



Safety of Ro-Ro Passenger & Cruise Ships

January 2018



Move Forward with Confidence

**BUREAU
VERITAS**



SAFETY OF RO-RO PASSENGER AND CRUISE SHIPS

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INTRODUCTION

Since the 80's, passenger ship design moved from cruise liners to leisure cruise ships. Passenger ships are now basically designed as hotel accommodation fitted inside a ship, where public spaces and leisure areas demand larger space. Size and capacity of cruise ships have increased during the last years, creating new challenges with respect to fire safety and evacuation. Furthermore nearly all new designs apply alternative design for the accommodation area and even lifesaving appliances.

Calculation tools and Rules notes have been developed to cope with new designs for large passenger ships, such as the use of aluminum, extensive glass superstructures, large multi-deck spaces as well as extra-large lifeboats.

One major step in 2010 has been that passenger ships above a certain size have to be able to safely return to port under their own power, and to provide passengers with safe areas onboard after a pre-defined flooding or fire incident. This has considerable impact on the design and system arrangement.

From the beginning BV has been involved in working groups for the elaboration of explanatory notes to facilitate harmonized application of these new amendments. Based on experience gained on projects already certified or under progress, BV has established its own understanding notes providing solutions to unclear and/or vague issues. Whilst BV and the industry has gained extensive experience in applying the requirements, the associated IMO interpretations and our own notes, BV still see room for further improvement and development.

Recent adoptions of IGF and POLAR Code in 2016 are considered as further milestones having impact on design and operation of cruise ships. Gas as fuel can be used for propulsion and/or electrical production due to environmental reasons. Small and even large ferries have been the first to be built acc. to the Code and to operate on LNG. Gas fueled cruise ships are also under construction now. The POLAR Code contains technical and operational requirements for ships going to and operate in Polar waters, both for new (constructed on or after 1st January 2017) and existing ships (1st January 2018).

Bureau Veritas is actively contributing to draw up the SOLAS Conventions, participating to IMO Committees and publishing Rules and Guidance Notes formalizing their implementation and helping owners and shipyards to achieve compliance with safety always at the forefront.

1 - CLASSIFICATION OF PASSENGER SHIPS

A- WHY CLASSIFICATION?

Classification is the expression of confidence given by the Classification Society to a ship, for a particular use or service and for a certain period of time, by reference to its Rules, Rule or Guidance Notes and other documents.

B- CLASSIFICATION WORK

The classification of a ship includes, in accordance with the Rule book:

- Review of design drawings and documents
- Surveys of materials and equipment
- Survey during construction of the ship
- Attendance to trials alongside and at sea
- Issuance of Classification documents
- In service surveys.

The ship, the construction and condition of which satisfy the applicable Rule requirements, is registered with the corresponding classification symbols, marks and notations.

C- BV CLASS NOTATIONS

A typical entry for a passenger ship would be:

I	<i>main class symbol</i>
Passenger ship - SRTP	<i>service notation & additional service feature</i>
Unrestricted Navigation	<i>navigation notation</i>
⌘ HULL, ⌘ MACH	<i>construction marks</i>
⌘ AUT-UMS	<i>additional class notation</i>

- Main Class symbol & construction marks -

“**I**” is the main Class symbol assigned to ships built in accordance with the rule requirements, and maintained in a condition considered satisfactory by the Society.

“**⌘**” is the construction mark when ship has been constructed under BV special survey.

- Service notations and additional service features -

“**Passenger ship**” is granted to ships intended to carry more than 12 passengers.

“**Ro-ro passenger ship**” assigned to passenger ships specially equipped to carry complete trains or wheeled vehicles.

“**SRTP**” is added for ships having to comply with SOLAS “Safe Return to Port” requirements

“**DUALFUEL**” or “**GASFUEL**” are for ships fitted with engines using gas as fuel.

“**POLAR CAT-A (or B or C)**” are mandatory for ships operating in polar waters (as defined in SOLAS and MARPOL)

- Additional class notations particularly adapted to passenger ships –

- Class notations related to Technical Design of the ship:

ACCOMODATION for ships found in compliance with the criteria of MLC 2006 for design and construction of crew accommodation.

AUT-UMS or IMS, indicate compliance with different Rule requirements for unattended machinery spaces.

AUT-CCS assigned to ships which are fitted with machinery installations operated and monitored from a centralized control station.

AUT-PORT if the automation of the machinery is also required when the ship is at berth.

ALP, ALM & ALS: notations for special certification & test of lifting appliances.

AVM-DPS and AVM-IPS for ships fitted with duplicated or independent propulsion systems, insuring redundancy of propulsion, electrical production and steering.

ERS assuring technical assistance in case of maritime accident at sea by providing information on ship's remaining strength and stability in the resulting damaged condition.

HEL assigned to ships fitted with helicopter facilities subject to design review and construction survey by the Society.

ICE class notations of different levels for ships strengthened for navigation in icy waters.

INWATERSURVEY for ships having suitable arrangements to facilitate afloat bottom surveys

LI supplemented by "HG" and/or "S1" to "S3" for ships equipped with a loading instrument performing hull girder calculation and/or different extends of intact & damage stability calculations

MON-SHAFT assigned to ships fitted with a Tailshaft Monitoring system allowing the vessel to be granted with a reduced scope for complete tailshaft surveys.

POLAR CLASS 1 to 7 notations are relevant to ships intended for navigation in ice-infested polar waters except icebreakers.

COLD DI & COLD (H t_{DG}, E t_{DE}) are assigned to ships intended to operate in cold climate environments.

REF-STORE covering refrigerating plants intended for the preservation of ship's provisions.

SYS-NEQ and SYS-NEQ-1 for ships equipped with centralized navigation control system.

VeriSTAR Machinery class notation is granted to vessels on which a maintenance plan taking into account a risk analysis review of the installation is implemented.

- Class Notations related to Comfort and Protection of Environment:

BATTERY SYSTEM for ships when batteries are used for propulsion and/or el. power supply

ELECTRIC HYBRID (PM, PB, ZE) for ships provided with an energy storage system (ESS) used to supply the electric propulsion and/or main electrical power distribution system

URN-controlled/advanced or specified vessel for ships meeting the different underwater radiated noise limits complying with the requirements of BV Rule note NR614.

COMFORT & COMFORT+ for ships with levels of noise and/or vibration in different spaces being in compliance with BV Rule Part; It can be divided in **COMF-PAX & COMF-CREW** when different severity grades are applied respectively in passenger areas and crew living spaces

CLEANSHIP & CLEANSHIP SUPER for ships designed, built and operated to achieve additional protection of the environment. They can be supplemented with following notations:

AWT A/B, for ships fitted with Advanced Water Treatment plant for grey and black water verifying specific requirements for operation in Alaska and/or Baltic waters.

NDO-x days, when the vessel is designed for No Discharge Operation during x days,

HVSC, granted to ships fitted with certified installation for “cold ironing”

BWT, when the vessel is fitted with approved Ballast Water Treatment plant

GREEN PASSPORT, covering inventory of any potentially hazardous materials

EGCS-SCRUBBER for ships fitted with an exhaust gas cleaning system using scrubber installed in accordance with the provisions of BV Rules.

GAS-PREPARED for new ships having suitable arrangements to accommodate future installation of an LNG fuel gas system for propulsion or el-generation.

The notation “GAS PREPARED” can be completed by the following additional notations:

S, when specific arrangements are implemented for the ship structure

P, for piping

ME-DF, when the main engine(s) is (are) of dual fuel type

AEB, when aux. engines and oil-fired boilers are of dual fuel type, or designed to be converted to dual fuel

SCRUBBER READY when the ship is prepared for a later installation of an Exhaust Gas Cleaning System as described in BV NR 644.

D- SPECIAL BV RULES FOR PASSENGER SHIPS

Hull

In addition to the general requirements applicable for all ships, **passenger ships** have to comply with specific provisions as defined in **Part D Ch. 11 of the Rules, and Ch. 12 for Ro-ro passenger ships**.

Due to their specific design (large rooms, stairs, lifts, large openings in decks and side shell, design point of view and safety consideration), the structural strength is to be particularly checked.

An overall calculation using **Finite Element Method (FEM)** analysis is performed. The model includes all the different elements of the ship, such as all the decks, superstructure ... Results show among others which part is taken by these elements in the longitudinal strength, and allow refinement of the steel structure by determining the highly stressed areas.

Another particular item necessary to verify is the longitudinal and transverse behavior of the structure (i.e. the strength of end parts of the ship in way of large openings in side shell and the racking study due to rolling acceleration).

Equipment

The main and auxiliary machinery systems, piping systems and electrical plant are checked and surveyed for compliance with appropriate parts of the rules.

Special expertise has been developed within BV organization regarding **electrical propulsion** and **azimuth propulsion thrusters** which is quite popular for these types of ships.

Specific rules requirements have been developed to cover installation of **propulsion and el-production plants using gas as fuel**. Risk analysis covering the vessel itself and the interface with the bunkering facilities (trucks, barge or shore storage plant) are mandatory for this type of installation.

The regulations specific to passenger ships generally cover the requirements of Load Line and SOLAS Conventions (e.g. bilge systems, emergency source of power).

Fire Safety

In addition to the survey of fire-fighting systems on board a passenger ship, BV will systematically review and survey the fire prevention and associated safety measures such as escape arrangement.

In service, the Classification Society need be involved in any modification of accommodation spaces with respect to structural fire protection, the use of proper material and modifications related to SRtP and alternative design.

This review includes, at the design stage or even at the project stage the appraisal of the general arrangement of the ship, to ensure the correct arrangement of main fire bulkheads and of escape routes, the presence, enclosure and sizing of stairways, the relative location

of spaces such as main and emergency sources of power, etc. Further, the fire resistance of all bulkheads and decks are checked, including doors and penetrations.

Ventilation systems are to be designed to limit the spread of fire and smoke. Fire detection and alarm systems, sprinkler systems or equivalent systems are also thoroughly checked.

Materials used in the construction of accommodation and service spaces are to demonstrate satisfactory properties of fire reaction (e.g. non combustibility, low flame spread, smoke and toxicity levels, etc.). This practically implies that these materials are granted with a type approval certificate showing conformity with testing schemes listed in IMO “Fire Testing Procedures” code (FTP Code).

Membership in IACS, participation to the drafting of IMO instruments and experience as one of the leading classification societies for passenger ships allow BV to develop its interpretations. Specific requirements of Flag Administrations will also be taken into account.

Safe Return to Port

SOLAS requirement for “Safe Return to Port”, which entered into force for ships keel laid on or after 01st July 2010, applies to passenger ships of minimum 120m in length or having three or more main vertical zones. The meaning of it is to enable ships to return to a safe port under their own propulsion after a fire or flooding casualty which remains within well-defined casualty threshold.

Bureau Veritas was actively participating in the development of explanatory notes issued by IMO and since then in several passenger ship projects having to comply with these requirements. Working with administrations, shipyards, operators and suppliers of concerned systems, Bureau Veritas has gained a wide knowledge and expertise allowing us to help owners and designers to find safe and efficient solutions for ships having to comply with these requirements. *For technical details see Appendix 1.*

2. BUREAU VERITAS STATUTORY ACTIVITIES

A- INTERNATIONAL REGULATIONS

Bureau Veritas is recognized by more than one hundred thirty Administrations to act on their behalf on various statutory matters. A number of Flag Administrations have granted BV to issue, within the scope of **SOLAS Convention**, the **Passenger Ship Safety Certificates** (PSSC).

This includes in addition to class related matters, the examination, testing, initial and periodical surveys of ships construction with respect to structural fire protection and evacuation, lifesaving appliances, radio and navigation equipment, and approval of stability documents.

Examination of intact and damage stability documentation benefits of the extensive computer program library of the Society.

Other recognitions cover other conventions and codes such as **Load Line, Tonnage, MARPOL, IAFS, COLREG, ILO/MLC, IGF Code, Polar Code...**etc.

B- NATIONAL REGULATIONS & CO-OPERATION WITH U.S.C.G

A number of coastal States have promulgated national legislation and impose controls on compliance to the adopted technical regulation.

Concerning the passenger vessels operating in **US waters**, the **USCG COMDTINST M16000.7 Vol II.Ch 7B June 2014 (Examinations procedures for Foreign Passenger Vessels)** specifies that **USCG** have to review safety drawings of the ship in order to be satisfied that this vessel complies with applicable requirements of SOLAS 1974 as amended, prior to inspection of vessels which are to operate for the first time from a US port.

