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REPORT OF THE MARITIME SAFETY COMMITTEE ON ITS EIGHTIETH SESSION

Attached are annexes 1 to 19 to the report of the Maritime Safety Committee on its eightieth session (MSC 80/24).

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ANNEX 1

RESOLUTION MSC.194(80)
(adopted on 20 May 2005)

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

THE MARITIME SAFETY COMMITTEE,

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

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

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

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annexes to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that:

(a) the said amendments set out in annex 1 shall be deemed to have been accepted on 1 July 2006; and

(b) the said amendments set out in annex 2 shall be deemed to have been accepted on 1 July 2008,

unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention:

(a) the amendments set out in annex 1 shall enter into force on 1 January 2007; and

(b) the amendments set out in annex 2 shall enter into force on 1 January 2009,

upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX 1

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

CHAPTER II-1

CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A
GENERAL

Regulation 2 – Definitions

1 The following new paragraph 14 is added after the existing paragraph 13:

"14 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1".

PART A-1
STRUCTURE OF SHIPS

2 The existing text of part A-1 is replaced by the following:

"PART A-1
STRUCTURE OF SHIPS

Regulation 3-1
Structural, mechanical and electrical requirements for ships

In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or with applicable national standards of the Administration which provide an equivalent level of safety.

Regulation 3-2
Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers

(This regulation applies to oil tankers and bulk carriers constructed on or after 1 July 1998)

All dedicated seawater ballast tanks shall have an efficient corrosion prevention system, such as hard protective coatings or equivalent. The coatings should preferably be of a light colour. The scheme for the selection, application and maintenance of the system shall be approved by the Administration, based on the guidelines adopted by the Organization.* Where appropriate, sacrificial anodes shall also be used.

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* Refer to the Guidelines for the selection, application and maintenance of corrosion prevention systems of dedicated seawater ballast tanks, adopted by the Organization by resolution A.798(19).

Regulation 3-3
Safe access to tanker bows

1 For the purpose of this regulation and regulation 3-4, tankers include oil tankers as defined in regulation 2, chemical tankers as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2.

2 Every tanker shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. Such means of access shall be approved by the Administration based on the guidelines developed by the Organization.*

Regulation 3-4
Emergency towing arrangements on tankers

1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

2 For tankers constructed on or after 1 July 2002:

.1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and

.2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of the emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.

3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.**

Regulation 3-5
New installation of materials containing asbestos

1 This regulation shall apply to materials used for the structure, machinery, electrical installations and equipment covered by the present Convention.

2 For all ships, new installation of materials which contain asbestos shall be prohibited except for:

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* Refer to the Guidelines for safe access to tanker bows, adopted by the Maritime Safety Committee by resolution MSC.62(67).

** Refer to the Guidelines on emergency towing arrangements for tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as may be amended.

.1 vanes used in rotary vane compressors and rotary vane vacuum pumps;

.2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350ºC) or pressure (in excess of 7 x 10^6 Pa), there is a risk of fire, corrosion or toxicity; and

.3 supple and flexible thermal insulation assemblies used for temperatures above 1000ºC.

Regulation 3-6
Access to and within spaces in, and forward of, the cargo area of oil tankers and bulk carriers

1 Application

1.1 Except as provided for in paragraph 1.2, this regulation applies to oil tankers of 500 gross tonnage and over and bulk carriers, as defined in regulation IX/1, of 20,000 gross tonnage and over, constructed on or after 1 January 2006.

1.2 Oil tankers of 500 gross tonnage and over constructed on or after 1 October 1994 but before 1 January 2005 shall comply with the provisions of regulation II-1/12-2 adopted by resolution MSC.27(61).

2 Means of access to cargo and other spaces

2.1 Each space shall be provided with means of access to enable, throughout the life of a ship, overall and close-up inspections and thickness measurements of the ship's structures to be carried out by the Administration, the company, as defined in regulation IX/1, and the ship's personnel and others as necessary. Such means of access shall comply with the requirements of paragraph 5 and with the Technical provisions for means of access for inspections, adopted by the Maritime Safety Committee by resolution MSC.133(76), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than chapter I.

2.2 Where a permanent means of access may be susceptible to damage during normal cargo loading and unloading operations or where it is impracticable to fit permanent means of access, the Administration may allow, in lieu thereof, the provision of movable or portable means of access, as specified in the Technical provisions, provided that the means of attaching, rigging, suspending or supporting the portable means of access forms a permanent part of the ship's structure. All portable equipment shall be capable of being readily erected or deployed by ship's personnel.

2.3 The construction and materials of all means of access and their attachment to the ship's structure shall be to the satisfaction of the Administration. The means of access shall be subject to survey prior to, or in conjunction with, its use in carrying out surveys in accordance with regulation I/10.

3 Safe access to cargo holds, cargo tanks, ballast tanks and other spaces

3.1 Safe access* to cargo holds, cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area shall be direct from the open deck and such as to ensure their complete inspection. Safe access to double bottom spaces or to forward ballast tanks may be from a pump-room, deep cofferdam, pipe tunnel, cargo hold, double hull space or similar compartment not intended for the carriage of oil or hazardous cargoes.

3.2 Tanks, and subdivisions of tanks, having a length of 35 m or more, shall be fitted with at least two access hatchways and ladders, as far apart as practicable. Tanks less than 35 m in length shall be served by at least one access hatchway and ladder. When a tank is subdivided by one or more swash bulkheads or similar obstructions which do not allow ready means of access to the other parts of the tank, at least two hatchways and ladders shall be fitted.

3.3 Each cargo hold shall be provided with at least two means of access as far apart as practicable. In general, these accesses should be arranged diagonally, for example one access near the forward bulkhead on the port side, the other one near the aft bulkhead on the starboard side.

4 Ship structure access manual

4.1 A ship's means of access to carry out overall and close-up inspections and thickness measurements shall be described in a Ship structure access manual approved by the Administration, an updated copy of which shall be kept on board. The Ship structure access manual shall include the following for each space:

> .1 plans showing the means of access to the space, with appropriate technical specifications and dimensions;
>
> .2 plans showing the means of access within each space to enable an overall inspection to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate from where each area in the space can be inspected;
>
> .3 plans showing the means of access within the space to enable close-up inspections to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate the positions of critical structural areas, whether the means of access is permanent or portable and from where each area can be inspected;
>
> .4 instructions for inspecting and maintaining the structural strength of all means of access and means of attachment, taking into account any corrosive atmosphere that may be within the space;
>
> .5 instructions for safety guidance when rafting is used for close-up inspections and thickness measurements;

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* Refer to the Recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.864(20).

.6 instructions for the rigging and use of any portable means of access in a safe manner;

.7 an inventory of all portable means of access; and

.8 records of periodical inspections and maintenance of the ship's means of access.

4.2 For the purpose of this regulation "critical structural areas" are locations which have been identified from calculations to require monitoring or from the service history of similar or sister ships to be sensitive to cracking, buckling, deformation or corrosion which would impair the structural integrity of the ship.

5 General technical specifications

5.1 For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening shall not be less than 600 mm x 600 mm. When access to a cargo hold is arranged through the cargo hatch, the top of the ladder shall be placed as close as possible to the hatch coaming. Access hatch coamings having a height greater than 900 mm shall also have steps on the outside in conjunction with the ladder.

5.2 For access through vertical openings, or manholes, in swash bulkheads, floors, girders and web frames providing passage through the length and breadth of the space, the minimum opening shall be not less than 600 mm x 800 mm at a height of not more than 600 mm from the bottom shell plating unless gratings or other foot holds are provided.

5.3 For oil tankers of less than 5,000 tonnes deadweight, the Administration may approve, in special circumstances, smaller dimensions for the openings referred to in paragraphs 5.1 and 5.2, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

Regulation 3-7
Construction drawings maintained on board and ashore

1 A set of as-built construction drawings* and other plans showing any subsequent structural alterations shall be kept on board a ship constructed on or after 1 January 2007.

2 An additional set of such drawings shall be kept ashore by the Company, as defined in regulation IX/1.2.

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* Refer to MSC/Circ.1135 on As-built construction drawings to be maintained on board the ship and ashore.

Regulation 3-8
Towing and mooring equipment

1 This regulation applies to ships constructed on or after 1 January 2007, but does not apply to emergency towing arrangements provided in accordance with regulation 3-4.

2 Ships shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operation of the ship.

3 Arrangements, equipment and fittings provided in accordance with paragraph 2 shall meet the appropriate requirements of the Administration or an organization recognized by the Administration under regulation I/6.*

4 Each fitting or item of equipment provided under this regulation shall be clearly marked with any restrictions associated with its safe operation, taking into account the strength of its attachment to the ship's structure."

PART B
SUBDIVISION AND STABILITY

3 The following new regulation 23-3 is added after existing regulation 23-2:

"**Regulation 23-3**
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than the date of the first intermediate or renewal survey of the ship to be carried out after 1 January 2007, whichever comes first.

2 For the purpose of this regulation, *freeboard deck* has the meaning defined in the International Convention on Load Lines in force.

3 Ships having a length (L) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors**.

4 The water level detectors required by paragraph 3 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

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* Refer to MSC/Circ.1175 on Guidance on shipboard towing and mooring equipment.
** Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

5 The water level detectors required by paragraph 3 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

PART C
MACHINERY INSTALLATIONS

Regulation 31 – Machinery controls

4 The existing paragraph 2.10 is deleted.

5 The following new paragraph 6 is added after the existing paragraph 5:

"6 Ships constructed on or after 1 July 2004 shall comply with the requirements of paragraphs 1 to 5, as amended, as follows:

.1 a new subparagraph .10 is added to paragraph 2 to read as follows:

".10 automation systems shall be designed in a manner which ensures that threshold warning of impending or imminent slowdown or shutdown of the propulsion system is given to the officer in charge of the navigational watch in time to assess navigational circumstances in an emergency. In particular, the systems shall control, monitor, report, alert and take safety action to slow down or stop propulsion while providing the officer in charge of the navigational watch an opportunity to manually intervene, except for those cases where manual intervention will result in total failure of the engine and/or propulsion equipment within a short time, for example in the case of overspeed.""

ANNEX 2

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

CHAPTER II-1

CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

1 The existing text of parts A, B and B-1 of the chapter is replaced by the following:

"**PART A**
GENERAL

Regulation 1
Application

1.1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009.

1.2 For the purpose of this chapter, the term *a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *all ships* means ships constructed before, on or after 1 January 2009;

.3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences;

.4 the expression *alterations and modifications of a major character* means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the A/R ratio calculated for the ship after such modifications is not less than the A/R ratio calculated for the ship before the modification. However, in those cases where the ship's A/R ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an A value which is not less than R, calculated for the modified ship.

2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall ensure that the requirements which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), Resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with.

3 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before the date on which any relevant amendments enter into force, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable.

4 The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

.1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

.2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *Subdivision length (L_s)* of the ship is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.

2 *Mid-length* is the mid-point of the subdivision length of the ship.

3 *Aft terminal* is the aft limit of the subdivision length.

4 *Forward terminal* is the forward limit of the subdivision length.

5 *Length (L)* is the length as defined in the International Convention on Load Lines in force.

6 *Freeboard deck* is the deck as defined in the International Convention on Load Lines in force.

7 *Forward perpendicular* is the forward perpendicular as defined in the International Convention on Load Lines in force.

8 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision draught.

9 *Draught (d)* is the vertical distance from the keel line at mid-length to the waterline in question.

10 *Deepest subdivision draught* (d_s) is the waterline which corresponds to the summer load line draught of the ship.

11 *Light service draught* (d_l) is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew on board.

12 *Partial subdivision draught* (d_p) is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught.

13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel.

14 *Permeability* (μ) of a space is the proportion of the immersed volume of that space which can be occupied by water.

15 *Machinery spaces* are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

16 *Weathertight* means that in any sea conditions water will not penetrate into the ship.

17 *Watertight* means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding.

18 *Design pressure* means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.

19 *Bulkhead deck* in a passenger ship means the uppermost deck at any point in the subdivision length (L_s) to which the main bulkheads and the ship's shell are carried

watertight and the lowermost deck from which passenger and crew evacuation will not be impeded by water in any stage of flooding for damage cases defined in regulation 8 and in part B-2 of this chapter. The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck.

20 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship.

21 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

22 *Oil tanker* is the oil tanker defined in regulation 1 of Annex 1 of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 *Ro-ro passenger ship* means a passenger ship with ro-ro spaces or special category spaces as defined in regulation II-2/3.

24 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1.

25 *Keel line* is a line parallel to the slope of the keel passing amidships through:

.1 the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell; or

.2 in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. When the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inward intersects the centreline amidships.

26 *Amidship* is at the middle of the length (*L*).

Regulation 3
Definitions relating to parts C, D and E

For the purpose of parts C, D and E, unless expressly provided otherwise:

1 *Steering gear control system* is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2 *Main steering gear* is the machinery, rudder actuators, steering gear, power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g. tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3 *Steering gear power unit* is:

.1 in the case of electric steering gear, an electric motor and its associated electrical equipment;

.2 in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump; or

.3 in the case of other hydraulic steering gear, a driving engine and connected pump.

4 *Auxiliary steering gear* is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.

5 *Normal operational and habitable condition* is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.

6 *Emergency condition* is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.

7 *Main source of electrical power* is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.

8 *Dead ship condition* is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power.

9 *Main generating station* is the space in which the main source of electrical power is situated.

10 *Main switchboard* is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.

11 *Emergency switchboard* is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.

12 *Emergency source of electrical power* is a source of electrical power, intended to supply the emergency switchboard in the event of a failure of the supply from the main source of electrical power.

13 *Power actuating system* is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may

share common mechanical components (i.e. tiller, quadrant and rudder stock) or components serving the same purpose.

14 *Maximum ahead service speed* is the greatest speed which the ship is designed to maintain in service at sea at the deepest sea-going draught.

15 *Maximum astern speed* is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught.

16 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

.1 internal combustion machinery used for main propulsion;

.2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

.3 any oil-fired boiler or oil fuel unit.

18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

19 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

.1 chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as “the International Bulk Chemical Code”, as may be amended by the Organization; or

.2 chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as “the Bulk Chemical Code”, as has been or may be amended by the Organization,

whichever is applicable.

20 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

.1 chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety

Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organization; or

.2 chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organization,

whichever is applicable.

PART B
SUBDIVISION AND STABILITY

Regulation 4
General

1 The damage stability requirements in Parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organization.

2 The Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.

3 Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the subdivision length (L_s) of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length (L_s), primarily engaged in the carriage of passengers.

4 Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

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* Cargo ships shown to comply with the following regulations may be excluded from the application of part B-1:
  .1 Annex I to MARPOL 73/78, except OBO ships with type B freeboards are not excluded;
  .2 International Bulk Chemical Code;
  .3 International Gas Carrier Code;
  .4 Guidelines for the design and construction of offshore supply vessels (resolution A.469(XII));
  .5 Code of Safety for Special Purpose Ships (resolution A.534(13), as amended);
  .6 Damage stability requirements of regulation 27 of the 1966 Load Lines Convention as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of cargo ships to which regulation 27(9) applies, main transverse watertight bulkheads, to be considered effective, are spaced according to paragraph (12)(f) of resolution A.320(IX); and
  .7 Damage stability requirements of regulation 27 of the 1988 Load Lines Protocol.

PART B-1
STABILITY

Regulation 5
Intact stability information*

1 Every passenger ship regardless of size and every cargo ship having a length (L) of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined.

2 The Administration may allow the inclining test of an individual cargo ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by regulation 5-1. A weight survey shall be carried out upon completion and the ship shall be inclined whenever in comparison with the data derived from the sister ship, a deviation from the lightship displacement exceeding 1% for ships of 160 m or more in length and 2% for ships of 50 m or less in length and as determined by linear interpolation for intermediate lengths or a deviation from the lightship longitudinal centre of gravity exceeding 0.5% of L_s is found.

3 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

4 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph 5.

5 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L_s is found or anticipated.

6 Every ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

* Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the Organization by resolution A.749(18).

Regulation 5-1
Stability information to be supplied to the master*

1 The master shall be supplied with such information satisfactory to the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.

2 The information should include:

.1 curves or tables of minimum operational metacentric height (*GM*) versus draught which assures compliance with the relevant intact and damage stability requirements, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (*KG*) versus draught, or with the equivalents of either of these curves;

.2 instructions concerning the operation of cross-flooding arrangements; and

.3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

3 The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s.

4 For ships which have to fulfil the stability requirements of part B-1, information referred to in paragraph 2 are determined from considerations related to the subdivision index, in the following manner: Minimum required *GM* (or maximum permissible vertical position of centre of gravity *KG*) for the three draughts d_s, d_p and d_l are equal to the *GM* (or *KG* values) of corresponding loading cases used for the calculation of survival factor s_i. For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the *GM* value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required *GM* values or the minimum of maximum permissible *KG* values for both criteria. If the subdivision index is calculated for different trims, several required *GM* curves will be established in the same way.

5 When curves or tables of minimum operational metacentric height (*GM*) versus draught are not appropriate, the master should ensure that the operating condition does not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

* Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456); Guidance on the intact stability of existing tankers during transfer operations (MSC/Circ.706); and the Guidance to the master for avoiding dangerous situations in following and quartering seas (MSC/Circ.707).

Regulation 6
Required subdivision index *R**

1 The subdivision of a ship is considered sufficient if the attained subdivision index A, determined in accordance with regulation 7, is not less than the required subdivision index R calculated in accordance with this regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than $0.9R$ for passenger ships and $0.5R$ for cargo ships.

2 For all ships to which the damage stability requirements of this chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index R, as follows:

.1 In the case of cargo ships greater than 100 m in length (L_s):

$$R = 1 - \frac{128}{L_s + 152}$$

.2 In the case of cargo ships not less than 80 m in length (L_s) and not greater than 100 m in length (L_s):

$$R = 1 - [1/(1 + \frac{L_s}{100} \times \frac{R_o}{1 - R_o})]$$

Where R_o is the value R as calculated in accordance with the formula in subparagraph .1.

.3 In the case of passenger ships:

$$R = 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

where:

$N = N_1 + 2N_2$
N_1 = number of persons for whom lifeboats are provided
N_2 = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1.

.4 Where the conditions of service are such that compliance with paragraph 2.3 of this regulation on the basis of $N = N_1 + 2N_2$ is impracticable and where the Administration considers that a suitably reduced degree of hazard exists, a lesser value of N may be taken but in no case less than $N = N_1 + N_2$.

* The Maritime Safety Committee, in adopting the regulations contained in parts B to B-4, invited Administrations to note that the regulations should be applied in conjunction with the explanatory notes developed by the Organization in order to ensure their uniform application.

Regulation 7
Attained subdivision index *A*

1 The attained subdivision index A is obtained by the summation of the partial indices A_s, A_p and A_l, (weighted as shown) calculated for the draughts d_s, d_p and d_l defined in regulation 2 in accordance with the following formula:

$$A = 0.4A_s + 0.4A_p + 0.2A_l$$

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A = \Sigma p_i s_i$$

where:

i represents each compartment or group of compartments under consideration,

p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in regulation 7-1,

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in regulation 7-2.

2 In the calculation of A, the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s, one or more additional calculations of A are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s.

3 When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

4 The summation indicated by the above formula shall be taken over the ship's subdivision length (L_s) for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated A value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

5 Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are involved. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth B, may be

added. For the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

6 In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

7 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

Regulation 7-1
Calculation of the factor p_i

1 The factor p_i for a compartment or group of compartments shall be calculated in accordance with paragraphs 1.1 and 1.2 using the following notations:

j = the aftmost damage zone number involved in the damage starting with no.1 at the stern;

n = the number of adjacent damage zones involved in the damage;

k = is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has $k = 0$;

$x1$ = the distance from the aft terminal of L_s to the aft end of the zone in question;

$x2$ = the distance from the aft terminal of L_s to the forward end of the zone in question;

b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision loadline the vertical plane used for determination of b is assumed to extend upwards to the deepest subdivision waterline. In any case, b is not to be taken greater than $B/2$.

If the damage involves a single zone only:

$$p_i = p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})]$$

If the damage involves two adjacent zones:

$$\begin{aligned} p_i = {} & p(x1_j,x2_{j+1}) \cdot [r(x1_j,x2_{j+1},b_k) - r(x1_j,x2_{j+1},b_{k-1})] \\ & - p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})] \\ & - p(x1_{j+1},x2_{j+1}) \cdot [r(x1_{j+1},x2_{j+1},b_k) - r(x1_{j+1},x2_{j+1},b_{k-1})] \end{aligned}$$

If the damage involves three or more adjacent zones:

$$\begin{aligned} p_i = {} & p(x1_j,x2_{j+n-1}) \cdot [r(x1_j,x2_{j+n-1},b_k) - r(x1_j,x2_{j+n-1},b_{k-1})] \\ & - p(x1_j,x2_{j+n-2}) \cdot [r(x1_j,x2_{j+n-2},b_k) - r(x1_j,x2_{j+n-2},b_{k-1})] \\ & - p(x1_{j+1},x2_{j+n-1}) \cdot [r(x1_{j+1},x2_{j+n-1},b_k) - r(x1_{j+1},x2_{j+n-1},b_{k-1})] \\ & + p(x1_{j+1},x2_{j+n-2}) \cdot [r(x1_{j+1},x2_{j+n-2},b_k) - r(x1_{j+1},x2_{j+n-2},b_{k-1})] \end{aligned}$$

and where $r(x1, x2, b0) = 0$

1.1 The factor $p(x1, x2)$ is to be calculated according to the following formulae:

Overall normalized max damage length:	J_{max}	=	10/33
Knuckle point in the distribution:	J_{kn}	=	5/33
Cumulative probability at J_{kn}:	p_k	=	11/12
Maximum absolute damage length:	l_{max}	=	60 m
Length where normalized distribution ends:	L^*	=	260 m

Probability density at $J = 0$:

$$b_0 = 2\left(\frac{p_k}{J_{kn}} - \frac{1-p_k}{J_{max} - J_{kn}}\right)$$

When $L_s \le L^*$:

$$J_m = \min\left\{J_{max}, \frac{l_{max}}{L_s}\right\}$$

$$J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1-2p_k)b_0 J_m + \frac{1}{4}b_0^2 J_m^2}}{b_0}$$

$$b_{12} = b_0$$

When $L_s > L^*$:

$$J_m^* = \min\left\{J_{max}, \frac{l_{max}}{L^*}\right\}$$

$$J_k^* = \frac{J_m^*}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k) b_0 J_m^* + \frac{1}{4} b_0^2 J_m^{*2}}}{b_0}$$

$$J_m = \frac{J_m^* \cdot L^*}{L_s}$$

$$J_k = \frac{J_k^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{p_k}{J_k} - \frac{1 - p_k}{J_m - J_k}\right)$$

$$b_{11} = 4\frac{1 - p_k}{(J_m - J_k) J_k} - 2\frac{p_k}{J_k^2}$$

$$b_{21} = -2\frac{1 - p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21} J_m$$

The non-dimensional damage length:

$$J = \frac{(x2 - x1)}{L_s}$$

The normalized length of a compartment or group of compartments:

J_n is to be taken as the lesser of J and J_m

1.1.1 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J \le J_k$:

$$p(x1, x2) = p_1 = \frac{1}{6} \mathrm{J}^2 (\mathrm{b}_{11} \mathrm{J} + 3\mathrm{b}_{12})$$

$J > J_k$:

$$p(x1, x2) = p_2 = -\frac{1}{3} b_{11} J_k^3 + \frac{1}{2}(b_{11} J - b_{12}) J_k^2 + b_{12} J J_k - \frac{1}{3} b_{21} \left(J_n^3 - J_k^3\right) + \frac{1}{2}(b_{21} J - b_{22})\left(J_n^2 - J_k^2\right) + b_{22} J (J_n - J_k)$$

1.1.2 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J \leq J_k$:

$$p(x1,x2) = \frac{1}{2}(p_1 + J)$$

$J > J_k$:

$$p(x1,x2) = \frac{1}{2}(p_2 + J)$$

1.1.3 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$p(x1, x2) = 1$$

1.2 The factor $r(x1, x2, b)$ shall be determined by the following formulae:

$$r(x1,x2,b) = 1 - (1 - C) \cdot \left[1 - \frac{G}{p(x1,x2)}\right]$$

where:

$$C = 12 \cdot J_b \cdot (-45 \cdot J_b + 4)\text{, where}$$

$$J_b = \frac{b}{15 \cdot B}$$

1.2.1 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$G = G_1 = \frac{1}{2} b_{11} J_b^{\,2} + b_{12} J_b$$

1.2.2 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$$G = G_2 = -\frac{1}{3} b_{11} J_0^{\,3} + \frac{1}{2}(b_{11} J - b_{12}) J_0^{\,2} + b_{12} J J_0 \text{ , where}$$

$$J_0 = \min(J, J_b)$$

1.2.3 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$$G = \frac{1}{2} \cdot (G_2 + G_1 \cdot J)$$

Regulation 7-2
Calculation of the factor s_i

1 The factor s_i shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this regulation.

θ_e is the equilibrium heel angle in any stage of flooding, in degrees;

θ_v is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

$GZ_{\max}$ is the maximum positive righting lever, in metres, up to the angle θ_v;

Range is the range of positive righting levers, in degrees, measured from the angle θ_e. The positive range is to be taken up to the angle θ_v;

Flooding stage is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

1.1 The factor s_i, for any damage case at any initial loading condition, d_i, shall be obtained from the formula:

$$s_i = \text{minimum} \{ s_{\text{intermediate,i}} \text{ or } s_{\text{final,i}} \cdot s_{\text{mom,i}} \}$$

where:

$s_{\text{intermediate,i}}$ is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph 2;

$s_{\text{final,i}}$ is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph 3;

$s_{\text{mom,i}}$ is the probability to survive heeling moments, and is calculated in accordance with paragraph 4.

2 The factor $s_{\text{intermediate,i}}$ is applicable only to passenger ships (for cargo ships $s_{\text{intermediate,i}}$ should be taken as unity) and shall be taken as the least of the s-factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows:

$$s_{\text{intermediate,i}} = \left[\frac{GZ_{\max}}{0.05} \cdot \frac{Range}{7} \right]^{\frac{1}{4}}$$

where $GZ_{\max}$ is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{\text{intermediate}} = 0$, if the intermediate heel angle exceeds 15°. Where cross-flooding fittings are required, the time for equalization shall not exceed 10 min.

3 The factor $s_{\mathrm{final},i}$ shall be obtained from the formula:

$$s_{\mathrm{final},i} = K \cdot \left[\frac{GZ_{\max}}{0.12} \cdot \frac{Range}{16} \right]^{\frac{1}{4}}$$

where:

$GZ_{\max}$ is not to be taken as more than 0.12 m;

Range is not to be taken as more than 16°;

$K = 1$ if $\theta_e \leq \theta_{\min}$

$K = 0$ if $\theta_e \geq \theta_{\max}$

$K = \sqrt{\dfrac{\theta_{\max} - \theta_e}{\theta_{\max} - \theta_{\min}}}$ otherwise,

where:

$\theta_{\min}$ is 7° for passenger ships and 25° for cargo ships; and

$\theta_{\max}$ is 15° for passenger ships and 30° for cargo ships.

4 The factor $s_{\mathrm{mom},i}$ is applicable only to passenger ships (for cargo ships $s_{\mathrm{mom},i}$ shall be taken as unity) and shall be calculated at the final equilibrium from the formula:

$$s_{\mathrm{mom},i} = \frac{(GZ_{\max} - 0.04) \cdot Displacement}{M_{\mathrm{heel}}}$$

where:

Displacement is the intact displacement at the subdivision draught;

M_{heel} is the maximum assumed heeling moment as calculated in accordance with subparagraph 4.1; and

$s_{\mathrm{mom},i} \leq 1$

4.1 The heeling moment M_{heel} is to be calculated as follows:

$M_{\mathrm{heel}} = \text{maximum } \{M_{\mathrm{passenger}} \text{ or } M_{\mathrm{wind}} \text{ or } M_{\mathrm{Survivalcraft}}\}$

4.1.1 $M_{\mathrm{passenger}}$ is the maximum assumed heeling moment resulting from movement of passengers, and is to be obtained as follows:

$M_{\mathrm{passenger}} = (0.075 \cdot N_p) \cdot (0.45 \cdot B)$ (tm) where:

N_p is the maximum number of passengers permitted to be on board in the service condition corresponding to the deepest subdivision draught under consideration; and

B is the beam of the ship.

Alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment. In doing so, a weight of 75 kg per passenger is to be assumed.

4.1.2 M_{wind} is the maximum assumed wind force acting in a damage situation:

$$M_{\text{wind}} = (P \cdot A \cdot Z) / 9{,}806 \ \ (\text{tm})$$

where:

P = 120 N/m^2;

A = projected lateral area above waterline;

Z = distance from centre of lateral projected area above waterline to $T/2$; and

T = ship's draught, d_i.

4.1.3 $M_{\text{Survivalcraft}}$ is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

.1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

.2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

.3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

.4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and

.5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.

5 Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalization devices are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Administration.* Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.

5.1 Tanks and compartments taking part in such equalization shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

5.2 In all cases, s_i is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:

.1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor s_i. Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and

.2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2.

5.3 The factor s_i is to be taken as zero if, taking into account sinkage, heel and trim, any of the following occur in any intermediate stage or in the final stage of flooding:

.1 immersion of any vertical escape hatch in the bulkhead deck intended for compliance with chapter II-2;

.2 any controls intended for the operation of watertight doors, equalization devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck become inaccessible or inoperable;

.3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index A, if not fitted with watertight means of closure at each boundary.

5.4 However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of $s_{\text{intermediate},i}$ may be calculated assuming equalization in additional flooding phases.

5.5 Except as provided in paragraph 5.3.1, openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea need not be considered.

* Reference is made to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passengers ships, adopted by the Organization by resolution A.266(VIII), as may be amended.

6 Where horizontal watertight boundaries are fitted above the waterline under consideration the s-value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph 1.1 by the reduction factor v_m according to paragraph 6.1, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

6.1 The factor v_m shall be obtained from the formula:

$$v_m = v(H_{j,\ n,\ m}, d) - v(H_{j,\ n,\ m\text{-}1}, d)$$

where:

$H_{j,\ n,\ m}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the m^{th} horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j,\ n,\ m\text{-}1}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the $(m\text{-}1)^{th}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

j signifies the aft terminal of the damaged compartments under consideration;

m represents each horizontal boundary counted upwards from the waterline under consideration;

d is the draught in question as defined in regulation 2; and

x_1 and x_2 represent the terminals of the compartment or group of compartments considered in regulation 7-1.

6.1.1 The factors $v(H_{j,\ n,\ m}, d)$ and $v(H_{j,\ n,\ m\text{-}1}, d)$ shall be obtained from the formulas:

$$v(H,d) = 0.8\frac{(H-d)}{7.8}$$, if $(H_m\text{-}d)$ is less than, or equal to, 7.8 m;

$$v(H,d) = 0.8 + 0.2\left[\frac{(H-d)-7.8}{4.7}\right]$$ in all other cases,

where:

$v(H_{j,\ n,\ m}, d)$ is to be taken as 1, if H_m coincides with the uppermost watertight boundary of the ship within the range $(x1_{(j)}...x2_{(j+n-1)})$, and

$v(H_{j,\ n,\ 0}, d)$ is to be taken as 0.

In no case is v_m to be taken as less than zero or more than 1.

6.2 In general, each contribution dA to the index A in the case of horizontal subdivisions is obtained from the formula:

$$dA = p_i \cdot \left[v_1 \cdot s_{\min 1} + (v_2 - v_1)\cdot s_{\min 2} + \cdots + (1 - v_{m-1})\cdot s_{\min m}\right]$$

where:

v_m = the v-value calculated in accordance with paragraph 6.1;
s_{min} = the least s-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards.

Regulation 7-3
Permeability

1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each general compartment or part of a compartment shall be as follows:

Spaces	**Permeability**
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Intended for liquids	0 or 0.95[1]

[1] Whichever results in the more severe requirement.

2 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	**Permeability at draught d_s**	**Permeability at draught d_p**	**Permeability at draught d_l**
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

3 Other figures for permeability may be used if substantiated by calculations.

Regulation 8
Special requirements concerning passenger ship stability

1 A passenger ship intended to carry 400 or more persons shall have watertight subdivision abaft the collision bulkhead so that $s_i = 1$ for the three loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartments within $0.08L$ measured from the forward perpendicular.

2 A passenger ship intended to carry 36 or more persons is to be capable of withstanding damage along the side shell to an extent specified in paragraph 3. Compliance with this regulation is to be achieved by demonstrating that s_i, as defined in regulation 7-2, is not less than 0.9 for the three loading conditions on which is based the calculation of the subdivision index.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on both N as defined in regulation 6, and L_s as defined in regulation 2, such that:

.1 the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in regulation 2, unless a lesser vertical extent of damage were to give a lower value of s_i, in which case this reduced extent is to be used;

.2 where 400 or more persons are to be carried, a damage length of $0.03L_s$ but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of $0.1B$ but not less than 0.75 m measured inboard from the ship side, at right angle to the centreline at the level of the deepest subdivision draught;

.3 where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph 2;

.4 where 36 persons are carried, a damage length of $0.015L_s$ but not less than 3 m is to be assumed, in conjunction with a penetration inboard of $0.05B$ but not less than 0.75 m; and

.5 where more than 36, but fewer than 400 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 400 persons as specified in subparagraphs .4 and .2.

PART B-2
SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY

Regulation 9
Double bottoms in passenger ships and cargo ships other than tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance h measured from the keel line, as calculated by the formula:

$$h = B/20$$

However, in no case is the value of h to be less than 760 mm, and need not be taken as more than 2,000 mm.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. Other wells (e.g. for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

5 In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

6 Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5 shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship.

7 In the case of unusual bottom arrangements in a passenger ship or a cargo ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8.

8 Compliance with paragraphs 6 or 7 is to be achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in .2 below for the affected part of the ship:

.1 Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.

.2 Assumed extent of damage shall be as follows:

	For 0.3 L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ or 14.5 m, whichever is less
Transverse extent	B/6 or 10 m, whichever is less	B/6 or 5 m, whichever is less
Vertical extent, measured from the keel line	B/20 or 2 m, whichever is less	B/20 or 2 m, whichever is less

.3 If any damage of a lesser extent than the maximum damage specified in .2 would result in a more severe condition, such damage should be considered.

9 In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than $B/10$ or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.

Regulation 10
Construction of watertight bulkheads

1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in regulation 2.17. In all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck.

2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

Regulation 11
Initial testing of watertight bulkheads, etc.

1 Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case a thorough inspection of the watertight bulkheads shall be carried out.

2 The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of regulation 10.1.

3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

4 The tests referred to in paragraphs 2 and 3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

Regulation 12
Peak and machinery space bulkheads, shaft tunnels, etc.

1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 0.05*L* or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 0.08*L* or 0.05*L* + 3 m, whichever is the greater.

2 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g. a bulbous bow, the distances stipulated in paragraph 1 shall be measured from a point either:

.1 at the mid-length of such extension;

.2 at a distance 0.015*L* forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

3 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 2.

4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

5.1 Except as provided in paragraph 5.2, the collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead. The Administration may, however, authorize the fitting of this valve on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

5.2 If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the bulkhead by two pipes, each of which is fitted as required by paragraph 5.1, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

6 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 1 or 2 with the exception permitted by paragraph 7 and that the part of the deck which forms the step is made effectively weathertight. The extension shall be so arranged as to preclude the possibility of the bow door causing damage to it in the case of damage to, or detachment of, a bow door.

7 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck the ramp shall be weathertight over its complete length. In cargo ships the part of the ramp which is more than 2.3 m above the bulkhead deck may extend forward of the limit specified in paragraph 1 or 2. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

8 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

9 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck. In passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

10 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck will not be immersed. In cargo ships other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration.

Regulation 13
Openings in watertight bulkheads below the bulkhead deck in passenger ships

1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.

2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

2.2 Valves not forming part of a piping system shall not be permitted in watertight bulkheads.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

3 No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 9.1 and in regulation 14.

4 Subject to paragraph 10, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating

passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

5.1 Watertight doors, except as provided in paragraph 9.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.

5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15^{o} either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6 All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only be at the navigation bridge as required by paragraph 7.1.5 and at the location where hand operation above the bulkhead deck is required by paragraph 7.1.4.

7.1 Each power-operated sliding watertight door:

- .1 shall have a vertical or horizontal motion;
- .2 shall, subject to paragraph 10, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:
  - .1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and
  - .2 the door shall be located inboard the damage zone *B*/5;
- .3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration;

.4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position;

.5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;

.6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

.7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

7.2 The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by regulation 42.3.1.3 in the event of failure of either the main or emergency source of electrical power.

7.3 Power-operated sliding watertight doors shall have either:

.1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15º. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or

.2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or

.3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by regulation 42.4.2 - in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in paragraphs 7.3.1, 7.3.2 and 7.3.3, provision should be made as follows: Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

7.4 Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

7.5 As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

7.6 The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.*

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* Refer to the following IEC publication 529, 1976:

.1 electrical motors, associated circuits and control components; protected to IPX 7 standard;

.2 door position indicators and associated circuit components; protected to IPX 8 standard; and

.3 door movement warning signals; protected to IPX 6 standard.

Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.

7.7 Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

7.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 7.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

8.1 The central operating console at the navigation bridge shall have a “master mode” switch with two modes of control: a “local control” mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a “doors closed” mode which shall automatically close any door that is open. The “doors closed” mode shall automatically close any door that is open. The “doors closed” mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The “master mode” switch shall normally be in the “local control” mode. The “doors closed” mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the “master mode” switch.

8.2 The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

8.3 It shall not be possible to remotely open any door from the central operating console.

9.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

9.2 Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

10 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door

in each watertight bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.

11.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 16-1. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the bulkhead deck. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

11.2 Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.

11.3 Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

Regulation 13-1
Openings in watertight bulkheads and internal decks in cargo ships

1 The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

2 Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimizing the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

3 Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled.* Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

5 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 14
Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

2 If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where A_d = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 m, the provisions of regulations 13.9.1 and 13.9.2 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

3 The ship may not be certified for a higher number of passengers than assumed in paragraph 2, if a watertight door has been fitted in accordance with this regulation.

Regulation 15
Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1 Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision draught, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by paragraph 3.1, shall be of such

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* Refer to Interpretations of regulations of part B-1 of SOLAS chapter II-1 (MSC/Circ.651).

construction as will effectively prevent any person opening them without the consent of the master of the ship.

4 Efficient hinged inside deadlights so arranged that they can be easily and effectively closed and secured watertight, shall be fitted to all sidescuttles except that abaft one eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 m plus 2.5% of the breadth of the ship above the deepest subdivision draught, the deadlights may be portable in passenger accommodation other than that for steerage passengers, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

5.1 No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo or coal.

5.2 Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.

7 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

8.1 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

8.2.1 Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 8.3, each separate discharge led through the shell plating from spaces below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision draught and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating position above the bulkhead deck shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

8.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

8.3 Machinery space, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

8.4 Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Administration. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck will not be submerged. The Administration may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship.

8.5 All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

9 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

10.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

10.2 If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the cover shall be watertight and, in addition, an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision draught.

Regulation 15-1
External openings in cargo ships

1 All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.

2 External openings required to be watertight in accordance with paragraph 1 shall, except for cargo hatch covers, be fitted with indicators on the bridge.

3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.

4 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 16
Construction and initial tests of watertight doors, sidescuttles, etc.

1 In all ships:

.1 the design, materials and construction of all watertight doors, sidescuttles, gangway and cargo ports, valves, pipes, ash-chutes and rubbish-chutes referred to in these regulations shall be to the satisfaction of the Administration;

.2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and

.3 the frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

2 In passenger ships and cargo ships watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

Regulation 16-1
Construction and initial tests of watertight decks, trunks, etc.

1 Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

2 Where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle allowable during intermediate stages of flooding, in accordance with regulation 7-2.

3 Where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck.

4 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 17
Internal watertight integrity of passenger ships above the bulkhead deck

1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck

between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.*

2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

3 The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15º, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

4 Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.**

5 Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 17-1
Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships

1.1 Subject to the provisions of paragraphs 1.2 and 1.3, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge.

1.3 The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

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* Refer to the Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS 1974, as amended (MSC/Circ.541, as may be amended).

** Refer to the Recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships, adopted by the Organization by resolution A.793(19).

2 Indicators shall be provided on the navigation bridge for all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.

3 Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro spaces.

PART B-3
SUBDIVISION LOAD LINE ASSIGNMENT FOR PASSENGER SHIPS

Regulation 18
Assigning, marking and recording of subdivision load lines for passenger ships

1 In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index R will have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

4 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.

PART B-4
STABILITY MANAGEMENT

Regulation 19
Damage control information

1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.*

2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers and crew.

5 In case of ships to which damage stability requirements of part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.**

Regulation 20
Loading of passenger ships

1 On completion of loading of the ship and prior to its departure, the master shall determine the ship’s trim and stability and also ascertain and record that the ship is in compliance with stability criteria in relevant regulations. The determination of the ship’s stability shall always be made by calculation. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

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* Refer to the Guidelines for damage control plans (MSC/Circ.919).

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

2 Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 21
Periodical operation and inspection of watertight doors, etc. in passenger ships

1 Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes shall take place weekly. In ships in which the voyage exceeds one week in duration a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

2 All watertight doors, both hinged and power operated, in watertight bulkheads, in use at sea, shall be operated daily.

3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.

4 A record of all drills and inspections required by this regulation shall be entered in the log-book with an explicit record of any defects which may be disclosed.

Regulation 22
Prevention and control of water ingress, etc.

1 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 3 and 4. Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by regulation 13.10 may only be opened in the circumstances detailed in that regulation. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration.

3 A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished.

4 Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only after careful consideration of the impact on ship operations and

survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

5 Portable plates on bulkheads shall always be in place before the ship leaves port, and shall not be removed during navigation except in case of urgent necessity at the discretion of the master. The necessary precautions shall be taken in replacing them to ensure that the joints are watertight. Power-operated sliding watertight doors permitted in machinery spaces in accordance with regulation 13.10 shall be closed before the ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

6 Watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with regulation 13.9.1 shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

7 Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage and shall remain closed and locked until the ship is at its next berth:

.1 cargo loading doors in the shell or the boundaries of enclosed superstructures;

.2 bow visors fitted in positions as indicated in paragraph 8.1;

.3 cargo loading doors in the collision bulkhead; and

.4 ramps forming an alternative closure to those defined in paragraphs 8.1 to 8.3 inclusive.

9 Provided that where a door cannot be opened or closed while the ship is at the berth such a door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated. In any case, the inner bow door must be kept closed.

10 Notwithstanding the requirements of paragraphs 8.1 and 8.4, the Administration may authorize that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.

11 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 8 is implemented.

12 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book is made of the time of the last closing of the doors specified in paragraph 13 and the time of any opening of particular doors in accordance with paragraph 14.

13 Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering ports and other openings, which are required by these regulations to be kept closed during navigation, shall be closed before the ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.

14 Where in a between-decks, the sills of any of the sidescuttles referred to in regulation 15.3.2 are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, and they shall not be opened before the ship arrives at the next port. In the application of this paragraph the appropriate allowance for fresh water may be made when applicable.

.1 The time of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log-book as may be prescribed by the Administration.

.2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 15 would apply when it was floating at its deepest subdivision draught, the Administration may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side, and having its lowest point 1.4 m plus 25% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

15 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

16 If cargo is carried in such spaces, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in such log-book as may be prescribed by the Administration.

17 When a rubbish-chute, etc. is not in use, both the cover and the valve required by regulation 15.10.2 shall be kept closed and secured.

Regulation 23
Special requirements for ro-ro passenger ships

1 Special category spaces and ro-ro spaces shall be continuously patrolled or monitored by effective means, such as television surveillance, so that any movement of vehicles in adverse weather conditions and unauthorized access by passengers thereto can be detected whilst the ship is underway.

2 Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space, shall be kept on board and posted at an appropriate place.

3 All accesses from the ro-ro deck and vehicle ramps that lead to spaces below the bulkhead deck shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth.

4 The master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraph 3 is implemented.

5 The master shall ensure, before the ship leaves the berth on any voyage, that an entry in the log-book, as required by regulation 22.13, is made of the time of the last closing of the accesses referred to in paragraph 3.

6 Notwithstanding the requirements of paragraph 3, the Administration may permit some accesses to be opened during the voyage, but only for a period sufficient to permit through passage and, if required, for the essential working of the ship.

7 All transverse or longitudinal bulkheads which are taken into account as effective to confine the seawater accumulated on the ro-ro deck shall be in place and secured before the ship leaves the berth and remain in place and secured until the ship is at its next berth.

8 Notwithstanding the requirements of paragraph 7, the Administration may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.

9 In all ro-ro passenger ships, the master or the designated officer shall ensure that, without the expressed consent of the master or the designated officer, no passengers are allowed access to an enclosed ro-ro deck when the ship is under way.

Regulation 24
Prevention and control of water ingress, etc. in cargo ships

1 Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed while at sea.

2 Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

3 Watertight doors or ramps fitted internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

4 The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.

Regulation 25
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than 31 December 2009.

2 Ships having a length (*L*) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors*.

3 The water level detectors required by paragraph 2 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

4 The water level detectors required by paragraph 2 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

PART C
MACHINERY INSTALLATIONS

2 The following new regulation 35-1 is inserted after existing regulation 35:

"**Regulation 35-1**
Bilge pumping arrangements

1 This regulation applies to ships constructed on or after 1 January 2009.

2 Passenger ships and cargo ships

2.1 An efficient bilge pumping system shall be provided, capable of pumping from and draining any watertight compartment other than a space permanently appropriated for the carriage of fresh water, water ballast, oil fuel or liquid cargo and for which other efficient means of pumping are provided, under all practical conditions. Efficient means shall be provided for draining water from insulated holds.

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* Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

2.2 Sanitary, ballast and general service pumps may be accepted as independent power bilge pumps if fitted with the necessary connections to the bilge pumping system.

2.3 All bilge pipes used in or under coal bunkers or fuel storage tanks or in boiler or machinery spaces, including spaces in which oil-settling tanks or oil fuel pumping units are situated, shall be of steel or other suitable material.

2.4 The arrangement of the bilge and ballast pumping system shall be such as to prevent the possibility of water passing from the sea and from water ballast spaces into the cargo and machinery spaces, or from one compartment to another. Provision shall be made to prevent any deep tank having bilge and ballast connections being inadvertently flooded from the sea when containing cargo, or being discharged through a bilge pump when containing water ballast.

2.5 All distribution boxes and manually operated valves in connection with the bilge pumping arrangements shall be in positions which are accessible under ordinary circumstances.

2.6 Provision shall be made for the drainage of enclosed cargo spaces situated on the bulkhead deck of a passenger ship and on the freeboard deck of a cargo ship, provided that the Administration may permit the means of drainage to be dispensed with in any particular compartment of any ship or class of ship if it is satisfied that by reason of size or internal subdivision of those spaces the safety of the ship is not thereby impaired.

2.6.1 Where the freeboard to the bulkhead deck or the freeboard deck, respectively, is such that the deck edge is immersed when the ship heels more than 5°, the drainage shall be by means of a sufficient number of scuppers of suitable size discharging directly overboard, fitted in accordance with the requirements of regulation 15 in the case of a passenger ship and the requirements for scuppers, inlets and discharges of the International Convention on Load Lines in force in the case of a cargo ship.

2.6.2 Where the freeboard is such that the edge of the bulkhead deck or the edge of the freeboard deck, respectively, is immersed when the ship heels 5° or less, the drainage of the enclosed cargo spaces on the bulkhead deck or on the freeboard deck, respectively, shall be led to a suitable space, or spaces, of adequate capacity, having a high water level alarm and provided with suitable arrangements for discharge overboard. In addition it shall be ensured that:

.1 the number, size and disposition of the scuppers are such as to prevent unreasonable accumulation of free water;

.2 the pumping arrangements required by this regulation for passenger ships or cargo ships, as applicable, take account of the requirements for any fixed pressure water-spraying fire extinguishing system;

.3 water contaminated with petrol or other dangerous substances is not drained to machinery spaces or other spaces where sources of ignition may be present; and

.4 where the enclosed cargo space is protected by a carbon dioxide fire extinguishing system the deck scuppers are fitted with means to prevent the escape of the smothering gas.

3 Passenger ships

3.1 The bilge pumping system required by paragraph 2.1 shall be capable of operation under all practicable conditions after a casualty whether the ship is upright or listed. For this purpose wing suctions shall generally be fitted except in narrow compartments at the end of the ship where one suction may be sufficient. In compartments of unusual form, additional suctions may be required. Arrangements shall be made whereby water in the compartment may find its way to the suction pipes. Where, for particular compartments, the Administration is satisfied that the provision of drainage may be undesirable, it may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in regulations 7 and 8 show that the survival capability of the ship will not be impaired.

3.2 At least three power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the bilge pump numeral is 30 or more, one additional independent power pump shall be provided.

The bilge pump numeral shall be calculated as follows:

when P_1 is greater than P: bilge pump numeral $= 72 \cdot \left[\dfrac{M + 2P_1}{V + P_1 - P} \right]$

in other cases: bilge pump numeral $= 72 \cdot \left[\dfrac{M + 2P}{V} \right]$

where:

L = the length of the ship (metres), as defined in regulation 2;

M = the volume of the machinery space (cubic metres), as defined in regulation 2, that is below the bulkhead deck; with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and forward of, or abaft, the machinery space;

P = the whole volume of the passenger and crew spaces below the bulkhead deck (cubic metres), which are provided for the accommodation and use of passengers and crew, excluding baggage, store, provision and mail rooms;

V = the whole volume of the ship below the bulkhead deck (cubic metres);

P_1 = KN,

where:

N = the number of passengers for which the ship is to be certified; and

K = $0.056L$

However, where the value of *KN* is greater than the sum of *P* and the whole volume of the actual passenger spaces above the bulkhead deck, the figure to be taken as P_1 is that sum or two-thirds *KN*, whichever is the greater.

3.3 Where practicable, the power bilge pumps shall be placed in separate watertight compartments and so arranged or situated that these compartments will not be flooded by the same damage. If the main propulsion machinery, auxiliary machinery and boilers are in two or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

3.4 On a ship of 91.5 m in length and upwards or having a bilge pump numeral, calculated in accordance with paragraph 3.2, of 30 or more, the arrangements shall be such that at least one power bilge pump shall be available for use in all flooding conditions which the ship is required to withstand, as follows:

.1 one of the required bilge pumps shall be an emergency pump of a reliable submersible type having a source of power situated above the bulkhead deck; or

.2 the bilge pumps and their sources of power shall be so distributed throughout the length of the ship that at least one pump in an undamaged compartment will be available.

3.5 With the exception of additional pumps which may be provided for peak compartments only, each required bilge pump shall be so arranged as to draw water from any space required to be drained by paragraph 2.1.

3.6 Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 m/s. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than two such suctions shall be required in any one space. Where two or more such suctions are provided, there shall be at least one on each side of the ship. The Administration may require independent power bilge pumps situated in other spaces to have separate direct suctions. Direct suctions shall be suitably arranged and those in a machinery space shall be of a diameter not less than that required for the bilge main.

3.7.1 In addition to the direct bilge suction or suctions required by paragraph 3.6, a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a non-return valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

3.7.2 Where in the opinion of the Administration the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Administration.

3.7.3 The spindles of the sea inlet and direct suction valves shall extend well above the engine-room platform.

3.8 All bilge suction piping up to the connection to the pumps shall be independent of other piping.

3.9 The diameter *d* of the bilge main shall be calculated according to the following formula. However, the actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the Administration:

$$d = 25 + 1.68\sqrt{L(B + D)}$$

where:

d is the internal diameter of the bilge main (millimetres);

L and *B* are the length and the breadth of the ship (metres) as defined in regulation 2; and

D is the moulded depth of the ship to the bulkhead deck (metres) provided that, in a ship having an enclosed cargo space on the bulkhead deck which is internally drained in accordance with the requirements of paragraph 2.6.2 and which extends for the full length of the ship, *D* shall be measured to the next deck above the bulkhead deck. Where the enclosed cargo spaces cover a lesser length, *D* shall be taken as the moulded depth to the bulkhead deck plus *lh*/*L* where *l* and *h* are the aggregate length and height respectively of the enclosed cargo spaces (metres).
The diameter of the bilge branch pipes shall meet the requirements of the Administration.

3.10 Provision shall be made to prevent the compartment served by any bilge suction pipe being flooded in the event of the pipe being severed or otherwise damaged by collision or grounding in any other compartment. For this purpose, where the pipe is at any part situated nearer the side of the ship than one fifth of the breadth of the ship (as defined in regulation 2 and measured at right angles to the centreline at the level of the deepest subdivision load line), or is in a duct keel, a non-return valve shall be fitted to the pipe in the compartment containing the open end.

3.11 Distribution boxes, cocks and valves in connection with the bilge pumping system shall be so arranged that, in the event of flooding, one of the bilge pumps may be operative on any compartment; in addition, damage to a pump or its pipe connecting to the bilge main outboard of a line drawn at one fifth of the breadth of the ship shall not put the bilge system out of action. If there is only one system of pipes common to all the pumps, the necessary valves for controlling the bilge suctions must be capable of being operated from above the bulkhead deck. Where in addition to the main bilge pumping system an emergency bilge pumping system is provided, it shall be independent of the main system and so arranged that a pump is capable of operating on any compartment under flooding condition as specified in paragraph 3.1; in that case only the valves necessary for the operation of the emergency system need be capable of being operated from above the bulkhead deck.

3.12 All cocks and valves referred to in paragraph 3.11 which can be operated from above the bulkhead deck shall have their controls at their place of operation clearly marked and shall be provided with means to indicate whether they are open or closed.

4 Cargo ships

At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 4 – Probability of ignition

3 In paragraph 5.2.4, the reference to "regulation II-1/25-9.2" is replaced by the reference to "regulation II-1/13-1.2".

Regulation 10 – Fire fighting

4 In paragraph 2.2.4.1.2, the reference to "regulation II-1/21" is replaced by the reference to "regulation II-1/35-1".

Regulation 20 – Protection of vehicle, special category and ro–ro spaces

5 In paragraph 6.1.4.1.3, the reference to "regulation II-1/21" is replaced by the reference to "regulation II-1/35-1", and in paragraph 6.1.4.2, the reference to "regulation II-1/22" is replaced by the reference to "regulation II-1/5-1".

CHAPTER VI
CARRIAGE OF CARGOES

Regulation 7 – Loading, unloading and stowage of bulk cargoes

6 In subparagraph 2.1, the reference to "regulation II-1/22" is replaced by the reference to "regulation II-1/5-1".

CHAPTER IX
MANAGEMENT FOR THE SAFE OPERATION OF SHIPS

Regulation 1 – Definitions

7 In paragraph 3, the reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

Regulation 2 – Enhanced surveys

8 The reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

9 The following new regulation 3-1 is added after the existing regulation 3:

"**Regulation 3-1**
Company and registered owner identification number

1 This regulation applies to Companies and registered owners of ships to which chapter I applies.

2 For the purpose of this regulation, registered owner shall be as specified by the Administration and Company as defined in regulation IX/l.

3 Every Company and registered owner shall be provided with an identification number which conforms to the IMO Unique Company and Registered Owner Identification Number Scheme adopted by the Organization*.

4 The Company identification number shall be inserted on the certificates and certified copies thereof issued under regulation IX/4 and section A/19.2 or A/19.4 of the ISPS Code.

5 This regulation shall take effect when the certificates referred to in paragraph 4 are issued or renewed on or after 1 January 2009."

Regulation 5 – Continuous Synopsis Record

10 In paragraph 3, in the first sentence, after the word "information", the following words are inserted:

"(The Continuous Synopsis Record shall contain the information in paragraphs 3.7 and 3.10 when it is issued or updated on or after 1 January 2009)";

and the following new subparagraphs .7 and .10 are inserted as follows:

".7 the registered owner identification number;" and

".10 the Company identification number;".

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* Refer to resolution MSC.160(78) entitled "Adoption of the IMO Unique Company and Registered Owner Identification Number Scheme".

11 In paragraph 3, existing subparagraphs .7 and .8 are renumbered as subparagraphs .8 and .9, and existing subparagraphs .9 to .13 are renumbered as subparagraphs .11 to .15.

