competent authority, aerosols and receptacles, small, are not subject to 6.2.4.1 and 6.2.4.2, if they are required to be sterile but may be adversely affected by water bath testing, provided:

- (a) They contain a non-flammable gas and either
 - (i) contain other substances that are constituent parts of pharmaceutical products for medical, veterinary or similar purposes;

- (ii) contain other substances used in the production process for pharmaceutical products; or
 - (iii) are used in medical, veterinary or similar applications;
- (b) An equivalent level of safety is achieved by the manufacturer's use of alternative methods for leak detection and pressure resistance, such as helium detection and water bathing a statistical sample of at least 1 in 2000 from each production batch; and
- (c) For pharmaceutical products according to (a)(i) and (iii) above, they are manufactured under the authority of a national health administration. If required by the competent authority, the principles of Good Manufacturing Practice (GMP) established by the World Health Organization (WHO)² shall be followed."

Chapter 6.3 – Provisions for the construction and testing of packagings for class 6.2 infectious substances of category A

6.3.4 Marking

6.3.4.2 (a) Replace the second sentence with the following:

"This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;".

6.3.5 Test provisions for packagings

6.3.5.4 Puncture test

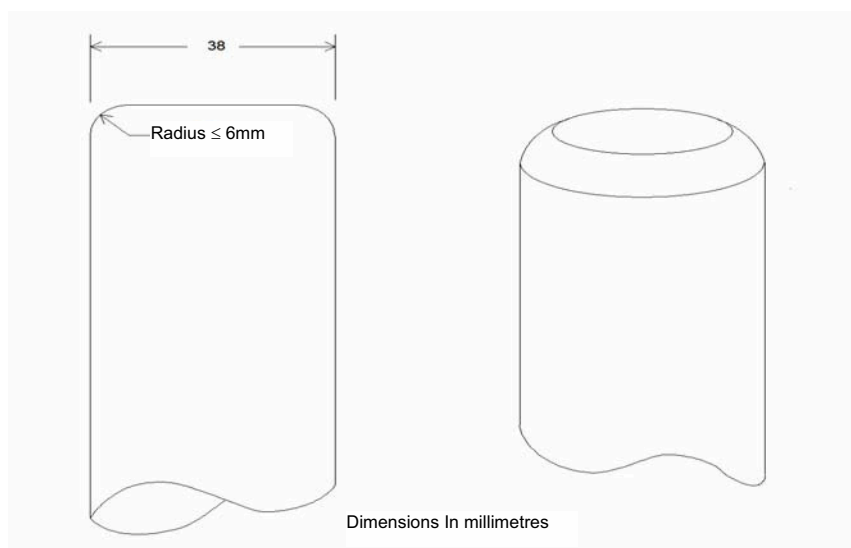
6.3.5.4.1 Packagings with a gross mass of 7 kg or less

6.3.5.4.1 In the second sentence, after "not exceeding 6 mm" insert "(see below)".

6.3.5.4.2 Packagings with a gross mass exceeding 7 kg

6.3.5.4.2 In the third sentence, after "not exceeding 6 mm" insert "(see below)". And at the end, insert the following new figure:

² WHO Publication: "Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection".



Chapter 6.4 – Provisions for the construction, testing and approval of packages and material of class 7

6.4.2 General provisions

6.4.2.9 Delete "otherwise".

6.4.5 Provisions for industrial packages

6.4.5.4 Alternative provisions for Type IP-2 and Type IP-3 packages

6.4.5.4.2.3 Replace "an increase of more than 20%" with "more than a 20% increase".

6.4.5.4.3.3 Replace "an increase of more than 20%" with "more than a 20% increase".

6.4.5.4.4 Replace "of a permanent enclosed character" with "with the characteristics of a permanent enclosure". And in subparagraph .3 after "Part 1: General Cargo Containers" insert "and subsequent amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006,".

6.4.5.4.4.3.2 Replace "any increase of more than 20%" with "more than a 20% increase".

6.4.5.4.5.2.2 Replace "any increase of more than 20%" with "more than a 20% increase".

6.4.6 Provisions for packages containing uranium hexafluoride

6.4.6.1 Replace "ISO 7195:1993 "Packaging of uranium hexafluoride (UF_6) for transport"" with "ISO 7195:2005 "Nuclear Energy – Packaging of uranium hexafluoride (UF_6) for transport"".

6.4.6.2.1 Replace "ISO 7195:1993" with "ISO 7195:2005".

6.4.6.4 (a) Replace "ISO 7195:1993" with "ISO 7195:2005".

6.4.7 Provisions for Type A packages

Type A packages to contain liquids

6.4.7.16.2 (ii) Replace "designed to ensure retention of the liquid contents" by "designed to enclose the liquid contents completely and ensure their retention".

6.4.10 Provisions for Type C packages

6.4.10.2 Replace references "6.4.8.7.2" and "6.4.8.11" with "6.4.8.8.2" and "6.4.8.12".

6.4.11 Provisions for packages containing fissile material

6.4.11.5 Replace with the following:

"6.4.11.5 The package, after being subjected to the tests specified in 6.4.15, shall:

- (a) Preserve the minimum overall outside dimensions of the package to at least 10 cm; and
- (b) Prevent the entry of a 10 cm cube."

6.4.11.7 (a) Replace "each of which" by "not less than two of which".

6.4.13 Testing the integrity of the containment system and shielding and evaluating criticality safety

6.4.13 (c) Replace "6.4.11.12" with "6.4.11.13".

6.4.15 Test for demonstrating ability to withstand normal conditions of transport

6.4.15.5 Replace existing subparagraph (a) with the following:

"(a) A total weight equal to 5 times the maximum weight of the package; and".

6.4.23 Applications for approval and approvals for radioactive material transport

6.4.23.12 (j) In the second sentence, replace "(for fissile material)" with "(for fissile material or for each fissile nuclide when appropriate)".

6.4.23.13 (j) In the second sentence, replace "(for fissile material)" with "(for fissile material or for each fissile nuclide when appropriate)".

6.4.23.14 (l) In the second sentence, replace "(for fissile material)" with "(for fissile material or for each fissile nuclide when appropriate)".

Chapter 6.5 – Provisions for the construction and testing of large packagings

6.5.1 General requirements

6.5.1.4 Designatory code system for IBCs

6.5.1.4.1.2 At the beginning before the list add "Materials".

6.5.2 Marking

6.5.2.1.1.1 Replace the second sentence with the following:

"This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7."

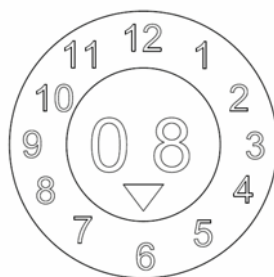
6.5.2.1.1.7 In the footnote replace the existing reference "6.5.4.6.4" with "6.5.6.6.4".

6.5.2.2 Additional marking

6.5.2.2.4 Replace the existing paragraph with the following:

"6.5.2.2.4 The inner receptacle of composite IBCs manufactured after 1 January 2011 shall bear the markings indicated in 6.5.2.1.1.2, .3, .4 where this date is that of the manufacture of the plastics inner receptacle, .5 and .6. The UN packaging symbol shall not be applied. The marking shall be applied in the sequence shown in 6.5.2.1.1. It shall be durable, legible and placed in a location so as to be readily visible when the inner receptacle is placed in the outer casing.

The date of the manufacture of the plastics inner receptacle may alternatively be marked on the inner receptacle adjacent to the remainder of the marking. An example of an appropriate marking method is:



".

6.5.2.4 Add a new paragraph 6.5.2.4 to read as follows:

"6.5.2.4 Marking of remanufactured composite IBCs (31HZ1)

The marking specified in 6.5.2.1.1 and 6.5.2.2 shall be removed from the original IBC or made permanently illegible and new markings shall be applied to an IBC remanufactured in accordance with these provisions of this Code."

6.5.4 Testing, certification and inspection

6.5.4.1 Quality assurance

6.5.4.1 At the beginning, after "manufactured" insert ", remanufactured, repaired". And at the end, after "manufactured" insert ", remanufactured or repaired".

6.5.4.5 Repaired IBCs

6.5.4.5.5 Renumber as "6.5.4.4.4".

6.5.6.7.3 Method of testing and pressure to be applied

6.5.6.7.3 The second sentence is replaced with the following:

"The airtightness of the IBC shall be determined by a suitable method such as air-pressure differential test or by immersing the IBC in water, or for metal IBCs, by coating the seams and joints with a soap solution."

Chapter 6.6 – Provision for the construction and testing of large packagings

6.6.1 General

6.6.1.2 Replace "and tested" with ", tested and remanufactured" and, at the end, after "each manufactured" insert "or remanufactured large".

6.6.3 Marking

6.6.3.1 Primary marking

6.6.3.1 (a) Replace the second sentence with the following:

"This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7."

6.6.5 Test provisions for large packagings

6.6.5.1 Performance and frequency of test

6.6.5.1.3 Replace "6.6.5.2.3" with "6.6.5.2.4".

6.6.5.2 Preparation for testing

6.6.5.2.2 Replace the existing paragraph with the following:

"6.6.5.2.2 In the drop tests for liquids, when another substance is used, it shall be of similar relative density and viscosity to those of the substance being transported. Water may also be used for the liquid drop test under the conditions in 6.6.5.3.4.4."

6.6.5.3 Test provisions

6.6.5.3.4 Drop test

6.6.5.3.4.4 Drop height

6.6.5.3.4.4 Replace the existing paragraph with the following:

"6.6.5.3.4.4 Drop height

Note: Large packagings for substances and articles of class 1 shall be tested at the packing group II performance level.

6.6.5.3.4.4.1 For inner packagings containing solid or liquid substances or articles, if the test is performed with the solid, liquid or articles to be transported, or with another substance or article having essentially the same characteristics:

Packing group I	Packing group II	Packing group III
1.8 m	1.2 m	0.8 m

6.6.5.3.4.4.2 For inner packagings containing liquids if the test is performed with water:

(a) Where the substances to be transported have a relative density not exceeding 1.2:

Packing group I	Packing group II	Packing group III
1.8 m	1.2 m	0.8 m

(b) Where the substances to be transported have a relative density exceeding 1.2, the drop height shall be calculated on the basis of the relative density (d) of the substance to be carried, rounded up to the first decimal, as follows:

Packing group I	Packing group II	Packing group III
$d \times 1.5$ (m)	$d \times 1.0$ (m)	$d \times 0.67$ (m)

"

Chapter 6.7 – Provisions for the design, construction, inspection and testing of portable tanks and multiple-element gas containers (MEGCs)

6.7.2 Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of substances of class 1 and classes 3 to 9

6.7.2.1 Definitions

6.7.2.1 In the definition of "Portable tank", delete the word "transport" in the last but one sentence.

6.7.2.2.12 Replace four times "*" with "1" and amend the footnote accordingly.

6.7.2.6 Bottom openings

6.7.2.6.2.1 Replace existing paragraph with the following:

".1 An external stop-valve, fitted as close to the shell as reasonably practicable, and so designed as to prevent any unintended opening through impact or other inadvertent act; and".

6.7.2.8 Pressure relief devices

6.7.2.8.4 At the end, add the following sentence:

"In addition, fusible elements conforming to 6.7.2.10.1 may also be used."

6.7.2.10 Fusible elements

6.7.2.10.1 In the first sentence, replace "110°C" with "100°C". In the second sentence, replace "in no case shall they" with "when used for transport safety purposes, they shall not". In the third sentence, replace "utilized" with "used" and at the end of the sentence, add "unless specified by special provision TP36 in Column 14 of the Dangerous Goods List of chapter 3.2."

6.7.2.20 Marking

6.7.2.20.1 Replace existing paragraph with the following:

"6.7.2.20.1 Every portable tank shall be fitted with a corrosion-resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate by stamping or by any other similar method:

(a) Owner information

(i) Owner's registration number;

(b) Manufacturing information

(i) Country of manufacture;

(ii) Year of manufacture;

(iii) Manufacturer's name or mark;

(iv) Manufacturer's serial number;

(c) Approval information

(i) The United Nations packaging symbol



;

This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;

(ii) Approval country;

(iii) Authorized body for the design approval;

(iv) Design approval number;

(v) Letters 'AA', if the design was approved under alternative arrangements (see 6.7.1.2);

(vi) Pressure vessel code to which the shell is designed;

(d) Pressures

- (i) MAWP (in bar gauge or kPa gauge)²;
- (ii) Test pressure (in bar gauge or kPa gauge)²;
- (iii) Initial pressure test date (month and year);
- (iv) Identification mark of the initial pressure test witness;
- (v) External design pressure³ (in bar gauge or kPa gauge)²;
- (vi) MAWP for heating/cooling system (in bar gauge or kPa gauge)² (when applicable);

(e) Temperatures

- (i) Design temperature range (in °C)²;

(f) Materials

- (i) Shell material(s) and material standard reference(s);
- (ii) Equivalent thickness in reference steel (in mm)²; and
- (iii) Lining material (when applicable);

(g) Capacity


- (i) Tank water capacity at 20°C (in litres)²;
This indication is to be followed by the symbol "S" when the shell is divided by surge plates into sections of not more than 7,500 litres capacity;
- (ii) Water capacity of each compartment at 20°C (in litres)² (when applicable, for multi-compartment tanks).
This indication is to be followed by the symbol "S" when the compartment is divided by surge plates into sections of not more than 7,500 litres capacity;

(h) Periodic inspections and tests

- (i) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
- (ii) Date of the most recent periodic test (month and year);
- (iii) Test pressure (in bar gauge or kPa gauge)² of the most recent periodic test (if applicable);
- (iv) Identification mark of the authorized body who performed or witnessed the most recent test.

² The unit used shall be indicated.
³ See 6.7.2.2.10.

Figure 6.7.2.20.1: Example of identification plate marking

Owner's registration number							
MANUFACTURING INFORMATION							
Country of manufacture							
Year of manufacture							
Manufacturer							
Manufacturer's serial number							
APPROVAL INFORMATION							
	Approval country						
	Authorized body for design approval						
	Design approval number					'AA' (if applicable)	
Shell design code (pressure vessel code)							
PRESSURES							
MAWP				bar or kPa			
Test pressure				bar or kPa			
Initial pressure test date:		(mm/yyyy)		Witness stamp:			
External design pressure				bar or kPa			
MAWP for heating/cooling system (when applicable)				bar or kPa			
TEMPERATURES							
Design temperature range				°C to °C			
MATERIALS							
Shell material(s) and material standard reference(s)							
Equivalent thickness in reference steel				mm			
Lining material (when applicable)							
CAPACITY							
Tank water capacity at 20°C				litres		'S' (if applicable)	
Water capacity of compartment ____ at 20°C (when applicable, for multi-compartment tanks)				litres		'S' (if applicable)	
PERIODIC INSPECTIONS/TESTS							
Test type	Test date	Witness stamp and test pressure ^a		Test type	Test date	Witness stamp and test pressure ^a	
	(mm/yyyy)	bar or kPa			(mm/yyyy)	bar or kPa	

^a Test pressure if applicable."

6.7.2.20.2 Insert at the end of the list, "Portable tank instruction in accordance with 4.2.5.2.6".

6.7.3 Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of non-refrigerated liquefied gases of class 2

6.7.3.2.9 Replace four times "*" with "1" and amend the footnote accordingly.

6.7.3.8.1.1 Replace "*" with "4" and amend the footnote accordingly.

6.7.3.16 Marking

6.7.3.16.1 Replace the existing paragraph with the following:

"6.7.3.16.1 Every portable tank shall be fitted with a corrosion-resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate by stamping or by any other similar method:

(a) Owner information

(i) Owner's registration number;

(b) Manufacturing information

(i) Country of manufacture;

(ii) Year of manufacture;

(iii) Manufacturer's name or mark;

(iv) Manufacturer's serial number;

(c) Approval information

(i) The United Nations packaging symbol



;

This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;

(ii) Approval country;

(iii) Authorized body for the design approval;

(iv) Design approval number;

(v) Letters 'AA', if the design was approved under alternative arrangements (see 6.7.1.2);

(vi) Pressure vessel code to which the shell is designed;

(d) Pressures

(i) MAWP (in bar gauge or kPa gauge)²;

(ii) Test pressure (in bar gauge or kPa gauge)²;


(iii) Initial pressure test date (month and year);

(iv) Identification mark of the initial pressure test witness;

- (v) External design pressure⁵ (in bar gauge or kPa gauge)²;
- (e) Temperatures
 - (i) Design temperature range (in °C)²;
 - (ii) Design reference temperature (in °C)²;
- (f) Materials
 - (i) Shell material(s) and material standard reference(s);
 - (ii) Equivalent thickness in reference steel (in mm)²;
- (g) Capacity
 - (i) Tank water capacity at 20°C (in litres)²;
- (h) Periodic inspections and tests
 - (i) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
 - (ii) Date of the most recent periodic test (month and year);
 - (iii) Test pressure (in bar gauge or kPa gauge)² of the most recent periodic test (if applicable);
 - (iv) Identification mark of the authorized body who performed or witnessed the most recent test.

² The unit used shall be indicated.
⁵ See 6.7.3.2.8.

Figure 6.7.3.16.1: Example of identification plate marking

Owner's registration number					
MANUFACTURING INFORMATION					
Country of manufacture					
Year of manufacture					
Manufacturer					
Manufacturer's serial number					
APPROVAL INFORMATION					
	Approval country				
	Authorized body for design approval				
	Design approval number		'AA' (if applicable)		
Shell design code (pressure vessel code)					
PRESSURES					
MAWP		bar or kPa			
Test pressure		bar or kPa			
Initial pressure test date:	(mm/yyyy)	Witness stamp:			
External design pressure		bar or kPa			
TEMPERATURES					
Design temperature range		°C to °C			
Design reference temperature		°C			
MATERIALS					
Shell material(s) and material standard reference(s)					
Equivalent thickness in reference steel		mm			
CAPACITY					
Tank water capacity at 20°C		litres			
PERIODIC INSPECTIONS/TESTS					
Test type	Test date	Witness stamp and test pressure ^a	Test type	Test date	Witness stamp and test pressure ^a
	(mm/yyyy)	bar or kPa		(mm/yyyy)	bar or kPa

^a Test pressure if applicable."

6.7.3.16.2 Insert at the end of the list, "Portable tank instruction in accordance with 4.2.5.2.6".

6.7.4 Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of refrigerated liquefied gases of class 2

6.7.4.2.12 Replace four times "*" with "1" and amend the footnote accordingly.

6.7.4.7.4 Replace "*" with "6" and amend the footnote accordingly.

6.7.4.14 Inspection and testing

6.7.4.14.4 In the first sentence the words "inspection and test" are replaced with "inspections and tests". And the second sentence is replaced with the following:

"In the case of non-vacuum insulated tanks, the jacket and insulation shall be removed during the 2.5-year and the 5-year periodic inspections and tests, but only to the extent necessary for a reliable appraisal."

6.7.4.15 Marking

6.7.4.15.1 Replace existing paragraph with the following:

"6.7.4.15.1 Every portable tank shall be fitted with a corrosion-resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate by stamping or by any other similar method:

(a) Owner information

(i) Owner's registration number;

(b) Manufacturing information

(i) Country of manufacture;

(ii) Year of manufacture;

(iii) Manufacturer's name or mark;

(iv) Manufacturer's serial number;

(c) Approval information

(i) The United Nations packaging symbol



;

This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;

(ii) Approval country;

(iii) Authorized body for the design approval;

(iv) Design approval number;


(v) Letters 'AA', if the design was approved under alternative arrangements (see 6.7.1.2);

(vi) Pressure vessel code to which the shell is designed;

- (d) Pressures
 - (i) MAWP (in bar gauge or kPa gauge)²;
 - (ii) Test pressure (in bar gauge or kPa gauge)²;
 - (iii) Initial pressure test date (month and year);
 - (iv) Identification mark of the initial pressure test witness;
- (e) Temperatures
 - (i) Minimum design temperature (in °C)²;
- (f) Materials
 - (i) Shell material(s) and material standard reference(s);
 - (ii) Equivalent thickness in reference steel (in mm)²;
- (g) Capacity
 - (i) Tank water capacity at 20°C (in litres)²;
- (h) Insulation
 - (i) Either "Thermally insulated" or "Vacuum insulated" (as applicable);
 - (ii) Effectiveness of the insulation system (heat influx) (in Watts)²;
- (i) Holding times – For each refrigerated liquefied gas permitted to be transported in the portable tank:
 - (i) Name, in full, of the refrigerated liquefied gas;
 - (ii) Reference holding time (in days or hours)²;
 - (iii) Initial pressure (in bar gauge or kPa gauge)²;
 - (iv) Degree of filling (in kg)²;
- (j) Periodic inspections and tests
 - (i) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
 - (ii) Date of the most recent periodic test (month and year);
 - (iii) Identification mark of the authorized body who performed or witnessed the most recent test.

² The unit used shall be indicated.

Figure 6.7.4.15.1: Example of identification plate marking

Owner's registration number					
MANUFACTURING INFORMATION					
Country of manufacture					
Year of manufacture					
Manufacturer					
Manufacturer's serial number					
APPROVAL INFORMATION					
	Approval country				
	Authorized body for design approval				
	Design approval number		'AA' (if applicable)		
Shell design code (pressure vessel code)					
PRESSURES					
MAWP		bar or kPa			
Test pressure		bar or kPa			
Initial pressure test date:	(mm/yyyy)	Witness stamp:			
TEMPERATURES					
Minimum design temperature		°C			
MATERIALS					
Shell material(s) and material standard reference(s)					
Equivalent thickness in reference steel		mm			
CAPACITY					
Tank water capacity at 20°C		litres			
INSULATION					
'Thermally insulated' or 'Vacuum insulated' (as applicable)					
Heat influx		Watts			
HOLDING TIMES					
Refrigerated gas(es) permitted	liquefied	Reference holding time	Degree of filling		
		days or hours	bar or kPa		
			kg		
PERIODIC INSPECTIONS / TESTS					
Test type	Test date	Witness stamp	Test type	Test date	Witness stamp
	(mm/yyyy)			(mm/yyyy)	

".

6.7.4.15.2 Insert "Portable tank instruction in accordance with 4.2.5.2.6" at the end of the list.

6.7.5 Provisions for the design, construction, inspection and testing of multiple-element gas containers (MEGCs) intended for the transport of non-refrigerated gases

6.7.5.2 General design and construction provisions

6.7.5.2.1 In the last sentence the words "cargo transport unit" are replaced by the word "vehicle".

6.7.5.2.8 Replace four times "*" with "1" and amend the footnote accordingly.

6.7.5.4 Pressure relief devices

6.7.5.4.1 Replace the third sentence with the following:

"If so required by the competent authority of the country of use, MEGCs for other gases shall be fitted with pressure relief devices as specified by that competent authority."

6.7.5.13 Marking

6.7.5.13.1 Replace the existing paragraph with the following:

"6.7.5.13.1 Every MEGC shall be fitted with a corrosion-resistant metal plate permanently attached to the MEGC in a conspicuous place readily accessible for inspection. The metal plate shall not be affixed to the elements. The elements shall be marked in accordance with chapter 6.2. As a minimum, at least the following information shall be marked on the plate by stamping or by any other similar method:

(a) Owner information

(i) Owner's registration number;

(b) Manufacturing information

(i) Country of manufacture;

(ii) Year of manufacture;

(iii) Manufacturer's name or mark;

(iv) Manufacturer's serial number;

(c) Approval information

(i) The United Nations packaging symbol




This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;

- (ii) Approval country;
 - (iii) Authorized body for the design approval;
 - (iv) Design approval number;
 - (v) Letters 'AA', if the design was approved under alternative arrangements (see 6.7.1.2);
- (d) Pressures
- (i) Test pressure (in bar gauge)²;
 - (ii) Initial pressure test date (month and year);
 - (iii) Identification mark of the initial pressure test witness;
- (e) Temperatures
- (i) Design temperature range (in °C)²;
- (f) Elements/Capacity
- (i) Number of elements;
 - (ii) Total water capacity (in litres)²;
- (h) Periodic inspections and tests
- (i) Type of the most recent periodic test (5-year or exceptional);
 - (ii) Date of the most recent periodic test (month and year);
 - (iv) Identification mark of the authorized body who performed or witnessed the most recent test.

² The unit used shall be indicated.

Figure 6.7.5.13.1: Example of identification plate marking

Owner's registration number			
MANUFACTURING INFORMATION			
Country of manufacture			
Year of manufacture			
Manufacturer			
Manufacturer's serial number			
APPROVAL INFORMATION			
	Approval country		
	Authorized body for design approval		
	Design approval number		'AA' (if applicable)
PRESSURES			
Test pressure		bar	
Initial pressure test date:	(mm/yyyy)	Witness stamp:	
TEMPERATURES			
Design temperature range		°C to °C	
ELEMENTS/CAPACITY			
Number of elements			
Total water capacity		litres	
PERIODIC INSPECTIONS/TESTS			
Test type	Test date (mm/yyyy)	Witness stamp	

"

PART 7 – PROVISIONS CONCERNING TRANSPORT OPERATIONS

Chapter 7.1 – Stowage

7.1.1.5 Replace "6.5.4.6.4" with "6.5.6.6.4".

7.1.7.1.1 Add "with complete and rigid surfaces" after permanent structures.

7.1.12.5 Add the following words at the end of the sentence:

"or flooding of the container with water".

7.1.14 Stowage of goods of class 7

7.1.14.2 Replace "inland water craft" with "inland waterway craft". And in the heading of the third column, replace "inland water craft" with "inland waterway craft".

Chapter 7.2 – Segregation

7.2.7 Segregation of goods of class 1

7.2.7.1 Segregation from dangerous goods of other classes

7.2.7.1.1 At the end, add the following new note:

"NOTE: Alkali metal nitrates include caesium nitrate (UN 1451), lithium nitrate (UN 2722), potassium nitrate (UN 1486), rubidium nitrate (UN 1477) and sodium nitrate (UN 1498). Alkaline earth metal nitrates include barium nitrate (UN 1446), beryllium nitrate (UN 2464), calcium nitrate (UN 1454), magnesium nitrate (UN 1474) and strontium nitrate (UN 1507).".

Consequential amendment:

In the alphabetical index, add the following new entry:

"Rubidium nitrate, see 5.1 1477".