Bureau Veritas has signed in December 1997 an **Outline Of Co-operation with USCG (O.O.C)** to facilitate the control verification examination process.

BV is acting during the examination phase as **single point of contact to the USCG**, and BV specialists are also present during USCG visits.

Registration of the ship under the O.O.C scheme is to be requested by Owners to BV who will inform USCG accordingly.

During design review, BV will advise Owners, Designers and Yards on relevant USCG interpretations, and will present the project, during a concept review meeting at USCG's Marine Safety Centre in Washington Headquarter, to discuss, new or unusual arrangements.

Certain drawings, approved by BV on behalf of the Flag Administration, are submitted to USCG Marine Safety Center together with relevant documentation and list of applicable regulations and interpretations.

Compliance with approved drawings and USCG comments are verified during the building phase by attending BV's surveyors.

BV is informing USCG in due time on proposed dates for their visit(s) at the shipyard, and is assisting building yard and Owners in preparation for and planning of the USCG examination until issuance of the **USCG's Certificate of Compliance (COC)** at the first US port call.

3 – THE SOLAS CONVENTION

A – INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA

For the international shipping community, the safety of passenger ships had always been a priority. Disasters such as the Titanic sinking of 1912 caused international concern and it is significant that the most important treaty dealing with shipping safety is called the **International Convention for the Safety of Life at Sea (SOLAS)**. The first version was adopted in 1914, the second in 1929 and the third in 1948.

The 1960 Convention was the first major task for the International Maritime Organization (IMO) after its creation and it represented a considerable step forward in modernizing regulations and in keeping pace with technical developments in the shipping industry.

The present version was adopted in 1974 with entry into force in 1980, and has since then been subject to several sets of amendments (see “**Regulations recently in force or coming in the future**” in **Annex table n°1**).

Technical provisions concerning passenger vessels are contained in:

Chapter II-1: Construction – subdivision and stability, machinery and electrical installations.

Parts A & B are covering structure, subdivision and stability requirements.

The subdivision of passenger ships into watertight compartments must be such that after assumed damage to the ship’s hull, the vessel will remain afloat in a stable position. Requirements for the watertight integrity and bilge pumping arrangements for passenger ships are also laid down.

The degree of subdivision varies with the ship’s length and the service in which it is engaged. The highest degree of subdivision applies to ships of the greatest length primarily engaged in the carriage of passengers.

In parts C & D, requirements for machinery and electrical installations are detailed to ensure that services which are essential for the safety of the ship, passengers and crew are maintained under various emergency conditions.

SOLAS Chapter II-1 parts A and B have been totally revised starting with MSC 80 and MSC 82, including the new probabilistic damage stability requirements to be applied for new passenger ships having their keel laying date on or after on 01st January 2009. The revision of SOLAS chapter II-1, part B, is intended to harmonize the provisions on subdivision and damage stability for passenger and cargo ships.

The revised SOLAS chapter II-1, part B, contains the following parts:

Part B – Subdivision and Stability

Regulation 4

Part B-1- Stability

Regulations 5 to 8, with introduction of the new “Code on Intact Stability 2008” entered into force on 01st July 2010, and amended requirement on system capabilities and operational information after a flooding casualty on passenger ships.

Part B-2 – Subdivision, Watertightness and Weathertightness

Regulations 9 to 17-1

Part B-3 – Subdivision and Line Load Assignment for Passenger Ships

Regulation 18

Part B-4 – Stability Management

Regulations 19 to 23-3

In June 2015, the amendments adopted by the Committee introduced to SOLAS a new part G to Chapter II-1 (MSC.392(95)), and the Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels, **IGF Code** (resolution MSC.391(95)).

The mandatory provisions of the Code entered into force on 1st January 2017 and are applicable to new cargo ships ≥ 500 GT and passenger ships using natural gas as fuel:

- With a building contract placed on or after 1st January 2017; or
- In the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1st July 2017; or
- Regardless of the building contract or keel laying date, the delivery is on or after 1st January 2021.

The IGF Code does not apply to gas carriers certified to the IGC Code which use their cargoes as fuel or use other low-flashpoint gaseous fuels provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of the IGC Code for gas as a cargo.

Chapter II-1 has in 2017 been extensively revised (see IMO Res.MSC.421 (98)).

Regulation 4 – clarification of when probabilistic calculations are required

Regulation 5-1 – limiting curves to include trim

Regulation 6 – required subdivision index R modified

Regulation 7-2 – amending the calculation for s in the probability of survival

Regulation 9.3 – wells constructed in the double bottom

Regulation 19-1 – requirement to perform damage control drills

Regulation 22.3 – new requirements for opening of watertight doors during navigation (see revised MSC.1/Circ. 1564 – Guidance for watertight doors on Passenger ships which may be opened during navigation – new Annex: watertight doors will no longer be permitted to be left permanently open)

A list of further amendments and circulars can be found in the Annexes.

Chapter II-2: Construction – Fire protection, fire detection and fire extinction.

This chapter has been totally revised by the 2000 Amendments and contains separate provisions for the passenger ships. The revised chapter includes seven parts, each including requirements applicable to all or specified ship types, while the new Fire Safety Systems Code (FSS Code), which is made mandatory under the new chapter, includes detailed specifications for fire safety systems in 15 Chapters. New methodology, based

on modern fire prevention and fire-fighting techniques, and using fire load criteria and risk analysis methods, are now allowed, thus allowing new alternative designs as long as they are at least as safe as a design complying with the prescriptive SOLAS requirements.

Reference is also made in this chapter to the International Code for Application of Fire Test Procedures (FTP Code) in force since 01st July 1998 with a new edition adopted in December 2010 which entered into force on 01st July 2012 (2010 FTP Code).

Important changes have been made to Chapter II-2 with the Amendments adopted with MSC 82. Another important milestone was the introduction of the “safe return to port” concept (See Appendix 1).

In 2016 MSC 96 adopted amendments to SOLAS II-2/13.3.2 making evacuation analysis, to be performed early in design process, mandatory for passenger ships carrying more than 36 passengers keel laid on or after 1st January 2020. See also revised Guidelines for evacuation analysis (MSC.1/Circ. 1533).

A list of further amendments and circulars can be found in the Annexes.

Chapter III: Life-saving appliances and arrangements

Completely redrafted by the 96 Amendments, this chapter is divided in two parts, and contains specific requirements for passenger vessels.

This chapter refers to the International Life-Saving Appliance Code (LSA Code) entered into force on 01st July 1998 with the last edition dated September 2010.

Current changes include the amendment of Regulation 30 (require damage control drills) and Regulation 37 (include damage control for flooding emergencies) – see IMO Res.MSC.421 (98).

A list of further amendments and circulars can be found in the Annexes.

Chapter IV: Radiotelegraphy and radiotelephony

This chapter contains all requirements for the Global Maritime Distress and Safety System (GMDSS) as set out in Nov 88 SOLAS Amendments, in force for every existing ships since 01st February 1999.

Chapter V: Safety of navigation

This chapter covers safety of navigation, includes requirements on navigation and emergency procedures, navigation equipment and documentation, and manning.

Regulation 23, in force since 01st July 1997, requires for all passenger ships a list of operational limitations and exemptions to be kept onboard. A new revised chapter V was adopted in December 2000, which entered into force on 1st July 2002. The new chapter makes mandatory the carriage of voyage data recorders (VDRs) and automatic ship identification systems (AIS) for certain ships.

The 2009 Amendments required passenger ships keel laid on or after 1st July 2011 be fitted with a bridge navigational watch alarm system (BNWAS). This applies as well to existing ships (Res. MSC.350 (92)).

Ships keel laid on or after 1st July 2012 shall be provided with an Electronic Chart Display and information system (ECDIS); applies to existing ships as well (first survey after 1st July 2014).

Chapter IX: Management of the safe operation of ships

This chapter has, after its entry into force on 1st July 1998, made the International Safety Management (ISM) Code mandatory.

Chapter X: Safety measures for High-Speed Craft.

This chapter has, after its entry into force on 1st January 1996, made the International Code of Safety for High Speed Craft (HSC Code) mandatory. Since then, several amendments were introduced.

Chapters XI-1 & XI-2: Enhanced maritime Safety and Security measures

This sub-chapters deal with measures to enhance maritime safety and maritime security, with the later one referring to the International Ship and Port Facility Security Code (ISPS Code) .

The ISPS Code is divided into two parts.

- Part A is made mandatory under SOLAS Chapter XI-2, as is the ISM Code under Chapter IX.

- Part B is a Guidance Note intended to clarify the provisions of SOLAS Chapter XI-2 and Part A of the ISPS Code. Most of major authorities, and among them USCG, ask for compliance with part A together with part B as applicable.

Chapter XIV: “Safety measures for ships operating in polar waters”.

IMO has adopted the International Code for Ships Operating in Polar Waters (Polar Code) and related amendments to make it mandatory under both the International Convention for the Safety of Life at Sea (MSC.385 (94) Nov 2014 Amendments to SOLAS) and the International Convention for the Prevention of Pollution from Ships (MEPC.264 (68) May 2015 with Amendments to MARPOL Annexes I, II, IV & V).

The SOLAS amendments came into force on 1st January 2017 applicable to new ships constructed on or after that date. Ships constructed before 1 January 2017 are required to meet the relevant requirements of the Polar Code by the first intermediate or renewal survey, whichever occurs first, after 1st January 2018.

The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles.

The Polar Code includes mandatory measures covering safety (part I-A) and pollution prevention (part II-A) as well as recommendatory provisions for both (parts I-B and II-B). The Code will require ships intending to operate in the defined waters of the Antarctic and Arctic to apply for a Polar Ship Certificate, which would classify the vessel as:

- Category A ship – ships designed for operation in polar waters at least in medium first-year ice, which may include old ice inclusions;
- Category B ship – a ship not included in category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions; or
- Category C ship – a ship designed to operate in open water or in ice conditions less severe than those included in Categories A and B.

The issuance of a certificate would require an assessment, taking into account the anticipated range of operating conditions in the polar waters, and it would include information on identified operational limitations, and plans or procedures or additional safety equipment necessary to mitigate incidents with potential safety or environmental consequences.

Ships will need to carry a Polar Water Operational Manual, providing the Owner, Operator, Master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.

B –WORK IN PROGRESS at IMO–

| Following important work related to safety on passenger ships is still going on:

- | • Stability support for the master

| Draft amendments to SOLAS II-1/1 and II-1/8-1 on computerized stability support for the master (stability computer) in case flooding for existing passenger ships has been approved by MSC98 with a view to adoption at MSC99.

- | • Escape route signs

| MSC98 approved a Draft assembly resolution on escape route signs and equipment location markings with a view to adoption at IMO Assembly 30meeting with an entry into force date of 1st January 2019.

4 - OPERATIONAL PROCEDURES AND STANDARDS

A- FOR A GLOBAL APPROACH OF MARINE SAFETY

The safety of maritime transports is dependent upon:

- The ship condition;
- A satisfactory ship management system and
- The competence of management and crew.

1. The ship condition is covered by the classification and statutory requirements dealing with the design, construction and maintenance of the ship.

This approach considers the ship technical condition which is regularly verified by BV when conducting surveys on board. However, statistics shows that only about 20% of the casualties relate to the condition of the ship whilst the majority of incidents are the result of human errors involving then the ship management system, the competence of ship's crew and the Company management.

2. The ship management system requirements are covered by the International Safety Management Code (ISM Code) for the Safe Operation of Ships and Pollution Prevention, the fourth edition of it entered into force on 1st January 2015.

3. The Company (owner of the ship or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner) shall establish and implement the Safety Management System for compliance with the requirements of the ISM Code in the Company and onboard any managed vessel.

A "Document of Compliance" (DOC), valid for maximum 5 years, shall be issued to the Company, after a satisfactory audit in the Company has been performed. Each DOC is related to only one Flag Administration and shall state ship types managed by the Company with that Flag.

The validity of the DOC is maintained by satisfactory annual company periodical audits which are to be performed in the window of plus/minus three months from the anniversary date of the subject certificate.

A "Safety Management Certificate" (SMC), valid for maximum 5 years, shall be issued for each ship after a satisfactory audit on board has been performed and confirmation that the Company is holding valid DOC for the Flag and the type of the vessel concerned. The validity of SMC is maintained by one intermediate onboard audit which is to be performed in the window between second and third anniversary date of the subject certificate.