CHAPTER XI-2
SPECIAL MEASURES TO ENHANCE MARITIME SECURITY

Regulation 1 – Definitions

12 In paragraph 1.6, the reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

APPENDIX
CERTIFICATES

Form of Safety Certificate for Passenger Ships

13 In the table of paragraph 2.1.3, in the section commencing with the words "THIS IS TO CERTIFY:", the reference to "regulation II-1/13" is replaced by the reference to "regulation II-1/18".

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ANNEX 2

RESOLUTION MSC.195(80)
(adopted on 20 May 2005)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL MANAGEMENT CODE FOR THE SAFE OPERATION OF SHIPS AND FOR POLLUTION PREVENTION (INTERNATIONAL SAFETY MANAGEMENT (ISM) CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution A.741(18), by which the Assembly adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code) (hereinafter referred to as "the ISM Code"), which has become mandatory under chapter IX of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"),

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

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

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the ISM Code, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2008, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2009 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL MANAGEMENT CODE FOR THE SAFE OPERATION OF SHIPS AND FOR POLLUTION PREVENTION (INTERNATIONAL SAFETY MANAGEMENT (ISM) CODE)

Appendix

Forms of the Document of Compliance, the Safety Management Certificate, the Interim Document of Compliance and the Interim Safety Management Certificate

1 After "Name and address of the Company" in the forms of the Document of Compliance and Interim Document of Compliance, the following is added:

"Company identification number ...."

2 After "Name and address of the Company" in the form of the Safety Management Certificate and Interim Safety Management Certificate, the following is added:

"Company identification number ...."

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ANNEX 3

RESOLUTION MSC.196(80)
(adopted on 20 May 2005)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE FOR THE SECURITY OF SHIPS AND OF PORT FACILITIES (INTERNATIONAL SHIP AND PORT FACILITY SECURITY (ISPS) CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING Conference Resolution 2, by which the 2002 SOLAS Conference adopted the International Code for the Security of Ships and of Port Facilities (International Ship and Port Facility Security (ISPS) Code) (hereinafter referred to as "the ISPS Code"), which has become mandatory under chapter XI-2 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation XI-2/1.1.12 of the Convention concerning the procedure for amending part A of the ISPS Code,

HAVING CONSIDERED, at its eightieth session, amendments to part A of the ISPS Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to part A of the ISPS Code, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2008, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2009 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE SECURITY OF SHIPS AND OF PORT FACILITIES (INTERNATIONAL SHIP AND PORT FACILITY SECURITY (ISPS) CODE)

PART A

MANDATORY REQUIREMENTS REGARDING THE PROVISIONS OF CHAPTER XI-2 OF THE ANNEX TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

APPENDIX TO PART A

Appendix 1

Form of the International Ship Security Certificate

1 After the existing entry "Name and address of the Company", the following new entry is inserted:

"Company identification number ……….."

Appendix 2

Form of the Interim International Ship Security Certificate

2 After the existing entry "Name and address of Company", the following new entry is inserted:

"Company identification number ……….."

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ANNEX 4

RESOLUTION MSC.197(80)
(adopted on 20 May 2005)

ADOPTION OF AMENDMENTS TO THE GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS (RESOLUTION A.744(18), AS AMENDED)

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO resolution A.744(18) by which the Assembly adopted the Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers (the Guidelines),

RECALLING FURTHER article VIII(b) and regulation XI-1/2 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention") concerning the procedure for amending the Guidelines,

NOTING that the Assembly, when adopting resolution A.744(18), requested the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Guidelines under review and update them as necessary, in the light of experience gained in their application,

NOTING ALSO resolutions MSC.49(66), MSC.105(73), MSC.125(75), MSC.144(77) and resolution 2 of the 1997 Conference of Contracting Governments to the Convention, by which amendments to resolution A.744(18) were adopted by the Maritime Safety Committee and the Conference of Contracting Governments to the Convention, in accordance with article VIII(b) and regulation XI-1/2 of the Convention,

HAVING CONSIDERED, at its eightieth session, amendments to the Guidelines proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2006, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2007 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS (RESOLUTION A.744(18), AS AMENDED)

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS

1 The section "Contents" is replaced with the following and the relevant headings in the text of the Guidelines are amended accordingly:

"**Contents**

ANNEX A

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

ANNEX B

Part A

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF DOUBLE HULL OIL TANKERS

Part B

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS OTHER THAN DOUBLE HULL OIL TANKERS

Annex 7 Procedures for certification of a company engaged in thickness measurement of hull structures

Annex 8 Survey reporting principles

Annex 9 Condition evaluation report

Annex 10 Recommended procedures for thickness measurements

Annex 11 Guidelines for technical assessment in conjunction with the planning of enhanced surveys for oil tankers

Annex 12 Criteria for longitudinal strength of hull girder for oil tankers".

2 Throughout the Guidelines:

.1 the words "enhanced survey during the periodical survey", "periodical survey" and "enhanced survey" are replaced with the words "renewal survey";

.2 the words "enhanced survey during annual survey" are replaced with the words "annual survey";

.3 the words "intermediate enhanced survey" are replaced with the words "intermediate survey"; and

.4 the words "is to be" and "are to be" are replaced with the words "should be".

ANNEX A

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

3 A new paragraph 1.1.1 is added as follows:

"1.1.1 The Guidelines should apply to all self-propelled bulk carriers of 500 gross tonnage and above."

Existing paragraphs 1.1.1 and 1.1.2 are renumbered as paragraphs 1.1.2 and 1.1.3.

4 In new paragraph 1.1.2 (existing paragraph 1.1.1), in the second sentence, the words "regulation I/10 of" are inserted between "by" and "the 1974 SOLAS Convention".

5 In paragraph 1.2.14, the words "Intermediate enhanced survey is an enhanced survey" are replaced by "Intermediate survey is a survey".

6 In existing paragraph 1.2.15, the words "condition of classification" are replaced by "condition of classification or recommendation".

7 A new paragraph 1.2.17 is added as follows:

"1.2.17 *Specially considered* means sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under coating."

8 The word "significant" in paragraph 1.3.2 is deleted.

9 The following new paragraph 1.4 is added:

"**1.4 Surveyors**

For bulk carriers of 20,000 tons deadweight and above, two surveyors should jointly carry out the first scheduled renewal survey after the bulk carrier passes 10 years of age, and all subsequent renewal surveys and intermediate surveys. If the surveys are carried out by a recognized organization, the surveyors should be exclusively employed by such recognized organizations."

10 The words "thickness measurement and" in paragraph 2.1.2 are deleted.

11 Paragraph 2.2.4 is deleted.

12 The references to a footnote regarding "specially considered" in paragraphs 2.3.1, 2.6.4, 3.4.1.1 and 3.4.2.1 are deleted.

13 In paragraph 3.1, the word "annual" is inserted before the word "survey".

14 Existing paragraphs 3.3.2, 3.3.4, 3.3.5 and 3.3.6 are deleted.

15 The following new paragraphs 3.3.2 to 3.3.7 are added after existing paragraph 3.3.1:

"3.3.2 A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and should include verification of proper opening and closing operation. As a result, the hatch cover sets within the forward 25% of the ship's length and at least one additional set, such that all sets on the ship are assessed at least once in every 5-year period, should be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:

.1 stowage and securing in open condition;

.2 proper fit and efficiency of sealing in closed condition; and

.3 operational testing of hydraulic and power components, wires, chains and link drives.

The closing of the covers should include the fastening of all peripheral, and cross joint cleats or other securing devices. Particular attention should be paid to the condition of hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

3.3.3 If there are indications of difficulty in operating and securing hatch covers, additional sets above those required by 3.3.2, at the discretion of the surveyor, should be tested in operation.

3.3.4 Where the cargo hatch securing system does not function properly, repairs should be carried out under the supervision of the Administration. Where hatch covers or coamings undergo substantial repairs, the strength of securing devices should be upgraded to comply with annex 13.

3.3.5 For each cargo hatch cover set, at each annual survey, the following items should be surveyed:

.1 cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, deformation);

.2 sealing arrangements of perimeter and cross joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non return valves);

.3 clamping devices, retaining bars, cleating (for wastage, adjustment, and condition of rubber components);

.4 closed cover locating devices (for distortion and attachment);

.5 chain or rope pulleys;

.6 guides;

.7 guide rails and track wheels;

.8 stoppers;

.9 wires, chains, tensioners and gypsies;

.10 hydraulic system, electrical safety devices and interlocks; and

.11 end and interpanel hinges, pins and stools where fitted.

3.3.6 At each hatchway, at each annual survey, the coamings, with plating, stiffeners and brackets should be checked for corrosion, cracks and deformation, especially of the coaming tops.

3.3.7 Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components."

16 Existing paragraph 3.3.3 is renumbered as 3.3.8.

17 Existing paragraph 5.1.1 is replaced by the following:

"5.1.1 A specific survey programme should be worked out in advance of the renewal survey by the owner in co-operation with the Administration. The survey programme should be in a written format based on the information in annex 4A. The survey should not commence until the survey programme has been agreed.

5.1.1.1 Prior to the development of the survey programme, the survey planning questionnaire should be completed by the owner based on the information set out in annex 4B, and forwarded to the Administration."

18 The seven sub-items in paragraph 5.1.2 are numbered from ".1" to ".7" and the eleven sub-items in paragraph 5.1.3 are numbered from ".1" to ".11".

19 Paragraph 5.1.4 is deleted and paragraphs 5.1.5 and 5.1.6 are renumbered as 5.1.4 and 5.1.5.

20 The following new paragraphs 5.2.1.1 to 5.2.1.3 are added:

"5.2.1.1 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access, should be agreed between the owner and the Administration.

5.2.1.2 Details of the means of access should be provided in the survey planning questionnaire.

5.2.1.3 In cases where the provisions of safety and required access are judged by the attending surveyors not to be adequate, the survey of the spaces involved should not proceed."

21 Existing paragraphs 5.2.2, 5.2.3 and 5.2.4 are replaced by the following:

"5.2.2 Cargo holds, tanks and spaces should be safe for access. Cargo holds, tanks and spaces should be gas free and properly ventilated. Prior to entering a tank, void or enclosed space, it should be verified that the atmosphere in the tank is free from hazardous gas and contains sufficient oxygen.

5.2.3 Cargo holds, tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, sediments etc., to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating. In particular this applies to areas which are subject to thickness measurement.

5.2.4 Sufficient illumination should be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating."

22 The following new paragraphs 5.2.5 and 5.2.6 are added:

"5.2.5 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed spaces inspection. In addition a backup team of at least two experienced persons should be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team should continuously observe the work in the tank or space and should keep lifesaving and evacuation equipment ready for use.

5.2.6 A communication system should be arranged between the survey party in the cargo hold, tank or space being examined, the responsible officer on deck and, as the case may be, the navigation bridge. The communication arrangements should be maintained throughout the survey."

23 In existing paragraph 5.3.2, a new sub-item "portable ladders" is inserted between the third and fourth sub-items.

24 The five sub-items in paragraph 5.3.2 are numbered from ".1" to ".5" and the five sub-items in paragraph 5.4.2 are numbered from ".1" to ".5".

25 New paragraphs 5.4.3 to 5.4.5 are added as follows:

"5.4.3 Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use should be made available during the survey. A safety check-list should be provided.

5.4.4 Adequate and safe lighting should be provided for the safe and efficient conduct of the survey.

5.4.5 Adequate protective clothing should be made available and used (e.g. safety helmet, gloves, safety shoes, etc.) during the survey."

26 The existing paragraph 5.5.3 is replaced by the following:

"5.5.3 When rafts or boats will be used for close-up survey the following conditions should be observed:

.1 only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, should be used;

.2 the boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft;

.3 appropriate lifejackets should be available for all participants;

.4 the surface of water in the tank or hold should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25 m) and the water level either stationary or falling. On no account should the level of the water be rising while the boat or raft is in use;

.5 the tank, hold or space must contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable; and

.6 at no time should the water level be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should only be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered."

27 The following new paragraphs 5.5.4 to 5.5.6 are added:

"5.5.4 Rafts or boats alone may be allowed for inspection of the under deck areas for tanks or spaces, if the depth of the webs is 1.5 m or less.

5.5.5 If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

.1 when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or

.2 if a permanent means of access is provided in each bay to allow safe entry and exit. This means of access should be direct from the deck via a vertical ladder with a small platform fitted approximately 2 m below the deck. Other effective means of escape to the deck may be considered.

If neither of the above conditions are met, then staging or other equivalent means should be provided for the survey of the under deck areas.

5.5.6 The use of rafts or boats alone in paragraphs 5.5.4 and 5.5.5 does not preclude the use of boats or rafts to move about within a tank during a survey."

28 The following new section 5.6 is added:

"**5.6 Survey planning meeting**

5.6.1 The establishment of proper preparation and the close co-operation between the attending surveyor(s) and the owner's representatives onboard prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings should be held regularly.

5.6.2 Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting should be held between the attending surveyor(s), the owner's representative in attendance, the thickness measurement company operator (as applicable) and the master of the ship for the purpose to ascertain that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

5.6.3 The following is an indicative list of items that should be addressed in the meeting:

.1 schedule of the vessel (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.);

.2 provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);

.3 extent of the thickness measurements;

.4 acceptance criteria (refer to the list of minimum thicknesses);

.5 extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;

.6 execution of thickness measurements;

.7 taking representative readings in general and where uneven corrosion/pitting is found;

.8 mapping of areas of substantial corrosion; and

.9 communication between attending surveyor(s) the thickness measurement company operator(s) and owner representative(s) concerning findings."

29 The words "supply and maintain on-board" in paragraph 6.1.1 are replaced with "obtain, supply and maintain on board the ship".

30 Paragraph 6.2.1.4 is deleted.

31 The word "inspection" in paragraph 6.4 is replaced with "survey".

32 The word "extend" in paragraph 7.1.3 is replaced with "extent".

33 The following new paragraph 8.2.2 is added after existing paragraph 8.2.1:

"8.2.2 When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements etc.) and an indication of whether the item has been credited, should be made available to the next attending surveyor(s), prior to continuing or completing the survey."

34 The existing paragraph 8.2.2 is renumbered as 8.2.3.

35 The existing annex 4 is deleted.

36 The following new annex 4A is added after existing annex 3:

"**ANNEX 4A**

SURVEY PROGRAMME

Basic information and particulars

Name of ship :
IMO number :
Flag State :
Port of registry :
Gross tonnage :
Deadweight (metric tonnes) :
Length between perpendiculars (m) :
Shipbuilder :
Hull number :
Recognized organization (RO) :
RO ship identity :
Date of delivery of the ship :
Owner :
Thickness measurement company :

1 Preamble

1.1 Scope

1.1.1 The present survey programme covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, cargo holds, ballast tanks, including fore and aft peak tanks, required by the Guidelines.

1.1.2 The arrangements and safety aspects of the survey should be acceptable to the attending surveyor(s).

1.2 Documentation

All documents used in the development of the survey programme should be available onboard during the survey as required by section 6.

2 Arrangement of cargo holds, tanks and spaces

This section of the survey programme should provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

3 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion protection system

This section of the survey programme should indicate any changes relating to (and should update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire.

4 Conditions for survey

This section of the survey programme should provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

5 Provisions and method of access to structures

This section of the survey programme should indicate any changes relating to (and should update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire.

6 List of equipment for survey

This section of the survey programme should identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

7 Survey requirements

7.1 Overall survey

This section of the survey programme should identify and list the spaces that should undergo an overall survey for this ship in accordance with 2.4.1 and 2.5.1.

7.2 Close-up survey

This section of the survey programme should identify and list the hull structures that should undergo a close-up survey for this ship in accordance with 2.5.2.

8 Identification of tanks for tank testing

This section of the survey programme should identify and list the cargo holds and tanks that should undergo tank testing for this ship in accordance with 2.7.

9 Identification of areas and sections for thickness measurements

This section of the survey programme should identify and list the areas and sections where thickness measurements should be taken in accordance with 2.6.1.

10 Minimum thickness of hull structures

This section of the survey programme should specify the minimum thickness for hull structures of this ship that are subject to survey, according to (a) or (b):

(a) ☐ Determined from the attached wastage allowance table and the original thickness to the hull structure plans of the ship;

(b) ☐ Given in the following table(s):

Area or location	**Original as-built thickness (mm)**	**Minimum thickness (mm)**	**Substantial corrosion thickness (mm)**
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Cross deck plating			
Cross deck stiffeners			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Floors			
Ship side in way of topside tanks			
Plating			
Longitudinals			
Ship side in way of hopper side tanks			
Plating			
Longitudinals			
Ship side in way of tanks (if applicable)			
Plating			
Longitudinals			
Longitudinal stringers			
Ship side in way of cargo holds			
Plating			
Side frames webs			
Side frames flanges			
Upper brackets webs			
Upper brackets flanges			
Lower brackets webs			
Lower brackets flanges			

Longitudinal bulkhead if applicable			
Plating			
Longitudinals **if applicable**			
Longitudinal girders **if applicable**			
Transverse bulkheads			
Plating			
Stiffeners **if applicable**			
Upper stool plating			
Upper stool stiffeners			
Lower stool plating			
Lower stool stiffeners			
Transverse web frames in topside tanks			
Plating			
Flanges			
Stiffeners			
Transverse web frames in hopper tanks			
Plating			
Flanges			
Stiffeners			
Hatch covers			
Plating			
Stiffeners			
Hatch coamings			
Plating			
Stiffeners			

Note: The wastage allowance tables should be attached to the survey programme.

11 Thickness measurement company

This section of the survey programme should identify changes, if any, relating to the information on the thickness measurement company provided in the Survey Planning Questionnaire.

12 Damage experience related to the ship

This section of the survey programme should, using the tables provided below, provide details of the hull damages for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area. These damages are subject to survey.

Hull damages sorted by location for this ship

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

Hull damages for sister or similar ships (if available) in the case of design related damage

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

13 Areas identified with substantial corrosion from previous surveys

This section of the survey programme should identify and list the areas of substantial corrosion from previous surveys.

14 Critical structural areas and suspect areas

This section of the survey programme should identify and list the critical structural areas and the suspect areas, when such information is available.

15 Other relevant comments and information

This section of the survey programme should provide any other comments and information relevant to the survey.

Appendices

Appendix 1 – List of plans

Paragraph 5.1.3.2 requires that main structural plans of cargo holds and ballast tanks (scantling drawings), including information on regarding use of high tensile steel (HTS) should be available. This Appendix of the survey programme should identify and list the main structural plans which form part of the survey programme.

Appendix 2 – Survey Planning Questionnaire

The Survey Planning Questionnaire (annex 4B), which has been submitted by the owner, should be appended to the survey programme.

Appendix 3 – Other documentation

This part of the survey programme should identify and list any other documentation that forms part of the plan.

Prepared by the owner in co-operation with the Administration for compliance with 5.1.3:

Date:........ .... (name and signature of authorized owner's representative)

Date:........ .... (name and signature of authorized representative of the Administration)"

37 The following new Annex 4B is added after Annex 4A:

"**ANNEX 4B**

SURVEY PLANNING QUESTIONNAIRE

1 The following information will enable the owner in co-operation with the Administration to develop a Survey Plan complying with the requirements of the Guidelines. It is essential that the owner provides, when completing the present questionnaire, up-to-date information. The present questionnaire, when completed, should provide all information and material required by the Guidelines.

Particulars

Ship's name:
IMO number:
Flag State:
Port of registry:
Owner:
Recognized organization:
Gross tonnage:
Deadweight (metric tonnes):
Date of delivery:

Information on access provision for close-up surveys and thickness measurement

2 The owner should indicate, in the table below, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending surveyor, i.e. preferably within reach of hand.

Hold/Tank No.	Structure	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
F.P.	Fore Peak					
A.P.	Aft Peak					
Cargo Holds	Hatch side coamings					
	Topside sloping plate					
	Upper stool plating					
	Cross deck					
	Side shell, frames and brackets					
	Transverse bulkhead					
	Hopper tank platting					
	Lower stool					
	Tank top					
Topside Tanks	Underdeck structure					
	Side shell and structure					
	Sloping plate and structure					
	Webs and bulkheads					
Hopper Tanks	Hopper sloping plate and structure					
	Side shell and structure					
	Bottom structure					
	Webs and bulkheads					
	Double bottom structure					
	Upper stool internal structure					
	Lower stool internal structure					
Wing tanks of double Ore Carriers	Underdeck and structure					
	Side shell and structure					
	Side shell vertical web and structure					
	Longitudinal bulkhead and structure					
	Longitudinal bulkhead web and structure					
	Bottom plating and structure					
	Cross ties/stringers					

History of bulk cargoes of a corrosive nature (e.g. high sulphur content)

Owner's inspections

3 Using a format similar to that of the table below (which is given as an example), the owner should provide details of the results of their inspections, for the last 3 years - in accordance with the Guidelines - on all CARGO holds and BALLAST tanks and VOID spaces within the cargo area.

Tank/Hold No.	**Corrosion protection (1)**	**Coating extent (2)**	**Coating condition (3)**	**Structural deterioration (4)**	**Hold and tank history (5)**
Cargo holds					
Topside tanks					
Hopper tanks					
Double side skin tanks					
Double bottom tanks					
Upper stools					
Lower stools					
Wing tanks (ore tankers)					
Fore peak					
Aft peak					
Miscellaneous other spaces:					

Note: Indicate tanks which are used for oil/ballast

1) HC=hard coating; SC=soft coating; A=anodes; NP=no protection
2) U=upper part; M=middle part; L=lower part; C=complete
3) G=good; F=fair; P=poor; RC=recoated (during the last 3 years)
4) N=no findings recorded; Y=findings recorded, description of findings should be attached to this questionnaire
5) DR=Damage & Repair; L=Leakages; CV= Conversion (Description to be attached to this questionnaire)

Name of owner's representative:

Signature: --

Date: ---

Reports of Port State Control inspections

List the reports of Port State Control inspections containing hull structural related deficiencies, relevant information on rectification of the deficiencies:

Safety Management System

List non-conformities related to hull maintenance, including the associated corrective actions:

Name and address of the approved thickness measurement company:

”

38 The existing text of Annex 6 is replaced by the following:

“**ANNEX 6**

SURVEY REPORTING PRINCIPLES

As a principle, for bulk carriers subject to the Guidelines, the surveyor should include the following contents in his report for survey of hull structure and piping systems, as relevant for the survey.

1 General

1.1 A survey report should be generated in the following cases:

.1 in connection with commencement, continuation and/or completion of periodical hull surveys, i.e. annual, intermediate and renewal surveys, as relevant;

.2 when structural damages/defects have been found;

.3 when repairs, renewals or modifications have been carried out; and

.4 when condition of class (recommendation) has been imposed or has been deleted.

1.2 The reporting should provide:

.1 evidence that prescribed surveys have been carried out in accordance with applicable requirements;

.2 documentation of surveys carried out with findings, repairs carried out and condition of class (recommendation) imposed or deleted;

.3 survey records, including actions taken, which should form an auditable documentary trail. Survey reports should be kept in the survey report file required to be on board;

.4 information for planning of future surveys; and

.5 information which may be used as input for maintenance of classification rules and instructions.

1.3 When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items surveyed, relevant findings and an indication of whether the item has been credited, should be made available to the next attending surveyor, prior to continuing or completing the survey. Thickness measurement and tank testing carried out is also to be listed for the next surveyor.

2 Extent of the survey

2.1 Identification of compartments where an overall survey has been carried out.

2.2 Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where a close-up survey has been carried out, together with information on the means of access used.

2.3 Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where thickness measurement has been carried out.

Note: *As a minimum, the identification of location of close-up survey and thickness measurement should include a confirmation with description of individual structural members corresponding to the extent of requirements stipulated in Annex A based on type of periodical survey and the ship's age.*

Where only partial survey is required, i.e. 25% of shell frames, one transverse web, two selected cargo hold transverse bulkheads, the identification should include location within each ballast tank and cargo hold by reference to frame numbers.

2.4 For areas in ballast tanks and cargo holds where protective coating is found to be in good condition and the extent of close-up survey and/or thickness measurement has been specially considered, structures subject to special consideration should be identified.

2.5 Identification of tanks subject to tank testing.

2.6 Identification of piping systems on deck and within cargo holds, ballast tanks, pipe tunnels, cofferdams and void spaces where:

.1 examination including internal examination of piping with valves and fittings and thickness measurement, as relevant, has been carried out; and

.2 operational test to working pressure has been carried out.

3 Result of the survey

3.1 Type, extent and condition of protective coating in each tank, as relevant (rated GOOD, FAIR or POOR) including identification of tanks fitted with anodes.

3.2 Structural condition of each compartment with information on the following, as relevant:

.1 identification of findings, such as:

.1.1 corrosion with description of location, type and extent;

.1.2 areas with substantial corrosion;

.1.3 cracks/fractures with description of location and extent;

.1.4 buckling with description of location and extent; and

.1.5 indents with description of location and extent;

.2 identification of compartments where no structural damages/defects are found. The report may be supplemented by sketches/photos; and

.3 thickness measurement report should be verified and signed by the surveyor controlling the measurements on board.

4 Actions taken with respect to findings

4.1 Whenever the attending surveyor is of the opinion that repairs are required, each item to be repaired should be identified in a numbered list. Whenever repairs are carried out, details of the repairs effected should be reported by making specific reference to relevant items in the numbered list.

4.2 Repairs carried out should be reported with identification of:

.1 compartment;

.2 structural member;

.3 repair method (i.e. renewal or modification), including:

.3.1 steel grades and scantlings (if different from the original);

.3.2 sketches/photos, as appropriate;

.4 repair extent; and

.5 non-destructive test (NDT)/tests.

4.3 For repairs not completed at the time of survey, condition of class/recommendation should be imposed with a specific time limit for the repairs. In order to provide correct and proper information to the surveyor attending for survey of the repairs, condition of class/recommendation should be sufficiently detailed with identification of each item to be repaired. For identification of extensive repairs, reference may be made to the survey report."

39 Table 1 and table 2 in appendix 3 of Annex 8 are deleted and table 3 is renumbered as table 1.

40 In paragraph 1 of annex 9, the words "the paragraph 5.1.6 of annex A" are replaced with "5.1.5".

41 The following new Annex 13 is added:

"ANNEX 13

Strength of cargo hatch cover securing arrangements for bulk carriers

1 Securing devices

The strength of securing devices should comply with the following requirements:

.1 Panel hatch covers should be secured by appropriate devices (bolts, wedges or similar) suitably spaced alongside the coamings and between cover elements. Arrangement and spacing should be determined with due attention to the effectiveness for weather-tightness, depending upon the type and the size of the hatch cover, as well as on the stiffness of the cover edges between the securing devices.

.2 The net sectional area of each securing device is not to be less than:

$A = 1.4\ a / f\ (cm^2)$

where:

a = spacing between securing devices not to be taken less than 2 metres

f = $(\sigma_Y / 235)^e$

σ_Y = specified minimum upper yield stress in N/mm^2 of the steel used for fabrication, not to be taken greater than 70% of the ultimate tensile strength
e = 0.75 for $\sigma_Y > 235$
= 1.0 for $\sigma_Y \leq 235$

Rods or bolts should have a net diameter not less than 19 mm for hatchways exceeding 5 m^2 in area.

.3 Between cover and coaming and at cross-joints, a packing line pressure sufficient to obtain weathertightness should be maintained by the securing devices. For packing line pressures exceeding 5 N/mm, the cross section area should be increased in direct proportion. The packing line pressure should be specified.

.4 The cover edge stiffness should be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia, I, of edge elements be less than:

$$I = 6\, p\, a^4 \ (cm^4)$$

where:

p = packing line pressure in N/mm, minimum 5 N/mm
a = spacing in m of securing devices

.5 Securing devices should be of reliable construction and securely attached to the hatchway coamings, decks or covers. Individual securing devices on each cover are to have approximately the same stiffness characteristics.

.6 Where rod cleats are fitted, resilient washers or cushions should be incorporated.

.7 Where hydraulic cleating is adopted, a positive means should be provided to ensure that it remains mechanically locked in the closed position in the event of failure of the hydraulic system.

2 Stoppers

2.1 Nos.1 and 2 hatch covers should be effectively secured, by means of stoppers, against the transverse forces arising from a pressure of 175 kN/m^2.

2.2 No.2 hatch covers should be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 175 kN/m^2.

2.3 No.1 hatch cover should be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m^2. This pressure may be reduced to 175 kN/m^2 if a forecastle is fitted.

2.4 The equivalent stress in stoppers and their supporting structures and calculated in the throat of the stopper welds is not to exceed the allowable value of 0.8 σ_Y.

3 Materials and welding

Where stoppers or securing devices are fitted to comply with this annex, they should be manufactured of materials, including welding electrodes, to the satisfaction of the Administration."

ANNEX B

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS

42 The text of existing Annex B is replaced by a new part A with the title:

"Part A
GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF DOUBLE HULL OIL TANKERS"

and a new part B with the title:

"Part B
GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS OTHER THAN DOUBLE HULL OIL TANKERS"

43 The text of the new part A is as follows:

"Part A
GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF DOUBLE HULL OIL TANKERS

1 General

1.1 Application

1.1.1 The Guidelines should apply to all self-propelled double hull oil tankers of 500 gross tonnage and above.

1.1.2 The Guidelines should apply to surveys of hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels, void spaces within the cargo area and all ballast tanks. The surveys should be carried out during the surveys prescribed by regulation I/10 of the 1974 SOLAS Convention, as amended.

1.1.3 The Guidelines contain the extent of examination, thickness measurements and tank testing. The survey should be extended when substantial corrosion and/or structural defects are found and include additional close-up survey when necessary.

1.2 Definitions

1.2.1 *Double hull oil tanker* is a ship which is constructed primarily for the carriage of oil in bulk, which have the cargo tanks protected by a double hull which extends for the entire length of the cargo area, consisting of double sides and double bottom spaces for the carriage of water ballast or void spaces.

1.2.2 *A ballast tank* is a tank which is used solely for water ballast.

1.2.3 *Overall survey* is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

1.2.4 *Close-up survey* is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. preferably within reach of hand.

1.2.5 *Transverse section* includes all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom and longitudinal bulkheads.

1.2.6 *Representative tanks* are those which are expected to reflect the condition of other tanks of similar type and service and with similar corrosion protection systems. When selecting representative tanks account should be taken of the service and repair history onboard and identifiable critical and/or suspect areas.

1.2.7 *Suspect areas* are locations showing Substantial Corrosion and/or are considered by the surveyor to be prone to rapid wastage.

1.2.8 *Substantial corrosion* is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

1.2.9 *Corrosion prevention system* is normally considered either:

.1 a full hard coating, or

.2 a full hard coating supplemented by anodes.

Protective coating should usually be epoxy coating or equivalent. Other coating systems may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer's specification.

Where soft coatings have been applied, safe access should be provided for the surveyor to verify the effectiveness of the coating and to carry out an assessment of the condition of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft coating should be removed.

1.2.10 *Coating condition* is defined as follows:

GOOD condition with only minor spot rusting,

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition, POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

1.2.11 *Critical structural areas* are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

1.2.12 *Cargo area* is an area as defined in regulation II-2/3.6 of the 1974 SOLAS Convention, as amended.

1.2.13 *Intermediate survey* is a survey carried out either at the second or the third annual survey or between these surveys.

1.2.14 A *prompt and thorough repair* is a permanent repair completed at the time of survey to the satisfaction of the Surveyor, therein removing the need for the imposition of any associated condition of classification or recommendation.

1.2.15 *Specially considered* means sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under coating.

1.3 Repairs

1.3.1 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Administration, will affect the ship's structural, watertight or weathertight integrity, should be promptly and thoroughly (see 1.2.14) repaired. Areas to be considered include:

.1 bottom structure and bottom plating;

.2 side structure and side plating;

.3 deck structure and deck plating;

.4 inner bottom structure and inner bottom plating;

.5 inner side structure and inner side plating;

.6 longitudinal bulkhead(s) structure and longitudinal bulkhead(s) plating, where fitted;

.7 transverse watertight or oiltight bulkheads structure and transverse watertight or oiltight bulkheads plating;

.8 hatch covers or hatch coamings, where fitted; and

.9 items in paragraph 3.3.

Where adequate repair facilities are not available, the Administration may allow the ship to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

1.3.2 Additionally, when a survey results in the identification of corrosion or structural defects, either of which, in the opinion of the Administration, will impair the ship's fitness for continued service, remedial measures should be implemented before the ship continues in service.

1.4 Surveyors

For tankers of 20,000 tons deadweight and above, two surveyors should jointly carry out the first scheduled renewal survey after the tanker passes 10 years of age, and all subsequent renewal surveys and intermediate surveys. If the surveys are carried out by a recognized organization, the surveyors should be exclusively employed by such recognized organizations.

2 Renewal survey

2.1 General

2.1.1 The renewal survey may be commenced at the fourth annual survey and be progressed during the succeeding year with a view to completion by the fifth anniversary date.

2.1.2 As part of the preparation for the renewal survey the survey programme should be dealt with in advance of the renewal survey. The thickness measurement should not be carried out before the fourth annual survey.

2.1.3 The survey should include, in addition to the requirements of the annual survey, examination, tests and checks of sufficient extent to ensure that the hull and related piping as required in 2.1.5 is in a satisfactory condition and is fit for its intended purpose for the new period of validity of the Cargo Ship Safety Construction Certificate, subject to proper maintenance and operation and to periodical surveys being carried out.

2.1.4 All cargo tanks, ballast tanks, pump-rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull should be examined, and this examination should be supplemented by thickness measurement and testing as deemed necessary, to ensure that the structural integrity remains effective. The examination should be sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

2.1.5 Cargo piping on deck, including crude oil washing (COW) piping, and cargo and ballast piping within the above tanks and spaces should be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory. Special attention should be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces, and surveyors should be advised on all occasions when this piping, including valves and fittings, are open during repair periods and can be examined internally.

2.2 Dry-dock survey

2.2.1 A survey in dry-dock should be a part of the renewal survey. There should be a minimum of two inspections of the outside of the ship's bottom during the five-year period of the Safety Construction Certificate. In all cases, the maximum interval between bottom inspections should not exceed 36 months.

2.2.2 For ships of 15 years of age and over, inspection of the outside of the ship’s bottom should be carried out with the ship in dry dock. For ships of less than 15 years of age, alternate inspections of the ship’s bottom not conducted in conjunction with the renewal survey may be carried out with the ship afloat. Inspection of the ship afloat should only be carried out when the conditions are satisfactory and the proper equipment and suitably qualified staff is available.

2.2.3 If a survey in dry-dock is not completed in conjunction with the renewal survey or if the 36 month maximum interval referred to in 2.2.1 is not complied with, the Cargo Ship Safety Construction Certificate should cease to be valid until a survey in dry-dock is completed.

2.3 Tank corrosion prevention system

Where provided, the condition of the corrosion prevention system of cargo tanks should be examined. A ballast tank where a protective coating is found in POOR condition and it is not renewed, or where soft coating has been applied, or where a protective coating has not been applied from the time of construction, the tank in question should be examined at annual intervals. Thickness measurement should be carried out as deemed necessary by the surveyor.

2.4 Extent of overall and close-up surveys

2.4.1 An overall survey of all integral tanks and spaces should be carried out at the renewal survey.

2.4.2 The requirements for close-up surveys at the renewal survey are given in annex 1.

2.4.3 The surveyor may extend the scope of the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

.1 in particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information;

.2 in tanks which have structures with reduced scantlings in association with a corrosion prevention system approved by the Administration.

2.4.4 For areas in tanks where coatings are found to be in GOOD condition as defined in 1.2.10, the extent of close-up surveys according to annex 1 may be specially considered by the Administration.

2.5 Extent of thickness measurements

2.5.1 The requirements for thickness measurements at the renewal survey are given in annex 2.

2.5.2 Where substantial corrosion as defined in 1.2.8 is found, the extent of thickness measurements should be increased in accordance with the requirements of annex 4.

2.5.3 The surveyor may extend the thickness measurements as deemed necessary.

2.5.4 For areas in tanks where coatings are found to be in GOOD condition as defined in 1.2.10, the extent of thickness measurements according to annex 2 may be specially considered by the Administration.

2.5.5 Transverse sections should be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.5.6 In cases where two or three sections are to be measured, at least one should include a ballast tank within 0.5L amidships.

2.6 Extent of tank pressure testing

2.6.1 The requirements for tank pressure testing at the renewal survey are given in annex 3.

2.6.2 The surveyor may extend the tank pressure testing as deemed necessary.

2.6.3 Generally, the pressure should correspond to a water level to the top of access hatches for cargo tanks, or top of air pipes for ballast tanks.

3 Annual survey

3.1 General

The annual survey should consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition and should take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

3.2 Examination of the hull

3.2.1 Examination of the hull plating and its closing appliances should be carried out as far as can be seen.

3.2.2 Examination of watertight penetrations should be carried out as far as practicable.

3.3 Examination of weather decks

3.3.1 Examination of cargo tank openings including gaskets, covers, coamings and flame screens.

3.3.2 Examination of cargo tank pressure/vacuum valves and flame screens.

3.3.3 Examination of flame screens on vents to all bunker and oily slop tanks.

3.3.4 Examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers.

3.4 Examination of cargo pump-rooms and pipe tunnels

3.4.1 Examination of all bulkheads for signs of oil leakage or fractures and, in particular, the sealing arrangements of all penetrations of bulkheads.

3.4.2 Examination of the condition of all piping systems and pipe tunnels.

3.5 Examination of ballast tanks

3.5.1 Examination of ballast tanks should be carried out when required as a consequence of the results of the renewal survey and intermediate survey. When extensive corrosion is found, thickness measurements should be carried out.

3.5.2 Where substantial corrosion as defined in 1.2.8 is found, the extent of thickness measurements should be increased in accordance with the requirements in annex 4.

3.5.3 Double hull oil tankers exceeding 15 years of age

All ballast tanks adjacent to (i.e. with a common plane boundary) a cargo or fuel tank with any means of heating should be examined internally. When considered necessary by the surveyor, thickness measurement should be carried out and if the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with annex 4.

Ballast tanks which were found, at the previous intermediate or renewal survey, to have no substantial corrosion within the tank and which were found in compliance with either of the following conditions:

.1 coating in GOOD condition; or

.2 coating of the common boundary, including adjacent structures, in GOOD condition and the coating of the remaining parts of the tank in FAIR condition,

may be specially considered by the Administration.

4 Intermediate survey

4.1 General

4.1.1 Items that are additional to the requirements of the annual survey may be surveyed either at the second or third annual survey or between these surveys.

4.1.2 The survey extent of cargo and ballast tanks dependent on the age of the ship is specified in 4.2, 4.3 and 4.4 and shown in annex 5.

4.1.3 For weather decks, an examination as far as applicable of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, the piping may be required to be pressure tested, thickness measured or both.

4.2 Oil tankers of 5 to 10 years of age

4.2.1 The requirements of 4.1.3 apply.

4.2.2 For tanks used for salt-water ballast, an overall survey of representative tanks selected by the surveyor should be carried out. If the overall survey of salt-water ballast tanks reveals no visible structural defects, the examination may be limited to verification that the protective coatings remain efficient.

4.2.3 Where POOR coating condition, corrosion or other defects are found in salt water ballast tanks or where a protective coating was not applied from the time of construction, the examination should be extended to other ballast tanks of the same type.

4.2.4 In salt water ballast tanks where a protective coating is found in POOR condition and it is not renewed, where soft coating has been applied, or where a protective coating was not applied from the time of construction, the tanks in question should be examined and thickness measurements carried out as considered necessary at annual intervals.

4.3 Oil tankers of 10 to 15 years of age

4.3.1 The requirements of 4.2 apply.

4.3.2 An overall survey of at least two representative cargo tanks should be carried out.

4.3.3 For ballast tanks, where fitted, an overall survey of all such tanks should be carried out. If such survey reveals no visible structural defects, the survey may be limited to a verification that the protective coatings remain efficient.

4.3.4 Extent of close-up survey

Ballast tanks: to the same extent as previous renewal survey;

Cargo tanks: the extent of survey should be based on the record of the previous renewal survey and repair history of the tanks, and be applied to two cargo tanks after the second renewal survey.

The minimum requirements of close-up surveys are given in annex 5. The extent of close-up surveys may be extended as stated in 2.4.3. For areas in tanks where coatings are found to be in GOOD condition, the extent of the close-up surveys according to annex 5 may be specially considered by the Administration.

4.3.5 Extent of thickness measurements

The extent of thickness measurements is also given in annex 5. The minimum requirements for thickness measurements at the intermediate survey are areas found to be suspect areas according to 1.2.7 at the previous renewal survey. Where substantial corrosion as defined in 1.2.8 is found, the extent of the thickness measurements according to annex 5 should be increased in accordance with the requirements of annex 4.

4.4 Oil tankers exceeding 15 years of age

The requirements of the intermediate survey should be to the same extent as the previous renewal survey as required in 2 and 5.1. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending surveyor.

5 Preparations for survey

5.1 Survey programme

5.1.1 A specific survey programme should be worked out in advance of the renewal survey by the owner in co-operation with the Administration. The survey programme should be in a written format based on the information in annex 6A. The survey should not commence until the survey programme has been agreed.

5.1.1.1 Prior to the development of the survey programme, the survey planning questionnaire should be completed by the owner based on the information set out in annex 6B, and forwarded to the Administration.

5.1.2 In developing the survey programme, the following documentation should be collected and consulted with a view to selecting tanks, areas, and structural elements to be examined:

.1 survey status and basic ship information;

.2 documentation on board, as described in 6.2 and 6.3;

.3 main structural plans of cargo and ballast tanks (scantlings drawings), including information regarding use of high-tensile steels (HTS);

.4 Condition Evaluation Report, according to annex 9;

.5 relevant previous damage and repair history;

.6 relevant previous survey and inspection reports from both the recognized organization and the owner;

.7 cargo and ballast history for the last 3 years, including carriage of cargo under heated conditions;

.8 details of the inert gas plant and tank cleaning procedures;

.9 information and other relevant data regarding conversion or modification of the ship's cargo and ballast tanks since the time of construction;

.10 description and history of the coating and corrosion protection system (including anodes and previous class notations), if any;

.11 inspections of the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the coating and corrosion protection system (including anodes) if any. A guidance for reporting is shown in annex 6C;

.12 information regarding the relevant maintenance level during operation including port state control reports of inspection containing hull related deficiencies, Safety Management System non-conformities relating to hull maintenance, including the associated corrective action(s); and

.13 any other information that will help identify suspect areas and critical structural areas.

5.1.3 The submitted survey programme should account for and comply, as a minimum, with the requirements of annexes 1, 2 and 3 and paragraph 2.6 for close-up survey, thickness measurement and tank testing, respectively, and should include relevant information including at least:

.1 basic ship information and particulars;

.2 main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steels (HTS);

.3 arrangement of tanks;

.4 list of tanks with information on their use, extent of coatings and corrosion protection systems;

.5 conditions for survey (e.g., information regarding tank cleaning, gas freeing, ventilation, lighting, etc.);

.6 provisions and methods for access to structures;

.7 equipment for surveys;

.8 identification of tanks and areas for close-up survey (see 2.4);

.9 identification of areas and sections for thickness measurement (see 2.5);

.10 identification of tanks for tank testing (see 2.6);

.11 identification of the thickness measurement company;

.12 damage experience related to the ship in question; and

.13 critical structural areas and suspect areas, where relevant.

5.1.4 The Administration will advise the owner of the maximum acceptable structural corrosion diminution levels applicable to the ship.

5.1.5 Use may also be made of the Guidelines for technical assessment in conjunction with the planning of enhanced surveys for tankers, contained in annex 11. These Guidelines are a recommended tool which may be invoked at the discretion of the Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

5.2 Conditions for survey

5.2.1 The owner should provide the necessary facilities for a safe execution of the survey.

5.2.1.1 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration.

5.2.1.2 Details of the means of access should be provided in the survey planning questionnaire.

5.2.1.3 In cases where the provisions of safety and required access are judged by the attending surveyors not to be adequate, the survey of the spaces involved should not proceed.

5.2.2 Tanks and spaces should be safe for access. Tanks and spaces should be gas free and properly ventilated. Prior to entering a tank, void or enclosed space, it should be verified that the atmosphere in that space is free from hazardous gas and contains sufficient oxygen.

5.2.3 Tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, sediments etc., to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating. In particular this applies to areas which are subject to thickness measurement.

5.2.4 Sufficient illumination should be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating.

5.2.5 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed spaces inspection. In addition a backup team of at least two experienced persons should be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team should continuously observe the work in the tank or space and should keep lifesaving and evacuation equipment ready for use.

5.2.6 A communication system should be arranged between the survey party in the tank or space being examined, the responsible officer on deck and, as the case may be, the navigation bridge. The communication arrangements should be maintained throughout the survey.

5.3 Access to structures*

5.3.1 For overall surveys, means should be provided to enable the surveyor to examine the structure in a safe and practical way.

5.3.2 For close-up surveys, one or more of the following means for access, acceptable to the surveyor, should be provided:

.1 permanent staging and passages through structures;

.2 temporary staging and passages through structures;

.3 lifts and moveable platforms;

.4 boats or rafts;

.5 portable ladders;

.6 other equivalent means.

5.4 Equipment for survey

5.4.1 Thickness measurement should normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment should be proven to the surveyor as required.

5.4.2 One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:

.1 radiographic equipment;

.2 ultrasonic equipment;

.3 magnetic particle equipment;

.4 dye penetrant; and

.5 other equivalent means.

5.4.3 Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use should be made available during the survey. A safety check-list should be provided.

5.4.4 Adequate and safe lighting should be provided for the safe and efficient conduct of the survey.

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* Refer to MSC/Circ.686, Guidelines on the means of access to structures for inspection and maintenance of oil tankers and bulk carriers.

5.4.5 Adequate protective clothing should be made available and used during the survey (e.g. safety helmet, gloves, safety shoes, etc.).

5.5 Surveys at sea or at anchorage

5.5.1 Surveys at sea or at anchorage may be accepted provided the surveyor(s) is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey should be in accordance with 5.1, 5.2, 5.3 and 5.4.

5.5.2 A communication system should be arranged between the survey party in the tank and the responsible officer on deck. This system should also include the personnel in charge of ballast pump handling if boats or rafts are used.

5.5.3 Surveys of tanks by means of boats or rafts may only be undertaken with the agreement of the surveyor, who should take into account the safety arrangements provided, including weather forecasting and ship response in reasonable sea conditions.

5.5.4 When rafts or boats are used for close-up surveys, the following conditions should be observed:

.1 only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, should be used;

.2 the boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft;

.3 appropriate lifejackets should be available for all participants;

.4 the surface of water in the tank should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25 m) and the water level either stationary or falling. On no account should the level of the water be rising while the boat or raft is in use;

.5 the tank or space must contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable;

.6 at no time should the water level be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should only be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered;

.7 if the tanks (or spaces) are connected by a common venting system, or inert gas system, the tank in which the boat or raft should be used should be isolated to prevent a transfer of gas from other tanks (or spaces).

5.5.5 Rafts or boats alone may be allowed for inspection of the under deck areas of tanks or spaces if the depth of the webs is 1.5 m or less.

5.5.6 If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

.1 when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or

.2 if a permanent means of access is provided in each bay to allow safe entry and exit. This means of access should be direct from the deck via a vertical ladder with a small platform fitted approximately 2 m below the deck. Other effective means of escape to the deck may be considered.

If neither of the above conditions are met, then staging or other equivalent means should be provided for the survey of the under deck areas.

5.5.7 The use of rafts or boats alone in paragraphs 5.5.5 and 5.5.6 does not preclude the use of boats or rafts to move about within a tank during a survey.

5.6 Survey planning meeting

5.6.1 Proper preparation and close co-operation between the attending surveyor(s) and the owner's representatives onboard prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings should be held regularly.

5.6.2 Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting should be held between the attending surveyor(s), the owner's representative in attendance, the thickness measurement company operator (as applicable) and the master of the ship for the purpose of ascertaining that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

5.6.3 The following is an indicative list of items that should be addressed in the meeting:

.1 schedule of the vessel (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.);

.2 provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);

.3 extent of the thickness measurements;

.4 acceptance criteria (refer to the list of minimum thicknesses);

.5 extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;

.6 execution of thickness measurements;

.7 taking representative readings in general and where uneven corrosion/pitting is found;

.8 mapping of areas of substantial corrosion; and

.9 communication between attending surveyor(s) the thickness measurement company operator(s) and owner representative(s) concerning findings.

6 Documentation on board

6.1 General

6.1.1 The owner should obtain, supply and maintain on board the ship documentation as specified in 6.2 and 6.3, which should be readily available for the surveyor. The condition evaluation report referred to in 6.2 should include a translation into English.

6.1.2 The documentation should be kept on board for the lifetime of the ship.

6.2 Survey report file

6.2.1 A survey report file should be a part of the documentation on board consisting of:

.1 reports of structural surveys (annex 8);

.2 condition evaluation report (annex 9); and

.3 thickness measurement reports (annex 10).

6.2.2 The survey report file should be available also in the owner's and the Administration's offices.

6.3 Supporting documents

The following additional documentation should be available on board:

.1 all documents required by 5.1.2;

.2 survey programme as required by 5.1 until such time as the renewal survey has been completed; and

.3 any other information that would help to identify critical structural areas and/or suspect areas requiring inspection.

6.4 Review of documentation on board

Prior to survey, the surveyor should examine the completeness of the documentation on board and its contents as a basis for the survey.

7 Procedures for thickness measurements

7.1 General

7.1.1 The required thickness measurements, if not carried out by the recognized organization acting on behalf of the Administration, should be witnessed by a surveyor of the recognized organization. The surveyor should be on board to the extent necessary to control the process.

7.1.2 The thickness measurement company should be part of the survey planning meeting to be held prior to commencing the survey.

7.1.3 In all cases the extent of the thickness measurements should be sufficient as to represent the actual average condition.

7.2 Certification of thickness measurement company

The thickness measurements should be carried out by a qualified company certified by an organization recognized by the Administration according to principles stated in annex 7.

7.3 Reporting

7.3.1 A thickness measurement report should be prepared and submitted to the Administration. The report should give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report should give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications and be signed by the operator. The thickness measurement report should follow the principles as specified in the recommended procedures for thickness measurements set out in annex 10.

7.3.2 The surveyor should verify and countersign the thickness measurement reports.

8 Reporting and evaluation of survey

8.1 Evaluation of survey report

8.1.1 The data and information on the structural condition of the ship collected during the survey should be evaluated for acceptability and continued structural integrity of the ship.

8.1.2 In case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force), the ship's longitudinal strength should be evaluated by using the thickness of structural members measured, renewed and reinforced, as appropriate, during the renewal survey of safety construction carried out after the ship reached 10 years of age, in accordance with the criteria for longitudinal strength of the ship's hull girder for oil tankers specified in annex 12.

8.1.3 The analysis of data should be carried out and endorsed by the Administration and the conclusions of the analysis should form a part of the condition evaluation report.

8.1.4 The final result of the evaluation of the ship's longitudinal strength required in 8.1.2, after renewal or reinforcement work of structural members, if carried out as a result of initial evaluation, should be reported as a part of the condition evaluation report.

8.2 Reporting

8.2.1 Principles for survey reporting are shown in annex 8.

8.2.2 When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements etc.) and an indication of whether the item has been credited, should be made available to the next attending surveyor(s), prior to continuing or completing the survey.

8.2.3 A condition evaluation report of the survey and results should be issued to the owner as shown in annex 9 and placed on board the ship for reference at future surveys. The condition evaluation report should be endorsed by the Administration.

ANNEX 1

MINIMUM REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS

Age ≤ 5 years	5<age≤ 10 years	10<age≤15 years	Age>15 years
1	2	3	4
One web frame **(1)**, in a complete ballast tank (see **Note 1)**	All web frames **(1)**, in a complete ballast tank (see **Note 1)** The knuckle area and the upper part (5 m approximately) of one web frame in each remaining ballast tank (**6)**	All web frames **(1)**, in all ballast tanks	As for ships referred to in column 3 Additional transverse areas as deemed necessary by the Administration
One deck transverse, in a cargo oil tank **(2)**	One deck transverse, in two cargo oil tanks **(2)**	All web frames **(7)**, including deck transverse and cross ties, if fitted, in a cargo oil tank One web frame **(7)**, including deck transverse and cross ties, if fitted, in each remaining cargo oil tank	
One transverse bulkhead **(4)**, in a complete ballast tank (see **Note 1)**	One transverse bulkhead **(4)**, in each complete ballast tank (see **Note 1)**	All transverse bulkheads, in all cargo oil **(3)** and ballast **(4)** tanks	
One transverse bulkhead **(5)** in a cargo oil centre tank One transverse bulkhead **(5)**, in a cargo oil wing tank (see **Note 2**)	One transverse bulkhead **(5)**, in two cargo oil centre tanks One transverse bulkhead **(5)**, in a cargo oil wing tank (see **Note 2**)		

NOTES:

(1), **(2)**, **(3)**, **(4)**, **(5)**, **(6)** and **(7)** are areas to be subjected to close-up surveys and thickness measurements (see appendix 3 of annex 10).

(1) Web frame in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.

(2) Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable).

(3) Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.

(4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.

(5) Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted.

(6) The knuckle area and the upper part (5 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.

(7) Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, including adjacent structural members.

Note 1 Complete ballast tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.

Note 2 Where no centre cargo tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in wing tanks should be surveyed.

ANNEX 2

MINIMUM REQUIREMENTS FOR THICKNESS MEASUREMENTS AT RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS

Age≤5 years	5<age≤10 years	10<age≤15 years	Age>15 years
1	2	3	4
One section of deck plating for the full beam of the ship within the cargo area	Within the cargo area: each deck plate one transverse section	Within the cargo area: each deck plate two transverse sections **(1)** all wind and water strakes	Within the cargo area: each deck plate three transverse sections **(1)** each bottom plate all wind and water strakes
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Annex 1	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Annex 1	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Annex 1	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Annex 1
Suspect areas	Suspect areas	Suspect areas	Suspect areas
(1): at least one section should be within 0,5L amidships.			