7.2.7.1.3 Dangerous goods of extreme flammability

7.2.7.1.3 Delete all the section.

7.2.8 Segregation provisions for goods of class 4.1 and class 5.2

7.2.8 Delete all the section including the title and insert "(Reserved)".

Chapter 7.4 – Transport of cargo transport units on board ships

7.4.3 Fumigated units

7.4.3 Delete the title "Fumigated units" and the all section and insert "(Reserved)".

Chapter 7.5 – Packing of cargo transport units

7.5.4 Insert a new section "7.5.4 – Tracking and monitoring equipment" as follows:

"7.5.4 – Tracking and monitoring equipment

7.5.4.1.1 When security devices, beacons or other tracking or monitoring equipment are used, they shall be securely installed to the cargo transport unit and shall be of a certified safe type* for the dangerous goods that will be carried within the cargo transport unit"

and add to the footnote the following:

* Refer to the Recommendations published by the International Electrotechnical Commission, in particular, to publication IEC 60079."

Chapter 7.6 – Transport of dangerous goods in shipborne barges on barges-carrying ships

7.6.6 Ventilation and condensation

7.6.6.3 Replace in the footnote "the Code of Safe practice for Solid Bulk Cargoes, 2004" with "the International Maritime Solid Bulk Cargo Code".

Appendix A – Class 4.1

For UN 3344 In column "Proper Shipping Name", add "(PENTAERYTHRITOL TETRANITRATE; PETN) before "MIXTURE".

Appendix B

Glossary

Insert the following:

"POWDER, SMOKELESS

Substances based on nitrocellulose used as propellant. The term includes propellants with a single base (nitrocellulose (NC) alone), those with a double base (such as NC and nitroglycerin (NC)) and those with a triple base (such as NC/NG/ nitroguanidine). Cast, pressed or bag-charges of smokeless powder are listed under "CHARGES, PROPELLING" or "CHARGES, PROPELLING FOR CANNON".

Alphabetical index

In the entry for "Fuze combination, percussion or time", insert "or FUZES, IGNITING" after "DETONATING".

For SODIUM HYDROSULPHIDE HYDRATED (UN 2949) in the column "Substance, material article" insert ", " after "HYDROSULPHIDE".

RESOLUTION MSC.295(87)
(adopted on 21 May 2010)

**ADOPTION OF AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING
OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70))**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.689(17) entitled "Testing of life-saving appliances", by which the Assembly, at its seventeenth session, adopted the Recommendation on testing of life-saving appliances,

RECALLING FURTHER that the Assembly, when adopting resolution A.689(17), authorized the Committee to keep the Recommendation on testing of life-saving appliances under review and to adopt, when appropriate, amendments thereto,

NOTING resolution MSC.81(70), by which, at its seventieth session, it adopted the Revised recommendation on testing of life-saving appliances, introducing more precise provisions for the testing of life-saving appliances based on the requirements of the International Life-Saving Appliances (LSA) Code,

RECOGNIZING the need to appropriately align the relevant provisions of the Revised recommendation on testing of life-saving appliances with the associated amendments to the LSA Code adopted by resolution MSC.293(87),

HAVING CONSIDERED, at its eighty-seventh session, proposed amendments to the Revised recommendation on testing of life-saving appliances, prepared by the Sub-Committee on Ship Design and Equipment at its fifty-second session,

1. ADOPTS amendments to the Revised recommendation on testing of life-saving appliances (resolution MSC.81(70)), as amended, the text of which is set out in the Annex to the present resolution;
2. RECOMMENDS Governments to apply the annexed amendments when testing life-saving appliances.

ANNEX

**AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING
APPLIANCES (RESOLUTION MSC.81(70)), AS AMENDED**

**PART 1
PROTOTYPE TESTS FOR LIFE-SAVING APPLIANCES**

1 In paragraphs 5.2.1, 5.7, 5.16.4, 5.17.1, 5.17.2.3, 5.17.10.4 and 5.17.12, the figure "75 kg" is replaced by the figure "82.5 kg".

**PART 2
PRODUCTION AND INSTALLATION TESTS**

2 In paragraph 5.2, the existing subparagraph .4 is replaced by the following:

"4 the 10% overload to be 10% of the mass of the liferaft or rescue boat assembly together with its full equipment and complement of persons calculated at 82.5 kg per person;"

3 In paragraph 6.2.5, the figure "75 kg" is replaced by the figure "82.5 kg".

RESOLUTION MSC.296(87)
(adopted on 20 May 2010)

**ADOPTION OF THE GUIDELINES FOR VERIFICATION OF CONFORMITY WITH
GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS
AND OIL TANKERS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

HAVING ADOPTED, by resolution MSC.287(87), the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers (hereinafter referred to as "the Standards") and, by resolution MSC.290(87), SOLAS regulations II-1/2.28 and II-1/3-10 to make the Standards mandatory,

NOTING that section 6 of the Standards requires that the rules for the design and construction of bulk carriers and oil tankers of an organization which is recognized by an Administration in accordance with the provisions of SOLAS regulation XI-1/1, or national rules of an Administration used as an equivalent to the rules of a recognized organization according to SOLAS regulation II-1/3-1, shall be verified as conforming to the goals and functional requirements of the Standards, based on the guidelines developed by the Organization,

RECOGNIZING the need for guidelines on how to carry out such verification, so as to ensure uniformity of the verification process,

HAVING CONSIDERED, at its eighty-seventh session, the proposed Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers,

1. ADOPTS the Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers, the text of which is set out in the Annex to the present resolution;
2. REQUESTS Administrations and organizations recognized by Administrations in accordance with the provisions of SOLAS regulation XI-1/1 to utilize the Guidelines when applying for verification that their design and construction rules for bulk carriers and oil tankers conform to the Standards;
3. RESOLVES to review these Guidelines, as necessary, in view of experience gained with their application.

ANNEX

GUIDELINES FOR VERIFICATION OF CONFORMITY WITH THE INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS AND OIL TANKERS

INTRODUCTION

1 The Organization has adopted, by resolution MSC.287(87), the International goal-based ship construction standards for bulk carriers and oil tankers (hereinafter referred to as "the Standards"), specifying goals, functional requirements and verification of conformity to ensure that ships are constructed in such a manner that, when properly operated and maintained, they can remain safe for their design life, and that all parts of a ship can be easily accessed to permit proper inspection and ease of maintenance.

2 These Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers (hereinafter referred to as "the Guidelines") provide the procedures necessary for demonstrating and verifying that the ship design and construction rules for bulk carriers and oil tankers of an Administration or its recognized organization conform to the Standards, including both the method and criteria to be applied during the verification process.

3 The Guidelines are composed of two parts:

- .1 Part A establishes the procedures to be followed in order to verify that ship design and construction rules conform to the Standards. It includes sections on initial verification and maintenance of verification of the rules.
- .2 Part B provides detailed documentation requirements and evaluation criteria that should be used to verify that the rules conform to the Standards.

Definitions

4 For the purpose of the Guidelines, the following definitions apply:

- .1 *Conformity* means fulfilment of a requirement.
- .2 *Finding* means an observation or a non-conformity.
- .3 *Non-conformity* means non-fulfilment of a requirement.
- .4 *Objective evidence* means quantitative or qualitative information, records or statement of fact which are based on observation, measurement or test and which can be verified.
- .5 *Observation* means statements of fact or proposals made during an audit which are based on objective evidence but are not a non-conformity.
- .6 *Organization* means the International Maritime Organization.
- .7 *Rules or rule set* means regulations for hull design and construction of bulk carriers and/or oil tankers operating in unrestricted worldwide service.

- .8 *Secretary-General* means the Secretary-General of the International Maritime Organization.
- .9 *Self-assessment* means the Submitter assesses its rules for the design and construction of bulk carriers and/or oil tankers for conformity with the goals and functional requirements as set out in the Standards.
- .10 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.
- .11 *Standards* means the International goal-based ship construction standards for bulk carriers and oil tankers, adopted by the Organization by resolution MSC.287(87).
- .12 *Submitter* means any Administration or recognized organization that requests the Organization to verify that its ship design and construction rules for bulk carriers and/or oil tankers conform to the Standards.
- .13 *Verification* (and any variation of the word *verify*) means the rules for the design and construction of bulk carriers and oil tankers have been compared to the Standards and have been found to be in conformity with or are consistent with the goals and functional requirements as set out in the Standards.
- .14 *Verification audit* or *audit* means the process of evaluating the Submitter's rules, self-assessment and supporting documentation to ascertain the validity and reliability of information. The purpose of the audit is to assess the conformity of the submitted rules with the Standards based on work done on a sampling basis.

PART A

VERIFICATION PROCESS

Scope of verification

5 This part establishes the procedures to be followed in order to verify that design and construction rules for bulk carriers and/or oil tankers conform to the Standards. It includes sections on initial verification, maintenance of verification and establishment of a Goal-based Standards Audit Team (the Team). The verification process consists of two main elements: self-assessment of the rules by the Submitter and an audit of the rules, the self-assessment and the supporting documentation by the Organization.

Initial verification

Initiation

6 Any Administration or recognized organization wishing to have its rules verified as conforming to the Standards should initiate the process with a letter to the Secretary-General, requesting a verification audit of their rules. The letter should be accompanied by a complete technical documentation package (see paragraph 9) and a supporting letter from an Administration that has recognized the Submitter, if applicable.

7 The Secretary-General notifies the Submitter of his decision to accept or reject the request, and, if accepted, advises the expected date for establishment of the Team to audit the submission. If the request is rejected, the Secretary-General will include the reason for doing so.

8 The Submitter may withdraw the application at any time prior to consideration by the Maritime Safety Committee.

Submission

9 The Submitter should provide a technical documentation package for review in hard copy (one copy for each member of the Team and one for the Secretariat) and in electronic form in English, including:

- .1 The rule set to be verified as conforming to the Standards.
- .2 All items listed under information and documentation requirements in part B of these Guidelines which are not included in .1 above and are included in the internal quality management system or the rule development process as applicable.
- .3 A self-assessment, addressing all items listed under information and documentation requirements and evaluation criteria in part B of these Guidelines.
- .4 A clear indication of any instance where a functional requirement, or portions of it, are satisfied by IMO mandatory instruments that are not part of the submitted rules (e.g., SOLAS or MARPOL requirements).
- .5 Any other documentation which, in the Submitter's opinion, supports their assessment that the rules conform to the Standards.
- .6 A completed Submission Template (see appendix 1).
- .7 A clear indication of any confidential and/or proprietary information submitted with the documentation package.

Audit process

10 The verification audit (audit) is an iterative process based on the following steps:

- .1 the Secretary-General verifies that the submitted technical documentation package includes all of the elements specified in paragraph 9;
- .2 the Secretary-General establishes the GBS Audit Team and forwards the request for audit and technical documentation package to the Team with the instructions given in paragraph 11;
- .3 the Team reviews the information, confirms completeness of the documentation submitted, exchanges views and establishes an audit plan;
- .4 the Team conducts the audit;

- .5 the Team prepares an interim audit report for the Submitter that contains the preliminary findings of the audit, requests for additional information as needed, and possible non-conformities, using the report format specified in appendix 2. Where the Team has identified a possible non-conformity, they should explain the reasons for reaching that conclusion;
- .6 upon receipt of the interim report, the Submitter may respond by submitting additional documentation to the Team to address the reported non-conformities and/or requests for additional information;
- .7 the Team prepares a final audit report with a recommendation, using the report format specified in appendix 2, and provides it to the Secretary-General with a copy to the Submitter. Where the Team has identified an unresolved non-conformity, they should explain the reasons for reaching that conclusion; and
- .8 the Team's observations on the audit process should be submitted in a separate report to the Secretary-General.

11 The Team is expected to conduct an audit to determine whether the submitted rules conform to each of the Tier II functional requirements, based on the criteria in Part B of the Guidelines. In undertaking this task, the Team should exercise their professional judgement in determining the depth of the audit.

12 Where the Submitter can clearly indicate that a functional requirement, or portions of it, are covered by IMO mandatory instruments (e.g., SOLAS or MARPOL requirements), but are not part of the submitted rules, the Team should accept this as part of the verification, provided that it does not affect other covered functional requirements. Mandatory IMO instruments used to satisfy functional requirements should be applied in a manner consistent with IMO interpretations.

Appeal

13 The Submitter, through their supporting Administration, can appeal a finding of the GBS Audit Team to the Secretary-General. Notification of intent to appeal must be made within 30 days after receiving the Team's final audit report. The appeal request should follow within six months of the notification with the documentation to support the appeal request. After the supporting documentation is received, the Secretary-General should establish an Appeal Board, independent of the original Team, to adjudicate the request. This Appeal Board should be comprised of three or five members and be selected by the Secretary-General from the same list of experts described in paragraph 22. These members should not have participated in the Team that conducted the audit that is being appealed.

Approval

14 The Secretary-General forwards the final audit report of the Team, supplemented by any appeal report, if applicable, to the Maritime Safety Committee for consideration and final decision.

15 Ships contracted to rules prior to the final decision of the MSC may be deemed to meet the Standards. Where non-conformities have been found, the rules should be revised and a new self-assessment submitted for audit. During this process ships contracted to the revised rules may be deemed to meet the Standards.

16 The Maritime Safety Committee considers the report prepared by the Team, supplemented by any appeal report, if applicable, with a view to confirming that the information provided by the Submitter demonstrates that the rules conform to the Standards.

17 Upon final decision by the Maritime Safety Committee, the Secretary-General notifies the relevant Administration and recognized organization as to whether the submitted rules conform to the Tier I goals and Tier II functional requirements of the Standards. In the case of non-conformity, the notification letter should include specific details to support the determination of non-conformity.

18 The Secretary-General circulates the results of successful verifications to Member Governments by appropriate means and maintains a list of all rule sets that have been verified for conformity as well as the original copy of the documentation package submitted.

Maintenance of verification

19 Changes to rules already verified as conforming to the Standards should be processed as follows:

- .1 At least annually, each recognized organization whose rules have been verified as conforming to the Standards should notify and make available any rule changes, including any errata, corrigenda or clarifications, to the Secretary-General and to all Administrations that have recognized them. The notification should include a rule commentary, clearly indicating the impact of those changes on conformity with the Standards of those rules already verified, including, but not limited to:
 - .1 an explanation of why the changes were considered necessary, including a description of the issues under consideration;
 - .2 the extent to which the changes address the issues under consideration;
 - .3 an explanation of the way the rules were formulated/drafted;
 - .4 an indication of any impact on and/or contribution to safety, security or environmental protection; and
 - .5 an indication of any impact on net and gross scantlings.
- .2 When an Administration considers a rule change described in .1 above to result in non-conformity with the Standards, it may request the Secretary-General to conduct a review of the change. The request should include supporting justification why such a review is necessary. The Secretary-General should establish a Team to assess the impact of the change(s) on conformity with the Standards. The findings of the Team should be forwarded to the Maritime Safety Committee by the Secretary-General, along with the request from the Administration and supporting documentation, for further consideration and final disposition.
- .3 The Organization should aim to audit 10% of the rule changes received per .1 on an annual basis. The Secretary-General should establish a GBS Audit Team accordingly and forward the compilation of annual changes

received per .1 to it for consideration. The Team should conduct a preliminary review of the changes, exchange views and establish an audit plan. The Team should exercise their professional judgement in identifying the changes to be audited. The Team conducts the audit and prepares a maintenance of verification audit report with a recommendation and provides it to the Secretary-General. Where the Team has identified a non-conformity, they should explain the reasons for reaching that conclusion. The findings of the Team should be forwarded by the Secretary-General to the Maritime Safety Committee for further consideration and final disposition.

- .4 Any Administration the rules of which have been verified as conforming to the Standards should submit rule changes as per .1 to .3 above, as applicable.
- .5 Rules should be considered to be in conformity unless .2 or .3 above results in non-conformities. Where non-conformities have been found, the rules should be revised and a new self-assessment submitted for audit. During this process ships contracted to the revised rules may be deemed to meet the Standards.

20 The Maritime Safety Committee may request re-verification of rules if significant changes are made to the Standards or other IMO mandatory instruments or if there is a compelling need.

GBS Audit Team

21 A GBS Audit Team, established under the auspices of the Maritime Safety Committee, will conduct an audit of the Submitter's documentation package to verify whether the rules conform to the Standards. The Team will serve as an independent panel of technical experts which are not considered to be representing any Member State of the Organization or any organization in consultative status. The Team should consist of three (3) or five (5) members, depending on the complexity of the submission(s). A simple majority will be required to recommend a finding of non-conformity for a functional requirement. The voting of individual members will be kept confidential, with the resulting outcome considered as a decision of the Team. In any case, the view of the minority should be fully documented in the final audit report of the Team.

22 Administrations and non-governmental organizations in consultative status with the Organization may nominate individuals for inclusion in a list of experts, maintained by the Secretary-General, from which the members of the Team will be selected. Nominations should be provided to the Secretary-General and should be accompanied by a curriculum vitae.

23 Nominees should have adequate knowledge of, and experience in, ship structural design and construction, the Standards and classification society rules and rule development and be able to correctly interpret the rules for correlation with relevant regulatory requirements. Additionally, nominees should satisfy at least some of the following requirements:

- .1 engineering degree in naval architecture and/or structural engineering;
- .2 scientific or engineering knowledge of technical subjects addressed in ship structural standards including strength of materials, structural analysis, fatigue analysis, hydrodynamics and load calculations, and structural reliability;

- .3 design, construction or operating experience with the type of ship addressed by the ship rules being verified;
- .4 knowledge of ship safety construction requirements, including SOLAS requirements and industry standards, guidelines and practices;
- .5 knowledge of environmental protection requirements related to ship structures;
- .6 knowledge and experience in survey, inspection and maintenance of ship structures;
- .7 knowledge and experience in shipbuilding and ship construction practices;
- .8 knowledge and experience in auditing; and
- .9 research experience in any of the areas referred to in .1 to .7 above.

24 The members of the Team will be selected by the Secretary-General as needed from the list of experts, giving due consideration to the qualifications listed in paragraph 23 and ensuring appropriate and balanced representation and expertise for the specific rules being considered. Additionally, the Secretary-General will select one of the members of the Team to be responsible for overall coordination of the audit. Team members should not have any conflict of interest relating to the rules being verified.

25 Each member of the GBS Audit Team or of the Appeal Board should sign a confidentiality agreement with the Secretary-General, stating that they will not disclose any proprietary information that is provided to them for the purpose of verifying rules, with the exception of the documentation required for the interim or final reports.

26 The Team should consider the need for transparency throughout their deliberations. The Team should meet in person with the Submitter during the audit process at a mutually agreed location to address any questions and issues that may arise during the audit process, review any additional documentation needed to complete the audit, and to share their preliminary findings.

27 The Secretary-General will provide the GBS Audit Team with adequate administrative assistance to support the verification process, including a permanent secretary.

PART B

INFORMATION/DOCUMENTATION REQUIREMENTS AND EVALUATION CRITERIA

INTRODUCTION

28 This part provides detailed information and documentation requirements and evaluation criteria to assist the Submitter to conduct a self-assessment that the rules conform to the Tier II functional requirements of the Standards, as outlined in part A. It includes a statement of intent, information and documentation requirements, and evaluation criteria for each Tier II functional requirement. Additionally, the information and documentation requirements and evaluation criteria serve as the audit standard for the GBS Audit Team.

29 The statement of intent links Tier II functional requirements to Tier III verification criteria by providing an overview of what the verification of the particular functional requirement should achieve.

30 The information and documentation requirements establish specific items that should be included and addressed in the submission supporting the verification.

31 The evaluation criteria should be considered as the basis for conducting the self-assessment and audit.

32 The rules, as referred to in this part, include the rule set, guidelines, interpretations, internal procedures, etc.

33 Justification means providing the supporting data, analysis or other study that demonstrates the adequacy of the methodology, process or requirement. It should include: (1) basis for the assumptions made; (2) description of the uncertainties associated with them; and (3) any sensitivity analyses carried out. It includes documented rationale on which the validity of the hypothesis or criteria used in the requirements or calculations are based. These may be the results of research work, historical data, statistics, etc. For example, justification of safety factors should describe how the many related assumptions and uncertainties, such as environmental conditions, loads, structural analysis methodology and strength criteria, are accounted for.

34 Where commentary or data are requested, it is sufficient for such information to be contained in a rule commentary or other supporting documentation.

35 Where the rules establish a process to evaluate and accept alternatives, the submission should clearly identify the process for determining that an equivalent level of safety is achieved.

36 INFORMATION AND DOCUMENTATION REQUIREMENTS AND EVALUATION CRITERIA

DESIGN

1 Design life

1.1 Statement of intent

Confirm that the specified design life is at least 25 years and properly incorporated in the rules.

1.2 Information and documentation requirements

1.2.1 Statement of the design life in years used in developing the rules.

1.2.2 Description of the assumptions and methods used to incorporate design life into the rules. This should include, but not be limited to, consideration of extreme loads, design loads, fatigue and corrosion.

1.3 Evaluation criteria

1.3.1 Are structural strength, fatigue and corrosion additions, and any other design parameters used in the rules based upon the specified design life?

1.3.2 Has the design life been properly applied in sections of the rules where specified?

2 Environmental conditions

2.1 *Statement of intent*

Confirm that the wave data and associated ship motions and loads are developed on the basis of North Atlantic environmental conditions and the relevant long-term sea state scatter diagrams for the specified design life.

2.2 *Information and documentation requirements*

2.2.1 Source of sea state data (scatter diagrams, etc.) including method and date of data collection and geographical location represented by the data.

2.2.2 Justification that sea state data and predictions used to develop motions and loads are representative of North Atlantic environmental conditions.

2.2.3 Justification of the methodology used to develop ship motions and loads, including assumptions related to speed, distribution of headings, number of cycles of wave encounters, probability of exceedance of design values, sea states, wave spectral shapes, hull form and other relevant parameters. Clearly define limits of applicability, and provide guidance for assessment when outside this range.

2.2.4 Description of how the methodology used to develop ship motions and loads has been benchmarked with experimental or service history data.

2.3 *Evaluation criteria*

2.3.1 Does the wave data properly represent North Atlantic conditions and include the regions where the most severe conditions are expected?

2.3.2 Do the rules specify the wave spectrum and statistical analysis methods used to obtain the design extreme value, including its probability of exceedance?

2.3.3 Are the design extreme motions and loads based on appropriate number of cycles of wave encounters corresponding to at least a 25-year design life?

2.3.4 Are the ship speeds and headings used for assessment of ship motions and loads based upon speeds and headings that can be expected in the sea states under consideration?

2.3.5 Do the rules properly specify the range of applicability of ship motions and loads, and when further analysis, such as direct sea-keeping analysis or model testing, is required? Do the rules clearly state the assumptions used in the methodologies to develop ship motions and loads?

2.3.6 Are the methodologies used to develop ship motions and loads validated by experimental or service history data?

3 Structural strength

3.1 Statement of intent

Confirm that the rules require a ship to be designed to withstand at net scantlings the operational and environmental loads for its specified design life. Confirm that the rules include the appropriate safety margins which reflect the degree of uncertainty.

3.2 Information and documentation requirements

3.2.1 Description of how the rules provide net scantlings that are sufficient to avoid excessive deformation (either elastic or plastic, as appropriate) and prevent failure modes including, but not limited to, those involving yielding and buckling of hull girder and structural members. Include the following:

- .1 Description of the strength assessment methodology.
- .2 Explanation of how the net scantlings concept is applied in the rules for structural design.
- .3 Justification of the methodologies used to obtain the global and local, static and dynamic design loads.
- .4 Justification of the acceptable limits of yielding and buckling.
- .5 Explanation of how the rules prevent deformation from compromising the integrity of the ship's structure. The term "deformation" means translational and/or rotational displacement.
- .6 Explanation of the requirements for finite element structural modelling, including load application, boundary conditions, element selection and mesh size. Explanation of how primary, secondary and tertiary stresses are considered.
- .7 List of the loading conditions considered in the rules that are to be included in the structural evaluation. Justification of the loading conditions especially in terms of what parts of the structure may be critically loaded and stressed.
- .8 Description of how construction tolerances and procedures, and material imperfections are accounted for in the rules.
- .9 Justification of the rationale of the rules for weld design and procedures.
- .10 Justification of how structural continuity is taken into account in the rules, including termination of primary structures at the fore and aft ends of the cargo block.
- .11 Explanation of how the rules consider deformations or vibration levels that may damage or impair the ship structure, equipment or machinery.
- .12 Description of the safety factors in conjunction with assumed design load(s) and justification as to why they are appropriate.

- .13 Description of how the strength assessment methodology has been benchmarked with experimental and service history data.
- .14 Application of the rules to representative design(s). Documentation should include an illustration of the midships section and of the cargo region showing net and gross scantlings, as well as a summary of the background calculations used to develop the scantlings.

3.2.2 Explanation of how the rules consider structural integrity at net scantlings for typical loading/discharging and ballast exchange scenarios, including criteria to determine acceptability and provide reasonably attainable sequences of loading, discharging and ballasting.

3.2.3 Justification of the methodology used for the calculation of local stresses, including stress concentration factors, if utilized.

3.2.4 Justification of how the rules account for sloshing effects.

3.2.5 Description of how the rules determine that the net scantlings are sufficient to provide adequate ultimate strength. Include the following:

- .1 Description of the ultimate strength assessment methodology.
- .2 Justification of how the net scantlings concept is applied in the rules for ultimate strength.
- .3 Justification of the loads considered for the ultimate strength analysis.
- .4 Explanation of the methodology used for calculating hull girder capacity and ultimate strength of plates and stiffeners, individually and in combination.
- .5 Description of acceptable limits of ultimate strength, including safety factors, with justification why they are appropriate.
- .6 Description of how the ultimate strength assessment methodology has been benchmarked with experimental and service history data.

3.2.6 Description of any protective arrangements and/or reinforcements required to avoid damage caused by loading/unloading equipment that would compromise the ship's structural integrity.

3.3 *Evaluation criteria*

3.3.1 Do the rules specify the probability of exceedance for which global and local dynamic loads are calculated?

3.3.2 Are the limits of yielding, buckling and ultimate strength set at levels that will maintain the structural integrity?

3.3.3 Do the rules satisfactorily consider deformations that may compromise the integrity of the ship's structure?

3.3.4 Do the rules adequately specify the required extent of finite element models and how ship structures should be modelled, including how boundary conditions and loads are to be

applied, and elements and mesh size selected? Are primary, secondary and tertiary stresses properly accounted for?