4. With the ship condition assessment and the Safety Management System certification, the crew qualification is the next element ensuring the safety onboard vessels. The competence requirements for seafarers are defined in Standards of Training, Certification and Watch keeping for Seafarers Code (STCW Code), with the latest Manila amendments adopted in 2010 which entered into force 2012.

Compliance with the a.m. topics will and has led to increased safety levels on board and at the same time may limit the risk of incidents hence protecting the crew, the vessel and the environment.

B- IMPLEMENTATION OF ISM CODE

From Bureau Veritas view, the ship classification and the Ship Management System certification are independent activities. This allows the ship Manager to entrust the certification of Safety Management System to any recognized organization regardless of the Classification Society of managed ships.

Following actions have been taken by Bureau Veritas in order to meet the demand from the industry:

- acting as Recognized Security Organization (RSO) for numerous Contracting Governments.
- establishing a network of more than 340 ISM auditors located worldwide
- enhancing performance of training courses in Companies related to ISM Code requirements as well as training courses for internal ISM Auditors and Designated Persons Ashore (DPA).

C- THE COMMON APPROACH OF ISM CODE AND ISO STANDARDS

Company Safety Management System created for compliance with ISM Code may be merged with other management systems established by the Company for compliance with international standards, such as:

- ISO 9001 – Quality management,
- ISO 14001- Environmental management
- OHSAS 18001 – Occupational health and safety management
- ISO 22000 – Food safety management
- ISO 50001 – Energy management,

Integrated Management System approach intends to facilitate the certification process and reduce the costs related to verification of compliance and certification of the Company and ships.

Bureau Veritas Marine and Offshore Division together with Bureau Veritas Certification have developed the network which will assist the Companies in preparation, verification of compliance and certification of Integrated Management Systems as per Company needs.

5 – INT^{AL} SHIP & PORT FACILITY SECURITY CODE (ISPS CODE)

The ISPS Code applies to all passenger ships, including high-speed passenger crafts. In addition to all other types of ships where the SOLAS regulation applies, the ISPS Code also applies to all port facilities and ports (as defined by the European Commission Directive 2005/65/EC) serving such ships engaged on international voyages, when required by the Contracting Governments.

In order to fully comply with the ISPS Code, the Company is to perform an on-scene survey, onboard any managed ship, which is to serve as a basis for the Ship Security Assessment (SSA), and from this assessment prepare a Ship Security Plan (SSP) to be approved by, or on behalf of, the Administration.

The SSP has to be fully implemented onboard and such implementation assessed by a Marine Management System Auditor (MMSA) who, if satisfied with the results of the audit, will issue an “International Ship Security Certificate” (ISSC) with validity of maximum 5 years. The validity of ISSC is maintained by one intermediate onboard audit which is to be performed in the window between second and third anniversary date of the subject certificate.

The Company has to nominate a Company Security Officer (CSO) to one or more ships and a Ship Security Officer (SSO) to each ship, with the responsibility for the full implementation of the Code on board the managed ship.

Bureau Veritas can help the Companies to implement the ISPS Code and therefore following actions have been taken by BV at an early stage in order to satisfy the demand from the industry:

- Bureau Veritas is acting as Recognized Security Organization (RSO) for numerous contracting Governments.
- Establishment of a network of more than 330 auditors located worldwide, which have been qualified as Marine Management Systems Auditors (MMSA).
- Develop performance of CSO and SSO training sessions within the Company

6 – MARITIME LABOUR CONVENTION, 2006

Desiring to create a single, coherent instrument embodying as far as possible all up-to-date standards of existing international maritime Labour Conventions and Recommendations, as well as the fundamental principles to be found in other international labour Conventions, the General Conference of the International Labour Organization, adopted the Maritime Labour Convention in November 2006 during its 94th Session in Geneva.

MLC 2006 shall come in force, for ratifying member states, one year after the ratification date. As of autumn 2017 the Convention has been ratified by 84 ILO member states representing 91% of world GT.

The MLC, 2006, applies to all seafarers on all ships covered by the Convention. All ships registered with a flag State, if covered by the MLC, 2006, are subject to an inspection for compliance with the requirements of the MLC, 2006.

On top of that, ships of 500 GT or over engaged in international voyages or ships of 500 GT or over that fly the flag of one country and operate from a port or between ports in another Country are to be certified in accordance with MLC 2006 until entry into force date for a single flag State.

Overview of MLC certification process:

1) Issuance of Declaration of Maritime Labor Compliance Part I (DMLC I):

DMLC, Part I is to be completed and issued by the competent authority of the flag State. It contains references to the relevant details of the national requirements implementing the MLC, 2006. Any national substantial equivalence and any exemption granted by the flag State must be specified in the DMLC, Part I.

2) Issuance and review of Declaration of Maritime Labor Compliance Part II (DMLC II):

DMLC II is to be completed by the ship-owner and must identify the measures adopted to ensure ongoing compliance with the national requirements, defined in DMLC I, between inspections and the measures proposed to ensure that there is continuous improvement.

DMLC II is subject to review by the competent authority of the flag State or an RO on its behalf following which the DMLC II review letter is issued.

3) Onboard inspection for certification:

A full scope onboard inspection is required in order to check the implementation of measures defined in DMLC II. A Maritime Labor Certificate is issued by the competent authority of the flag State, or by an authorized RO on its behalf, on completion of a satisfactory inspection. DMLC I and II must be attached to the certificate. The certificate is issued for a period not exceeding five years. The validity of MLC Certificate is maintained by one intermediate onboard audit which is to be performed in the window between second and third anniversary date of the subject certificate.

As on today, Bureau Veritas is authorized as Recognized Organization for onboard inspections and issuance of MLC certificates by numerous MLC ratifying and non-ratifying flags and has, with the worldwide network of about 310 MLC Inspectors, certified about 4300 vessels for compliance with requirements of MLC 2006.

Bureau Veritas is offering following services related to MLC 2006:

- GAP analysis for compliance with requirements of MLC 2006, for non-ratifying flag States, or national requirements defined in DMLC I for ratifying flag States
- Review of DMLC part II and certification of ships of ratifying flag states (in accordance with flag recognition)
- Voluntary certification of ships of non-ratifying flag states and ships < 500 GT
- External training courses for introduction to MLC 2006 and full training courses for MLC 2006 inspectors
- An on line MLC 2006 Inspector E-learning training course
- Certification of Seafarers Manning Offices for compliance with requirements of MLC 2006 Regulation 1.4

7 – BV TRAINING SOLUTIONS

BV, recognizing that an active training policy is a fundamental issue for all business enterprises, had developed a dedicated service called: “BV Training Solutions”.

The training services provided by the Marine Division are built upon the skills gained from more than 180 years of experience in ships and companies’ surveys, audits and inspections as well as in design review. Bureau Veritas may provide training in many different formats: in-door, on-site, advanced training, e-learning and webinars (please refer to BV Training Catalogue and Training Calendar on our website “www.veristar.com”).

Many subjects are already covered and any specific needs maybe analyzed by our trainers on demand. It includes subjects as:

- Internal auditors (ISM/ISPS/MLC)
- Accidents prevention
- Risk Assessment
- Preventing detentions – ready for PSC inspections
- Rules and Regulations
- Passenger & Ro-Pax vessel safety
- ISM Code
- ISPS Code
- ILO Maritime Labour Convention MLC 2006

More than 1.500 officers and staff from shipping companies participated to various MLC 2006 courses organized by Bureau Veritas worldwide. Every year BV publishes a Training Calendar (available through the BV website <http://www.veristar.com>) including about 30 different titles in training sessions delivered in many countries worldwide. The proposed training courses, cover the technical aspects of shipping, international regulations and management tools.

In addition to the training courses organized in Bureau Veritas training centres the tailor made in-door training sessions, on any of the above subjects, can be scheduled and open to anyone interested or can be organized in ship owner’s premises upon request.

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Note: texts in italics are new or have been amended since previous revision:

Table n°1 Entry into force dates of recent SOLAS Amendments related to passenger ships.

<u>Entry into Force</u>	<u>SOLAS Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.07.2011	June 2009	V/19.2.2.3.1	New passenger ships keel laying date ≥01.07.2011	A Bridge Navigational Watch Alarm System (BNWAS) shall be installed and in operation whenever the ship is underway at sea.
First period. Survey after 01.07.2012		V/19.2.2.3.2	Passenger ships keel laying <01.07.2010	
01.07.2012	June 2009	V/19.2.10.1	New passenger ships keel laying date ≥01.07.2012 ≥500gt	Mandatory installation of an Electronic Chart Display and information System (ECDIS). (unless the ship is to be decommissioned within two years of the compliance date).
First period. Survey after 01.07.2014		V/19.2.10.5	Passenger ships keel laying <01.07.2012 ≥500gt	
01.07.2012	Res. MSC.308(88) Dec 2010	II-2/3	All new ships keel laying date ≥01.07.2012	The revised FSS Code as per Res.MSC.311 (88) becomes mandatory. Complete revised Ch 9 re. fire detection and fire alarm systems.
01.07.2012	Res. MSC.308(88) Dec 2010	II-2/3	All new ships keel laying date ≥01.07.2012	The 2010 FTP Code as per Res.MSC.307(88) become mandatory, including up-dated and new test procedures
01.07.2012	Res. MSC.308(88) Dec 2010	II-2/7.4.1	All new ships keel laying date ≥01.07.2012	Installation of fixed detection and fire alarm system required in enclosed spaces containing incinerators.
01.07.2012	Res. MSC.308(88) Dec 2010	V/18.9	All ships	Annual testing requirements for AIS. Test report to be available onboard.
01.07.2012	Res. MSC.308(88) Dec 2010	V/23	Installation on ships ≥ 01.07.2012	Requirements on equipment and arrangements for pilot transfer, and prohibition of mechanical pilot hoist.
01.01.2014	Res. MSC.325(90) March 2012	II-1/8-1	New passenger ships built ≥01.01.2014	Ships subjected to Safe Return To Port shall be either fitted with onboard stability computer or to have shore-based support.
01.01.2014	Res. MSC.325(90) March 2012	V/14	All ships	Minimum safe manning to be established in accordance with Resolution A 1047(27)
01.01.2014	Res. MSC.325(90) March 2012	FSS Code Ch.8	All new ships	Dry pipe system or pre-action system allowed for sprinkler system in control stations where water may cause damage to essential equipment.
01.01.2014	Res. MSC.338(91) Nov 2012	III/17-1	Ships built ≥01.07.2014	All ships to have plans and procedures to recover persons from the water, taking into account the guidelines MSC.1/Circ.1412
First period. Survey after 01.07.2014			Ships built <01.07.2014	
01.07.2014	Res. MSC.337(91) & 338(91) Nov 2012	II-1/3-12	All new ships Contract date, ≥01.07.2014 Or keel laying date, ≥01.01.2015 Or delivery date ≥01.07.2018	Adoption of the Code of Noise Levels onboard ships, and implementation of this code for new ships /1,600gt