ANNEX 3

MINIMUM REQUIREMENTS FOR TANK TESTING AT RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS

Age≤5 years	5<age≤10 years	Age>10 years
1	2	3
All ballast tank boundaries	All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, representative fuel oil tanks, pump rooms or cofferdams	Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, representative fuel oil tanks, pump rooms or cofferdams	Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, representative fuel oil tanks, pump rooms or cofferdams
	All cargo tank bulkheads which form the boundaries of segregated cargoes	All remaining cargo tank bulkheads

ANNEX 4/Sheet 1

**REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION
RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS**

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across flange and three measurements on vertical web
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements
Bottom floors, including the watertight ones	Three floors in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	5-point pattern over one square metre of plating. Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	- lower 1/3 of bulkhead	5-point pattern over one square metre of plating
	- upper 2/3 of bulkhead	5-point pattern over two square metre of plating
	- stiffeners (minimum of three)	For web, 5-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

ANNEX 4/Sheet 2

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS WITHIN THE CARGO AREA LENGTH

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets (usually in cargo tanks only)	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. 5-point pattern on girder/bulkhead brackets
Deck transverse webs	Minimum of two webs, with measurements at both ends and middle of span	5-point pattern over one square metre area. Single measurements on flange
Vertical web and transverse bulkhead in wing ballast tank (two metres from deck)	Minimum of two webs, and both transverse bulkheads	5-point pattern over one square metre area
Panel stiffening	Where applicable	Single measurements

ANNEX 4/Sheet 3

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS WITHIN THE CARGO AREA LENGTH

STRUCTURE IN WING BALLAST TANKS		
Structural member	Extent of measurement	Pattern of measurement
Side shell and longitudinal bulkhead plating: - upper strake and strakes in way of horizontal girders - all other strakes	 Plating between each pair of longitudinals in a minimum of three bays (along the tank) Plating between every third pair of longitudinals in same three bays	Single measurement Single measurement
Side shell and longitudinal bulkhead longitudinals on: - upper strake - all other strakes	Each longitudinal in same three bays Every third longitudinal in same three bays	3 measurements across web and 1 measurement on flange 3 measurements across web and 1 measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Vertical web and transverse bulkheads (excluding deckhead area): - strakes in way of horizontal girders - other strakes	Minimum of two webs and both transverse bulkheads Minimum of two webs and both transverse bulkheads	5-point pattern over approx. two square metre area two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

ANNEX 4/Sheet 4

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS WITHIN THE CARGO AREA LENGTH

LONGITUDINAL BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes, and strakes in way of the horizontal stringers of transverse bulkheads	Plating between each pair of longitudinals in a minimum of three bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same three bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same three bays	Three measurements across web and one measurement on flange
All other longitudinals	Every third longitudinal in same three bays	Three measurements across web and one measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Web frames and cross ties	Three webs with minimum of three locations on each web, including in way of cross tie connections	5-point pattern over approximately two square metre area of webs, plus single measurements on flanges of web frame and cross ties
Lower end brackets (opposite side of web frame)	Minimum of three brackets	5-point pattern over approximately two square metre area of brackets, plus single measurements on bracket flanges

ANNEX 4/Sheet 5

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION RENEWAL SURVEY OF DOUBLE HULL OIL TANKERS WITHIN THE CARGO AREA LENGTH

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Upper and lower stool, where fitted	Transverse band within 25 mm of welded connection to inner bottom/deck plating Transverse band within 25 mm of welded connection to shelf plate	5-point pattern between stiffeners over one metre length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations: approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over one metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about one square metre of plating
Stiffeners	Minimum of three typical stiffeners	For web, 5-point pattern over span between bracket connections (two measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	5-point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	5-point pattern over one square metre area, plus single measurements near bracket toes and on flanges

ANNEX 5

MINIMUM REQUIREMENTS FOR OVERALL AND CLOSE-UP SURVEY AND THICKNESS MEASUREMENTS AT INTERMEDIATE SURVEY OF DOUBLE HULL OIL TANKERS

5<age≤ 10 years	10<age≤15 years	Age> 15 years
1	2	3
Overall survey of representative salt-water ballast tanks, selected by the attending surveyor (the selection should include fore and aft peak tanks and three other tanks) (see 4.2)	Overall survey of all salt water ballast tanks, including combined cargo/ballast tanks where fitted (see 4.3)	As for renewal survey given in annex 1
	Overall survey of at least two representative cargo tanks	As for renewal survey given in annex 1
	Close-up survey in salt-water ballast tanks of: - all web frames **(1)** in one complete tank **(**see **Note 1) -** the knuckle area and the upper part (5 m approximately) of one web frame in each remaining ballast tank **(6)** - one transverse bulkhead **(4)** in each complete tank **(**see **Note 1)** (see 4.2.3)	As for renewal survey given in annex 1
	Close-up survey in two cargo tanks (or two combined cargo/ballast tanks, where fitted): the extent of survey should be based on the records of the previous renewal survey and repair history of the tanks (see 4.3)	As for renewal survey given in annex 1
Thickness measurements of those areas found to be suspect areas, as defined in 1.2.7, at the previous renewal survey (see 4.3.5)	Thickness measurements of those areas found to be suspect areas, as defined in 1.2.7, at the previous renewal survey (see 4.3.5)	As for renewal survey given in annex 2

Notes:

(1), **(4)** and **(6)** are areas to be subjected to close-up surveys and thickness measurements (see appendix 3 of annex 3).

(1) Web frame means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.

(4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, inner hull longitudinal bulkhead, connecting brackets.

(6) The knuckle area and the upper part (5 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.

Note 1 Complete ballast tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.

ANNEX 6A

SURVEY PROGRAMME

Basic information and particulars

Name of ship :
IMO number :
Flag State :
Port of registry :
Gross tonnage :
Deadweight (metric tonnes) :
Length between perpendiculars (m) :
Shipbuilder :
Hull number :
Recognized organization (RO) :
RO ship identity :
Date of delivery of the ship :
Owner :
Thickness measurement company :

1 Preamble

1.1 Scope

1.1.1 The present survey programme covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo area, ballast tanks, including fore and aft peak tanks, required by the Guidelines.

1.1.2 The arrangements and safety aspects of the survey should be acceptable to the attending surveyor(s).

1.2 Documentation

All documents used in the development of the survey programme should be available onboard during the survey as required by section 6.

2 Arrangement of tanks and spaces

This section of the survey programme should provide information (either in the form of plans or text) on the arrangement of tanks and spaces that fall within the scope of the survey.

3 List of tanks and spaces with information on their use, extent of coatings and corrosion protection system

This section of the survey programme should indicate any changes relating to (and should update) the information on the use of the tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire.

4 Conditions for survey

This section of the survey programme should provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

5 Provisions and method of access to structures

This section of the survey programme should indicate any changes relating to (and should update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire.

6 List of equipment for survey

This section of the survey programme should identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

7 Survey requirements

7.1 Overall survey

This section of the survey programme should identify and list the spaces that should undergo an overall survey for the ship in accordance with 2.4.1.

7.2 Close-up survey

This section of the survey programme should identify and list the hull structures that should undergo a close-up survey for the ship in accordance with 2.4.2.

8 Identification of tanks for tank testing

This section of the survey programme should identify and list the tanks that should undergo tank testing for the ship in accordance with 2.6.

9 Identification of areas and sections for thickness measurements

This section of the survey programme should identify and list the areas and sections where thickness measurements should be taken in accordance with 2.5.1.

10 Minimum thickness of hull structures

This section of the survey programme should specify the minimum thickness for hull structures of the ship that are subject to the Guidelines (indicate either (a) or preferably (b), if such information is available):

(a) ☐ Determined from the attached wastage allowance table and the original thickness to the hull structure plans of the ship;

(b) ☐ Given in the following table(s):

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Ship side			
Plating			
Longitudinals			
Longitudinal girders			
Longitudinal bulkhead			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Transverse bulkheads			
Plating			
Stiffeners			
Transverse web frames, floors and stringers			
Plating			
Flanges			
Stiffeners			
Cross ties			
Flanges			
Webs			

Note: The wastage allowance tables should be attached to the survey programme.

11 Thickness measurement company

This section of the survey programme should identify changes, if any, relating to the information on the thickness measurement company provided in the Survey Planning Questionnaire.

12 Damage experience related to the ship

This section of the survey programme should, using the tables provided below, provide details of the hull damages for at least the last three years in way of the cargo and ballast tanks and void spaces within the cargo area. These damages are subject to survey.

Hull damages sorted by location for the ship

Tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

Hull damages for sister or similar ships (if available) in the case of design related damage

Tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

13 Areas identified with substantial corrosion from previous surveys

This section of the survey programme should identify and list the areas of substantial corrosion from previous surveys.

14 Critical structural areas and suspect areas

This section of the survey programme should identify and list the critical structural areas and the suspect areas, if such information is available.

15 Other relevant comments and information

This section of the survey programme should provide any other comments and information relevant to the survey.

Appendices

Appendix 1 – List of plans
Paragraph 5.1.3.2 requires that main structural plans of cargo and ballast tanks (scantling drawings), including information on regarding use of high tensile steel (HTS), to be available. This appendix of the survey programme should identify and list the main structural plans which form part of the survey programme.

Appendix 2 – Survey Planning Questionnaire
The Survey Planning Questionnaire (annex 6B), which has been submitted by the owner, should be appended to the survey programme.

Appendix 3 – Other documentation
This part of the survey programme should identify and list any other documentation that forms part of the Plan.

Prepared by the owner in co-operation with the Administration for compliance with 5.1.3.

Date:	(name and signature of authorized owner's representative)
Date: ...…. ...….	(name and signature of authorized representative of the Administration)

ANNEX 6B

SURVEY PLANNING QUESTIONNAIRE

The following information will enable the owner in co-operation with the Administration to develop a survey programme complying with the requirements of the Guidelines. It is essential that the owner provides, when completing the present questionnaire, up-to-date information. The present questionnaire, when completed, should provide all information and material required by the resolution.

Particulars

Ship's name:
IMO number:
Flag State:
Port of registry:
Owner:
Recognized organization (RO):
Gross tonnage:
Deadweight (metric tonnes):
Date of delivery:

Information on access provision for close-up surveys and thickness measurement:

The owner should indicate, in the table below, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending surveyor, i.e. preferably within reach of hand.

Tank No.	Structure	C (Cargo)/ B (Ballast)	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
F.P.	Fore peak						
A.P.	Aft peak						
Wing Tanks	Under deck						
	Side shell						
	Bottom transverse						
	Longitudinal						
	Transverse						
Centre Tanks	Under deck						
	Bottom transverse						
	Transverse						

History of cargo with H_2S content or heated cargo for the last 3 years together with indication as to whether cargo was heated and, where available, Marine Safety Data Sheets (MSDS)*

Owner's inspections

Using a format similar to that of the table below (which is given as an example), the owner should provide details of the results of their inspections for the last 3 years on all cargo and ballast tanks and void spaces within the cargo area, including peak tanks.

Tank No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage history (5)
Cargo centre tanks					
Cargo wing tanks					
Slop					

* Refer to resolution MSC.150(77) on Recommendation for material safety data sheets for MARPOL Annex I cargoes and marine fuel oils.

Tank No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage history (5)
Ballast tanks					
Aft peak					
Fore peak					
Miscellaneous spaces					

Note: Indicate tanks which are used for oil/ballast.

1) HC=hard coating; SC=soft coating; A=anodes; NP=no protection
2) U=upper part; M=middle part; L=lower part; C=complete
3) G=good; F=fair; P=poor; RC=recoated (during the last 3 years)
4) N=no findings recorded; Y=findings recorded, description of findings should be attached to the questionnaire
5) DR=damage & repair; L=leakages; CV= conversion (description should be attached to this questionnaire)

Name of owner's representative:

....

Signature: ....

Date: ....

Reports of Port State Control inspections

List the reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies:

Safety Management System

List non-conformities related to hull maintenance, including the associated corrective actions:

Name and address of the approved thickness measurement company:

ANNEX 6C

OWNER'S INSPECTION REPORT

Structural condition

Ship's name: ....

For tank No.: ....

Grade of steel: deck: .... side: ....

bottom: .... longitudinal bulkhead: ....

Elements	Cracks	Buckles	Corrosion	Coating condition	Pitting	Modifi-cation/ repair	Other
Deck							
Bottom							
Side							
Longitudinal bulkhead							
Transverse bulkhead							

Repairs carried out due to:

Thickness measurements carried out (dates):

Results in general:

Overdue surveys:

Outstanding conditions of class:

Comments:

Date of inspection:

Inspected by:

Signature:

ANNEX 7

PROCEDURES FOR CERTIFICATION OF A COMPANY ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES

1 Application

This guidance applies for certification of the company which intends to engage in the thickness measurement of hull structures of ships.

2 Procedures for certification

Submission of documents

2.1 The following documents should be submitted to an organization recognized by the Administration for approval:

.1 outline of the company, e.g., organization and management structure;

.2 experience of the company in thickness measurement of hull structures of ships;

.3 technicians' careers, i.e. experience of technicians as thickness measurement operators, technical knowledge and experience of hull structure, etc. Operators should be qualified according to a recognized industrial non-destructive test (NDT) standard;

.4 equipment used for thickness measurement such as ultrasonic testing machines and their maintenance/calibration procedures;

.5 a guide for thickness measurement operators;

.6 training programmes for technicians for thickness measurement;

.7 measurement record format in accordance with recommended procedures for thickness measurements (see annex 10). Recommended procedures for thickness measurements of double hull oil tankers are contained in annex 2.

Auditing of the company

2.2 Upon satisfactory review of the documents submitted, the company should be audited in order to ascertain that the company is duly organized and managed in accordance with the documents submitted and is capable of conducting thickness measurement of the hull structure of ships.

2.3 Certification is conditional upon an on-board demonstration of thickness measurement as well as satisfactory reporting.

3 Certification

3.1 Upon satisfactory results of both the audit of the company referred to in 2.2 and the demonstration tests referred to in 2.3, the Administration or organization recognized by the Administration should issue a certificate of approval as well as a notice to the effect that the thickness measurement operation system of the company has been certified.

3.2 Renewal/endorsement of the certificate should be carried out at intervals not exceeding three years by verification that original conditions are maintained.

4 Report of any alteration to the certified thickness measurement operation system

In case any alteration to the certified thickness measurement operation system of the company is made, such alteration should be immediately reported to the organization recognized by the Administration. A re-audit should be carried out where deemed necessary by the organization recognized by the Administration.

5 Withdrawal of certification

The certification may be withdrawn in the following cases:

.1 where the measurements were improperly carried out or the results were improperly reported;

.2 where the surveyor found any deficiencies in the approved thickness measurement operation system of the company;

.3 where the company failed to report any alteration referred to in 4 to the organization recognized by the Administration as required.

ANNEX 8

SURVEY REPORTING PRINCIPLES

As a principle, for oil tankers subject to ESP, the surveyor should include the following contents in his report for survey of hull structure and piping systems, as relevant for the survey.

1 General

1.1 A survey report should be generated in the following cases:

.1 in connection with commencement, continuation and/or completion of periodical hull surveys, i.e. annual, intermediate and renewal surveys, as relevant;

.2 when structural damages/defects have been found;

.3 when repairs, renewals or modifications have been carried out; and

.4 when condition of class (recommendation) has been imposed or deleted.

1.2 The reporting should provide:

.1 evidence that prescribed surveys have been carried out in accordance with applicable requirements;

.2 documentation of surveys carried out with findings, repairs carried out and condition of class (recommendation) imposed or deleted;

.3 survey records, including actions taken, which should form an auditable documentary trail. Survey reports should be kept in the survey report file required to be on board;

.4 information for planning of future surveys; and

.5 information which may be used as input for maintenance of classification rules and instructions.

1.3 When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items surveyed, relevant findings and an indication of whether the item has been credited, should be made available to the next attending surveyor, prior to continuing or completing the survey. Thickness measurement and tank testing carried out should also be listed for the next surveyor.

2 Extent of the survey

2.1 Identification of compartments where an overall survey has been carried out.

2.2 Identification of locations, in each tank, where a close-up survey has been carried out, together with information of the means of access used.

2.3 Identification of locations, in each tank, where thickness measurement has been carried out.

Note: *As a minimum, the identification of location of close-up survey and thickness measurement should include a confirmation with description of individual structural members corresponding to the extent of requirements stipulated in this part of Annex B based on type of periodical survey and the ship's age.*

Where only partial survey is required, i.e. one web frame ring/one deck transverse, the identification should include location within each ballast tank and cargo hold by reference to frame numbers.

2.4 For areas in tanks where protective coating is found to be in good condition and the extent of close-up survey and/or thickness measurement has been specially considered, structures subject to special consideration should be identified.

2.5 Identification of tanks subject to tank testing.

2.6 Identification of piping systems on deck, including crude oil washing (COW) piping, and ballast piping within cargo and ballast tanks, pipe tunnels, cofferdams and void spaces where:

.1 examination including internal examination of piping with valves and fittings and thickness measurement, as relevant, has been carried out; and

.2 operational test to working pressure has been carried out.

3 Result of survey

3.1 Type, extent and condition of protective coating in each tank, as relevant (rated GOOD, FAIR or POOR), including identification of tanks fitted with anodes.

3.2 Structural condition of each compartment with information on the following, as relevant:

.1 Identification of findings, such as:

.1.1 corrosion with description of location, type and extent;

.1.2 areas with substantial corrosion;

.1.3 cracks/fractures with description of location and extent;

.1.4 buckling with description of location and extent; and

.1.5 indents with description of location and extent.

.2 Identification of compartments where no structural damages/defects are found. The report may be supplemented by sketches/photos.

.3 Thickness measurement report should be verified and signed by the surveyor controlling the measurements on board.

.4 Evaluation result of longitudinal strength of the hull girder of oil tankers of 130 m in length and upwards and over 10 years of age. The following data should be included, as relevant:

.4.1 measured and as-built transverse sectional areas of deck and bottom flanges;

.4.2 diminution of transverse sectional areas of deck and bottom flanges; and

.4.3 details of renewals or reinforcements carried out, as relevant (see 4.2).

4 Actions taken with respect to findings

4.1 Whenever the attending surveyor is of the opinion that repairs are required, each item to be repaired should be identified in a numbered list. Whenever repairs are carried out, details of the repairs effected should be reported by making specific reference to relevant items in the numbered list.

4.2 Repairs carried out should be reported with identification of:

.1 compartment;

.2 structural member;

.3 repair method (i.e. renewal or modification), including:

.3.1 steel grades and scantlings (if different from the original);

.3.2 sketches/photos, as appropriate;

.4 repair extent; and

.5 non-destructive tests (NDT).

4.3 For repairs not completed at the time of survey, condition of class/recommendation should be imposed with a specific time limit for the repairs. In order to provide correct and proper information to the surveyor attending for survey of the repairs, condition of class/recommendation should be sufficiently detailed with identification of each item to be repaired. For identification of extensive repairs, reference may be given to the survey report.

ANNEX 9

CONDITION EVALUATION REPORT

Issued upon completion of renewal survey

General particulars

Ship's name:	Class/Administration identity number:
	Previous class/Administration identity number(s):
	IMO number:
Port of registry:	National flag:
	Previous national flag(s):
Deadweight	Gross tonnage:
(metric tonnes):	National:
	ITC (1969):
Date of build:	Classification notation:
Date of major conversion:	
Type of conversion:	Owner:
	Previous owner(s):

---

1 The survey reports and documents listed below have been reviewed by the undersigned and found to be satisfactory.

2 The renewal survey has been completed in accordance with the present Guidelines on (date)……………………………...

Condition evaluation report completed by	Name Signature	Title
Office	Date	
Condition evaluation report completed by	Name Signature	Title
Office	Date	

Attached reports and documents:

Contents of condition evaluation report

Part 1	– General particulars:	–	See front page
Part 2	– Report review:	–	Where and how survey was done
Part 3	– Close-up survey:	–	Extent (which tanks)
Part 4	– Cargo and ballast piping system:	–	Examined
		–	Operationally tested
Part 5	– Thickness measurements:	–	Reference to thickness measurement report
		–	Summary of where measured
		–	Separate form indicating the spaces with substantial corrosion, and corresponding: – thickness diminution – corrosion pattern
Part 6	– Tank corrosion prevention system:	–	Separate form indicating: – location of coating/anodes – condition of coating (if applicable)
Part 7	– Repairs:	–	Identification of tanks/areas
Part 8	– Condition of class/ flag State requirements:		
Part 9	– Memoranda:	–	Acceptable defects
		–	Any points of attention for future surveys, e.g. for suspect areas
		–	Extended annual/intermediate survey due to coating breakdown
Part 10	– Conclusion:	–	Statement on evaluation/verification of survey report

Extract of thickness measurements

Reference is made to the thickness measurements report:

Position of substantially corroded tanks/areas[1] or areas with deep pitting[3]	**Thickness diminution (%)**	**Corrosion pattern[2]**	**Remarks: (e.g., ref. attached sketches)**

Notes:

1 Substantial corrosion, i.e., 75%–100% of acceptable margins wasted.

2 P = Pitting
C = Corrosion in general

3 Any bottom plating with a pitting intensity of 20% or more, with wastage in the substantial corrosion range or having an average depth of pitting of 1/3 or more of actual plate thickness should be noted.

Tank corrosion prevention system

Tank Nos.[1]	Tank corrosion prevention system[2]	Coating condition[3]	Remarks

Notes:

1 All segregated ballast tanks and combined cargo/ballast tanks should be listed.

2 C = Coating
A = Anodes
NP = No protection

3 Coating condition according to the following standard:

GOOD condition with only minor spot rusting.

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

If coating condition "POOR" is given, extended annual surveys should be introduced. This should be noted in part 8 of the contents of the condition evaluation report.

Evaluation result of longitudinal strength of the hull girder of oil tankers of 130 m in length and upwards and of over 10 years of age

(of sections 1, 2 and 3 below, only one applicable section should be completed)

1 This section applies to ships regardless of the date of construction: Transverse sectional areas of deck flange (deck plating and deck longitudinals) and bottom flange (bottom shell plating and bottom longitudinals) of the ship's hull girder have been calculated by using the thickness measured, renewed or reinforced, as appropriate, during the renewal survey of the Cargo Ship Safety Construction Certificate or the Cargo Ship Safety Certificate (SC renewal survey) most recently conducted after the ship reached 10 years of age, and found that the diminution of the transverse sectional area does not exceed 10% of the as-built area, as shown in the following table:

Table 1 – Transverse sectional area of hull girder flange				
		Measured	As-built	Diminution
Transverse section 1	Deck flange	cm^2	cm^2	cm^2 (%)
	Bottom flange	cm^2	cm^2	cm^2 (%)
Transverse section 2	Deck flange	cm^2	cm^2	cm^2 (%)
	Bottom Flange	cm^2	cm^2	cm^2 (%)
Transverse section 3	Deck Flange	cm^2	cm^2	cm^2 (%)
	Bottom Flange	cm^2	cm^2	cm^2 (%)

2 This section applies to ships constructed on or after 1 July 2002: Section moduli of transverse section of the ship's hull girder have been calculated by using the thickness of structural members measured, renewed or reinforced, as appropriate, during the SC renewal survey most recently conducted after the ship reached 10 years of age in accordance with the provisions of paragraph 2.1.1 of annex 12, and are found to be within their diminution limits determined by the Administration, taking into account the recommendations adopted by the Organization*, as shown in the following table:

Table 2 – Transverse section modulus of hull girder				
		Z_{act} (cm^3)*1	Z_{req} (cm^3)*2	Remarks
Transverse section 1	Upper deck			
	Bottom			
Transverse section 2	Upper deck			
	Bottom			
Transverse section 3	Upper deck			
	Bottom			

Notes:

*1 Z_{act} means the actual section moduli of the transverse section of the ship's hull girder calculated by using the thickness of structural members measured, renewed or reinforced, as appropriate, during the SC renewal survey, in accordance with the provisions of paragraph 2.1.1 of annex 12.

*2 Z_{req} means the diminution limit of the longitudinal bending strength of ships, as calculated in accordance with the provisions of paragraph 2.1.1 of annex 12.

The calculation sheets for Z_{act} should be attached to this report.

3 This section applies to ships constructed before 1 July 2002: Section moduli of transverse sections of the ship's hull girder have been calculated by using the thickness of structural members measured, renewed or reinforced, as appropriate, during the SC renewal survey most recently conducted after the ship reached 10 years of age in accordance with the provisions of paragraph 2.2.1.2 of annex 12, and found to meet the criteria required by the Administration or the recognized classification society and that Z_{act} is not less than Z_{mc} (defined in *2 below) as specified in appendix 2 to annex 12, as shown in the following table.

* Refer to resolution MSC.108(73) on Recommendations on compliance with the requirements of paragraph 2.2.1.1 of annex 12 to Annex B to resolution A.744(18).

Describe the criteria for acceptance of the minimum section moduli of the ship's hull girder for ships in service required by the Administration or the recognized classification society.

Table 3 – Transverse section modulus of hull girder

		Z_{act} $(cm^3)^{*1}$	Z_{mc} $(cm^3)^{*2}$	Remarks
Transverse section 1	Upper deck			
	Bottom			
Transverse section 2	Upper deck			
	Bottom			
Transverse section 3	Upper deck			
	Bottom			

Notes:

*1 As defined in note *1 of table 2.

*2 Z_{mc} means the diminution limit of minimum section modulus calculated in accordance with provisions of paragraph 2.1.2 of annex 12.

ANNEX 10

RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS OF DOUBLE HULL OIL TANKERS

General

1 These procedures should be used for recording thickness measurements as required by annexes 2 and 4.

2 Reporting forms TM1-DHT, TM2-DHT(i), TM2-DHT(ii), TM3-DHT, TM4-DHT, TM5-DHT and TM6-DHT, set out in appendix 2, should be used for recording thickness measurements and the maximum allowable diminution should be stated.

3 Appendix 3 contains guidance diagrams and notes relating to the reporting forms and the requirements for thickness measurement.

4 The reporting forms should, where appropriate, be supplemented by data presented on structural sketches.

APPENDIX 1

Ship's name: ....

IMO number: ....

Class/Administration identity number: ....

Port of registry: ....

Gross tonnage: ....

Deadweight: ....

Date of build: ....

Classification society: ....

Name of company performing thickness measurement: ....

Thickness measurement company certified by: ....

Certificate number: ....

Certificate valid from: .... to ....

Place of measurement: ....

First date of measurement: ....

Last date of measurement: ....

Renewal survey/intermediate survey* due: ....

Details of measurement equipment: ....

Qualification of operator: ....

Report number: ..…………………………. consisting of …….... pages.

Name of operator: ....…………… Name of surveyor: ....

Signature of operator: ....………….... Signature of surveyor: ....

Company official stamp: ....………… Administration: ....

Official stamp: ....

* Delete as appropriate.

APPENDIX 2

M1-DHT Report on THICKNESS MEASUREMENT of ALL DECK PLATING, ALL BOTTOM SHELL PLATING or SIDE SHELL PLATING*

Ship's name .... Class identity No. ....

Report No. ....

STRAKE POSITION																
PLATE POSITION	No. or letter	Org Thk. mm	Forward Reading						Aft Reading						%	
			Gauged		Diminution P		Diminution S		Gauged		Diminution P		Diminution S			
			P	S	mm	%	mm	%	P	S	mm	%	mm	%	P	S mm
11th for																
10th																
9th																
8th																
7th																
6th																
5th																
4th																
3rd																
2nd																
1st																
Amidships																
1st aft																
2nd																
3rd																
4th																
5th																
6th																
7th																
8th																
9th																
10th																
11th																

Operators Signature .... Surveyors Signature ....

NOTES – See Reverse

* Delete as appropriate.

NOTES TO THE REPORT TM1-DHT:

1 This report should be used for recording the thickness measurement of:

.1 All strength deck plating within the cargo area.

.2 All keel, bottom shell plating and bilge plating within the cargo area.

.3 Side shell plating including selected wind and water strakes outside cargo area.

.4 All wind and water strakes within cargo area.

2 The strake position should be clearly indicated as follows:

.1 For strength deck indicate the number of the strake of plating inboard from the stringer plate.

.2 For bottom plating indicate the number of the strake of plating outboard from the keel plate.

.3 For side shell plating give number of the strake of plating below sheerstrake and letter as shown on shell expansion.

3 Measurements should be taken at the forward and aft areas of all and where plates cross ballast/cargo tank boundaries separate measurements for the area of plating in way of each type of tank should be recorded.

4 The single measurements recorded are to represent the average of multiple measurements.

5 The maximum allowable diminution could be stated in an attached document.

TM2–DHT (i) **Report on THICKNESS MEASUREMENT OF SHELL AND DECK PLATING** (one, two or three transverse sections)

Ship's name .... Class identity No. .... Report No. ....

STRENGTH DECK AND SHEERSTRAKE PLATING																											
	FIRST TRANSVERSE SECTION AT FRAME NUMBER									SECOND TRANSVERSE SECTION AT FRAME NUMBER									THIRD TRANSVERSE SECTION AT FRAME NUMBER								
STRAKE POSITION	No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S	
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	S	%		mm	mm	P	S	mm	%	mm	%
Stringer Plate																											
1sr strake inboard																											
2nd																											
3rd																											
4th																											
5th																											
6th																											
7th																											
8th																											
9th																											
10th																											
11th																											
12th																											
13th																											
14th																											
Centre strake																											
Sheer strake																											
TOPSIDE TOTAL																											

Operators Signature ……………………………… Surveyors Signature …………………………….. NOTES – See Reverse

NOTES TO THE REPORT TM2-DHT (i)

1 This report form should be used for recording the thickness measurements of strength deck plating and sheerstrake plating transverse sections:

One, two or three sections within the cargo area comprising of the structural items (0), (1) and (2) as shown on the diagrams of typical transverse sections illustrated in appendix 3 of annex 10.

2 The topside area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).

3 The exact frame station of measurement should be stated.

4 The single measurements recorded are to represent the average of multiple measurements.

5 The maximum allowable diminution could be stated in an attached document.

TM2–DHT (ii) Report on THICKNESS MEASUREMENT OF SHELL AND DECK PLATING (one, two or three transverse sections)

Ship's name .... Class identity No. .... Report No. ....

SHELL PLATING																											
	FIRST TRANSVERSE SECTION AT FRAME NUMBER									SECOND TRANSVERSE SECTION AT FRAME NUMBER									THIRD TRANSVERSE SECTION AT FRAME NUMBER								
STRAKE POSITION	No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S	
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	S	%		mm	mm	P	S	mm	%	mm	%
1st below sheer strake																											
2nd																											
3rd																											
4th																											
5th																											
6th																											
7th																											
8th																											
9th																											
10th																											
……..																											
17th																											
18th																											
19th																											
20th																											
Keel strake																											
Bottom total																											

Operators Signature ……………………………… Surveyors Signature …………………..…….. NOTES – See Reverse

NOTES TO THE REPORT TM2-DHT(ii)

1 This report form should be used for recording the thickness measurements of shell plating transverse sections:

One, two or three sections within the cargo area comprising of the structural items (3), (4) and (5) and (6) as shown on the diagrams of typical transverse sections illustrated in appendix 3 of annex 10.

2 The bottom area comprises keel, bottom and bilge plating.

3 The exact frame station of measurement should be stated.

4 The single measurements recorded are to represent the average of multiple measurements.

5 The maximum allowable diminution could be stated in an attached document.

TM3–DHT **Report on THICKNESS MEASUREMENT OF LONGITUDINAL MEMBERS** (one, two or three transverse sections)

Ship's name .... Class identity No. .... Report No. ....

	FIRST TRANSVERSE SECTION AT FRAME NUMBER									SECOND TRANSVERSE SECTION AT FRAME NUMBER									THIRD TRANSVERSE SECTION AT FRAME NUMBER								
Structural member	Item No	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		Item No	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S		Item No	Org. Thk.	Max. Alwb. Dim.	Gauged		Diminution P		Diminution S	
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	S	%		mm	mm	P	S	mm	%	mm	%

Operators Signature ……………………………… Surveyors Signature ………………………………... NOTES – See Reverse

NOTES TO THE REPORT TM3-DHT

1 This report should be used for recording the thickness measurements of longitudinal members at transverse sections:

One, two or three sections within the cargo area comprising of the appropriate structural items (10) to (29) as shown on the diagrams of typical transverse sections illustrated in appendix 3 of annex 10.

2 The exact frame station of measurement should be stated.

3 The single measurements recorded are to represent the average of multiple measurements.

4 The maximum allowable diminution could be stated in an attached document.

TM4-DHT Report on THICKNESS MEASUREMENT OF TRANSVERSE STRUCTURAL MEMBERS

In the cargo oil and water ballast tanks within the cargo tank length

Ship's name .... Class identity No. .... Report No. ....

TANK DESCRIPTION										
LOCATION OF STRUCTURE										
STRUCTURAL MEMBER	ITEM	Original Thickness mm	Max. Alwb. Dim. mm	Gauged		Diminution P		Diminution S		
				P	S	mm	%	mm	%	

Operators Signature ……………………………… Surveyors Signature ………………………………….. NOTES – See Reverse

NOTES TO THE REPORT TM4-DHT

1 This report should be used for recording the thickness measurements of transverse structural members, comprising of the appropriate structural items (30) to (36) as shown on diagrams of typical transverse sections illustrated in appendix 3 of annex 10.

2 Guidance for areas of measurement is indicated in appendix 3 of annex 10. The single measurements recorded are to represent the average of multiple measurements.

3 The maximum allowable diminution could be stated in an attached document.

TM5–DHT Report on THICKNESS OF W.T./O.T TRANSVERSE BULKHEADS

within the cargo tank or cargo hold spaces

Ship's name .... Class identity No. .... Report No. ....

TANK/HOLD Description									
LOCATION OF STRUCTURE					FRAME No				
STRUCTURAL COMPONENT (Plating, Stiffener)	Original Thickness mm	Max. Alwb. Dim. mm	Gauged		Diminution P		Diminution S		
			Port	Starboard	mm	%	mm	%	

Operators Signature ……………………………… Surveyors Signature …………………………………... NOTES – See Reverse

NOTES TO THE REPORT TM5-DHT

1 This report should be used for recording the thickness measurement of W.T./O.T. transverse bulkheads.

2 Guidance for areas of measurement is indicated in appendix 3 of annex 10.

3 The single measurements recorded are to represent the average of multiple measurements.

4 The maximum allowable diminution could be stated in an attached document.

TM6–DHT Report on THICKNESS MEASUREMENT OF MISCELLANEOUS STRUCTURAL MEMBERS

Ship's name .... Class identity No. .... Report No. ....

<table>
<tr><td colspan="9">STRUCTURAL MEMBER</td><td>SKETCH</td></tr>
<tr><td colspan="9">LOCATION OF STRUCTURE</td><td rowspan="10"></td></tr>
<tr><td rowspan="2">Description</td><td rowspan="2">Org.
Thk.
mm</td><td rowspan="2">Max.
Alwb.
Dim.
mm</td><td colspan="2">Gauged</td><td colspan="2">Diminution
P</td><td colspan="2">Diminution
S</td></tr>
<tr><td>P</td><td>S</td><td>mm</td><td>%</td><td>mm</td><td>%</td></tr>
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</table>

Operators Signature ……………………………… Surveyors Signature …………….. NOTES – See Reverse

NOTES TO THE REPORT TM6-DHT

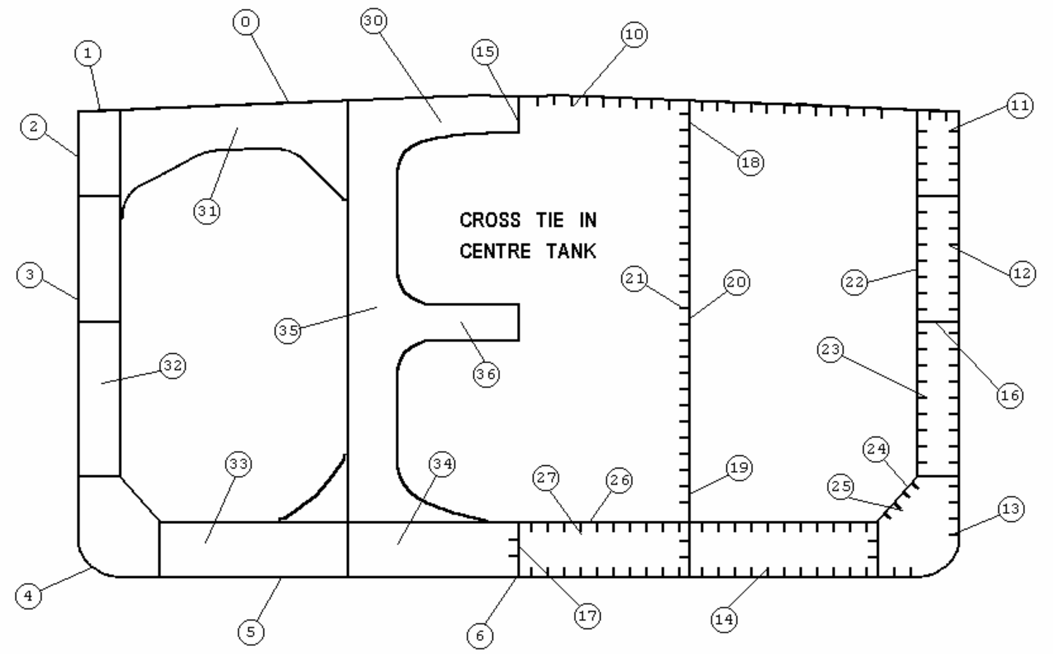
1 This report should be used for recording the thickness measurement of miscellaneous structural members.

2 The single measurements recorded are to represent the average of multiple measurements.

3 The maximum allowable diminution could be stated in an attached document.

APPENDIX 3

Thickness measurement – Double hull oil tankers
Typical transverse section of a double hull oil tanker above 150,000 dwt with indication of longitudinal and transverse members



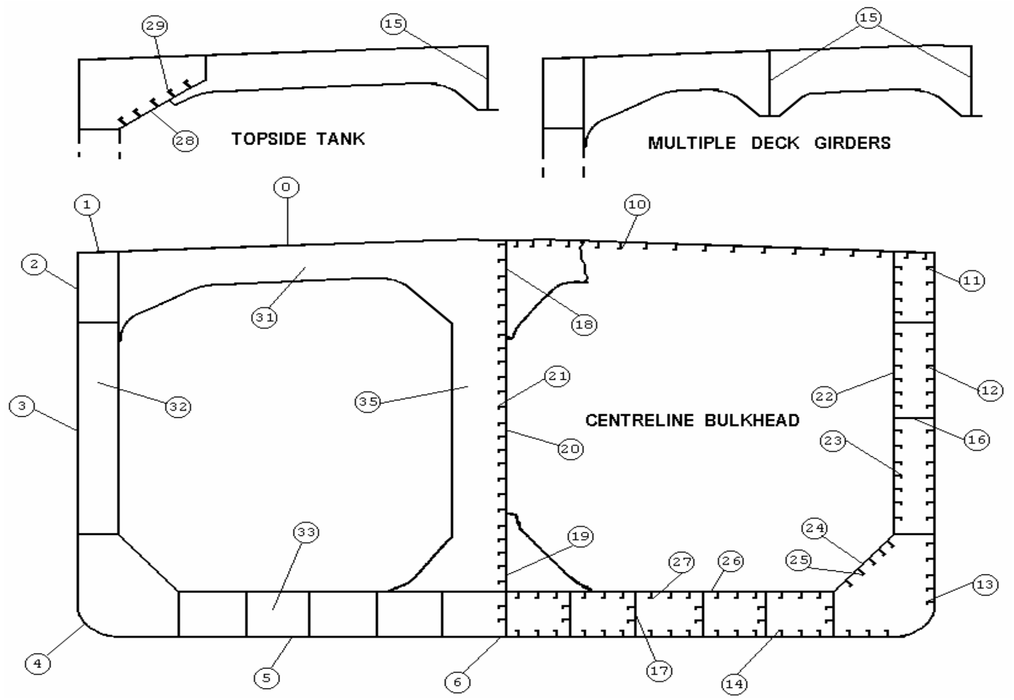
Report on TM2-DHT (i) and (ii)
0. Strength deck plating
1. Stringer plate
2. Sheerstrake
3. Side shell plating
4. Bilge plating
5. Bottom shell plating
6. Keel plate

Report on TM3-DHT	
10. Deck longitudinals	20. Longitudinal bulkhead plating (remainder)
11. Sheerstrake longitudinals	21. Longitudinal bulkhead longitudinals
12. Side shell longitudinals	22. Inner side plating
13. Bilge longitudinals	23. Inner side longitudinals
14. Bottom longitudinals	24. Hopper plating
15. Deck girders	25. Hopper longitudinals
16. Horizontal girders in wing ballast tanks	26. Inner bottom plating
17. Bottom girders	27. Inner bottom longitudinals
18. Longitudinal bulkhead top strake	28. Topside tank plating
19. Longitudinal bulkhead bottom strake	29. Topside tank longitudinals

Report on TM4-DHT
30. Deck transverse – centre tank
31. Deck transverse – wing tank
32. Vertical web in wing ballast tank
33. Double bottom floor – wing tank
34. Double bottom floor – centre tank
35. Longitudinal bulkhead vertical web
36. Cross ties

Thickness measurement – Double hull oil tankers

Typical transverse section of a double hull oil tanker up to 150,000 dwt with indication of longitudinal and transverse members



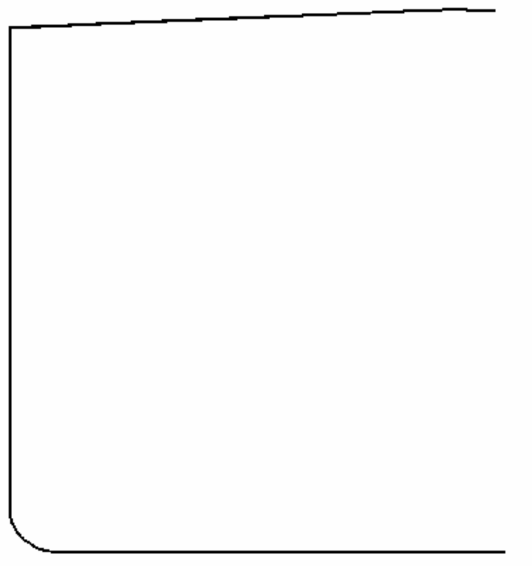
Report on TM2-DHT (i) and (ii)
0. Strength deck plating
1. Stringer plate
2. Sheerstrake
3. Side shell plating
4. Bilge plating
5. Bottom shell plating
6. Keel plate

Report on TM3-DHT	
10. Deck longitudinals	20. Longitudinal bulkhead plating (remainder)
11. Sheerstrake longitudinals	21. Longitudinal bulkhead longitudinals
12. Side shell longitudinals	22. Inner side plating
13. Bilge longitudinals	23. Inner side longitudinals
14. Bottom longitudinals	24. Hopper plating
15. Deck girders	25. Hopper longitudinals
16. Horizontal girders in wing ballast tanks	26. Inner bottom plating
17. Bottom girders	27. Inner bottom longitudinals
18. Longitudinal bulkhead top strake	28. Topside tank plating
19. Longitudinal bulkhead bottom strake	29. Topside tank longitudinals

Report on TM4-DHT
30. Deck transverse – centre tank
31. Deck transverse – wing tank
32. Vertical web in wing ballast tank
33. Double bottom floor – wing tank
34. Double bottom floor – centre tank
35. Longitudinal bulkhead vertical web
36. Cross ties

Thickness measurement – Double hull oil tankers

Transverse section outline. The diagram may be used for those ships typical sections are not applicable



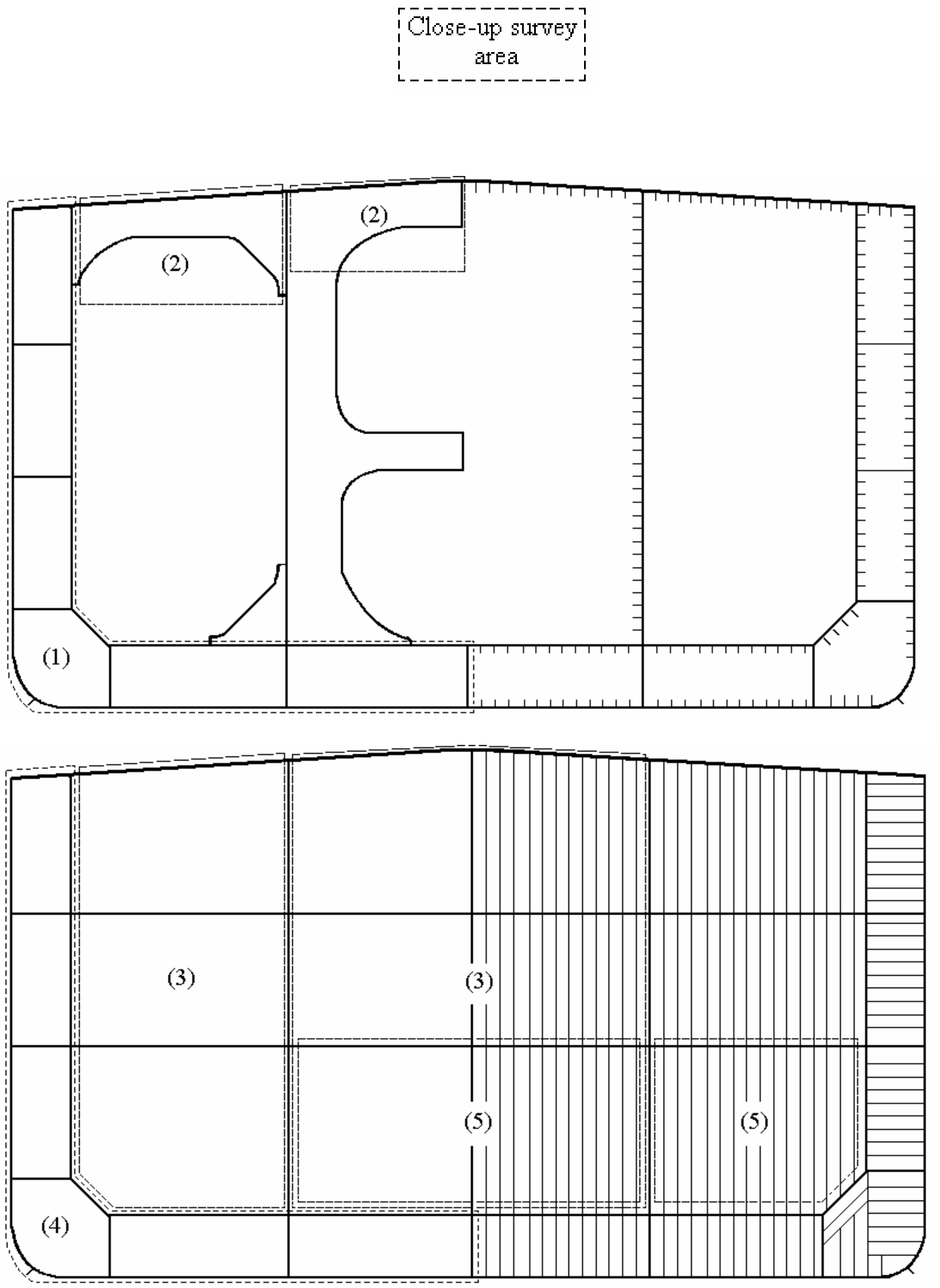
Report on TM2-DHT (i) and (ii)	
0.	Strength deck plating
1.	Stringer plate
2.	Sheerstrake
3.	Side shell plating
4.	Bilge plating
5.	Bottom shell plating
6.	Keel plate

Report on TM3-DHT			
10.	Deck longitudinals	20.	Longitudinal bulkhead plating (remainder)
11.	Sheerstrake longitudinals	21.	Longitudinal bulkhead longitudinals
12.	Side shell longitudinals	22.	Inner side plating
13.	Bilge longitudinals	23.	Inner side longitudinals
14.	Bottom longitudinals	24.	Hopper plating
15.	Deck girders	25.	Hopper longitudinals
16.	Horizontal girders in wing ballast tanks	26.	Inner bottom plating
17.	Bottom girders	27.	Inner bottom longitudinals
18.	Longitudinal bulkhead top strake	28.	Topside tank plating
19.	Longitudinal bulkhead bottom strake	29.	Topside tank longitudinals

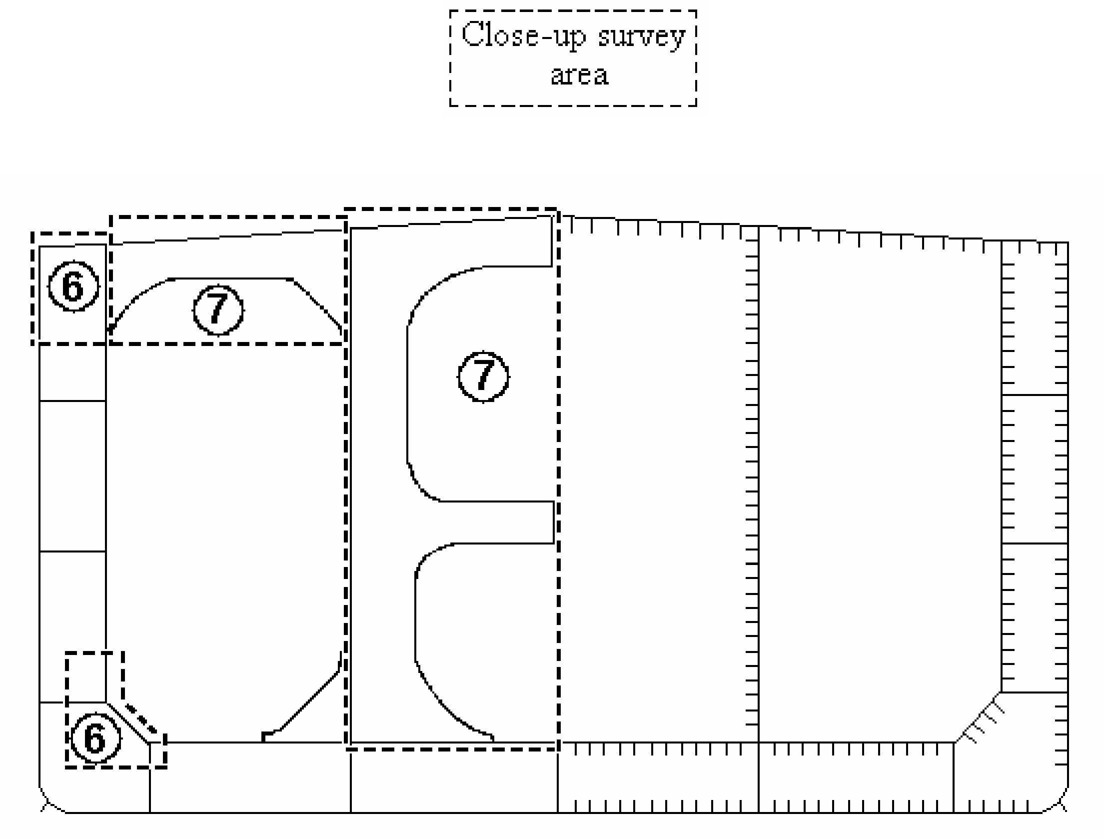
Report on TM4-DHT	
30.	Deck transverse – centre tank
31.	Deck transverse – wing tank
32.	Vertical web in wing ballast tank
33.	Double bottom floor – wing tank
34.	Double bottom floor – centre tank
35.	Longitudinal bulkhead vertical web
36.	Cross ties

Thickness measurement – double hull oil tankers

Areas subject to close-up survey and thickness measurements – areas (1) to (5) as defined in annex 1– Thickness to be reported on TM3-DHT, TM4-DHT and TM5-DHT as appropriate



Areas subject to close-up survey and thickness measurements – areas (6) to (7) as defined in annex 1 – Thickness to be reported on TM3-DHT and TM4-DHT as appropriate



ANNEX 11

GUIDELINES FOR TECHNICAL ASSESSMENT IN CONJUNCTION WITH THE PLANNING OF ENHANCED SURVEYS FOR OIL TANKERS

Renewal survey

1 Introduction

These Guidelines contain information and suggestions concerning technical assessments which may be of use in conjunction with the planning of renewal surveys of oil tankers. As indicated in 5.1.5, these Guidelines are a recommended tool which may be invoked at the discretion of an Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

2 Purpose and principles

2.1 Purpose

The technical assessments described in these Guidelines should assist in identifying critical structural areas, nominating suspect areas and in focusing attention on structural elements or areas of structural elements which may be particularly susceptible to, or evidence a history of, wastage or damage. This information may be useful in nominating locations, areas and tanks for thickness measurement, close-up survey and tank testing.

2.2 Minimum requirements

These Guidelines may not be used to reduce the requirements of annexes 1, 2 and 3 for close-up survey, thickness measurement and tank testing, respectively, which are, in all cases, to be complied with as a minimum.

2.3 Timing

As with other aspects of survey planning, the technical assessments described in these Guidelines should be completed out by the owner or operator in co-operation with the Administration well in advance of the commencement of the renewal survey, i.e., prior to commencing the survey and normally at least 12 to 15 months before the survey's completion due date.

2.4 Aspects to be considered

Technical assessments, which may include quantitative or qualitative evaluation of relative risks of possible deterioration, of the following aspects of a particular ship may be used as a basis for the nomination of tanks and areas for survey of:

.1 design features such as stress levels on various structural elements, design details and extent of use of high-tensile steel (HTS);

.2 former history with respect to corrosion, cracking, buckling, indents and repairs for the particular ship as well as similar vessels, where available; and

.3 information with respect to types of cargo carried, use of different tanks for cargo/ballast, protection of tanks and condition of coating, if any.

Technical assessments of the relative risks of susceptibility to damage or deterioration of various structural elements and areas should be judged and decided on the basis of recognized principles and practices, such as may be found in references 1 and 2.

3 Technical assessment

3.1 General

3.1.1 There are three basic types of possible failure which may be the subject of a technical assessment in connection with the planning of surveys: corrosion, cracks and buckling. Contact damages are not normally covered by the survey plan since indents are usually noted in memoranda and assumed to be dealt with as a normal routine by surveyors.

3.1.2 Technical assessments performed in conjunction with the survey planning process should, in principle, be as shown schematically in figure 1 which depicts how technical assessments can be carried out in conjunction with the survey planning process. The approach is basically an evaluation of the risk, based on the knowledge and experience related to design and corrosion.

3.1.3 The design should be considered with respect to structural details which may be susceptible to buckling or cracking as a result of vibration, high stress levels or fatigue.

3.1.4 Corrosion is related to the ageing process and is closely connected with the quality of corrosion protection at newbuilding and subsequent maintenance during the service life. Corrosion may also lead to cracking and/or buckling.

3.2 Methods

3.2.1 Design details

3.2.1.1 Damage experience related to the ship in question and similar ships, where available, are the main source of information to be used in the process of planning. In addition, a selection of structural details from the design drawings should be included. Typical damage experience to be considered will consist of:

.1.1 number, extent, location and frequency of cracks; and

.1.2 location of buckles.

3.2.1.2 This information may be found in the survey reports and/or the owner's files, including the results of the owner's own inspections. The defects should be analysed, noted and marked on sketches.

3.2.1.3 In addition, general experience should be utilized. For example, reference should be made to reference 1, which contains a catalogue of typical damages and proposed repair methods for various tanker structural details.

3.2.1.4 Such figures should be used together with a review of the main drawings, in order to compare with the actual structure and search for similar details which may be susceptible to damage. An example is shown in figure 2. In particular, chapter 3 of reference 1 deals with various aspects specific to double hull tankers, such as stress concentration locations, misalignment during construction, corrosion trends, fatigue considerations and areas requiring special attention, which should be considered in working out the survey planning.

3.2.1.5 The review of the main structural drawings, in addition to using the above-mentioned figures, should include checking for typical design details where cracking has been experienced. The factors contributing to damage should be carefully considered.

3.2.1.6 The use of HTS is an important factor. Details showing good service experience where ordinary, mild steel has been used may be more susceptible to damage when HTS, and its higher associated stresses, are utilized. There is extensive and, in general, good experience, with the use of HTS for longitudinal material in deck and bottom structures. Experience in other locations, where the dynamic stresses may be higher, is less favourable, e.g. side structures.

3.2.1.7 In this respect, stress calculations of typical and important components and details, in accordance with relevant methods, may prove useful and should be considered.

3.2.1.8 The selected areas of the structure identified during this process should be recorded and marked on the structural drawings to be included in the survey programme.

3.2.2 Corrosion

3.2.2.1 In order to evaluate relative corrosion risks, the following information is generally to be considered:

.1.1 usage of tanks and spaces;

.1.2 condition of coatings;

.1.3 condition of anodes;

.1.4 cleaning procedures;

.1.5 previous corrosion damage;

.1.6 ballast use and time for cargo tanks;

.1.7 corrosion risk scheme (see reference 2, table 2.1); and

.1.8 location of heated tanks.

3.2.2.2 Reference 2 gives definitive examples which can be used for judging and describing coating condition, using typical pictures of conditions.

3.2.2.3 The evaluation of corrosion risks should be based on information in reference 2, together with the age of the ship and relevant information on the anticipated condition as derived from the information collected in order to prepare the survey programme.

3.2.2.4 The various tanks and spaces should be listed with the corrosion risks nominated accordingly. Special attention should be given to the areas where the double hull tanker is particularly exposed to corrosion. To this end, the specific aspects addressing corrosion in double hull tankers indicated in 3.4 (Corrosion trends) of reference 1 should be taken into account.

3.2.3 Locations for close-up survey and thickness measurement

3.2.3.1 On the basis of the table of corrosion risks and the evaluation of design experience, the locations for initial close-up survey and thickness measurement (sections) may be nominated.

3.2.3.2 The sections subject to thickness measurement should normally be nominated in tanks and spaces where corrosion risk is judged to be the highest.

3.2.3.3 The nomination of tanks and spaces for close-up survey should, initially, be based on highest corrosion risk and should always include ballast tanks. The principle for the selection should be that the extent is increased by age or where information is insufficient or unreliable.

REFERENCES

1 Tanker Structure Co-operative Forum (TSCF), "Guidelines for the Inspection and Maintenance of Double Hull Tanker Structures, 1995."