3.3.5 Are the following loading conditions included: homogeneous, partial, alternate loads, multi-port, ballast conditions including ballast management, and loading and offloading sequences and intermediate conditions? Are these, and any other conditions identified in the loading or stability manuals, considered without exceeding allowable bending moments, shear forces and stresses?

3.3.6 Is the methodology for developing the lightship and deadweight load distributions clearly defined, in a way that it will be consistently applied?

3.3.7 Do the rules satisfactorily consider workmanship standards and construction tolerances?

3.3.8 Do weld designs and procedures provide a level of strength of welds in their net condition to withstand the expected loads on the joints?

3.3.9 Are the requirements for tapering primary structures, including transitions fore and aft of the cargo block, defined in sufficient detail in the rules?

- .1 Where prescriptive measures are specified, do these measures provide for adequate continuity and termination of primary structure and primary supporting members?
- .2 Where analytical methods are allowed for evaluating structural continuity, is the methodology sufficiently defined to enable adequate assessment of the proposed arrangements for the termination of primary structure and primary supporting members? Do these analytical methods include both the local stress evaluation and the effect of the relative stiffness of the members at the termination?

3.3.10 Do the rules satisfactorily consider deformations or vibration levels that may damage or impair the ship structure, equipment or machinery?

3.3.11 Do the rules include adequate safety factors?

3.3.12 Do the rules include methodology for the development of local loads, including specifying the characteristics of intended cargoes relevant to loading (cargo arrangement, minimum density, angle of repose for bulk cargo) and minimum density of ballast to be applied?

3.3.13 Do the rules specify procedures for direct calculation of local stresses in structural details. If direct calculation is not required, do the rules include definition and application of stress concentration factors? If stress concentration factors are utilized, a justification of the definition and application of these factors should be included.

3.3.14 With regard to local strength:

- .1 Do the rules require the structure in way of cargo and ballast spaces to be suitable for any level of filling, from empty to maximum capacity (where maximum capacity is either full or the clearly defined operational limit on filling height or cargo mass)?

- .2 Do the rules define loading conditions for evaluation, including the loaded/empty condition of adjacent cargo and/or ballast spaces, and the draughts to be considered for each loading condition?
- .3 For oil tankers, do the rules consider any reasonable combination of cargo or ballast space loading, including asymmetric loading and loading in any one athwartships row across to be empty at or near the scantling draught?
- .4 Do the assumed draught limits and assumed densities and other cargo characteristics cover the expected operational range?
- .5 Do the local strength evaluations consider the effects of maximum allowable still water and wave bending and shear loads on the structure?
- .6 Are sloshing effects adequately covered by the rules?

3.3.15 Do the rules require adequate protective arrangements and/or reinforcements to avoid damage caused by loading/unloading equipment that would compromise the ship's structural integrity?

3.3.16 Have the results from the strength and ultimate strength assessments been benchmarked? Do they compare favourably with service history and other standards?

3.3.17 Do the illustrations of the representative designs show net and gross scantlings? Do the background calculations show how the structure at net scantlings withstands the operational and environmental loads for the specified design life?

4 Fatigue life

4.1 Statement of intent

Confirm that the fatigue life is not less than the specified design life.

4.2 Information and documentation requirements

4.2.1 Description of how the rules provide that structural arrangement and net scantlings are sufficient to meet a calculated fatigue life not less than the specified design life. Include the following:

- .1 Description of the fatigue assessment methodology used in the rules including sea state data, long-term statistics of wave data applied in fatigue calculations, derivation of cyclic loads, calculation of stress ranges, modelling of their distribution functions, S-N curves used and factors of safety or margins taken.
- .2 Explanation of where and how the net scantlings concept is applied in the rules for fatigue. Justification of the values of the scantlings used in the calculations.
- .3 List of the loading conditions required by the rules to be considered as part of the fatigue evaluation. Justification of the selection of loading conditions.

- .4 Justification of how the rules take into account dynamic loads and their combinations, including the probability level for which dynamic loads are calculated.
- .5 Justification of the process for the selection of the structural members and typical critical design details required to be included in evaluation of ship's fatigue life.
- .6 Justification of procedures for the calculation of cyclic stresses and stress ranges in structural details. Explanation of the method used to take into account stress concentrations, as may be applicable to the detail analysed.
- .7 Explanation of the requirements for finite element structural modelling, including load application, boundary conditions, element selection and mesh size. Explanation of how primary, secondary and tertiary stresses are considered.
- .8 Description of how construction tolerances and procedures are accounted for in the rules. Description of how surface treatment, such as grinding and peening, is addressed in the rules.
- .9 Description of how the rules consider the effect on fatigue life of unprotected structural details in seawater (e.g., when the breakdown of coating leads to exposure to seawater).
- .10 Description of how the rules take into consideration slamming (e.g., whipping) and vibratory-induced fatigue effects (e.g., springing or propeller induced vibrations). Justification should be provided if not explicitly considered in fatigue assessment.
- .11 Explanation of the effect of uncertainties/assumptions on fatigue life, highlighting any margins used in fatigue calculations, taking into consideration the consequence of failure of the particular structural member.
- .12 Description of how the fatigue assessment methodology has been benchmarked with experimental and/or service history data.

4.3 Evaluation criteria

4.3.1 Is the methodology used in fatigue life assessment properly justified? Are the explanations provided to cover the sea state data used, long-term statistics of wave data applied, derivation of cyclic loads, method of calculation of the stress ranges and their distribution functions, S-N curves used and the factors of safety or margins taken, satisfactory?

4.3.2 Are the values of the scantlings required to be used in the calculations properly justified according to the net scantlings concept?

4.3.3 Are the assumed operating conditions (e.g., loaded and ballast) specified by the rules in the long-term fatigue response analysis adequate for a representative ship's operating profile? Are the stress ranges so obtained appropriate to represent the long-term fatigue response?

4.3.4 Are the internal/external dynamic loads and their combinations based on the North Atlantic environment? Is the probability level for which these loads are calculated properly justified?

4.3.5 Do the rules require the systematic identification of areas prone to fatigue throughout the entire ship that are required to be included in the evaluation of the ship's fatigue life?

4.3.6 Are the procedures for the calculation of cyclic stresses and stress ranges in structural details properly justified?

4.3.7 Do the rules properly take into account stress concentrations, as may be applicable to the detail analysed?

4.3.8 Do the rules specify the required extent of finite element models and how ship structures should be modelled, including how boundary conditions and loads are to be applied, and elements and mesh size selected? Are primary, secondary and tertiary stresses properly accounted for?

4.3.9 Do the rules satisfactorily consider construction tolerances and procedures? Is surface treatment, such as grinding and peening, adequately considered?

4.3.10 Do the fatigue life calculations consider degradation of coating performance under seawater environment?

4.3.11 Do the rules take slamming (e.g., whipping) and vibratory-induced fatigue effects (e.g., springing or propeller induced vibrations) into consideration? If not explicitly considered in fatigue assessment, is adequate justification provided?

4.3.12 Do the rules satisfactorily account for uncertainties or assumptions on fatigue life assessment?

4.3.13 Have the results from the fatigue life assessment methodology been benchmarked? Do the results compare favourably with service history and other standards?

5 Residual strength

5.1 Statement of intent

Confirm that the rules provide a reasonable level of residual strength after damage (e.g., collision, grounding and flooding).

5.2 Information and documentation requirements

5.2.1 Description of how ships designed to the rules with intact structure at net scantlings have sufficient ultimate strength to sustain flooding as defined in relevant IMO instruments.

5.2.2 Justification that ships designed to the rules have adequate residual strength to survive a casualty event. Include the following:

- .1 Description of the methodology used to assess residual strength.
- .2 Description of the flooding scenarios and the corresponding structural damage. Explanation of the relationship of the flooding scenarios with IMO instruments.

- .3 Description of the environmental conditions and period of exposure representative of the sea states expected for collision and grounding scenarios, and justification why they are appropriate.
- .4 Description of the acceptance criteria for residual strength of the ship in damaged condition, and justification if different from ultimate strength.
- .5 Where it is determined that the rules inherently provide adequate residual strength, justification should be provided that demonstrates through analysis of a range of representative ship designs and loading conditions.

5.2.3 Description of how the residual strength assessment procedure has been validated with experimental and/or casualty history data.

5.3 Evaluation criteria

5.3.1 Can a ship designed to the rules sustain flooding as defined in relevant IMO instruments and survive with intact structure at net scantlings?

5.3.2 Does a ship designed to the rules have sufficient residual strength to survive a more significant casualty event (e.g., flooding with structural damage due to collision or grounding) under environmental conditions consistent with the likelihood of occurrence? Are the assumed damage scenarios representative of the intent of damage in relevant IMO instruments?

5.3.3 Has the residual strength assessment procedure been validated with experimental and/or casualty data?

6 Protection against corrosion

6.1 Coating life

6.1.1 Statement of intent

Confirm that the coatings are properly selected and applied to protect the structure throughout the target useful life of the coating.

6.1.2 Information and documentation requirements

6.1.2.1 Provision of information on coating life and mandatory use of coatings, including:

- .1 Mandatory locations and/or spaces where coatings are required to be used.
- .2 Types of coating to be used for the various spaces.
- .3 Required target useful life of the coating and explanation for selection.
- .4 The coating performance standard to be followed (e.g., IMO PSPC²⁹ where mandated).

²⁹

Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

6.1.2.2 Description of the requirements to be followed in spaces where other corrosion prevention systems are used.

6.1.2.3 Description of the procedures used to verify that the selected coating system with associated surface preparation and application methods is compatible with the shipyard production processes.

6.1.2.4 Description of the procedures used to verify that the specified coating procedures have been followed.

6.1.2.5 If an alternative is proposed to that prescribed by IMO instruments, justification to support the selection of coating standards and target useful life of the coating or areas of application.

6.1.3 Evaluation criteria

6.1.3.1 Do the rules include appropriate requirements to achieve stated target useful life of the coating and fulfil SOLAS requirements as a minimum?

6.1.3.2 Do alternative or additional requirements allowed by the rules provide protection levels at least equivalent to those required by SOLAS?

6.1.3.3 Are the procedures indicated in 6.1.2.3 and 6.1.2.4 adequately documented in the rules?

6.1.3.4 Is adequate justification provided to support the use of alternatives to SOLAS or other IMO instruments?

6.2 Corrosion addition

6.2.1 Statement of intent

Confirm that the rules for corrosion addition values are rationally based and adequate for the specified design life.

6.2.2 Information and documentation requirements

6.2.2.1 Description of the methodology used to determine values for the design corrosion additions so that the scantlings remain above net scantlings over the specified design life.

6.2.2.2 Description of how assumed corrosion rates and rule design corrosion additions are determined based on ship type and location within the hull. Description should address how stress corrosion and any other modes of accelerated corrosion have been taken into consideration.

6.2.2.3 Description of any additional rule requirements that provide special consideration for other parameters such as unusual cargoes, loadings, trading patterns, material properties, etc.

6.2.2.4 Description of how corrosion of welds and heat-affected zones are considered.

6.2.2.5 Description of the steel/structure renewal criteria.

6.2.2.6 Description of how the methodology to determine corrosion addition and establish steel/structure renewal criteria has been benchmarked with experimental and service history data.

6.2.3 Evaluation criteria

6.2.3.1 Does the methodology and supporting statistical data justify the corrosion additions?

6.2.3.2 Confirm that reductions in the rule design corrosion additions are prohibited.

6.2.3.3 Is consideration given to the corrosion of welds and heat-affected zones?

6.2.3.4 Do the rules clearly establish the steel/structure renewal criteria? For ships in service, do the renewal criteria provide for scantlings that are not less than the required net scantlings and that produce a hull girder section modulus within SOLAS requirements?

6.2.3.5 Has the methodology used to determine corrosion addition and establish steel/structure renewal criteria been benchmarked? Does it compare favourably with experimental and service history data?

7 Structural redundancy

7.1 Statement of intent

Confirm that the rules require sufficient redundancy to withstand localized damage in any one stiffening structural member.

7.2 Information and documentation requirements

7.2.1 Demonstration that the rules have adequate requirements to provide ship structural redundancy.

7.2.2 Description of the requirements for localized damage assessments, including where applicable, modelling in finite element structural analysis.

7.2.3 Description of how the methodology used to assess structural redundancy has been benchmarked with experimental and/or service history data.

7.3 Evaluation criteria

7.3.1 Does a ship designed to the rules have sufficient structural redundancy to survive localized damage to a stiffening member?

7.3.2 Are the methods for assessing the consequences of localized damage satisfactorily described?

7.3.3 Has the methodology used to assess structural redundancy been benchmarked? Does it compare favourably with experimental or casualty history data?

8 Watertight and weathertight integrity

8.1 Statement of intent

Confirm that the rules require adequate watertight and weathertight integrity for North Atlantic environmental conditions, including adequate strength for the closing arrangements and adequate redundancy for the securing devices.

8.2 Information and documentation requirements

8.2.1 Description of the rule requirements for watertight and weathertight integrity.

8.2.2 Description of how the rules consider criteria from IMO instruments for determining which openings in the hull envelope are required to be watertight or weathertight.

8.2.3 Explanation of the criteria used in the development of the rules to determine that the strength and redundancy for closing arrangements, if appropriate, of the watertight and weathertight openings is adequate for the environmental conditions and specified design life.

8.3 Evaluation criteria

8.3.1 Do the rules satisfy all relevant IMO watertight and weathertight integrity requirements?

8.3.2 Do the rules require sufficient strength for closing arrangements and securing devices to meet environmental conditions, design loads and specified design life? Do the rules require securing devices to have adequate redundancy?

9 Human element considerations

9.1 Statement of intent

Confirm that the rules incorporate human element and ergonomic considerations into the structural design and arrangement to facilitate operations, inspection and maintenance activity.

9.2 Information and documentation requirements

9.2.1 Description of how the rules consider human element and ergonomics during the structural design and arrangement of the ship, including:

- .1 Stairs, vertical ladders, ramps, walkways and work platforms used for permanent means of access and/or for inspection and maintenance operations.
- .2 Structural arrangements to facilitate the provision of adequate lighting and ventilation, and to minimize noise and vibration in spaces normally occupied or manned by shipboard personnel.
- .3 Structural arrangements to facilitate the provision of adequate lighting and ventilation in tanks or closed spaces (e.g., duct keels, pipe tunnels, etc.) for periodic inspections, survey and maintenance.

- .4 Structural arrangements to facilitate emergency egress of inspection personnel or ships' crew from tanks, holds, voids, etc.

9.2.2 Description of how ergonomic design principles are factored into the design rules, including any guidance information provided to designers.

9.3 Evaluation criteria

9.3.1 Are human element and ergonomic considerations accounted for in the design of stairs, vertical ladders, ramps, walkways and work platforms?

9.3.2 Do the rules address structural or other arrangements to facilitate adequate lighting and ventilation in spaces normally manned or occupied by the crew?

9.3.3 Do the rules address structural or other measures to reduce the generation and transmission of vibration to a level at or below the acceptable ergonomic standards for spaces normally manned or occupied by the crew?

9.3.4 Do the rules address structural or other arrangements to facilitate adequate lighting and ventilation for the purposes of inspection, survey and maintenance?

9.3.5 Do the rules require structural arrangements to facilitate emergency egress from tanks or closed spaces?

9.3.6 Are relevant IMO requirements included or referred to in the rules (i.e. bow access, etc.)?

10 Design transparency

10.1 Statement of intent

Confirm that the design and construction process is transparent, and that design information is clearly stated and made available to the classification society, the owner and the flag State, with due consideration to intellectual property rights.

10.2 Information and documentation requirements

10.2.1 Description of how the rules require design specific information as required by SOLAS regulation II-1/3-10 to be included in the Ship Construction File (SCF), including:

- .1 Areas requiring special attention throughout the ship's life.
- .2 All design parameters limiting the operation of a ship.
- .3 Any alternatives to the rules, including structural details and equivalency calculations.
- .4 "As built" drawings and information which are verified to incorporate all alterations approved by the recognized organization or flag State during the construction process.
- .5 Procedures for updating the SCF throughout the ship's life.
- .6 Net (renewal) scantlings for all the structural constituent parts.

- .7 Minimum hull girder section modulus along the length of the ship which has to be maintained throughout the ship's life.

10.2.2 Description of the process, requirements and criteria to be followed when assessing, documenting and communicating alternative methods as being equivalent to specific rule requirements.

10.2.3 Description of procedures for ensuring that all relevant design and construction information, including correspondence exchanged between shipyard and recognized organization, is available to the owner and flag State during the construction process.

10.3 Evaluation criteria

10.3.1 Do the rules establish requirements for including and updating design specific and critical information, including limitations, in the SCF?

10.3.2 Do the rules establish clear criteria and techniques for assessing alternative methods used in the design? Do the rules require that all equivalencies are documented in the SCF and are made available to the owner and/or flag State?

10.3.3 Do the rules establish procedures to provide all relevant design and construction information, including correspondence exchanged between shipyard and recognized organization, e.g., on net scantlings, corrosion margins used, etc., to be made available to the owner and flag State during the construction process?

CONSTRUCTION

11 Construction quality procedures

11.1 Statement of intent

Confirm that the rules contain provisions for ensuring that construction tolerances and procedures assumed during rule formulation are implemented during construction.

11.2 Information and documentation requirements

11.2.1 Demonstration that the rules require the shipyard's construction procedures and standards to meet a minimum level of quality. Include the following:

- .1 Procedures for specifying the materials and their tracking.
- .2 Assembly requirements, including alignment, joining, welding, surface preparation, coating, castings, heat treatment, etc.
- .3 Approval scheme of welding procedures.
- .4 Qualification scheme of welders.
- .5 Requirements for yard fit-up and other quality control inspections.

11.2.2 Description of actions taken when a shipyard is determined as not meeting the minimum level of quality construction.

11.2.3 Description of the procedures followed when the "as built" is different than "design". Include the following:

- .1 Criteria for determining when review of the "as built" drawings is required.
- .2 Criteria for determining when re-evaluation for strength and/or fatigue life is required. This should include consideration of net scantlings where appropriate.

11.2.4 Description of the procedures for ensuring that construction tolerances are verified and maintained.

11.2.5 Description of the procedures used to continuously update the rules based on construction and in-service experience.

11.2.6 Description of how the quality construction requirements have been benchmarked with recognized international shipbuilding and repair quality standards.

11.3 Evaluation criteria

11.3.1 Are the construction tolerances used in rule formulations and calculations incorporated in the construction plan and verified during construction?

11.3.2 Do the quality requirements include continuous design improvement based on experience?

11.3.3 Have the rules' quality construction requirements been benchmarked? Do they compare favourably with recognized international shipbuilding and repair quality standards?

12 Survey during construction

12.1 Statement of intent

Confirm that the rules include provisions to ensure that the construction of ships is carried out to an acceptable quality level.

12.2 Information and documentation requirements

12.2.1 Description of the construction survey procedure requirements, including:

- .1 Types of surveys (visual, non-destructive examination, etc.) depending on location, materials, welding, casting, coatings, etc.
- .2 Establishment of a construction survey schedule for all assembly stages from the kick-off meeting, through all major construction phases, up to delivery.
- .3 Inspection/survey plan, including provisions for critical areas identified during design approval.
- .4 Survey criteria for acceptance.
- .5 Interaction with shipyard, including notification and documentation of survey results.

- .6 Correction procedures to remedy construction defects.
- .7 List of items that would require scheduling or formal surveys.
- .8 Qualification of surveyors.
- .9 Determination and documentation of areas that need special attention throughout ship's life, including criteria used in making the determination.
- .10 Procedures for determining the number and qualifications of surveyors for a project.

12.2.2 Description of procedures for providing shipowner and/or flag Administration representatives results of construction surveys.

12.2.3 Description of the requirements for testing during survey, including test criteria.

12.2.4 Description of how the construction survey requirements have been benchmarked with recognized international shipbuilding and repair quality standards.

12.3 Evaluation criteria

12.3.1 Do the rules require the development of a Survey Plan that is reviewed during the initial kick-off meeting? Does the survey plan address activities during ship construction sufficient to verify the ship is built in accordance with the appropriate rules or standards and address all elements in 12.2.1?

12.3.2 Do the rules contain provisions that areas of high stress or fatigue risk identified during design approval are surveyed with adequate detail and extent during construction?

12.3.3 Do the rules have procedures to provide for an adequate number of qualified surveyors to carry out proposed surveys in accordance with the size of the project?

12.3.4 Is survey related correspondence between shipyard and recognized organization relating to ship design and construction made available to the owner and flag Administration?

12.3.5 Do the rules include acceptance criteria for all tests required? Are the test criteria based on rule formulation parameters?

12.3.6 Have the rules' construction survey requirements been benchmarked? Do they compare favourably with recognized international shipbuilding and repair quality standards?

IN-SERVICE CONSIDERATIONS

13 Survey and maintenance

13.1 Statement of intent

Verify that the rules provide for spaces of adequate size to facilitate survey and maintenance. Confirm that the rules provide for the identification of areas requiring special attention over the life of the ship based on design parameter selection.

13.2 Information and documentation requirements

13.2.1 Description of the rule requirements to provide for spaces of adequate size to facilitate ship survey and maintenance.

13.2.2 Description of rule requirements to identify items for inclusion in an in-service Survey Plan, including:

- .1 Areas of high stress and with special fatigue considerations.
- .2 Any other areas that need special attention throughout the ship's life, including criteria used in making the determination (e.g., wave impact loading, mechanical impact areas, special materials, etc.).
- .3 Structural design features that were selected on the basis of special in-service requirements.

13.3 Evaluation criteria

13.3.1 Do the rules include design requirements to provide for spaces of adequate size for ship survey and maintenance?

13.3.2 Do the rules contain provisions for the identification of areas of high stress or fatigue risk that require monitoring while in-service?

13.3.3 Do the rules include provisions for the identification of structural design features selected on the basis of special in-service requirements?

13.3.4 Do the rules include provisions for the identification of any other areas needing special attention during the ship's life?

14 Structural accessibility

14.1 Statement of intent

Confirm that the rules include provisions to facilitate access for internal structural inspection and thickness measurements.

14.2 Information and documentation requirements

Description of rule requirements to facilitate overall and close-up inspections and thickness measurements of the internal structure. Include the following:

- .1 Standards for access.
- .2 Requirements for development of an Access Plan.

14.3 Evaluation criteria

14.3.1 Are relevant IMO requirements included or referred to in the rules (i.e. permanent means of access, etc.)?

14.3.2 Are there provisions to provide for safe access to critical areas referred to in 13.2.2?

RECYCLING CONSIDERATIONS

15 Recycling

15.1 Statement of intent

Confirm that the rules require the listing of materials used for the construction of the hull structure with a view toward identification of environmentally acceptable or recyclable materials and the development of an inventory list.

15.2 Information and documentation requirements

15.2.1 Description of the rule requirements for listing of materials, including:

- .1 List of materials used for the construction of the hull structure.
- .2 Provisions for listing of materials in the Ship Construction File.
- .3 Provisions for documenting changes to any of the above during the ship's service life.

15.3 Evaluation criteria

15.3.1 Do the rules include provisions for the listing of materials used for the construction of the hull structure within the scope of the Standard, including:

- .1 List of materials used for the construction of the hull structure;
- .2 Provisions for listing of materials in the Ship Construction File?

15.3.2 Do the rules include provisions for documenting changes to any of the above during the ship's service life?

SUBMISSION TEMPLATE

<p>2 RECOGNIZED ORGANIZATION INFORMATION</p>		
<p>1 Name of recognized organization:</p>		
<p>2 Full contact details for the designated single point of contact:</p>		
<p>Name and title:</p>		
<p>Address:</p>		
<p>Telephone No.:</p>		
<p>Fax No.:</p>		
<p>E-mail address:</p>		
<p>3 Rules coverage:</p>	<p>Oil tanker</p>	<p>Bulk carrier</p>

3 SELF-ASSESSMENT SUMMARY			
Functional requirement	Fully covered in rules	Not covered in rules	Comments
<i>Design</i>			
1 Design life			
2 Environmental conditions			
3 Structural strength			
4 Fatigue life			
5 Residual strength			
6 Protection against corrosion			
6.1 Coating life			
6.2 Corrosion addition			
7 Structural redundancy			
8 Watertight and weathertight integrity			
9 Human element considerations			
10 Design transparency			
<i>Construction</i>			
11 Construction quality procedures			
12 Survey during construction			
<i>In-service considerations</i>			
13 Survey and maintenance			
14 Structural accessibility			
<i>Recycling considerations</i>			
15 Recycling			

4 RULE LINKAGE SUMMARY TABLE

1 (Title and text of the relevant functional requirement)

1.1 (Text of the Statement of intent)

Information and documentation requirement		Regulation submitted (2)	Rule type (3)	Reference (4)
1.2.1	(Text) (1)			

Justification (If applicable) (5):

Evaluation criterion		Summarized comment (7)	Satisfied by rules (8)	Rule linkage (9)
1.3.1	(Text) (6)		(YES/NO)	

Detailed technical explanation (10):

Information and documentation requirement		Regulation submitted (2)	Rule type (3)	Reference (4)
1.2(n)	(Text) (1)			

Justification (If applicable) (5):

Evaluation criterion		Summarized comment (7)	Satisfied by rules (8)	Rule linkage (9)
1.3(n)	(Text) (6)		(YES/NO)	

Detailed technical explanation (10):

Notes:

Section 4 of the submission template should be filled for each information and documentation element and its associated evaluation criterion, for each functional requirement.

- (1) Copy text of the relevant information and documentation requirement established in the Guidelines.
- (2) Indicate the file name or internet link or title of the hard copy where the information/documentation provided is found in the documentation package.
- (3) Specify type of information/documentation provided (public rule, internal procedure, unified requirement, guidelines, etc.).
- (4) Indicate the reference in the rules where the information is found.
- (5) Develop the justification required. If a justification is not required, detailed technical explanation should be submitted in any case.
- (6) Copy text of the evaluation criterion established in the Guidelines for the relevant information and documentation requirement.
- (7) Include a short comment explaining why the relevant evaluation criterion is satisfied.
- (8) Indicate if the relevant evaluation criterion is satisfied by rules according to self-assessment.
- (9) Specify all the rules locations where the relevant criterion is applied.
- (10) Provide a technical explanation showing why the evaluation criterion is said to be satisfied or why it is not satisfied.