<u>Entry into Force</u>	<u>SOLAS Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.07.2014	Res. MSC.338(91) Nov 2012	II-2/9	All new ships keel laying date ≥01.07.2014	Stricter requirement for fire integrity for bulkheads and decks within ro-ro and special category spaces.
01/07/2014 ----- to be complied by 01/07/2019	Res. MSC.338(91) Nov 2012	II-2/10.10.1 FSS Code Ch 3	Ships keel laid ≥01.07.2014 -- ----- Ships keel laid <01.07.2014	Requirement for audible alarm device to notify low air pressure in the self-contained compressed air breathing apparatus cylinders.
01.07.2014	Res. MSC.338(91) Nov 2012	II-2/10.5.6.3	Ships keel laid <01.07.2014	Requirement for fixed water based local application firefighting system applicable for any internal combustion machinery located in cat A machinery space, regardless of service it supplies power to.
01.07.2014 ----- First period. Survey after 01.07.2018	Res. MSC.338(91) Nov 2012	II-2/10.10.4	Ships keel laid ≥01.07.2014 ----- Ships keel laid <01.07.2014	New requirement for carriage of two-ways portable radio apparatus of explosion proof or intrinsically safe type for fire-fighter's communication
01.07.2014	Res. MSC.338(91) Nov 2012	II-2/15.2.2.6	New passenger ships keel laying date ≥01.07.2012 ≥500gt	Requirements for means of recharging breathing apparatus cylinders used during drills, or suitable number of spare cylinders for replacement.
01.07.2014 ----- First period. Survey after 01.07.2014	Res. MSC.346(91) Nov 2012	III/17-1.1	Ships keel laid ≥01.07.2014 ----- Ships keel laid <01.07.2014	Requirement for ro-ro and non ro-ro passenger ships to have ship-specific plans and procedures for recovery of persons from the water.
01.01.2015	Res. MSC.350(92) June 2013	III/19.2.2 & 19.2.3	All passenger ships	On ships where passengers are staying more than 24 hrs, muster of newly embarked passengers shall take place prior to or immediately upon departure.
01.01.2015	Res. MSC.350(92) June 2013	III/19.3.3 & 19.3.6	All ships	Enclosed space entry and rescue drills at least once every two months become mandatory.
01.01.2016	Res MSC.350(92) June 2013	V/19.1.2.4	Ships keel laid <30.06.2002	To clarify that BNWAS is applicable to all ships including those built before 01.01.2002
01.01.2016	Res MSC.365(93) Nov 2014	II-1/29.3.2 & 29.4.2	All ships	Alternative methods to demonstrate compliance with testing requirements of steering gear during sea trials.
01.01.2016	Res MSC.365(93) Nov 2014	II-2/3.54 to .56	All ships	Definition of fire damper and smoke damper.
01.01.2016	Res MSC.365(93) Nov 2014	II-2/9.7	Ships keel laid ≥01.01.2016	New requirements for ventilation duct construction and installation.
01.01.2016	Res MSC.365(93) Nov 2014	New §: II-2/13.4.1.5 & .6 and 13.4.2.4 to .6	Ships keel laid ≥01.01.2016	Enhanced requirement for escape from machinery spaces, and new requirements for sheltered means of escape from workshops and control rooms within machinery spaces. See MSC.1/Circ.1511
01.07.2016	Res MSC.380(94) Nov 2014	XI-1/7 (new reg.)	All ships	New regulation requiring atmosphere testing instruments for enclosed spaces to be carried on board.

<u>Entry into Force</u>	<u>SOLAS Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.01.2017 ----- first renewal survey after 01.01.2018	Res MSC.385(94) & MSC.386(94) Nov 2014	New SOLAS Ch XIV & Res A.1024(26)	Ships operating in polar waters: Keel laid $\geq 01.01.2017$ $< 01.01.2017$	All ships which intend to operate in the polar areas have to be assessed for compliance with the new Polar Code and will have to carry a polar certificate.
01.01.2017	Res. MSC.391(95) & 392(95) June 2015	Amendts to - Ch II-1 Part G New IGF Code - Ch II-2/4	All new ships Contract date, $\geq 01.01.2017$ Or keel laying date, $\geq 01.07.2017$ Or delivery date $\geq 01.01.2021$	Adoption of new international code of safety for ships using gases or other low flash point fuels, except for those regulated by IGC Code(IGF Code)
01.01.2017	Res. MSC.391(95) June 2015	II-2/20.3	Ships keel laid $\geq 01.01.2017$	Regulation allowing for alternative to the prescriptive ventilation rates in special category and ro-ro spaces on the basis of an air quality control system, complying with MSC.1/Circ.1515
1.01.2020	Res. MSC.404(96) May 2016	II-2/13	Ships keel laid $\geq 01.01.2020$	Evacuation analysis in accordance with MSC.1/Circ. 1533 to be performed for all passenger ships carrying more than 36 passengers
01.01.2020	Res. MSC.404(96) May 2016	II-2/3, II-2/18	All ships	Foam fire extinguishing system complying with chapter 17 of the FSS Code (MSC.403(96)) to be provided for ships having helicopter landing area
01.01.2020	Res. MSC.404(96) May 2016	III/3, III/20	All ships	Thorough examination, operational testing, overhaul, required maintenance and repair of lifeboats and rescue boats, launching appliances and release gear according to IMO Res.MSC.402 (96).
01.01.2020	Res.MSC.409(97) November 2016	II-2/3, II-2/10.5	Ships keel laid $< 01.10.2020$ including those keel laid $< 01.07.2012$	135 l foam-type extinguisher not required in boiler spaces protected by fixed water-based local application fire-extinguishing system or boilers having less than 175 kW
01.01.2020	Res. MSC.421(98) June 2017	II-1/6, II-1/9, II-1/12, II-1/19-1, II-1/22	Ships keel laid $\geq 01.01.2020$	Revised R index depending on number of passengers; damage control drills to be performed; revised guidance for watertight doors which may be opened during navigation (MSC.1/Circ.1564)
01.01.2020	Res. MSC.421(98) June 2017	II-2/9, II-2/20	Ships keel laid $\geq 01.01.2020$	On passenger ships < 36 pax windows facing survival craft, embarkation and assembly stations, external stairs and open decks for escape routes and windows situated below liferaft and escape slide embarkation areas to be of at least equal to class A-0; vehicles with fuel in their tanks for their own propulsion can be carried in cargo spaces complying with regulation II-2/19 and subject that they are carried in accordance with the IMDG Code

Table n°2 List of Amendments to SOLAS 74

<u>SOLAS Amendments</u>	<u>resolution n° or SOLAS Conference</u>
May 1981	SOLAS 78 protocol
1983	Res. MSC 6 (48)
April 1988	Res. MSC 11 (55)
Oct. 1988	Res. MSC 12 (56)
Nov. 1988	GMDSS SOLAS conference
1988 Protocol	Nov 88 SOLAS conference
1989	Res. MSC 13 (57)
1990	Res. MSC 19 (58)
1991	Res. MSC 22 (59)
April 1992	Res. MSC 24 & 26 (60)
Dec. 1992	Res. MSC 27 (61)
May 1994	May 94 SOLAS conference & Res. MSC 31 (63)
Dec. 1994	Res. MSC 42 (64)
May 1995	Res. MSC 46 (65)
Nov. 1995	Nov 95 SOLAS conference
June 1996	Res. MSC 47 (66)
Dec. 1996	Res. MSC 57 (67)
June 1997	Res. MSC 65 (68)
Nov. 1998	Sept 97 SOLAS conference
1998 Amendts	Res. MSC.69 (69)
May 2000	Res. MSC 91 (72)
Dec 2000	Res. MSC 99 (73)
2001 Amendts	Res. MSC 117 (74)
Dec 2002	Res. MSC 134 (76)

<u>SOLAS Amendments</u>	<u>resolution n° or SOLAS Conference</u>
Dec 2002 London Conf.	Amendments on Maritime security
2003	Res. MSC 142 (77)
May 2004	Res. MSC 151 to 153 (78)
Dec 2004	Res. MSC 170 & 171 (79)
May 2005	Res. MSC 194 (80)
May 2006	Res. MSC 201 & 202 (81)
Dec 2006	Res. MSC 216(82), 227 (82)
May 2007	Res. MSC 239 & 240 (83)
May 2008	Res. MSC 256 & 257 (84)
Dec 2008	Res. MSC 269 (85)
June 2009	Res. MSC.282 & 283 (86)
May 2010	Res. MSC.290 & 291 (87)
Dec 2010	Res. MSC 308 & 309 (88)
May 2011	Res. MSC 317 (89)
June 2012	Res. MSC 325 (90)
Nov 2012	Res. MSC 338 (91)
June 2013	Res. MSC 350 (92)
May 2014	Res. MSC 365 & 366 (93)
Nov 2014	Res. MSC 380 & 386 (94)
June 2015	Res. MSC 392 (95)
May 2016	<i>Res. MSC 402 to 405 and 407(96)</i>
Nov 2016	<i>Res. MSC 409 and 411(97)</i>
June 2017	<i>Res. MSC 421 to 425, 427 and 429(98)</i>

Table n°3 List of amendments to other Conventions than SOLAS

<u>Conventions, Codes Amendments</u>	<u>resolution n° or Conference</u>
MARPOL, Annex II 1989 Amendments	Res. MEPC.34 (27)
MARPOL, Annex I 1991 Amendments	Res. MEPC.47 (31)
MARPOL, Annex I 1992 Amendments	Res. MEPC.51 (32) & Res. MEPC.52 (32)
MARPOL Annex III 1992 Amendments	Res. MEPC.58 (33)
MARPOL, Annex V 1995 Amendments	Res. MEPC.65 (37)
MARPOL Annex VI 1997 protocol	MARPOL conference September 1997
MARPOL Annex I 1999 Amendments	Res. MEPC. 78 (43)
MARPOL Annex II 1999 Amendments	Res. MEPC. 78 (43)
MARPOL Annex IV 2000 Amendments	Res. MEPC. 88 (45)
MARPOL Annex V 2000 Amendments	Res. MEPC. 89 (45)
MARPOL Annex I 2001 Amendments	Res. MEPC. 95 (46)
MARPOL Annex I 2003 Amendments	Res. MEPC. 107 (49)
MARPOL Annex I 2004 Amendments	Res. MEPC. 117 (52)
MARPOL Annex I 2006 Amendments	Res. MEPC.141 (54)
MARPOL 2007 Amendments	MEPC.56
MARPOL 2008 Amendments	MEPC.57 & MEPC.58
Ballast Water Managt Convention Feb 2004	International Convention on control of management of ship's water ballast and sediments
MEPC.288(71) July 2017	<i>Implementation of the BWM Convention</i>

<u>Conventions, Codes Amendments</u>	<u>resolution n° or Conference</u>
MARPOL Annex VI 2008 Amendments	Res. MEPC.176 (58)
MARPOL Annex I 2009 Amendments	Res. MEPC.186 & 187 (59)
MARPOL Annex VI 2009 Amendments	Res. MEPC.180 & 181 (59)
MARPOL Annex I 03/2010 Amendments	Res. MEPC.189 (60)
MARPOL Annex VI 03/2010 Amendments	Res. MEPC.190 (60)
MARPOL Annex III & V 10/2010 Amendments	Res. MEPC.193 (61)
MARPOL Annex VI 07/2011 Amendments	Res. MEPC.200 (62)
MARPOL Annex V 07/2011 Amendments	Res. MEPC.201 (62)
MARPOL Annex I, IV,V 07/2012 Amendments	Res. MEPC.216 (63)
MARPOL Annex I, VI 05/2013 Amendments	Res. MEPC.235(65) to 238(65)
MARPOL Annex I, VI 04/2014 Amendments	Res. MEPC.248(66) & 251(66)
MARPOL Annex I, III, VI 10/2014 Amendments	Res. MEPC.256(67) & 258(67)
MARPOL Annex I, III, VI 05/2015 Amendments	Res. MEPC.256(67) & 258(67)
MARPOL Annex IV, VI 04/2016	<i>Res. MEPC.271(69) to 272(69) and 274(69) to 275(69)</i>
MARPOL Annex VI 10/2016	<i>Res. MEPC.278(70) & 282(70)</i>
MARPOL Annex V, VI	<i>Res. MEPC.286(71) to 293(71) & 295(71)</i>
IAFS Convention	The International convention on the control of Harmful Anti-fouling Systems adopted Oct 2001
Hong Kong Convention July 2009	The International conference on the safe and Environmentally sound recycling of ships
MEPC 179 (59) 17 July 2009	Guidelines on inventory of hazardous materials

<u>Conventions, Codes Amendments</u>	<u>resolution n° or Conference</u>	<u>Conventions, Codes Amendments</u>	<u>resolution n° or Conference</u>
1994 HSC Code	Res. MSC. 36(63)	ILLC 66 / 1988 Protocol	Load Line Conference November 1988
2000 HSC Code	Res. MSC. 97(73)	1988 Load Line protocol Amendts June 2003	Res. MSC.143(77)
1994 HSC Code 2004 Amendments	Res. MSC. 174(79)	1988 Load Line protocol Amendts Dec 2004	Res. MSC.171(79)
2000 HSC Code 2004 Amendments	Res. MSC. 175(79)	1988 Load Line protocol Amendts Dec 2006	Res. MSC.223(82)
1994 & 2000 HSC Codes 2006 Amendments	Res. MSC. 221(82) & 222(82)	1988 Load Line protocol Amendts Dec 2008	Res. MSC.270(85)
1994 & 2000 HSC Codes May 2008 Amendments	Res. MSC. 259(84) & 260(84)	1988 Load Line protocol Amendts June 2012	Res. MSC.329(90)
2000 HSC Code Dec 2008 Amendments	Res. MSC. 271(85)	1988 Load Line protocol Amendts Nov 2012	Res. MSC.345(91)
2000 HSC Code Dec 2012 Amendments	Res. MSC. 326(90)	1988 Load Line protocol Amendts June 2013	Res. MSC.356(92)
1994 & 2000 HSC Codes June 2013 Amendments	Res. MSC. 351(92) & 352(92)	<i>1988 Load Line protocol Amendts May 2014</i>	<i>Res. MSC.375(93)</i>
1994 & 2000 HSC Codes June 2017 Amendments	<i>Res. MSC.423(98) & 424(98)</i>	<i>1988 Load Line protocol Amendts May 2014</i>	<i>Res. MSC.375(93)</i>