2 Tanker Structure Co-operative Forum (TSCF), "Guidance Manual for Tanker Structures, 1997."

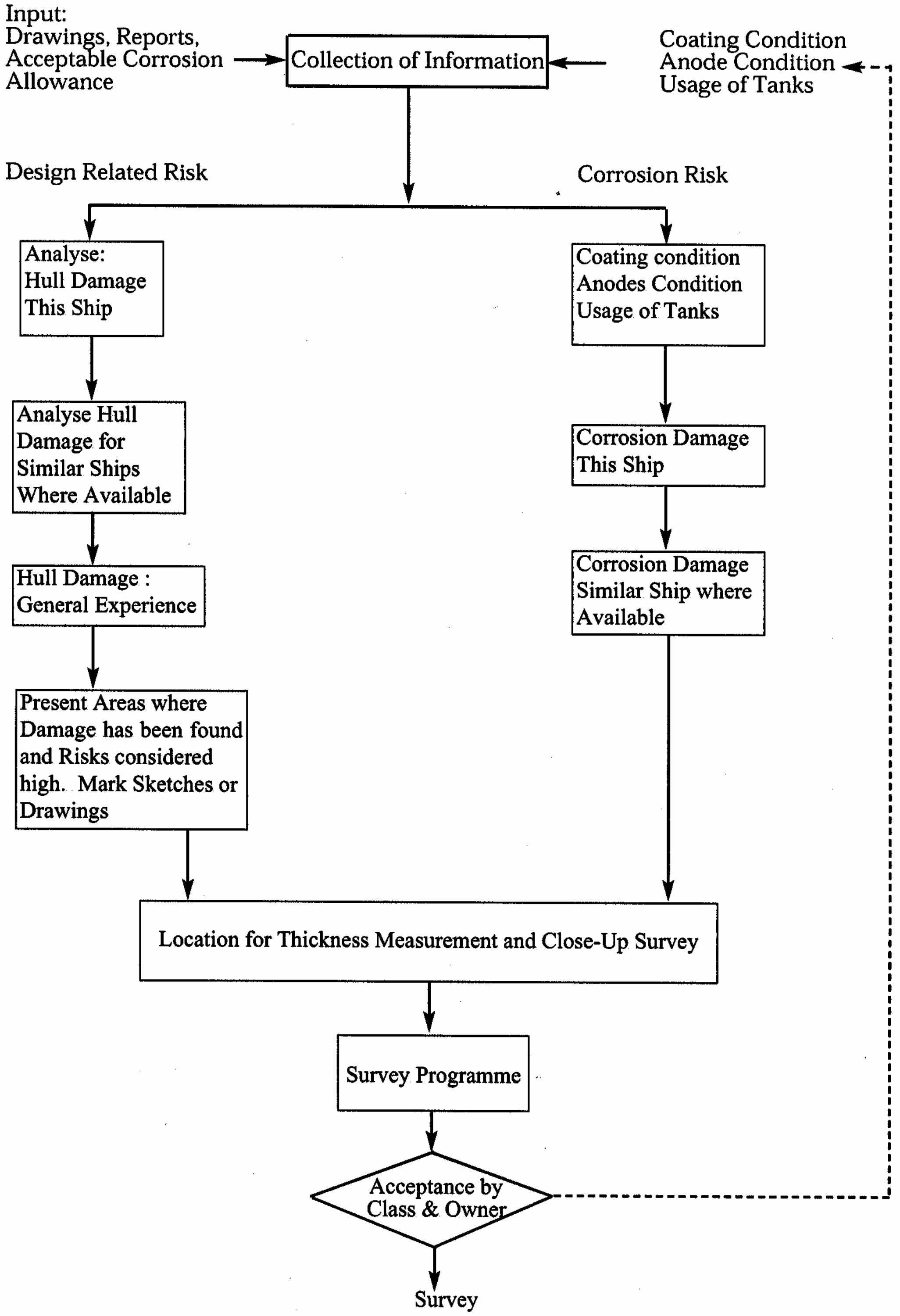
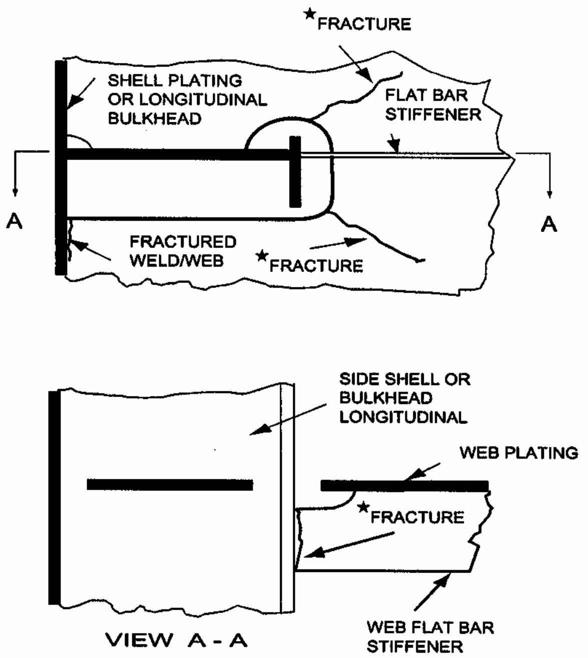


FIGURE 1: TECHNICAL ASSESSMENT AND THE SURVEY PLANNING PROCESS

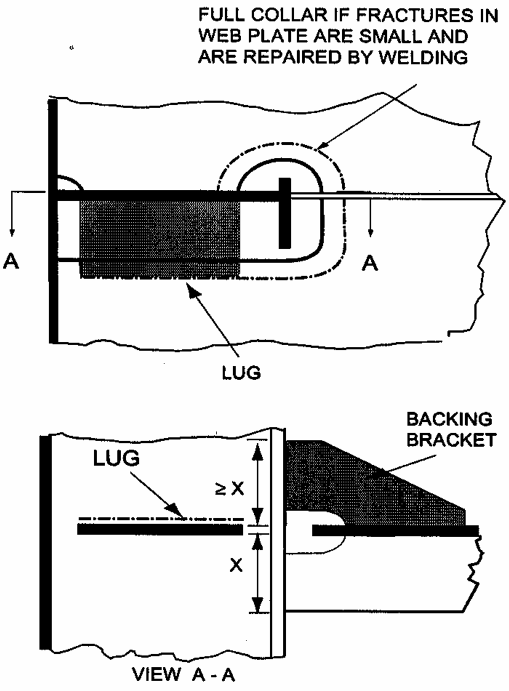
LOCATION: Connection of longitudinals to transverse webs

EXAMPLE No. 1 : Web and flat bar fractures at cut-outs for longitudinal stiffener connections

TYPICAL DAMAGE	PROPOSED REPAIR



NOTE ★ONE OR MORE FRACTURES MAY OCCUR



WEB AND FLAT BAR CROPPED AND PART RENEWED OR ALTERNATIVELY WELDED

FACTORS CONTRIBUTING TO DAMAGE

1. Asymmetrical connection of flat bar stiffener resulting in high peak stresses at the heel of the stiffener under fatigue loading.
2. Insufficient area of connection of longitudinal to web plate.
3. Defective weld at return around the plate thickness.
4. High localised corrosion at areas of stress concentration such as flat bar stiffener connections, corners of cut-out for the longitudinal and connection of web to shell at cut-outs.
5 High stress in the web of the transverse.
6. Dynamic sea way load/ship motions.

FIGURE 1	TANKER STRUCTURE CO-OPERATIVE FORUM SUBJECT: CATALOGUE OF STRUCTURAL DETAILS	FIGURE 1

FIGURE 2: TYPICAL DAMAGE AND REPAIR EXAMPLE (REPRODUCED FROM REF. 2)

ANNEX 12

CRITERIA FOR LONGITUDINAL STRENGTH OF HULL GIRDER FOR OIL TANKERS

1 General

1.1 These criteria should be used for the evaluation of the longitudinal strength of the ship's hull girder as required by 8.1.2.

1.2 In order that the ship's longitudinal strength to be evaluated can be recognized as valid, fillet welding between longitudinal internal members and hull envelopes should be in sound condition so as to keep the integrity of longitudinal internal members with hull envelopes.

2 Evaluation of longitudinal strength

On oil tankers of 130 m in length and upwards and over 10 years of age, the longitudinal strength of the ship's hull girder should be evaluated in compliance with the requirements of this annex on the basis of the thickness measured, renewed or reinforced, as appropriate, during the renewal survey of the Cargo Ship Safety Construction Certificate or Cargo Ship Safety Certificate (SC renewal survey). The condition of the hull girder for longitudinal strength evaluation should be determined in accordance with the methods specified in appendix 3.

2.1 Calculation of transverse sectional areas of deck and bottom flanges of hull girder

2.1.1 The transverse sectional areas of deck flange (deck plating and deck longitudinals) and bottom flange (bottom shell plating and bottom longitudinals) of the ship's hull girder should be calculated by using the thickness measured, renewed or reinforced, as appropriate, during the SC renewal survey.

2.1.2 If the diminution of sectional areas of either deck or bottom flange exceeds 10% of their respective as-built area (i.e., original sectional area when the ship was built), either one of the following measures should be taken:

.1 to renew or reinforce the deck or bottom flanges so that the actual sectional area is not less than 90% of the as-built area; or

.2 to calculate the actual section of moduli (Z_{act}) of transverse section of the ship's hull girder by applying the calculation method specified in appendix 1, by using the thickness measured, renewed or reinforced, as appropriate, during the SC renewal survey.

2.2 Requirements for transverse section modulus of hull girder

The actual section moduli of the transverse section of the ship's hull girder, calculated in accordance with paragraph 2.1.2.2, should satisfy either of the following provisions, as applicable:

.1 for ships constructed on or after 1 July 2002, the actual section moduli (Z_{act}) of the transverse section of the ship's hull girder calculated in accordance with the requirements of paragraph 2.1.2.2 should be not less than the diminution limits determined by the Administration, taking into account the recommendations adopted by the Organization;* or

.2 for ships constructed before 1 July 2002, the actual section moduli (Z_{act}) of the transverse section of the ship's hull girder calculated in accordance with the requirements of paragraph 2.1.2.2 should meet the criteria for minimum section modulus for ships in service required by the Administration or recognized classification society, provided that in no case Z_{act} should be less than the diminution limit of the minimum section modulus (Z_{mc}) as specified in appendix 2.

Appendix 1

Calculation criteria of section moduli of midship section of hull girder

1 When calculating the transverse section modulus of the ship's hull girder, the sectional area of all continuous longitudinal strength members should be taken into account.

2 Large openings, i.e. openings exceeding 2.5 m in length or 1.2 m in breadth, and scallops, where scallop welding is applied, are always to be deducted from the sectional areas used in the section modulus calculation.

3 Smaller openings (manholes, lightening holes, single scallops in way of seams, etc.) need not be deducted, provided that the sum of their breadths or shadow area breadths in one transverse section does not reduce the section modulus at deck or bottom by more than 3% and provided that he height of lightening holes, draining holes and single scallops in longitudinals or longitudinal girders does not exceed 25% of the web depth, for scallops maximum 75 mm.

4 A deduction-free sum of smaller opening breadths in one transverse section in the bottom or deck area of 0.06 ($B - \Sigma b$) (where B = breadth of ship, Σb = total breadth of large openings) may be considered equivalent to the above reduction in sectional modulus.

5 The shadow area will be obtained by drawing two tangent lines with an opening angle of 30°.

* Refer to resolution MSC.108(73) on Recommendation on compliance with the requirements of paragraph 2.2.1.1 of Annex 12 to Annex B to resolution A.744(18).

6 The deck modulus is related to the moulded deck line at side.

7 The bottom modulus is related to the baseline.

8 Continuous trunks and longitudinal hatch coamings should be included in the longitudinal sectional area provided they are effectively supported by longitudinal bulkheads or deep girders. The deck modulus is then to be calculated by dividing the moment of inertia by the following distance, provided this is greater than the distance to the deck line at side:

$$y_t = y\left(0.9 + 0.2\frac{x}{B}\right)$$

where:

y = distance from neutral axis to top of continuous strength member;

x = distance from top of continuous strength member to centreline of the ship;

x and y to be measured to the point giving the largest value of y_t .

9 Longitudinal girders between multi-hatchways will be considered by special calculations.

Appendix 2

Diminution limit of minimum longitudinal strength of ships in service

1 The diminution limit of the minimum section modulus (Z_{mc}) of oil tankers in service is given by the following formula:

$$Z_{mc} = cL^2 B (C_b + 0.7)k \quad (cm^3)$$

where:

L = Length of ship. L is the distance, in metres, on the summer load waterline from the fore side of stem to the after side of the rudder post, or the centre of the rudder stock if there is no rudder post. L should not be less than 96%, and need not be greater than 97%, of the extreme length on the summer load waterline. In ships with unusual stern and bow arrangement, the length L may be specially considered.

B = Greatest moulded breadth in metres.

C_b = Moulded block coefficient at draught d corresponding to summer load waterline, based on L and B. C_b should not be taken less than 0.6.

$$C_b = \frac{\text{moulded displacement}(\text{m}^3)\text{ at draught } d}{\text{LBd}}$$

$C = 0.9c_n$

$$c_n = 10.75 — \left(\frac{300 - L}{100}\right)^{1.5} \quad \text{for } 130 \text{ m} \leq L \leq 300 \text{ m}$$

$$c_n = 10.75 \quad \text{for } 300 \text{ m} < L < 350 \text{ m}$$

$$c_n = 10.75 — \left(\frac{L - 350}{150}\right)^{1.5} \quad \text{for } 350 \text{ m} \leq L \leq 500 \text{ m}$$

k = material factor, e.g.

k = 1.0 for mild steel with yield stress of 235 N/mm^2 and over

k = 0.78 for high-tensile steel with yield stress of 315 N/mm^2 and over

k = 0.72 for high-tensile steel with yield stress of 355 N/mm^2 and over.

2 Scantlings of all continuous longitudinal members of the ship's hull girder based on the section modulus requirement in 1 above should be maintained within 0.4L amidships. However, in special cases, based on consideration of type of ship, hull form and loading conditions, the scantlings may be gradually reduced towards the end of 0.4L part, bearing in mind the desire not to inhibit the ship's loading flexibility.

3 However, the above standard may not be applicable to ships of unusual type or design, e.g., for ships of unusual main proportions and/or weight distributions.

Appendix 3

Sampling method of thickness measurements for longitudinal strength evaluation and repair methods

1 Extent of longitudinal strength evaluation

Longitudinal strength should be evaluated within 0.4L amidships for the extent of the hull girder length that contains tanks therein and within 0.5L amidships for adjacent tanks which may extend beyond 0.4L amidships, where tanks means ballast tanks and cargo tanks.

2 Sampling method of thickness measurement

2.1 Pursuant to the requirements of section 2.5, transverse sections should be chosen such that thickness measurements can be taken for as many different tanks in corrosive environments as possible, e.g. ballast tanks sharing a common plane boundary with cargo tanks fitted with heating coils, other ballast tanks, cargo tanks permitted to be filled with sea water and other cargo tanks. Ballast tanks sharing a common plane boundary with cargo tanks fitted with heating coils and cargo tanks permitted to be filled with sea water should be selected where present.

2.2 The minimum number of transverse sections to be sampled should be in accordance with annex 2. The transverse sections should be located where the largest thickness reductions are suspected to occur or are revealed from deck and bottom plating measurements prescribed in 2.3 and should be clear of areas which have been locally renewed or reinforced.

2.3 At least two points should be measured on each deck plate and/or bottom shell plate required to be measured within the cargo area in accordance with the requirements of annex 2.

2.4 Within 0.1D (where D is the ship's moulded depth) of the deck and bottom at each transverse section to be measured in accordance with the requirements of annex 2, every longitudinal and girder should be measured on the web and face plate, and every plate should be measured at one point between longitudinals.

2.5 For longitudinal members other than those specified in 2.4 to be measured at each transverse section in accordance with the requirements of annex 2, every longitudinal and girder should be measured on the web and face plate, and every plate should be measured at least in one point per strake.

2.6 The thickness of each component should be determined by averaging all of the measurements taken in way of the transverse section on each component.

3 Additional measurements where the longitudinal strength is deficient

3.1 Where one or more of the transverse sections are found to be deficient in respect of the longitudinal strength requirements given in this annex, the number of transverse sections for thickness measurement should be increased such that each tank within the 0.5L amidships region has been sampled. Tank spaces that are partially within, but extend beyond, the 0.5L region, should be sampled.

3.2 Additional thickness measurements should also be performed on one transverse section forward and one aft of each repaired area to the extent necessary to ensure that the areas bordering the repaired section also comply with the requirements of the Guidelines.

4 Effective repair methods

4.1 The extent of renewal or reinforcement carried out to comply with this annex should be in accordance with 4.2.

4.2 The minimum continuous length of a renewed or reinforced structural member should be not less than twice the spacing of the primary members in way. In addition, the thickness diminution in way of the butt joint of each joining member forward and aft of the replaced member (plates, stiffeners, girder webs and flanges, etc.) should not be within the substantial corrosion range (75% of the allowable diminution associated with each particular member). Where differences in thickness at the butt joint exceed 15% of the lower thickness, a transition taper should be provided.

4.3 Alternative repair methods involving the fitting of straps or structural member modification should be subject to special consideration. In considering the fitting of straps, it should be limited to the following conditions:

.1 to restore and/or increase longitudinal strength;

.2 the thickness diminution of the deck or bottom plating to be reinforced should not be within the substantial corrosion range (75% of the allowable diminution associated with the deck plating);

.3 the alignment and arrangement, including the termination of the straps, is in accordance with a standard recognized by the Administration;

.4 the straps are continuous over the entire 0.5L amidships length; and

.5 continuous fillet welding and full penetration welds are used at butt welding and, depending on the width of the strap, slot welds. The welding procedures applied should be acceptable to the Administration.

4.4 The existing structure adjacent to replacement areas and in conjunction with the fitted straps, etc. should be capable of withstanding the applied loads, taking into account the buckling resistance and the condition of welds between the longitudinal members and hull envelope plating."

Part B

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS OTHER THAN DOUBLE HULL OIL TANKERS

44 The text of the new Part B is the text of existing Annex B subject to the following amendments.

45 The existing paragraph 1.1.1 is replaced with the following:

"1.1.1 The Guidelines should apply to self-propelled oil tankers of 500 gross tonnage and above other than double hull oil tankers, as defined in paragraph 1.2.1 of Part A of Annex B."

46 Paragraph 1.1.2 is deleted and paragraphs 1.1.3 and 1.1.4 are renumbered as paragraphs 1.1.2 and 1.1.3.

47 At the end of the new paragraph 1.1.2 (existing paragraph 1.1.3), the following sentence is added:

"The surveys should be carried out during the surveys prescribed by regulation I/10 of the 1974 SOLAS Convention, as amended."

48 In paragraph 1.2.11, the reference "II-2/3.32" is replaced with "II-2/3.6".

49 In paragraph 1.2.12, the words "Intermediated enhanced survey is an enhanced survey" are replaced by "Intermediate survey is a survey".

50 In paragraph 1.2.13, the words "condition of classification" are replaced by "condition of classification or recommendation".

51 A new paragraph 1.2.14 is added as follows:

> "1.2.14 *Specially considered* means sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under coating."

52 A new sub-item ".6 items in 3.3." is added in paragraph 1.3.1.

53 The word "significant" in paragraph 1.3.2 is deleted.

54 The following new paragraph 1.4 is added:

> "**1.4 Surveyors**
>
> For tankers of 20,000 tons deadweight and above, two surveyors should jointly carry out the first scheduled renewal survey after the tanker passes 10 years of age, and all subsequent renewal surveys and intermediate surveys. If the surveys are carried out by a recognized organization, the surveyors should be exclusively employed by such recognized organizations."

55 The words "thickness measurement and" in paragraph 2.1.2 are deleted.

56 The words "Cargo Ship Safety Construction" are inserted between the words "the" and "Certificate" in paragraphs 2.1.3 and 2.2.1.

57 The words "issued to oil tankers referred to in paragraph 1.1.1 and/or the International Oil Pollution Prevention Certificate, as appropriate, issued to oil tankers referred to in paragraph 1.1.2" in paragraph 2.2.3 are deleted.

58 Paragraph 2.2.4 is deleted.

59 The references to a footnote regarding "specially considered" in paragraph 2.4.4 and 2.5.4 are deleted.

60 The words "or as specified in planning document as described in annex 6" in paragraph 2.5.2 are deleted.

61 In paragraph 3.1, the word "annual" is inserted before the word "survey".

62 The words ", oily ballast" are deleted in paragraph 3.3.3.

63 In paragraph 3.5.3, the words "a cargo tank" are replaced by "a cargo or fuel tank".

64 The words "For tanks used for salt water ballast including combined cargo/ballast tanks" in paragraph 4.3.3 are replaced by "For ballast tanks".

65 Existing paragraph 5.1.1 is replaced by the following:

"5.1.1 A specific survey programme should be worked out in advance of the renewal survey by the owner in co-operation with the Administration. The survey programme should be in a written format based on the information in Annex 6A. The survey should not commence until the survey programme has been agreed.

5.1.1.1 Prior to the development of the survey programme, the survey planning questionnaire should be completed by the owner based on the information set out in Annex 6B, and forwarded to the Administration."

66 The existing paragraph 5.1.2 is replaced with the following:

"5.1.2 In developing the survey programme, the following documentation should be collected and consulted with a view to selecting tanks, areas, and structural elements to be examined:

.1 survey status and basic ship information;

.2 documentation on board, as described in 6.2 and 6.3;

.3 main structural plans of cargo and ballast tanks (scantlings drawings), including information regarding use of high-tensile steels (HTS);

.4 Condition Evaluation Report, according to annex 9;

.5 relevant previous damage and repair history;

.6 relevant previous survey and inspection reports from both the recognized organization and the owner;

.7 cargo and ballast history for the last 3 years, including carriage of cargo under heated conditions;

.8 details of the inert gas plant and tank cleaning procedures;

.9 information and other relevant data regarding conversion or modification of the ship's cargo and ballast tanks since the time of construction;

.10 description and history of the coating and corrosion protection system (including anodes and previous class notations), if any;

.11 inspections of the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the coating and corrosion protection system (including anodes) if any. A guidance for reporting is shown in annex 5;

.12 information regarding the relevant maintenance level during operation including port state control reports of inspection containing hull related deficiencies, Safety Management System non-conformities relating to hull maintenance, including the associated corrective action(s); and

.13 any other information that will help identify suspect areas and critical structural areas."

67 The existing paragraph 5.1.3 is replaced with the following:

"5.1.3 The submitted survey programme should account for and comply, as a minimum, with the requirements of 2.6 and annexes 1, 2 and 3 for close-up survey, thickness measurement and tank testing, respectively, and should include relevant information including at least:

.1 basic ship information and particulars;

.2 main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steels (HTS);

.3 arrangement of tanks;

.4 list of tanks with information on their use, extent of coatings and corrosion protection systems;

.5 conditions for survey (e.g., information regarding tank cleaning, gas freeing, ventilation, lighting, etc.);

.6 provisions and methods for access to structures;

.7 equipment for surveys;

.8 identification of tanks and areas for close-up survey (see 2.4);

.9 identification of areas and sections for thickness measurement (see 2.5);

.10 identification of tanks for tank testing (see 2.6);

.11 identification of the thickness measurement company;

.12 damage experience related to the ship in question; and

.13 critical structural areas and suspect areas, where relevant."

68 Paragraph 5.1.4 is deleted, and paragraphs 5.1.5 and 5.1.6 are renumbered as 5.1.4 and 5.1.5.

69 The following new paragraphs 5.2.1.1 to 5.2.1.3 are added after existing paragraph 5.2.1:

"5.2.1.1 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration.

5.2.1.2 Details of the means of access should be provided in the survey planning questionnaire.

5.2.1.3 In cases where the provisions of safety and required access are judged by the attending surveyors not to be adequate, the survey of the spaces involved should not proceed."

70 Existing paragraphs 5.2.2 to 5.2.4 are replaced by the following:

"5.2.2 Tanks and spaces should be safe for access. Tanks and spaces should be gas free and properly ventilated. Prior to entering tank, void or enclosed space, it should be verified that the atmosphere in that space is free from hazardous gas and contains sufficient oxygen.

5.2.3 Tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, sediments, etc., to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating. In particular this applies to areas which are subject to thickness measurements.

5.2.4 Sufficient illumination should be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating."

71 The following new paragraphs 5.2.5 and 5.2.6 are added:

"5.2.5 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed spaces inspection. In addition a backup team of at least two experienced persons should be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team should continuously observe the work in the tank or space and should keep lifesaving and evacuation equipment ready for use.

5.2.6 A communication system should be arranged between the survey party in the tank or space being examined, the responsible officer on deck and, as the case may be, the navigation bridge. The communication arrangements should be maintained throughout the survey."

72 In existing paragraph 5.3.2, between the fourth and fifth sub-items, a new sub-item "portable ladders" is inserted.

73 The six sub-items in paragraph 5.3.2 are numbered from ".1" to ".6" and the five sub-items in paragraph 5.4.2 are numbered from ".1" to ".5".

74 New paragraphs 5.4.3 to 5.4.5 are added as follows:

"5.4.3 Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use should be made available during the survey. A safety check-list should be provided.

5.4.4 Adequate and safe lighting should be provided for the safe and efficient conduct of the survey.

5.4.5 Adequate protective clothing should be made available and used (e.g. safety helmet, gloves, safety shoes, etc) during the survey."

75 The existing paragraph 5.5.3 is deleted and the existing paragraph 5.5.4 is renumbered as 5.5.3.

76 The following new paragraphs 5.5.4 to 5.5.7 are added:

"5.5.4 When rafts or boats will be used for close-up survey the following conditions should be observed:

.1 only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, should be used;

.2 the boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft;

.3 appropriate lifejackets should be available for all participants;

.4 the surface of water in the tank should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25 m) and the water level either stationary or falling. On no account should the level of the water be rising while the boat or raft is in use;

.5 the tank or space must contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable;

.6 at no time should the water level be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should only be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered;

.7 if the tanks (or spaces) are connected by a common venting system, or Inert Gas system, the tank in which the boat or raft should be used should be isolated to prevent a transfer of gas from other tanks (or spaces).

5.5.5 Rafts or boats alone may be allowed for inspection of the under deck areas for tanks or spaces if the depth of the webs is 1.5 m or less.

5.5.6 If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

.1 when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or

.2 if a permanent means of access is provided in each bay to allow safe entry and exit. This means of access should be direct from the deck via a vertical ladder with a small platform fitted approximately 2 m below the deck. Other effective means of escape to the deck may be considered.

If neither of the above conditions are met, then staging or other equivalent means should be provided for the survey of the under deck areas.

5.5.7 The use of rafts or boats alone in 5.5.5 and 5.5.6 does not preclude the use of boats or rafts to move about within a tank during a survey."

77 The following new section 5.6 is added:

"**5.6 Survey planning meeting**

5.6.1 Proper preparation and close co-operation between the attending surveyor(s) and the owner's representatives onboard prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings should be held regularly.

5.6.2 Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting should be held between the attending surveyor(s), the owner's representative in attendance, the thickness measurement company operator (as applicable) and the master of the ship for the purpose to ascertain that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

5.6.3 The following is an indicative list of items that should be addressed in the meeting:

.1 schedule of the vessel (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.);

.2 provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);

.3 extent of the thickness measurements;

.4 acceptance criteria (refer to the list of minimum thicknesses);

.5 extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;

.6 execution of thickness measurements;

.7 taking representative readings in general and where uneven corrosion/pitting is found;

.8 mapping of areas of substantial corrosion;

.9 communication between attending surveyor(s) the thickness measurement company operator(s) and owner representative(s) concerning findings."

78 The words "supply and maintain on-board" in paragraph 6.1.1 are replaced with "obtain, supply and maintain on board the ship".

79 Paragraph 6.2.1.4 is deleted.

80 The word "inspection" in paragraph 6.4 is replaced with "survey".

81 The word "extend" in paragraph 7.1.3 is replaced with "extent".

82 The following new paragraph 8.2.2 is added after existing paragraph 8.2.1:

> "8.2.2 When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements etc.) and an indication of whether the item has been credited, should be made available to the next attending surveyor(s), prior to continuing or completing the survey."

83 The existing paragraph 8.2.2 is renumbered as 8.2.3.

84 In the third column of annex 1, the words "One web frame rings in each remaining cargo wing tank" are replaced with "A minimum of 30% of all web frame rings in each remaining cargo wing tank (see Note 1)" and the words "One deck and bottom transverse in each cargo centre tank" are replaced with "A minimum of 30% of deck and bottom transverses including adjacent structural members in each cargo centre tank (see Note 1)". A Note 1 is added at the bottom of that annex as:

> "Note 1: The 30% should be rounded up to the next whole integer."

85 A new annex 6A "Survey programme" is added after existing annex 5. The text of the annex is identical to annex 6A of Part A (see amendment No.43).

86 A new annex 6B is added after the new annex 6A. The text of the annex is identical to annex 6B of Part A (see amendment No.43).

87 The existing annex 6 is deleted.

88 The existing text of annex 8 is replaced by new text with the heading "Survey reporting principles". The new text is identical to the text of annex 8 of Part A (see amendment No.43).

89 Table 1 and table 2 in appendix 3 of annex 10 are deleted and table 3 is renumbered as table 1.

90 In paragraph 1 of annex 11, the words "paragraph 5.1.6 of annex B" are replaced by "5.1.5".

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ANNEX 5

DRAFT AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS, 1978, AS AMENDED

Chapter I
General provisions

Regulation I/1 – Definitions and clarifications

1 The full stop "." at the end of paragraph 1 subparagraph .25 is replaced by a semicolon ";".

2 In paragraph 1, the following new subparagraphs .26 and .27 are inserted after the existing subparagraph .25:

".26 *ISPS Code* means the International Ship and Port Facility Security (ISPS) Code adopted on 12 December 2002, by resolution 2 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention) as may be amended by the Organization.

.27 *Ship security officer* means the person on board the ship, accountable to the master, designated by the Company as responsible for the security of the ship including implementation and maintenance of the ship security plan and liaison with the Company Security Officer and port facility security officers."

Chapter VI
Emergency, occupational safety, medical care and survival functions

3 The existing title of chapter VI is replaced by the following:

"**Emergency, occupational safety, security, medical care and survival functions**"

4 The following new regulation VI/5 is inserted after the existing regulation VI/4:

"**Regulation VI/5**
Requirements for the issue of certificates of proficiency for Ship Security Officers

1 Every candidate for a certificate of proficiency as ship security officer shall:

.1 have approved seagoing service of not less than 12 months or appropriate seagoing service and knowledge of ship operations; and

.2 meet the standard of competence for certification of proficiency as ship security officer, set out in section A-VI/5, paragraphs 1 to 4 of the STCW Code.

2 Administrations shall ensure that every person found qualified under the provisions of this regulation is issued with a certificate of proficiency.

3 Every Party shall compare the standards of competence which it required of ship security officers who hold or can document qualifications before the entry into force of this regulation with those specified for the certificate of proficiency in section A-VI/5 of the STCW Code, and shall determine the need for requiring these personnel to update their qualifications.

4 Until 1 July 2009, a Party may continue to recognize personnel who hold or can document qualifications as ship security officers before the entry into force of this regulation."

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ANNEX 6

DRAFT AMENDMENTS TO PART A OF THE SEAFARER'S TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) CODE

PART A
MANDATORY STANDARDS REGARDING PROVISIONS OF THE ANNEX TO THE STCW CONVENTION

1 In chapter VI, section A-VI/2, the existing table A-VI/2-2 is replaced by the following new table:

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Understand the construction, maintenance, repair and outfitting of fast rescue boats	Construction and outfit of fast rescue boats and individual items of their equipment Knowledge of the maintenance, emergency repairs of fast rescue boats and the normal inflation and deflation of buoyancy compartments of inflated fast rescue boats	Assessment of evidence obtained from practical instruction	The method of carrying out routine maintenance and emergency repairs Identify components and required equipment for fast rescue boats
Take charge of the launching equipment and appliance, as commonly fitted; during launch and recovery	Assessment of the readiness of launch equipment and launch appliance of fast rescue boats for immediate launch and operation Understand the operation and limitations of the winch, brakes, falls, painters, motion compensation and other equipment as commonly fitted Safety precautions during launch and recovery of a fast rescue boat Launching and recovery of fast rescue boat in prevailing and adverse weather and sea conditions	Assessment of evidence obtained from practical demonstration of ability to control safe launching and recovery of fast rescue boat, with equipment as fitted	Ability to prepare and take charge of the launch equipment and appliance during launching and recovery of fast rescue boat
Take charge of the fast rescue boat as commonly fitted during launch and recovery	Assessment of the readiness of fast rescue boats and related equipment for immediate launch and operation Safety precautions during launch and recovery of a fast rescue boat Launch and recovery of fast rescue boat in prevailing and adverse weather and sea conditions	Assessment of evidence obtained from practical demonstration of ability to conduct safe launching and recovery of fast rescue boat, with equipment as fitted	Ability to take charge of the fast rescue boat during launching and recovery

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Take charge of a fast rescue boat after launch	Particular characteristic, facilities and limitations of fast rescue boats Procedures for the righting of a capsized fast rescue boat How to handle a fast rescue boat in prevailing and adverse weather and sea conditions Navigational and safety equipment available in a fast rescue boat Search patterns and environmental factors affecting their execution	Assessment of evidence obtained from practical demonstration of ability to: .1 Right a capsized fast rescue boat .2 Handle a fast rescue boat in prevailing weather and sea conditions .3 Swim in special equipment .4 Use communications and signalling equipment between the fast rescue boat and helicopter and a ship .5 Use the emergency equipment carried .6 Recover a casualty from the water and transfer a casualty to a rescue helicopter or to a ship or to a place of safety .7 Carry out search patterns, taking account of environmental factors	Demonstration of operation of fast rescue boats within equipment limitations in prevailing weather conditions
Operate a fast rescue boat engine	Methods of starting and operating a fast rescue boat engine and its accessories	Assessment of evidence obtained from practical demonstration of ability to start and operate a fast rescue boat engine	Engine is started and operated as required for manoeuvring

2 The existing title of chapter VI is replaced by the following:

"**Standards regarding emergency, occupational safety, security, medical care and survival functions**"

3 The following new section A-VI/5 and table is inserted after the existing table VI/4-2:

"**Section A-VI/5**

Requirements for the issue of certificates of proficiency for Ship Security Officers

Standard of competence

1 Every candidate for a certificate of proficiency as a ship security officer shall be required to demonstrate competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-VI/5.

2 The level of knowledge of the subjects listed in column 2 of table A-VI/5 shall be sufficient to enable the candidate to act as the designated ship security officer.

3 Training and experience to achieve the necessary level of theoretical knowledge, understanding and proficiency shall take into account the guidance in section B-VI/5 of this Code.

4 Every candidate for certification shall be required to provide evidence of having achieved the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-VI/5.

Transitional provisions

5 Determining professional competence for existing ship security officers who hold or can document qualifications before the entry into force of this regulation shall be established by:

.1 approved seagoing service as a ship security officer, for a period of at least six months in total during the preceding three years; or

.2 having performed security functions considered to be equivalent to the seagoing service required in paragraph 5.1; or

.3 passing an approved test; or

.4 successfully completing approved training.

6 Every person who has been found competent under section A-VI/5, paragraph 5, shall be issued a certificate of proficiency as a ship security officer.

Table A-VI/5

Specifications of minimum standards of proficiency for ship security officers

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Maintain and supervise the implementation of a ship security plan	• Knowledge of international maritime security policy and responsibilities of Governments, Companies and designated persons • Knowledge of the purpose for and the elements that make up a ship security plan, related procedures and maintenance of records • Knowledge of procedures to be employed in implementing a ship security plan and reporting of security incidents • Knowledge of maritime security levels and the consequential security measures and procedures aboard ship and in the port facility environment • Knowledge of the requirements and procedures for conducting internal audits, on-scene inspections, control and monitoring of security activities specified in a ship security plan • Knowledge of the requirements and procedures for reporting to the company security officer any deficiencies and non-conformities identified during internal audits, periodic reviews, and security inspections • Knowledge of the methods and procedures used to modify the ship security plan • Knowledge of security related contingency plans and the procedures for responding to security threats or breaches of security including provisions for maintaining critical operations of the ship/port interface • Working knowledge of maritime security terms and definitions	Assessment of evidence obtained from approved training or examination	Procedures and actions are in accordance with the principles established by the ISPS Code and SOLAS as amended Legislative requirements relating to security are correctly identified Procedures achieve a state of readiness to respond to changes in maritime security levels Communications within the ship security officer's area of responsibility are clear and understood

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Assess security risk, threat, and vulnerability	• Knowledge of risk assessment and assessment tools • Knowledge of security assessment documentation including the Declaration of Security • Knowledge of techniques used to circumvent security measures • Knowledge enabling recognition, on a non-discriminatory basis, of persons posing potential security risks • Knowledge enabling recognition of weapons, dangerous substances, and devices and awareness of the damage they can cause • Knowledge of crowd management and control techniques, where appropriate • Knowledge in handling sensitive security related information and security related communications • Knowledge of implementing and co-ordinating searches • Knowledge of the methods for physical searches and non-intrusive inspections	Assessment of evidence obtained from approved training, or approved experience and examination, including practical demonstration of competence to: .1 conduct physical searches .2 conduct non-intrusive inspections	Procedures and actions are in accordance with the principles established by the ISPS Code and SOLAS Convention Procedures achieve a state of readiness to respond to changes in the maritime security levels Communications within the ship security officer's area of responsibility are clear and understood
Undertake regular inspections of the ship to ensure that appropriate security measures are implemented and maintained	• Knowledge of the requirements for designating and monitoring restricted areas • Knowledge of controlling access to the ship and to restricted areas on board ship • Knowledge of methods for effective monitoring of deck areas and areas surrounding the ship • Knowledge of security aspects relating to the handling of cargo and ship's stores with other shipboard personnel and relevant port facility security officers • Knowledge of methods for controlling the embarkation, disembarkation and access while on board of persons and their effects	Assessment of evidence obtained from approved training or examination	Procedures and actions are in accordance with the principles established by the ISPS Code and SOLAS Convention Procedures achieve a state of readiness to respond to changes in the maritime security levels Communications within the ship security officer's area of responsibility are clear and understood

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure that security equipment and systems, if any, are properly operated, tested and calibrated	• Knowledge of the various types of security equipment and systems and their limitations • Knowledge of the procedures, instructions, and guidance on the use of ship security alert systems • Knowledge of the methods for testing, calibrating, and maintaining security systems and equipment, particularly whilst at sea	Assessment of evidence obtained from approved training or examination	Procedures and actions are in accordance with the principles established by the ISPS Code and SOLAS Convention
Encourage security awareness and vigilance	• Knowledge of training, drill and exercise requirements under relevant conventions and codes • Knowledge of the methods for enhancing security awareness and vigilance on board • Knowledge of the methods for assessing the effectiveness of drills and exercises	Assessment of evidence obtained from approved training or examination	Procedures and actions are in accordance with the principles established by the ISPS Code and SOLAS Convention Communications within the ship security officer's area of responsibility are clear and understood

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ANNEX 7

DRAFT STCW.6 CIRCULAR

AMENDMENTS TO PART B OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) CODE

1 The Maritime Safety Committee, [at its eighty-first session ([… to … May 2006])], adopted amendments to part B of the STCW Code regarding training for Ship Security Officers, as set out in annex.

2 The Committee decided that the aforesaid amendments will become effective on [1 January 2008].

3 STCW Parties and all others concerned are invited to note the annexed amendments and take action as appropriate.

ANNEX

AMENDMENTS TO PART B OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) CODE

PART B
RECOMMENDED GUIDANCE REGARDING PROVISIONS OF THE STCW CONVENTION AND ITS ANNEX

Chapter VI
Guidance regarding emergency, occupational safety, medical care and survival functions

1 The existing title to chapter VI is replaced by the following:

"**Guidance regarding emergency, occupational safety, security, medical care and survival functions**"

2 The following new section is inserted at the end of chapter VI after the existing section VI/4:

"**Section B-VI/5**

Guidance regarding training for ship security officers

1 The training should be relevant to the provisions of the ISPS Code and SOLAS Convention, as amended.*

2 On completion of training, a ship security officer should have adequate knowledge of the English language to correctly interpret and communicate messages relevant to ship or port facility security."

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* IMO Model Course 3.19 – Ship Security Officer may be of assistance in the preparation of courses.

ANNEX 8

RESOLUTION MSC.198(80)
(adopted on 20 May 2005)

ADOPTION OF AMENDMENTS TO THE FORMAT AND GUIDELINES FOR THE MAINTENANCE OF THE CONTINUOUS SYNOPSIS RECORD (CSR)

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO resolution A.959(23) on Formal and guidelines for the maintenance of the Continuous Synopsis Record (CSR) and in particular operating paragraph 4(b) through which the Assembly has requested the Committee to keep the Format and guidelines under review and amend them, as appropriate, in the light of experience gained,

NOTING that a number of practical difficulties have been encountered when issuing Continuous Synopsis Records and, in particular, when a ship is transferred to the flag of another State the Government of which is a Contracting Government to the International Convention for the Safety of Life at Sea, 1974, as amended (the Convention),

NOTING ALSO that on a number of occasions ships have encountered difficulties during the exercise of control pursuant to the provisions of regulation I/19 of the Convention and/or during the exercise of control and compliance measures pursuant to the provisions of regulation XI-2/9 of the Convention as a result of matters related to the Continuous Synopsis Record,

ACKNOWLEDGING the need to review and amend the guidelines for the maintenance and the forms of the Continuous Synopsis Record as result of the experience gained,

HAVING ADOPTED amendments to the provisions of the regulation XI-1/3 of the Convention to introduce the IMO Unique Company and Registered Owner Identification Number Scheme and to regulation XI-1/5 of the Convention (SOLAS regulation XI-1/5) to include in the Continuous Synopsis Record the registered owner and the company identification numbers,

RECOGNIZING the need to reflect the aforesaid amendments to SOLAS regulation XI-1/5 in the forms of the Continuous Synopsis Record,

1. ADOPTS:

.1 amendments to the Format and Guidelines for the maintenance of the Continuous Synopsis Record (CSR), as set out in Annex 1 to the present resolution to reflect the experience gained;

.2 amendment to the Format and Guidelines for the maintenance of the Continuous Synopsis Record (CSR), as set out in Annex 2 to the present resolution to reflect the amendments to SOLAS regulation XI-1/5;

2. DECIDES that the amendments to the annex to resolution A.959(23) set out in Annex 1 should enter into force on the date of adoption of the present resolution and those set out in Annex 2 should enter into force on 1 January 2009;

3. STRONGLY URGES Contracting Governments to the Convention to meet their obligations under SOLAS regulation XI-1/5 and resolution A.959(23) and, in particular, when a ship entitled to fly their flag is transferred to the flag of another Contracting Government to the Convention, to forward to it the Continuous Synopsis Record of the ship as soon as possible and within the time frame prescribed in resolution A.959(23), as amended, so as to enable the latter Government to promptly issue to the ship the required Continuous Synopsis Record;

4. INVITES Contracting Governments to the Convention to bring to its attention any difficulties encountered with the implementation of the provisions of SOLAS regulation XI-1/5 or of resolution A.959(23) as amended for consideration of the issues involved and decision on the actions to be taken.

ANNEX 1

AMENDMENTS TO THE FORMAT AND GUIDELINES FOR THE MAINTENANCE OF THE CONTINUOUS SYNOPSIS RECORD (CSR) (RESOLUTION A.959(23))

Issue of revised and updated CSR documents by the Administration

1 The existing paragraph 8 is replaced by the following text:

"In the case of a change of flag, the previous flag State has to issue a new CSR document to the ship showing the date the ship ceased to be registered with that flag State. That flag State is required to send a copy of the ship's CSR file, as soon as possible and preferably not later than one month from the date the ship ceased to be registered, to the new flag State. The new flag State is required to issue a new CSR document as soon as possible and not later than three months after the date of change of flag."

2 At the end of paragraph 9, the following new paragraph 9.1 is inserted:

"9.1 In instances where the previous flag State has not forwarded, within three months from the date of change of flag, the CSR file of the ship covering the period during which the ship was entitled to fly its flag, to the new flag State, then the new flag State should issue to the ship a CSR based on the CSR information received from onboard the ship. The sequential number to be allocated to the CSR document to be so issued should be the second sequential number after the last sequentially number shown on the CSR document found (i.e. leaving first sequential number unused). The new flag State should explain, in entry box 14, the reason for issuing the CSR document in such a manner."

Possibility of inconsistencies

3 At the end of paragraph 13, the following new paragraph 13.1 is inserted:

"13.1 When inspecting the CSR file of ships that have changed flag, those exercising control under SOLAS regulation I/19 or control and compliance measures under SOLAS regulation XI-2/9, should be guided by the provisions of sections 8, 9 and 9.1, as well as the Remarks shown in entry box 14 of the CSR document. In the circumstances referred to in section 9.1 the missing sequential number should be considered as constituting a deficiency against the previous flag State. Such a deficiency is due to the fact that the previous flag State did not forward the CSR file and thus failed to fulfil its obligations under SOLAS regulation XI-1/5."

4 The following new section is inserted after paragraph 13.1:

"**The use of the "Remarks" entry box**

14 The "Remarks" entry box should only be used by the flag State when encountering difficulties with the implementation of the provisions of SOLAS regulation XI-1/5 or of resolution A.959(23) as amended, such as in the case of bareboat registration and change of flag."

APPENDIX

FORM 1

5 At the end of the form the following new entry box is inserted:

14	Remarks (*insert relevant information as appropriate*)	

FORM 2

6 At the end of the form the following new entry box is inserted:

14	Remarks (*insert relevant information as appropriate*)	

ANNEX 2

AMENDMENTS TO THE FORMAT AND GUIDELINES FOR THE MAINTENANCE OF THE CONTINUOUS SYNOPSIS RECORD (CSR) (RESOLUTION A.959(23))

APPENDIX

FORM 1

1 After the existing entry box number 6 the following new entry box is inserted:

7	Registered owner identification number	

2 The existing entry boxes numbers 7 and 8 are renumbered as 8 and 9.

3 After the existing box number 8, which is being renumbered as 9, the following new entry box is inserted:

10	Company identification number	

4 The existing entry boxes numbers 9 to 14 are renumbered as 11 to 16.

FORM 2

5 After the existing entry box number 6 the following new entry box is inserted:

7	Registered owner identification number	

6 The existing entry boxes numbers 7 and 8 are renumbered as 8 and 9.

7 After the existing box number 8, which is being renumbered as 9, the following new entry box is inserted:

10	Company identification number	

8 The existing entry boxes numbers 9 to 14 are renumbered as 11 to 16.

***

ANNEX 9

DRAFT ASSEMBLY RESOLUTION

CODE FOR THE IMPLEMENTATION OF MANDATORY IMO INSTRUMENTS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING FURTHER resolution A.847(20) entitled "Guidelines to assist flag States in the implementation of IMO instruments" intended to provide flag States with a means to establish and maintain measures for the effective application and enforcement of the relevant IMO instruments,

BEING AWARE of the request of the seventh session of the UN Commission on Sustainable Development (CSD 7) to develop measures to ensure that flag States give full and complete effect to the IMO and other relevant conventions to which they are Party, so that the ships of all flag States meet international rules and standards,

RECOGNIZING that Parties to the relevant international conventions have, as part of the ratification process, accepted to fully meet their responsibilities and to discharge their obligations under the conventions and other instruments to which they are Party,

REAFFIRMING that States have the primary responsibility to have in place an adequate and effective system to exercise control over ships entitled to fly their flag, and to ensure that they comply with relevant international rules and regulations in respect of maritime safety, security and protection of the marine environment,

REAFFIRMING ALSO that States, in their capacity as port and coastal States, have other obligations and responsibilities under applicable international law in respect of maritime safety, security and protection of the marine environment,

NOTING that, while States may realize certain benefits by becoming Party to instruments aiming at promoting maritime safety, security and the prevention of pollution from ships, these benefits can only be fully realized when all Parties carry out their obligations as required by the instruments concerned,

NOTING ALSO that the ultimate effectiveness of any instrument depends, *inter alia*, upon all States:

(a) becoming Parties to all instruments related to maritime safety, security and pollution prevention and control;

(b) implementing and enforcing such instruments fully and effectively;

(c) reporting to the Organization, as required, [NOTING FURTHER that in the context of the Voluntary IMO Member State Audit Scheme, the enactment of appropriate legislation, its implementation and enforcement are the three key issues on which a Member State's performance can be measured,

BEARING IN MIND that the Voluntary IMO Member State Audit Scheme contains references to the Code for the implementation of mandatory IMO instruments, as appropriate; and that the Code, in addition to providing guidance for the implementation and enforcement of IMO instruments, forms the basis of the Audit Scheme, in particular concerning the identification of the auditable areas,]

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee, at its eightieth session and by the Marine Environment Protection Committee[, at its fifty-third session],

1. ADOPTS the Code for the Implementation of Mandatory IMO Instruments, set out in the Annex to the present resolution;

2. URGES Governments of flag States, port States and coastal States to implement the Code on a national basis;

3. REQUESTS the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Code under review and, in co-ordination with the Council, to propose amendments thereto to the Assembly;

4. REVOKES resolution A.847(20).

ANNEX

CODE FOR THE IMPLEMENTATION OF MANDATORY IMO INSTRUMENTS

PART 1 – COMMON AREAS

Objective

1 The objective of this Code is to enhance global maritime safety and protection of the marine environment.

2 Different Administrations will view this Code according to their own circumstances and will be bound only for the implementation of those instruments referred to in paragraph 6 to which they are contracting governments or parties. By virtue of geography and circumstance some Administrations may have a greater role as a flag State than as a port State or as a coastal State, whilst others may have a greater role as a coastal State or port State than as a flag State. Such imbalances do not diminish, in any way, their duties as a flag, port or coastal State.

Strategy

3 In order for a State to meet the objective of this Code, a strategy should be developed, covering the following issues:

.1 implementation and enforcement of relevant international mandatory instruments;

.2 adherence to international recommendations, as appropriate;

.3 continuous review and verification of the effectiveness of the State in respect of meeting its international obligations; and

.4 the achievement, maintenance and improvement of overall organizational performance and capability.

In implementing the aforementioned strategy, the guidance given in this Code should be adhered to.

General

4 Under the provisions of the United Nations Convention on the Law of the Sea 1982 (UNCLOS) and of IMO conventions, Administrations are responsible for promulgating laws and regulations and for taking all other steps which may be necessary to give these instruments full and complete effect so as to ensure that, from the point of view of safety of life at sea and protection of the marine environment, a ship is fit for the service for which it is intended and is manned with competent maritime personnel.

5 In taking measures to prevent, reduce and control pollution of the marine environment, States shall act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another. (UNCLOS, article 195).

Scope

6 The mandatory IMO instruments addressed in this Code are:

.1 the International Convention for the Safety of Life at Sea (SOLAS 74), as amended;

.2 the International Convention for the Safety of Life at Sea (SOLAS 74), as amended, and as modified by its 1978 Protocol;

.3 the International Convention for the Safety of Life at Sea (SOLAS 74), as amended, and as modified by its 1988 Protocol;

.4 the International Convention for the Prevention of Pollution from Ships, 1973, as modified by its 1978 Protocol (MARPOL 73/78);

.5 the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), as amended;

.6 the International Convention on Load Lines, 1966 (LL 66);

.7 the International Convention on Load Lines, 1966 (LL 66), as modified by its 1988 Protocol;

.8 the International Convention on Tonnage Measurement of Ships, 1969 (TONNAGE 69); and

.9 the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 72), as amended,

as well as all instruments made mandatory through these conventions and protocols. Non-exhaustive lists of obligations under the above mandatory instruments are found in annexes 1 to 4. A list of the relevant instruments is given in annex 5.

Initial actions

7 When a new or amended IMO mandatory instrument enters into force for a State, the Government of that State must be in a position to implement and enforce its provisions through appropriate national legislation and to provide the necessary implementation and enforcement infrastructure. This means that a Government of the State must have:

.1 the ability to promulgate laws which permit effective jurisdiction and control in administrative, technical and social matters over ships flying its flag and, in particular, provide the legal basis for general requirements for registries, the inspection of ships, safety and pollution-prevention laws applying to such ships and the making of associated regulations;

.2 a legal basis for the enforcement of its national laws and regulations including the associated investigative and penal processes; and

.3 the availability of sufficient personnel with maritime expertise to assist in the promulgation of the necessary national laws and to discharge all the responsibilities of the State, including reporting as required by the respective conventions.

8 A possible framework for national legislation to give effect to the provisions of relevant IMO instruments can be found in "Guidelines for Maritime Legislation", a United Nations publication[1].

Communication of information

9 The State should communicate its strategy, as referred to in paragraph 3, including information on its national legislation to all concerned.

Records

10 Records, as appropriate, should be established and maintained to provide evidence of conformity to requirements and of the effective operation of the State. Records should remain legible, readily identifiable and retrievable. A documented procedure should be established to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of records.

Improvement

11 States should continually improve the adequacy of the measures which are taken to give effect to those conventions and protocols which they have accepted. Improvement should be made through rigorous and effective application and enforcement of national legislation, as appropriate, and monitoring of compliance.

12 The State should stimulate a culture which provides opportunities to people for improvement of performance in maritime safety and environmental protection activities.

13 Further, the State should take action to identify and eliminate the cause of any non-conformities in order to prevent recurrence, including:

.1 review and analysis of non-conformities;

.2 implementation of necessary corrective action; and

.3 review of the corrective action taken.

14 The State should determine action to eliminate the causes of potential non-conformities in order to prevent their occurrence.

1 ST/ESCAP/1076.

PART 2 – FLAG STATES

Implementation

15 In order to effectively discharge their responsibilities and obligations, flag States should:

.1 implement policies through the issuance of national legislation and guidance which will assist in the implementation and enforcement of the requirements of all safety and pollution prevention conventions and protocols they are party to; and

.2 assign responsibilities within their Administration to update and revise any relevant policies adopted, as necessary.

16 Flag States should establish resources and processes capable of administering a safety and environmental protection programme which, as a minimum, should consist of the following:

.1 administrative instructions to implement applicable international rules and regulations as well as develop and disseminate any interpretative national regulations that may be needed;

.2 resources to ensure compliance with the requirements of the mandatory IMO instruments listed in paragraph 6 using an audit and inspection programme independent of any administrative bodies issuing the required certificates and relevant documentation and/or of any entity which has been delegated authority by the flag States to issue the required certificates and relevant documentation;

.3 resources to ensure compliance with the requirements of the 1978 STCW Convention, as amended. This includes resources to ensure, *inter alia*, that:

.3.1 training, assessment of competence and certification of seafarers are in accordance with the provisions of the Convention;

.3.2 STCW certificates and endorsements accurately reflect the competencies of the seafarers, using the appropriate STCW terminology as well as terms which are identical to those used in any safe manning document issued to the ship;

.3.3 impartial investigation can be held of any reported failure, whether by act or omission, that may pose a direct threat to safety of life or property at sea or to the marine environment, by the holders of certificates or endorsements issued by that Party;

.3.4 certificates or endorsements issued by the flag State can be effectively withdrawn, suspended or cancelled when warranted, and when necessary to prevent fraud; and

.3.5 administrative arrangements, including those involving training, assessment and certification activities conducted under the purview of another State, are such that the flag State accepts its responsibility for ensuring the competence of masters, officers and other seafarers serving on ships entitled to fly its flag*;

.4 resources to ensure the conduct of investigations into casualties and adequate and timely handling of cases of ships with identified deficiencies; and

.5 the development, documentation and provision of guidance concerning those requirements that are to the satisfaction of the Administration, found in relevant mandatory IMO instruments.

17 Flag States shall ensure that ships entitled to fly their flag are sufficiently and efficiently manned, taking into account the Principles of Safe Manning adopted by IMO.

Delegation of authority

18 Flag States authorizing recognized organizations to act on their behalf in conducting the surveys, inspections, the issue of certificates and documents, the marking of ships and other statutory work required under the IMO conventions must regulate such authorization in accordance with SOLAS regulation XI-1/1 to:

.1 determine that the recognized organization has adequate resources in terms of technical, managerial and research capabilities to accomplish the tasks being assigned, in accordance with the Minimum standards for recognized organizations acting on behalf of the Administration set out in the relevant IMO resolution**;

.2 have as its basis a formal written agreement between the Administration and the recognized organization which, as a minimum, includes the elements set out in the relevant IMO resolution#, or equivalent legal arrangements, and which may be based on the model agreement for the authorization of recognized organizations acting on behalf of the Administration##;

.3 issue specific instructions detailing actions to be followed in the event that a ship is found unfit to proceed to sea without danger to the ship or persons on board, or is found to present an unreasonable threat of harm to the marine environment;

.4 provide the recognized organization with all appropriate instruments of national law and interpretations thereof giving effect to the provisions of the conventions or specify whether the Administration's standards go beyond convention requirements in any respect; and

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* Regulations I/2, I/9, I/10 and I/11 of the 1978 STCW Convention, as amended.

** Appendix 1 of resolution A.739(18) "Guidelines for the authorization of organizations acting on behalf of the Administration".