APPENDIX 2**FORMAT FOR GBS AUDIT TEAM REPORTS****1 EXECUTIVE SUMMARY**

- 1.1 Subject of audit
- 1.2 Scope of verification audit (e.g., audit plan)
- 1.3 Findings of audit
- 1.4 Recommendation of the GBS Audit Team

2 SUBMISSION OF PARTICULARS

- 2.1 Submitting Administration(s)
- 2.2 Recognized organization name (if applicable)
- 2.3 Title and revision date of rules submitted
- 2.4 Submission date
- 2.5 Report type: [Interim] [Final]
- 2.6 GBS Audit Team members

3 AUDIT SUMMARY

Functional requirement	Conforming	Not conforming	Summary comment
<i>Design</i>			
1 Design life			
2 Environmental conditions			
3 Structural strength			
4 Fatigue life			
5 Residual strength			
6 Protection against corrosion			
6.1 Coating life			
6.2 Corrosion addition			
7 Structural redundancy			
8 Watertight and weathertight integrity			
9 Human element considerations			
10 Design transparency			
<i>Construction</i>			
11 Construction quality procedures			
12 Survey during construction			
<i>In-service considerations</i>			
13 Survey and maintenance			
14 Structural accessibility			
<i>Recycling considerations</i>			
15 Recycling			

4 MODEL FORM FOR AUDIT FINDINGS

FINDINGS	
Recognized organization:	Functional requirement:
Audit date:	
Non-conformity No.:	Observation No.:
FINDINGS:	
APPLICABLE PROVISION OF THE AUDIT STANDARD:	
Auditor:	Date:
Team leader:	Date:
Recognized organization:	Date received:

RESOLUTION MSC.299(87)
(adopted on 14 May 2010)

**ADOPTION OF AMENDMENTS TO THE CODE OF SAFETY FOR
SPECIAL PURPOSE SHIPS, 2008**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution MSC.266(84), by which it adopted the Code of Safety for Special Purpose Ships, 2008 (2008 SPS Code),

NOTING the need to amend respective provisions of the Code,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the 2008 SPS Code proposed by the Sub-Committee on Ship Design and Equipment, at its fifty-third session,

1. ADOPTS amendments to the Code of Safety for Special Purpose Ships, 2008, the text of which is set out in the Annex to the present resolution;
2. DETERMINES that the said amendments should become effective on 14 May 2010.

ANNEX

AMENDMENTS TO THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008

Chapter 5 – Periodically unattended machinery spaces

- 1 Paragraph 5.1 is amended as follows:

"Special purpose ships carrying not more than 240 persons on board should comply with regulations 46 to 53 of chapter II-1 of SOLAS, as amended."

Chapter 8 – Life-saving appliances

- 2 In paragraph 8.3, the words "sail training" are inserted before the word "ship".

Annex – Form of Safety Certificate for Special Purpose Ships

Appendix – Record of Equipment for the Special Purpose Ship Safety Certificate (Form SPS)

2 – Details of life-saving appliances

- 3 In item 2.2, the reference to "section 4.6" is replaced with the reference to "section 4.5".
- 4 Item 2.3 is deleted and items 2.4, 2.5, 2.5.1 and 2.5.2 are renumbered as items 2.3, 2.4, 2.4.1 and 2.4.2, respectively.
- 5 In renumbered item 2.3, the reference to "section 4.9" is replaced with the reference to "section 4.6".
- 6 Items 6, 6.1 and 6.2 are deleted and items 7, 8, 9, 9.1, 9.2, 10, 11, 11.1 and 11.2 are renumbered as 6, 7, 8, 8.1, 8.2, 9, 10, 10.1 and 10.2, respectively.

RESOLUTION MSC.300(87)
(adopted on 17 May 2010)

**ADOPTION OF AMENDMENTS TO THE EXISTING MANDATORY
SHIP REPORTING SYSTEM "IN THE STRAIT OF GIBRALTAR" (GIBREP)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO regulation V/11 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), in relation to the adoption of ship reporting systems by the Organization,

RECALLING FURTHER resolution A.858(20) resolving that the function of adopting ship reporting systems shall be performed by the Committee on behalf of the Organization,

TAKING INTO ACCOUNT the Guidelines and criteria for ship reporting systems adopted by resolution MSC.43(64), as amended by resolutions MSC.111(73) and MSC.189(79),

[TAKING FURTHER INTO ACCOUNT that, in addition to the existing operational Tarifa Vessel Traffic Services (VTS), the newly established Tangier Vessel Traffic Services (VTS) had also become operational with effect from 4 January 2010,

HAVING CONSIDERED the recommendations of the Sub-Committee on Safety of Navigation at its fifty-fifth session,

1. ADOPTS, in accordance with SOLAS regulation V/11, the amendments to the existing mandatory ship reporting system "In the Strait of Gibraltar" (GIBREP), as given in the Annex;
2. DECIDES that the said amendments to the existing mandatory ship reporting system "In the Strait of Gibraltar" (GIBREP) will enter into force at 0000 hours UTC on 1 December 2010;
3. REQUESTS the Secretary-General to bring this resolution and its Annex to the attention of the Member Governments and Contracting Governments to the 1974 SOLAS Convention.

ANNEX

**AMENDMENTS TO THE EXISTING MANDATORY SHIP REPORTING
SYSTEM FOR THE STRAIT OF GIBRALTAR**

1 Categories of ships required to participate in the system

1.1 Ships of the following general categories are required to participate in the reporting system:

- .1 all ships of 300 gross tonnage and over;
- .2 all ships, regardless of gross tonnage, carrying hazardous and/or potentially polluting cargo, as defined in paragraph 1.4 of the Guidelines and criteria for ship reporting systems (resolution MSC.43(64));
- .3 ships engaged in towing or pushing another vessel regardless of gross tonnage;
- .4 any category of vessel less than 300 gross tonnage which is using the appropriate traffic lane or separation zone in order to engage in fishing; and
- .5 any category of ships less than 300 gross tonnage which is using the appropriate traffic separation zone in an emergency in order to avoid immediate danger.

Exemption

1.2 Recognizing that regular cross-Strait ferries, including passenger high-speed craft, generally operate according to published schedules, special reporting arrangements can be made on a ship-by-ship basis, subject to the approval of both TARIFA TRAFFIC and TANGIER TRAFFIC.

2 Geographical coverage of the system and the number and edition of the reference chart used for the delineation of the system

2.1 The reporting system will cover the area (appendix) between longitudes 005° 58'.00 W and 005° 15'.00 W. This area includes the amended traffic separation scheme "In the Strait of Gibraltar" (IMO circular COLREG.2/Circ.58).

2.2 The reference charts which include all the area of coverage for the system are Spanish Hydrographic Office 105, French marine hydro graphic and oceanographic service (SHOM) No.7042 (INT 3150), and British Admiralty chart No.142.

3 Format, content of report, times and geographical positions for submitting reports, authority to whom reports should be sent, available services

The ship report short title "GIBREP" shall be made to the ship reporting centres located at TARIFA and TANGIER. Report should be made using VHF voice transmissions.

3.1 Format

3.1.1 The information requested from ships should be provided in the standard reporting format, given in paragraph 2 of the appendix to resolution A.851(20).

3.1.2 A ship may elect, for reasons of commercial confidentiality, to communicate that section of the GIBREP ENTRY report which provides information on cargo (line P) by no-verbal means prior to entering the system.

3.2 Content

The report from a ship to the VTS should contain only information which is essential to achieve the objectives of the system:

- A – Name of the ship, call sign, IMO identification number;
- B – Date and time of event;
- C or D – Position in latitude and longitude or true bearing and distance from a clearly identified landmark;
- E – True course;
- F – Speed in knots;
- G – Port of departure;
- I – Port of destination and expected time of arrival;
- P – Cargo and quantity and if dangerous goods are on board IMO classes and quantities;
- Q or R – Defect, damage and/or deficiencies affecting the structure, cargo or equipment of the ship or any other circumstances affecting normal navigation, in accordance with the provisions of relevant IMO Conventions;
- T – Address for provision of information concerning a cargo of dangerous goods;
- W – Total number of persons on board;
- X – Miscellaneous:
 - Estimated quantity of bunker fuel and characteristics for ships carrying over 5,000 tonnes bunker fuel;
 - Navigation conditions.

Note: On receipt of a position message, operators of the VTS will establish the relation between the ship's position and the information supplied by the facilities available to them. The information on heading and speed will facilitate the VTS operator's task of identifying a ship within a group.

3.3 Geographical position for submitting report

3.3.1 Westbound traffic should report to TARIFA TRAFFIC on the Spanish coast when crossing the meridian 005°15'.00 W (appendix).

3.3.2 Eastbound traffic should report to TANGIER TRAFFIC on the Moroccan coast when crossing the meridian 005° 58'.00 W (appendix).

3.3.3 Reports to the nearer of the two shore stations should be made on departure from the limits of a port or anchorage within the coverage area, except vessels departing from Tangier-Med ports and its anchorage areas which should report to TANGIER TRAFFIC (appendix).

3.3.4 Further reports should be made to the relevant shore station whenever there is a change of navigational circumstances, particularly in relation to items Q and R of the reporting format detailed in section 3.2.

3.4 Authority

The shore-based authorities are:

- .1 The Maritime Rescue Co-ordination Centre, MRCC TARIFA (Call sign: TARIFA TRAFFIC) under the authority of the Spanish Government Search and Rescue and Maritime safety Division. The Division, administered by the Ministry of Development, is entrusted, among other responsibilities, with providing services relating to maritime search and rescue, vessel traffic services and assistance, and prevention and control of pollution of the marine environment; and
- .2 The Centre de Surveillance du Trafic Maritime de Tanger (CSTM Tanger, Call sign: TANGIER TRAFFIC) is under the authority of the Moroccan Merchant Marine Directorate. The Directorate, administered by the Ministry of Equipment and Transports, is entrusted, among other responsibilities, in cooperation with governmental bodies with providing services related to maritime search and rescue (SAR), vessel traffic services and assistance and prevention and control of pollution of the marine environment.

3.5 Services offered

3.5.1 Both TARIFA and TANGIER Centres monitor navigation in the TSS in the Strait of Gibraltar using radar and AIS.

3.5.2 Each of them provides regular information about weather and navigational condition, this information is broadcast at and on the following times and frequencies:

Station	Frequency	Broadcasting hours (U.T.C)
Tarifa (Call sign: TARIFA TRAFFIC)	VHF Ch 10	00h15; 04h15; 08h15; 12h15; 16h15; 20h15
Tangier (Call sign: TANGIER TRAFFIC)	VHF Ch 69	02h15; 06h15; 10h15; 14h15; 18h15; 22h15

3.5.3 Information broadcasts will be preceded by an announcement on VHF Ch 16 and broadcasts from both stations will end with a reminder about the time of the next broadcast and the VHF frequency on which it will be made.

3.5.4 When deemed necessary, navigational hazards, brought to the knowledge of any centre, could be broadcast at any time.

4 Information to be provided to participating ships and procedures to be followed

In addition to the general information stated above, TARIFA TRAFFIC and TANGIER TRAFFIC could provide a particular vessel with information regarding her position, course, speed and/or the identification of the traffic in her vicinity provided that it has been brought to the knowledge of the Centre. The ship should request this additional information.

5 Radiocommunication equipment required for the system, frequencies on which report should be transmitted and information to be reported

The radiocommunication equipment required for the system is that defined in the GMDSS for sea areas A1 and A2:

- .1 The ships reports can be made by voice on VHF radio using:
 - .1 channel 10 for reporting to TARIFA TRAFFIC, with the channel 67 as a supplementary option; and
 - .2 channel 69 for reporting to TANGIER TRAFFIC, with the channel 68 as a supplementary option.
- .2 In special circumstances, the hectometric wave band may also be used for the interchange of information between the ship and the VTS;
- .3 Information of commercial confidentiality may be transmitted by non-verbal means. Details are as follows:

TARIFA TRAFFIC
Fax: + 34 956 68 06 06
E-mail: tarifa@sasemar.es
Inmarsat telex: 422423126

TANGIER TRAFFIC
Fax: + 212 539 93 45 71
E-mail: tangiervts@dmm.gov.ma
Inmarsat telex: 424241310
- .4 The language used for reports in the system will be English, using the IMO Standard Marine Communication Phrases (SMCPs) where necessary or Spanish, French or Arabic, if appropriate.
- .5 Communications associated with reporting in accordance with the requirements of this system will be free of charge.

6 Rules and regulations in force in the area of the system

6.1 The International Regulations for Preventing Collisions at Sea (COLREG), 1972, as amended, are applicable throughout the area of coverage of the system.

6.2 The amended TSS "In the Strait of Gibraltar" has been approved by IMO and therefore rule 10 of the COLREGs applies.

7 Shore-based facilities to support operation of the system

7.1 Tarifa Traffic

7.1.1 Tarifa Traffic has radar, communication equipments in different bands and frequencies, VHF direction finding, AIS and DSC located in local and in remote sites to enable an appropriate coverage of the area.

7.1.2 Traffic surveillance is provided by a tracking system in which the AIS and VHF direction finding are integrated. Vessel tracks are continuously recorded and can be plotted on paper.

7.1.3 Besides, the Tarifa Traffic Centre is equipped with data processing and retrieval systems, and normal communications such as telephone, fax and e-mail terminals.

7.1.4 A continuous listening watch is kept on VHF Channel 16 and on the working channels.

7.2 Tangier Traffic

7.2.1 TANGIER VTS is an integrated system using facilities such as radars, communication equipments in different bands and frequencies, VHF direction finding, AIS and DSC located either in local site at Ras Parot and in remote site at Ras Cires in order to enable an appropriate coverage of the area.

7.2.2 TANGIER TRAFFIC system allows the simultaneous monitoring of 1,000 tracks, which can be recorded and saved. Advanced functions include alarms signalling risk scenarios, the identification of tracks infringing COLREG rules, particularly rule 10, and the monitoring of ships at anchor. All situations can be recorded, archived and replayed either on screen or in the form of printout.

7.2.3 A continuous listening watch is kept on VHF Channel 16 and on the working channels.

8 Alternative communication in case of failure of the shore-based communication facilities

8.1 The system is designed to avoid, as far as possible, any irretrievable breakdown of equipment which would hinder the functioning of the services normally provided.

8.2 The most important items of equipment and power sources are duplicated and the facilities are provided with emergency generating sets as well as with UPS units. A maintenance team, on call 24 hours a day, stands ready to repair to the extent possible any breakdowns which may occur.

8.3 If operations are jeopardized at either TARIFA TRAFFIC or TANGIER TRAFFIC, then the other centre will try to provide the service.

9 Measures to be taken if a ship fails to comply with the requirements of the system

The primary objective of the system is to facilitate the exchange of information between the ship and the shore and so support safe navigation and the protection of the marine environment. All means will be used to encourage and promote the full participation of ships required to submit reports under SOLAS regulation V/11. If reports are not submitted and the offending ship can be positively identified, then information will be passed to the relevant flag State Authorities for investigation and possible prosecution in accordance with national legislation. Information will also be made available to Port State Control Officers.

RESOLUTION MSC.301(87)
(adopted on 17 May 2010)

**ADOPTION OF AMENDMENTS TO THE EXISTING MANDATORY SHIP REPORTING
SYSTEM IN "THE WESTERN EUROPEAN
PARTICULARLY SENSITIVE SEA AREA" (WETREP)
(RESOLUTION MSC.190(79))**

THE MARITIME SAFETY COMMITTEE,

RECALLING article 28(b) of the Convention related to the creation of the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO regulation V/11 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), in relation to the adoption of ship reporting systems by the Organization,

RECALLING FURTHER resolution A.858(20), which authorizes the Committee to perform the function of adopting ship-reporting systems on behalf of the Organization,

TAKING INTO ACCOUNT the Guidelines and criteria for ship-reporting systems, adopted by resolution MSC.43(64), as amended by resolutions MSC.111(73) and MSC.189(79),

HAVING NOTED that the Marine Environment Protection Committee, at its fifty-second session, endorsed the recommendations of the Sub-Committee on Safety of Navigation at its fiftieth session and designated the Western European Waters as a Particularly Sensitive Sea Area (PSSA) by resolution MEPC.121(52),

HAVING CONSIDERED the recommendations of the Sub-Committee on Safety of Navigation at its fifty-fifth session,

1. ADOPTS, in accordance with SOLAS regulation V/11, the amendments to the existing ship-reporting system in the Western European Particularly Sensitive Sea Area as described in the Annex to this resolution;
2. DECIDES that the amendments to this mandatory ship-reporting system will enter into force at 0000 hours UTC on 1 December 2010;
3. REQUESTS the Secretary-General to bring this resolution and its Annex to the attention of Contracting Governments to the SOLAS Convention and to members of the Organization who are not parties to the Convention.

ANNEX

**AMENDMENTS TO THE EXISTING MANDATORY SHIP-REPORTING SYSTEM IN THE
WESTERN EUROPEAN PARTICULARLY SENSITIVE SEA AREA**

Annex 1 of resolution MSC.190(79):

- 1 In paragraph 6.2.5, under **Mandatory Ship Reporting Systems**, insert:
"Off the coast of Portugal"
- 2 In paragraph 6.2.6, under **Coastal Vessel Traffic Services (VTS)**, insert:
Coast of Portugal VTS

**Annex 1 of resolution MSC.190(79), Appendix 1 – Vessel Traffic Services, RCC, coast
radio stations or other facilities to whom the reports must be submitted**

- 3 Under **PORTUGAL**, entire content to be replaced by the following:

PORTUGAL

ROCA CONTROL 38° 41'.508 N 009° 17'.915 W

Tel: +351 214464838
Fax: +351 214464839
E-mail: oper.vts@imarpor.pt
VHF: 22 & 79
MMSI: 002633030

RESOLUTION MSC.302(87)
(adopted on 17 May 2010)

**ADOPTION OF PERFORMANCE STANDARDS FOR
BRIDGE ALERT MANAGEMENT**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21) on Procedure for the adoption of, and amendments to, performance standards and technical specifications, by which the Assembly resolved that the function of adoption of performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee,

RECOGNIZING the need to prepare performance standards harmonizing the priority, classification, handling, distribution and presentation of alerts, to enable the bridge team to devote full attention to the safe operation of the ship and to immediately identify any alert situation requiring action to maintain the safe operation of the ship,

RECOGNIZING ALSO that a central alert management human machine interface (CAM-HMI) for presenting alerts as individual alerts or as aggregated alerts supports the bridge team in the immediate identification of any abnormal situation, of the source and reason for the abnormal situation and in its decisions for the necessary actions to be taken,

NOTING that further guidance on the presentation of alerts is provided in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)) which is intended to provide general design guidance and to promote uniformity of type, location and priority for alerts and indicators,

HAVING CONSIDERED, at its eighty-seventh session, the recommendation made by the Sub-Committee on Safety of Navigation at its fifty-fifth session,

1. ADOPTS the Performance standards for bridge alert management, set out in the Annex to the present resolution;

2. RECOMMENDS Governments:

- .1 to encourage the use of Bridge Alert Management on the ships flying their flags;
- .2 that central alert management (CAM) and central alert management human machine interface (CAM-HMI), if installed on the bridge on or after 1 July 2014, conform to performance standards not inferior to those set out in Annex to the present resolution; and
- .3 to encourage that the general requirements of modules A and C of the performance standards set out in Annex to the present resolution are applied to relevant equipment on the bridge presenting alerts on or after 1 July 2014.

ANNEX

PERFORMANCE STANDARDS FOR BRIDGE ALERT MANAGEMENT

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Appendix 1 Definitions

Appendix 2 Guidance to equipment manufacturers for the provisions of onboard familiarization material

1 Purpose

1.1 The purpose of the bridge alert management (BAM) is to enhance the handling, distribution and presentation of alerts, applying the Guidelines on the application of SOLAS regulation V/15 to INS, IBS and bridge design (SN.1/Circ.265).

1.2 The BAM harmonizes the priority, classification, handling, distribution and presentation of alerts, to enable the bridge team to devote full attention to the safe operation of the ship and to immediately identify any alert situation requiring action to maintain the safe operation of the ship.

1.3 A central alert management human machine interface (CAM-HMI) for presenting alerts as individual alerts or as aggregated alerts supports the bridge team in the immediate identification of any abnormal situation, of the source and reason for the abnormal situation and supports the bridge team in its decisions for the necessary actions to be taken.

1.4 The BAM architecture and the acknowledgement/silencing concept specified avoid unnecessary distraction of the bridge team by redundant and superfluous audible and visual alarm announcements. It reduces the cognitive load on the operator by minimizing the information presented to which is necessary to assess the situation.

1.5 Further guidance on the presentation of alerts is provided in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)) which is intended to provide general design guidance and to promote uniformity of type, location and priority for alerts and indicators.

2 Scope

To enhance the safety of operation, these Performance standards provide requirements for the harmonized presentation and treatment of alerts on the bridge and specify a central alert management (CAM).

3 Application

3.1 Module A describes the general concept of the BAM and the presentation of alerts on the bridge equipment.

3.2 Modules B and D contain requirements for the CAM and the CAM-HMI.

3.3 Module C describes the interface requirements for BAM.

3.4 In addition to the general requirements set out in the General requirements for shipborne radio equipment performing part of the GMDSS and for electronic navigational aids (resolution A.694(17), as amended)* and the presentation requirements set out in the Performance standards for the presentation of navigation-related information on shipborne navigational displays (resolution MSC.191(79)), CAM should meet the requirements of these performance standards and follow the relevant guidelines on ergonomic principles adopted by the Organization.

3.5 If an INS is installed on the bridge it should be assured that the functionality of module C of the INS PS is included in one CAM system.

* Refer to publication IEC 60945.

3.6 In case of conflict with alert requirements of existing performance standards, the present Performance standards will take precedence.

3.7 These Performance standards should apply for all alerts presented on, and transferred to, the bridge.

4 Definitions

For the purpose of these Performance standards, the definitions in appendix 1 apply.

MODULE A – PRESENTATION AND HANDLING OF ALERTS ON THE BRIDGE

5 General

5.1 The BAM should provide:

- .1 the means used to draw the attention of the bridge team to the existence of alert situations;
- .2 the means to enable the bridge team to identify and address that condition;
- .3 the means for the bridge team and pilot to assess the urgency of different alert situations in cases where more than one alert situation has to be handled;

.4 the means to enable the bridge team to handle alert announcements; and

- .5 the means to manage all alert-related states in a distributed system structure in a consistent manner.

5.2 If practicable, there should be not more than one alert for one situation that requires attention.

5.3 As alerts can be displayed at several locations, the presentation of the alert on the bridge equipment should be consistent as far as practicable with respect to how alerts are displayed, silenced and acknowledged. The states of alerts should be consistent on the bridge.

5.4 It should be possible to provide the CAM-HMI at least on the workstation for navigating and manoeuvring, and if provided at the workstation for monitoring.

5.5 If an INS is installed on the bridge the functionality of the INS alert management HMI and the CAM-HMI should be integrated.

6 Priorities – Classification

6.1 *Priorities of alerts*

6.1.1 The BAM should distinguish between the four priorities listed:

- .1 emergency alarms;
- .2 alarms;

.3 warnings; and

.4 cautions.

6.1.2 Alerts additional to the alerts required by the Organization should be assigned to a priority level using the criteria for classification.

6.2 Criteria for classification of alerts

6.2.1 Criteria for emergency alarms:

.1 alarms which indicate that immediate danger to human life or to the ship and its machinery exists and that immediate action must be taken; and

.2 emergency alarms are specified in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)).

6.2.2 Criteria for classification of alarms:

.1 conditions requiring immediate attention and action by the bridge team to avoid any kind of hazardous situation and to maintain the safe operation of the ship; and

.2 escalation required as alarm from not acknowledged warning.

6.2.3 Criteria for classification of warnings: conditions or situations which require immediate attention for precautionary reasons, to make the bridge team aware of conditions which are not immediately hazardous, but may become so.

6.2.4 Criteria for classification of cautions: awareness of a condition which still requires attention out of the ordinary consideration of the situation or of given information.

6.3 Categories of alerts

Alerts should be separated for the alert handling into three categories of alerts:

6.3.1 Category A alerts

6.3.1.1 Category A alerts are specified as alerts where information at a task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition, e.g.:

.1 danger of collision; and

.2 danger of grounding.

Where category A alerts cannot be acknowledged at a HMI, this fact should be clearly indicated to the user.

6.3.2 Category B alerts

6.3.2.1 Category B alerts are specified as alerts where no additional information for decision support is necessary besides the information which can be presented at the CAM-HMI.

6.3.3 *Category C alerts*

Category C alerts are specified as alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alerts, e.g., certain alerts from the engine.

7 State of alerts

7.1 General

7.1.1 The presentation of alarms and warnings is defined in the Performance standards for presentation of navigation-related information on shipborne navigational displays (resolution MSC.191(79)).

7.1.2 The state of an alert should be consistently distributed and presented for the BAM and all associated displays.

7.2 Emergency alarms

The handling of emergency alarms is specified in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)).

7.3 Alarms

7.3.1 The BAM should distinguish between different alarm states:

- .1 unacknowledged alarm; and
- .2 acknowledged alarm.

7.3.2 When an alarm condition is detected, it should be indicated as unacknowledged alarm:

- .1 initiate an audible signal, accompanied by the visual alarm announcement;
- .2 provide a message of sufficient detail to enable the bridge team to identify and address the alarm condition; and
- .3 may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.

7.3.3 An unacknowledged alarm should be clearly distinguishable from those existing and already acknowledged. Unacknowledged alarms should be indicated flashing and by an audible signal.

7.3.4 The characteristics of the audible alarm signal, whether used singly or in combination with speech, should be such that there is no possibility of mistaking it for the audible signal used for a warning.

7.3.5 Means may be provided at an HMI to temporarily silence audible alarm signals, if the alert identification is provided at the HMI. If an alarm, which can be acknowledged on the bridge (categories A and B), is not acknowledged within 30 s the audible signal should start again or as specified in the equipment performance standards.

7.3.6 It should be possible to temporarily silence category C alarms. The alarm should be retriggered after a specified period of time consistent with the Code on alerts and indicators when the alarm is not acknowledged at the specified workplace (e.g., engine-room).