1997 STCW 78 convention amendments	Res. MSC.66 (68)
1997 STCW code amendments	Res. MSC. 67(68)
STCW Code Dec 2004 Amendments	Res. MSC 180 (79)
STCW Code June 2010 Amendments	Manila Amendments to the convention and code
STCW Code May 2014 Amendments	Res. MSC 374 (93)
STCW Code June 2015 Amendments	Res. MSC 396 & 397 (95)
<i>STCW Code November 2016 Amendments</i>	<i>Res. MSC 416 & 417 (97)</i>

COLREG 1993 Amendments	Res. A. 736(18)
COLREG 2007 Amendments	Res. A. 1004(25)
Stockholm Agreement (regional agreement)	Meeting in Stockholm February 1996
IAFS Convention	The International convention on the control Of Harmful Anti-fouling Systems adopted Oct 2001

Table n°4 Main IMO Circulars and Resolutions related to Passenger ships

Document reference	Date of issue	title
MSC / Circ. 681	05/1995	Guidelines for Passenger safety instructions on ro-ro passenger ships
MSC / Circ. 699	07/1995	Revised guidelines for Passenger safety instructions
MSC / Circ. 735	06/1996	Rec. on design & operation of pax ships for need of elderly & disabled persons .
MSC / Circ. 777	12/1996	Indication of “ Assembly Stations ” in passenger ships
MSC / Circ. 800	06/1997	Safety measures for deep-fat cooking equipment
MSC / Circ. 808	06/1997	Recommendation on performance standards for public address syst. On Pax ships
MSC / Circ. 810	06/1997	Recommendation on means of rescue on ro-ro passenger ships.
MSC / Circ. 887	12/1998	Interpretations of vague term in Solas III/50 and LSA Code § VII/7.2
MSC / Circ. 910	06/1999	Rec. on strength of ro-ro passenger ship “ B ” class bulkheads with handrails.
MSC.1 / Circ. 1000	06/2001	Guidelines for preparation of search and rescue plans for passenger ships
MSC.1 / Circ. 1002	06/2001	Guidelines on alternative design and arrangements for fire safety
MSC.1 / Circ. 1003	06/2001	Guidelines for calculation of combustible materials in accommodation spaces.
MSC.1 / Circ. 1005	06/2001	Interpretations of vague expressions in SOLAS Ch II-2 Reg. 3.3.1 & 3.3.2
MSC.1 / Circ. 1016	06/2001	Applicat of reg III/26 re. fast rescue boats and means of rescue on ro-ro passenger.
MSC.1 / Circ. 1034	05/2002	Guideline for smoke control & ventilat. Syst for int. assembly station & atrium
MSC.1 / Circ. 1037	05/2002	Unified interpretations of the revised SOLAS Ch II-2
MSC.1 / Circ. 1042	05/2002	List of contents of “ emerg medical kit ” for use on Ro-Pax not carrying doctor
MSC.1 / Circ. 1050	05/2002	Shipboard plans for firefighting & lifesaving appliances, and means of escape.
MSC.1 / Circ. 1053	12/2002	Explanatory notes to the standard for ship manoeuvrability .
MSC.1 / Circ. 1097	06/2004	Guidance relating to the implementation of SOLAS XI-1 & the ISPS code .
MSC.1 / Circ. 1120	06/2004	Unified interpretations of SOLAS Ch II-2, the FSS Code & the FTP code .
MSC.1 / Circ. 1129	12/2004	Guidance on medical & sanitation related programs for passenger ships.
MSC.1 / Circ. 1132	12/2004	Guidance relating to the implementation of SOLAS XI-1 & the ISPS code .
MSC.1 / Circ. 1151	12/2004	List of certificates & documents required to be carried onboard ships.
MSC.1 / Circ. 1152	01/2005	Helicopter facilities on board ships
MSC.1 / Circ. 1158	05/2005	Unified interpretation of SOLAS Ch II-1 – lightweight survey
MSC.1 / Circ. 1161	05/2005	Guidance on training fast rescue boat launch and recovery teams
MSC.1 / Circ. 1165	06/2005	Revised guidelines for water-based fire-extinguishing systems for mach spaces
MSC.1 / Circ. 1166	06/2005	Guidelines for a simplified evacuation analysis for high-speed passenger craft.
MSC.1 / Circ. 1167	06/2005	Functional requirements and performance standards of evacuation guidance system
MSC.1 / Circ. 1169	06/2005	Unified interpretation of Ch II-2 for ventilation duct
MSC.1 / Circ. 1172	05/2005	Identification of pax ships other than ro-ro pax ships, which should be equipped with emergency medical kit (EMK)
MSC.1 / Circ. 1184	05/2006	Contingency planning guidance for pax ships operating in areas remote from SAR facilities
MSC.1 / Circ. 1187	05/2006	Operational recommendations for passenger ships with cabin balconies
MSC.1 / Circ. 1206	05/2006	Measures to prevent accident with lifeboats
MSC.1 / Circ. 1211	05/2006	Unified interpretations to Ch II-1 reg 10 and 12 regarding bow doors and the extension of the collision bulkhead.
MSC.1 / Circ. 1212	12/2006	Guidelines on alternative design & arrangement for SOLAS Ch II-1 and III.
MSC.1 / Circ. 1224	12/2006	Unified interpretations of SOLAS Ch V.
MSC.1 / Circ. 1238	10/2007	Guidelines for evacuation analysis for new & existing passenger ships
MSC.1 / Circ. 1242	10/2007	Guidelines for appr. of fixed fire detection and fire alarm syst. for cabin balconies
MSC.1 / Circ. 1244	10/2007	Symbol of infant lifejacket
MSC.1 / Circ. 1252	10/2007	Guidelines on annual testing of AIS
MSC.1 / Circ. 1255	05/2008	Guidelines on preparing emergency towing procedures
MSC.1 / Circ. 1268	05/2008	Guidelines for approval of fixed pressure water spraying and water based fire extinguishing system for balconies
MSC.1 / Circ. 1274	06/2008	Guidelines for evaluation of fire risk of external areas on passenger ships.
MSC.1 / Circ. 1275/Corr. 1	06/2017	<i>Interpret. of SOLAS II-2 on nbr and arrgt of portable fire extinguishers on ships</i>
MSC.1 / Circ. 1276	05/2008	Interpret. of SOLAS II-2

MSC.1 / Circ. 1281	12/2008	Explanatory notes to the international Code of Intact Stability, 2008
MSC.1 / Circ. 1291	12/2008	Guidelines for flooding detection systems on passenger ships
MSC.1 / Circ. 1318	06/2009	Guidelines for maintenance and inspections of fixed CO2 fire exting. Systems
MSC.1 / Circ. 1319	06/2009	Recommendat. for evaluation of fire performance & approval of large fire doors
MSC.1 / Circ. 1320	06/2009	Guidelines for drainage from ro-ro & special category spaces of passenger ships
MSC.1 / Circ. 1322	06/2009	Interpret. of SOLAS II-2
MSC.1 / Circ. 1328	06/2009	Guidelines for approval of inflatable liferafts for service intervals ≤ 30 months
MSC.1 / Circ. 1329	06/2009	Guidelines for uniform operating limitations for High Speed Crafts
MSC.1 / Circ. 1331	06/2009	Guidelines for construction, installation, maintenance & inspection of accommodation ladders & gangways .
MSC.1 / Circ. 1347	06/2010	Determination of the required safe working load of liferaft launching appliances
MSC.1 / Circ. 1348	06/2010	Guidelines for assessment of in-water survey in lieu of dry-dock bottom survey to permit one dry-dock in any 5 years period for passenger ships other than ro-ro.
MSC.1 / Circ. 1350	06/2010	Unified interpretat. Of SOLAS Ch.V/22.1.6 relating to navigation bridge visibility
MSC.1 / Circ. 1368	06/2010	Interim clarifications of SOLAS II-2 regarding interrelation between navigation bridge and safety centre
MSC.1 / Circ. 1369	06/2010	Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty. (SRTP) .
MSC.1 / Circ. 1369 Add. 1	12/2012	Interim explanatory notes for SRTP: rev to interpretations n°22 & 27 of MSC.1/Circ 1369
MSC.1 / Circ. 1374	12/2010	Information on prohibiting the use of asbestos on board ships
MSC.1 / Circ. 1380	12/2010	Guidance for watertight doors on passenger ships which may be opened at sea
MSC.1 / Circ. 1383	12/2010	Unified Interpretation of the International Code of Safety for High-Speed Craft, 94
MSC.1 / Circ. 1385	12/2010	Scientific methods on scaling of test volume for fire test on water-mist fire-extinguishing systems
MSC.1 / Circ. 1386	12/2010	Revised guidelines for water-based fire-extinguishing systems for mach spaces
MSC.1 / Circ. 1387	12/2010	Revised Guideline for approval of fixed water based local application fire-fighting syst. For cat A mach. Spaces.
MSC.1 / Circ. 1392	05/2011	Guidelines for evaluation and replacement of lifeboat release and retrieval systems
MSC.1 / Circ. 1397	06/2011	Unified interpretation SOLAS III/15.1 stowage of Marine Evacuation Systems
MSC.1 / Circ. 1400	05/2011	Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow
MSC.1 / Circ. 1402	05/2011	Safety of pilot transfer arrangements
MSC.1 / Circ. 1403	05/2011	Revised NAVTEX manual with entry into force on 01/01/2013
MSC.1 / Circ. 1407	05/2011	Guidelines for application of SOLAS regulation II-2/19.3
MSC.1 / Circ. 1416	06/2012	Unified interpretation of SOLAS II-1 / 28 & 29 regarding steering capability of ships with azimuth thrusters
MSC.1 / Circ. 1417	06/2012	Guidelines for passenger ship tenders
MSC.1 / Circ. 1418	06/2012	Guidelines for the design and installation of a visible element to the general emergency alarm on passenger ships
MSC.1 / Circ. 1423	06/2012	Unified interpretation to paragraph 1.2.2.6 of the LSA Code concerning lifeboat exterior color
MSC.1 / Circ. 1430	05/2012	Revised Guidelines for the design and approval of fixed water-based fire-fighting systems for ro-ro spaces and special category spaces
MSC.1 / Circ. 1432	05/2012	Revised guidelines for the maintenance and inspection of fire protection systems and appliances
MSC.1 / Circ. 1434	05/2012	Unified interpretations of SOLAS chapter II-2
MSC.1 / Circ. 1435	06/2012	Unified interpretations of the FTP Code
MSC.1 / Circ. 1437	05/2012	Amendments to Interim explanatory notes for assessment of passenger ship systems' capabilities for SRTP (MSC.1/Circ.1369)
MSC.1 / Circ. 1446 Rev.2	08/2013	Recommended interim measures for passenger ship companies to enhance safety of passenger ships (post Concordia)
MSC.1 / Circ. 1447	12/2012	Guidelines for development of plans and procedures for recovery of persons from water .
MSC.1 / Circ. 1455	06/2013	Guidelines for approval of alternatives & equivalents as provided in various IMO instruments
MSC.1 / Circ. 1456	06/2013	Unified interpretation of SOLAS Ch. II-2, FSS Code and FTP Code
MSC.1 / Circ. 1457	06/2013	Unified interpretation of the 2000 HSC Code