Appendix 2 of resolution A.739(18) "Guidelines for the authorization of organizations acting on behalf of the Administration".

(MSC/Circ.710-MEPC/Circ.307).

.5 require that the recognized organization must maintain records which will provide the Administration with data to assist in interpretation of convention regulations.

19 Flag States nominating surveyors for the purpose of carrying out surveys and inspections on their behalf should regulate such nominations, as appropriate, in accordance with the guidance provided in paragraph 18, in particular subparagraphs .3 and .4.

20 The flag State should establish or participate in an oversight programme with adequate resources for monitoring of, and communication with, its recognized organizations in order to ensure that its international obligations are fully met, by:

.1 exercising its authority to conduct supplementary surveys to ensure that ships entitled to fly its flag in fact comply with mandatory IMO instruments;

.2 conducting supplementary surveys as it deems necessary to ensure that ships entitled to fly its flag comply with national requirements which supplement the IMO convention requirements; and

.3 providing staff who have a good knowledge of the rules and regulations of the flag State and the recognized organizations and who are available to carry out effective field oversight of the recognized organizations.

Enforcement

21 Flag States should take all necessary measures to secure observance of international rules and standards by ships entitled to fly their flag and by entities and persons under their jurisdiction so as to ensure compliance with their international obligations. Such measure should, *inter alia*, include:

.1 prohibiting ships entitled to fly their flag from sailing until such ships can proceed to sea in compliance with the requirements of international rules and standards;

.2 the periodic inspection of ships entitled to fly their flag to verify that the actual condition of the ship and its crew is in conformity with the certificates it carries;

.3 that, during the periodic inspection referred to in subparagraph .2, the surveyor should ensure that seafarers assigned to the ships are familiar with:

.3.1 their specific duties; and

.3.2 ship arrangements, installations, equipments and procedures;

.4 ensuring that the ship's complement, as a whole, can effectively co-ordinate their activities in an emergency situation and in performing functions vital to safety or to the prevention or mitigation of pollution;

.5 providing in national laws and regulations for penalties of adequate severity to discourage violation of international rules and standards by ships entitled to fly their flag;

.6 instituting proceedings – after an investigation has been conducted – against ships entitled to fly their flag which have violated international rules and standards, irrespective of where the violation has occurred;

.7 providing in national laws and regulations for penalties of adequate severity to discourage violations of international rules and standards by individuals issued with certificates or endorsements under their authority; and

.8 instituting proceedings – after an investigation has been conducted – against individuals holding certificates or endorsements who have violated international rules and standards, irrespective of where the violation has occurred.

22 A flag State should consider developing and implementing a control and monitoring programme, as appropriate, in order to:

.1 provide for prompt and thorough casualty investigations, with reporting to IMO as appropriate;

.2 provide for the collection of statistical data, so that trend analyses can be conducted to identify problem areas; and

.3 provide for a timely response to deficiencies and alleged pollution incidents reported by port or coastal States.

23 Furthermore, the flag State should:

.1 ensure compliance with applicable IMO instruments through national legislation;

.2 provide an appropriate number of qualified personnel to implement and enforce the national legislation referred to in subparagraph 15.1, including personnel for performing investigations and surveys;

.3 provide a sufficient number of qualified flag State personnel to investigate incidents where ships entitled to fly its flag have been detained by port States;

.4 provide a sufficient number of qualified flag State personnel to investigate incidents where the validity of a certificate or endorsement or competence of individuals holding certificates or endorsements issued under its authority are questioned by port States; and

.5 ensure the training and oversight of the activities of flag State surveyors and investigators.

24 When a State is informed that a ship entitled to fly its flag has been detained by a port State, the flag State should oversee that appropriate corrective measures to bring the ship in question into immediate compliance with the applicable international conventions are taken.

25 A flag State, or a recognized organization acting on its behalf, should only issue or endorse an international certificate to a ship after it has determined that the ship meets all applicable requirements.

26 A flag State should only issue an international certificate of competency or endorsement to a person after it has determined that the person meets all applicable requirements.

Flag State surveyors

27 The flag State should define and document the responsibilities, authority and interrelation of all personnel who manage, perform and verify work relating to and affecting safety and pollution prevention.

28 Personnel responsible for, or performing, surveys, inspections and audits on ships and companies covered by the relevant IMO mandatory instruments should have as a minimum the following:

.1 appropriate qualifications from a marine or nautical institution and relevant seagoing experience as a certificated ship officer holding or having held a valid STCW II/2 or III/2 certificate of competency and have maintained their technical knowledge of ships and their operation since gaining their certificate of competency; or

.2 a degree or equivalent from a tertiary institution within a relevant field of engineering or science recognized by the State.

29 Personnel qualified under 29.1 should have served for a period of not less than three years at sea as an officer in the deck or engine department.

30 Personnel qualified under 29.2 should have worked in a relevant capacity for at least three years.

31 In addition such personnel should have appropriate practical and theoretical knowledge of ships, their operation and the provisions of the relevant national and international instruments necessary to perform their duties as flag State surveyors obtained through documented training programmes.

32 Other personnel assisting in the performance of such work should have education, training and supervision commensurate with the tasks they are authorized to perform.

33 Previous relevant experience in the field of expertise should be considered an advantage; in case of no previous experience the Administration should provide appropriate field training.

34 Flag States may accredit surveyors through a formalized, detailed training programme that leads to the same standard of knowledge and ability as that required in paragraphs 29 to 32.

35 The flag State should have implemented a documented system for qualification of personnel and continuous updating of their knowledge as appropriate to the tasks they are authorized to undertake.

36 Depending on the function(s) to be performed the qualifications should encompass:

.1 knowledge of applicable international and national rules and regulations for ships, their companies, their crew, their cargo and their operation;

.2 knowledge of the procedures to be applied in survey, certification, control, investigative and oversight functions;

.3 understanding of the goals and objectives of the international and national instruments dealing with maritime safety and protection of the marine environment, and of related programmes;

.4 understanding of the processes both on board and ashore, internal as well as external;

.5 possession of professional competency necessary to perform the given tasks effectively and efficiently;

.6 full safety awareness in all circumstances, also for one's own safety; and

.7 training or experience in the various tasks to be performed and, preferably, also in the functions to be assessed.

37 The flag State should issue an identification document for the surveyor to carry when performing his/her tasks.

Flag State investigations

38 Investigations should be carried out following a marine casualty or pollution incident. Casualty investigations should be conducted by suitably qualified investigators, competent in matters relating to the casualty. The flag State should be prepared to provide qualified investigators for this purpose, irrespective of the location of the casualty or incident.

39 The flag State should ensure that individual investigators have working knowledge and practical experience in those subject areas pertaining to their normal duties. Additionally, to assist individual investigators in performing duties outside their normal assignments, the flag State should ensure ready access to expertise in the following areas, as necessary:

.1 navigation and the Collision Regulations;

.2 flag State regulations on certificates of competency;

.3 causes of marine pollution;

.4 interviewing techniques;

.5 evidence gathering; and

.6 evaluation of the effects of the human element.

40 Any accidents involving personal injury necessitating absence from duty of three days or more and any deaths resulting from occupational accidents and casualties to ships of the flag State should be investigated, and the results of such investigations made public.

41 Ship casualties should be investigated and reported upon in accordance with relevant IMO conventions, and the guidelines developed by IMO*. The report on the investigation should be forwarded to IMO together with the flag State's observations, in accordance with the guidelines referred to above.

Evaluation and review

42 The flag States should, on a periodic basis, evaluate their performances with respect to the implementation of administrative processes, procedures and resources necessary to meet their obligations as required by the conventions to which they are party.

43 Measures to evaluate the performance of the flag States may include, *inter alia*, port State control detention rates, flag State inspection results, casualty statistics, communication and information processes, annual loss statistics (excluding constructive total losses (CTLs)), and other performance indicators as may be appropriate, to determine whether staffing, resources and administrative procedures are adequate to meet their flag State obligations.

44 Measures may include a regular review of:

.1 fleet loss and accident ratios to identify trends over selected time periods;

.2 the number of verified cases of detained ships in relation to the size of the fleet;

.3 the number of verified cases of incompetence or wrongdoing by individuals holding certificates or endorsements issued under its authority;

.4 responses to port State deficiency reports or interventions;

.5 investigations into serious casualties and lessons learned therefrom;

.6 financial, technical and other resources committed;

.7 results of inspections, surveys and controls of the ships in the fleet;

.8 investigation of occupational accidents;

.9 the number of incidents and violations under MARPOL 73/78, as amended; and

.10 the number of suspensions or withdrawals of certificates, endorsements, approvals, etc.

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* Refer to the Code for the Investigation of Marine Casualties and Incidents, adopted by the Organization by resolution A.849(20), as amended by resolution A.884(21).

PART 3 – COASTAL STATES

Implementation

45 Coastal States have certain rights and obligations under various mandatory IMO instruments. When exercising their rights under the instruments coastal States incur additional obligations.

46 In order to effectively meet their obligations, coastal States should:

.1 implement policies and guidance which will assist in the implementation and enforcement of their obligations; and

.2 assign responsibilities within their Administration to update and revise any relevant policies adopted, as necessary.

Enforcement

47 Coastal States should take all necessary measures to ensure their observance of international rules when exercising their rights and fulfilling their obligations.

48 A coastal State should consider developing and implementing a control and monitoring programme, as appropriate, in order to:

.1 provide for the allocation of statistical data so that trend analyses can be conducted to identify problem areas;

.2 provide for timely response to pollution incidents in its waters; and

.3 co-operate with flag States and/or port States, as appropriate, in investigations of maritime casualties.

Evaluation and review

49 Coastal States should periodically evaluate their performance in respect of exercising their rights and meeting their obligations under mandatory IMO instruments.

PART 4 – PORT STATES

Implementation

50 Port States have certain rights and obligations under various mandatory IMO instruments. When exercising their rights under the instruments, port States incur additional obligations.

51 Port States can play an integral role in the achievement of maritime safety and environmental protection, including pollution prevention. The role and responsibilities of the port State with respect to maritime safety and environmental protection is derived from a combination of international treaties, conventions, national laws, as well as in some instances, bilateral and multilateral agreements.

Enforcement

52 Port States should take all necessary measures to ensure their observance of international rules when exercising their rights and fulfilling their obligations.

53 Several IMO conventions contain specific provisions that permit port State control.

54 In this respect, SOLAS, as modified by its 1988 Protocol, MARPOL and STCW also contain provisions that obligate port States to treat non-parties to those conventions no more favourably than those who are parties. This means that port States are obliged to impose the conditions of the conventions on parties as well as on non-parties.

55 When exercising their right to carry out port State control, a port State should establish processes to administer a port State control programme consistent with the relevant resolution adopted by the Organization*.

56 Port State control should be carried out only by authorized and qualified port State control officers in accordance with the relevant resolution adopted by the Organization*.

57 Port State control officers and persons assisting them should have no commercial interest, either in the port of inspection or the ships inspected, nor should the port State control officers be employed by or undertake work on behalf of recognized organizations or classification societies.

Evaluation and review

58 Port States should periodically evaluate their performance in respect of exercising their rights and meeting their obligations under mandatory IMO instruments.

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* Resolution A.787(19), as amended by resolution A.882(21) on Procedures for Port State Control.

ANNEX 1

OBLIGATIONS OF CONTRACTING GOVERNMENTS/PARTIES

The following table contains a non-exhaustive list of obligations, including those obligations imposed when a right is exercised.

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
TONNAGE 69		
Art. 1	General obligations under the Convention	
Art. 5(2)	Force majeure	
Art. 8	Issue of a certificate by another Government	
Art. 11	Acceptance of certificates	
Art. 15	Communication of information	
LL 66		
Art. 1	General obligations under the Convention	Also in LL PROT 88 (Art. I)
Art. 7(2)	Force majeure	"
Art. 17	Issue or endorsement of certificates by another Government	LL PROT 88
Art. 20	Acceptance of certificates	"
Art. 26	Communication of information	Also in LL PROT 88 (Art. III)
COLREG 72		
Art. I	General obligations	
STCW 78		
Art. I	General obligations under the Convention	
Art. IV	Communication of information	

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
Art. XI(1)	Promotion of technical co-operation	
Reg. I/3	Principles governing near-coastal waters	
Reg. I/5	National provisions	
Reg. I/6	Training and assessment	
Reg. I/7	Communication of information	
Reg. I/8	Quality standards	
Reg. I/9	Medical standards – Issue and registration of certificates	
SOLAS 74		
Art. I	General obligations under the Convention	In SOLAS PROT 78 and SOLAS PROT 88
Art. III	Communication of information	In SOLAS PROT 78 and SOLAS PROT 88
Art. V(c)	Carriage of persons in emergencies – reporting	
Art. VII	Special rules drawn up by agreement	
Art. XI	Denunciation	In PROT 88
Reg. I/13	Issue or endorsement of certificates by another Government	In PROT 88
Reg. I/17	Acceptance of certificates	Also reg. I/19(b)
Reg. I/21(b)	Casualties – reporting	
Reg. IV/5	Provision of radiocommunication services and communication of information on such provision	
Reg. IV/5-1	Global Maritime Distress and Safety System Identities – ensuring suitable arrangements	
Reg. V/4	Navigational warnings	
Reg. V/5	Meteorological services and warnings	
Reg. V/6	Ice Patrol service	

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
Reg. V/9	Hydrographic services	
Reg. V/10	Ships' routeing	
Reg. V/11	Ship reporting systems	
Reg. V/12	Vessel traffic services	in force 1.7.06
Reg. V/13	Establishment and operation of aids to navigation	
Reg. V/31.2	Danger messages – bring to the knowledge of those concerned and communicated to other interested Governments	
Reg. V/33.1-1	Distress situations: obligations and procedures – co-ordination and co-operation	
Reg. VI/1.2	Appropriate information on safe carriage of cargoes	
Reg. VII/2.4	Issue instructions on emergency response, etc.	
Reg. VII/7-1	Issue instructions on emergency response, etc.	
MARPOL		
Art. 1	General obligations under the Convention	And Art. I of PROT 78
Art. 4(2) and (4)	Violation	
Art. 5(1)	Certificates and special rules on inspection of ships – acceptance of certificates	
Art. 5(4)	Certificates and special rules on inspection of ships – no more favourable treatment	
Art. 6(1)	Detection of violations and enforcement of the Convention – co-operation	
Art. 6(3)	Detection of violations and enforcement of the Convention – furnishing evidence	
Art. 7	Undue delay to ships	
Art. 8	Reports on incidents involving harmful substances	

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
Art. 11	Communication of information	
Art. 12(2)	Casualties to ships – information to IMO	
Art. 17	Promotion of technical co-operation	
Annex I		
Reg. 6	Issue or endorsement of a certificate by another Government	
Reg. 9(3)	Control of discharge of oil – investigations	
Reg. 10(6)	Methods for the prevention of oil pollution from ships while operating in special areas – investigations	
Annex II		
Reg. 3(4)	Categorization and listing of noxious liquid substances – establish and agree on provisional assessment and notify IMO	
Reg. 5(13)(a)	Discharge of noxious liquid substances – agree and notify IMO	
Reg. 8	Measures of control	
Reg. 11(3)	Issue or endorsement of a certificate by another Government	
Annex III		
Reg. 1(3)	Application – issue detailed requirements	
Annex IV		
Reg. 6	Issue or endorsement of a certificate by another Government	
Annex VI		
Reg. 7	Issue or endorsement of a certificate by another Government	
Reg. 11(1)	Detection of violations and enforcement – co-operation	
Reg. 11(2)	Detection of violations and enforcement – inspections	

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
Reg. 11(3)	Detection of violations and enforcement – information to flag State on violations detected	
Reg. 18(7)	Fuel oil quality	
ISM Code		
Para 14.3	Extension of validity of Interim SMC by another Contracting Government	
1994 HSC Code		
Para 1.8.2	Issue of certificates by another Government	
Para 14.2.1.12	Definition of "sea area A1"	
Para 14.2.9.13	Definition of "sea area A2"	
2000 HSC Code		
Para 1.8.2	Issue of certificates by another Government	
Para 14.2.1.13	Definition of "sea area A1"	As may be defined
Para 14.2.1.14	Definition of "sea area A2"	As may be defined
IMDG Code		
Section 1.1.3	Transport of radioactive material – role of Competent Authority	
Section 5.1.5	General provisions for class 7 – role of Competent Authority	
Chapter 6.2	Approval of pressure receptacles, aerosol dispensers and small receptacles containing gas – role of Competent Authority	
Chapter 6.4	Approval of package design and materials for class 7 – role of Competent Authority	
Section 6.5.1.6	Testing, certification and inspection – role of Competent Authority	

Obligations of Contracting Governments/Parties		
Source	**Summary description**	**Comments**
Chapter 6.6	Provisions for the construction and testing of large packagings – role of Competent Authority	
Chapter 6.7	Provisions for the design, construction, inspection and testing of portable tanks and multiple-element gas containers – role of Competent Authority	
Chapter 6.8	Provisions for road tank vehicles – role of Competent Authority	
Section 7.1.14	Stowage of goods of class 7 – role of Competent Authority	
Chapter 7.9	Exemptions, approvals and certificates – notification to IMO and recognition of approvals and certificates	
IBC Code		
Para 1.5.5.1	Issue or endorsement of International Certificate of Fitness by another Government	
BCH Code		
Para 1.6.4.1	Issue or endorsement of certificate by another Government	
IGC Code		
Para 1.5.5.1	Issue or endorsement of certificate by another Government	
STCW Code, Part A		
Section A-I/6.1	Training and assessment	
Section A-I/6.3	Qualifications of instructors, supervisors and assessors	
Section A-I/6.7	Training and assessment within an institution	
Section A-I/7	Communication of information	
Section A-I/8	Quality standards	
Section A-I/12	Standards governing the use of simulators	
Section A.VIII/2.8	Watchkeeping at sea – direct attention of companies, masters, chief engineer officers and watchkeeping personnel to observe principles in Parts 3-1 and 3-2	

ANNEX 2

SPECIFIC FLAG STATE OBLIGATIONS

The following tables contain a non-exhaustive list of obligations, including those obligations imposed when a right is exercised.

Specific flag State obligations		
Source	**Summary description**	**Comments**
TONNAGE 69		
Art. 6	Determination of tonnages	
Art. 7(2)	Issue of certificates	
Annex I, reg. 1(3)	Novel types of craft – determination of tonnage and communication to IMO on method used	
Annex I, reg. 5(3)(b)	Change of net tonnage – Alterations or modifications deemed by the Administration to be of a major character	
Annex I, reg. 7	Measurement and calculation	
LL 66		
Art. 6(3)	Exemptions – reporting	LL PROT 88
Art. 8(2)	Equivalents – reporting	"
Art. 9(2)	Approvals for experimental purposes – reporting	"
Art. 13	Surveys and marking	"
Art. 14	Initial, renewal and annual survey	LL PROT 88
Art. 16(3)	Issue of certificates	"
Art. 23	Casualties	"
Annex I, reg. 1	Strength of hull	"
	Strength and intact stability of ships	LL PROT 88
Annex I, reg. 2	Application – Assignment of freeboard	"

Specific flag State obligations		
Source	**Summary description**	**Comments**
Annex I, reg. 2-1	Authorization of recognized organizations	LL PROT 88 only
Annex I, reg. 8	Details of marking	"
Annex I, reg. 10	Stability information – approval	LL PROT 88
Annex I, reg. 12	Doors	
Annex I, reg. 13	Position of hatchways, doorways and ventilators	
Annex I, reg. 14	Cargo and other hatchways	
Annex I, reg. 14-1(2)	Hatchway coamings – reduced heights	LL PROT 88 only
Annex I, reg. 15	Hatchways closed by portable covers and secured weathertight by tarpaulins and battering devices	
Annex I, reg. 16(6)	Securing arrangements	LL PROT 88
Annex I, reg. 17	Machinery space openings	
Annex I, reg. 19	Ventilators	
Annex I, reg. 20	Air pipes	
Annex I, reg. 21(5)	Cargo ports and other similar openings – applicable national standards	LL PROT 88
Annex I, reg. 22	Scuppers, inlets and discharges	
Annex I, reg. 25	Protection of the crew	
Annex I, reg. 27(13)(f)	Conditions of equilibrium – stability sufficient during intermediate stages of flooding	LL PROT 88
Annex I, reg. 28(1)	Ships above 365 m in length	"
Annex I, reg. 39	Minimum bow height and reserve buoyancy	
Annex I, reg. 44(6)	Lashing system	LL PROT 88

Specific flag State obligations		
Source	**Summary description**	**Comments**
COLREG 72		
Annex I, paragraph 14	Approval of construction of lights and shapes and the installation of lights on board	
Annex III, paragraph 3	Approval of construction, performance and installation of sound signal appliances on board	
STCW 78		
Art. VI	Certificates	
Art. VIII(3)	Dispensation – reporting	
Art. IX(2)	Equivalents – reporting	
Reg. I/2	Certificates and endorsements	
Reg. I/10	Recognition of certificates	
Reg. I/11(5)	Revalidation of certificates	
Reg. I/14	Responsibilities of companies	
Reg. IV/1.3	Application	
Reg. V/1.4	Mandatory minimum requirements for the training and qualification of masters, officers and ratings on tankers	
Reg. V/2.9	Mandatory minimum requirements for the training and qualification of masters, officers, ratings and other personnel on ro-ro passenger ships	
Reg. V/3.9	Mandatory minimum requirements for the training and qualification of masters, officers, ratings and other personnel on passenger ships other than ro-ro passenger ships	
Reg. VIII/1	Fitness for duty	
Reg. VIII/2	Watchkeeping arrangements and principles to be observed	

Specific flag State obligations		
Source	**Summary description**	**Comments**
SOLAS 74		
Reg. I/4(b)	Exemptions – reporting	
Reg. I/5(b)	Equivalents – reporting	
Reg. I/6	Inspection and survey	Also in PROT 78 and 88
Reg. I/7	Survey of passenger ships	In PROT 88
Reg. I/8	Survey of life-saving appliances and other equipment of cargo ships	In PROT 88
Reg. I/9	Survey of radio installations of cargo ships	In PROT 88
Reg. I/10	Survey of structure, machinery and equipment of cargo ships	In PROT 88
Reg. I/12	Issue of certificates	In SOLAS 74
	Issue and endorsement of certificates	In PROT 88
Reg. I/14	Duration and validity of certificates	In PROT 88
Reg. I/15	Forms of certificates and records of equipment	In PROT 88
Reg. I/18	Qualification of certificates	
Reg. I/21	Casualties	
Reg. II-1/1.2	Compliance with earlier requirements	Revised chapter II-I to be adopted by MSC 80
Reg. II-1/3-2.2	Approval of corrosion prevention systems of seawater ballast tanks	
Reg. II-1/3-3.2	Approval of means of access to tanker bows	Only for tankers constructed before July 2002
Reg. II-1/3-4.3	Approval of emergency towing arrangements on tankers	
Reg. II-1/3-6.2.3	Means of access to cargo and other spaces – satisfaction of the Administration as well as survey	
Reg. II-1/3-6.4.1	Approval of ship structure access manual	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. II-1/9.1	Ballasting of passenger ships	
Reg. II-1/12.1.2	Approval of double bottoms in passenger ships	
Reg. II-1/14.1	Construction and initial testing of watertight bulkheads, etc. in passenger ships and cargo ships	
Reg. II-1/17.2 and .9.4	Openings in the shell plating of passenger ships below the margin line	
Reg. II-1/18.1.1	Construction and initial tests of watertight doors, sidescuttles, etc. in passenger ships and cargo ships	
Reg. II-1/19.1	Construction and initial tests of watertight decks, trunks, etc., in passenger ships and cargo ships	
Reg. II-1/25-1.3	Alternative arrangements – information to IMO	
Reg. II-1/26.2	Consideration of reliability of single essential propulsion components	
Reg. II-1/29.1, .2.1 and .6.3	Steering gear	
Reg. II-1/29.17.2	Adoption of requirements on rudder actuators for tankers, chemical tankers and gas carriers	
Reg. II-1/40.2	Electrical installations – ensuring uniformity	
Reg. II-1/42.1.3	Emergency source of electrical power in passenger ships	
Reg. II-1/43.1.3	Emergency source of electrical power in cargo ships	
Reg. II-1/44.2	Approval of automatically starting emergency generating set	
Reg. II-1/45.5.3	Approval of cabling and wiring on ro-ro passenger ships	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. II-1/45.3.3, 45.5.4, 45.9.3, 45.10, and 45.11	Precautions against shock, fire and other hazards of electrical origin – satisfaction of the Administration	in force 1.7.06
Reg. II-1/46.2 and .3	Additional requirements for periodically unattended machinery space	
Reg. II-1/53.1	Special requirements for machinery, boiler and electrical installations	
Reg. II-2/12.1	Approval of fire protection arrangements in existing ships	
Reg. II-2/1.6.2.1.2 and 1.6.6	Application of requirements for tankers	
Reg. II-2/4.2.2.5.1	Approval of material for oil fuel pipes and their valves and fittings	
Reg. II-2/4.3	Approval of gaseous fuel systems used for domestic purposes	
Reg. II-2/4.5.1.4.4	Installation of cargo oil lines where cargo wing tanks are provided	
Reg. II-2/4.5.3.3	Require establishment of safety devices in venting systems	
Reg. II-2/4.5.5.2.1	Establishment of requirements for inert gas system on chemical tankers	
Reg. II-2/4.5.6.3	Arrangements for purging and/or gas-freeing	see para. 5.5.3.1
Reg. II-2/5.2.2.5	Positioning of controls for any required fire-extinguishing system	see reg. 8.3.3 and reg. 9.5.2.3
Reg. II-2/5.2.3.1	Special consideration to maintaining the fire integrity of periodically unattended machinery spaces	
Reg. II-2/7.3.2	Initial and periodical tests	
Reg. II-2/7.6	Protection of cargo spaces in passenger ships	
Reg. II/8.3.4	Release of smoke from machinery spaces	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. II-2/9.2.2.1.5.1	Approval of equivalent means of controlling and limiting a fire on ships designed for special purposes	
Reg. II-2/9.2.2.3.1	Fire integrity of bulkheads and decks in ships carrying more than 36 passengers	
Reg. II-2/9.2.2.4.4 and 9.2.3.3.4	Fire integrity of bulkheads and decks	see reg. 11.2
Reg. II-2/9.3.4	Approval of structural fire protection details, taking into account the risk of heat transmission	
Reg. II-9.5.2.4	Protection of openings in machinery space boundaries	
Reg. II-2/10.2.1.2.1.3	Provisions for fixed water fire-extinguishing arrangements for periodically unattended machinery spaces	
Reg. II-2/ 10.2.1.2.2.2.1	Ready availability of water supply	
Reg. II-2/10.2.3.1.1	Approval of non-perishable material for fire hoses	
Reg. II-2/10.2.3.2.1	Provisions of number and diameter of fire hoses	
Reg. II-2/10.3.2.1	Arrangement of fire extinguishers	
Reg. II-2/10.6.1.1	Type approval of automatic sprinkler, fire detection and fire alarm system	
Reg. II-2/10.6.3.2	Approval of fire-extinguishing arrangements for flammable liquid lockers	
Reg. II-2/10.7.1.2	Fixed gas fire-extinguishing systems for general cargo	
Reg. II-2/10.7.1.4	Issue of an Exemption Certificate in case exemption is granted	
Reg. II-2/13.3.1.4	Provision of means of escape from control stations, accommodation spaces and service spaces	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. II-2/13.3.2.5.1	Ensure that lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with FSS	
Reg. II-2/13.3.2.6.2	Normally locked doors that form part of an escape route	
Reg. II-2/13.5.1	Means of escape on passenger ships from special category and open ro-ro spaces to which any passengers carried can have access	
Reg. II-2/17.4.1 and 17.6	Evaluation and approval of engineering analysis of alternative design and arrangements	
Reg. II-2/17.5	Alternative design and arrangements – communication of information	
Reg. II-2/19.4	Provision of document of compliance	
Reg. II-2/20.4.1	Provision and approval of fixed fire detection and fire alarm systems	
Reg. III/4	Approval of life-saving appliances	
Reg. III/5	Requirements for production tests for LSA	
Reg. III/20.8.5	Extension of liferaft service intervals – notification	
Reg. III/20.11.1 and 20.11.2	Periodic servicing of launching appliances and on-load release gear – thorough examination at the annual surveys	in force 1.7.06
Reg. III/26.2.4	Approval of liferafts – ro-ro passenger ships	
Reg. III/26.3.1 and 26.3.2	Approval of fast rescue boats and their launching appliances on ro-ro passenger ships	
Reg. III/28	Approval of helicopter landing and pick-up areas on ro-ro passenger ships	
Reg. IV/3.3	Exemptions – reporting	
Reg. IV/14.1	Type approval	
Reg. IV/15.5	Ensure equipment is maintained	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. IV/16.1	Radio personnel	
Reg.IV/17	Radio records	
Reg. V/3.3	Exemptions and equivalents – reporting to the Organization	
Reg. V/14	Ships' manning	
Reg. V/16	Maintenance of equipment	
Reg. V/17	Electromagnetic compatibility	
Reg. V/18.1	Type approval	
Reg. V/18.2	Require quality control system at manufacturer	
Reg. V/23.3.3.1.3	Pilot transfer arrangements	
Reg. V/23.6.1	Type approval of mechanical pilot hoists	
Reg. VI/3.1 and 3.2	Provision of equipment for oxygen analysis and gas detection and training of crews in their use	
Reg. VI/5.6	Approval of cargo securing manual	
Reg. VI/6	Acceptability for shipment	
Reg. VI/9.2	Grain loading information	
Reg. VII/5	Approval of cargo securing manual	
Reg. VII/15.2	Warships – INF cargo	
Reg. VIII/4	Approval of design, construction and standards of inspection and assembly of reactor installations	
Reg. VIII/6	Ensure radiation safety	
Reg. VIII/7(a)	Approval of safety assessment	
Reg. VIII/8	Approval of operating manual	
Reg. VIII/10(f)	Issue of certificates	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. IX/4.1	Issue of Document of Compliance (DOC)	
Reg. IX/4.3	Issue of Safety Management Certificate (SMC)	
Reg. IX/6.1	Periodical verification	in force 1.7.06
Reg. XI-1/1	Authorization of recognized organizations	
Reg. XI-1/2	Enhanced surveys	
Reg. XI-1/3.5.4	Approval of method of marking	
Reg. XI-1/5.3	Issue continuous synopsis record (CSR)	
Reg. XI-1/5.4.2	Amendments to CSR	
Reg. XI-1/5.4.3	Authorize and require changes to be made to CSR	
Reg. XI-1/5.8	Former flag State to send CSR to new flag State	
Reg. XI-1/5.9	Append previous CSR to new CSR	Completely revised chapter XII adopted by MSC 79 to enter into force on 7 July 2006
Reg. XII/8.1	Endorse booklet required by reg. VI/7.2	
Reg. XII/9.2	Approval of bilge well high water level alarms	in force 1.7.06
Reg. XII/11.3	Loading instrument – approval of software for stability calculations	
MARPOL		
Art. 4(1) and (3)	Violation	
Art. 6(4)	Detection of violations and enforcement of the Convention – investigations	
Art. 12(1)	Casualties to ships – investigations	
Annex I		
Reg. 2(4)(c)	Exemptions – reporting	
Reg. 3(2)	Equivalents – reporting	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. 4	Surveys	
Reg. 5	Issue or endorsement of certificate	
Reg. 8(9)(c)	Transfer of flag	
Reg. 9(2)	Control of discharge of oil – ships with GT less than 400 other than oil tankers	
Reg. 10(8)(b)	Methods for the prevention of oil pollution from ships while operating in special areas – Antarctic area	
Reg. 11(c)	Exceptions – discharge of substances containing oil for the purpose of combating pollution incidents	
Reg. 12(5)	Notification on alleged inadequacies of port reception facilities	
Reg. 13(6)	Crude Oil Washing	
Reg. 13A(2) and (3)	Requirements for oil tankers with dedicated clean ballast tanks – establishment and approval of arrangements	
Reg. 13B(2)	Requirements for crude oil washing – establishment of requirements	
Reg. 13B(5)	COW – Operations and Equipment Manual	
Reg. 13C(2)(b)	Existing tankers engaged in specific trades – agreement with port States	
Reg. 13D(1)(a)	Existing oil tankers having special ballast arrangements – approval	
Reg. 13D(1)(b)	Existing oil tankers having special ballast arrangements – agreement with port States	
Reg. 13D(3)	Existing oil tankers having special ballast arrangements – communication to IMO	
Reg. 13G(8)(a)	Prevention of accidental oil pollution – Measures for existing oil tankers – communication to IMO	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. 13H(8)(a)	Prevention of oil pollution from oil tankers carrying heavy grades of oil as cargo – communication to IMO	
Reg. 15(2)(a)	Retention of oil on board – approval of slop tanks	
Reg. 15(3)	Retention of oil on board – approval	
Reg. 16(3)(b)	Oil discharge monitoring and control system and oil filtering equipment – ships of less than 400 tons gross tonnage	
Reg. 16(4) and (5)	Oil discharge monitoring and control system and oil filtering equipment – approval	
Reg. 18(6)(e)(ii)	Pumping, piping and discharge arrangements of oil tankers – establishment of requirements	
Reg. 20(7)	Oil record book – for ships with GT less than 150 operating in accordance with reg. 15(4)	
Reg. 21(b)	Special requirements for drilling rigs and other platforms – approval of record of operation	
Reg. 23(5)	Hypothetical outflow of oil – information to IMO on accepted arrangements	
Reg. 25(3)(d)	Subdivision and stability – sufficient stability during flooding	
Reg. 25A(4)	Intact stability – approval of written procedures for liquid transfer operations	
Reg. 26(1)	Shipboard oil pollution emergency plan – approval	
Annex II		
Reg. 2(6)	Application – communication to IMO on alternatives	
Reg. 2(7)(b)	Application – communication to IMO on relaxations	
Reg. 3(4)	Establishment of Tripartite Agreements – Notification to IMO	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. 5(2)(b) and (3)(b)	Discharge of noxious liquid substances – approval of procedures and arrangements	
Reg. 5(8)(a)	Discharge of noxious liquid substances of Category B – in special areas – approval of pre-wash procedures	
Reg. 5(8)(c)	Discharge of noxious liquid substances of Category B – in special areas – approval of procedures and washings	
Reg. 5(9)(b)	Discharge of noxious liquid substances of Category C – approval of procedures and arrangements	
Reg. 5A(5)	Pumping, piping and unloading arrangements – approval of pumping conditions – approval of pumping efficiency tests	
Reg. 5A(6)(b)(iv)	Pumping, piping and unloading arrangements – communication of information to IMO on exemptions	
Reg. 5A(7)(e)	Pumping, piping and unloading arrangements – communication to IMO on exemptions	
Reg. 6(c)	Exceptions – discharge of NLS for the purpose of combating pollution incidents	
Reg. 7(4)	Notification on alleged inadequacies of port reception facilities	
Reg. 10	Surveys	
Reg. 11	Issue or endorsement of certificates	
Reg. 12(9)(c)	Transfer of flag	
Reg. 13(4)	Requirements for minimizing accidental pollution – ships other than chemical tankers carrying noxious liquid substances of Category A, B or C in bulk	
Reg. 14(d)	Carriage and discharge of oil-like substances – approval of oil content meter	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. 16(1)	Shipboard marine pollution emergency plan for NLS – approval	
Annex IV		
Reg. 4	Surveys	
Reg. 5	Issue or endorsement of certificates	
Reg. 8(8)(2)	Transfer of flag	
Reg. 9	Approval of sewage systems	
Reg. 12(2)	Notification on alleged inadequacies of port reception facilities	
Annex V		
Reg. 5(5)(b)	Disposal of garbage within special areas – Antarctic area	
Reg. 7(2)	Notification on alleged inadequacies of port reception facilities	
Annex VI		
Reg. 4(2)	Equivalents – communication to IMO	
Reg. 5(3)	Surveys	
Reg. 5(5)	Surveys – unscheduled inspections	
Reg. 6	Issue of International Air Pollution Certificate	
Reg. 9(4)(c)	Transfer of flag	
Reg. 11	Detection of violations and enforcement – investigations	
Reg. 13(1)(b)(ii)	Nitrogen oxides – alternative control measures	
Reg. 13(2)(b)	Nitrogen oxides – approval of documentation	
Reg. 13(3)(b)	Nitrogen oxides – approvals of exhaust gas cleaning systems or equivalent methods	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Reg. 14(4)(b) and (c)	Sulphur oxides – approvals of exhaust gas cleaning systems or alternatives	
Reg. 14(6)	Sulphur oxides – prescription of log-book	
Reg. 15(5)	Volatile organic compounds – approval of vapour collection systems	
Reg. 16(2)(a)	Shipboard incineration – approvals	
Reg. 17(2)	Notification on alleged inadequacies of port reception facilities	
Res.MSC.133(76)		From 1.1.06 replaced by res. MSC.158(78)
Para 3.7	Vertical or spiral ladders – acceptance	Also in res. MSC.158(78)
Para 3.9.7	Other means of access – approval and acceptance	Also in res. MSC.158(78)
Res. A.739(18)		
Para 2	Assignment of authority	
Para 3	Verification and monitoring	
ISM Code		
Para 13.2	Issue of DOC	
Para 13.4	Annual verification (DOC)	
Para 13.5	Withdrawal of DOC	
Para 13.7	Issue of SMC	
Para 13.8	Intermediate verification (SMC)	
Para 13.9	Withdrawal of SMC	
Para 14.1	Issue of Interim DOC	
Para 14.2	Issue of Interim SMC	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 14.4	Verification required for issuance of an Interim SMC	
Para 15.1	Verification – acceptance of procedures	
Para 16	Forms of certificates	
INF Code		
Para 1.3.2	Issue of certificate	
Para 2.1	Damage stability (INF.1 ship)	
Para 3.1	Fire safety measures (INF.1 cargo)	
Para 4.1.3	Temperature control of cargo spaces (INF.1, 2 and 3 ship)	
Para 6.2	Safe stowage and securing – approval of principles	
Para 7.1	Electrical power supplies (INF.1 ship)	
Chapter 8	Radiological protection	
Chapter 9	Management and training	
Para 10.2	Shipboard emergency plan – approval	
FSS Code		
Para 1/4	Use of toxic extinguishing media	
Para 4/2	Type approval of fire extinguishers	
Para 4/3.1.1.2	Determine equivalents of fire extinguishers	
Para 5/2.1.1.4	Containers for the storage of fire-extinguishing medium, etc.	
Para 5/2.1.2.3	Spare parts	
Para 5/2.3	Steam systems	
Para 5/2.5	Equivalent systems – approval	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 6/2.2.1.1 and 6/2.3.1.1	Foam concentrates – approval	
Para 7/2.1.1.1	Type approval of spraying nozzles	
Para 7/2.1.1.2	Number and arrangement of nozzles	
Para 7/2.2	Equivalent systems – approval	
Para 8/2.1.2	Equivalent sprinkler systems – approval	
Para 9/2.3.1.3	Heat detectors temperature limits	
Para 9/2.4.1.3	Limiting the number of enclosed spaces included in each section	
Para 10/2.1.2	Sequential scanning – overall response time	
Para 10/2.2.2	Extractor fans – overall response time	
Para 10/2.3.1.1	Means to isolate smoke accumulators	
Para 11/2.1	Low-location lighting – approval	
Para 14/2.2.1.2	Medium expansion ratio foam – application rate, etc.	
Para 15/2.1.2	Inert gas systems – approval	
Para 15/2.2.4.6	Adequate reserve of water	
FTP Code		
Para 4.2.1	Recognition of testing laboratories	
Para 5.1.1	Approval procedures	
Para 5.2.2	Requirement of manufactures' quality control system audit	
Para 7.2	Use of equivalents and modern technology – information to IMO	

Specific flag State obligations		
Source	**Summary description**	**Comments**
LSA Code		
Para 1.2.3	Determine the period of acceptability of LSAs subject to deterioration with age	
Para 4.4.1.2	Endorsement of lifeboat certificate of approval	
Para 4.5.4	Fixed two-way VHF radiotelephone apparatus – sheltered space	
Para 5.1.1.4	Rescue boats – combination of rigid and inflatable construction	
Para 5.1.3.8	Rubbing strips on inflated rescue boats	
Paras 6.1.2.9 and 6.1.2.10	Lowering speed of a fully equipped liferaft	
Para 6.2.1.2	MES – strength and construction of passage and platform	
Para 7.2.2.1	Broadcast of messages from other places on board	
CSS Code		
Para 1.6.2	Cargo securing arrangements	
Para 3.1.2	Standardized stowage and securing systems	
1994 HSC Code		
Para 1.3.5	Verification	
Para 1.4.29	Determination of “maximum operational weight”	
Para 1.5.1.2	Specifying intervals for renewal surveys	
Para 1.5.4	Inspection and survey	
Para 1.5.5	Recognized organizations and nominated surveyors	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 1.5.7	Completeness of survey and inspection	
Para 1.8.1	Issue / endorsement of certificate	
Para 1.9.2	Issue of permit to operate	
Para 1.11.2	Equivalents – reporting	
Para 1.12.1	Adequate information and guidance provided to the craft by the company	
Para 1.13.3	Novel designs	
Para 1.14.1	Investigation reports to IMO	
Paras 2.7.4 and 2.14.2	Inclining and stability information – approval	
Para 3.4	Determination of service life	
Para 3.5	Design criteria	
Para 4.8.3	Documentation and verification of evacuation time	
Para 7.5.6.3	Safe outlets for exhaust fans in fuel tank spaces	
Para 7.7.2.3.2	Sensitivity limits of smoke detectors	
Para 7.7.6.1.5	Additional quantity of fire-extinguishing medium	
Para 7.7.6.1.12	Containers for the storage of fire-extinguishing medium, etc. – design	
Para 7.7.8.5	Maximum length of fire hoses	
Para 8.1	Approval and acceptance of LSA and arrangements	
Para 10.2.4.9	Flexible oil fuel pipes	
Para 10.3.7	Internal diameters of suction branches	
Para 12.6.2	Specified voltages to earth	
Para 13.1.2	Navigational equipment and its installation	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 13.13	Approval of systems, equipment and performance standards	
Para 14.3.3	Exemptions – reporting	
Para 14.13.1	Type approval	
Para 14.14.5	Ensuring maintenance	
Para 14.15	Radio personnel	
Para 14.16	Radio records	
Para 15.3.1	Operating station – field of vision	
Para 15.7.2	Ensuring clear view through windows	
Para 17.8	Acceleration and deceleration	
Para 18.1.4	Determining maximum allowable distance from a base port or place of refuge	
Para 18.2	Craft documentation	
Paras 18.3.1 to 18.3.7	Training and qualifications	
Chapter 19	Inspection and maintenance requirements	
2000 HSC Code		
Para 1.3.7	Verification	
Para 1.4.36	Determination of “maximum operational weight”	
Para 1.5.1.2	Specifying intervals for renewal surveys	
Para 1.5.4	Inspection and survey	
Para 1.5.5	Recognized organizations and nominated surveyors	
Para 1.5.7	Completeness of survey and inspection	
Para 1.8.1	Issue/endorsement of certificate	
Para 1.9.2	Issue of permit to operate	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 1.11.2	Equivalents – reporting	
Para 1.12.1	Adequate information and guidance provided to the craft by the company	
Para 1.13.3	Novel designs	
Para 1.14.1	Investigation reports to IMO	
Para 2.9.3	Verification of load line marks	
Paras 2.7.4 and 2.14.2	Inclining and stability information – approval	
Para 3.4	Determination of service life	
Para 3.5	Design criteria	
Para 4.2.2	Approval of public address	
Para 4.8.3	Documentation and verification of evacuation time	
Para 7.3.2	Approval of structural fire protection details	
Para 7.5.6.3	Safe outlets for exhaust fans in fuel tank spaces	
Para 7.7.1.1.8	Limitation of number of enclosed spaces in each section	
Para 7.7.1.3.2	Sensitivity limits of smoke detectors	
Para 7.7.3.2.6	Additional quantity of fire-extinguishing medium	
Para 7.7.5.5	Maximum length of fire hoses	
Para 7.17.1	Reduced requirements for cargo craft of less than 500 GT	
Para 7.17.3.3	Smoke detection systems – equivalent protection	
Para 7.17.4	Issue of Document of Compliance for craft carrying dangerous goods	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 8.1	Approval and acceptance of LSA and arrangements	
Para 8.9.8	Rotational deployment of marine evacuation systems	
Para 8.9.11	Extension of liferaft service intervals – notification	
Para 8.11	Helicopter pick-up areas – approval	
Para 10.2.4.9	Flexible oil fuel pipes	
Para 10.3.7	Internal diameters of suction branches	
Para 12.6.2	Specified voltages to earth	
Para 13.1.2	Ship borne navigational system and equipment and voyage data recorder and their installation	
Para 13.17	Type approval	
Para 14.3.3	Exemptions – reporting	
Para 14.4.2	GMDSS Identities – suitable arrangements	
Para 14.14.1	Type approval	
Para 14.15.5	Ensuring maintenance	
Para 14.16	Radio personnel	
Para 14.17	Radio records	
Para 15.3.1	Operating station – field of vision	
Para 15.7.2	Ensuring clear view through windows	
Para 17.8	Acceleration and deceleration	
Para 18.1.4	Determining maximum allowable distance from a base port or place of refuge	
Para 18.2	Craft documentation	
Paras 18.3.1 to 18.3.7	Training and qualifications	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Chapter 19	Inspection and maintenance requirements	
Res. A.744(18), as amended		
Annex A – Bulk carriers		
Para 1.3.1	Repair of damages affecting the ship's structural, watertight or weathertight integrity	
Para 1.3.2	Corrosion or structural defects impairing the ship's fitness	
Para 3.3.4	Repairs of cargo hatch securing system	
Para 5.1.1	Survey programme	
Para 5.1.4	Maximum acceptable structural corrosion diminution levels	
Para 5.2.1.1	Provisions for proper and safe access	
Para 6.2.2	Survey report file	
Para 8.1.2	Evaluation of survey report	
Para 8.2.3	Condition evaluation report	
Annex 4B, para 1	Survey planning questionnaire	
Annex 5, para 3.1	Certification of thickness measurement	
Annex 9, para 2.3	Technical assessment in conjunction with the planning of enhanced surveys for bulk carriers	
Annex 13, para 3	Cargo hatch cover securing arrangements	
Annex B – Oil tankers		
Part A – Double hull oil tankers		
Para 1.3.1	Repair of damages affecting the ship's structural, watertight or weathertight integrity	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 1.3.2	Corrosion or structural defects impairing the ship's fitness	
Para 2.4.3.2	Approval of corrosion prevention system	
Para 5.1.1	Survey programme	
Para 5.1.4	Maximum acceptable structural corrosion diminution levels	
Para 5.2.1.1	Provisions for proper and safe access	
Para 6.2.2	Survey report file	
Para 8.1.3	Evaluation of survey report	
Para 8.2.3	Condition evaluation report	
Annex 6B	Survey planning questionnaire	
Annex 7, para 3.1	Certification of thickness measurement	
Annex 9	Diminution limits of structural members	
Annex 11, para 2.3	Technical assessment in conjunction with the planning of enhanced surveys for oil tankers	
Annex 12	Criteria for longitudinal strength of hull girder for oil tankers	
Part B – Oil tankers other than double hull oil tankers		
Para 1.3.1	Repair of damages affecting the ship's structural, watertight or weathertight integrity	
Para 1.3.2	Corrosion or structural defects impairing the ship's fitness	
Para 2.4.3.2	Approval of corrosion prevention system	
Para 5.1.1	Survey programme	
Para 5.1.4	Maximum acceptable structural corrosion diminution levels	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 5.2.1.1	Provisions for proper and safe access	
Para 6.2.2	Survey report file	
Para 8.1.3	Evaluation of survey report	
Para 8.2.3	Condition evaluation report	
Annex 6B	Survey planning questionnaire	
Annex 7, para 3.1	Certification of thickness measurement	
Annex 9	Diminution limits of structural members	
Annex 11, para 2.3	Technical assessment in conjunction with the planning of enhanced surveys for oil tankers	
Annex 12	Criteria for longitudinal strength of hull girder for oil tankers	
Res.4 of the 1997 SOLAS Conference		
Section 5	Dimension and selection of weld connections and materials	
Res. MSC.168(79)		in force 1.7.06
Para 2.1	Applicable national standards	
Para 4.4	Applicable national standards	
Para 4.5	Applicable national standards	
NO_x Technical Code		
Para 1.2.2	Full responsibility	
Chapter 2	Survey and certification	
Para 4.3.5	Review selection of parent engine	
Para 4.3.7	Adequate arrangements to ensure effective control of conformity of production	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 4.3.9.1	Agree and approve method of selection of parent engine	
Para 4.3.10	Certification of an engine family	
Paras 4.4.3 and 4.4.4	Engine group concept – approval	
Para 5.1.7	Auxiliary loss exceeding 5% – approval	
Para 5.3.2	Test fuels	
Para 5.4.2	Other systems or analysers – approval	
Para 5.10.1	File a certified true copy of test report	
Para 5.12.3.3	Other corrective formulae – approval	
Para 6.2.2.2	Adjustments on settings	
Para 6.2.3.2	Approval of documentation on board	
Para 6.2.3.4.2	Engine technical file – approval	
Para 6.3.1.3	Measurement of torque	
Para 6.3.4.2	Test fuels – approval	
Para 6.3.9	Test cycles – approval	
IBC Code		
Para 1.1.3	Prescribe preliminary suitable conditions for carriage of products not listed in chapter 17 or 18	
Para 1.4.2	Equivalents – communication to IMO	
Section 1.5	Survey and certification	
Para 2.2.2	Intact stability in all seagoing conditions	
Para 2.9.2.3	Residual stability during intermediate stages of flooding	
Para 5.1.6.4	Dimensions for flanges not complying with the standards	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 8.3.5	Devices to prevent the passage of flames into cargo tanks – requirements for the design, testing and locating	
Para 10.1.3	Electrical installations – appropriate steps for uniform implementation	
Para 10.1.5	Electrical equipment in hazardous locations	
Para 11.2.2	Approval of an appropriate fire-extinguishing systems	
Paras 11.3.5 and 11.3.7	Minimum capacity of foam monitor for ships less than 4,000 tonnes deadweight	
Para 11.3.13	Alternative provisions to deck foam system	
Chapter 15	Approval of special requirements for specific chemicals	
Para 16.5.1	Stowage of cargo samples – approval	
Para 16A.3.1	Procedures and Arrangements Manual – approval	
Para 19.4.2	Design and construction of incinerators – acceptance of safety standards	
BCH Code		
Para 1.5.2	Equivalents – communication to IMO	
Section 1.6	Survey requirements	
Section 1.8	New products – establishing suitable conditions – notification to IMO	
Para 2.2.4	Determination of the ability to survive flooding of the machinery space in Type 3 below 125m in length	
Para 2.2.5	Nature of alternative measures prescribed for small ships – duly noted on certificate	
Para 2.9.5	Access to void spaces, cargo tanks, etc. – approval of smaller dimensions in special circumstances	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Section 2.10	Cargo piping systems – setting standards	
Section 2.12	Cargo hoses – setting standards	
Para 2.14.2	High-velocity vent valves – type approval	
Para 2.15.1	Cargo heating and cooling systems	
Section 2.17	Structural materials for tank construction, etc.	
Para 3.1.2(f)	Ventilation fans – approval	
Para 3.14.1	Alternative provisions for ships dedicated to the carriage of specific cargoes	
Para 3.14.2	Additional arrangements when foam is not effective or is incompatible	
Para 3.14.7	Foam monitors on ships of less than 4,000 tonnes deadweight – minimum capacity	
Para 3.15.2	Protection of cargo pump-rooms with fire-extinguishing systems – approval	
Para 3.15.5	Products evolving flammable vapours – fire-extinguishing systems – approval	
Chapter IV	Approval of special requirements for specific chemicals	
Para 5A.3.1	Procedures and Arrangements Manual – approval	
IGC Code		
Para 1.1.6	Establishment of preliminary suitable conditions of carriage and notification	
Para 1.4.2	Equivalents – reporting	
Section 1.5	Surveys and certification	
Para 2.2.2	Stability standard – acceptance	
Para 2.2.3	Method to calculate free surface effect – acceptance	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 2.3.3	Automatic nonreturn valves – acceptance	
Para 2.4	Damage survival capability investigation	
Para 2.8.2	Alternative measures – approval	
Para 2.9.1.3	Residual stability during intermediate stages of flooding	
Para 3.5.3.2	Decreased clear opening in the cargo area	
Section 3.8	Bow or stern loading and unloading arrangements – approval	
Para 4.2.7	Design temperature	
Paras 4.4.2.5 and 4.4.4.1	Structural analysis of the hull	
Paras 4.4.6.1.1, 4.4.6.2.1 and 4.4.6.3.2	Setting standards	
Para 4.4.7.2.1	Three-dimensional structural analysis	
Para 4.4.7.3	Analysis	
Para 4.5.1.11	Allowable stresses – approval	
Para 4.7.3	Secondary barriers for non-basic tank types	
Para 4.7.7	Checking method – approval	
Para 4.8.4.4	Design and construction of the heating system	
Para 4.9.8	Insulation materials	
Para 4.10.1.2.2	Bevel preparation, etc. – acceptance and approval	
Para 4.10.2	Workmanship	
Para 4.10.5.2	Quality control specifications	
Para 4.10.6	Integral tank-testing	
Para 4.10.8.3	Tightness test	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 4.10.9	Type C independent tanks – inspection and NDT	
Para 4.10.10.3.7	Consideration of pneumatic testing	
Para 4.11.1	Soaking temperature and holding times	
Para 4.11.2	Alternative to heat treatment – approval	
Paras 5.2.4.4 and 5.2.4.5	Flanges, valves and other fittings	
Para 5.4.2.2	Dimensions	
Para 5.4.2.3	Screwed couplings – acceptance	
Para 5.5.2	Cargo and process piping – alternative testing approval	
Para 6.1.5	Tensile strength, yield stress and elongation	
Para 6.3.7.4	Schedule for inspection and NDT	
Section 7.1	Cargo pressure/temperature control	
Paras 8.2.2, 8.2.5 and 8.2.7	Pressure relief devices	
Para 9.5.2	A means of preventing the backflow of cargo	
Para 10.1.5	Electrical equipment installation	
Para 11.4.1	Dry chemical powder fire-extinguishing system	
Para 11.5.2	Approval of appropriate fire-extinguishing system for cargo compressor and pump-rooms	
Para 13.5.4	Number and position of temperature indicating devices	
Para 13.6.1	Gas detector equipment	
Para 13.6.13	Portable gas detection equipment	
Para 14.4.5	Provision of space to protect personnel	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Section 15.2	Maximum allowable loading limits – approval of list	
Para 16.5.2	Forced draught system for boilers	
Para 16.5.6	Purging of combustion chambers of boilers	
Para 17.14.2.1	Non-acceptance of cargo discharge compressors on board	
Para 17.20.3.1	Valves, flanges, fittings and accessory equipment material – acceptance	
Para 17.20.13.2	Cargo handling plans – approval	
Para 17.20.14	Maximum allowable tank filling limits – approval of list	
STCW Code, Part A		
Section A-I/10.2	Withdrawal of endorsement – information	
Section A-III/4.4	No tables of competence – determine requirements	
Section A-VIII/1.5	Watch schedules to be posted	
Section A-VIII/2.84	Principles to be observed in keeping radio watch – direct attention of companies masters, radio watchkeeping personnel to comply with provisions in Part 3-3 to ensure that and adequate safety radio watch is maintained when the ship is at sea	
CAS (Res. MEPC.94(46), as amended)		
Para 4.1	Issue instructions to RO for CAS survey	
Para 4.3	Require oil tankers to remain out of service until Statement of Compliance is issued	
Para 11	Verification of CAS	

Specific flag State obligations		
Source	**Summary description**	**Comments**
Para 12	Reassessment of ships that have failed	
Para 13	Issue, suspension or withdrawal of Statement of Compliance	
Para 14	Communication to IMO	

ANNEX 3

SPECIFIC COASTAL STATE OBLIGATIONS

The following tables contain a non-exhaustive list of obligations, including those obligations imposed when a right is exercised.