7.3.7 The visual indication for an unacknowledged alarm should continue until the alarm is acknowledged, unless specified otherwise in the equipment performance standards, e.g., for CPA/TCPA alerts where the visual signal can be ceased when the alarm condition is rectified.

7.3.8 The audible indication, if not temporarily silenced, for an unacknowledged alarm should continue until the alarm is acknowledged or the alarm condition is rectified. The audible signal of an unacknowledged alarm should be ceased when the alarm condition is rectified.

7.3.9 An acknowledged alarm should be indicated by a steady visual indication.

7.3.10 The visual signal for an acknowledged alarm should continue until the alarm condition is rectified.

7.4 Warnings

7.4.1 The BAM should distinguish between different warning states:

- .1 unacknowledged warning; and
- .2 acknowledged warning.

7.4.2 When a warning condition is detected, it should be indicated as unacknowledged warning:

- .1 initiate a momentarily audible signal, accompanied by the visual warning announcement;
- .2 provide a message of sufficient detail to enable the bridge team to identify and address the warning condition; and
- .3 may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.

7.4.3 An unacknowledged warning should be clearly distinguishable from those existing and already acknowledged. Unacknowledged warnings should be indicated flashing and by an audible signal.

7.4.4 The characteristics of the momentarily audible warning signal, whether used singly or in combination with speech, should be such that there is no possibility of mistaking it for the audible signal used for an alarm.

7.4.5 The visualization for an unacknowledged warning should continue until the warning is acknowledged, unless specified otherwise in the equipment performance standards where the visual indication can be ceased when the alarm condition is rectified.

7.4.6 An acknowledged warning should be indicated by a steady visual indication.

7.4.7 The visual indication for an acknowledged warning should continue until the warning condition is rectified.

7.5 Cautions

7.5.1 A caution should be indicated by a steady visual indication. No acknowledgement should be necessary for a caution.

7.5.2 A caution should be automatically removed after the condition is rectified.

7.5.3 A message should be provided of sufficient detail to enable the bridge team to identify and address the caution condition.

7.6 Alert escalation

7.6.1 The alert escalation should be compliant with the alert escalation requirements of the individual performance standards.

7.6.2 An unacknowledged warning should be:

- .1 repeated as a warning after a limited time period not exceeding 5 min; or
- .2 changed to alarm priority after a limited time period not exceeding 5 min; or
- .3 changed to alarm priority after a user selectable time not more than 5 min, if provided; or
- .4 changed to alarm priority, as required by specific requirements for the individual equipment and system.

8 Presentation of alerts on the bridge

8.1 The alert messages should be completed with aids for decision-making, as far as practicable.

8.2 Audible annunciation of category A should only occur at the task station, system or sensor directly assigned to the function generating the alert.

8.3 The audible annunciation of category B and C alerts should be duplicated at the CAM-HMI.

MODULE B – CENTRAL ALERT MANAGEMENT FUNCTIONALITY

9 Central alert management human machine interface (CAM-HMI)

9.1 All alerts should be displayed on the CAM-HMI either as individual alerts or as aggregated alerts.

- 9.2 The CAM-HMI should offer the possibility to display aggregated alerts.
- 9.3 The CAM-HMI should provide the means to announce and indicate alerts to draw the attention of the bridge team.
- 9.4 The CAM-HMI should have the capability to duplicate the audible alert annunciation of the individual equipment and displays installed on the bridge for category B and C alerts.
- 9.5 The CAM-HMI should allow for easy identification of alerts, and the enabling of immediate identification of the alert releasing function or sensor/source.
- 9.6 The CAM-HMI should be designed that alert messages of the different priorities are clearly distinguishable from each other.
- 9.7 The alert messages should be completed with aids for decision-making, as far as practicable. An explanation or justification of an alert should be available on request.
- 9.8 The CAM-HMI should enable an immediate acknowledgement of individual alarms and warnings by a single operator action for category B alerts.
- 9.9 It should only be possible to acknowledge alarms and warnings individually.
- 9.10 It should be possible to temporarily silence all audible alert signals with a single operator action at the CAM-HMI.
- 9.11 The CAM-HMI should be able to display at least 20 recent alerts at the same time.
- 9.12 If the CAM-HMI is such that it can not display all alerts simultaneously requiring the bridge team's attention, then there should be a clear and unambiguous indication that there are additional alerts requiring attention.
- 9.13 It should be possible to display the additional alerts by a single operator action.
- 9.14 It should be possible to return to the display containing the highest priority alerts by a single operator action.
- 9.15 When information other than the list of active alerts (e.g., the alert history list, configurations) is presented, then it should still be possible to see the appearance of new alerts.
- 9.16 As default, the alerts should be presented grouped in order of priority. Within the priorities the alerts should be displayed in the order in which they occur (sequence). Additionally, alerts may be presented in functional groups.

9.17 Aggregated alerts

9.17.1 Aggregated alerts may be provided.

9.17.2 As the handling of aggregated alerts requires more user operations and time to obtain the necessary information alerts required by the Organization for presentation on the bridge should only be aggregated to combine multiple individual alerts of the same kind to provide one alert at the CAM-HMI for which individual presentation is anyway necessary at alert releasing task station or system.

9.17.3 Alerts presented on the bridge which are not required by the Organization may be aggregated for presentation on the CAM-HMI, according to the requirements in these performance standards.

9.17.4 Only alerts of the same priority should be combined in one aggregated alert.

9.17.5 It should not be possible to acknowledge aggregated alerts unless otherwise specified by the Organization.

9.17.6 It should be possible to temporarily silence aggregated alerts.

9.17.7 Individual alerts should not trigger more than one aggregated alert.

9.17.8 Each additional new individual alert has to retrigger the aggregated alert.

9.17.9 If required by the Organization to be displayed as individual alert, alerts should not be aggregated.

9.18 Alert history list

9.18.1 An operator accessible alert history list should be provided by the CAM-HMI.

9.18.2 When an alert is no longer active the message should be kept with its entire content in an alert history list, with the date and time the alert was raised, acknowledged and rectified.

9.18.3 The messages of the alert history list should be displayed in chronological order.

9.18.4 Access to the alert history list and return to the active alert display should be possible by a simple operator action.

9.18.5 The system should provide a clear and unambiguous indication when the alert history list is being accessed and displayed.

9.18.6 The CAM-HMI should support the search and identification of alerts in the alert history list.

9.18.7 For the purpose of onboard "trouble shooting" it should be possible to keep the content of the alert history list at least for 24 h.

9.18.8 If an INS is installed, the functionality of INS may be extended to include the alert history functionality.

10 Functional aspects of CAM

10.1 The CAM should handle alert information for presentation on the CAM-HMI, including priority, state.

10.2 Alert information, including priority, state should be distributed to appropriate functions and equipment carrying out further processing or presentation (e.g., CAM-HMI).

10.3 The presentation of the alert on the bridge equipment should be consistent as far as practicable with respect to how alerts are displayed. Before presentation of an alert on any HMI it should be checked wherever possible, whether the functions and equipment may have

the ability to evaluate and process the alert with additional knowledge, regarding its presentation, priority, and state. If this functionality is provided the CAM should support this further processing. The presentation of an alert should take place after the result of the processing could have been taken into consideration. For INS, the requirements are specified in paragraph 21 of the Performance standards for integrated navigation systems (INS) (resolution MSC.252(83)).

10.4 Only one CAM should be active on the bridge at any one time, but it is allowed to display and operate the information on multiple CAM-HMIs. The CAM functions may be centralized or partly centralized in subsystems and interconnected via a standardized alert-related communication.

11 Back-up and redundancies

11.1 The system configuration should allow one of the two possibilities for the layout of the back-up and redundancy functionality for the CAM, CAM-HMI:

- .1 in case of a failure of the CAM-HMI, it should be ensured that the connected systems present their alerts individually (a system failure of the CAM-HMI functionality should not lead to the loss of the alert announcement functionality); and
- .2 or, if functionality from systems and equipment is transferred to the CAM and CAM-HMI, a back-up should be provided. The back-up arrangement should enable a safe takeover of CAM functionality and ensure that a CAM failure does not result in a critical situation. The power supply of the back-up arrangement solution should be resistant against single failures.

11.2 In case of a breakdown of one task station, at least one other task station should be able to take over the CAM-HMI task.

12 System failures and fallback arrangements

12.1 System failures should be alerted according to these performance standards.

12.2 Loss of system communication between the CAM and connected systems should be indicated as a warning at the CAM-HMI. The alerts from the systems where the communication is lost should be removed from the list of active alerts on the CAM-HMI. After reactivation of the communication all active alerts should be displayed again.

12.3 A system failure of the CAM or the loss of system communication between the CAM and the connected systems should not lead to the loss of the alert announcement functionality of the individual functions.

MODULE C – INTERFACING

13 Interfacing

13.1 *Interfacing requirements for alert-related communication*

13.1.1 The communication protocol should allow the implementation of the functions described in these standards.

13.1.2 The alert-related communication should follow a standardized concept to provide the following functions and operations:

- .1 unique identification of an alert divided into cluster, function, alert code, time;
- .2 distribution of alerts with its priority, state and text information;
- .3 distribution of acknowledgement, silencing and other commands for alerts from different locations, including operator input and results of system processing;
- .4 transmission of aggregated alerts with relevant information (e.g., number of alerts aggregated);
- .5 proper reconnection after disconnection or power down at any time and in any alert condition with a result of a consistent alert presentation within recovery time; and
- .6 standardized communication should be used. Individual subsystems may use an alternative internal concept.

13.2 Connection to the ship's power supply

13.2.1 The CAM should be supplied from both the main and the emergency source of electrical power with automated changeover through a local distribution board with provision to preclude inadvertent shutdown.

13.2.2 After an electrical power failure the system should restart automatically when the power is restored.

MODULE D – SYSTEM AND EQUIPMENT DOCUMENTATION

14 Manuals

14.1 Operating manuals should include:

- .1 an overall description of the CAM functionality;
- .2 a description of the redundancy concept; and
- .3 a description of possible failures and their effects on the system (e.g., by using part of the failure analysis).

14.2 The installation manuals should include adequate information to allow the installation of an alert management so that it can meet all requirements adopted by the Organization.

14.3 The installation manuals should include the following:

- .1 interconnection diagrams and interfacing details for connected systems and sensors;

- .2 instructions for the installation and connection of facilities including the BNWAS; and
- .3 the details of the power supply arrangements.

15 Information regarding system configuration for surveyor

Manufacturer or system integrator of CAM should declare the following information relating to the system configuration, if applicable:

- .1 basic system configuration;
- .2 data flow schematic diagram and its interpretation; and
- .3 back-up and redundancy arrangement.

16 Failure analysis

A failure analysis, at functional level, should be performed and documented for the CAM. The failure analysis should verify that a failure of the CAM should not affect the functionality of the connected systems and sensors including their alert announcement functionality.

17 Guidance to equipment manufactures for the provision of onboard familiarization material

Material enabling onboard familiarization training should be provided for the CAM. The onboard familiarization material should explain configurations, functions, limitations, controls, displays, alerts and indications. Furthermore, the onboard familiarization material should explain the results of operational actions as acknowledgement, silencing for the CAM-HMI and the connected systems. Guidance and recommendations to the equipment manufacturers for the provision of onboard familiarization material are given in appendix 2.

Appendix 1

Definitions

Aggregated alert	Alert indicating the existence of multiple individual alerts.
Aggregation	Combination of individual alerts to provide one alert (one alert represents plenty of individual alerts).
Alarm	An alarm is a high-priority alert. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship.
Alert	Alerts are announcing abnormal situations and conditions requiring attention. Alerts are divided in four priorities: emergency alarms, alarms, warnings and cautions. An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.
Alert announcements	Visual and acoustical presentation of alerts.
Alert history list	Accessible list of past alerts.
Alert management	Concept for the harmonized regulation of the monitoring, handling, distribution and presentation of alerts on the bridge.
Bridge Alert Management (BAM)	Overall concept for management, handling and harmonized presentation of alerts on the bridge.
Central Alert Management (CAM)	Functionality for the management of the presentation of alerts on the CAM-HMI, the communication of alert states between CAM-HMI and navigational systems and sensors. The functions may be centralized or partly centralized in subsystems and interconnected via a standardized alert-related communication.
Category A alerts	Alerts for which graphical information at the task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition.

Category B alerts	Alerts where no additional information for decision support is necessary besides the information which can be presented at the CAM-HMI.
Category C alerts	Alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alert.
Caution	Lowest priority of an alert. Awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information.
Central alert management HMI (CAM-HMI)	Human machine interface for presentation and handling of alerts on the bridge.
Cluster	Group of functions on a high level, e.g., navigation, automation.
Emergency alarm	Highest priority of an alert. Alarms which indicate immediate danger to human life or to the ship and its machinery exists and require immediate action.
Failure analysis	The logical, systematic examination of an item, including its diagrams or formulas, to identify and analyse the probability, causes and consequences of potential and real failures.
Grouping	Arrangement of alerts in terms of their function or priority.
Human machine interface (HMI)	The part of a system an operator interacts with. The interface is the aggregate of means by which the users interact with a machine, device, and system (the system). The interface provides means for input, allowing the users to control the system and output, allowing the system to inform the users.
Individual alerts	Alerts announcing one abnormal situation and condition requiring attention.
Multifunction display	A single visual display unit that can present, either simultaneously or through a series of selectable pages, information from more than a single function.

Simple operator action

A procedure achieved by no more than two hard-key or soft-key actions, excluding any necessary cursor movements, or voice actuation using programmed codes.

Single operator action

A procedure achieved by no more than one hard-key or soft-key action, excluding any necessary cursor movements, or voice actuation using programmed codes.

Task station

Multifunction display with dedicated controls providing the possibility to display and operate any tasks. A task station is part of a workstation.

Warning

Condition requiring immediate attention, but no immediate action by the bridge team. Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.

Appendix 2

Guidance to equipment manufacturers for the provision of onboard familiarization material

1 General

1.1 It is a requirement of the International Safety Management Code (ISM) that personnel working on assignments related to safety and the protection of the environment need to be given proper familiarization with their duties.

1.2 To assist with this process it is required that the equipment manufacturer or system integrator provides suitable training material that may be used by the ship operator as a basis for onboard familiarization of users.

1.3 The intention of the familiarization material is that it should give a rapid means of understanding the configuration of the bridge alert management, the presentation of alerts on the CAM-HMI and its method of operation.

1.4 The material should be organized such that it represents the actual equipment and configuration that is fitted to the ship.

2 Onboard familiarization

2.1 The aim of familiarization training is to explain the functionality of the CAM and the CAM-HMI.

2.2 It should allow an OOW to become rapidly acquainted with the installed system.

2.3 Emphasis should be given on producing effective familiarization training that can be completed in the shortest possible time.

2.4 For a typical system it may be expected that it will take no longer than 30 minutes for an OOW to undertake familiarization. This time does not include the time taken to become familiar with major interconnected functionality, such as radar and ECDIS.

2.5 Familiarization can take a number of forms. The following are illustrative examples but other effective methods of training are acceptable:

- .1 computer-based training on the vessel. Such training may also be appropriate to be used remotely (e.g., on a notebook computer of a new user, prior to joining the ship);
- .2 a training mode on the fitted systems;
- .3 a training video (on tape, disk or solid state memory), supported by a self-training manual; and
- .4 a stand-alone self-training manual.

2.6 The topics that need to be covered are listed in section 3 below.

2.7 The familiarization material does not replace the User Instruction Manual. Appropriate references can be made to it from within the material. This may be beneficial when describing more detailed operations or to reference large diagrams.

2.8 For lesser used, non-critical functions it is only necessary to reference the relevant section in the User Instruction Manual, rather than them having to be included in their entirety in the familiarization material. Ideally, material is provided for such functions but with instructions to enable the user to skip these sections, as appropriate, until a more convenient opportunity.

3 Familiarization training framework

3.1 General description

3.1.1 This should start with a system overview and a top-level functionality description.

3.1.2 A description should be given of a BAM configuration, including CAM-HMI and possible connected equipment. This description should be supported by a block diagram.

3.1.3 The general philosophy of presentation of alerts and user actions (e.g., acknowledgement, silencing) for the BAM should be explained, including a description of the CAM-HMI.

3.1.6 The back-up and redundancy concept for CAM, CAM-HMI should be explained.

3.2 Detailed operation

3.2.1 The functionality of the CAM-HMI should be described.

3.2.2 Where appropriate, the following should be included:

- .1 description of functions;
- .2 description of menu structure and displayed information;
- .3 description of operator controls; and
- .4 description how to configure the user-modifiable presentation preferences.
The method to rapidly revert to defaults configurations.

3.2.3 Instructions on setting basic display controls such as brightness, contrast, colour and day/night colour schemes should be given.

RESOLUTION MSC.303(87)
(adopted on 17 May 2010)

**ASSURING SAFETY DURING DEMONSTRATIONS, PROTESTS OR CONFRONTATIONS
ON THE HIGH SEAS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

CONSIDERING THAT the safety of vessels¹, crew and other persons on board such vessels on the high seas is of paramount importance to the Organization and its Member States and has long been the common interest of nations worldwide,

AFFIRMING the rights and obligations relating to legitimate and peaceful forms of demonstration, protest or confrontation and noting that there are international instruments that may be relevant to these rights and obligations,

BEARING IN MIND that the Organization does not condone any actions that intentionally imperil human life, the marine environment or property,

SERIOUSLY CONCERNED that demonstrations, protests or confrontations involving vessels on the high seas may affect or compromise the safety and security of such vessels and may lead to incidents that cause a risk to human life, the marine environment or property,

RECOGNIZING the need to cooperate, as appropriate, in accordance with relevant rules of international law and respective domestic laws and regulations, to ensure that actions that intentionally imperil human life, the marine environment or property are adequately addressed,

RECALLING FURTHER that the Organization has adopted important instruments directed at the safety and security of vessels, crew and other persons on those vessels including in particular the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG), as amended, which sets uniform rules and principles for avoiding collisions at sea; the International Convention for the Safety of Life at Sea, 1974 (SOLAS) as amended, in particular chapter V pertaining to safety of navigation and chapter XI/2 pertaining to special measures to enhance maritime safety and security; the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988 and its Protocol for the Suppression of Unlawful Acts against Fixed Platforms Located on The Continental Shelf (the SUA Convention and its 1988 Protocol), relating to international cooperation for the prevention of unlawful acts against the safety of maritime navigation and platforms, and actions against alleged offenders; and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, which has provisions pertaining to watchkeeping arrangements,

¹

The term "vessel" used in this resolution is meant to be interpreted in the broadest manner possible and includes definitions in applicable IMO instruments of "ship" and "vessel".

RECALLING ALSO the relevant provisions of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and of customary international law of the sea related to activities of vessels on the high seas,

HAVING CONSIDERED, at its eighty-seventh session, the recommendations of the Sub-Committee on Safety of Navigation and the Sub-Committee on Flag State Implementation,

1. RECALLS AND REAFFIRMS the importance of safety of vessels, crew and other persons on board such vessels;

2. CONDEMNS any actions that intentionally imperil human life, the marine environment, or property during demonstrations, protests or confrontations on the high seas;

3. CALLS UPON Governments to urge:

.1 persons and entities under their jurisdiction to refrain from actions that intentionally imperil human life, the marine environment, or property during demonstrations, protests or confrontations on the high seas;

.2 all vessels entitled to fly their flag to comply with the applicable instruments adopted by this Organization directed at safety of navigation, security and safety of life at sea;

.3 all vessels, during demonstrations, protests or confrontations on the high seas, to comply with COLREG and SOLAS by taking all steps to avoid collisions and safeguard navigation, security and safety of life at sea; and

.4 all vessels, during demonstrations, protests or confrontations on the high seas, to conduct their radio communications in accordance with the International Telecommunication Union Radio Regulations;

4. ALSO CALLS UPON Governments to take such measures as may be necessary to establish jurisdiction over any offences set forth in the SUA Convention and its 1988 Protocol;

5. FURTHER CALLS UPON Governments, consistent with international law and their domestic laws and regulations, to conduct inquiries into every marine casualty or incident of navigation on the high seas that imperils safety of vessels, crew or other persons on board such vessels that involve a vessel entitled to fly their flag;

6. ENCOURAGES Governments, consistent with international law and their domestic laws and regulations, to cooperate, as appropriate, to ensure that actions that intentionally imperil human life, the marine environment or property on the high seas are adequately addressed;

7. REQUESTS Governments to bring this resolution to the attention of all entities concerned, in particular those that might be involved during demonstrations, protests or confrontations on the high seas.

RESOLUTION MSC.304(87)
(adopted on 14 May 2010)

**ADOPTION OF AMENDMENTS TO THE CODE OF PRACTICE FOR THE SAFE LOADING
AND UNLOADING OF BULK CARRIERS (BLU CODE)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning functions of the Committee,

RECALLING ALSO resolution A.862(20), by which the Assembly, at its twentieth session, adopted the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code), as further amended by resolution MSC.238(82);

NOTING that the Assembly requested the Committee to keep the Code under review and amend it as may be necessary,

RECOGNIZING the need to amend the Code in view of the envisaged mandatory application of the International Maritime Solid Bulk Cargoes Code,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the BLU Code prepared by the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers, at its fourteenth session,

1. ADOPTS the amendments to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers, the text of which is set out in the Annex to the present resolution;
2. DETERMINES that the above-said amendments should become effective on 1 January 2011.

ANNEX

**AMENDMENTS TO THE CODE OF PRACTICE FOR THE SAFE LOADING AND
UNLOADING OF BULK CARRIERS (BLU CODE)**

**Section 1
Definitions**

1 The following new paragraph 1.2 is inserted after the existing paragraph 1.1:

"1.2 *Bulk Cargo Shipping Name (BCSN)* identifies a bulk cargo during transport by sea. When a cargo is listed in the IMSBC Code, the Bulk Cargo Shipping Name of the cargo is identified by capital letters in the individual schedules or in the index. When the cargo is a dangerous good, as defined in the International Maritime Dangerous Goods (IMDG) Code, as defined in regulation VII/1.1 of the SOLAS Convention, the Proper Shipping Name of that cargo is the Bulk Cargo Shipping Name.",

and existing paragraphs 1.2, 1.3 and 1.4 are renumbered as 1.3, 1.4 and 1.5, respectively.

2 The following new paragraph 1.6 is inserted after renumbered paragraph 1.5:

"1.6 *IMSBC Code* means the International Maritime Solid Bulk Cargoes Code as defined in regulation VI/1.1 of the SOLAS Convention.",

and existing paragraphs 1.5, 1.6 and 1.7 are renumbered as 1.7, 1.8 and 1.9, respectively.

3 The following new paragraph 1.10 is inserted after renumbered paragraph 1.9:

"1.10 *Solid bulk cargo* means any cargo, other than a liquid or a gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.",

and existing paragraphs 1.8, 1.9, 1.10 and 1.11 are renumbered as 1.11, 1.12, 1.13 and 1.14, respectively.

**Section 3
Procedures between ship and shore prior to the ship's arrival**

4 The existing subparagraph .3 of paragraph 3.2.2 is replaced by the following:

".3 nature and stowage of cargo already on board and, when solid bulk cargoes are on board, the Bulk Cargo Shipping Name (BCSN), the IMSBC Code Class and UN Number, when applicable."

**Section 5
Cargo loading and handling of ballast**

5 In paragraph 5.1.4, the words "IMO Code of Safe Practice for Solid Bulk Cargoes (BC Code)" are replaced by the words "IMSBC Code".

Appendix 4

Guidelines for completing ship/shore safety check list

6 In paragraph 12, the words "IMO BC Code" are replaced by the words "IMSBC Code".

7 In paragraph 17, the words "BC Code" are replaced by the words "IMSBC Code".

Appendix 5

Form for cargo information (recommended layout)

8 The recommended Form for cargo information is replaced with the recommended form in section 4.2.3 of the IMSBC Code.



Ref: T2-0SS/2.7

SN.1/Circ.265
19 October 2007

**GUIDELINES ON THE APPLICATION OF SOLAS REGULATION V/15
TO INS, IBS AND BRIDGE DESIGN**

1 The Maritime Safety Committee (MSC), at its eighty-third session (3 to 12 October 2007), recognizing the importance of Guidelines on the application of SOLAS regulation V/15 to INS, IBS and bridge design, to be taken into account by designers and system integrators, approved the Guidelines on the application of SOLAS regulation V/15 to INS, IBS and bridge design prepared by the Sub-Committee on Safety of Navigation (NAV), at its fifty-third session, as set out in the annex.

2 Member Governments are invited to bring the annexed guidelines to the attention of designers, manufactures and all other parties concerned.

ANNEX

GUIDELINES ON THE APPLICATION OF SOLAS REGULATION V/15 TO INS, IBS AND BRIDGE DESIGN

1 Purpose

SOLAS regulation V/15 requires that the design and arrangement of navigation systems and equipment on the bridge facilitate the tasks to be performed by the bridge team and the pilot and promote safe and effective Bridge Resource Management (BRM). The purpose of this document is to identify the needs of the bridge team and the pilot and the BRM principles that should be taken into account in the design and arrangement of INS, IBS and for bridge design for the installation of INS and IBS on the bridge.

2 Application

2.1 These guidelines should be taken into account by designers and system integrators designing and installing INS and IBS systems on board, for bridge design and installation of navigation equipment. The guidelines should also be taken into account in the development of performance standards.

3 Definitions

System Unless otherwise noted or clear from the context of the statement, the term “system” used in this document means either an INS and/or an IBS.

4 General

4.1 The system should facilitate the tasks to be performed by the bridge team and pilot in navigating the ship safely under all operational conditions. The physical arrangement of the systems on the bridge and presentation of information should permit observation or monitoring by all members of the bridge team and pilot.

4.2 The system should avoid the potential for a single-person failure during operation and should minimize the risk of human error by facilitating monitoring and cross checks between members of the bridge team and pilot and to conduct supervision of operator interaction with the system.

4.3 The system and its physical arrangement should facilitate the bridge team and pilot in maintaining a full appraisal of the situation by both observing information provided by the system and validating that information by actual observation of the surrounding environment.

4.4 The system and its physical arrangement should promote safe and effective exchange of information amongst the members of the bridge team and with pilots.