MSC.1 / Circ. 1462	07/2013	List of certificates & documents to be carried on board ships
MSC.1 / Circ. 1466	06/2013	Unified interpretation on fall preventer devices (MSC.1/Circ 1392 & 1327)
MSC.1 / Circ. 1467	06/2013	Unified interpretation SOLAS II-1/26.3 fuel pumps on ships when operating in ECA & non ECA areas.
MSC.1 / Circ. 1474	05/2014	Guidance on BNWAS – no use of Auto-function
MSC.1 / Circ. 1480	05/2014	Unified interpretation of SOLAS II-2/9.7.1.1 use of flexible below for fans
MSC.1 / Circ. 1488	01/2015	Unified Interpretation Pt 3 Annex 1 of FTP Code- cable & pipe penetration
MSC.1 / Circ. 1493	01/2015	Interim guidance for in-service testing of automatic sprinkler systems
MSC.1/circ. 1503 Rev. 1	06/2017	<i>ECDIS – Guidance for good practice</i>
MSC.1 / Circ. 1505	06/2015	Unified Interpretation SOLAS II-2 reg13.6 escape from ro-ro spaces
MSC.1 / Circ. 1509	06/2015	Unified Interpretation of Code On Noise Levels On Board Ships
MSC.1 / Circ. 1510	06/2015	Amendts to MSC/Circ. 1120 on Ch II-2, FSS code and FTP code
MSC.1 / Circ. 1511	06/2015	Unified Interpretation SOLAS Regs II-2.9 & II-2.13- escapes from mach spaces
MSC.1 / Circ. 1514	06/2015	Performance Standard & Functional Requirements for smoke managt systems
MSC.1 / Circ. 1515	06/2015	Revised Design Guidelines For Ventilation In Ro-Ro spaces
MSC.1 / Circ. 1516	06/2015	Amendts to Guidelines MSC.1/Circ.1432 for Maintenance & Inspection of Fire Protection systems
MSC.1/Circ. 1519	05/2016	<i>Guidance on Methodologies for assessing operational capabilities and limitations in Ice</i>
MSC.1/Circ. 1524	05/2016	Protection of helicopter landing areas by foam application system complying with the FSS Code Chapt. 17 – revision of MSC.1/Circ. 895
MSC.1/Circ. 1526	05/2016	<i>Interim guidelines on maritime cyber risk management</i>
MSC.1/Circ. 1527	05/2016	Unified Interpretation of SOLAS II-2/9.7.1.1 – material equivalent to steel used for vent ducts
MSC.1/Circ. 1530	05/2016	Unified Interpretation of SOLAS III/6.4 and 6.5 – specific guidance on general emergency alarm and public address systems
MSC.1/Circ. 1532	05/2016	<i>Revised Guidelines concerning the use of stability software by masters for SRtP</i>
MSC.1/Circ. 1533	05/2016	<i>Revised Guidelines on Evacuation Analysis for new and existing passenger ships</i>
MSC.1/Circ. 1539	05/2016	Unified Interpretation of SOLAS II-1/2.21 – Definition of lightweight to include also the weight of mediums used for fixed firefighting systems
MSC.1/Circ. 1555	11/2016	Unified Interpretation of suitable number of spare air cylinders for BA in connection with drills (SOLAS II-2/15.2.2.6)
MSC.1/Circ. 1564	06/2017	Revised Guidance for watertight doors which may be opened during navigation
MSC.1/Circ. 1570	06/2017	Amendments to section 3 of the Guidelines for damage control plans and information to the master (MSC.1/Circ. 1245)
MSC.1/Circ. 1571	06/2017	Unified Interpretation of SOLAS II-1 (subdivision and damage stability regulations)
MSC.1/Circ. 1574	06/2017	Interim Guidelines for use of Fiber Reinforced Plastic (FRP) elements within ship structures
MSC.1/Circ. 1576	06/2017	Annual testing of VDR, S-VDR, AIS and EPIRB
MSC.1/Circ. 1577	06/2017	UI on the application of COLREG with respect to placement of sidelights
MSC.1/Circ. 1578	06/2017	Guidelines on safety during abandon ship drills using lifeboats
MSC.1/Circ. 1580	06/2017	Guidelines for vessels with Dynamic Positioning (DP)
MSC.1/Circ. 1584	06/2017	Amendments to the Guidelines for evaluation and replacement of lifeboat release and retrieval systems (MSC.1/Circ. 1392)
Res. MSC.128(75)	2002	Performance standard for BNWAS
Res. MSC 137(76)	2002	Standards for ship's manoeuvrability
Res. MSC 158(78)	2004	Amendments to the technical provisions for means of access for inspections.
Res. MSC 232(82)	2006	Performance standard for ECDIS
Res. MSC 267(85)	2008	International Code on Intact Stability 2008
Res. MSC 281(85)	2008	Explanatory notes to SOLAS II-1 subdivisions & damage stability regulation
Res. MSC 292(87)	2009	Amendments to the international code FSS
Res. MSC 293(87)	2009	Amendments to the international code LSA
Res. MSC 307(88)	2010	New 2010 FTP Code
Res. MSC 311(88)	2010	Revised FSS Code
Res. MSC 337(91)	2013	Code of noise levels on board ships
Res. MSC 385(94)	2014	Code for Ships Operating in Polar Waters (Polar Code)
Res. MSC 391(95)	2015	Code of safety for ships using gases or other low-flashpoint fuels (IGF Code)

Res.A.691(17)	1991	Safety instructions to passengers
Res.A.752(18)	1993	Guidelines for evaluation, testing & application of LLL on passenger ships
Res.A.753(18)	1993	Guidelines for the application of plastic pipes on ships
Res.A.756(18)	1993	Guidelines on the information for fire control plans and booklets as II-2/20 & 41-2
Res.A.800(19)	1995	Revised guidelines for approval of equivalent sprinkler systems (water mist syst.)
Res.A.952(23)	2003	Graphical symbols for shipboard fire control plans
Res.A.1021(26)	2009	Code on alarms and indicators, 2009
MEPC. /Circ 421	11.2004	Cross references between old & new regs of MARPOL Annex I
MEPC.1/Circ.681	08.2009	Interim guidelines for calculation of Energy Efficiency Design Index (EEDI)
MEPC.1/Circ.682	08.2009	Interim guidelines for voluntary verification of the EEDI for new ships
MEPC.1/Circ.683	08.2009	Guidance on development of a SEEMP for new and existing ships.
MEPC.1/Circ.684	08.2009	Guidelines for voluntary use of Ship Energy Efficiency Operational Indicator (EEOI) for new and existing ships
MEPC.1/Circ.685	08.2009	Discharge of waste water from cruise ships in semi-closed and closed sea areas
Res.MEPC.224(64)	10.2012	Amendts to 2012 guidelines on calculat. method for attained EEDI for new ships.
Res.MEPC.231(65)	05.2013	Guidelines for calculation of reference lines for use with the Energy Efficiency Design Index (EEDI).
Res.MEPC.233(65)	05.2013	Guidelines for calculation of reference lines for use with the EEDI for cruise passenger ships having non-conventional propulsion
<i>Res. MEPC.289(71)</i>	<i>07/2017</i>	<i>Guidelines for ballast water exchange (G6)</i>
<i>Res. MEPC.291(71)</i>	<i>07/2017</i>	<i>The experience-building phase associated with the BWM Convention</i>
<i>BWM.2/Circ.61</i>	<i>07/2017</i>	<i>Guidance on contingency measures under the BWM Convention</i>
ISO 15371-2000	2000	Recommendation for fire extinguishing systems for deep-fat cooking equipment .
ISO 15370-2010	2010	Low Location Lighting arrangement on passenger ship
ISO 24409-1-2010	2010	Design, location and use of shipboard safety signs - Part 1: design principle

Table n° 5 Entry into force dates of amendments to Conventions other than SOLAS, and related to passenger ships				
<u>Entry into force</u>	<u>convention Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.07.2010	MARPOL Amendts Oct 2008	Annex VI Reg. 13.4	New ships constructed $\geq 01.01.2011$ GT/400	NOx certificates required for diesel engines according to Tier II.
		Annex VI Reg. 13.5	New ships constructed $\geq 01.01.2016$ (probably postponed until 2021) GT/400	NOx certificates required for diesel engines according to Tier III if operating in Emission Control Area (ECA).
		Annex VI Reg. 13.7	constructed $\geq 01.01.1990$ and $< 01.01.2000$ GT/400	NOx certificates required for diesel engines greater than 5000 kw according to Tier I. (already required for any engine installed on or after 01.01.2000)
08.09.2017	Ballast Water Management Convention 2004	Reg B-3.1, 2, 3, 4 and 10	Existing ships Keel laid $\leq 08.09.2017$	Ships comply with Ballast Water exchange standard (D-1) or BW performance ("treatment") standard (Reg D-2) on 8 th September 2017
		Reg B-3.1, 2, 3, 4 and 10	Existing ships Keel laid $\leq 08.09.2017$	Ships must comply with BW performance standard (Reg D-2) 1. at 1st IOPP renewal survey if - Survey completed on or after 08.09.2019 or - A renewal IOPP survey (deharmonized or not) completed after 08.09.2014 but prior to 08.09.2017; 2. At 2nd IOPP renewal survey after 08.09.2017 if 1st renewal survey completed prior to 08.09.2019 and if conditions under item 1 are not met.
		Reg B-3.1	Existing ships Keel laid $\leq 08.09.2017$ and delivered after that date	Ships comply with BW performance standard (Reg D-2) at 1 st IOPP renewal survey after delivery
		Reg B-3.5	New ships Keel laid $\geq 08.09.2017$	Ships comply with Ballast Water performance ("treatment") standard (Reg D-2) upon delivery.
01.07.2010	MARPOL Amendts Oct 2008	Annex VI Reg 12.3.1	delivery of ships or installation $\geq 19.05.2005$	Installations containing ozone depleting substances, other than HCFCs (hydro-chlorofluorocarbon), shall be prohibited.
01.08.2010	MARPOL Mar 2006	Annex I Reg.12A MEPC.141(54)	New ships delivered after 01.08.10 & aggregate F.O capacity $\geq 600m^3$	F.O tanks to be in protected location. Maximum capacity of any single tank limited to $2500m^3$

<u>Entry into force</u>	<u>convention Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.07.2010	MARPOL Amendts Oct 2008	Annex VI Reg 14.1.1 & 14.4.1	All ships ≥ 400 GT	The sulfur content of any fuel oil used in designated Emission Control Areas (ECA) shall not exceed 1.00% m/m S The sulfur content of any fuel oil used globally shall not exceed 4.50% m/m S
01.01.2010	European directive 2005/33/EC	Article 4b	All	Ships at berth for longer than 2 hours within European ports of EU are required to switch to 0.1% sulphur content marine fuel oil.
01.01.2012	MARPOL Amendts Oct 2008	Annex VI Reg 14.1.2	All ships ≥ 400 GT	The sulfur content of any fuel oil used globally shall not exceed 3.50% m/m S
01.08.2012	MARPOL Amendts March 2010	Annex VI Reg 13.6 & 14.3	All ships	Creation of new North American Emission Control Area (ECA)
01.01.2013	MARPOL Amendts July 2011	Annex V complete revision	All ships ≥ 100 GT & ships ≥ 15 persons	A garbage management plan is required. New restriction on discharges at sea.
01.01.2013	MARPOL Amendts July 2011	Annex VI New Ch 4	new ships contract date ≥ 01.01.2013 or Keel laid ≥ 01.07.2013 Or delivery date ≥ 01.07.2015	New ships, except those with diesel-electric, steam turbine or hybrid propulsion system are required to have an Attained EEDI. In addition, for ships ≥ 400 GT, some ship types are required to meet a calculated Attained EEDI ≤ Required EEDI. Passenger ships are not listed yet.
01.01.2013 ----- 1 st intermediate or renewal surv. of IAPP certif. after 01.01.2013	MARPOL Amendts July 2011	Annex VI New Ch 4 Reg 22	new ships ≥ 400 GT ----- existing ships ≥ 400 GT	New Ship Energy Efficiency Management Plan (SEEMP) to be available onboard. Its presence onboard to be verified at intermediate & renewal survey of IAPP certificate
20.08.2013	MLC 2006		All vessels	Entry into force of the Maritime Labour Convention (MLC 2006)
01.01.2014	MARPOL Amendts July 2011	Annex VI Reg 14	All ships	Creation of new Emission Control Area (ECA) in central America: in the region of Puerto Rico & US Virgin Islands.
01.01.2015	MARPOL Amendts Oct 2008	Annex VI Reg 14.4.3	All ships ≥ 400 GT	The sulfur content of any fuel oil used in designated Emission Control Areas (ECA) shall not exceed 0.10% m/m S
(if reception facilities ready) 01.01.2016 ----- 01.01.2018	MEPC.200(62)	MARPOL Annex IV Regs 1, 11 & 13.	New passenger ships: Keel laid ≥ 01.01.2016 ----- Existing pax ships: contract date ≤ 31.12.2015 or and delivery date ≤ 31.12.2017	Establishment of Special Area in the Baltic Sea. More stringent requirements within the Special Area for discharging sewage from passenger ships. Necessity to have holding tanks or a sewage treatment system meeting the new standard.
01.01.2016	MEPC.256(67)	MARPOL Annex I Ch 9 Reg.43	All ships	Use of oil as ballast is also prohibited in the Antarctic sea.