Specific coastal State obligations		
Source	**Summary description**	**Comments**
TONNAGE 69 **LL 66** **COLREG 72** **STCW 78** None		
SOLAS 74		
Reg. V/7.1	Search and rescue services – necessary arrangements	
Reg. V/7.2	Search and rescue services – information to IMO	
Reg. V/8	Life-saving signals	
Reg. VII/6.1/7.4	Report of incidents involving dangerous goods	
MARPOL		
Annex I		
Reg. 11(c)	Exceptions – approval of discharge of substances containing oil for the purpose of combating pollution incidents	
Annex II		
Reg. 6(c)	Exceptions – approval of discharge of NLS for the purpose of combating pollution incidents	

ANNEX 4

SPECIFIC PORT STATE OBLIGATIONS

The following tables contain a non-exhaustive list of obligations, including those obligations imposed when a right is exercised.

Specific port State obligations		
Source	**Summary description**	**Comments**
TONNAGE 69		
Art. 12	Inspection	
LL 66		
Art. 21	Control	
COLREG 72		
STCW 78		
Art. X	Control	
Reg. I/4	Control procedures	
SOLAS 74		
Reg. I/19	Control	
Reg. VII/7-2.2	Documents relating to carriage of dangerous goods in solid form	
Reg. VIII/11	Special control for nuclear ships	
Reg. XI-1/4	Port State control on operational requirements	
MARPOL		
Art. 5(2)	Certificates and special rules on inspection of ships – port State control	
Art. 5(3)	Certificates and special rules on inspection of ships – denial of entry	

Specific port State obligations		
Source	**Summary description**	**Comments**
Art. 6(2)	Detection of violations and enforcement of the Convention – inspection	
Art. 6(5)	Detection of violations and enforcement of the Convention – inspection upon request – reporting	
Annex I		
Reg. 8A	Port State control on operational requirements	
Reg. 10(7)	Reception facilities within special areas	
Reg. 10(8)(a)	Provision of reception facilities – Antarctic area	
Reg. 12(1)-(4)	Reception facilities	
Reg. 13C(2)(b)	Existing tankers engaged in specific trades – agreement with flag States	
Reg. 13C(2)(c)	Existing tankers engaged in specific trades – approval by port State	
Reg. 13D(1)(b)	Existing oil tankers having special ballast arrangements – agreements with flag States	
Reg. 13G(8)(b)	Denial of entry – communication to IMO	
Reg. 13H(8)(b)	Denial of entry – communication to IMO	
Reg. 20(6)	Oil Record Book – Inspection	
Annex II		
Reg. 5A(6)(b)(iii)	Pumping, piping and unloading arrangements – approval of adequacy of reception facilities	
Reg. 7(1)-(3)	Reception facilities and cargo unloading terminal arrangements	
Reg. 9(7)	Cargo record book – inspections	
Reg. 15	Port State control on operational requirements	
Annex III		
Reg. 8	Port State control on operational requirements	

Specific port State obligations		
Source	**Summary description**	**Comments**
Annex IV		
Reg. 12(1)	Provision of reception facilities	
Annex V		
Reg. 5(4)	Reception facilities within special areas	
Reg. 5(5)(a)	Provision of reception facilities – Antarctic area	
Reg. 7(1)	Reception facilities	
Reg. 8	Port State control on operational requirements	
Reg. 9(5)	Inspection of Garbage Record Book	
Annex VI		
Reg. 10	Port State control on operational requirements	
Reg. 14(4)(b)	Discharge criteria – Communication to IMO	
Reg. 15(2) and (3)	Volatile organic compounds – approvals and notification to IMO	
Reg. 17(1)	Reception facilities	
Reg. 18(5)	Fuel oil quality – inspection of bunker delivery notes	
Reg. 18(8)	Fuel oil quality – information and remedial action	
1994 HSC Code		
Para 1.3.5	Acceptance of the Code	
Para 1.5.6	Provide assistance for surveyors	
Para 1.6	Design approval	
Para 1.9.3	Operational conditions – Permit to Operate	
Para 1.9.4	Port State control	
Para 18.3.8	Training and qualifications	

Specific port State obligations		
Source	**Summary description**	**Comments**
2000 HSC Code		
Para 1.3.7	Acceptance of the Code	
Para 1.5.6	Provide assistance for surveyors	
Para 1.6	Design approval	
Para 1.9.3	Operational conditions – Permit to Operate	
Para 1.9.4	Port State control	
Para 18.3.8	Training and qualifications	
Grain Code		
Para 3.4	Document of authorization	
Para 3.5	Document of authorization	
Para 5	Exemptions for certain voyages	
Para 7.2	Stability requirements	

ANNEX 5

INSTRUMENTS MADE MANDATORY UNDER IMO CONVENTIONS

SOLAS 74:	Res. MSC.133(76)	reg. 3-6.2.1
	FSS Code	reg. II-2/3.22
	FTP Code	reg. II-2/3.23
	LSA Code	reg. III/3.10
	CSS Code, sub-chapter 1.9	reg. VI/2.2.1
	Grain Code	reg. VI/8.1
	IMDG Code	reg. VII/1.1
	IBC Code	reg. VII/8.1
	IGC Code	reg. VII/11.1
	INF Code	reg. VII/14.1
	ISM Code	reg. IX/1.1
	1994 HSC Code	reg. X/1.1
	2000 HSC Code	reg. X/1.2
	Res. A.739(18)	reg. XI-1/1
	Res. A.789(19)	reg. XI-1/1
	Res. A.744(18), as amended	reg. XI-1/2
	Res. 4 of the 1997 SOLAS Conf.	reg. XII/1.7
	Res. MSC.169(79)	reg. XII/7.2
	Res. MSC.168(79)	reg. XII/14
MARPOL 73/78	Res. MEPC.94(46), as amended	Annex I, reg. 13G, 13H
	IBC Code	Annex II, reg. 1(10)
	BCH Code	Annex II, reg. 1(11)
	NO_x Technical Code	Annex VI, reg. 2(5)
STCW 78	STCW Code, Part A	reg. I/1.2.3

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ANNEX 10

DRAFT AMENDMENT TO SOLAS REGULATION II-2/9.4.1.3.3

CHAPTER II-2

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 9 – Containment of fire

1 In subparagraph 4.1.3.3.2, "." is replaced by "; or".

2 In paragraph 4.1.3.3, the following new subparagraph .3 is added after the existing subparagraph .2:

".3 water-mist nozzles that have been tested and approved in accordance with the guidelines approved by the Organization*."

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* Refer to the Revised Guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12 (resolution A.800(19)).

ANNEX 11

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

1 The existing text of chapter 5 of the FSS Code is replaced by the following:

"CHAPTER 5 – FIXED GAS FIRE-EXTINGUISHING SYSTEMS

1 Application

This chapter details the specifications for fixed gas fire-extinguishing systems as required by chapter II-2 of the Convention.

2 Engineering specifications

2.1 *General*

2.1.1 Fire-extinguishing medium

2.1.1.1 Where the quantity of the fire-extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected. The system shall be fitted with normally closed control valves arranged to direct the agent into the appropriate space.

2.1.1.2 The volume of starting air receivers, converted to free air volume, shall be added to the gross volume of the machinery space when calculating the necessary quantity of the fire-extinguishing medium. Alternatively, a discharge pipe from the safety valves may be fitted and led directly to the open air.

2.1.1.3 Means shall be provided for the crew to safely check the quantity of the fire-extinguishing medium in the containers.

2.1.1.4 Containers for the storage of fire-extinguishing medium, piping and associated pressure components shall be designed to pressure codes of practice to the satisfaction of the Administration having regard to their locations and maximum ambient temperatures expected in service.*

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* Publication ISO – 9809/1: Refillable seamless steel gas cylinders (design, construction and testing);
ISO – 3500: Seamless steel CO_2 cylinders. For fixed fire-fighting installations on ships, specifying the principal external dimensions, accessories, filling ratio and marking for seamless steel CO_2 cylinders used in fixed fire-fighting installations on ships, in order to facilitate their interchange ability;
ISO – 5923: Fire protection – Fire-extinguishing media – Carbon dioxide;
ISO – 13769: Gas cylinders – Stamp marking;
ISO – 6406: Periodic inspection and testing of seamless steel gas cylinders;
ISO – 9329, part 1: Seamless steel tubes for pressure purposes – Technical delivery conditions – Part 1: Unalloyed steels with specified room temperature properties;
ISO – 9329, part 2: Seamless steel tubes for pressure purposes – Technical delivery conditions – Part 2: Unalloyed and alloyed steels with specified elevated temperature properties;
ISO – 9330, part 1: Welded steel tubes for pressure purposes – Technical delivery conditions – Part 1: Unalloyed steel tubes with specified room temperature properties;
ISO – 9330, part 2: Welded steel tubes for pressure purposes – Technical delivery conditions – Part 2: Electric resistance and induction welded unalloyed and alloyed steel tubes with specified elevated temperature properties.

2.1.2 Installation requirements

2.1.2.1 The piping for the distribution of fire-extinguishing medium shall be arranged and discharge nozzles so positioned that a uniform distribution of the medium is obtained. System flow calculations shall be performed using a calculation technique acceptable to the Administration.

2.1.2.2 Except as otherwise permitted by the Administration, pressure containers required for the storage of fire-extinguishing medium, other than steam, shall be located outside the protected spaces in accordance with regulation II-2/10.4.3 of the Convention.

2.1.2.3 Spare parts for the system shall be stored on board and be to the satisfaction of the Administration.

2.1.2.4 In piping sections where valve arrangements introduce sections of closed piping, such sections shall be fitted with a pressure relief valve and the outlet of the valve shall be led to open deck.

2.1.2.5 All discharge piping, fittings and nozzles in the protected spaces shall be constructed of materials having a melting temperature which exceeds 925°C. The piping and associated equipment shall be adequately supported.

2.1.2.6 A fitting shall be installed in the discharge piping to permit the air testing as required by paragraph 2.2.3.1.

2.1.3 System control requirements

2.1.3.1 The necessary pipes for conveying fire-extinguishing medium into the protected spaces shall be provided with control valves so marked as to indicate clearly the spaces to which the pipes are led. Suitable provisions shall be made to prevent inadvertent release of the medium into the space. Where a cargo space fitted with a gas fire-extinguishing system is used as a passenger space, the gas connection shall be blanked during such use. The pipes may pass through accommodations providing that they are of substantial thickness and that their tightness is verified with a pressure test, after their installation, at a pressure head not less than 5 N/mm^2. In addition, pipes passing through accommodation areas shall be joined only by welding and shall not be fitted with drains or other openings within such spaces. The pipes shall not pass through refrigerated spaces.

2.1.3.2 Means shall be provided for automatically giving audible and visual warning of the release of fire-extinguishing medium into any ro-ro spaces and other spaces in which personnel normally work or to which they have access. The audible alarms shall be located so as to be audible throughout the protected space with all machinery operating, and the alarms should be distinguished from other audible alarms by adjustment of sound pressure or sound patterns. The pre-discharge alarm shall be automatically activated (e.g., by opening of the release cabinet door). The alarm shall operate for the length of time needed to evacuate the space, but in no case less than 20 s before the medium is released. Conventional cargo spaces and small spaces (such as compressor rooms, paint lockers, etc.) with only a local release need not be provided with such an alarm.

2.1.3.3 The means of control of any fixed gas fire-extinguishing system shall be readily accessible, simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

2.1.3.4 Automatic release of fire-extinguishing medium shall not be permitted, except as permitted by the Administration.

2.2 *Carbon dioxide systems*

2.2.1 Quantity of fire-extinguishing medium

2.2.1.1 For cargo spaces the quantity of carbon dioxide available shall, unless otherwise provided, be sufficient to give a minimum volume of free gas equal to 30% of the gross volume of the largest cargo space to be protected in the ship.

2.2.1.2 For machinery spaces the quantity of carbon dioxide carried shall be sufficient to give a minimum volume of free gas equal to the larger of the following volumes, either:

- **.1** 40% of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40% or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing; or

- **.2** 35% of the gross volume of the largest machinery space protected, including the casing.

2.2.1.3 The percentages specified in paragraph 2.2.1.2 above may be reduced to 35% and 30%, respectively, for cargo ships of less than 2,000 gross tonnage where two or more machinery spaces, which are not entirely separate, are considered as forming one space.

2.2.1.4 For the purpose of this paragraph the volume of free carbon dioxide shall be calculated at 0.56 m^3/kg.

2.2.1.5 For machinery spaces, the fixed piping system shall be such that 85% of the gas can be discharged into the space within 2 min.

2.2.2 Controls

2.2.2.1 Carbon dioxide systems shall comply with the following requirements:

- **.1** two separate controls shall be provided for releasing carbon dioxide into a protected space and to ensure the activation of the alarm. One control shall be used for opening the valve of the piping which conveys the gas into the protected space and a second control shall be used to discharge the gas from its storage containers. Positive means shall be provided so they can only be operated in that order; and

.2 the two controls shall be located inside a release box clearly identified for the particular space. If the box containing the controls is to be locked, a key to the box shall be in a break-glass-type enclosure conspicuously located adjacent to the box.

2.2.3 Testing of the installation

When the system has been installed, pressure-tested and inspected, the following shall be carried out:

.1 a test of the free air flow in all pipes and nozzles; and

.2 a functional test of the alarm equipment.

2.2.4 Low-pressure CO_2 system

Where a low pressure CO_2 system is fitted to comply with this regulation, the following applies:

2.2.4.1 The system control devices and the refrigerating plants shall be located within the same room where the pressure vessels are stored.

2.2.4.2 The rated amount of liquid carbon dioxide shall be stored in vessel(s) under the working pressure in the range of 1.8 to 2.2 N/mm^2. The normal liquid charge in the container shall be limited to provide sufficient vapour space to allow for expansion of the liquid under the maximum storage temperatures than can be obtained corresponding to the setting of the pressure relief valves but shall not exceed 95% of the volumetric capacity of the container.

2.2.4.3 Provision shall be made for:

.1 pressure gauge;

.2 high pressure alarm: not more than setting of the relief valve;

.3 low pressure alarm: not less than 1.8 N/mm^2;

.4 branch pipes with stop valves for filling the vessel;

.5 discharge pipes;

.6 liquid CO_2 level indicator, fitted on the vessel(s); and

.7 two safety valves.

2.2.4.4 The two safety relief valves shall be arranged so that either valve can be shut off while the other is connected to the vessel. The setting of the relief valves shall not be less than 1.1 times working pressure. The capacity of each valve shall be such that the vapours generated under fire condition can be discharged with a pressure rise not more than 20% above the setting pressure. The discharge from the safety valves shall be led to the open.

2.2.4.5 The vessel(s) and outgoing pipes permanently filled with carbon dioxide shall have thermal insulation preventing the operation of the safety valve in 24 h after de-energizing the plant, at ambient temperature of 45°C and an initial pressure equal to the starting pressure of the refrigeration unit.

2.2.4.6 The vessel(s) shall be serviced by two automated completely independent refrigerating units solely intended for this purpose, each comprising a compressor and the relevant prime mover, evaporator and condenser.

2.2.4.7 The refrigerating capacity and the automatic control of each unit shall be so as to maintain the required temperature under conditions of continuous operation during 24 h at sea temperatures up to 32°C and ambient air temperatures up to 45°C.

2.2.4.8 Each electric refrigerating unit shall be supplied from the main switchboard busbars by a separate feeder.

2.2.4.9 Cooling water supply to the refrigerating plant (where required) shall be provided from at least two circulating pumps one of which being used as a stand-by. The stand-by pump may be a pump used for other services so long as its use for cooling would not interfere with any other essential service of the ship. Cooling water shall be taken from not less than two sea connections, preferably one port and one starboard.

2.2.4.10 Safety relief devices shall be provided in each section of pipe that may be isolated by block valves and in which there could be a build-up of pressure in excess of the design pressure of any of the components.

2.2.4.11 Audible and visual alarms shall be given in a central control station when:

.1 the pressure in the vessel(s) reaches the low and high values according to 2.2.4.2;

.2 any one of the refrigerating units fails to operate; or

.3 the lowest permissible level of the liquid in the vessels is reached.

2.2.4.12 If the system serves more than one space, means for control of discharge quantities of CO_2 shall be provided, e.g. automatic timer or accurate level indicators located at the control position(s).

2.2.4.13 If a device is provided which automatically regulates the discharge of the rated quantity of carbon dioxide into the protected spaces, it shall be also possible to regulate the discharge manually.

2.3 *Requirements of steam systems*

The boiler or boilers available for supplying steam shall have an evaporation of at least 1 kg of steam per hour for each 0.75 m^3 of the gross volume of the largest space so protected. In addition to complying with the foregoing requirements, the systems in all respects shall be as determined by, and to the satisfaction of, the Administration.

2.4 *Systems using gaseous products of fuel combustion*

2.4.1 General

Where gas other than carbon dioxide or steam, as permitted by paragraph 2.3, is produced on the ship and is used as a fire-extinguishing medium, the system shall comply with the requirements in paragraph 2.4.2.

2.4.2 Requirements of the systems

2.4.2.1 Gaseous products

Gas shall be a gaseous product of fuel combustion in which the oxygen content, the carbon monoxide content, the corrosive elements and any solid combustible elements in a gaseous product shall have been reduced to a permissible minimum.

2.4.2.2 Capacity of fire-extinguishing systems

2.4.2.2.1 Where such gas is used as the fire-extinguishing medium in a fixed fire-extinguishing system for the protection of machinery spaces, it shall afford protection equivalent to that provided by a fixed system using carbon dioxide as the medium.

2.4.2.2.2 Where such gas is used as the fire-extinguishing medium in a fixed fire-extinguishing system for the protection of cargo spaces, a sufficient quantity of such gas shall be available to supply hourly a volume of free gas at least equal to 25% of the gross volume of the largest space protected in this way for a period of 72 h.

2.5 *Equivalent fixed gas fire-extinguishing systems for machinery spaces and cargo pump-rooms*

Fixed gas fire-extinguishing systems equivalent to those specified in paragraphs 2.2 to 2.4 shall be approved by the Administration based on the guidelines developed by the Organization.*"

***

* Refer to the Revised guidelines for the approval of equivalent fixed gas fire-extinguishing systems, as referred to in SOLAS 74, for machinery spaces and cargo pump rooms (MSC/Circ.848) and the Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas fire-extinguishing systems, as referred to in SOLAS 74, for machinery spaces (MSC/Circ.1007).

ANNEX 12

DRAFT AMENDMENTS TO SOLAS REGULATION II-2/15

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation II-2/15 – Arrangements for oil fuel, lubricating oil and other flammable oils

An amendment No.1 to regulation II-2/15, as adopted by resolution MSC.31(63), is replaced by the following text:

"1 The text after the title is replaced by the following:

"(Paragraphs 2.9 to 2.12 of this regulation apply to ships constructed on or after 1 February 1992, except that the references to paragraphs 2.10 and 2.11 in paragraphs 3 and 4 apply to ships constructed on or after 1 July 1998)"."

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ANNEX 13

DRAFT RESOLUTION MSC.199(80)
(adopted on 16 May 2005)

ADOPTION OF AMENDMENTS TO PROVISION OF RADIO SERVICES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) (RESOLUTION A.801(19))

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

HAVING CONSIDERED amendments to the existing criteria for use when providing a NAVTEX service, set out in Annex 4 to resolution A.801(19) − Provision of radio services for the Global Maritime Distress and Safety System (GMDSS), as prepared by the ninth session of the Sub-Committee on Radiocommunications and Search and Rescue,

1. ADOPTS the revised Annex 4 to resolution A.801(19) on Provision of radio services for the Global Maritime Distress and Safety System (GMDSS), set out in the Annex to the present resolution;

2. RECOMMENDS Member Governments to ensure that NAVTEX services established on or after 1 January 2006 conform to criteria not inferior to that set out in the Annex to the present resolution.

ANNEX

AMENDMENTS TO PROVISION OF RADIO SERVICES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) (RESOLUTION A.801(19))

The existing text of Annex 4 is replaced by the following:

"ANNEX 4

CRITERIA FOR USE WHEN PROVIDING A NAVTEX SERVICE

1 There are two basic areas which must be defined when establishing a NAVTEX service. They are:

Coverage area: An area defined by an arc of a circle having a radius from the transmitter calculated according to the method and criteria given in this Annex.

Service area: A unique and precisely defined sea area, wholly contained within the coverage area, for which MSI is provided from a particular NAVTEX transmitter. It is normally defined by a line which takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region.

2 Governments desiring to provide a NAVTEX service should use the following criteria for calculating the coverage area of the NAVTEX transmitter they intend to install, in order to:

- determine the most appropriate location for NAVTEX stations having regard to existing or planned stations;
- avoid interference with existing or planned NAVTEX stations; and
- establish a service area for promulgation to seafarers.

3 The ground-wave coverage may be determined for each coast station by reference to Recommendation ITU-R PN.368-7 and ITU-R Report 322 for the performance of a system under the following conditions:

Frequency	-	518 kHz
Bandwidth	-	300 Hz
Propagation	-	ground wave
Time of day	-	[1]
Season	-	[1]

1 Administrations should determine time periods in accordance with NAVTEX time transmission table (NAVTEX Manual, figure 3) and seasons appropriate to their geographic area based on prevailing noise level.

Transmitter power	-	2
Antenna efficiency	-	[2]
RF S/N in 500 Hz band width	-	8 dB[3]
Percentage of time	-	90

4 Full coverage of NAVTEX service area should be verified by field strength measurements."

***

2 The range of a NAVTEX transmitter depends on the transmitter power and local propagation conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the NAVTEX area served, taking into account the needs of ships approaching from other areas. Experience has indicated that the required range of 250 to 400 nautical miles (nm) can generally be attained by transmitter power in the range between 100 and 1,000 W during daylight with a 60% reduction at night. The receiver characteristics, particularly as regards the bandwidth response, must be compatible with that of the NAVTEX transmitter.

3 Bit error rate 1×10^{-2}.

ANNEX 14

DRAFT AMENDMENTS TO SOLAS CHAPTER IV

CHAPTER IV
RADIOCOMMUNICATIONS

Regulation 7 – Radio equipment: General

1 The existing text of paragraph 1.6.1 is replaced by the following:

"1.6.1 capable of transmitting a distress alert through the polar orbiting satellite service operating in the 406 MHz band;"

Regulation 9 – Radio equipment: Sea areas A1 and A2

2 The existing text of paragraph 1.3.3 is replaced by the following:

"1.3.3 through the Inmarsat geostationary satellite service by a ship earth station."

Regulation 10 – Radio equipment: Sea areas A1, A2 and A3

3 The existing text of paragraph 1.4.3 is replaced by the following:

"1.4.3 through the Inmarsat geostationary satellite service by an additional ship earth station."

4 The existing text of paragraph 2.3.2 is replaced by the following:

"2.3.2 through the Inmarsat geostationary satellite service by a ship earth station; and"

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ANNEX 15

DRAFT AMENDMENTS TO SOLAS REGULATION III/7

Regulation 7 – Personal life-saving appliances

1 The following new subparagraphs .1 and .2 are inserted in paragraph 2.1:

".1 for passenger ships on voyages less than 24 h, a number of infant lifejackets equal to at least 2.5% of the number of passengers on board shall be provided;

.2 for passenger ships on voyages 24 h or greater, infant lifejackets shall be provided for each infant on board;",

and the existing subparagraphs .1 and .2 are renumbered as subparagraphs .3 and .4.

2 The following new subparagraph .5 is inserted after the renumbered subparagraph .4 of paragraph 2.1:

".5 if the adult lifejackets provided are not designed to fit persons with a chest girth of up to 1,750 mm, a sufficient number of suitable accessories shall be available on board to allow them to be secured to such persons."

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ANNEX 16

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

Chapter I

General

1 The existing subparagraph .2 of paragraph 1.2.2 is replaced by the following:

> "**.2** not be damaged in stowage throughout the air temperature range -30°C to +65°C and, in the case of personal life-saving appliances, unless otherwise specified, remain operational throughout the air temperature range -15°C to +40°C;"

2 The existing subparagraph .6 of paragraph 1.2.2 is replaced by the following:

> "**.6** be of international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea;"

Chapter II

Personal life-saving appliances

3 The words "sufficient to operate the quick-release arrangement" in paragraph 2.1.1.7 are replaced by the words "of not less than 4 kg".

4 In paragraph 2.1.3, the word "and" is moved from the end of subparagraph .4 to the end of subparagraph .5, and the following new subparagraph .6 is added:

> "**.6** be provided with a quick-release arrangement that will automatically release and activate the signal and associated self-igniting light connected to a lifebuoy having a mass of not more than 4 kg."

5 The existing section 2.2 is replaced by the following:

"**2.2 Lifejackets**

2.2.1 *General requirements for lifejackets*

2.2.1.1 A lifejacket shall not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s.

2.2.1.2 Lifejackets shall be provided in three sizes in accordance with table 2.1. If a lifejacket fully complies with the requirements of two adjacent size ranges, it may be marked with both size ranges, but the specified ranges shall not be divided. Lifejackets shall be marked by either weight or height, or by both weight and height, according to table 2.1.

Table 2.1 – Lifejacket sizing criteria

Lifejacket marking	Infant	Child	Adult
User's size:			
Weight (kg)	less than 15	15 or more but less than 43	43 or more
Height (cm)	less than 100	100 or more but less than 155	155 or more

2.2.1.3 If an adult lifejacket is not designed to fit persons weighing up to 140 kg and with a chest girth of 1,750 mm, suitable accessories shall be available to allow it to be secured to such persons.

2.2.1.4 The in-water performance of a lifejacket shall be evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) complying with the recommendations of the Organization.*

2.2.1.5 An adult lifejacket shall be so constructed that:

.1 at least 75% of persons who are completely unfamiliar with the lifejacket can correctly don it within a period of 1 min without assistance, guidance or prior demonstration;

.2 after demonstration, all persons can correctly don it within a period of 1 min without assistance;

.3 it is clearly capable of being worn in only one way or inside–out and, if donned incorrectly, it is not injurious to the wearer;

.4 the method of securing the lifejacket to the wearer has quick and positive means of closure that do not require tying of knots;

.5 it is comfortable to wear; and

.6 it allows the wearer to jump into the water from a height of at least 4.5 m while holding on to the lifejacket, and from a height of at least 1m with arms held overhead, without injury and without dislodging or damaging the lifejacket or its attachments.

2.2.1.6 When tested according to the recommendations of the Organization on at least 12 persons, adult lifejackets shall have sufficient buoyancy and stability in calm fresh water to:

.1 lift the mouth of exhausted or unconscious persons by an average height of not less than the average provided by the adult RTD;

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* Refer to the Revised Recommendation on Testing of Life-saving Appliances, adopted by the Organization by resolution MSC.81(70), as amended by resolution MSC.200(80).

.2 turn the body of unconscious, face-down persons in the water to a position where the mouth is clear of the water in an average time not exceeding that of the RTD, with the number of persons not turned by the lifejacket no greater than that of the RTD;

.3 incline the body backwards from the vertical position for an average torso angle of not less than that of the RTD minus 5°;

.4 lift the head above horizontal for an average faceplane angle of not less than that of the RTD minus 5°; and

.5 return the wearer to a stable face-up position after being destabilized when floating in the flexed foetal position.*

2.2.1.7 An adult lifejacket shall allow the person wearing it to swim a short distance and to board a survival craft.

2.2.1.8 An infant or child lifejacket shall perform the same as an adult lifejacket except as follows:

.1 donning assistance is permitted for small children and infants;

.2 the appropriate child or infant RTD shall be used in place of the adult RTD; and

.3 assistance may be given to board a survival craft, but wearer mobility shall not be reduced to any greater extent than by the appropriate size RTD.

2.2.1.9 With the exception of freeboard and self-righting performance, the requirements for infant lifejackets may be relaxed, if necessary, in order to:

.1 facilitate the rescue of the infant by a caretaker;

.2 allow the infant to be fastened to a caretaker and contribute to keeping the infant close to the caretaker;

.3 keep the infant dry, with free respiratory passages;

.4 protect the infant against bumps and jolts during evacuation; and

.5 allow a caretaker to monitor and control heat loss by the infant.

2.2.1.10 In addition to the markings required by paragraph 1.2.2.9, an infant or child lifejacket shall be marked with:

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* Refer to the illustration on page 11 of the IMO Pocket Guide to Cold Water Survival and to the Revised Recommendation on Testing of Life-saving Appliances adopted by the Organization by resolution MSC.81(70), as amended by resolution MSC.200(80).

.1 the size range in accordance with 2.2.1.2; and

.2 an "infant" or "child" symbol as shown in the "infant's lifejacket" or "child's lifejacket" symbol adopted by the Organization.*

2.2.1.11 A lifejacket shall have buoyancy which is not reduced by more than 5% after 24 h submersion in fresh water.

2.2.1.12 The buoyancy of a lifejacket shall not depend on the use of loose granulated materials.

2.2.1.13 Each lifejacket shall be provided with means of securing a lifejacket light as specified in paragraph 2.2.3 such that it shall be capable of complying with paragraphs 2.2.1.4.6 and 2.2.3.1.3.

2.2.1.14 Each lifejacket shall be fitted with a whistle firmly secured by a lanyard.

2.2.1.15 Lifejacket lights and whistles shall be selected and secured to the lifejacket in such a way that their performance in combination is not degraded.

2.2.1.16 A lifejacket shall be provided with a releasable buoyant means to secure it to a lifejacket worn by another person in the water.

2.2.1.17 A lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.

2.2.2 *Inflatable lifejackets*

A lifejacket which depends on inflation for buoyancy shall have not less than two separate compartments, shall comply with the requirements of paragraph 2.2.1, and shall:

.1 inflate automatically upon immersion, be provided with a device to permit inflation by a single manual motion and be capable of having each chamber inflated by mouth;

.2 in the event of loss of buoyancy in any one compartment be capable of complying with the requirements of paragraphs 2.2.1.5, 2.2.1.6 and 2.2.1.7; and

.3 comply with the requirements of paragraph 2.2.1.11 after inflation by means of the automatic mechanism.

2.2.3 *Lifejacket lights*

2.2.3.1 Each lifejacket light shall:

.1 have a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere;

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* Refer to Symbols related to Life-Saving Appliances and Arrangements adopted by the Organization by resolution A.760(18), as may be amended.

.2 have a source of energy capable of providing a luminous intensity of 0.75 cd for a period of at least 8 h;

.3 be visible over as great a segment of the upper hemisphere as is practicable when attached to a lifejacket; and

.4 be of white colour.

2.2.3.2 If the light referred to in paragraph 2.2.3.1 is a flashing light it shall, in addition:

.1 be provided with a manually operated switch; and

.2 flash at a rate of not less than 50 flashes and not more than 70 flashes per minute with an effective luminous intensity of at least 0.75 cd."

6 The word "The" in the beginning of paragraph 2.3.1.1 is replaced by the word "An".

7 The words "if the immersion suit is to be worn in conjunction with a lifejacket" in paragraph 2.3.1.1.1 are replaced by the words "if the immersion suit must be worn in conjunction with a lifejacket to meet the requirements of paragraph 2.3.1.2".

8 The existing subparagraph .3 of paragraph 2.3.1.1 is replaced by the following:

"**.3** it will cover the whole body with the exception of the face, except that covering for the hands may be provided by separate gloves which shall be permanently attached to the suit;"

9 The existing paragraph 2.3.1.2 is replaced by the following:

"**2.3.1.2** An immersion suit on its own, or worn in conjunction with a lifejacket if necessary, shall have sufficient buoyancy and stability in calm fresh water to:

.1 lift the mouth of an exhausted or unconscious person clear of the water by not less than 120 mm; and

.2 allow the wearer to turn from a face-down to a face-up position in not more than 5 s."

10 In paragraph 2.3.1.3.3, the words "or its attachments," are inserted between the words "the immersion suit" and "or being injured".

11 In paragraph 2.3.1.4, the number "2.2.1.8" is replaced by "2.2.1.14".

12 The following new paragraphs 2.3.1.5 and 2.3.1.6 are inserted after the existing paragraph 2.3.1.4:

"**2.3.1.5** An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a releasable buoyant means to secure it to a suit worn by another person in the water.

2.3.1.6 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat."

13 The existing paragraph 2.3.1.5 is replaced by the following:

"**2.3.1.7** If an immersion suit is to be worn in conjunction with a lifejacket, the lifejacket shall be worn over the immersion suit. Persons wearing such an immersion suit shall be able to don a lifejacket without assistance. The immersion suit shall be marked to indicate that it must be worn in conjunction with a compatible lifejacket."

14 The following new paragraph 2.3.1.8 is added:

"**2.3.1.8** An immersion suit shall have buoyancy which is not reduced by more than 5% after 24 h submersion in fresh water and does not depend on the use of loose granulated materials."

15 The existing paragraph 2.3.3 is deleted.

16 The word "The" in the beginning of paragraph 2.4.1.1 is replaced by the word "An".

17 The existing subparagraph .3 of paragraph 2.4.1.1 is replaced by the following:

"**.3** covers the whole body except, where the Administration so permits, the feet; covering for the hands and head may be provided by separate gloves and a hood, both of which shall be permanently attached to the suit;"

18 The existing paragraph 2.4.1.2 is deleted and paragraphs 2.4.1.3 and 2.4.1.4 are renumbered as paragraphs 2.4.1.2 and 2.4.1.3 respectively.

19 The words "or its attachments," are inserted between the words "the suit" and "or being injured" in subparagraph .2 of the renumbered paragraph 2.4.1.2.

20 Renumbered paragraph 2.4.1.3 is replaced by the following:

"**2.4.1.3** An anti-exposure suit shall be fitted with a light complying with the requirements of paragraph 2.2.3 such that it shall be capable of complying with paragraphs 2.2.3.1.3 and 2.4.1.2.2, and the whistle prescribed by paragraph 2.2.1.14."

21 The existing subparagraph .2 of paragraph 2.4.2.1 is replaced with the following:

"**.2** be so constructed that, when worn as marked and following one jump into the water which totally submerges the wearer, the suit continues to provide sufficient thermal protection to ensure that when it is worn in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall at a rate of more than 1.5°C per hour, after the first 0.5 h."

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ANNEX 17

RESOLUTION MSC.200(80)
(adopted on 13 May 2005)

ADOPTION OF AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO resolution A.689(17) on Testing of life-saving appliances, by which the Assembly, at its seventeenth session, adopted recommendations for test requirements for life-saving appliances,

RECALLING FURTHER that the Assembly, when adopting resolution A.689(17), authorized the Committee to keep the Recommendation on testing of life-saving appliances under review and to adopt, when appropriate, amendments thereto,

NOTING resolution MSC.81(70), by which, at its seventieth session, it adopted the Revised recommendation on testing of life-saving appliances, recognizing the need to introduce more precise provisions for the testing of life-saving appliances based on the requirements of the International Life-Saving Appliances (LSA) Code,

BEING DESIROUS to identify and develop comprehensive performance testing and approval standards for personal life-saving appliances to ensure a good probability of survival for short duration water immersion,

HAVING CONSIDERED, at its eightieth session, amendments to the Revised recommendation on testing of life-saving appliances, proposed by the Sub-Committee on Ship Design and Equipment at its forty-eighth session,

1. ADOPTS amendments to the Revised recommendation on testing of life-saving appliances (resolution MSC.81(70)), the text of which is set out in the Annex to the present resolution;

2. RECOMMENDS Governments to apply the annexed amendments when testing life-saving appliances.

ANNEX

AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70))

PART 1 – ***Prototype tests for life-saving appliances***

1 The existing subparagraph .3 of paragraph 1.1 is replaced by the following:

"**.3** if it is intended to operate the quick-release arrangement provided for a self-activated smoke signal and self-igniting light, the lifebuoy has a mass of not less than 4 kg (see 1.8); and"

2 In paragraph 1.2.1.1, the words "8 h cycle at +65°C" are replaced by "8 h exposure at a minimum temperature of +65°C".

3 In paragraphs 1.2.1.2 and 1.2.1.4, the words "at a temperature of 20°C ± 3°C" are added after the words "under ordinary room conditions".

4 In paragraph 1.2.1.3, the words "8 h cycle at -30°C" are replaced by the words "8 h exposure at a maximum temperature of -30°C".

5 The existing paragraph 1.9.3 is replaced by the following:

"**1.9.3** The last three smoke signals taken from ordinary room conditions and attached by a line to a lifebuoy having a mass of not more than 4 kg should undergo the drop test into water prescribed in 1.3. The lifebuoy should have both a smoke signal and a lifebuoy light attached in the manner recommended by the manufacturers and be dropped from a quick-release fitting. The smoke signals should not be damaged and should function for a period of at least 15 min."

6 The following new paragraph 1.9.6 is added:

"**1.9.6** A force of 225 N should be applied to the fitting that attaches the self-activating smoke signal to the lifebuoy. Neither the fitting nor the signal should be damaged as a result of the test."

7 The existing section 2 is replaced by the following:

"**2 LIFEJACKETS**

2.1 Temperature cycling test

A lifejacket should be subjected to the temperature cycling as prescribed in 1.2.1 and should then be externally examined. The lifejacket materials should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

2.2 Buoyancy test

The buoyancy of the lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water. The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy.

2.3 Fire test

A lifejacket should be subjected to the fire test prescribed in 1.5. The lifejacket should not sustain burning for more than 6 s or continue melting after being removed from the flames.

2.4 Tests of components other than buoyancy materials

All the materials, other than buoyancy materials, used in the construction of the lifejacket, including the cover, tapes, seams and closures should be tested to an international standard acceptable to the Organization* to establish that they are rot-proof, colour-fast and resistant to deterioration from exposure to sunlight and that they are not unduly affected by seawater, oil or fungal attack.

2.5 Strength tests

Body or lifting loop strength tests

2.5.1 The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 3,200 N (2,400 N in the case of a child or infant-size lifejacket) should be applied for 30 min to the part of the lifejacket that secures it to the body of the wearer (see figure 1) and separately to the lifting loop of the lifejacket. The lifejacket should not be damaged as a result of this test. The test should be repeated for each encircling closure.

Shoulder lift test

2.5.2 The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed on a form as shown in figure 2, in the same manner as when it is worn by a person. A force of not less than 900 N (700 N in the case of a child- or infant-size lifejacket) should be applied for 30 min across the form and the shoulder section of the lifejacket (see figure 3). The lifejacket should not be damaged as a result of this test. The lifejacket should remain secured on the form during this test.

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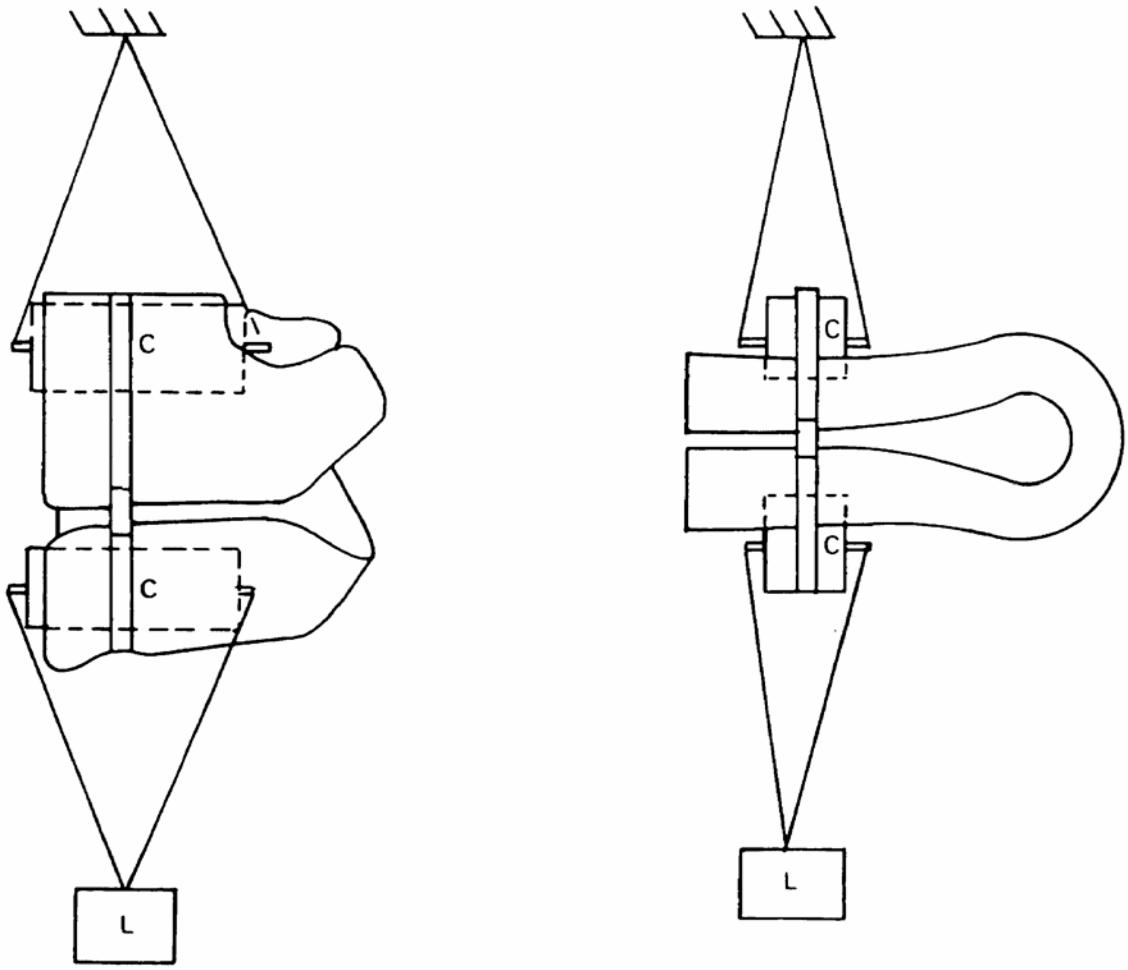
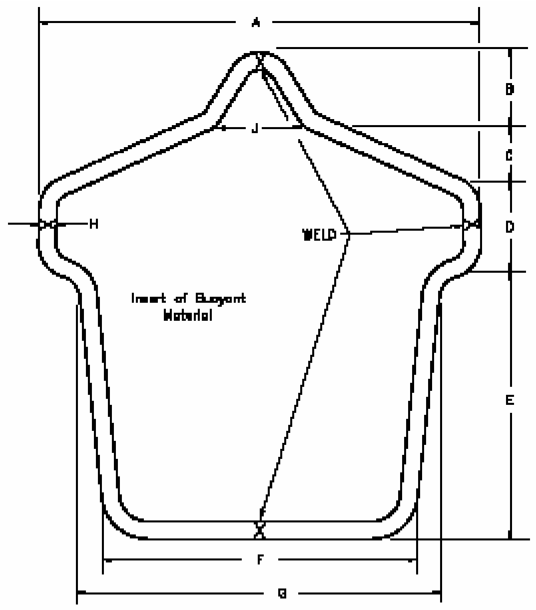
* Refer to the recommendations of the International Organization for Standardization, in particular publication ISO 12402-7 *Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods.*



Vest-type lifejacket **Yoke or over-the-head-type lifejacket**

C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for infant and child sizes
L - Test load

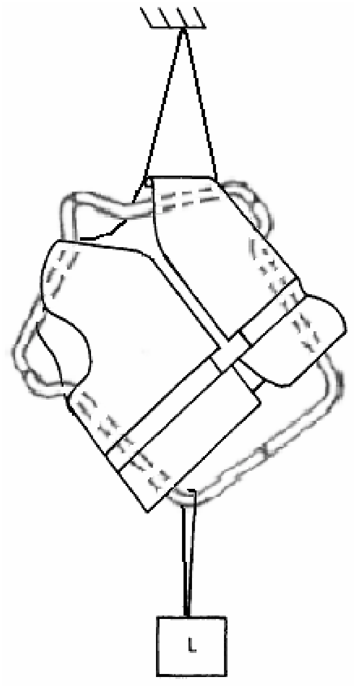
Figure 1 – Body strength test arrangement for lifejackets



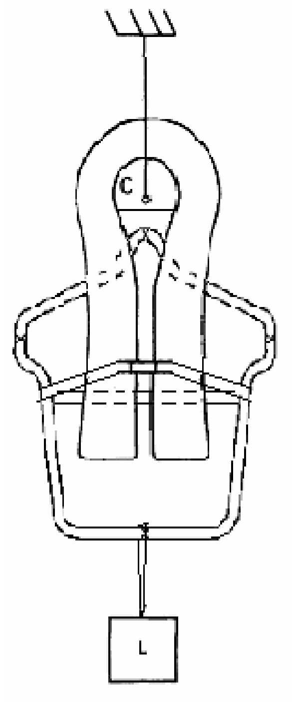
Dimensions in mm

Size	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**
Adult	610	114	76.2	127	381	432	508	25.4	178
Child	508	102	76.2	102	279	330	406	22.2	152
Infant	305	63.5	38.1	63.5	191	203	241	19.1	76.2

Figure 2 – Test form for shoulder lift test for lifejackets



Vest-type lifejacket



Yoke or over-the-head-type lifejacket

C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for infant and child sizes
L - Test load

Figure 3 – Shoulder lift test arrangement for lifejackets

2.6 Tests for lifejacket buoyancy material

The following tests should be carried out on eight specimens of each lifejacket buoyancy material. The specimens should be at least 300 mm square and be of the same thickness as used in the lifejacket. In the case of kapok, the entire lifejacket should be subjected to the test. The dimensions should be recorded at the beginning and end of these tests. Where multiple layers of materials are used to achieve the total thickness desired for the lifejacket, the specimens should be of the thinnest material used.

Test for stability under temperature cycling

2.6.1 Six specimens should be subjected to temperature cycling as prescribed in 1.2.1.

2.6.2 The dimensions of the specimens (except kapok) should be recorded at the end of the last cycle. The specimens should be carefully examined and should not show any sign of external change of structure or of mechanical qualities.

2.6.3 Two of the specimens should be cut open and should not show any sign of internal change of structure.

2.6.4 Four of the specimens should be used for compression and water absorption tests, two of which should be so tested after they have also been subjected to the diesel oil test as prescribed in 1.4.

Tests for compression and water absorption

2.6.5 The tests should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water.

2.6.6 The tests should be carried out:

.1 on two specimens as supplied;

.2 on two specimens which have been subjected to the temperature cycling as prescribed in 2.6.1; and

.3 on two specimens which have been subjected to the temperature cycling as prescribed in 2.6.1 followed by the diesel oil test as prescribed in 1.4.

2.6.7 The results should state the buoyant force in N which each specimen exerts when submerged in water after one and seven days' immersion. The reduction of buoyancy should not exceed 10% for specimens which have been exposed to the diesel oil conditioning and must not exceed 5% for all other specimens. The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

Tensile strength test

2.6.8 The tensile strength at break of the material should be measured before and after the combined exposure described in 2.6.6.3. When tested according to an international standard acceptable to the Organization*, the materials should have a minimum tensile strength of 140 kPa before exposure, which should not be reduced by more than 25% following the combined exposures. In the case of kapok, the protective cover should have a minimum breaking strength of 13 kPa before exposure, which should not be reduced by more than 25% following the combined exposures.

2.7 Donning test

2.7.1 To minimize the risk of incorrect donning by uninitiated persons, often in adverse conditions, lifejackets should be examined for the following features and tested as follows:

.1 fastenings necessary for proper performance should be few and simple, and provide quick and positive closure that does not require tying of knots;

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* Refer to the recommendations of the International Organization for Standardization, in particular publication ISO 12402-7, *Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods*.

.2 adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad; and

.3 all lifejackets should be capable of being worn inside-out, or clearly in only one way.

Test subjects

2.7.2 These tests should be carried out with at least 12 able-bodied persons who are completely unfamiliar with the lifejacket and selected according to the heights and weights in table 2.1 and the following:

.1 small test subjects need not be adults;

.2 at least 1/3, but not more than 1/2 of test subjects should be females, including at least 1 per height category but excluding the tallest height;

.3 at least one male and one female should be from the lowest and highest weight group;

.4 at least one subject should be selected from each cell containing a “1”; and

.5 enough additional subjects should be selected from cells containing a “X” to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.

Table 2.1 – Test subject selection for adult lifejackets

	Weight range – kg							
Height range (m)	40 - 43	43 - 60	60 - 70	70 - 80	80 - 100	100 - 110	110 - 120	>120
< 1.5	1	X	X	X				
1.5 - 1.6	X	1	1	X	X			
1.6 - 1.7		X	X	1	X	X		
1.7 - 1.8			X	X	1	X	X	X
1.8 - 1.9			X	X	X	1	1	X
> 1.9					X	X	X	1

Clothing

2.7.3 Each test subject should be tested wearing the clothing specified for the test and appropriate to their size as follows:

.1 *Normal clothing* means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; and

.2 *Heavy-weather clothing* means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves.

2.7.4 Each test should be timed from when the order is given until the test subject declares that donning is complete. For assessment purposes donning is considered complete when the subject has donned and securely adjusted all methods of securing the lifejacket to the extent needed to meet the in-water performance requirements, including inflation, if needed.

Test without instruction

2.7.4.1 The test subjects may be tested individually or as a group. Wearing normal clothing, the first attempt should be with no assistance, guidance or prior demonstration. The lifejacket, with closures in the stored condition, should be placed on the floor, face up, in front of the test subject. The instruction provided should be identical for each subject and should be equivalent to the following: "PLEASE DON THIS LIFEJACKET AS QUICKLY AS POSSIBLE AND ADJUST IT TO A SNUG FIT SO YOU CAN ABANDON SHIP." The lifejacket should be capable of being donned by at least 75 % of the subjects, and within 1 min. If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 and in-water performance tests in 2.8.5 and 2.8.6 should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful.

Test after instruction

2.7.4.2 For each subject whose first attempt exceeds 1 min or is incomplete, after demonstration or instruction to familiarize the subject with the donning procedure, the test subject should then don the lifejacket without assistance while wearing normal clothing, using the same instruction and timing method as in 2.7.4.1. Each subject should correctly don the lifejacket within a period of 1 min.

Heavy-weather clothing test

2.7.4.3 Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as in 2.7.4.1. Each subject should don the lifejacket correctly within a period of 1 min.

2.8 Water performance tests

2.8.1 This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 1 to 3. All tests should be carried out in fresh water under still conditions.

Test subjects

2.8.2 These tests should be carried out with at least 12 persons as described in 2.7.2. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained.

Clothing

2.8.3 Subjects should wear only swimming costumes.

Preparation for water performance tests

2.8.4 The test subjects should be made familiar with each of the tests set out below, particularly the requirement regarding relaxing and exhaling in the face-down position. The test subject should don the lifejacket, unassisted, using only the instructions provided by the manufacturer. After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume.

Righting tests

2.8.5 Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally. During the relaxation phase, the subject should be maintained in a stable face down position. Immediately after the subject has relaxed with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released. The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The above test should be conducted for a total of six times, and the highest and lowest times discarded. The test should then be conducted for a total of six times in the RTD and the highest and lowest times discarded.

Static balance measurements

2.8.6 At the conclusion of the righting tests without making any adjustments in body or lifejacket position, measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests. The following measurements should be made (see figure 4):

.1 freeboard – the distance measured perpendicularly from the surface of the water to the lowest point of the subject's mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level;

.2 faceplane angle – the angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and the chin;

.3 torso angle – the angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis); and

.4 list angle – the angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.

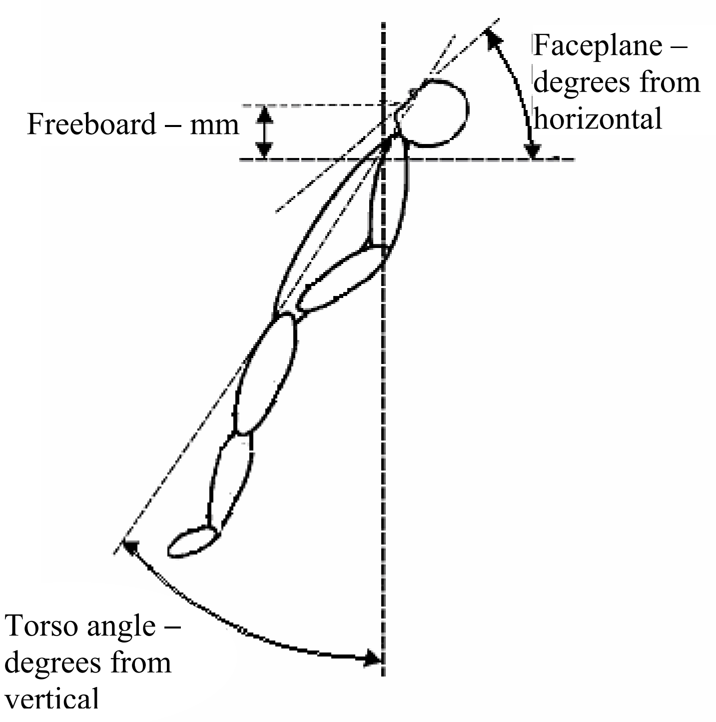


Figure 4 – Static balance measurements

Assessment

2.8.7 After the water tests described in 2.8.5 and .6 above:

.1 *Turning time:* The average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD, and the number of "no-turns", if any, should not exceed the number in the RTD;

.2 *Freeboard:* The average freeboard of all the subjects should not be less than the average for the RTD;

.3 *Torso angles:* The average of all subjects' torso angles should be not less than the average for the RTD minus 5°;

.4 *Faceplane (head) angles:* The average of all subjects' faceplane angles should be not less than the average for the RTD minus 5°;

.5 *Lifejacket light location:* The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.

Jump and drop tests

2.8.8 Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1 m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5 m but, when jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test the lifejacket should be rejected or the test delayed until tests from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable.

Assessment

2.8.9 Following the drop test, the lifejacket should:

.1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average for the RTD determined in accordance with 2.8.6;

.2 not be dislodged or cause harm to the test subject;

.3 have no damage that would affect its in-water performance or buoyancy; and

.4 have no damage to its attachments.

Stability test

2.8.10 The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: "place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible." The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position. The test should then be conducted with the subject rotated counter-clockwise. The entire test should then be repeated with the test subject wearing the RTD. The candidate lifejacket should not roll any subject face down in the water. The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD.

Swimming and water emergence test

2.8.11 All test subjects, without wearing the lifejacket, should attempt to swim 25 m and board a liferaft or a rigid platform with its surface 300 mm above the water surface. All test subjects who successfully complete this task should perform it again wearing the lifejacket. At least two thirds of the test subjects who can accomplish the task without the lifejacket should also be able to perform it with the lifejacket.

2.9 Infant and children's lifejacket tests

As far as possible, similar tests should be applied for approval of lifejackets suitable for infants and children.

Infant and child test subjects

2.9.1 For child-size lifejackets, tests should be carried out with at least 9 able-bodied persons, and for infant-size lifejackets, tests should be carried out with at least 5 able-bodied persons. All test subjects should be selected according to table 2.2 or table 2.3 as follows:

.1 One subject should be selected per each cell containing a "1".

.2 Remaining subjects should be selected from cells containing an "X", without repeating a cell.

.3 At least 40% of the subjects should be male and at least 40% female.

.4 Devices for infants should be tested on infants as small as 6 kg mass.

.5 A manikin or manikins may be substituted for infant lifejacket test subjects if the manikin or manikins have been demonstrated to provide representative results compared to human subjects.

Table 2.2 – Selection of child test subjects

Height range (cm)	Weight range (kg)										
	14-17	17-20	20-22	22-25	25-28	28-30	30-33	33-36	36-38	38-41	41-43
79-105	1	X									
90-118		X	1								
102-130				1	X						
112-135					X	1					
122-150							1	1	X		
145-165									X	1	1

Table 2.3 – Selection of infant test subjects

Height range (cm)	Weight range (kg)		
	Less than 11	11-14	14-17
Less than 83	1	X	
79-105	X	1	1
90-118			X

2.9.2 When conducting water performance tests under 2.8, infant and child-size lifejackets should meet the following requirements for their critical flotation stability characteristics:

.1 *Turning time:* The average turn time for all subjects in the candidate lifejacket should not exceed the average time in the appropriate size RTD;

.2 *Freeboard:* The average results for clearance of the mouth above the water for all subjects should not be less than the average for the appropriate size RTD;

.3 *Torso angle:* The average of all subjects' results should be not less than the average for the appropriate size RTD minus 10°;

.4 *Faceplane (head) angle:* The average of all subjects' results should be not less than the average for the appropriate size RTD minus 10°; and

.5 *Mobility:* Mobility of the subject both in and out of the water should be given consideration in determining the acceptability of a device for approval and should be compared to mobility when wearing the appropriate size RTD when climbing out of the water, going up and down stairs, picking up an article from the floor, and then drinking from a cup.