4.5 The system and its physical arrangements should comply with appropriate ergonomic standards, e.g., Guidelines on Ergonomic Criteria for Bridge Equipment and Layout, MSC/Circ.982.

5 Support to tasks

5.1 The system should have the capability of allowing the operator to decline or override the automated ship control functions at any time or intervene part way through a process by means of a simple operator action.

5.2 Recognizing that the bridge team and pilot are required to use 'any means available' to safely navigate the ship including visual position fixing and lookout as well as communications with external sources of information such as other traffic and VTS stations, the design of the system should therefore support the use of all means and their correlation.

5.3 The system and its physical arrangement should enable the bridge team and pilot to conn (i.e., direct the movement of) the ship by verbal instructions from any position on the bridge while still having access to heading, rudder or azipod angle, and propeller RPM or pitch and, if available, rate-of-turn information.

5.4 The system should support procedures and actions to address failure modes and default to manual controls on failure of automated ship control functions.

5.5 The system should be designed so that its operation minimizes distraction on the bridge that may interfere with the vigilance of the bridge team and the pilot. The focus should be on handling the ship rather than on operating the system.

5.6 The workload involved in navigation tasks employing the system should be analysed and tested during the design phase. Complex or error-prone interaction with the system should be avoided in its design.

5.7 The system should support the bridge team and the pilot in navigating the ship safely under all operational conditions. All conditions should be considered in design tasks such as failure analysis, task analysis, user interface design, etc. During design, functional and operational testing or analysis should be conducted.

5.8 The system and its physical arrangement should support team working, including the assignment of tasks among the bridge team and pilot.

5.9 All navigation and watch keeping tasks required by the STCW, SOLAS, and COLREGs, as appropriate, should be considered in the system design phase. The usability of the system and its arrangement, when employed for such tasks should be assessed during functional and operational analysis and tests.

6 Human error prevention and detection

6.1 User inputs and commands related to ship control should be displayed so that all members of the bridge team and the pilot are able to monitor and detect single-person errors.

6.2 The system should provide means to rapidly correct erroneous inputs or commands related to ship control. Wherever possible, an "undo" function should be provided.

6.3 The system should provide checks in the human-machine interface dialogue and in the user input handling to prevent erroneous data or control inputs.

7 Traffic awareness

7.1 The system and its physical arrangement should facilitate effective lookout by visual, audible and electronic means under all conditions.

7.2 The system and its physical arrangement should provide means to acquire and maintain timely and accurate situational awareness of current and projected traffic conditions.

8 Operational mode awareness

8.1 The system and its physical arrangement should provide convenient and continuous access to essential information such as heading, rudder or azipod angle, and propeller RPM or pitch and, if available, rate-of-turn for both the bridge team and the pilot to information necessary for the safe navigation. If any auxiliary or separate console or workstation is provided for the pilot, it should provide the same quality and quantity of navigation information needed by the pilot as the main console or workstation.

8.2 The system should continuously indicate to the bridge team and pilot the system operating modes currently in use and provide simple access to other available operating modes.

8.3 The system should indicate failures in a clear and unambiguous manner to enable the bridge team and pilot to understand the nature of the failure.

8.4 Information should be presented consistently within and between different subsystems. Standardized information presentation, symbols, abbreviations and coding should be used according to resolution MSC.191(79).

8.5 Where standardized symbols are not available, information, symbols and coding should be visually representative and should be consistent with established information presentation, symbols and coding. The used symbols should not conflict with the symbols specified in SN/Circ.243. Any inconsistencies that might cause confusion or errors should be avoided.



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MSC.1/Circ.1343

2 June 2010

**GUIDELINES FOR THE INFORMATION TO BE INCLUDED IN A
SHIP CONSTRUCTION FILE**

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), approved the Guidelines for the information to be included in a Ship Construction File, set out in the annex, aiming at providing additional guidance on the application of the requirements in SOLAS regulation II-1/3-10.

2 Member Governments are invited to bring the annexed Guidelines to the attention of shipowners, operators, shipmasters, shipyards, recognized organizations and other parties involved in building, repairing, surveying and inspecting bulk carriers and oil tankers.

ANNEX

GUIDELINES FOR THE INFORMATION TO BE INCLUDED IN A SHIP CONSTRUCTION FILE

1 Purpose

The aim of these Guidelines is to provide additional guidance on the content of the Ship Construction File (SCF) to be provided upon delivery of new bulk carriers and oil tankers in accordance with SOLAS regulation II-1/3-10.4, kept on board the ship and/or ashore and updated as appropriate throughout the ship's life in order to facilitate safe operation, maintenance, survey, repair and emergency measures. It is to be noted that parts of the content of the SCF may be subject to various degrees of restricted access and that such documentation may be appropriately kept ashore as indicated in these Guidelines.

2 Definition

Tier II items means the functional requirements included in the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by resolution MSC 287(87).

3 Scope of information

3.1 The SCF should include the list of documents constituting the SCF and all information listed in the annex, which is required for a ship's safe operation, maintenance, survey, repair and in emergency situations. Details of specific information that is not considered to be critical to safety might be included directly or by reference to other documents.

3.2 When developing an SCF, all of the columns in the table annexed to these Guidelines should be reviewed to ensure that all necessary information has been provided.

3.3 It may be possible to provide information listed in the annex under more than one Tier II functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC^{*} is relevant for both "Coating life" and "Survey during construction".

4 Availability and storage

The SCF should remain with the ship and, in addition, be available to its classification society and flag State throughout the ship's life. Where information not considered necessary to be on board is stored ashore, procedures to access this information should be specified in the onboard SCF. The intellectual property provisions within the SCF should be duly complied with.

5 Updates

The SCF should be updated throughout the ship's life at any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structure.

*

Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

APPENDIX

LIST OF INFORMATION TO BE INCLUDED IN THE SHIP CONSTRUCTION FILE (SCF)

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
DESIGN					
1	Design life	<ul style="list-style-type: none"> assumed design life in years 	<ul style="list-style-type: none"> statement or note on midship section 	<ul style="list-style-type: none"> SCF-specific midship section 	<p>on board ship</p> <p>on board ship</p>
2	Environmental conditions	<ul style="list-style-type: none"> assumed environmental conditions 	<ul style="list-style-type: none"> statement referencing data source or Rule (specific rule and data) or; in accordance with Rule (date and revision) 	<ul style="list-style-type: none"> SCF-specific 	<p>on board ship</p>
3	Structural strength				
3.1	General design	<ul style="list-style-type: none"> applied Rule (date and revision) applied alternative to Rule 	<ul style="list-style-type: none"> applied design method alternative to Rule and subject structure(s) 	<ul style="list-style-type: none"> SCF-specific capacity plan 	<p>on board ship</p> <p>on board ship</p>
3.2	Deformation and failure modes	<ul style="list-style-type: none"> calculating conditions and results; <ul style="list-style-type: none"> assumed loading conditions operational restrictions due to structural strength 	<ul style="list-style-type: none"> allowable loading pattern maximum allowable hull girder bending moment and shear force 	<ul style="list-style-type: none"> loading manual 	<p>on board ship</p>
3.3	Ultimate strength		<ul style="list-style-type: none"> maximum allowable cargo density or storage factor 	<ul style="list-style-type: none"> trim and stability booklet 	<p>on board ship</p>
3.4	Safety margins	<ul style="list-style-type: none"> strength calculation results 	<ul style="list-style-type: none"> bulky output of strength calculation 	<ul style="list-style-type: none"> loading instrument instruction manual operation and maintenance manuals strength calculation 	<p>on board ship</p> <p>on shore archive</p>

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
		<ul style="list-style-type: none"> gross hull girder section modulus minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life gross scantlings of structural constituent parts net scantlings of structural constituent parts hull form 	<ul style="list-style-type: none"> plan showing highly stressed areas prone to yielding and/or buckling structural drawings rudder and stern frame structural details of typical members hull form information indicated in key construction plans hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations 	<ul style="list-style-type: none"> areas prone to yielding and/or buckling general arrangement key construction plans rudder and rudder stock structural details yard plans dangerous area plan lines plan <p>or equivalent</p>	<p>on board ship</p> <p>on board ship</p> <p>on board ship</p> <p>on board ship</p> <p>on board ship</p> <p>on shore archive</p> <p>on board ship</p> <p>on shore archive</p> <p>on board ship</p>
4	Fatigue life	<ul style="list-style-type: none"> applied Rule (date and revision) applied alternative to Rule calculating conditions and results; assumed loading conditions fatigue life calculation results 	<ul style="list-style-type: none"> applied design method alternative to Rule and subject structure(s) assumed loading conditions and rates bulky output of fatigue life calculation 	<ul style="list-style-type: none"> SCF-specific structural details fatigue life calculation 	<p>on board ship</p> <p>on board ship</p> <p>on shore archive</p>

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
			<ul style="list-style-type: none"> plan showing areas prone to fatigue 	<ul style="list-style-type: none"> areas prone to fatigue 	on board ship
5	Residual strength	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> SCF-specific 	on board ship
6	Protection against corrosion				
6.1	Coating life	<ul style="list-style-type: none"> coated areas and target coating life and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces gross scantlings of structural constituent parts net scantlings of structural constituent parts 	<ul style="list-style-type: none"> plans showing areas prone to excessive corrosion 	<ul style="list-style-type: none"> SCF-specific 	on board ship
6.2	Corrosion addition			<ul style="list-style-type: none"> Coating Technical File required by PSPC* areas prone to excessive corrosion 	on board ship
				<ul style="list-style-type: none"> key construction plans 	on board ship
7	Structural redundancy	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> SCF-specific 	on board ship

* Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
8	Watertight and weathertight integrity	<ul style="list-style-type: none"> applied Rule (date and revision) key factors for watertight and weathertight integrity 	<ul style="list-style-type: none"> details of equipment forming part of the watertight and weathertight integrity 	<ul style="list-style-type: none"> SCF-specific structural details of hatch covers, doors and other closings integral with the shell and bulkheads 	<p>on board ship</p> <p>on board ship</p>
9	Human element considerations	<ul style="list-style-type: none"> list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship 		<ul style="list-style-type: none"> SCF-specific 	on board ship
10	Design transparency	<ul style="list-style-type: none"> applied Rule (date and revision) applicable industry standards for design transparency and IP protection reference to part of SCF information kept ashore 		<ul style="list-style-type: none"> intellectual property provisions summary, location and access procedure for part of SCF information on shore 	<p>on board ship</p> <p>on board ship</p>
CONSTRUCTION					
11	Construction quality procedures	<ul style="list-style-type: none"> applied construction quality standard 	<ul style="list-style-type: none"> recognized national or international construction quality standard 	<ul style="list-style-type: none"> SCF-specific 	on board ship
12	Survey during construction	<ul style="list-style-type: none"> survey regime applied during construction (to include all owner and class scheduled inspections during construction) information on non-destructive examination 	<ul style="list-style-type: none"> applied Rules (date and revision) copies of certificates of forgings and castings welded into the hull 	<ul style="list-style-type: none"> SCF-specific tank testing plan non-destructive testing plan Coating Technical File required by PSPC 	<p>on board ship</p> <p>on board ship</p> <p>on board ship</p> <p>on board ship</p>

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
IN-SERVICE CONSIDERATIONS					
13	Survey and maintenance	<ul style="list-style-type: none">• maintenance plans specific to the structure of the ship where higher attention is called for• preparations for survey• gross hull girder section modulus• minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life• gross scantlings of structural constituent parts• net scantlings of structural constituent parts• hull form	<ul style="list-style-type: none">• plan showing highly stressed areas prone to yielding, buckling, fatigue and/or excessive corrosion• arrangement and details of all penetrations normally examined at dry-docking• details for dry-docking• details for in-water survey• hull form information indicated in key construction plans	<ul style="list-style-type: none">• SCF-specific• operation and maintenance manuals (e.g., hatch covers and doors)• docking plan• dangerous area plan• Ship Structure Access Manual• Means of access to other structure-integrated deep tanks• Coating Technical File required by PSPC• key construction plans• rudder and rudder stock• structural details• yard plans• lines plan or equivalent	<ul style="list-style-type: none">on board shipon board shipon board shipon board shipon board shipon board shipon board shipon board shipon board shipon board shipon shore archiveon shore archiveon board ship
14	Structural accessibility	<ul style="list-style-type: none">• means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks	<ul style="list-style-type: none">• plans showing arrangement and details of means of access	<ul style="list-style-type: none">• Ship Structure Access Manual• means of access to other structure-integrated deep tanks	<ul style="list-style-type: none">on board shipon board ship

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
RECYCLING CONSIDERATIONS					
15	Recycling	<ul style="list-style-type: none"> identification of all materials that were used in construction and may need special handling due to environmental and safety concerns 	<ul style="list-style-type: none"> list of materials used for the construction of the hull structure 	<ul style="list-style-type: none"> SCF-specific 	on board ship

Notes:

- 1 "SCF-specific" means documents to be developed especially to meet the requirements of these Guidelines.
- 2 "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- 3 "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- 4 "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- 5 "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- 6 "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- 7 "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- 8 "Shore archive" is to be operated in accordance with applicable international standards.



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MSC.1/Circ.1345
2 June 2010

UNIFIED INTERPRETATION OF SOLAS REGULATION II-1/27.5

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), with a view to ensuring a uniform approach towards the application of SOLAS regulation II-1/27.5 concerning machinery shut-off arrangements and oil mist detector (OMD) arrangements and, following the recommendation made by the Sub-Committee on Ship Design and Equipment, at its fifty-second session, approved a unified interpretation of SOLAS regulation II-1/27.5, as follows:

"The OMD arrangements (or engine bearing temperature monitors or equivalent devices) are part of the automatic shut-off arrangements required by SOLAS regulation II-1/27.5, in the case of medium and high-speed diesel engines of 2,250 kW and above or having cylinders of more than 300 mm bore.

For the case of low speed diesel engines of 2,250 kW and above or having cylinders of more than 300 mm bore, the OMD arrangements (or engine bearing temperature monitors or equivalent devices) should initiate the alarm and slow down procedures.

The consequences of overriding automatic shut-off arrangements should be established and documented."

2 Member Governments are invited to use the above interpretation when applying the relevant provisions of SOLAS chapter II-1 and to bring it to the attention of all parties concerned.



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MSC.1/Circ.1346
2 June 2010

UNIFIED INTERPRETATION OF THE 2000 HSC CODE

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), with a view to ensuring a uniform approach towards the application of the amendments to the 2000 HSC Code adopted by resolution MSC.222(82) and following the recommendations made by the Sub-Committee on Ship Design and Equipment, at its fifty-second session, approved a unified interpretation of the 2000 HSC Code as follows:

"The amendments set out in the annex to resolution MSC.222(82) apply to high-speed craft constructed on or after 1 July 2008.

However, the amendments concerning paragraphs 1.2.2 (asbestos), 1.8.1 (certificates), 1.9.1.1 (transit voyages without Permit to Operate), 2.7.2 (measurement of lightship where inclining experiment is impractical), 13.8.2 (carriage of ECDIS) and 14.15.10 (testing and maintenance of satellite EPIRBs) apply to high-speed craft constructed on or after 1 July 2008 and to high-speed craft constructed on or after 1 July 2002 but prior to 1 July 2008."

2 Member Governments are invited to use the above interpretation when applying the relevant requirements of the 2000 HSC Code and to bring it to the attention of all parties concerned.

DRAFT MSC CIRCULAR**UNIFIED INTERPRETATIONS OF SOLAS CHAPTER V**

1 The Maritime Safety Committee, at its [eighty-seventh session] (12 to 21 May 2010), with a view to providing more specific guidance for vague expressions such as “The ship’s side shall be visible from the bridge wing”, which are open to different interpretations contained in IMO instruments, approved the unified interpretations of SOLAS chapter V prepared by the Sub-Committee on Safety of Navigation, as set out in the annex.

2 Member Governments are invited to use the annexed unified interpretations as guidance when applying relevant provisions of SOLAS chapter V to ships contracted for construction¹ on or after [1 January 2011] and to bring the unified interpretations to the attention of all parties concerned.

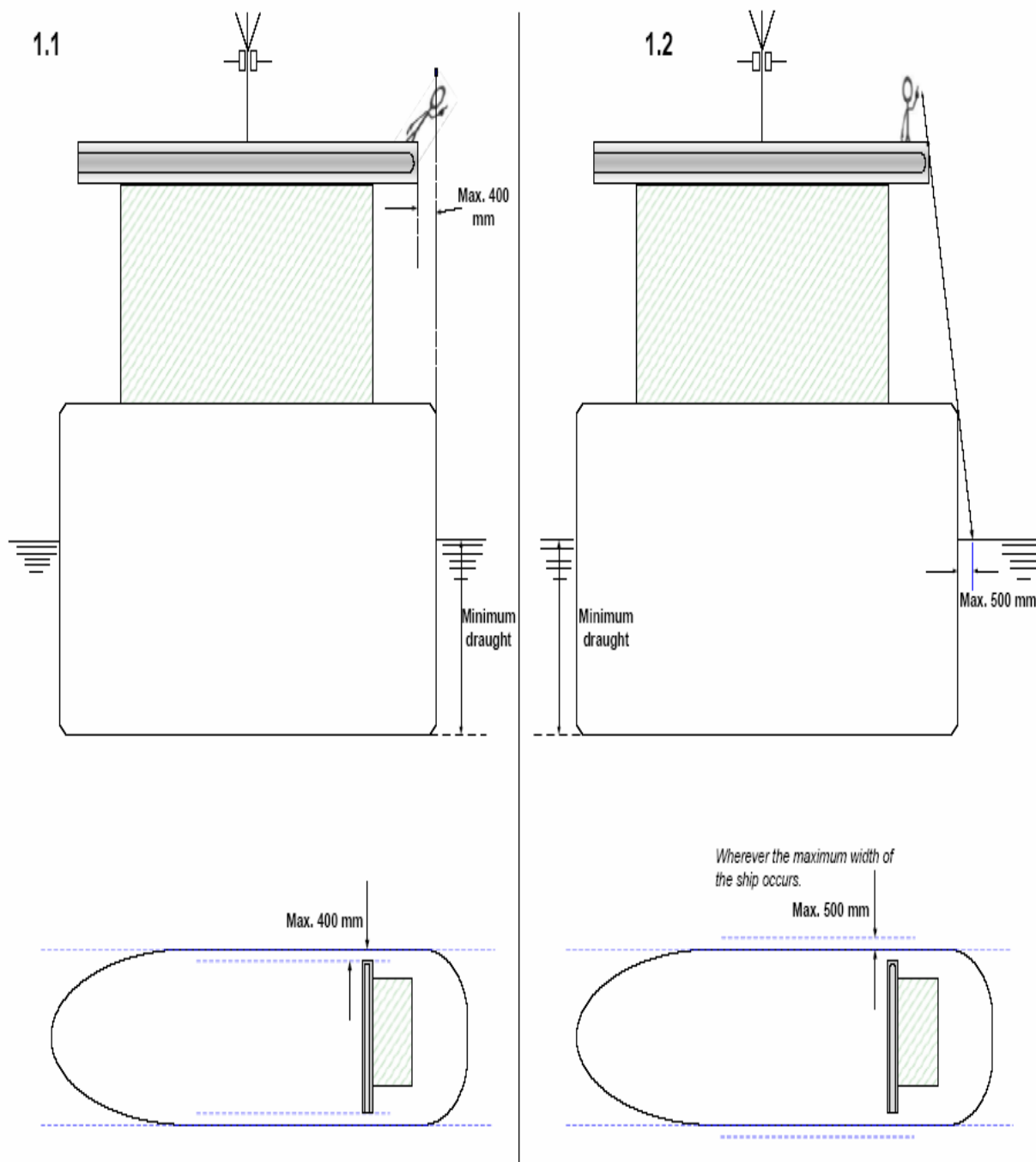
¹ The “contracted for construction” date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder.

ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER V

Regulation V/22.1.6 – Navigation bridge visibility

- 1 The requirements of SOLAS regulation V/22.1.6 are accomplished when:
 - .1 a view from the bridge wing plus a distance corresponding to a reasonable and safe distance of a seafarer leaning over the side of the bridge wing, which needs not to be more than 400 mm, to the location vertically right under the maximum beam of the ship at the lowest seagoing draught is not obscured; or
 - .2 the sea surface at the lowest seagoing draught and with a transverse distance of 500 mm and more from the maximum beam throughout the ship's length is visible from the side of the bridge wing.
- 2 A schematic diagram depicting the unified interpretations is also attached herewith.
- 3 For particular types of ships such as tug/tow boat, offshore supply vessel (OSV), rescue ship, work ship (e.g., Floating Crane), etc., in meeting the requirements of SOLAS regulation V/22.1.6, the bridge wings should at least extend to a location from which the sea surface, at the lowest seagoing draught and at a transverse distance of 1,500 mm from the maximum beam throughout the ship's length, is visible. If this ship type is changed through conversion then this interpretation in this paragraph would no longer apply.





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MSC.1/Circ.1351
15 June 2010

**INTERPRETATION OF STOWAGE AND SEGREGATION REQUIREMENTS
FOR BROWN COAL BRIQUETTES AND COAL RELATED TO
"HOT AREAS" IN THE IMSBC CODE**

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), noting that the provisions of the IMSBC Code may be applied from 1 January 2009 on a voluntary basis and are envisaged to become mandatory under the SOLAS Convention on 1 January 2011, recognized the need for clarification of the following stowage and segregation requirements:

- .1 "This cargo shall not be stowed adjacent to hot areas." in paragraph 5 in the section for "STOWAGE & SEGREGATION" in the appendix to the individual schedule for BROWN COAL BRIQUETTES; and
- .2 "The master shall ensure that this cargo is not stowed adjacent to hot areas." in paragraph 4 in the section for "Segregation and stowage requirements" in the appendix to the individual schedule for COAL.

2 The Committee agreed that the words "adjacent to hot areas" in these provisions should be interpreted as "boundary areas of the cargo hold in contact with the cargo, having a temperature consistently greater than 55°C during carriage of the cargo, such as can sometimes be experienced when heated fuel oil service tanks and fuel oil settling tanks have a common boundary with the cargo hold".

3 The Committee recommends that, in applying the aforementioned interpretation, the following is taken into account:

"Heated fuel oil tanks adjacent to cargo spaces carrying these cargoes should not normally be considered as "hot areas" when the fuel oil temperature is controlled at less than 55°C; this temperature is not exceeded for periods greater than 12 hours in any 24-hour period; and the maximum temperature of the fuel oil reached does not exceed 65°C."

4 Member Governments are invited to use the aforementioned interpretation as guidance when applying the provisions of the IMSBC Code and to bring it to the attention of all parties concerned.



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Ref. T4/5.01

MSC.1/Circ.1362
26 May 2010

UNIFIED INTERPRETATION OF SOLAS CHAPTER II-1

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), with a view to providing more specific guidance for application of the relevant requirements of the 1974 SOLAS Convention, approved unified interpretation of SOLAS chapter II-1, prepared by the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety at its fifty-second session, as set out in the annex.

2 Member Governments are invited to use the annexed unified interpretation as guidance when applying relevant provisions of SOLAS chapter II-1 to ships constructed on or after 21 May 2010 and to bring the unified interpretation to the attention of all parties concerned.

ANNEX

UNIFIED INTERPRETATION OF SOLAS CHAPTER II-1

Regulation 2.14 – Definitions

In determining the permeability of a space, the volume of a space should be taken as the moulded volume, i.e. the immersed volume of a space should be the underwater moulded volume of that space multiplied by the permeability.



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MSC.1/Circ.1368
22 June 2010

**INTERIM CLARIFICATIONS OF SOLAS CHAPTER II-2 REQUIREMENTS REGARDING
INTERRELATION BETWEEN THE CENTRAL CONTROL STATION,
NAVIGATION BRIDGE AND SAFETY CENTRE**

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), having considered the proposal by the Sub-Committee on Fire Protection, at its fifty-fourth session, approved the Interim Clarifications of SOLAS chapter II-2 requirements regarding interrelation between the central control station, navigation bridge and safety centre, set out in the annex, to provide additional guidance for the uniform implementation of SOLAS regulation II-2/23 which was adopted by resolution MSC.216(82) and are due to enter into force on 1 July 2010.

2 Member Governments are invited to bring the annexed Interim Clarifications to the attention of passenger ship owners, shipbuilders, ship designers and other parties concerned.

ANNEX

INTERIM CLARIFICATIONS OF SOLAS CHAPTER II-2 REQUIREMENTS REGARDING INTERRELATION BETWEEN THE CENTRAL CONTROL STATION, NAVIGATION BRIDGE AND SAFETY CENTRE

1 The functionality of the safety systems stated in SOLAS regulation II-2/23.6 should be available from the safety centre systems under any envisaged emergency situation (other than casualty affecting the safety centre itself) and should be efficiently managed from the safety centre without distracting the bridge team*. The functionality of these systems within the safety centre is specified in appendix 1.

2 The safety centre may or may not be part of the navigation bridge. The safety centre may be considered as part of the navigation bridge when it is arranged as examples indicated in diagrams (a), (b) and (c) of the illustration in appendix 4. In case of arrangements such as in diagram (d) in appendix 4, the safety centre should be considered as not being part of the navigation bridge.

3 Where the safety centre is part of the bridge:

- .1 it is acceptable to consider nearby members of the bridge team as being sufficient to make the safety centre "continuously manned";
- .2 alarms in the safety centre should be audible at the conning position for responsible members of the bridge team to make them aware of an alarm condition; and
- .3 at least one member of the on-watch bridge team should be properly trained and authorized to take appropriate initial and interim actions in the event of an emergency or in response to an alarm, until the safety centre is fully manned.

4 Where the safety centre is not part of the navigation bridge, it may or may not be continuously manned.

4.1 When the safety centre is continuously manned the functionality of the systems listed in appendix 2 should be duplicated on the Navigating Bridge.

4.2 When the safety centre is not continuously manned, there should be the capability on the navigation bridge to alert the bridge team of developing shipboard emergencies, to respond to them appropriately by taking initial and interim actions and to allow necessary monitoring functions after the safety centre is manned by properly trained persons. Therefore, the functionality of the systems listed in appendix 3 should be duplicated on the navigation bridge.

*

For the purpose of these clarifications the term "bridge team" identifies the team on the bridge in charge of the navigation of the ship, i.e. performing navigational duties.