<u>Entry into force</u>	<u>convention Amendments</u>	<u>Regulation n°</u>	<u>Applicable to :</u>	<u>Subject of requirement</u>
01.01.2016	MEPC.251(66)	Revised NOX Technical Code (Tier III Standard) MARPOL Annex VI	Ships operating in the North American ECA or the U.S. Caribbean Sea ECA; and ships constructed on or after the date of adoption of a new ECA	On ships with a combined propulsion power <750 kW, diesel engines (>130 kW) installed on ships operating within an Emission Control Area are to meet the Tier III Nox emission standard
01.03.2016	MEPC.251(66)	MARPOL VI Chapter IV Attained EEDI	New passenger ships: Keel laid ≥01.03.2016	An Energy Efficiency Design Index (EEDI - Attained) is to be determined and assigned if the ship has a non-conventional method of propulsion, as defined in Regulation 2.41.
01.03.2016	MEPC.251(66)	MARPOL VI Chapter IV Required EEDI	New ro-ro passenger ships ≥ 10000gt : Keel laid ≥01.03.2016	The Attained Energy Efficiency Design Index (EEDI) is not to exceed a maximum Required EEDI as per regulation 21. EEDI requirements do not apply to ships which have diesel-electric propulsion, turbine propulsion or hybrid propulsion systems. The flag Administration can postpone compliance for up to four years from the compliance date. The Attained EEDI is first checked at the design stage and then confirmed during sea trials.
01.01.2019	MEPC.292(71)	MARPOL VI Appendix V	All ships	Information to be included in bunker delivery note for ships equipped with SOx scrubbers
01.01.2020	MEPC.176(58)	Revised MARPOL Annex VI Reg 12.3.2 Use of CFCs	delivery of ship or installation ≥01.01.2020	Installations (except permanently sealed equipment where there are no refrigerant charging connections or potentially removable components containing ozone depleting substances) containing HCFCs (hydro-chlorofluorocarbon) are prohibited
(Expected) 01.01.2020	MARPOL Amends Oct 2008	Annex VI Reg 14.1.3	All ships ≥ 400 GT	The sulfur content of any fuel oil used globally shall not exceed 0.50% m/m S
01.01.2021	MEPC.286(71)	MARPOL VI Reg. 13.6	All ships keel laid ≥01.01.21	Compliance with NOx Tier III emission limit when trading in Baltic Sea or the North Sea
U.S. Cruise Vessel Security and Safety Act of 2010 (27.07.2010) which applies to Passenger Ships: <ul style="list-style-type: none"> - carrying at least 250 passengers - having passenger sleeping facilities - on a voyage that embarks or disembarks passengers in the United States - not engaged on a coastwise voyage 				
27.01.2012	Title 46 US code 2010 Amends	§3507(a)(1) (A),(B),(D)(E)	- Ships rails at not less than 42 inches (1,07m) from deck - Each passenger & crew cabin's entry door shall be fitted with peep hole. - Video system to capture images of passengers falling overboard	
27.07.2010	Title 46 US code 2010 Amends	§3507(a)(1)(C)	New ships Keel laid ≥27.07.2010	In addition to requirements for existing ships: - Each passenger & crew cabin shall be equipped with security latches and time-sensitive key technology.

SAFE RETURN TO PORT (SRTP)

DECEMBER 2006 AMENDMENTS - MSC 216 (82):

GENERAL

In 2000 IMO started to evaluate whether the current regulations were still adequate for modern cruise vessel taking into account the growth in size as well as passenger capacity, and the development to operate in more remote areas.

More than 50% of cruise ships presently under construction are of the over-panamax type with a total number of persons onboard over 5,000. A rescue operation for such a great number of persons might be challenging as current regulations had been developed for much smaller vessels.

Several amendments to SOLAS were adopted during the 82nd session of the Maritime Safety Committee in December 2006 with the aim of preventing casualty but in the event of a casualty to improve survivability of the vessel so that all persons may safely remain onboard while the vessel proceed to a safe port.

As per these amendments, passenger ships shall be able to proceed to a safe port under their own power after a fire or a flooding casualty not exceeding a “casualty threshold” defined in these new regulations. During this “safe return to port” (SRTP) period, all persons onboard shall be accommodated in a “safe area” where basic services for their safety and health are available. If the “casualty threshold” is exceeded, SOLAS now requires some essential systems to be still operational for three hours in order to support the “orderly evacuation” of the vessel, considering one entire main fire zone lost.

These new concepts of “casualty threshold”, “safe area”, “safe return to port” and “orderly evacuation” have now to be applied to new ships having their keel laid on or after 1st July 2010, and having a length of 120m or more, or having three or more Main Vertical Zones (MVZ).

It is obvious that these so-called “safe return to port” rules have an impact on design, not only on large cruise ships (as originally thought), but also on small or medium size cruise ships and passenger ferries. Increased redundancy for propulsion, el-production and steering systems as well as new adapted architecture of safety systems will certainly have consequences on the design and most probably also on the cost.

The necessity to assess the capability of each concerned system to remain operational after a flooding or a fire casualty will require new studies from the yards at a very early stage of design, and will also need from the Administration or from the Class Societies working on their behalf, a new system-based approach philosophy for the assessment of the design taking into account the foreseen operational pattern of the vessel.

SAFE RETURN TO PORT REQUIREMENTS

As per new SOLAS regulation Ch II-2/21.1, passenger ships constructed on or after 1st July 2010 having a length of 120m or more, or having 3 or more main vertical fire zones, shall comply with the provisions of regulation II-2/21.

It is understood that all main vertical zones in the ship should be counted for the purpose of this regulation, irrespective of whether they contain accommodation spaces or not. Nevertheless, horizontal fire zone (special category and ro-ro spaces) should not be included in this count of main vertical zones. Same applies to vertical fire zone containing only tanks or void space (often the case for the most forward MVZ).

These new SOLAS amendments are introducing several new concepts which are detailed in the next paragraphs, such as: “Casualty Threshold”, “Essential Systems”, “Safe Area” and “Orderly Evacuation”.

New SOLAS regulations II-1/8-1, II-2/21 and II-2/22

- **Ch II-1 Reg 8-1** requires that “**essential systems**” listed in Ch II-2/21.4 remain operational after flooding of any single watertight compartment. It is important to note that both internal compartments and compartments having a boundary to the sea are concerned.

- **Ch II-2 Reg 21** provides design criteria for a “**safe return to port**” of the ship under its own propulsion after a fire casualty that does not exceed the “**casualty threshold**”. The fire casualty threshold is defined in §21.3 as being the loss of the space of origin up to the nearest A-class boundary if the space is protected by a fixed fire-fighting system, or the loss of the space of origin and adjacent spaces up to the nearest A-class boundaries which are not part of the space of origin.

As can be seen from the regulation text, the requirement was relatively vague and more detailed explanatory documents were needed by the industry for a proper and uniform implementation. Initial explanatory notes were developed by five leading classification societies (BV, DNV, GL, LR and RINA) with the assistance of major European Shipyards and some Operators, and were submitted by Italy and CLIA to the IMO Fire Protection subcommittee in October 2008. After review by a correspondence group and drafting of a proposal in April 2010 by IMO FP, the Maritime Safety Committee, at its eighty-seventh session in May 2010, approved the Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty, to provide additional guidance for the uniform implementation of SOLAS regulations II-1/8-1, II-2/21 and II-2/22. These notes were published as interim explanatory notes in June 2010 as **MSC.1/Circ.1369**.

Regarding extend of casualty threshold in the case of the space of origin not being protected by a fixed fire-extinguishing system, the following interpretation was approved with the explanatory notes:

- Casualty threshold may include spaces one deck above (considering that fire is spreading upwards, the deck below has been excluded from such extension).
- Only spaces within the same Main Vertical Zone have to be considered.

“**essential systems**” which are required to ensure propulsion and maneuverability after a casualty not exceeding the casualty threshold, and also to maintain safety in all parts of the ship not affected by the casualty, as well as to ensure services needed to be available in safe areas, are listed in § 4 of Regulation 21.

(text in italics refers to interpretations as per IMO MSC.1/Circ.1369, MSC.1/Circ.1437 and BV NR 598 Rev. 01 -2016):

These essential systems are:

- **Propulsion systems with their necessary auxiliaries**
- **Electrical power plant with their auxiliaries**
- **Steering systems with their power and control systems**
- **Systems for filling, transfer and service of fuel oil**

Full redundancy for propulsion and electrical production will be required as well as for steering system. Propulsion engines and electrical generators will have to be distributed in two separate engine rooms, as well as main switchboards and all auxiliaries for propulsion and electrical production. Two steering gear rooms have to be arranged and fitted with a fixed extinguishing system if they are adjacent. Tunnel thruster is not to be considered for emergency steering.

It has also to be taken care that necessary fuel for remaining main engine(s) and diesel generators is still available in sufficient quantity for the whole safe return to port operation. Operating pattern of the vessel will have an important impact on this last issue as a worldwide cruise ship will have different need than a ferry certified for short international voyages.

- **Navigation systems**

In case of casualty affecting the bridge, an alternative place shall be arranged where essential equipment (fixed or portable) for navigation and detection of risk of collision shall be available for the duration of SRTP. List of equipment to be available at this alternative place is given in IMO.1/ Circ.1369.Add 1 of Dec 2012.

- **Internal and external communication systems**

P.A system shall remain operational in all main vertical zones not affected by the fire. Portable communication system is acceptable for internal communication, provided repeater system remains operational and charging facilities are available in more than one main vertical zone.

- **Fire main system**

It is accepted to have the fire main isolated in the main fire zone affected by the casualty. Affected main fire zone can then be served from hydrants of adjacent zones or watertight compartment. Fire hoses may be extended for fire-fighting within the affected main fire zone using maximum two lengths of hoses from each hydrant.

Manual local start of remaining fire pumps may be accepted after a casualty.

- **Fixed fire extinguishing systems**

Lay-out of the sprinkler or equivalent system will have to be carefully reviewed and pumps will have to be duplicated and installed in separate compartments. Each section should not serve more than one deck in one main vertical zone.

CO2 total flooding extinguishing system capacity to be sufficient to protect the largest and the second largest spaces.

- **Fire and smoke detection system**

Architecture of smoke detection system will have to be modified in order to remain operational in spaces not directly affected by the fire casualty. It will be acceptable to loose detection in maximum one deck in one fire zone.

- **Bilge and ballast systems**

Proper distribution of bilge and ballast pumps will be necessary, as well as careful routing of the piping. Extra manual controlled section valves will be necessary when crossing watertight compartment bulkheads to segregate any flooded compartment. BV NR 598 §2.4: In case a compartment right above the tank top has been damaged by a fire or flooding casualty, it is acceptable to lose the ballasting operation of the ballast

tank located right underneath this compartment. However, the ballasting operation should remain available for all other ballast tanks.

- Watertight and semi-watertight doors

Position indication of the doors shall remain available for any fire casualty within the casualty threshold except for doors in the boundary of spaces directly affected by the casualty.

- Flooding detection system as per SOLAS II-1/22-1 requirement

- Basic services to support “safe areas” as indicated in SOLAS II-2/21.5.1.2

Detailed in next paragraph

- Other systems deemed to be vital by the Administration for damage control efforts.

BV NR 598 §2.1: The indication of the position of the doors within the main vertical zones bulkheads that are part of the boundaries of the main vertical zones containing the safe areas should be maintained after any fire casualty, as being part of safety system covering the safe area.

“Safe area” is defined in II-2/21.5 as being generally any internal space(s) which is not flooded and outside the main vertical zone affected by the fire. It shall provide all occupants with the following basic services to ensure the health of all persons onboard (*text in italics refers to interpretations as per IMO.1/Circ 1369 and BV NR 598-2012*):

- Sanitation

Minimum one toilet required for every 50 persons or fraction of.

BV NR 598 §3.2: The black and grey water systems are considered as part of the sanitation systems and should remain available to serve the safe areas. Grey and black waters may however be disposed of into the sea after a fire or flooding casualty impairing the equipment for the treatment of these waters

- Water

Minimum 3 liters per person per day drinking water, plus water for food preparation and hygiene.