2.9.3 With the exception of reducing freeboard and self-righting performance, the requirements for infant lifejackets may be relaxed if necessary in order to:

.1 contribute to the rescue of the infant by a caretaker;

.2 allow the infant to be fastened to a caretaker and contribute to keeping the infant close to the caretaker;

.3 keep the infant dry, with free respiratory passages;

.4 protect the infant against bumps and jolts during the evacuation; and

.5 allow a caretaker to monitor and control heat loss by the infant.

2.10 Tests for inflatable lifejackets

2.10.1 Inflation tests

2.10.1.1 Two inflatable lifejackets should be subjected to the temperature cycling test prescribed in 1.2.1 in the uninflated condition and should then be externally examined. The inflatable lifejacket materials should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The automatic and manual inflation systems should each be tested immediately after each temperature cycling test as follows:

.1 After a high temperature cycle, the two inflatable lifejackets should be taken from the stowage temperature of +65°C. One should be activated using the automatic inflation system by placing it in seawater at a temperature of +30°C and the other should be activated using the manual inflation system. Each should fully inflate.

.2 After a low temperature cycle, the two inflatable lifejackets should be taken from the stowage temperature of -30°C. One should be activated using the automatic inflation system by placing it in seawater at a temperature of -1°C and the other should be activated using the manual inflation system. Each should fully inflate.

2.10.1.2 After exposure to a temperature of -15°C for a period of at least 8 h, two lifejackets should be activated using the manual inflation system and should fully inflate.

2.10.1.3 After exposure to a temperature of +40°C for a period of at least 8 h, two lifejackets should be activated using the manual inflation system and should fully inflate.

2.10.2 The test in 2.7 should be conducted using lifejackets both in the inflated and uninflated conditions.

2.10.3 The tests in 2.8 should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated. The tests with one of the compartments uninflated should be repeated as many times as necessary to perform the test once with each compartment in the uninflated condition.

2.10.4 *Tests of materials for inflatable bladders, inflation systems and components*

The material used for the inflatable bladder, inflation system and components should be tested to establish that they are rot-proof, colour fast and resistant to deterioration from exposure to sunlight and that they are not duly affected by seawater, oil or fungal attack.

2.10.4.1 *Material tests*

Resistance to rot and illumination tested according to AATCC Method 30:1981 and ISO 105-B04:1988 Illumination should take place to class 4-5.

Following exposure to rot or illumination tests above the tensile strength should be measured using the grab method given in ISO 5082. Minimum tensile strength should be not less than 300 N per 25 mm in the warp and weft direction.

2.10.4.2 *Coated fabrics*

Coated fabrics used in the construction of inflatable buoyancy chambers should comply with the following requirements:

.1 Coating adhesion should be tested in accordance with ISO 2411:1991 using the method described in paragraph 5.1 at 100 mm/min and should be not less than 50 N per 50 mm width.

.2 Coating adhesion should be tested when wet following ageing according to ISO 188 with an exposure of 336 ± 0.5 h in fresh water at (70 ± 1)°C, following which the method at ISO 2411:1991, paragraph 5.1 should be applied at 100 mm/min and should not be less than 40 N per 50 mm width.

.3 Tear strength should be tested in accordance with ISO 4674:1977 using method A1 and should not be less than 35 N.

.4 Resistance to flex cracking should be tested in accordance with ISO 7854:1984 method A using 9000 flex cycles, there should be no visible cracking or deterioration.

.5 Breaking strength should be tested in accordance with ISO 1421:1977 using the constant-rate-of-extension (CRE) or constant-rate-of-traverse (CRT) method, following conditioning for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width.

.6 Breaking strength should be tested in accordance with ISO 1421:1977 using the CRE or CRT method, following conditioning immersed in fresh water for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width.

.7 Elongation to break should be tested in accordance with ISO 1421:1977 using the CRE or CRT method following conditioning at room temperature for 24 ± 0.5 h and should not be more than 60%.

.8 Elongation to break should be tested in accordance with ISO 1421:1977 using the CRE or CRT method following conditioning immersed in fresh water at room temperature for 24 ± 0.5 h and should not be more than 60%.

.9 The resistance to exposure to light when tested in accordance with ISO 105-BO2:1988 and the contrast between the unexposed and exposed samples should not be less than class 5.

.10 The resistance to wet and dry rubbing when tested in accordance with ISO 105-X12:1995 and should not be less than class 3.

.11 The resistance to seawater should not be less than class 4 in accordance with ISO 105 EO2:1978 and the change in colour of the specimen should not be less than class 4.

2.10.4.3 *Operating head load test*

The operating head load test should be carried out using two lifejackets one lifejacket to be conditioned at -30°C for 8 h and the other at +65°C for 8 h. After mounting on the manikin or the test form the lifejackets should be inflated, and a steady force of 220 ± 10 N applied to the operating head as near as possible to the point where it enters the buoyancy chamber. This load should be maintained for 5 min during which the direction and angle in which it is applied should be continuously varied. On completion of the test the lifejacket should remain intact and should hold its pressure for 30 min.

2.10.4.4 *Pressure test*

2.10.4.4.1 *Overpressure test:* The inflatable buoyancy chambers should be capable of withstanding an internal over pressure at ambient temperature. A lifejacket should be inflated using the manual method of inflation, after inflation the relief valves should be disabled and a fully charged gas cylinder according to the manufacturers recommendation should be fitted to the same inflation device and fired. The lifejacket should remain intact and should hold its pressure for 30 min. The lifejackets should show no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component. All fully charged gas cylinders used in this test should be sized according to the markings on lifejacket.

2.10.4.4.2 *Relief valve test:* With one buoyancy chamber inflated, the operating head on the opposite buoyancy chamber should be fired manually, using a fully charged gas cylinder according to the manufacturers recommendations. The operation of the relief valves should be noted to ensure that the excess pressure is relieved. The lifejacket should remain intact and should hold its pressure for 30 min. The lifejackets should no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component.

2.10.4.4.3 *Air retention test:* One inflation chamber of a lifejacket is filled with air until air escapes from the over-pressure valve or, if the lifejacket does no have an over-pressure valve, until its design pressure, as stated in the plans and specifications, is reached. After 12 h the drop in pressure should not be greater than 10%. This test is then repeated as many times as necessary to test a different chamber until each chamber has been tested in this manner.

2.10.4.5 *Compression test*

The inflatable lifejacket, packed in the normal manner should be laid on a table. A bag containing 75 kg of sand and having a base of 320 mm diameter should be lowered onto the lifejacket from a height of 150 mm in a time of 1 second. This should be repeated ten times, after which the bag should remain on the jacket for not less than 3 h. The lifejacket should be inflated by immersion into water and should inflate fully, the jacket to be inspected to ensure that no swelling or change of mechanical properties has occurred, the jacket should be checked for leaks.

2.10.4.6 *Test of metallic components*

2.10.4.6.1 Metal parts and components of a lifejacket should be corrosion-resistant to seawater and should be tested in accordance with ISO 9227:1990 for a period of 96 h. The metal components should be inspected and should not be significantly affected by corrosion, or affect any other part of the lifejacket and should not impair the performance of the lifejacket.

2.10.4.6.2 Metal components should not affect a magnetic compass of a type used in small boats by more than 1°, when placed at a distance of 500 mm from it.

2.10.4.7 *Inadvertent inflation test*

2.10.4.7.1 The resistance of an automatic inflation device to inadvertent operation should be assessed by exposing the entire lifejacket to sprays of water for fixed period. The lifejacket should be fitted correctly to a free-standing manikin of adult size, with a minimum shoulder height of 1,500 mm (see figure 5), or alternatively to an appropriately sized form as shown in figure 2. The lifejacket should be deployed in the mode in which it is worn ready for use but not deployed as used in the water (i.e. if it is equipped with a cover which is normally worn closed, then the cover should be closed for the test). Two sprays should be installed so as to spray fresh water onto the lifejacket, as shown in the diagram. One should be positioned 500 mm above the highest point of the lifejacket, and at an angle of 15° from the vertical centre line of the manikin and the bottom line of the lifejacket. The other nozzle should be installed horizontally at a distance of 500 mm from the bottom line of the lifejacket, and points directly at the lifejacket. These nozzles should have a spray cone of 30°, each orifice being 1.5 ± 0.1 mm in diameter, and the total area of the orifice should be 50 ± 5 mm², the orifice being evenly spread over the spray nozzle area.

2.10.4.7.2 The air temperature should be 20°C, and water should be supplied to the sprays at a pressure of 0.3 kPa - 0.4 kPa, a flow of 600 *l*/h, and a temperature of 18°C to 20°C.

2.10.4.7.3 The sprays should be turned on, and the lifejacket exposed to the following series of test to access the ability of the jacket to resist inadvertent inflation:

.1 5 min with the high spray on the front of the lifejacket;

.2 5 min with the high spray on the left side of the lifejacket;

.3 5 min with the high spray on the back of the lifejacket; and

.4 5 min with the high spray on the right side of the lifejacket.

During exposures .1, .2 and .4, the horizontal spray should be applied for 10 periods of 3 s each to the front, left or right sides (but not back) as with the high spray.

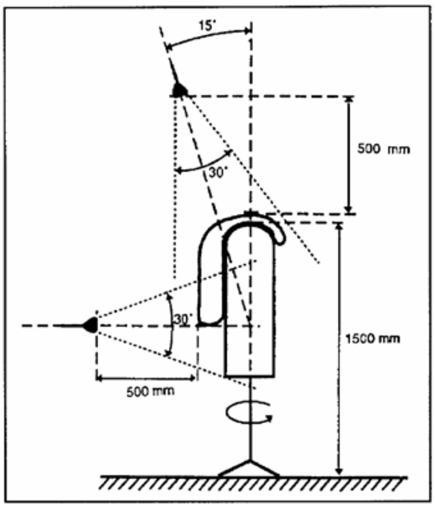


Figure 5 – Test set-up for test of automatic inflation system

2.10.4.7.4 After completing the above test, the lifejacket should be removed from the manikin and immersed in water to verify that the auto-inflation system functions."

8 The existing paragraph 3.1.1 is replaced by the following:

"**3.1.1** These tests should be carried out with at least six able-bodied persons of the following heights and weights:

Height	Weight
1.4 m - 1.6 m	1 person under 60 kg 1 person over 60 kg
1.6 m - 1.8 m	1 person under 70 kg 1 person over 70 kg
over 1.8 m	1 person under 80 kg 1 person over 80 kg

At least one and not more than two of the persons should be females with not more than one female in the same height range."

9 In paragraph 3.1.5, the word "shall" is replaced by the word "should".

10 At the end of paragraph 3.1.7, the sentence "The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable." is added.

11 In paragraph 3.1.10, the words "and its attachments" are inserted between the words "anti-exposure suit" and "should not be damaged".

12 In paragraph 3.1.15, the words "for more than 6 s" are inserted between "sustain burning" and "or continue melting".

13 At the end of paragraph 10.4.9, the note is deleted.

14 At the end of paragraph 10.4.9, the following new paragraph is added:

"Flashing lights with a flash duration of not less than 0.3 s may be considered as fixed/steady lights for the measurement of their luminous intensity. Such lights should provide the required luminous intensity in all directions of the upper hemisphere. The time interval between switching on and reaching the required luminous intensity (incandescence time) and all time spent below the required luminous intensity when the light switches off should be disregarded (see figure 10.4.1.)

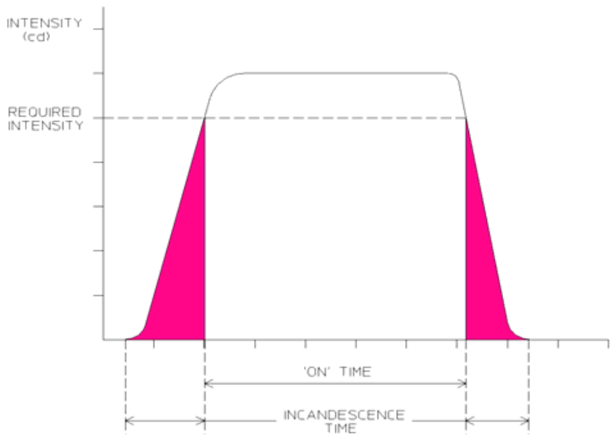


Figure 10.4.1 – "On-time" measurement diagram"

PART 2 – *Production and installation tests*

15 In paragraph 2.2, the word "shall" is replaced by the word "should".

16 The words ", using a dummy smoke signal, if necessary" are inserted between the words "should be" and "to demonstrate" in paragraph 3.1. In the same paragraph, the word "will" is inserted between the words "their attachments" and "drop clear".

17 The following new appendices 1 to 3 are added after part 2:

"APPENDIX 1

ADULT REFERENCE TEST DEVICE (RTD) DESIGN AND CONSTRUCTION

1 **General.** The RTD is intended for use only as a test reference standard to represent the desired level of in-water performance of a lifejacket required by the 1974 SOLAS Convention, and is not considered representative of any other required lifejacket performance. The adult RTD is designed to fit persons from a chest size of 700 mm to 1,350 mm and to be comfortable to wear as a non-reversible device such that it would be obvious to the wearer as to which is the inside and outside of the device, even under reduced lighting conditions. The adult RTD is made with two types of buoyant foam in a vest style using a heavy nylon cover fabric shell secured to the body with 25 mm webbing, closures and adjustments. The shell is made with slide fasteners (zippers) in place of closing seams to hold the foam within, in order that the foam inserts can be easily removed to check their buoyancy and renew or supplement them if they are out of tolerance. Hook and loop fasteners are used on the interior foam retainers to position and prevent shifting of the foam panels.

2 **Materials.** All materials used should comply with ISO 12402-7.

2.1 **Foam requirements.** The performance of the RTD is dependent on using plastic foam of the proper stiffness, shape and buoyancy.

2.1.1 **Stiffness.** Two different stiffness foams are used: one is a soft foam and the other is a stiff foam. A bridge deflection test is provided to determine acceptability for the intended application. Figure A.1 provides the setup details and table A.1 provides the specific measured values. For selecting the type of foam for the specific insert, see tables A.2 and A.3. To measure the centre deflection of a foam panel of the specified cross-section (a × b) and 110 mm wide, place the foam panel centred across the two equal height, parallel horizontal surfaces separated by the specified distance (c), and then load with a mass of the specified width. Note the length of the load should be at least 110 mm, such that when placed on the foam panel it will extend the full width of the foam panel. It is acceptable for the load to extend beyond the width of the foam panel provided that it is centred over the panel with equal amounts extending over the sides of the foam panel. Measure the deflection at the bottom centre location of the foam panel 30 s after placing the load on the panel.

2.1.2 **Shape.** The shape of each foam insert is specified in figures A.8 to A.11. For dimensions see tables A.2 and A.4.

2.1.3 **Buoyancy.** The total design buoyancy of the device is 155,6 N. Table A.3 specifies the foam characteristics, the buoyancy for each insert and its tolerances and the overall buoyancy distribution to be verified when using the RTD for certification testing.

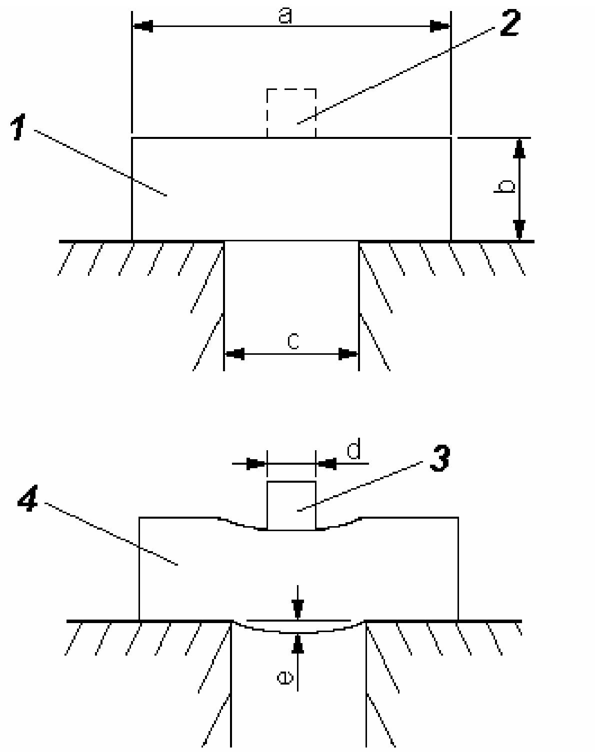
2.2 **Other component requirements.** See table A.2.

3 **Construction.** The construction and assembly of the device should be in accordance with tables A.2 to A.4 and figures A.2 to A.14. A tolerance of ± 6 mm is used throughout for fabric cutting and stitching assembly. A tolerance of ± 6 mm is also used for foam cutting, however, the buoyancy requirements of table A.3 should be met.

3.1 **Seams.** The seam allowances are 13 mm, unless otherwise specified. All structural seams use a lock type stitch so that the seam will not unravel when a force is applied in the direction of the seam on any of the threads forming the stitch. Stitching should have a density of 7 to 12 stitches per 25 mm of stitch length. The box-x stitching on the webbing is 15 mm × 18 mm, unless otherwise specified. The bar-tack stitching on the webbing is 15 mm × 2 mm.

3.1.1 On the closing seam of the back section of the outer and inside cover, the cut ends of the fabric are turned under and stitched so that the fabric will not ravel. The cut ends of webbing should be heat-sealed.

3.1.2 Tabs on the ends of the waist belt are formed by turning under 40 mm of material twice and stitching 19 mm from the end of the folds with box-x or bar tack stitching.



Key
1 Foam at initial setup
2 Centre load
3 Load
4 Foam bridge deflection after 30 seconds

Figure A.1 – Foam bridge deflection test

Table A.1 — Specifications for the foam bridge deflection test

	Dimension shown in figure A.1						Load mass
Foam type	a (Length) mm	(Not shown) (Width) mm	b (Thickness) mm	c (Span) mm	d (Load width) mm	e (Deflection) mm	kg
Stiff	394	110	83	300	120	< 20	8,6
Soft	394	110	45	150	30	≥ 25	0,75

Table A.2 — Parts, quantity and assembly

Component	Description	Quantity	See figure	Construction notes
1 Cover fabric	420 denier nylon, with ravel resistant coating, orange			
1.1 Front outer cover		1	A.2	
1.2 Back outer cover		1	A.2	
1.3 Inside cover		1	A.3	
1.4 Centre gusset		2	A.4	

Component		Description	Quantity	See figure	Construction notes
1.5	Collar, outer and inside cover		2	A.5	
1.6	Fabric reinforcement		4	A.6 A.14	Attach to inside of collar cover, as attachment 1, for reinforcement at webbing attachment (see figure A.14).
1.7	Interior fabric retainers for foam inserts 1		2	A.7 A.13	Attach to inside of front cover, as attachment 3, stitch to cover at each side to form a foam retainer for inside front foam insert components 2.2.1 and 2.2.2 (see figure A.13).
1.8	Interior fabric retainers for foam inserts 2		2	A.7 A.14	Attach hoop and loop fasteners to the ends and stitch at centre to the inside of front cover, as attachment 4, to form a foam retainer for front foam insert components 2.1.1 and 2.1.2 (see figure A.13).
2	**Foam**				
2.1	Stiff	See tables A.1 and A.3			
2.1.1	Front foam insert, right side	81 mm thick	1	A.8	
2.1.2	Front foam insert, left side	81 mm thick	1	A.8	
2.1.3	Collar foam insert	56 mm thick	1	A.10	
2.2	Soft	See tables A.1 and A.3			
2.2.1	Inside front foam insert, right side	46 mm thick	1	A.9	
2.2.2	Inside front foam insert, left side	46 mm thick	1	A.9	
2.2.3	Back foam insert	32 mm thick	1	A.11	
3	**Webbing**	25 mm, polypropylene, with easy adjustment and no significant slippage when used with the specified hardware.			
3.1	Chest strap	127 mm, black	2	A.12	On left side of front cover, attach webbing with male buckle. On right side of front cover attach webbing with female buckle. The free ends of the chest strap are folded under the yellow

Component	Description	Quantity	See figure	Construction notes
				webbing (collar attachment webbing), with reinforcing fabric (see figure A.6) on inside of cover fabric. A box-x stitch is used to attached the chest strap to the front cover.
3.2 Waist belt	152 mm, black	2	A.12	On left side attach waist belt with slide and buckle clip waist belt. On right side attach bottom belt with D-ring and slide.
3.3 Waist belt	1,867 mm, black	1	A.12 A.13	Form 40 mm tab on each end. Attach to back cover using three box-x stitches (after front and back covers are assembled).
3.4 Belt loop on front cover	76 mm, black	2	A.12	Attach webbing to front outer cover and form a belt loop (one on each side) by two sets of double bar tack stitches
3.5 Belt loop on inside cover	89 mm, black	2	A.13	Attach webbing to inside cover and form a belt loop (one on each side) by two box-x stitches
3.6 Collar attachment	1,384 mm, yellow	1	A.14 A.6 A.12	Attach webbing to collar and reinforcing fabric, in two places using box-x stitch
4 Hook and loop fastener	50 mm × 70 mm, black generic	2	A.13 A.7	Hook and loop fasteners are attached to the ends of interior fabric retainer for foam insert
5 Thread	Generic synthetic	AR		
6 Hardware				
6.1 Buckle	Male and female 25 mm, plastic, 890 N single-end strength	1		Chest strap
6.2 Slide	Adjuster 25 mm, plastic, 1,600 N single-end strength	2		Waist belt
6.3 Snap hook	25 mm, SS, 1,600 N single-end strength	1		Waist belt
6.4 D-ring	25 mm, SS, 1,600 N single-end strength	2		Waist belt
6.5 Zipper	280 mm, plastic (zipper chain and pulls)	1	A.14	Foam access for collar cover

Component	Description	Quantity	See figure	Construction notes
6.6 Zipper	370 mm, plastic (zipper chain and pulls)	1	A.12	Foam access for back cover
6.7 Zipper	440 mm, plastic (zipper chain and pulls)	2	A.12 A.13	Foam access for front cover

Table A.3 — Foam insert specifications

Values in Newtons (N)

	Front right	Front left	Inside front right	Inside front left	Back	Collar
Foam type[a]	Stiff	Stiff	Soft	Soft	Soft	Stiff
Buoyancy[b]	34 ± 1.2	34 ± 1.2	17.5 ± 0.65	17.5 ± 0.65	18 ± 0.8	28 ± 1

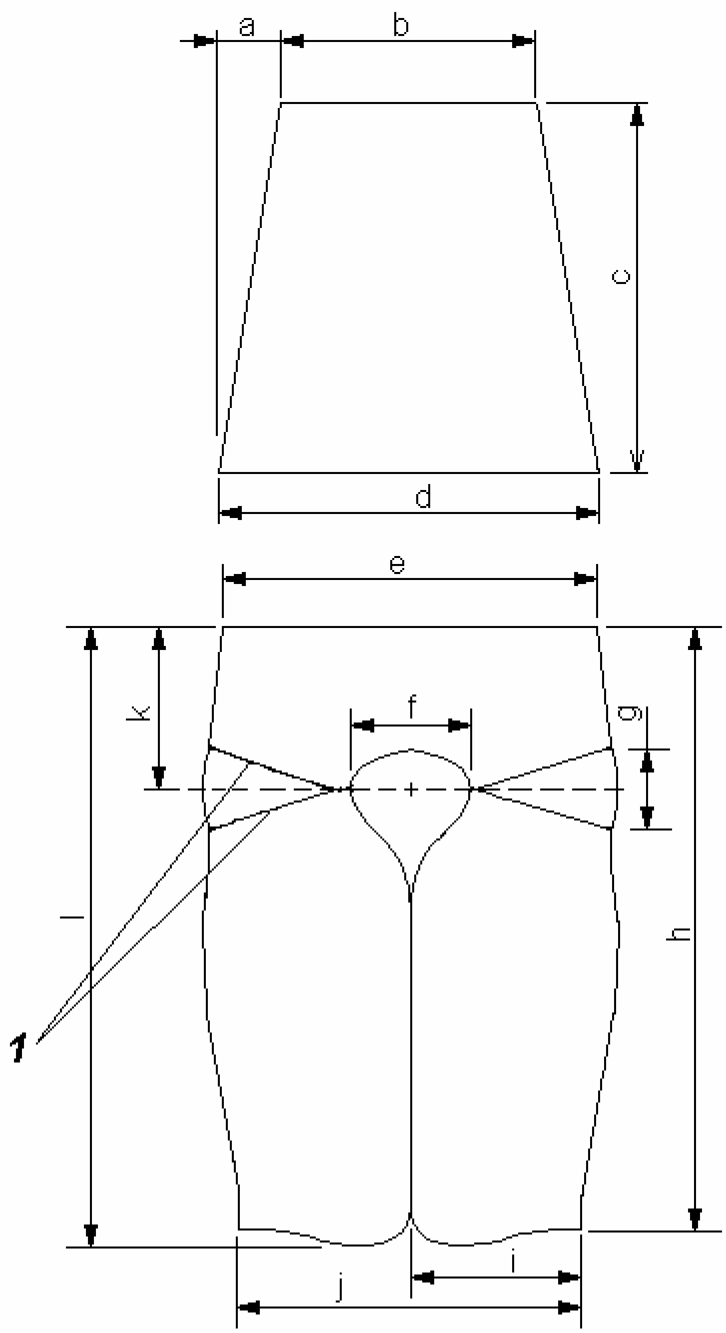
[a] The buoyancy of most foams will change over time with the greatest change occurring in the first several months after manufacture. The exact kind of foam selected with need to be evaluated to determine the amount of additional buoyancy needed at the time of manufacture to maintain the values specified.

[b] Buoyancy distribution: 69 % front ± 1.5 percentage points

Table A.4 – List of dimensions shown in figures A.2 to A.14

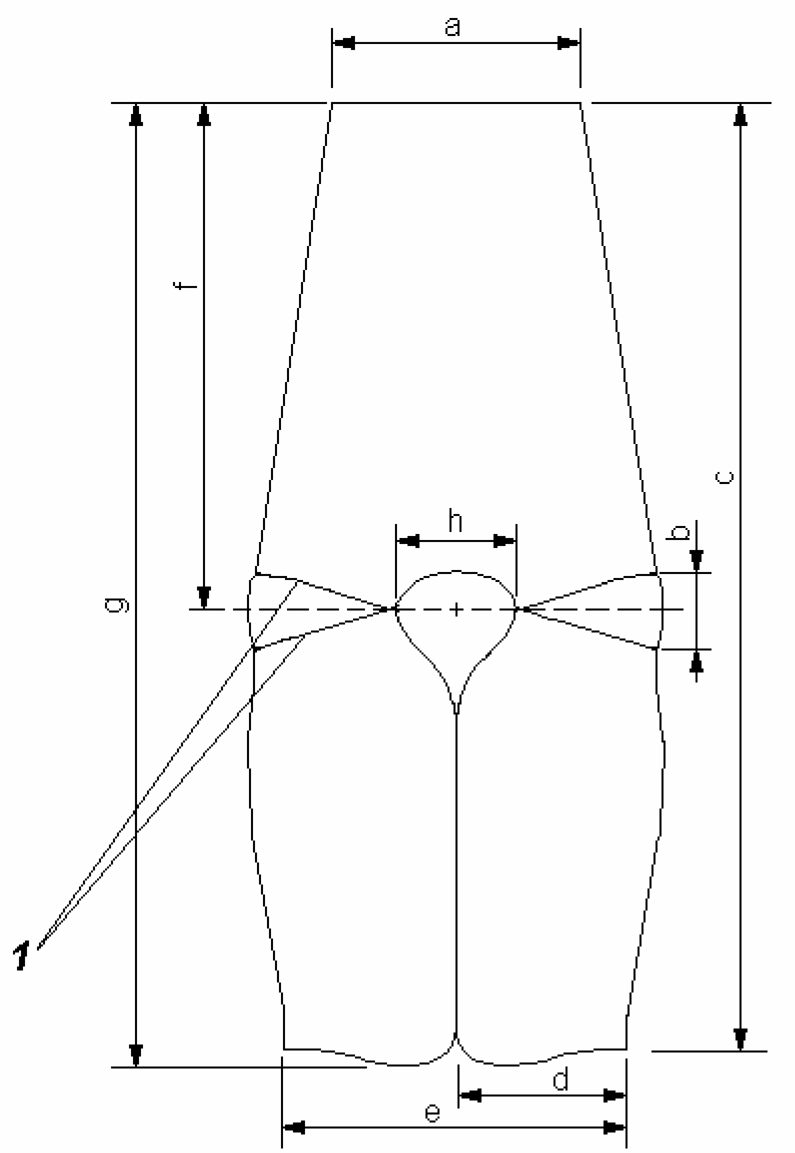
Dimensions in millimetres

Letter	Figure										
	A.2	A.3	A.4	A.5	A.6, A.7	A.8	A.9	A.10	A.11	A.12	A.13	A.14
a	72	294	23	308	73	198	76	20	188	100	100	25
b	298	100	516	142	73	46	46	56	274	35	35	160
c	438	1,106	618	10	130	76	394	51	414	20	20	53
d	442	199	102	288	205	81	38	216	343	35	300	25
e	432	398		342	72	76	51	229	147	120	30	45
f	141	597		476	470	157	165	259	223	260		
g	100	1,124		65		394		45		85		
R								70				
h	705	141				46				40		
i	199					8				55		
j	398					20				225		
k	188					20				75		
l	723					76						
m						46						
n						38						
o						165						
p						25						



Key
1 Dart

Figure A.2 – Outer cover, front and back sections



Key
1 Dart

Figure A.3 – Inside cover

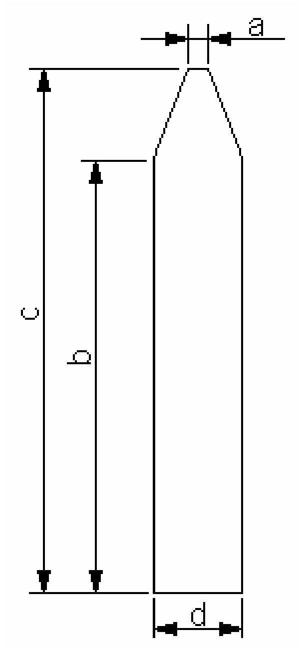


Figure A.4 – Centre gusset

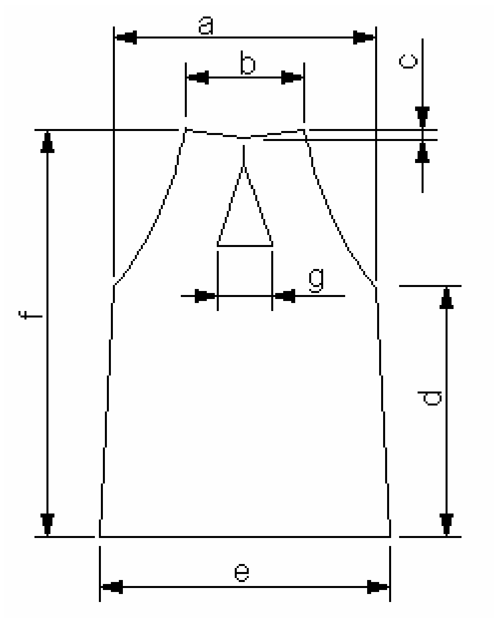


Figure A.5 – Outer and inside cover, collar

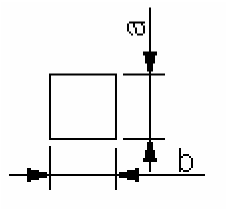


Figure A.6 – Fabric reinforcement

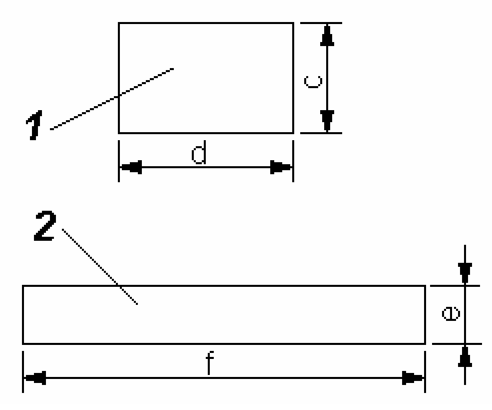
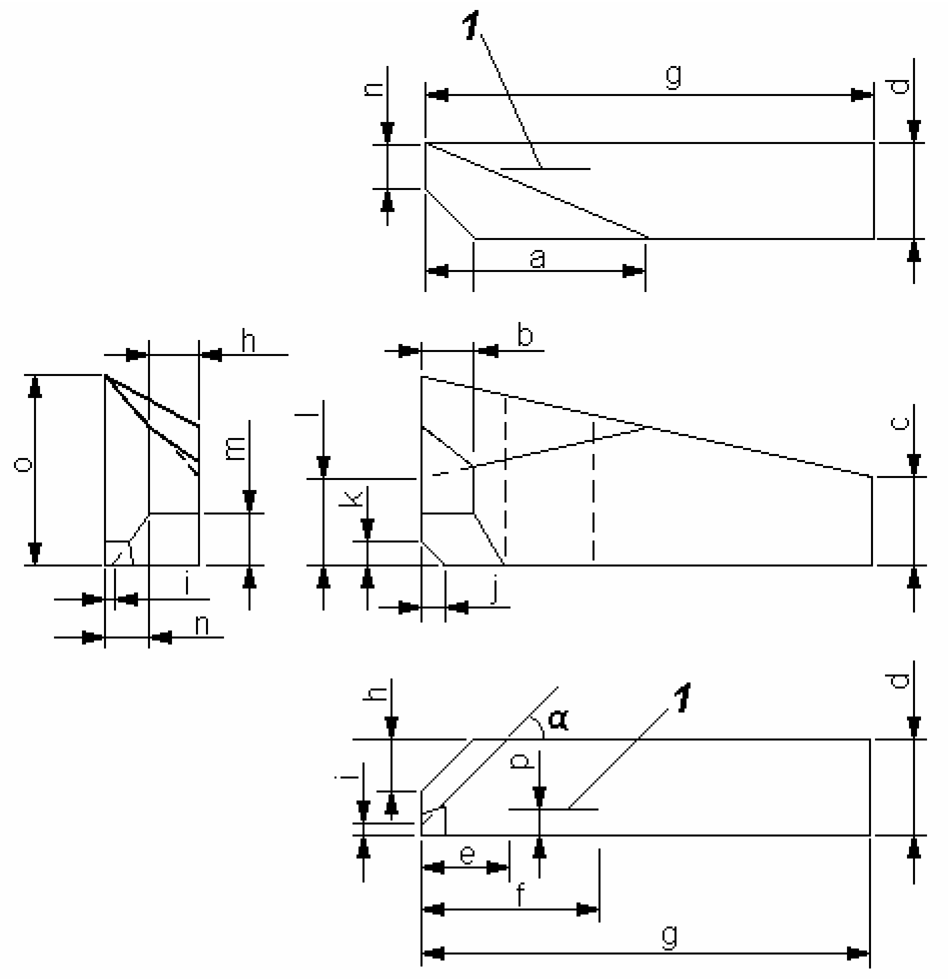


Figure A.7 – Interior foam retainer



Key

1 Slot

α 45°

Figure A.8 – Front foam insert

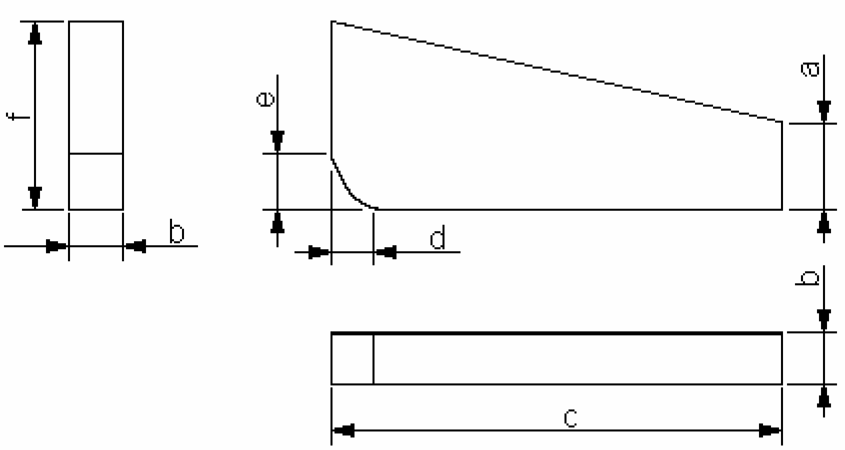
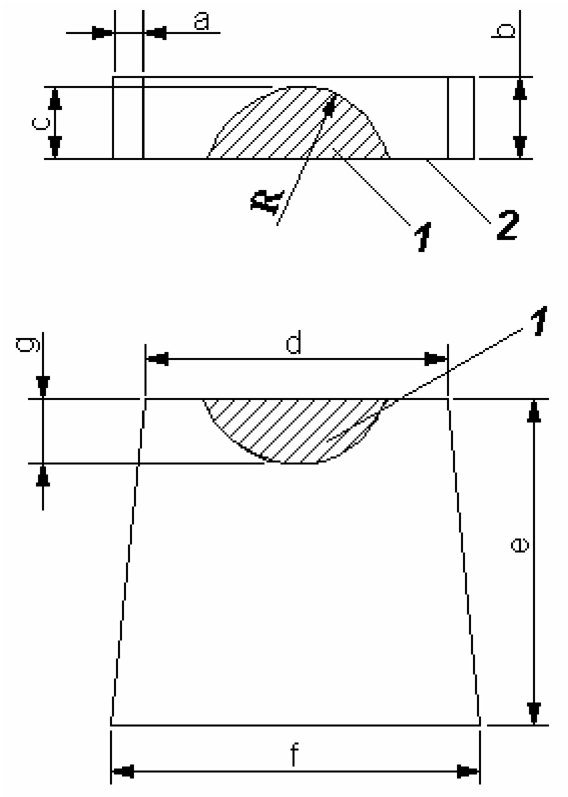


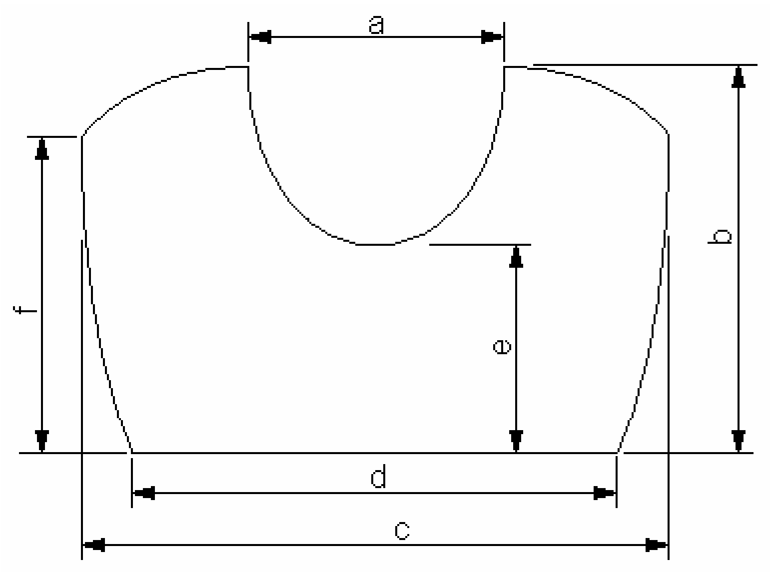
Figure A.9 – Inside front foam insert



Key

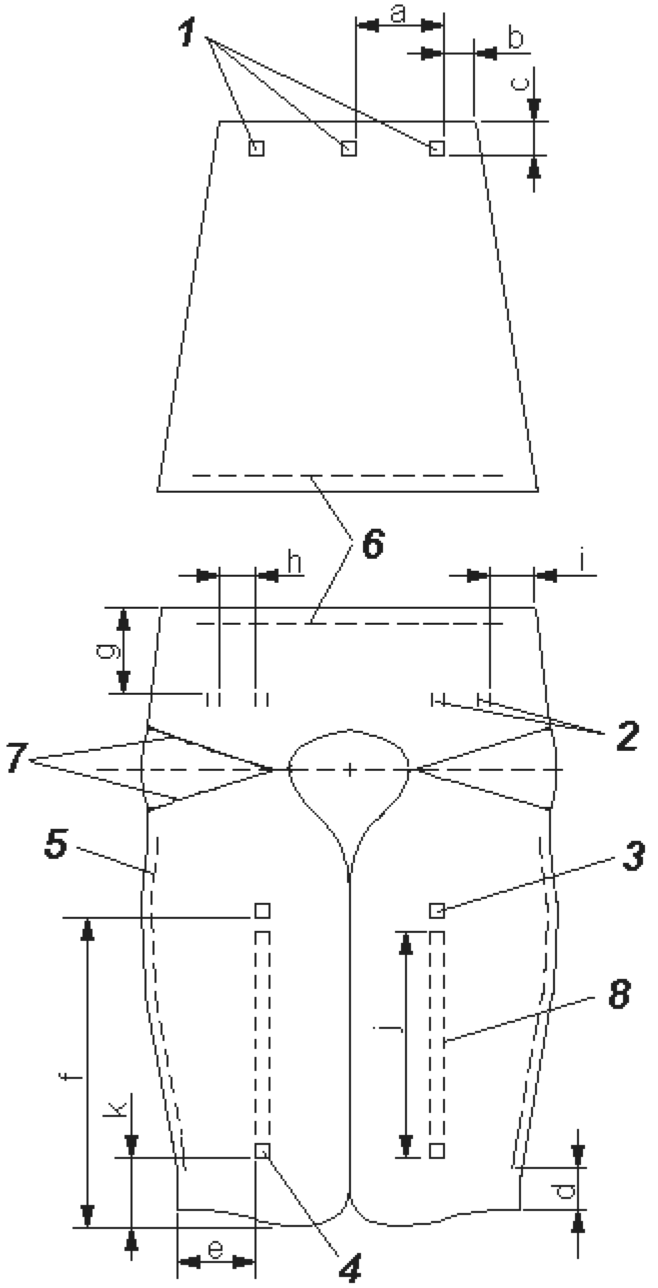
1 Skive
2 Side towards body

Figure A.10 – Collar foam insert



Thickness = 25 mm

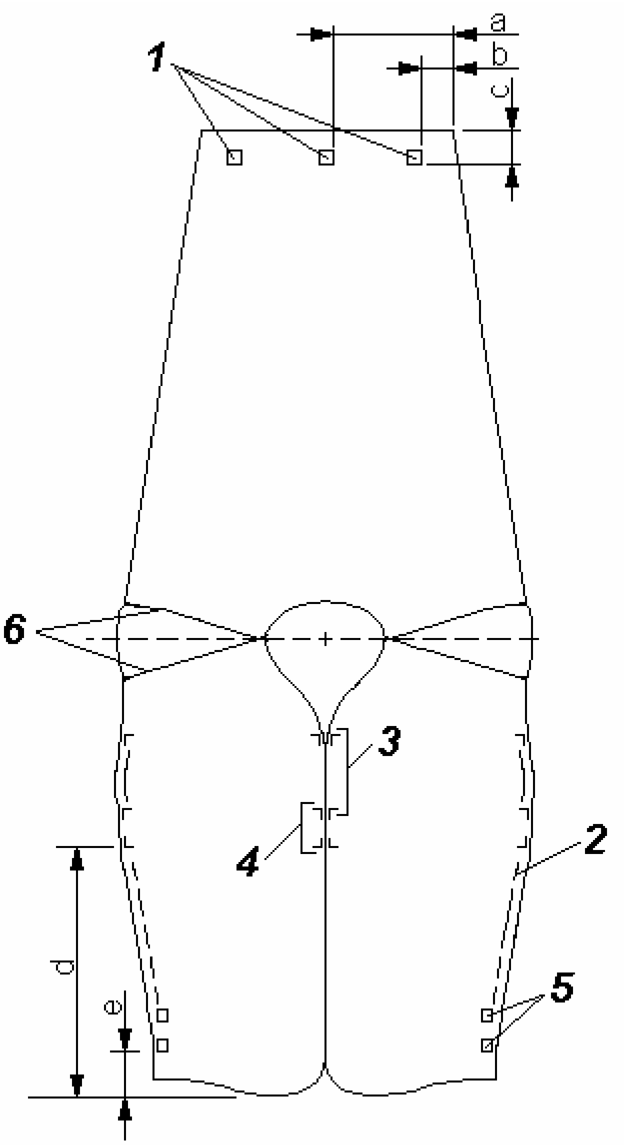
Figure A.11 – Back foam insert



Key

1 Waist belt (1,867 mm) attachment to outside of back cover
2 Zipper (440 mm) attachment to front
3 Chest strap webbing (127 mm) attachment to outside of front cover
4 Waist belt (152 mm) attachment to outside of front cover
5 Belt loop webbing (76 mm) attachment to outside of front cover
6 Zipper (370 mm) attachment to the front and back covers
7 Dart
8 Collar webbing (1,384 mm) attachment to outside of front cover

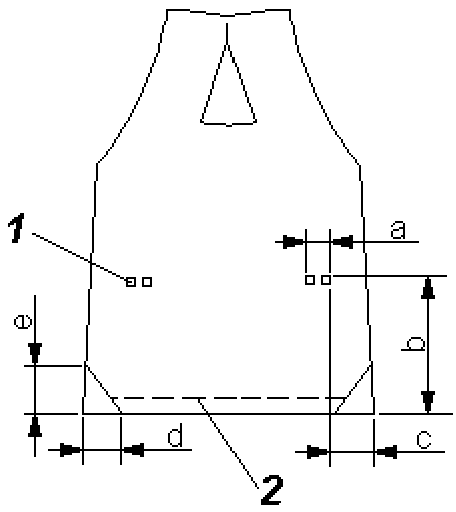
Figure A.12 – Attachments to front and back cover



Key

1	Waist belt (1,867 mm) attachment to outside of back cover and inside cover (see figure A.12)
2	Zipper (440 mm) attachment
3	Interior fabric retainer attachment to inside front cover
4	Interior fabric retainer attachment to centre of inside front cover
5	Belt loop webbing (89 mm) attachment to outside of cover
6	Dart

Figure A.13 – Attachments to inside cover



Key

1 Collar webbing (1,384 mm) attachment on the outside of the inner cover with reinforcement fabric inside

2 Zipper (280 mm) attachment to the outer and inner covers

Figure A.14 – Attachments to outer and inside collar cover

APPENDIX

RTD Serial number: ___________

ADULT REFERENCE TEST DEVICE – BUOYANCY TRACKING AND VERIFICATION

To achieve repeatability in human subject testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD must be maintained within a tight tolerance as specified in Table 1.

Table 1 – SOLAS adult RTD buoyancy and tolerance

Limit / Units	Front buoyancy[1]	Back buoyancy	Total buoyancy	Buoyancy distribution[2]
Design / N	103.5	46.5	150	69% in front
Maximum / N	107	48	155	70.5% in front
Minimum / N	100	45	145	67.5% in front

[1] Values at or corrected to standard temperature and pressure.
[2] Buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTDs with buoyancies within tolerance should be used for certification testing. A data sheet to document the buoyancy and buoyancy distribution of the RTD is attached.

Adjustment of buoyancy: At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, thin layers of foam (“make-up” inserts) may have been inserted between the front and inside front foam inserts. The test house may need to increase the size of these make-up inserts from time to time to keep these parameters within tolerance, or may need to add buoyancy to the back or collar inserts (or trim buoyancy, if the back insert has not shrunk as anticipated). Figure 2 provides guidance for sizing of make-up inserts to adjust buoyancy. After a full sheet of 6.5 mm thick foam is required in any one of the four major areas, an inside front or back insert probably needs to be replaced. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained.

Table 2 – SOLAS adult RTD insert design buoyancies

	Combined left front and inside front [1]	Combined right front and inside front [1]	Back	Collar
Design (N)	34 + 17.75 = 51.75	34 + 17.75 = 51.75	18.5	28
S/N ____ Date:				

[1] Plus make-up inserts, if used.

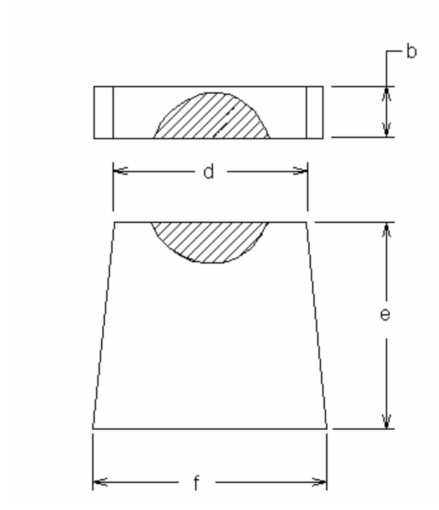
RTD BUOYANCY DATA SHEET

RTD Serial number/identification: _________________

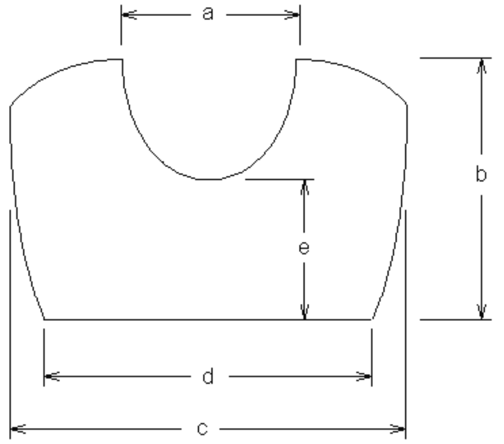
Date	Left front buoyancy (N)	Right front buoyancy (N)	Total front buoyancy (N)	Total back buoyancy (N)	Total buoyancy (N)	Buoyancy distribution (% in front)	Remarks
	(1)		(2)				

(1) Left and right front buoyancy need not be checked if distribution is within tolerance.

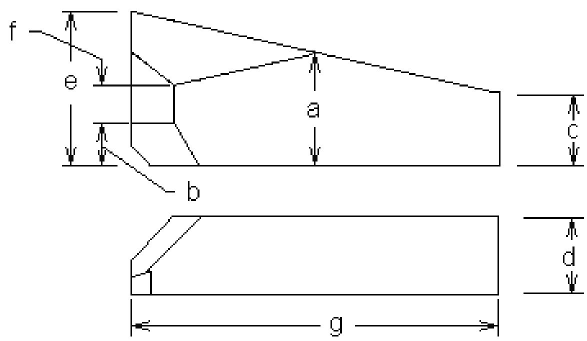
(2) If the temperature and pressure at the time of measurement is not at standard conditions, these values should be corrected to standard temperature and pressure.



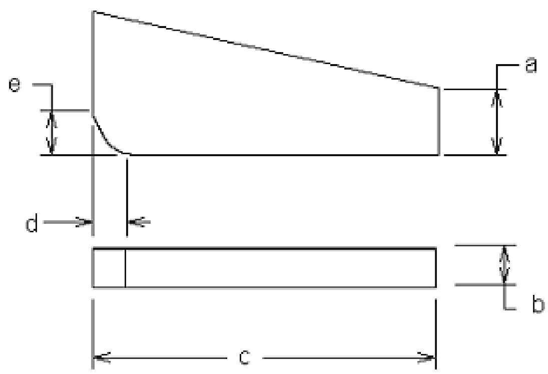
COLLAR INSERT



BACK INSERT



FRONT INSERT



INSIDE FRONT FOAM INSERT

Figure 1 – Adult RTD foam insert nomenclature

Buoyancy (N)	Length (mm)	Height (mm)
0.9	84	146
1.3	126	137
1.8	172	126
2.2	222	114
3.1	394	76

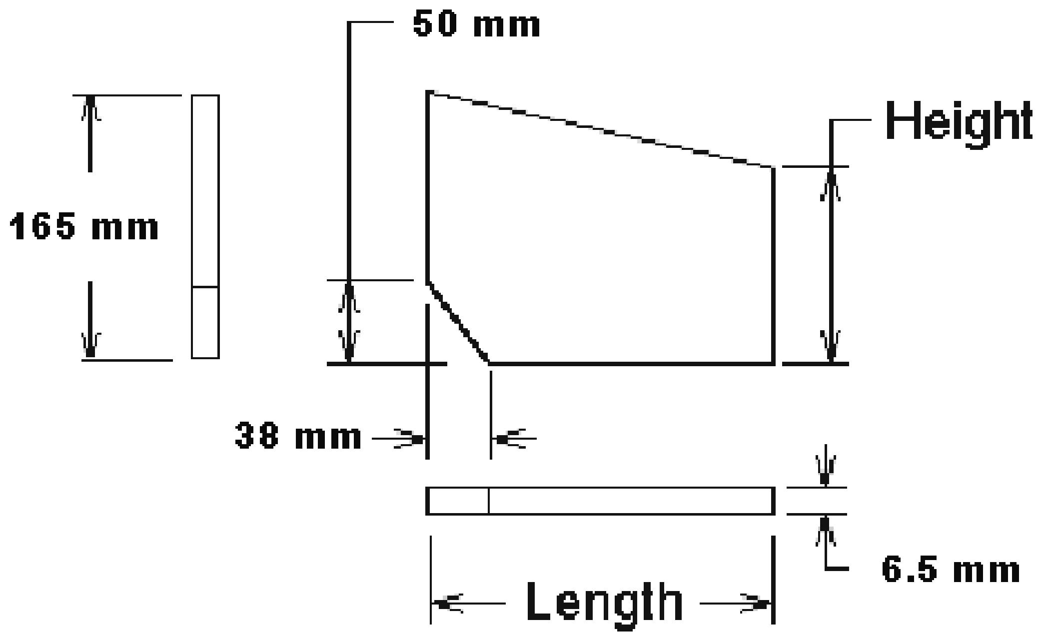


Figure 2 – Adult RTD "make-up" foam insert sizes

APPENDIX 2

CHILD REFERENCE TEST DEVICE (RTD) DESIGN AND CONSTRUCTION

1 **General.** The RTD is intended for use only as a test reference standard to represent the desired level of in-water performance of a lifejacket required by the 1974 SOLAS Convention, and is not considered representative of any other required lifejacket performance. The child RTD is for persons weighing approximately 15 to 43 kg, or 100 to 155 cm in height. The device is designed to fit persons with chest sizes from 50 cm to 70 cm. This RTD is made with layers of buoyant foam in a bib-style design using a heavy nylon shell cover fabric secured to the body with a waist belt with quick and positive closure and adjustment, along with a chest strap at the neck for closure and adjustment. The shell is made with slide fasteners (zippers) in place of closing seams to hold the foam within, in order that the foam inserts can be easily removed to check their buoyancy and renew or supplement them if they are out of tolerance. The RTD is designed to be reasonably comfortable to wear as a non-reversible device.

2 **Materials.** All materials used should comply with ISO 12402-7.

2.1 **Foam requirements.** The performance of the RTD is dependent on using plastic foam of the proper stiffness, shape and buoyancy.

2.1.1 **Stiffness.** The buoyant inserts are made of layers of medium stiffness foam to create a flexible but firm buoyancy element.

2.1.2 **Shape.** The shape of each foam layer is identified in figures B.2 and B.3. Dimensions are in tables B.1, B.2 and B.3.

2.1.3 **Buoyancy.** The total design buoyancy of the device is 88 N. Table B.4 specifies foam characteristics, the buoyancy for each insert and its tolerances, and the overall buoyancy distribution to be verified when using the RTD for certification testing.

2.2 **Other component requirements.** See table B.1.

3 **Construction.** The construction and assembly of the device should be in accordance with tables B.1 and B.5 and figures B.1 through B.9. A tolerance of ± 6 mm is used throughout for fabric cutting and stitching assembly. A tolerance of ± 6 mm is also used for foam cutting, however, the buoyancy requirements of table A.3 should be met.

3.1 **Seams.** Seam allowances are 13 mm, unless otherwise specified. All structural seams use a lock type stitch so that the seam will not unravel when a force is applied in the direction of the seam on any of the threads forming the stitch. Stitching should have a density of 7 to 12 stitches per 25 mm of stitch length. Box-x stitching on the webbing is 30 x 15 mm for the waist belt and 15 x 13 mm for the belt loop and chest strap, unless otherwise specified. The bar-tack stitching on webbing is 30 x 2 mm for the waist belt and 15 x 2 mm for the belt loop and chest strap.

3.1.1 The fabric reinforcements for the waist belt, belt loop and chest strap should be attached to the inside surface of the outside cover before attaching any of these items. On the closing seam of the top and bottom sections of the outside and inside cover, the cut ends of the fabric is turned under and stitched when installing the zippers so that the fabric will not ravel and so that the folds are flush with the line where the zipper teeth mesh (zippers installed to be hidden by cover fabric when closed).