5 The hierarchy of control between the navigation bridge and safety centre should be specified within the shipboard safety management system. In this respect:

- .1 an adequate number of properly trained personnel should be available for immediate response to the safety centre in an emergency while maintaining an effective navigational watch;
- .2 the duties of the safety centre personnel and navigation bridge personnel should not overlap; and
- .3 coordination of emergency management actions and communications should be assured through established emergency procedures, harmonized with the onboard decision support system required by SOLAS regulation III/29.

6 In carrying out the various functions on the navigation bridge and safety centre an integrated computer technology may be used.

7 When such a system is utilized:

- .1 the hierarchy of control of the various computer stations and locations should be clearly documented;
- .2 the computer system and programming should be designed to assure that failure of the system does not cause the loss of any of the ship's safety systems; and
- .3 the operational status and failures of the computer system or its communications should be indicated.

8 Controls and monitoring of safety and security related systems other than those listed under SOLAS regulation II-2/23.6 may also be located in the safety centre.

APPENDIX 1

**FUNCTIONALITY OF SYSTEMS TO BE LOCATED IN ONBOARD SAFETY CENTRE
FUNCTIONAL REQUIREMENTS**

System	Operation and control	Monitoring	Alarm
Powered ventilation systems	X	X	X*
Fire doors	X	X	
General emergency alarm system	X		
Public address system	X		
Electrically-powered evacuation guidance systems	X		
Watertight and semi-watertight doors	X	X	X
Indicators for shell doors, loading doors and other closing appliances		X	X
Water leakage of inner/outer bow doors, stern doors and any other shell door		X	X
Television surveillance system		X	
Fire detection and alarm system	X	X	X
Fixed fire-fighting local application system(s)		X	X
Sprinkler and equivalent systems		X	X
Water-based systems for machinery spaces		X	X
Alarm to summon the crew	X		
Atrium smoke extraction system	X		
Flooding detection systems			X
Fire pumps and emergency fire pumps	X	X	

* For ro-ro ships, SOLAS regulation II-2/20.3.1.3 applies.

APPENDIX 2

**DUPLICATION ON NAVIGATING BRIDGE OF FUNCTIONALITY OF SYSTEMS
LOCATED IN CONTINUOUSLY MANNED ONBOARD SAFETY CENTRE**

System	Operation and control	Monitoring	Alarm
Powered ventilation systems			X*
Fire doors		X	
General emergency alarm system	X		
Public address system	X		
Watertight and semi-watertight doors	X	X	X
Indicators for shell doors, loading doors and other closing appliances (ro-ro ships)		X	X
Water leakage of inner/outer bow doors, stern doors and any other shell door (ro-ro ships)		X	X
Television surveillance system (ro-ro ships)		X	
Fire detection and alarm system	X**	X	X
Sprinkler and equivalent systems		X	X
Alarm to summon the crew	X		
Flooding detection systems			X
Fire pump (ships less than 1,000 gross tonnage)***	X		
Fire doors leading to or from the special category spaces (ro-ro ships)		X	X
Ventilation systems for vehicle, special category and ro-ro spaces		X	X

* For ro-ro ships, SOLAS regulation II-2/20.3.1.3 applies.

** Activation of the fire alarm should be possible from the navigating bridge.

*** Unless the automatic start of one fire pump is provided.

APPENDIX 3

**DUPLICATION ON NAVIGATION BRIDGE OF FUNCTIONALITY OF SYSTEMS
LOCATED IN ONBOARD SAFETY CENTRE NOT CONTINUOUSLY MANNED**

System	Operation and control	Monitoring	Alarm
Powered ventilation systems	X		X*
Fire doors	X**	X	
General emergency alarm system	X		
Public address system	X		
Watertight and semi-watertight doors	X	X	X
Indicators for shell doors, loading doors and other closing appliances		X	X
Water leakage of inner/outer bow doors, stern doors and any other shell door		X	X
Television surveillance system		X	
Fire detection and alarm system	X***	X	X
Sprinkler and equivalent systems		X	X
Alarm to summon the crew	X		
Flooding detection systems			X
Fire pump (ships less than 1,000 gross tonnage) ****	X		
Fire doors leading to or from the special category spaces (ro-ro ships)		X	X

* For ro-ro ships, SOLAS regulation II-2/20.3.1.3 applies.

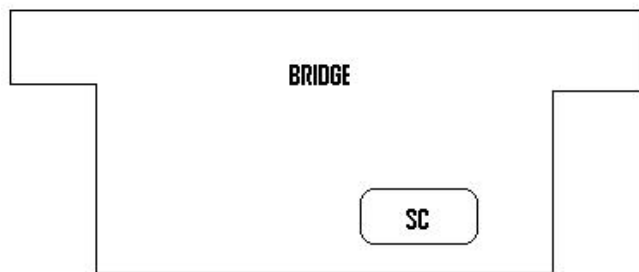
** Operation and control of the systems from the navigation bridge when the safety centre is unmanned, until the management of the emergency situation is transferred to the safety centre. This implies duplication of the systems and a function to transfer the commands and controls (bridge ↔ safety centre).

*** Activation of the fire alarm is to be possible from the navigation bridge.

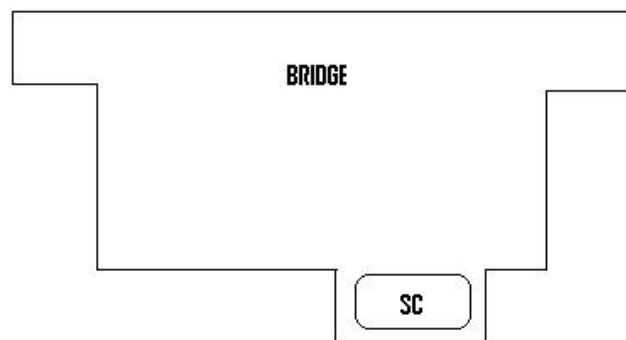
**** Unless the automatic start of one fire pump is provided.

APPENDIX 4

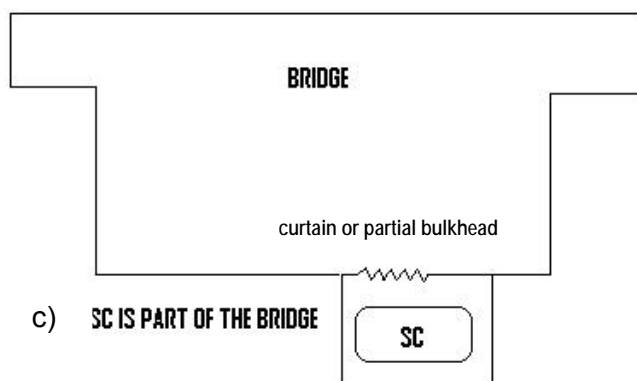
**ILLUSTRATIONS AS TO WHEN A SAFETY CENTRE MAY OR MAY
NOT BE CONSIDERED AS PART OF THE NAVIGATION BRIDGE**



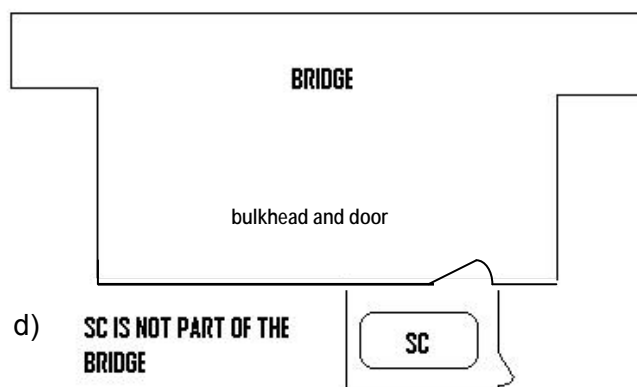
a) **SC IS PART OF THE BRIDGE**



b) **SC IS PART OF THE BRIDGE**



c) **SC IS PART OF THE BRIDGE**



d) **SC IS NOT PART OF THE
BRIDGE**



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MSC.1/Circ.1369
22 June 2010

**INTERIM EXPLANATORY NOTES FOR THE ASSESSMENT OF PASSENGER SHIP
SYSTEMS' CAPABILITIES AFTER A FIRE OR FLOODING CASUALTY**

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), having considered the proposal by the Sub-Committee on Fire Protection, at its fifty-fourth session, approved the Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty, set out in the annex, to provide additional guidance for the uniform implementation of SOLAS regulations II-1/8-1, II-2/21 and II-2/22, which were adopted by resolution MSC.216(82) and are due to enter into force on 1 July 2010.

2 Member Governments are invited to bring the annexed Interim Explanatory Notes to the attention of passenger shipowners, ship builders, ship designers and other parties concerned.

3 This circular revokes circular MSC.1/Circ.1214.

ANNEX

INTERIM EXPLANATORY NOTES FOR THE ASSESSMENT OF PASSENGER SHIP SYSTEMS CAPABILITIES AFTER A FIRE OR FLOODING CASUALTY

INTRODUCTION

The requirements relevant to the safe return to port for passenger ships, as contained in resolution MSC.216(82), entering into force on 1 July 2010, have been shown to be challenging.

These Interim Explanatory Notes have been developed in the light of the experience gained so far in the early application of the aforementioned requirements, taking into account the guidance contained in the Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty (MSC.1/Circ.1214).

1 GENERAL

1.1 These Interim Explanatory Notes are intended to outline the process of verification and of approval of a ship's design by the Administration, as well as describing the necessary documentation required, when requirements relevant to safe return to port (regulations II-1/8-1, II-2/21 and 22 of the 1974 SOLAS Convention, as amended) are applied.

1.2 These Interim Explanatory Notes are also intended to support safe engineering design with guidance on all three scenarios to be considered in the light of the above mentioned regulations:

- .1 availability of essential systems after a flooding casualty, according to SOLAS regulation II-1/8-1;
- .2 availability of essential systems to support a ship's safe return to port after a fire casualty, according to SOLAS regulation II-2/21; and
- .3 availability of essential systems to support a ship's evacuation and abandonment after a fire casualty, according to SOLAS regulation II-2/22.

In light of the above, general and specific interpretations to regulations II-2/21 and 22 of the 1974 SOLAS Convention, as amended are given in appendix 1.

1.3 The outcome of these assessments should confirm that the ship is designed and constructed to provide the capabilities required by SOLAS regulations II-1/8-1, II-2/21 and 22.

1.4 Within these Interim Explanatory Notes a system-based approach is primarily intended to be performed. Where a system approach will outline potential weaknesses, a compartment or space-by-space based approach may also be applied. In the latter case, part of or all the spaces subject to individual consideration may be subject to operational restrictions on access, use and installations as one element of the overall system of protection. All such spaces and their restrictions should be identified on drawings or in manuals as appropriate (see paragraphs 7.3 and 7.4). For the application of these Interim Explanatory Notes to be successful, all relevant parties, including the Administration or its designated representative, owners, operators, designers and classification societies, should be in continuous communication from the onset of a specific proposal to utilize these Interim Explanatory Notes.

1.5 A pre-requisite and starting point for this assessment is that the owner of the ship has defined the operating pattern or patterns of the ship (for instance, worldwide liner/cruise ship or point-to-point ferry operations, maximum number of passengers and crew for required routes, foreseeable area of operation and routes, etc.). The capabilities that will be needed to be built into the ship will depend on the above.

1.6 The Administration may (as per SOLAS regulation II-2/21.4.14) determine any system to remain operational after a casualty in addition to those identified.

2 DEFINITIONS

For the purpose of these Interim Explanatory Notes, the following definitions apply:

2.1 *Passenger ship systems' capabilities after a fire or flooding casualty (short: ship systems' capabilities)* are those required for passenger ships according to SOLAS regulations II-1/8-1, II-2/21 and II-2/22. The ship systems' capabilities are addressing:

- .1 availability of essential systems after a flooding casualty, according to SOLAS regulation II-1/8-1;
- .2 availability of essential systems to support a ship's safe return to port under its own propulsion after a fire casualty, according to SOLAS regulation II-2/21.4 (including functional requirements for safe areas according to SOLAS regulation II-2/21.5); and
- .3 availability of essential systems to support a ship's evacuation and abandonment after a fire casualty, according to SOLAS regulation II-2/22.

2.2 *Passenger ship systems' design (short: ship systems' design)* is a design description of systems intended to be installed, including all essential information showing how to achieve the ship systems' capabilities after a fire or flooding casualty according to SOLAS regulations II-1/8-1, II-2/21 and II-2/22.

2.3 *Passenger ship systems' functionality (short: ship systems' functionality)* is part of the passenger ship systems' design and defines how the onboard systems achieve the functional requirements defined in SOLAS regulations II-2/21 and II-2/22.

2.4 *Fire casualty* is any possible fire case on board the ship under consideration. Fire casualties may or may not exceed the casualty threshold stipulated in SOLAS regulation II-2/21.3.

2.5 *Flooding casualty* is any possible flooding cases on board the ship under consideration. Flooding casualties may not exceed a single watertight (WT) compartment flooding as stated in SOLAS regulation II-1/8-1.2.

2.6 Essential systems are all systems and those sections of systems in spaces not directly affected by the casualty that need to remain operational after a fire or flooding casualty, according to SOLAS regulations II-2/21.4 and II-2/22.3, and as referred to in SOLAS regulation II-1/8-1.2.

2.7 *Critical systems* are essential systems that were identified in the overall assessment of essential systems to have a possibility to fail to operate adequately as a consequence of one or more fire casualty case, each not exceeding the fire casualty threshold, or as a consequence of one or more flooding case, each not exceeding a single WT compartment. The failure of the

system may be caused by a failure of the whole system, of one component or of a connection between system components or by any other failure causing unsatisfactory operation of the essential system under consideration.

3 SHIP'S DESCRIPTION

3.1 For the purpose of the ship's description, any necessary information regarding the design of the ship should be provided to the Administration along with description of ship essential systems' design and functionality following a fire or flooding casualty. As a minimum, such information and description should include:

- .1 the design criteria for each individual essential system or group of essential systems, to achieve compliance (e.g., separation, duplication, redundancy, protection, or a combination of the above);
- .2 the basic layout of the vessel including boundaries of compartments subject to the casualty (watertight or "A" class boundaries), e.g., in the form of plan views and cross-sections, including, but may not be limited to: general arrangement plan, capacity plan, watertight subdivision plan, space fire categorization plan (or structural fire protection plan), plan of spaces protected by fixed fire-extinguishing systems, etc.;
- .3 criteria adopted for the selection of safe areas and intended locations;
- .4 a list of all systems that are intended to be submitted for assessment. It should be noted that although such a list would include, in the first instance and as a minimum, all essential systems referred to in SOLAS regulations II-2/21.4 and 22.3, their actual number and identification may vary depending on the size, type, arrangements, design, etc., (e.g., propulsion systems: shaft or podded propulsion units, etc.) of the ship;
- .5 drawings/documents describing the location, arrangement and connections of essential systems (including any of their components) mentioned in SOLAS regulation II-2/21 or II-2/22;
- .6 the description of the power supply for the essential systems;
- .7 data regarding the minimum speed vs. weather and sea conditions (e.g., results of model tank tests in sea keeping conditions including consideration of wind forces); and
- .8 any additional design detail intended to ensure or support the ship systems' capabilities.

3.2 Additional information about the intended area of operation, the operating pattern or patterns (which may be used to define any intended speed/maximum distance for safe return to port) should be included in the ship's description.

3.3 Interpretations as contained in paragraph 1 of appendix 1 to these Interim Explanatory Notes may be used when completing the ship's description.

4 ASSESSMENT OF REQUIRED SHIP SYSTEMS' CAPABILITIES

4.1 The assessment of ship systems' capabilities should follow the process described in these Interim Explanatory Notes and refer to appendix 2. The assessment should be based on structured methods and should document the intended essential systems functionality after a fire or flooding casualty defined by SOLAS regulations II-1/8-1, II-2/21 and II-2/22. An example of the development of an assessment is given in appendix 3.

4.2 Each assessment should be divided in two steps.

4.2.1 The first step is an overall systems' assessment. The systems' assessment is addressing all essential systems and functional requirements mentioned in SOLAS regulations II-2/21 and II-2/22. This step should include a structured assessment of all essential systems after a fire or flooding casualty, as defined in SOLAS regulations II-1/8-1.2, II-2/21.4 or II-2/22.3.1. Propulsion and steering systems are required to remain in operational and may not be identified as "critical systems". However, manual intervention may be accepted in order to make these systems available in the minimum possible time.

4.2.2 The second step is a detailed assessment of critical systems identified in the systems' assessment. The detailed assessment is only required if any critical system was identified in the previous systems' assessment.

4.3 SOLAS regulations II-1/8-1, II-2/21 and 22 do not include reference to quantities or performance limits. The ability of the ship to return to port should be linked to the area and conditions of operation. The capability available for each system in the worst case (e.g., minimum propulsion power for return to port, electrical generating capacity, heating capacity, ventilation capacity, food and water storage/availability, etc.) should be included in the onboard documentation as a part of the assessment report (see paragraph 7.4).

5 OVERALL ASSESSMENT OF ESSENTIAL SYSTEMS

5.1 Assessment of all essential systems

5.1.1 A structured assessment of all essential systems should be conducted. The systems' assessment can be performed in qualitative terms. Quantitative analysis may be required as part of the detailed systems' assessment as described in section 6. A systems' assessment report should be prepared according to section 7.

5.2 Identification of critical systems

5.2.1 Essential systems identified to be fully redundant for all fire and flooding casualty cases not exceeding the threshold (e.g., when runs of cables, pipes and equipment are duplicated and adequately separated), need not be further analysed as described in section 6.

5.2.2 For the arrangement of equipment, components or connections reference may be made to relevant interpretations contained in paragraph 2 of appendix 1 to these Interim Explanatory Notes. Where other solutions are adopted, equipment, components or connections should be further analysed as described in section 6.

5.2.3 Manual action by the crew, to provide ship systems' capabilities, may also be possible but should be assessed in detail taking into account that:

- .1 manual action should only be acceptable by the Administration in connection with an agreed defined number of fire and flooding casualties and should be clearly described in the documentation that should be prepared as per section 7;
- .2 compliance with the return to port criteria should be based on the assumption that any manual action that may be required for the ship to return to port, or for any essential system to remain operational, following a casualty:
 - .1 is pre-planned, pre-set and instructions as well as necessary materials are available on board;
 - .2 is performed on systems designed to ensure that the required manual action can be completed within one hour from the time the action started; and
 - .3 emergency lighting and a means of communication is demonstrated available in the area where manual actions are to be taken; and
- .3 in general, feasibility of manual actions should be demonstrated by tests or drills, as applicable.

5.2.4 Performance requirements applicable to any essential system may be analysed and documented separately; however, any relevant information should be included in the overall assessment of essential systems' report.

5.3 Results of overall assessment

5.3.1 Should no critical systems be identified, the overall assessment can be considered acceptable without the need for a detailed systems' assessment to be carried out. The systems' assessment report can be used for the preparation of documentation and approval submission, as referred to in section 7.

6 DETAILED ASSESSMENT OF CRITICAL SYSTEMS

6.1 When performing a detailed assessment of critical systems, additional information may be necessary. The ship's description, described in section 3, should be supplemented, for each identified critical system, with the following, as applicable:

- .1 details of pipes, cables or other devices connecting the components of the critical system, or connecting different critical systems including their location within the affected area;
- .2 details of any manual action providing the required ship systems' functionality (see also paragraph 5.2.3); and
- .3 details of any operational solution forming part of the design criteria.

6.2 Where acceptable to the Administration, a quantitative analysis can be carried out as a part of the detailed assessment of all critical systems. As an example, the following may be performed:

- .1 quantitative analysis of fire risk within a space, supplemented by fire engineering analysis and/or fire testing where necessary (e.g., to assess consequences of a fire casualty on a system or system component);

- .2 Failure Mode Effect Analysis (FMEA) of a system or system component analyses in accordance with standard IEC 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)* or resolution MSC.36(63), annex 4 (Procedures for Failure Mode and Effects Analysis), would be acceptable; and
- .3 detailed analysis of possibility of flooding of internal watertight compartments and of consequences of flooding on system components, given the location of the compartment and arrangement of piping within the compartment.

7 DOCUMENTATION

7.1 Design of ship and ship's systems

7.1.1 Different design criteria may be followed in the design of the ship and in the design of the ship's systems and arrangements to achieve the passenger ship systems' capabilities after a fire or flooding casualty and to comply with the requirements. The chosen design criteria should be well documented. This is to form the basis for the preparation of all ship's operational procedures to be adopted by the crew for the case of any such casualty.

7.2 Documentation for future design changes

7.2.1 The documentation to be presented for approval is described in detail in the paragraphs below. Such documentation should also be referred to in case design changes to the ship are proposed and may also be used as evidence of compliance should the ship transfers to the flag of another State.

7.3 Documentation of the assessment of required ship systems' capabilities for approval

7.3.1 The documentation of the assessment to be presented for approval should include the design criteria followed to reach ship systems' capabilities and summarize the whole process of assessment including methods and assumptions. The following information should be provided for approval of ship systems' capabilities:

- .1 ship's description (see section 3);
- .2 overall assessment of essential systems' report (see paragraph 4.2.1 and section 5);
- .3 detailed assessment of critical systems' report (see paragraph 4.2.2 and section 6), if any critical system is identified; and
- .4 additional information:
 - .1 list of manual actions (see paragraph 5.2.3);
 - .2 test programme (for both testing during construction, and sea trials, as applicable) which should include methods of testing, and test facilities provided, where applicable;
 - .3 maintenance plan; and
 - .4 references.

7.4 Onboard documentation

The onboard documentation demonstrating the ship system capabilities should include:

- .1 documentation, as per paragraphs 7.3.1.1, 7.3.1.2 and 7.3.1.3 above;
- .2 operational manual for fire and flooding casualty cases and safe return to port operation, including details of any manual action required to ensure operation of all essential systems, availability of safe areas including provision of basic services therein (e.g., closing/opening of valves, shutting down/start of equipment/fans, etc.);
- .3 description of operation of essential systems after a fire casualty exceeding the casualty threshold;
- .4 list of spaces considered having negligible fire risk, if any; and
- .5 test, inspection, and maintenance plan.

7.5 Record of ship systems' capabilities

7.5.1 The ship systems' capabilities should be included in the list of operational limitations issued to passenger ships (reference SOLAS regulation V/30). The ship's safety management manual should describe in detail the quantities, arrangements and procedures that are to be applied in each particular case. (For example, food/drink/fuel carriage requirements may be different for a ship cruising in the Aegean to one cruising in the Antarctic.) Example of wording concept for this purpose may be as follows:

"Safe return to port voyage planning should be based on:

- .1 habitable conditions for passengers and crew is provided according to "Owners document xyz" dated yyyy-mm-dd (the operational area will determine maximum possible distance to a safe location and the maximum numbers of persons that can be supported during the safe return voyage).
- .2 the ship systems' capabilities of returning to port following a fire casualty is contingent upon the conditions/assumptions given in onboard document xyz, yyyy-mm-dd.
- .3 ships "port/aft/main" propulsion and steering system is capable of x knots in Beaufort x with a consumption of x tonnes of fuel.
- .4 ships "starboard"/forward/emergency propulsion and steering system is capable of x knots in Beaufort x with a consumption of x tonnes of fuel."

APPENDIX 1

INTERPRETATIONS TO SOLAS REGULATIONS II-2/21 (SAFE RETURN TO PORT AND SAFE AREAS) AND II-2/22 (SHIP'S ORDERLY EVACUATION AND ABANDONMENT)

1 Interpretation for ship's description

1.1 The following interpretations are intended to be of assistance when carrying out the ship description contained in section 3 of the Interim Explanatory Notes, before performing assessments as described in sections 4, 5 and 6.

1.2 These interpretations provide design criteria. The decision on whether or not to evacuate the ship remains with the Master. In actual situations the Master may well decide, based on the actual appraisal of the situation that it is safer to evacuate for accidents that are below the casualty threshold and remain on board for accidents that are above it.

Regulation	Interpretations
II-2/21.1 Application	Interpretation 1 Horizontal Fire Zones (special category and ro-ro spaces) should not be included in the count of the number of the Main Vertical Zones.
II-2/21.1 Application	Interpretation 2 Where electrical or machinery installation, fire safety, or lifesaving appliances of a ship have been approved following the methodology of SOLAS regulations II-1/55, II-2/17 or III/38 respectively (Alternative design and arrangements), the effect on the ship essential system capability should be explicitly included in the analysis required by the above regulations. Special attention is to be given to the determination and assignment of Safe Areas and compliance with the requirements of SOLAS regulation II-2/22.
II-2/21.2 Purpose	Interpretation 3 For the purpose of assessing the ship systems' capabilities, fire casualties and flooding casualties may be considered as not occurring at the same time.
II-2/21.3 Casualty threshold	Interpretation 4 "A" class boundaries refers to both bulkheads and decks.

Regulation	Interpretations
II-2/21.3 Casualty threshold	Interpretation 5 The rating of "A" class boundaries does not affect the application of this regulation. However, a trunk closed at all boundaries constructed to "A-60" standard and containing ducts, cabling and/or piping is considered operational when passing through a space of origin.
II-2/21.3 Casualty threshold	Interpretation 6 The lay-out of special category and ro-ro spaces, normally extending for more than the length of one MVZ, does not properly fit with the casualty threshold. However, during the assessment of the ship systems' capabilities it has to be verified that a casualty in such spaces would not compromise the operation of the essential systems in the remaining fire zones of the ship.
II-2/21.3.2 Casualty threshold	Interpretation 7 Where a space of origin is not protected by a fixed fire-extinguishing system, for determining the "nearest "A" class boundaries, which are not part of the space of origin": a) only the spaces within the same Main Vertical Zone need to be considered; and b) casualty threshold includes spaces one deck upwards.
II-2/21.3.2 Casualty threshold	Interpretation 8 Spaces in which the risk of a fire originating is negligible ¹ need not be considered as spaces of origin of a fire. Examples of such spaces include but may not be limited to: a) spaces with restricted accessibility for inspection and/or maintenance only, such as: .1 void spaces; .2 trunks closed at all boundaries only containing pipes and/or electrical cables; and .3 cofferdams;

¹ **Note:** A fire/risk assessment may be requested (refer to paragraphs 7.4.4 of the Interim Explanatory Notes), to determine whether a space other than those listed in the above can be considered as being "space in which the risk of a fire originating is negligible". Different factors should be taken into account while performing the assessment such as:

- a) presence of combustible material, flammable liquids and/or flammable gases;
- b) presence of electrical switchboards and relevant power;
- c) statistics on fire within spaces having the same purpose;
- d) intended service of equipment/machinery installed; and
- e) other factors considered appropriate for the space under consideration.