BV NR 598 §3.3: The cold water distribution system should remain operable in all safe areas during SRtP. The availability of the hot water distribution system is not required during SRtP.

- Food

Food could be of any kind including dry food.

BV NR 598 §3.4: A sufficient quantity of food for SRtP with the full complement of the ship should be permanently available on board. One food ration described in ISO 18831:2006, per person and per day (i.e. 10.000kJ equivalent to 2.500kCal) may be acceptable for this purpose.

- Alternate space for medical care

The alternate space for medical care is to be in a different MVZ than the hospital, and to have lighting and power supply from the emergency source of power.

- Shelter from the weather:

Internal spaces required unless otherwise accepted by the Administration

Use of exterior spaces as safe areas might be evaluated taking into account possible current operation of the vessel in warm climates and short duration of SRTP operation.

- Means of preventing heat stress and hypothermia

Temperature within safe areas should be maintained in the range of 10° to 30°C.

- Lighting

Portable rechargeable battery operated lighting may be acceptable for use in spaces not covered by the ship’s emergency lighting system.

- Ventilation

Minimum ventilation volume available should be not less than 4,5m³/H per person.

The above list will require a number of systems to be possibly evaluated as essential systems, in order to support these above listed basic services such as:

- Black & grey water system (although it is accepted that grey and black water could be disposed of into the sea during SRTP operation, as allowed by MARPOL Annex V, Reg 3).
- Potable water system
- Refrigerating system and galley system
- HVAC system (depending of the operation pattern of the vessel)
- Lighting distribution.

It is well understood that Safe Areas should preferably be arranged in accommodation spaces, and sizing could be based on the time needed for safe return to port operation. Interpretation 42 of Circ.1369 is asking for a minimum space of 2m² per person for a SRTP operation longer than 12 hours.

BV NR 598 §3.1: The area to be taken into consideration for the sizing of the safe areas should not include the areas occupied by fixed furniture such as desks, bars etc.

An important issue related to the safe areas is the requirement asking for means of access to life-saving appliances which shall be ensured from each safe area taking into account that internal transit through the affected main vertical zone might not be possible. This requirement will be achieved easily on cruise ships having embarkation deck running the entire length of the vessel, but will have to be closely investigated for ferries or small and medium size cruise ships where each main vertical zone do not have direct access to external embarkation deck. For this purpose, it is accepted that external routes on upper deck are considered to remain available also in the portion of the ship containing the main vertical zone affected by the casualty.

“orderly evacuation” and abandonment of the ship if the casualty threshold is exceeded are dealt with in **Ch II-2 Reg 22** which provides design criteria for systems required to remain operational during this period.

The following systems will then be required to remain operational for at least 3 hours in all main vertical zones not affected by the casualty:

- Fire main
- Internal communication for passenger and crew notification and evacuation
- External communication
- Bilge system for removal of fire-fighting water
- Lighting along escape routes, at assembly stations and embarkation stations
- Guidance systems for evacuation (e.g. Low Location Lighting).

To achieve the above requirement, proper distribution of pumps for fire main and bilge systems will have to be taken care of, as well as careful routing and protection of concerned piping and cables.

BV NR 598 related to orderly evacuation:

- §4.3: *It is recommended to store a sufficient number of life jackets at an outside embarkation station to compensate for the possible loss of all life jackets stored inside any one main vertical zone that may be considered lost under the provision of SOLAS II-2/22.3.1.*

- §4.4: *The main and emergency sources of electrical power should be distributed in at least two separate main vertical zones.*

It is important to remind that SOLAS Ch III Regulation 21.1.4 requirement stating that all survival crafts shall be capable of being launched with their full complement of persons within a period of 30 minutes from the time the abandon ship signal is given, remains fully applicable.

Assessment of systems capabilities

Process of verification of the ship's design with respect to Safe Return to Port requirements is detailed in MSC.1/Circ.1369, and is primarily intended to be performed with a system-based approach.

Documentation required for such assessment shall contain as a minimum the following:

Ship's description

- Information about the intended area of operation and operating pattern in order to define intended speed and maximum distance for safe return to port.

- The list of all systems considered as essential and subject to required assessment.

This list shall include as a minimum all systems referred to in SOLAS regs II-2/21.4 and 22.3 for "safe return to port" and "orderly evacuation".

- The design criteria for each individual essential system or group of systems to achieve compliance

e.g. separation, duplication, redundancy, protection or a combination of the above.

- Drawings showing basic lay-out of the vessels with necessary information

Drawings describing watertight boundaries, A-class fire boundaries, tank arrangement, fire category of spaces, etc...

Submitted documents shall also show the spaces protected by fixed fire extinguishing systems and spaces considered having negligible fire risk if any.

- Drawings showing location, arrangement and connections of essential systems, as well as a description of their power supply.

- Criteria adopted for the selection of safe areas and intended locations.

Position and size of selected safe areas, as well as number of persons accommodated during SRTP operation for each safe area in the different fire scenarii (each scenario corresponding to one MVZ affected by a fire casualty).

- 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.

Assessment of required ship system's capabilities

The assessment method is detailed in MSC.1/Circ.1369 and consists in a two-steps study:

- Overall assessment of all essential systems:

This assessment is a systematic study of each essential system to demonstrate their capability to remain operational after a flooding or fire casualty. Essential systems identified as being fully redundant for all concerned casualties need not be further analyzed.

Manual action by the crew may also be possible under certain conditions detailed in the Circular.

If a system is identified during this overall study as having a possibility to fail to operate as a consequence of a fire or flooding casualty not exceeding the casualty threshold, then this system is considered as being “critical”.

If no critical system has been identified during this study, the overall assessment is considered acceptable without the need for further study.

- Detailed assessment of critical systems:

Each identified critical system shall be subject to a detailed assessment. Such assessment may require additional detailed information regarding installation of the equipment, manual action required to restore the system’s functionality, and on any operational procedure to be implemented to achieve the desired results.

Quantitative analysis may be required such as fire engineering analysis and/or fire testing, failure mode effect analysis (FMEA) of a system or detailed analysis of possibility of flooding of a particular compartment with its consequences on the system components.

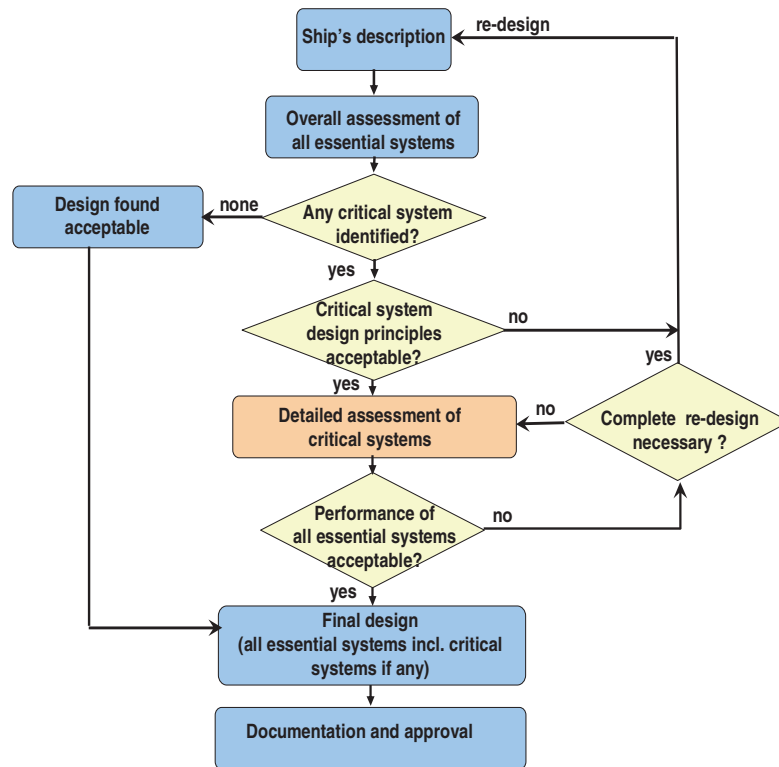
If the system’s capability cannot be ascertained for all casualties not exceeding the casualty threshold, the design will have to be modified and a new assessment will have to be performed.

Final approval and documentation to be kept onboard

When the assessment of all essential systems’ capability to fulfill SRTP requirement has been successfully completed, the assessment report together with the ship’s description file can be submitted to the Administration or to the Classification Society acting on its behalf for approval. Such approval will be valid taking into account the intended area of operation and operating pattern as defined in the ship’s description.

During the vessel’s life, any changes in the ship’s design or in the way the vessel will be operated, will have to be evaluated with respect to compliance with SRTP requirements.

Therefore documentation as listed in MSC.1/Circ1369 §7.4 will have to be kept onboard and up-dated when necessary. This documentation shall include the ship’s file and the assessment report, together with required operational information related to operation of essential systems and availability of safe areas, and description of tests, inspection and maintenance plan related to the concerned essential systems.



*Process flowchart for assessment of passenger ship system's capabilities
 for SRTP as shown in appendix 2 of MSC.1/Circ.1369*

CONCLUSIONS

Based on experience gained from actual projects under certification by BV according to subject SRTP regulation, the following issues can be highlighted:

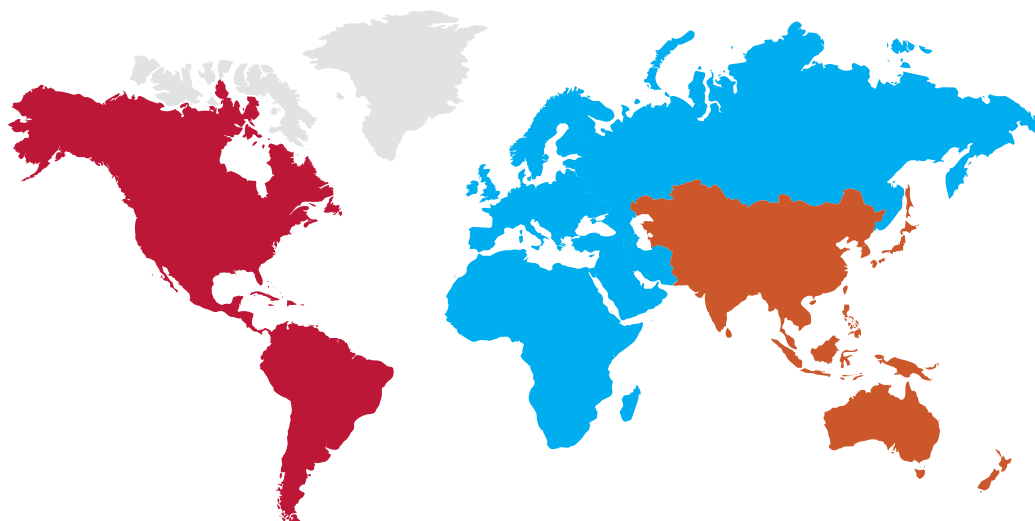
- Impact of these SRTP rules is certainly more important on the design of small or medium size passenger ships, and specially passenger ferries, than on larger cruise vessels which were originally the main target. Most probably, totally new machinery arrangements will be developed for ferries, when for large cruise ships (generally already designed with two separate engine rooms) changes will mainly be related to necessary SRTP duration because of their worldwide operation, and availability of needed services in safe areas during this SRTP period.
- As shown above, approval will depend on how and where the vessel will be operated. Therefore, eventual future operational changes should be as far as possible anticipated in building specification in order to avoid difficult re-assessment of the vessel's capability to meet SRTP requirements in case of changes in operational areas or operational pattern.
- Overall assessment of all essential systems as described above has to be carried out at a very early stage of the project to define appropriate solutions and avoid later important changes in the design. Quality and degree of details of submitted documentation are of great importance for an efficient and accurate review.
- The big challenge during systems assessment, but also during building of the ship, is the control of routing of pipes and cables. Inspection procedures and extent of survey during building period will have to be re-evaluated between all involved parties.

- SRTP documentation will have to be kept up-dated on board during the vessel's life in case of modification in the vessel's design or in case of new operating pattern or operational area. This documentation will also be needed in case of change of Flag to provide necessary evidence of compliance with applicable SRTP rules.
- These new SRTP rules are certainly improving the safety level of passenger ship design by imposing new requirements for higher functionality and availability of systems as well as survivability of these vessels.
- *Based on work already performed on projects under progress, BV has established its own understanding notes to provide some acceptable solutions to unclear issues. (BV Rule Note NR 598 Rev. 01)*

NOTES

[illegible]

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