Regulation	Interpretations
II-2/21.3.2 Casualty threshold	Interpretation 8 (cont'd) b) tanks; c) chain lockers; d) ventilation trunks except those containing ducts presenting fire hazard such as galley range exhaust ducts, laundry exhaust ducts, category "A" machinery spaces ducts, special category and ro-ro spaces ducts; e) cross flooding ducts connecting void spaces. In the case where connected spaces are not with a negligible fire risk, ducts should be separated from those spaces by non-watertight fire resistant boundaries to be considered as a space where fire risk is negligible; f) vertical escape trunks from machinery spaces, service spaces, control stations and other crew accommodation spaces; g) store rooms for gaseous fixed fire-extinguishing systems; h) busbars enclosed in "A" class divisions; i) "A" class enclosures within spaces of Category 1, 2 or 4 only containing isolation valves or section valves forming part of the fixed fire-extinguishing system for the protection of accommodation spaces, service spaces and control stations; and j) shaft tunnels only used for this purpose, i.e. no storage is allowed.
II-2/21.3.2 Casualty threshold	Interpretation 9 Concealed spaces (spaces above ceilings, behind bulkheads linings) are considered as part of the space of origin. Lack of a fixed fire-extinguishing system above ceilings or behind linings need not be considered under regulation II-2/21.3.2.
II-2/21.3.2 Casualty threshold	Interpretation 10 In case of manual actions, equipment and systems the controls of which cannot be reached without accessing the space affected by the casualty should not be considered operational.
II-2/21.3.2 Casualty threshold	Interpretation 11 For passenger ships carrying not more than 36 passengers space of origin is any space bounded by "A" class boundaries or divisions of steel or equivalent material. Where the deck between two spaces is constructed of steel or equivalent material it should be considered to form part of the "A" class boundary provided all penetrations are tight to prevent the passage of flame or smoke.

2 Interpretations for detailed assessment of critical systems

2.1 The following interpretations are intended to be of assistance when performing detailed assessments of critical systems, as described in section 6.

Regulation	Interpretations
II-2/21.4 Safe Return to Port/Fire Casualty	<p>Interpretation 12</p> <p>Steel pipes other than those carrying flammable liquids and passing through (not serving) spaces affected by a fire casualty may be considered to remain operational provided they are of substantial thickness (reference can be made to ICLL 66 regulation 22(3), as interpreted by IACS UI LL36/Rev. 2 paragraph (b)) or "A-60" insulated ("A-60" class insulation approved in accordance with resolution A.754(18) for bulkheads or decks may be used for this purpose). In both cases the pipes should be adequately supported.</p> <p>In order to be considered as remaining operational after a fire casualty, steel pipes should be joined by welding otherwise mechanical joints should be tested according to IACS UR P2.11.5.5.6 fire test or equivalent to the satisfaction of the Administration.</p> <p>Temperature increase of liquids carried may need to be considered, and measures taken where necessary, so that the performance and purpose of the affected systems can be maintained as intended after the casualty has occurred.</p> <p>Plastic pipes can be considered to remain operational after a fire casualty if tested to resolution A.753(18), Level 1.</p>
II-2/21.4 Safe Return to Port/Fire casualty	<p>Interpretation 13</p> <p>Fire-resistant cables complying with standards IEC 60331-1 and IEC 60331-2 (see also IACS UR E15) passing through (not serving) spaces may be considered to remain operational after a fire casualty provided they have no connections, joints and equipment connected to them, etc., within the space affected by the casualty.</p> <p>Installation of these cables should be made to support their survival in a fire casualty and during fire fighting efforts.</p>

Regulation	Interpretations
II-2/8.1 Flooding casualty II-2/21 Fire casualty	<p>Interpretation 14</p> <p>An electrical balance should be submitted for each of the following return to port scenarios:</p> <ul style="list-style-type: none"> a) minimum electrical-generating capacity available; and b) any other scenario of reduced power that would cause any essential system to run at reduced capacity due to lack of electrical generating capacity. <p>In connection with the above, all essential systems and their auxiliaries and systems needed to support safe areas should be accounted according to their use in these particular conditions.</p>
II-2/21 Fire casualty	<p>Interpretation 15</p> <p>Emergency generator, fitted for compliance with SOLAS regulation II-1/42, may be used to meet the requirements on safe return to port and ship's orderly evacuation and abandonment providing that its ability to supply emergency services as referred to in SOLAS regulation II-1/42.2, is not impaired (e.g., the availability of fuel needed for providing those services listed in regulation II-1/42 should be maintained). In the evaluation of the emergency generator capacity, the most demanding condition between regulations II-1/42, II-2/21 and 22 may be considered.</p>
II-2/21.4 Safe return to port	<p>Interpretation 16</p> <p>Electrical power should be available and sustainable for all essential services specified in SOLAS regulations II-2/21.4 and II-2/21.5.1.2, with due regard being paid to such services as may be operated simultaneously. The application of regulation II-2/21.4 requires that other systems (e.g., engine-room ventilation, lighting of spaces outside safe areas not affected by the casualty, etc.) remain operational to support the functionalities listed therein.</p>
II-2/21.4.1 Propulsion	<p>Interpretation 17</p> <p>Propulsion machinery and auxiliary machinery essential for the propulsion of the ship should remain operable.</p>
II-2/21.4.1 Propulsion	<p>Interpretation 18</p> <p>Following a fire casualty within the threshold, the ship should be able to maintain an adequate speed for sufficient time to permit the ship's planned safe return to port in sea and wind conditions acceptable to the Administration taking into account the intended area of operation. A minimum speed of 6 knots while heading into Beaufort 8 weather and corresponding sea conditions is recommended. Configuration for power generation and propulsion in the worst case scenario in terms of casualty cases should be verified during normal sea trials.</p>

Regulation	Interpretations
II-2/21.4.1 Propulsion	Interpretation 19 A steel shaft line including relevant bearings passing through a space affected by a flooding or a fire casualty (see also interpretation 11), may be considered operational if it is enclosed in a watertight and "A" class tunnel or alternatively if: a) in the flooding case it can be shown that it can operate under water; and b) in the fire case it is protected by a dedicated water spray system capable of delivering not less than 5 l/m ² /min on the protected area or equivalent.
II-2/21.4.1 Propulsion	Interpretation 20 Manual control at local positions can be accepted provided adequate communication and emergency lighting are arranged and it is demonstrated that the loss of any control and monitoring system does not prevent or impair any such manual/local control of the propulsion and electrical power generation systems (including, but may not be limited to, engines, electric motors, fuel system, etc.). Consideration should be given to the provision of machinery alarms when operating in that manner.
II-2/21.4.2 Steering systems and steering-control systems	Interpretation 21 When documenting that steering system is operable the following should be taken into consideration: a) local control of remaining steering system is acceptable provided adequate communication and emergency lighting are arranged; b) emergency means of steering, e.g., azimuth thrusters, pump jets, rudder, propellers, may be considered; and c) in general, tunnel thrusters should not be considered adequate for emergency steering.
II-2/21.4.3 Navigational systems	Interpretation 22 Equipment essential for navigation, position fixing and detection of risk of collision should be available. The ship should be capable of displaying the proper light configuration in compliance with the International Regulations for Preventing Collisions at Sea in force.
II-2/21.4.4 Systems for fill, transfer and service of fuel oil	Interpretation 23 Systems for internal fill transfer and service of fuel oil should be capable of fuel transfer to active propulsion and power generation equipment.

Regulation	Interpretations
II-2/21.4.4 Systems for fill, transfer and service of fuel oil	Interpretation 24 Systems for internal fill, transfer and service of: a) fuel; b) other flammable hydrocarbons; or c) any fluid that may be flammable or dangerous if heated to a very high temperature (both within the pipe and on going through pumps, orifices or other equipment), should not be considered operational within spaces affected by a fire casualty.
II-2/21.4.5 Internal communication between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering	Interpretation 25 Internal communications should be achieved by any effective portable or fixed means of communications. However, portable equipment may be accepted provided that repeater system or equivalent remains operational after the casualty and charging capability is available in more than one MVZ.
II-2/21.4.5 Internal communication between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering	Interpretation 26 PA systems, arranged as general alarm systems, should remain operational in the MVZs not affected by the casualty.

Regulation	Interpretations
II-2/21.4.6 External communication	Interpretation 27 The ship should be capable of communicating via the GMDSS or the VHF Marine and Air Band distress frequencies, even if the main GMDSS equipment is lost.
II-2/21.4.7 Fire main	Interpretation 28 Automatic start of remaining pumps may not be necessarily required (manual local start may be accepted after a casualty). The system should be so arranged that SOLAS regulation II-2/10.2.1.5.1 is fulfilled in all other Main Vertical Zones of the ship not affected by the casualty. Isolating valves should be arranged as appropriate. The remaining part of the affected deck in a Main Vertical Zone may be served from hydrants of adjacent zone or water tight compartment. Fire hoses may be extended for fire-fighting within the affected Main Vertical Zone; however, for complying with this requirement, two lengths of hoses from each hydrant may be accepted.
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 29 When a gaseous based system located outside the protected space is the sole fixed fire-extinguishing system as defined in regulations II-2/10.4.1 and 10.7.1 and it is designed to protect more than one space: a) there should be enough capacity to protect the two largest spaces; b) where the application of the fire casualty threshold leads to the loss of the storage room due to fire in an adjacent space, there should be two rooms, not being lost by the result of the same casualty, each holding a quantity of gas, capable of protecting the largest space; and c) the system should be so arranged that a casualty in one protected space does not impair the operation of the system in another protected space. When a gaseous based system located outside the protected space is the sole fixed fire-extinguishing system as defined in regulations II-2/10.4.1 and 10.7.1 and it is designed to protect a single space, where the application of the fire casualty threshold leads to the loss of the storage room due to fire in an adjacent space, there should be two rooms, not being lost by the result of the same casualty, each holding the quantity of gas required for the protected space.
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 30 Sprinkler or equivalent fixed fire-extinguishing systems may be considered to be lost only in spaces directly affected by the fire casualty and in other spaces that are protected by the same section (i.e. are controlled by the same section valve) provided each section should not serve more than one deck area in one MVZ. However, all levels of a stairway enclosure may be protected by the same section.

Regulation	Interpretations
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 31 Section valves (as referred to in FSS Code, chapter 8, paragraph 2.4.2.2) located within the space affected by the fire casualty should be considered to be not operational unless they are suitably fire rated or fire protected (e.g., contained within a solely dedicated enclosure having "A" class boundaries, or protected by a water nozzle, etc.).
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 32 Equivalent water based fire-extinguishing systems intended for the protection of machinery spaces (total flooding, as referred to in MSC/Circ.1165, as amended) should be so designed that in case of loss of any section valve it would still be possible to supply the entire system at the required performance, except where another fixed fire-extinguishing system is provided for the protection of such spaces (e.g., gaseous based systems). Duplication, fire protection of valves (e.g., contained within a solely dedicated enclosure having "A" class boundaries, or protected by a water nozzle, etc.), fire rated valves* or location of valves in spaces as identified by interpretation 11 may be considered. <small>* Reference may be made to IACS UR P2.11.5.5.6.</small>
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 33 Indication of activated sections in the continuously manned central control station for sprinkler or equivalent fixed fire-extinguishing systems, located outside the Main Vertical Zone, where the space affected by the casualty is located, should continue to function after a fire or flooding casualty.
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 34 Arrangement of piping distribution for sprinkler systems or equivalent, or for water based fixed fire-extinguishing systems for machinery spaces, may include isolation valves, to ensure the system can be reconfigured as to remain operational after a casualty, which should be kept to a minimum, clearly marked and easily accessible. Valves whose uncorrected status may jeopardize the operation of the system under normal condition should be provided with status indication in the continuously manned control station.
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 35 When sprinkler or equivalent water based fixed fire-extinguishing systems include one or more emergency feed, risers, connection, or other emergency means to comply with this regulation, then hydraulic calculations (as referred to in the FSS Code, chapter 8, paragraph 2.3.3.2) should take this into account.

Regulation	Interpretations
II-2/21.4.8 Fixed fire-extinguishing systems	Interpretation 36 Local application systems need not to remain operational following a casualty unless they form part of a system for the protection of machinery spaces (total flooding, as referred to in MSC/Circ.1165, as amended).
II-2/21.4.9 Fire and smoke detection systems	Interpretation 37 Fire and smoke detection systems may be considered to be lost only in spaces directly affected by the fire casualty and in other spaces on the same deck that are part of the same section, as defined by the FSS Code, chapter 9, paragraph 2.4.1, provided that all other detectors remain operational in any other decks served by that section.
II-2/21.4.10 Bilge and ballast systems	Interpretation 38 The bilge and ballast pumping systems and all associated essential equipment should be operational in all spaces served by the systems and not directly affected by the casualty. Manual control at local positions may be accepted provided fixed or portable means of communication are available from those positions to the Safety Centre or the Engine Control room.
II-2/21.4.11 Power-operated watertight and semi-watertight doors	Interpretation 39 Indication to show whether each door is open or closed should be provided for any fire casualty not exceeding the casualty threshold except for those doors in the boundary of spaces directly affected by the casualty.
II-2/21.4.13 Flooding detection systems	Interpretation 40 Flooding detection systems may be considered to be lost only in spaces directly affected by the fire casualty and in other spaces in the same compartment that are part of the same section provided that all other detectors remain operational in any other compartment served by that section.
II-2/21.5 Safe areas	Interpretation 41 When considering a fire casualty in a certain MVZ, only spaces within the casualty threshold are to be considered lost. Food, water and equipment for the support of the basic services to the safe areas, stored in spaces not directly affected by the fire casualty and belonging to the same MVZ, could be considered still available.

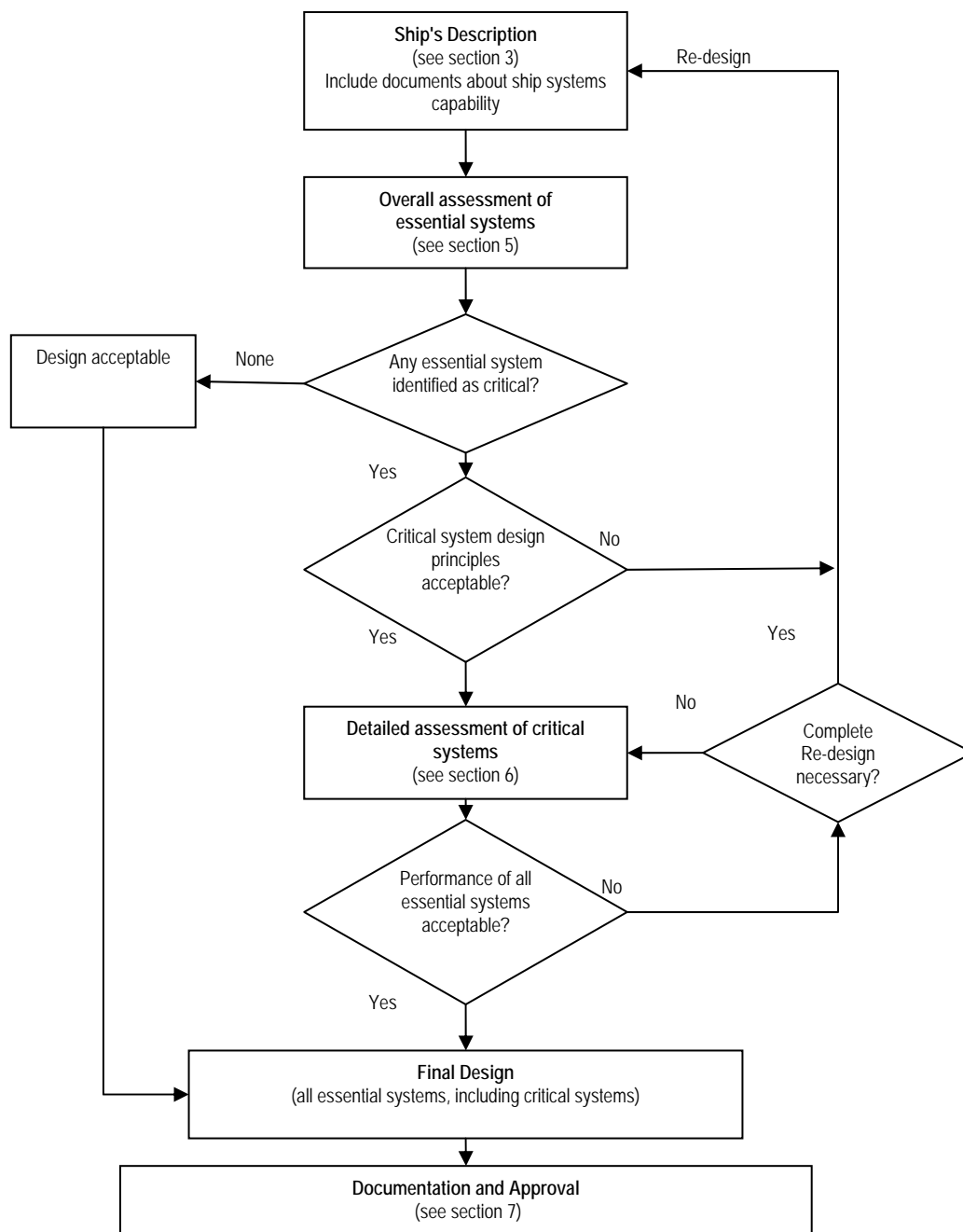
Regulation	Interpretations
II-2/21.5.1.1 Safe areas Functional requirements	Interpretation 42 Safe areas could be a number of spaces distributed on board and should preferably be arranged in accommodation spaces. Sizing of safe areas where persons are accommodated could be based on the time needed for safe return to port operation. For safe return to port operations longer than 12 h a minimum space of 2 m ² per person, calculated on the basis of the gross deck surface of the space(s) being considered, should be provided. For safe return to port operations shorter than 12 h a minimum space of 1 m ² per person should be provided.
II-2/21.5.1.2.1 Safe areas, sanitation	Interpretation 43 As a minimum one toilet for every 50 persons or fraction should remain operational. Grey and black water can be disposed of into the sea, allowed by MARPOL (reference MARPOL Annex IV, regulation 3).
II-2/21.5.1.2.2 Safe areas, water	Interpretation 44 As a minimum 3 litres per person per day drinking water should be available. Additional water for food preparation and hygiene may need to be provided.
II-2/21.5.1.2.3 Safe areas, food	Interpretation 45 Food could be of any kind including dry food. Storage of food should be distributed as necessary, so that an access route is available from the safe areas.
II-2/21.5.1.2.4 Safe areas Alternate space for medical care	Interpretation 46 In addition to the ship's hospital or medical centre one or more locations on the ship should be provided which should: <ul style="list-style-type: none"> a) be in a different Fire Zone (from the hospital or primary medical centre); b) be easily accessible; and c) have lighting and power supply on the main and emergency source of electrical power. Reference should also be made to MSC/Circ.1129.

Regulation	Interpretations
II-2/21.5.1.2.6 Means of preventing heat stress and hypothermia	Interpretation 47 Definition of means for protection against heat stress and hypothermia should take into account external weather conditions, which may depend on area(s) of operation of the vessel. Casualty scenarios for which there is a reduction in ventilation or heating capacity should be identified and consequences assessed. The temperature within the internal safe areas should be maintained in the range of 10 to 30°, consideration being paid to the external temperature during expected operations.
II-2/21.5.1.2.7 Safe areas, light	Interpretation 48 Portable rechargeable battery operated lighting may be acceptable for use in spaces which are not covered by the ship's emergency lighting system. Adequate charging capability should be available for these lights. Supplementary lighting complying with regulation II-1/42-1 is also acceptable.
II-2/21.5.1.2.8 Safe areas, ventilation	Interpretation 49 Ventilation volume should be available as a minimum of 4.5 m ³ /h per person.
II-2/21.4.14 Safe areas, other systems vital to damage control efforts	Interpretation 50 This includes any system that the Administration determines is vital to damage control pertaining to fire or flooding.
II-2/21.5.1.4 Safe areas, access to embarkation deck	Interpretation 51 Means of access from safe areas to life-saving appliances should be provided from all safe areas in case of any casualty, either internally through areas unaffected by the fire or via external routes. External routes are considered to remain available also in the portion of the ship containing the MVZ where the casualty had occurred.
II-2/22.3.1 Evacuation and abandonment, Systems	Interpretation 52 Electrical power should be available for the abandonment of the ship, including life-saving appliances and arrangements and the systems referred to in SOLAS regulation II-2/22.3.1, with due regard being paid to such services as may be operated simultaneously.

Regulation	Interpretations
II-2/22.3.1.1 Evacuation and abandonment, Fire Main Safe	Interpretation 53 The fire main should remain operational in all main vertical zones not directly affected by the casualty. Water for fire-fighting purposes should be available to all areas of the ship.
II-2/22.3.1.2 Evacuation and abandonment, Internal communications	Interpretation 54 A means should be available for communicating orders to fire-fighting and damage control teams and personnel in charge of evacuation and abandonment.
II-2/22.3.1.4 Evacuation and abandonment, Means of external	Interpretation 55 The ship should be capable of communicating via the GMDSS or the VHF Marine and Air Band distress frequencies even if the main GMDSS equipment is lost.
II-2/22.3.1.3 Evacuation and abandonment, Bilge system	Interpretation 56 The bilge pumping system and all associated equipment essential for its operation should be available in all spaces not directly affected by the casualty.

APPENDIX 2

Assessment of passenger ship systems' capabilities process flowchart



APPENDIX 3

EXAMPLE OF THE DEVELOPMENT OF AN ASSESSMENT (refers to an assessment for SOLAS regulation II-2/22)

Note: Users should note that the example provided represents one way of handling an assessment as other approaches could be equally effective.

The assessment is developed adopting the following steps:

Step 1 – Identification of all essential systems and any required auxiliaries and support systems.

Step 2 – For each deck of each MVZ, determination of which essential systems are present.

Step 3 – For each essential system that is located in the MVZ under analysis, verification of the availability of an alternative in another location.

Step 4 – Essential systems without a suitable alternative in another location must be protected from a fire/flooding casualty.

Step 5 – For each critical system, determination of how the cables, pipes, components will be protected. A hierarchy for protecting critical systems is proposed as follows:

1. First solution – Provide an alternative in a MVZ not affected by the casualty

Example: A main power cable for the GMDSS system passes through the MVZ on deck 3. In a fire this cable could be damaged. An emergency power cable is routed from a different direction to the navigation bridge that does not pass through this area. The conclusion is that further analysis is not needed. Damage to the power cable does not affect the ship's safe return to port capability.

2. Second solution – Protect the essential system within the MVZ under analysis

Example: In the case of the a.m. power cable, it is determined that only a short length of cable passes through the MVZ under consideration, located 5 m above the deck. An A-60 trunk is installed to protect the cable to preclude fire damage.

3. Third solution – Provide a repair or manual action to compensate for loss of the system

Example: – Another essential system cable is analysed, and it is determined that the cable is routed throughout the MVZ at various levels and construction of an A-60 trunk is not practicable. Instead, a repair cable is prepared and staged with necessary tools at a protected location. If the cable is damaged from a fire in the MVZ under analysis, the crew is able to temporarily re-route power from another location using the repair cable.



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**UNIFIED INTERPRETATIONS OF THE 1966 LL CONVENTION AND
THE 1988 LL PROTOCOL AS MODIFIED BY RESOLUTION MSC.143(77)**

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), with a view to providing more specific guidance for application of the relevant requirements of the 1966 LL Convention and the 1988 LL Protocol, approved unified interpretations of the 1966 LL Convention and the 1988 LL Protocol as modified by resolution MSC.143(77), prepared by the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety, at its fifty-second session, as set out in annexes 1 and 2, respectively.

2 Member Governments are invited to use the annexed unified interpretations as guidance when applying relevant provisions of the 1966 LL Convention and the 1988 LL Protocol, as modified by resolution MSC.143(77), to ships constructed on or after 21 May 2010 and to bring the unified interpretations to the attention of all parties concerned.

ANNEX 1

UNIFIED INTERPRETATIONS OF THE 1966 LL CONVENTION

Regulation 24 – Freeing ports

Regulation 26 – Special conditions of assignment for type "A" ships

Where gutter bars are installed on the weather decks of tankers in way of cargo manifolds and are extended aft as far as the after house front for the purpose of containing cargo spills on deck during loading and discharge operations, the free surface effects caused by containment of a cargo spill during liquid transfer operations or of boarding seas while underway require consideration with respect to the ship's available margin of positive initial stability (GMo).

Where the gutter bars installed are greater than 300 mm in height, they should be treated as bulwarks according to the Load Line Convention with freeing ports arranged in accordance with regulation 24 and effective closures provided for use during loading and discharge operations. Attached closures should be arranged in such a way that jamming cannot occur while at sea, ensuring that the freeing ports will remain fully effective.

On ships without deck camber, or where the height of the installed gutter bars exceeds the camber, and for tankers having cargo tanks exceeding 60% of the ship's maximum beam at midships regardless of gutter bar height, gutter bars should not be accepted without an assessment of the initial stability (GMo) for compliance with the relevant intact stability requirement taking into account the free surface effect caused by liquids contained by the gutter bars.

Regulation 27(3) and (7) – Types of ships

The permeability assumed in the damage stability calculation for the flooding of any store space should be 0.95.

ANNEX 2

UNIFIED INTERPRETATIONS OF THE 1988 LL PROTOCOL AS MODIFIED BY RESOLUTION MSC.143(77)

Regulation 24 – Freeing Ports

Regulation 26 – Special conditions of assignment for type "A" ships

Where gutter bars are installed on the weather decks of tankers in way of cargo manifolds and are extended aft as far as the after house front for the purpose of containing cargo spills on deck during loading and discharge operations, the free surface effects caused by containment of a cargo spill during liquid transfer operations or of boarding seas while underway require consideration with respect to the ship's available margin of positive initial stability (GMo).

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Regulation 27(3) and (8d) – Types of ships

The permeability assumed in the damage stability calculation for the flooding of any store space should be 0.95.