Table B.1 – Parts, quantity and assembly

Component	Description	Quantity	See figure	Construction notes
1 **Cover fabric**	420 denier nylon, with ravel resistant coating, orange		B.1, B.4, and B.9	
1.1 Outside cover		1	B.1, B.4, and B.9	
1.2 Inside cover		1	B.1, B.4, and B.9	
1.3 Fabric reinforce-ment, chest strap)		2	B.5 and B.9	Attach one each to inside left and right outside covers for the chest strap. Use lock stitches on three sides each (see figure B.9 for locations).
1.4 Fabric reinforce-ment, belt, and belt loop		2	B.5 and B.9	Attach to inside left and right outside covers for the waist belt and belt loop. Use lock stitches on three sides (see figure B.9 for location).
2 **Foam**	7 mm thickness, polyethylene (PE) foam, except for one layer as needed to achieve required buoyancy		B.2 and B.3	Layers stacked per figures B.2 and B.3.
2.1 Front foam insert, left		13 layers	B.2	Trim corner of layers A and B only per figure B.2.
2.2 Front foam insert, right		13 layers	B.2	Trim corner of layers A and B only per figure B.2.
2.3 Back foam insert		11 layers	B.3	
3 **Webbing**				All cut ends heat-sealed.
3.1 Waist belt webbing	38 mm, black, polypropylene, with easy adjustment and no significant slippage when used with the specified hardware.	1,285 mm cut length	B.1, B.8 and B.9	On left side attach waist belt with fixed part of buckle. Tab on the end of belt formed by turning under 40 mm of material twice and stitching 19 mm from the end of the fold with a bar-tack stitch. For location see figure B.9.
3.2 Belt loop webbing	19 mm, black, polypropylene.	80 mm cut length	B.1 and B.9	Attach webbing to front outside cover with two sets of double bar tack stitches to form a belt loop. For location see figure B.9.

Component	Description	Quantity	See figure	Construction notes
3.3 Chest strap webbing	19 mm, black, polypropylene.	235 mm and 80 mm cut length	B.1, B.7 and B.9	Attach webbing with female buckle to right outside cover. Attach webbing with male buckle to left outside cover. For location see figure B.9. Tab formed 75 mm from the free end of the male section of chest strap by folding in "Z" pattern 30 mm apart and stitching 15 mm from the fold with a bar-tack stitch. See figure B.7.
4 Thread	Generic synthetic	AR		
5 Hardware				
5.1 Buckle	38 mm, plastic (male and female sections)	1	B.1 and B.8	Used in waist belt assembly
5.2 Buckle	19 mm, plastic (male and female sections)	1	B.1 and B.7	Used in chest strap assembly
5.3 Zipper	380 mm, plastic (zipper chain length)	1	B.1 and B.9	
5.4 Zipper	150 mm, plastic separating (zipper chain and box/pin length)	2	B.1 and B.9	

Table B.2 – List of dimensions shown in figure B.2

Dimension	Insert layer dimensions (mm)				
	A	*B*	*C*	*D*	*E*
a	145	140	125	115	95
b	305	300	285	275	255
c	30	30	0	0	0
d	30	30	0	0	0

Table B.3 – List of dimensions shown in figure B.3

Dimension	Insert layer dimensions (mm)				
	A	*B*	*C*	*D*	*E*
a	343	335	325	315	305
b	140	133	120	108	95
c	9	5	3	0	-5*
R	46	50	52	55	55

*measured in direction opposite to that shown in figure.

Table B.4 – Foam insert specifications

	Left front insert	Right front insert	Back insert
Density	29 ± 5 kg/m^3	29 ± 5 kg/m^3	29 ± 5 kg/m^3
Compressive strength at 25% (ISO 3386-1)	35 ± 10 kPa	35 ± 10 kPa	35 ± 10 kPa
Buoyancy [a, b]	31.5 ± 1.2 N	31.5 ± 1.2 N	25 ± 1.2 N

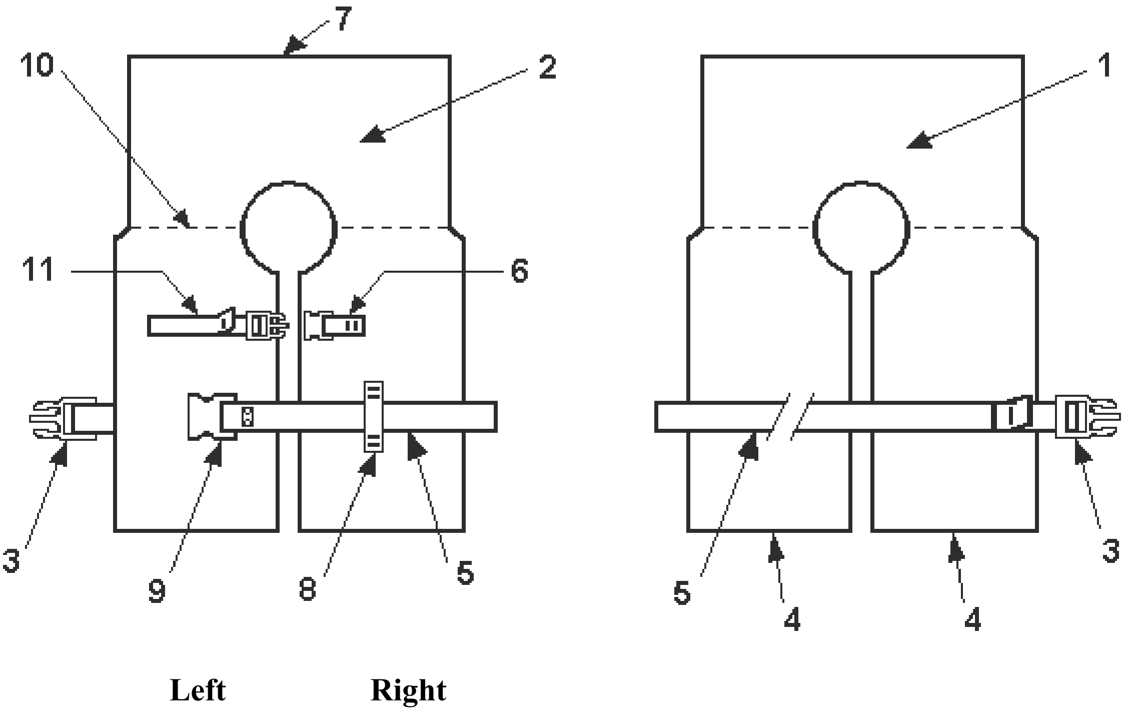
[a] The buoyancy of most foams will change over time with the greatest change occurring in the first several months after manufacture. The exact kind of foam selected with need to be evaluated to determine the amount of additional buoyancy needed at the time of manufacture to achieve the values specified.

[b] Buoyancy distribution: 71.5% front ± 1.5 percentage points

Table B.5 – List of dimensions shown in figures B.4 - B.9

Dimension	Dimensions (mm)						
	Figure B.4	Figure B.5		Figure B.6	Figure B.7	Figure B.8	Figure B.9
		Key-1	Key-2				
a	420	75	80	75	90	1,150*	45
b	210	105	110		40		135
c	92						85
d	210						45
e	356						25
f	230						33
g	460						115
h	375						25
i	580						265

* With webbing assembly fully extended.

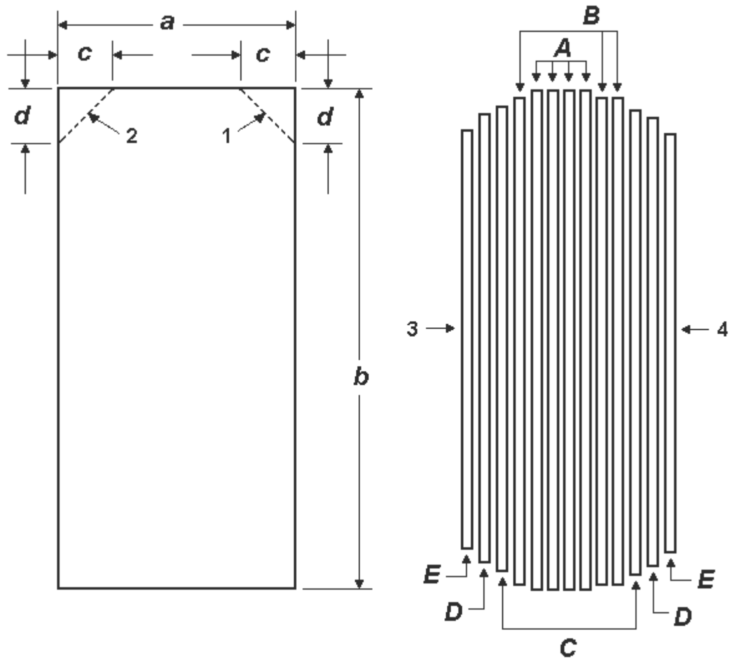


Outside (front) **Inside**

Key

1	Inside cover fabric
2	Outside cover fabric
3	Adjustable part of waist belt closure
4	Zippers for access to front right and left foam compartment
5	Waist belt
6	Fixed part of chest strap
7	Zipper for access to back foam compartment
8	Belt loop
9	Fixed part of waist belt closure
10	Lockstitch to provide foam compartment separation
11	Adjustable part of chest strap

Figure B.1 – General arrangement, right side out (outside and inside)



Key

1 Trim upper right corner only for left insert layers per table B.2
2 Trim upper left corner only for right insert layers per table B.2
3 Outside
4 Inside

Figure B.2 – Front foam inserts (right and left sides)

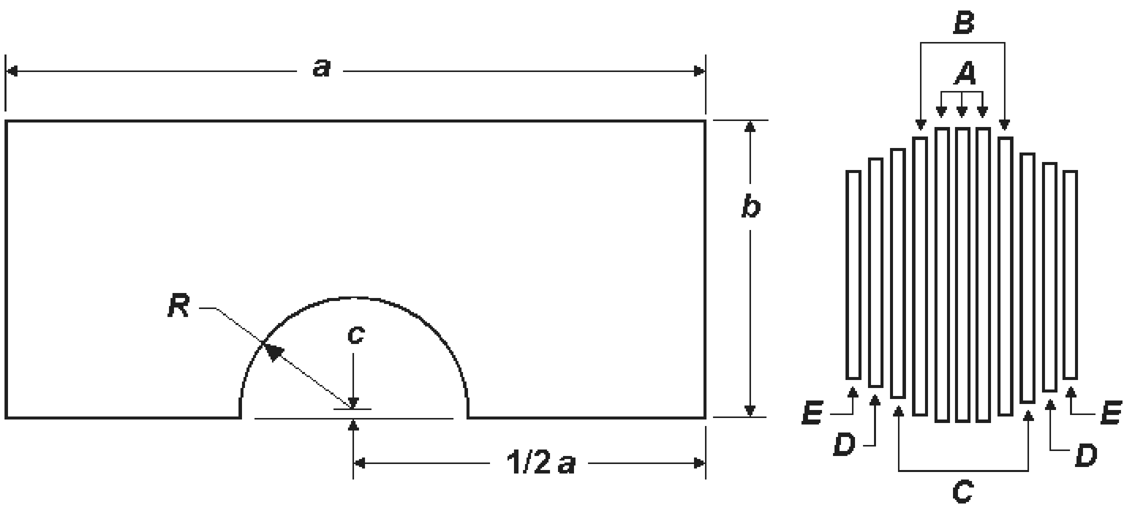


Figure B.3 – Back foam insert

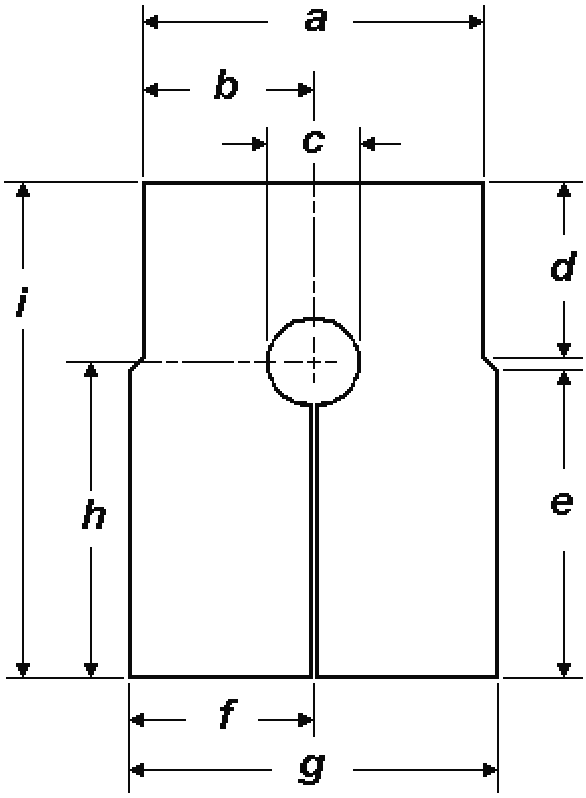
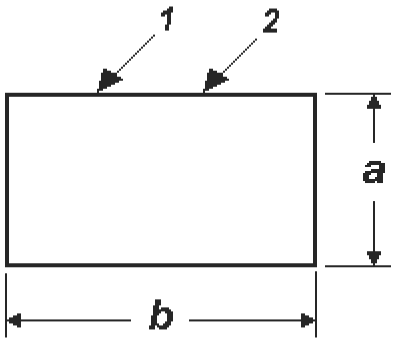


Figure B.4 – Cover cut pattern (outside and inside covers)

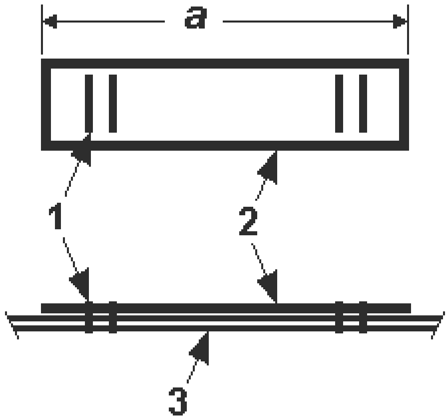


Key

1 Fabric reinforcements for chest strap attachments

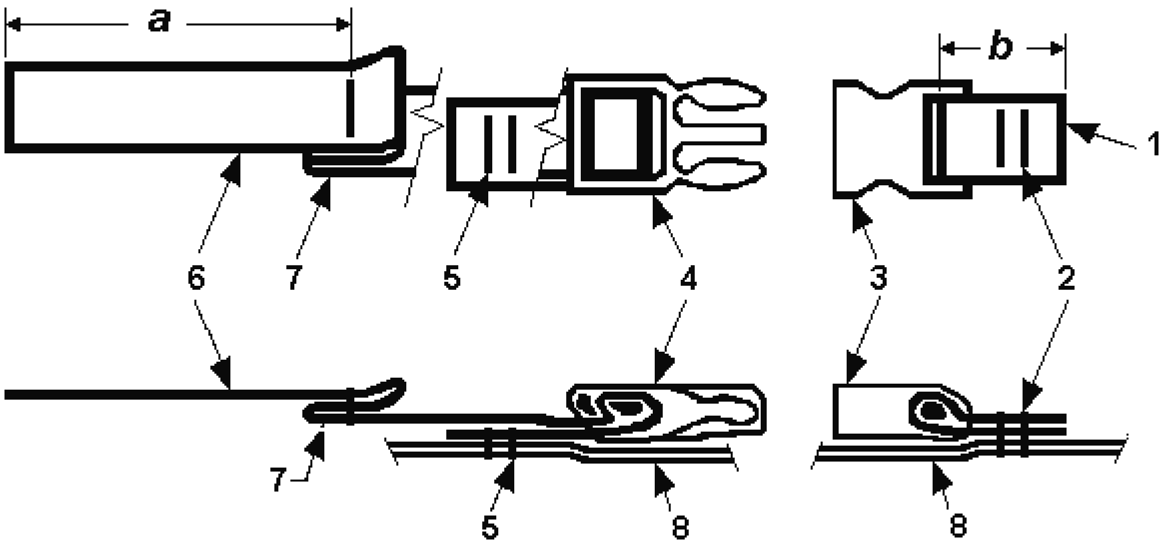
2 Fabric reinforcement for waist belt and belt loop attachments

Figure B.5 – Fabric reinforcements



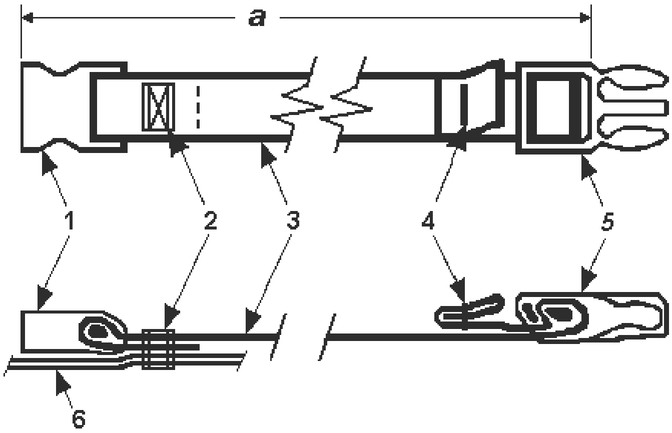
Key
1 Bar-tack
2 Webbing
3 Outer cover and reinforcement (shown on lower view only)

Figure B.6 – Belt loop



Key
1 Webbing
2 Double bar-tack (or Box-x) stitch
3 Fixed part of closure
4 Adjustable part of closure
5 Double bar-tack (or Box-x) stitch
6 Webbing
7 Tab
8 Outer cover and reinforcement (shown on lower view only)

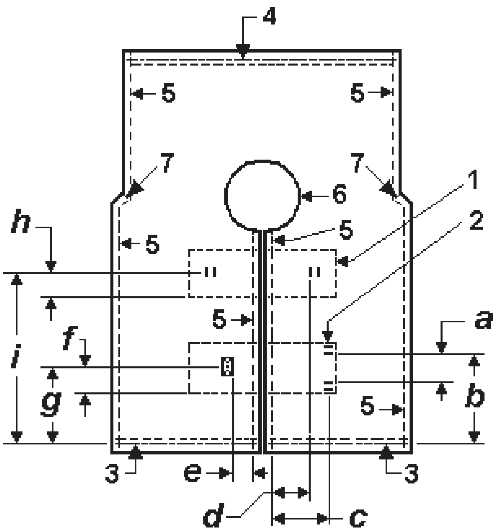
Figure B.7 – Chest strap assembly (adjustable part left and fixed part right)



Key

1 Fixed part of closure
2 Box-x (or double bar-tack) stitch
3 Webbing
4 Tab, double fold webbing and secure with a bar-tack stitch
5 Adjustable part of closure
6 Outer left cover and reinforcement (shown on lower view only)

Figure B.8 – Waist belt assembly



Key

1 Stitching on interior fabric reinforcement for chest strap on right and left sides of the outside cover
2 Stitching on interior fabric reinforcement for waist belt and belt loop on right and left sides of the outside cover
3 Fabric fold and zipper teeth line of engagement when zipper is attached to outside and inside covers
4 Fabric fold and zipper teeth line of engagement when zipper is attached to outside and inside covers
5 Lockstitch seams (with fabric face to face)
6 Lockstitch with 5 mm seam allowance and over-edge stitch (with fabric face to face)
7 After stitching cut relief

Figure B.9 – Initial assembly (shown right side out, except as noted)

APPENDIX

RTD Serial number: ___________

CHILD REFERENCE TEST DEVICE – BUOYANCY TRACKING AND VERIFICATION

To achieve repeatability in human subject and manikin testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD should be maintained within a tight tolerance as specified in Table 1.

Table 1 – SOLAS child RTD buoyancy and tolerance

Limit / Units	Front buoyancy (1) (2)	Back buoyancy (1)	Total buoyancy (1)	Buoyancy distribution (3)
Design / N	63	25	88	71.5% in front
Maximum / N	65.4	26.2	91.6	73% in front
Minimum / N	60.6	23.8	84.4	70% in front

(1) Values at or corrected to standard temperature and pressure.
(2) The left-to-right buoyancy distribution in the front inserts is to be within 1.3 N of each other.
(3) Buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTD's with buoyancies within tolerance should be used for certification testing. A data sheet to document the buoyancy and buoyancy distribution of the RTD is attached.

To check buoyancy tolerances, foam inserts need to be removed from the device. Take care that all trapped air is removed when checking buoyancy and that layers are maintained in their proper sequence when reinstalled (considerable effort would be needed to remove entrapped air if testing the intact device).

Adjustment of buoyancy: At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, the layers were individually selected to achieve the cumulative insert buoyancy. If buoyancy of a new device exceeds the upper limits, one layer per compartment may be altered or replaced to bring the unit into compliance. The test house may need to add make-up layers (see figure 3) from time to time to maintain the front-to-back and side-to-side insert tolerances. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained.

Table 2 – SOLAS child RTD insert design buoyancies

	Combined left front insert (13 layers)	Combined right front insert (13 layers)	Combined back insert (11 layers)
Design (N)	31.5	31.5	25
S/N ____ Date:			

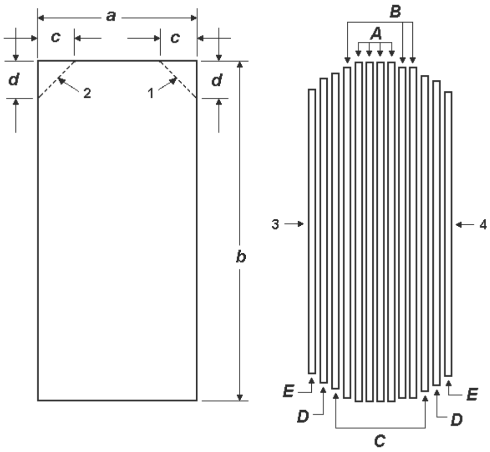
RTD BUOYANCY DATA SHEET

RTD Serial number/identification: _________________

Date	Left front buoyancy (N)	Right front buoyancy (N)	Total front buoyancy (N)	Total back buoyancy (N)	Total buoyancy (N)	Buoyancy distribution (% in front)	Remarks
	(1)		(2)				

(1) Left and right front buoyancy need not be checked if distribution is within tolerance.

(2) If the temperature and pressure at the time of measurement is not at standard conditions, these values should be corrected to standard temperature and pressure.

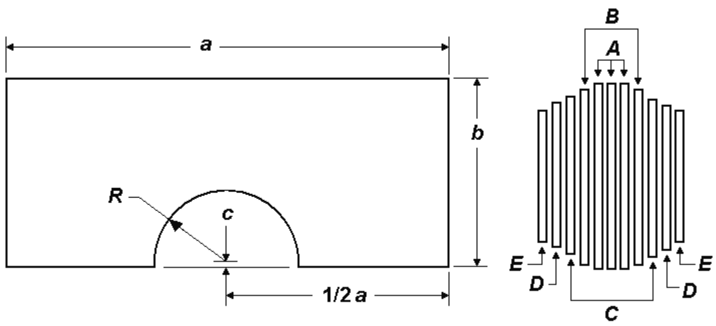


Key

1 Trim upper right corner only for left insert layers A and B.
2 Trim upper left corner only for right insert layers A and B.
3 Outside
4 Inside

Insert layer	Buoyancy (approx.) (N)	Insert layer dimensions (mm)			
		a	*b*	*c*	*d*
A	2.8	145	305	30	30
B	2.7	140	300	30	30
C	2.3	125	285	0	0
D	2.0	115	275	0	0
E	1.6	95	255	0	0

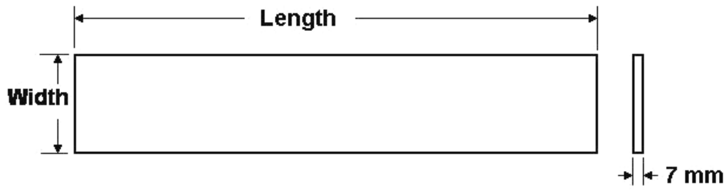
Figure 1 – Front foam insert specifications



Insert layer	Buoyancy (approx.) (N)	Insert layer dimensions (mm)			
		a	*b*	*c*	*R*
A	2.8	343	140	9	46
B	2.6	335	133	5	50
C	2.2	325	120	3	52
D	1.9	315	108	0	55
E	1.6	305	95	-5*	55

* measured in direction opposite to that shown in figure.

Figure 2 – Back foam insert specifications



1 Any thickness of foam up to 7 mm is acceptable for a make-up layer.
2 For 7 mm thick foam, 15,300 mm^2 surface area equals approximately 1 N of buoyancy.

Make-up layer (1)	Buoyancy (approx.) (N)	Make-up layer dimensions (mm)	
		Length (mm) (2)	Width (mm)
Front	1.0	300	51
	1.5		76
Back	1.0	340	45
	1.5		67

(1) For 7 mm thick foam.

(2) The length for make-up layer is fixed to maintain proper placement within the lifejacket, but the width may vary to obtain desired buoyancy.

Figure 3 – Child RTD "make-up" foam insert sizes

APPENDIX 3

INFANT REFERENCE TEST DEVICE (RTD) DESIGN AND CONSTRUCTION

1 **General.** The RTD is intended for use only as a test reference standard to represent the desired level of in-water performance of a lifejacket required by the 1974 SOLAS Convention, and is not considered representative of any other required lifejacket performance. The infant RTD is for persons weighing less than 15 kg, or less than 100 cm in height. The device is designed to fit persons with a chest size of less than 50 cm. This RTD is made with layers of buoyant foam in a bib-style design using a heavy nylon shell cover fabric secured to the body with a waist belt with quick and positive closure and adjustment, along with a chest strap at the neck for closure and adjustment. The shell is made with slide fasteners (zippers) in place of closing seams to hold the foam within, in order that the foam inserts can be easily removed to check their buoyancy and renew or supplement them if they are out of tolerance. The RTD is designed to be reasonably comfortable to wear as a non-reversible device.

2 **Materials.** All materials used should comply with ISO 12402-7.

2.1 **Foam requirements.** The performance of the RTD is dependent on using plastic foam of the proper stiffness, shapes, and buoyancy.

2.1.1 **Stiffness.** The buoyant inserts are made of layers of medium stiffness foam to create a flexible but firm buoyancy element.

2.1.2 **Shape.** The shape of each foam layer is identified in figures C.2 and C.3. Dimensions are in tables C.1, C.2 and C.3.

2.1.3 **Buoyancy.** The total design buoyancy of the device is 71 N. Table C.4 identifies foam characteristics, the buoyancy for each insert and its tolerances, and the overall buoyancy distribution to be verified when using the RTD for certification testing.

2.2 **Other component requirements.** See table C.1.

3 **Construction.** The construction and assembly of the device should be in accordance with tables C.1 and C.5 and figures C.1 to C.9. A tolerance of ± 6 mm is used throughout for fabric cutting and stitching assembly. A tolerance of ± 6 mm is also used for foam cutting, however, the buoyancy requirements of table C.4 should be met.

3.1 **Seams.** Seam allowances are 13 mm, unless otherwise specified. All structural seams use a lock type stitch so that the seam will not unravel when a force is applied in the direction of the seam on any of the threads forming the stitch. Stitching should have a density of 7 - 12 stitches per 25 mm of stitch length. Box-x stitching on the webbing is 30 x 15 mm for the waist belt and 15 x 13 mm for the belt loop and chest strap, unless otherwise specified. The bar-tack stitching on webbing is 30 x 2 mm for the waist belt and 15 x 2 mm for the belt loop and chest strap.

3.1.1 The fabric reinforcements for the waist belt, belt loop and chest strap should be attached to the inside surface of the outside cover before attaching any of these items. On the closing seam of the top and bottom sections of the outside and inside cover, the cut ends of the fabric are turned under and stitched when installing the zippers so that the fabric will not ravel and so that the folds are flush with the line where the zipper teeth mesh (zippers installed to be hidden by cover fabric when closed).

Table C.1 – Parts, quantity and assembly

Component	Description	Quantity	See figure	Construction notes
1 Cover fabric	420 denier nylon, with ravel resistant coating, orange		C.1, C.4, and C.9	
1.1 Outside cover		1	C.1, C.4, and C.9	
1.2 Inside cover		1	C.1, C.4, & C.9	
1.3 Fabric reinforcement, chest strap		2	C.5 and C.9	Attach one each to inside left and right outside covers for the chest strap. Use lock stitches on three sides each (see figure C.9 for locations).
1.4 Fabric reinforcement, belt and belt loop		2	C.5 and C.9	Attach to inside left and right outside covers for the waist belt and belt loop. Use lock stitches on three sides (see figure C.9 for location).
2 Foam	7 mm thickness, polyethylene (PE) foam, except for one layer as needed to achieve required buoyancy		C.2 and C.3	Layers stacked per Figures C.2 and C.3.
2.1 Front foam insert, left		15 layers	C.2	Trim corners per figure C.2, except outside layers B to G.
2.2 Front foam insert, right		15 layers	C.2	Trim corners per figure C.2, except outside layers B to G.
2.3 Back foam insert		12 layers	C.3	
3 Webbing				All cut ends heat-sealed.
3.1 Waist belt webbing	38 mm, black, polypropylene, with easy adjustment and no significant slippage when used with the specified hardware.	1,085 mm cut length	C.1, C.8 and C.9	On left side attach waist belt with female buckle. Tab on the end of belt formed by turning under 40 mm of material twice and stitching 19 mm from the end of the fold with a bar-tack stitch. For location see figure C.9.

3.2 Belt loop webbing	19 mm, black, polypropylene.	80 mm cut length	C.1, C.6, and C.9	Attach webbing to front outside cover with two sets of double bar tack stitches to form a belt loop. For location see figure C.9.
3.3 Chest strap webbing	19 mm, black, polypropylene.	235 mm and 80 mm cut length	C.1, C.7 and C.9	Attach webbing with female buckle to right outside cover. Attach webbing with male buckle to left outside cover. For location see figure C.9. Tab formed 75 mm from the free end of the male section of chest strap by folding in "Z" pattern 30 mm apart and stitching 15 mm from the fold with a bar-tack stitch. See figure C.7.
4 Thread	Generic synthetic	AR		
5 Hardware				
5.1 Buckle	38 mm, plastic (male and female sections)	1	C.1 and C.8	Used in waist belt assembly.
5.2 Buckle	19 mm, plastic (male and female sections)	1	C.1 and C.7	Used in chest strap assembly
5.3 Zipper	350 mm, plastic (zipper chain length)	1	C.1 and C.9	Installed to be hidden by cover fabric when closed.
5.4 Zipper	180 mm, plastic separating (zipper chain and box/pin length)	2	C.1 and C.9	Installed to be hidden by cover fabric when closed.

Table C.2 – List of dimensions shown in figure C.2

Dimension	Insert layer dimensions (mm)						
	A	*B*	*C*	*D*	*E*	*F*	*G*
a	140	133	127	120	108	95	83
b	190	184	178	172	165	160	140
c	28	28	28	28	28		

Table C.3 – List of dimensions shown in figure C.3

Dimension	Insert layer dimensions (mm)				
	A	*B*	*C*	*D*	*E*
a	310	303	290	275	255
b	165	160	140	120	95
c	3	3	3	3	-3*
R	44	44	44	44	44

* measured in direction opposite to that shown in figure.

Table C.4 – Foam insert specifications

	Left front insert	Right front insert	Back insert
Density	29 ± 5 kg/m^3	29 ± 5 kg/m^3	29 ± 5 kg/m^3
Compressive strength at 25% (ISO 3386-1)	35 ± 10 kPa	35 ± 10 kPa	35 ± 10 kPa
Buoyancy [a, b]	21 ± 1.2 N	21 ± 1.2 N	29 ± 1.2 N

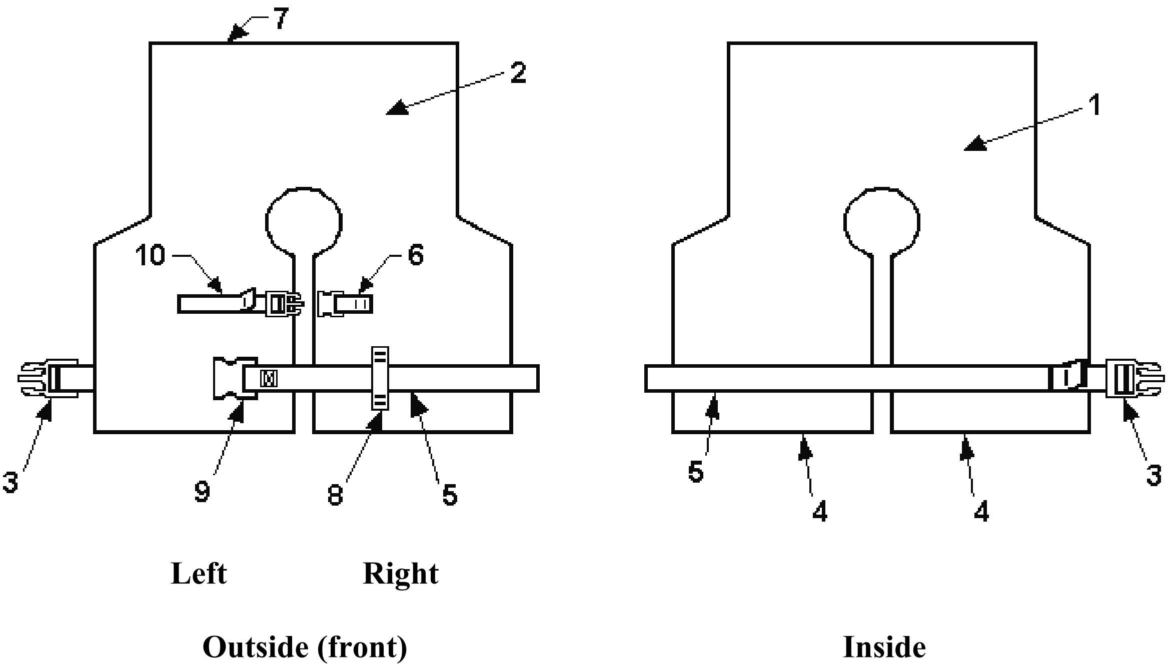
[a] The buoyancy of most foams will change over time with the greatest change occurring in the first several months after manufacture. The exact kind of foam selected will need to be evaluated to determine the amount of additional buoyancy needed at the time of manufacture to achieve the values specified.

[b] Buoyancy distribution: 59.2 % front ± 1.5 percentage points

Table C.5 – List of dimensions shown in figures C.4 - C.9

Dimension	Dimensions (mm)						
	Figure C.4	Figure C.5		Figure C.6	Figure C.7	Figure C.8	Figure C.9
		Key-1	Key-2				
a	390	75	80	75	90	950*	45
b	195	105	110		40		115
c	85						140
d	220						45
e	245						25
f	241						33
g	482						95
h	260						25
i	490						160

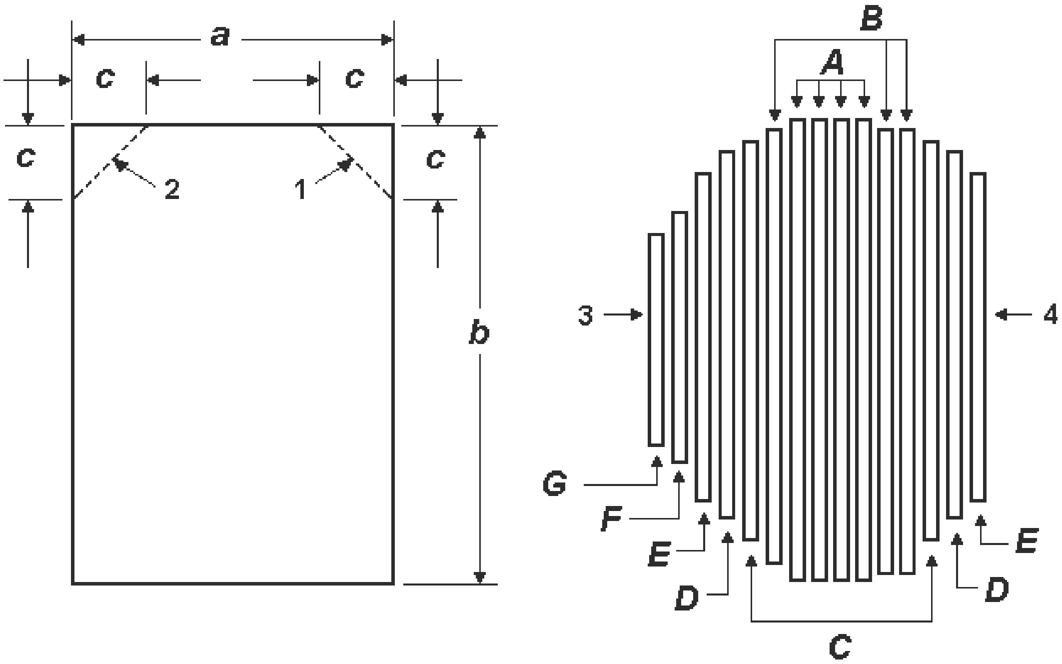
* With webbing assembly fully extended.



Key

1 Inside cover fabric
2 Outside cover fabric
3 Adjustable part of closure
4 Zippers for access to front right and left foam compartment
5 Waist belt
6 Fixed part of chest strap
7 Zipper for access to back foam compartment
8 Belt loop
9 Fixed part of closure
10 Adjustable part of chest strap

Figure C.1 – General arrangement, right side out (outside and inside)



Key

1 Trim upper right corner only for left insert layers per table C.2
2 Trim upper left corner only for right insert layers per table C.2
3 Outside
4 Inside

Figure C.2 – Front foam inserts (right and left sides)

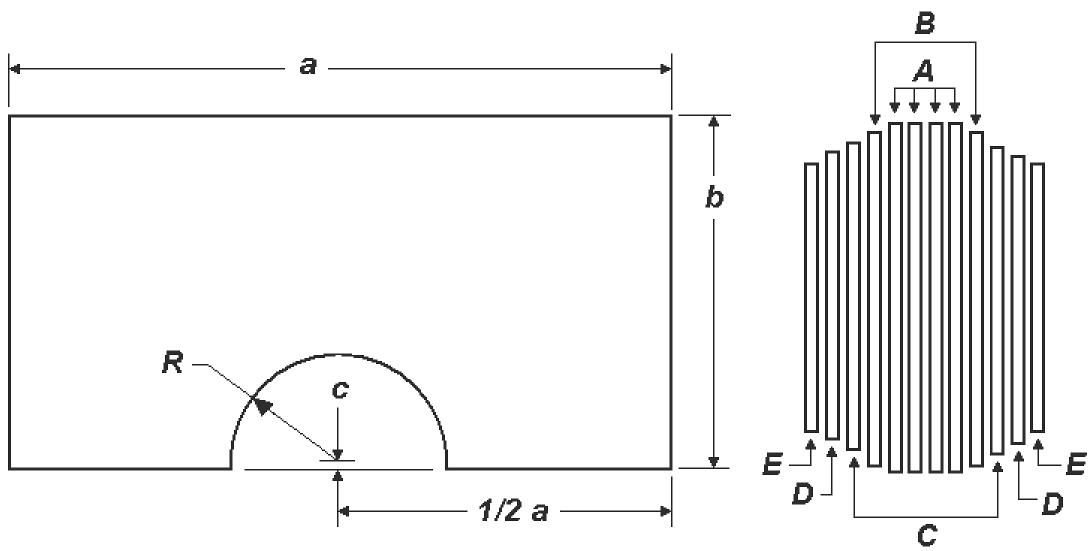


Figure C.3 – Back foam insert

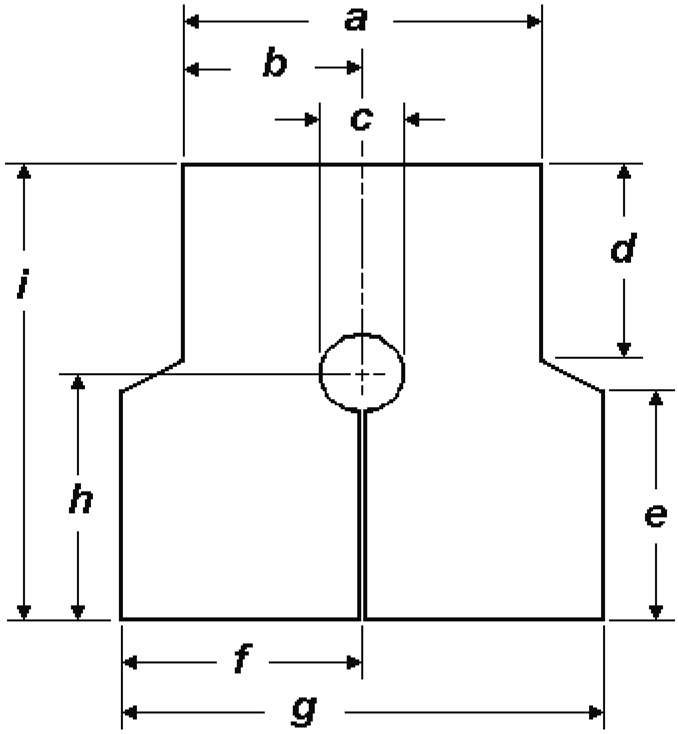
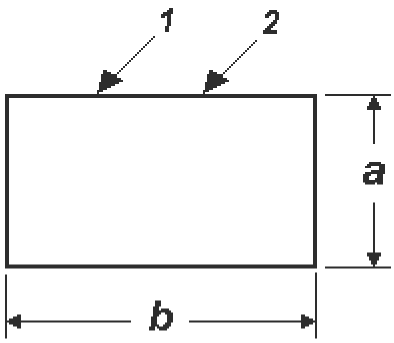


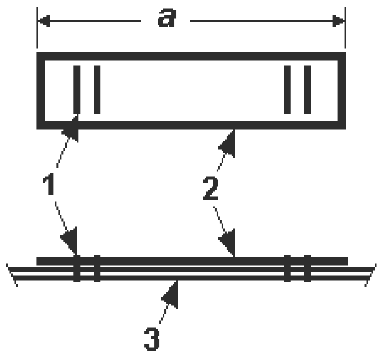
Figure C.4 – Cover cut pattern (outside and inside covers)



Key

1 Fabric reinforcements for chest strap attachments
2 Fabric reinforcement for waist belt and belt loop attachments

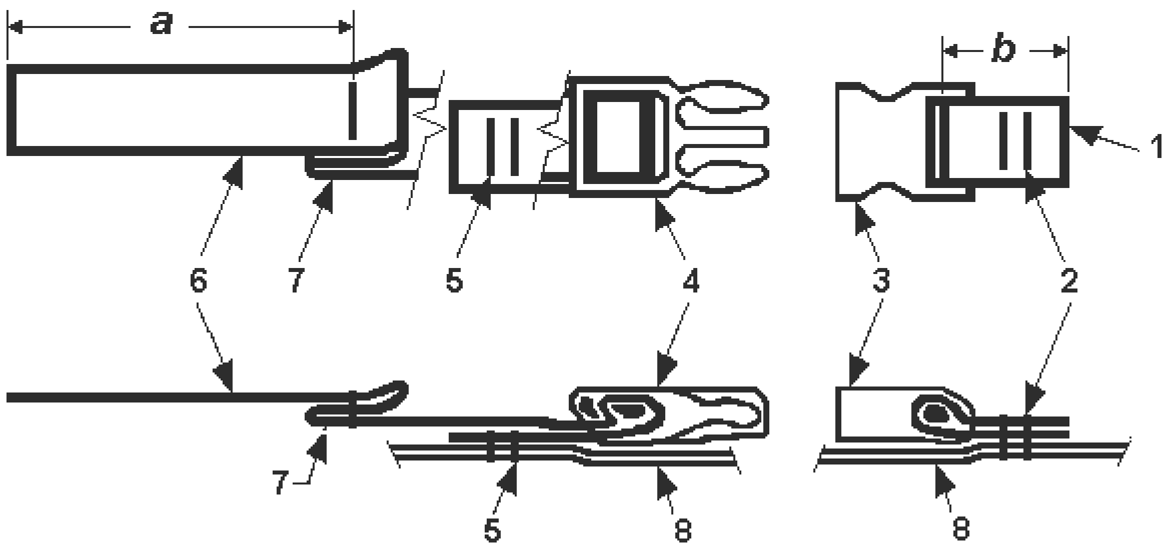
Figure C.5 – Fabric reinforcements



Key

1 Bar-tack
2 Webbing
3 Outer cover and reinforcement (shown on lower view only)

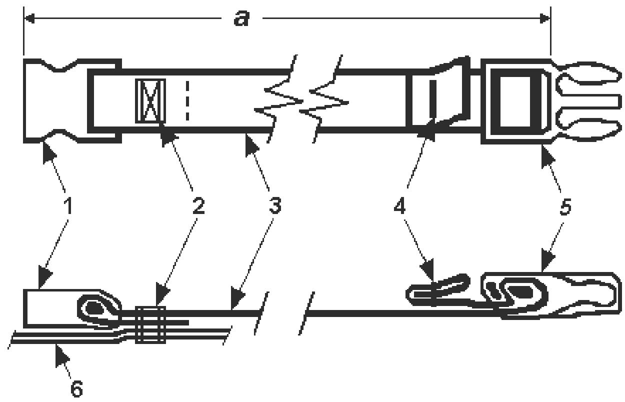
Figure C.6 – Belt loop



Key

1 Webbing
2 Double bar-tack (or Box-x) stitch
3 Fixed part of closure
4 Adjustable part of closure
5 Double bar-tack (or Box-x) stitch
6 Webbing
7 Tab
8 Outer cover and reinforcement (shown on lower view only)

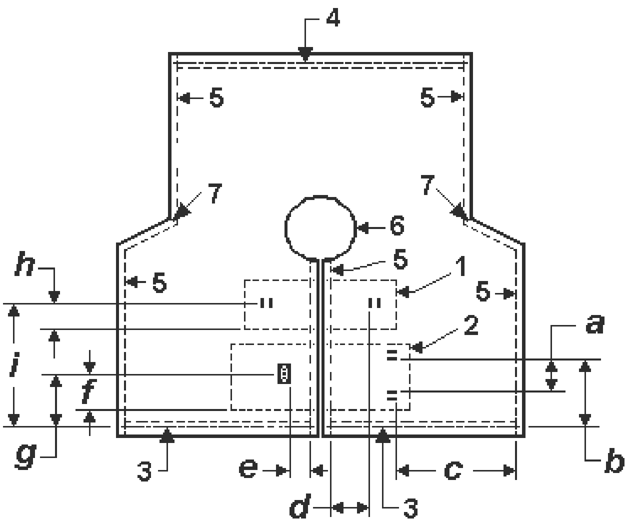
Figure C.7 – Chest strap assembly (adjustable part left and fixed part right)



Key

1 Fixed part of closure
2 Box-x (or double bar-tack) stitch
3 Webbing
4 Tab, double fold webbing and secure with a bar-tack stitch
5 Adjustable part of closure
6 Outer left cover and reinforcement (shown on lower view only)

Figure C.8 – Waist belt assembly



Key

1 Stitching on interior reinforcement for chest strap on right and left sides of outside cover only
2 Stitching on interior reinforcement for waist belt and belt loop on right and left sides of outside cover only
3 Fabric fold and zipper teeth line of engagement when attached to outside and inside covers
4 Fabric fold and zipper teeth line of engagement when attached to outside and inside covers
5 Lockstitch seams (with fabric face to face)
6 Lockstitch with 5 mm seam allowance and over-edge stitch (with fabric face to face)
7 After stitching seams cut relief

Figure C.9 – Initial assembly (shown right side out, except as noted)

APPENDIX

RTD Serial number: ___________

INFANT REFERENCE TEST DEVICE – BUOYANCY TRACKING AND VERIFICATION

To achieve repeatability in human subject and manikin testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD should be maintained within a tight tolerance as specified in table 1.

Table 1 – SOLAS infant RTD buoyancy and tolerance

Limit / Units	Front buoyancy (1) (2)	Back buoyancy (1)	Total buoyancy (1)	Buoyancy distribution (3)
Design / N	42	29	71	59.2% in front
Maximum / N	44.4	30.2	74.6	60.7% in front
Minimum / N	39.6	27.8	67.4	57.7% in front

(1) Values at or corrected to standard temperature and pressure.
(2) The left-to-right buoyancy distribution in the front inserts is to be within 1.3 N of each other.
(3) Buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTD's with buoyancies within tolerance should be used for certification testing. A data sheet to document the buoyancy and buoyancy distribution of the RTD is attached.

To check buoyancy tolerances, foam inserts need to be removed from the device. Take care that all trapped air is removed when checking buoyancy and that layers are maintained in their proper sequence when reinstalled (considerable effort would be needed to remove entrapped air if testing the intact device).

Adjustment of buoyancy: At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, the layers were individually selected to achieve the cumulative insert buoyancy. If buoyancy of a new device exceeds the upper limits, one layer per compartment may be altered or replaced to bring the unit into compliance. The test house may need to add make-up layers (see figure 3) from time to time to maintain the front-to-back and side-to-side insert tolerances. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained.

Table 2 – SOLAS infant RTD insert design buoyancies

	Combined left front inserts (15 layers)	Combined right front inserts (15 layers)	Combined back inserts (11 layers)
Design (N)	21	21	29
S/N ________ Date:			

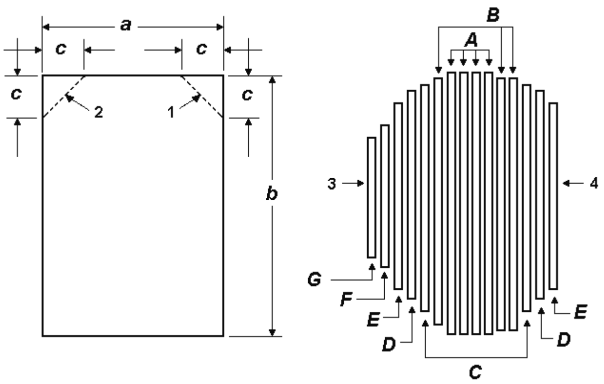
RTD BUOYANCY DATA SHEET

RTD Serial number/identification: _________________

Date	Left front buoyancy (N)	Right front buoyancy (N)	Total front buoyancy (N)	Total back buoyancy (N)	Total buoyancy (N)	Buoyancy distribution (% in front)	Remarks
	(1)		(2)				

(1) Left and right front buoyancy need not be checked if distribution is within tolerance.

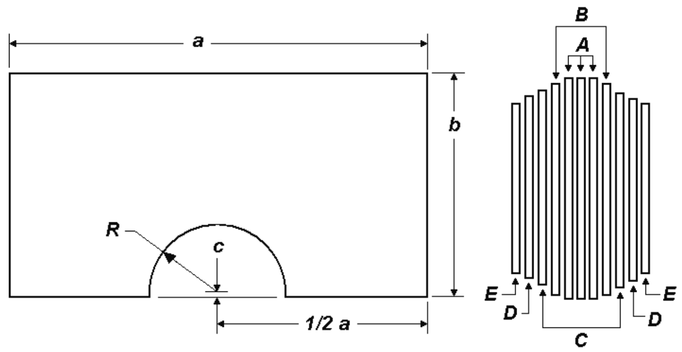
(2) If the temperature and pressure at the time of measurement is not at standard conditions, these values should be corrected to standard temperature and pressure.



Key
1 Trim upper right corner only for left insert layers A to E
2 Trim upper left corner only for right insert layers A to E
3 Outside
4 Inside

Insert layer	Buoyancy (N)	Insert layer dimensions (mm)		
		a	*b*	*c*
A	1.7	140	190	28
B	1.6	133	184	28
C	1.4	127	178	28
D	1.3	120	172	28
E	1.1	108	165	28
F	1.0	95	160	0
G	0.8	83	140	0

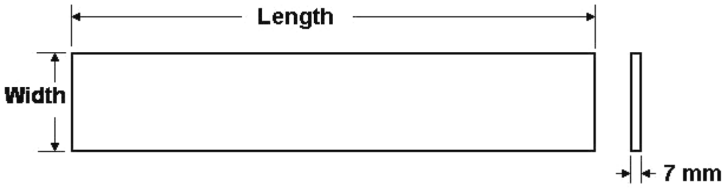
Figure 1 – Front foam insert specifications



Insert layer	Buoyancy (N)	Insert layer dimensions (mm)			
		a	*b*	*c*	*R*
A	3.1	310	165	3	44
B	2.9	303	160	3	46
C	2.4	290	140	3	48
D	1.8	275	120	3	50
E	1.3	255	95	-3*	52

* measured in direction opposite to that shown in figure.

Figure 2 – Back foam insert specifications



1 Any thickness of foam up to 7 mm is acceptable for a make-up layer.
2 For 7 mm thick foam, 15,300 mm^2 surface area equals approximately 1 N of buoyancy.

Make-up layer (1)	Buoyancy (approx.) (N)	Make-up layer dimensions (mm)	
		Length (mm) (2)	Width (mm)
Front	1	185	82
	1.5		123
Back	1	305	50
	1.5		75

(1) For 7 mm thick foam.
(2) The length for make-up layer is fixed to maintain proper placement within the lifejacket, but the width may vary to obtain desired buoyancy.

Figure 3 – Child RTD "make-up" foam insert sizes"

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ANNEX 18

WORK PROGRAMMES OF THE SUB-COMMITTEES

SUB-COMMITTEE ON BULK LIQUIDS AND GASES (BLG)

		Target completion date/number of sessions needed for completion	Reference
1	**Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments**	Continuous	BLG 9/17, section 3
2	**Casualty analysis** (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; BLG 8/18, section 13; MSC 80/24, paragraph 21.6
3	**Consideration of IACS unified interpretations**	Continuous	MSC 78/26, paragraph 22.12; BLG 9/17, section 6
H.1	Environmental and safety aspects of alternative tanker designs under MARPOL 73/78 regulation I/13F		BLG 3/18, paragraph 15.7
	.1 assessment of alternative tanker designs, if any (as necessary)	Continuous	BLG 1/20, section 16; BLG 4/18, paragraph 15.3
H.2	**Requirements for protection of personnel involved in the transport of cargoes containing toxic substances in all types of tankers**	2006	BLG 1/20, section 12; BLG 9/17, section 4
H.3	Oil tagging systems	2 sessions	MEPC 45/20, paragraph 17.4; BLG 8/18, section 10 and paragraph 15.4.3

Notes: 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for BLG 10.

Sub-Committee on Bulk Liquids and Gases (BLG) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.4	**Amendments to resolution MEPC.2(VI)**	2006	MEPC 51/22, paragraph 17.12; BLG 9/17, section 7
H.5	**Development of standards regarding rate of discharge for sewage**	2006	MEPC 51/22, paragraph 17.15; BLG 9/17, section 8
H.6	**Development of provisions for gas-fuelled ships** (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.11; BLG 9/17, section 9
H.7	**Development of guidelines for uniform implementation of the 2004 BWM Convention**	2006	MEPC 52/24, paragraph 2.21.6; BLG 9/17, section 11

SUB-COMMITTEE ON DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS (DSC)

		Target completion date/number of sessions needed for completion	Reference
1	**Harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods**	Continuous	MSC 63/23, paragraph 10.6; DSC 9/15, section 3
2	**Reports on incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas**	Continuous	CDG 45/22, section 11 and paragraph 20.2; DSC 9/15, section 6
3	**Amendments to the BC Code, including evaluation of properties of solid bulk cargoes**	Continuous	BC 34/17, section 3; DSC 9/15, section 4
	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; DSC 9/15, section 6
H.1	**Amendment (33-06) to the IMDG Code and supplements**	2005	DSC 3/15, paragraph 12.6; DSC 9/15, section 3
H.2	**Review of Annex III of MARPOL 73/78**	2005	DSC 3/15, paragraph 12.6; MEPC 48/21, paragraph 18.3.1; DSC 9/15, section 3

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2 Items printed in bold letters have been selected for the provisional agenda for DSC 10.

Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.3	**Mandatory application of the BC Code**	2007	DSC 3/15, paragraph 12.7; MSC 78/25, paragraph 13.7 ; DSC 9/15, section 4
H.4	**Measures to enhance maritime security**	2006	MSC 75/24, paragraph 22.9; DSC 9/15, section 9
H.5	**Guidance on serious structural deficiencies in containers: reporting procedure on serious structural deficiencies**	2005	MSC 75/24, paragraph 22.15; DSC 9/15, section 8
H.6	Review of the SPS Code (co-ordinated by DE)	2 sessions	MSC 78/26, paragraph 24.9
H.7	**Amendments to the CSS Code**	2005	DSC 8/15, section 5; MSC 78/26, paragraph 24.15.3
H.8	**Revision of the LHNS and OSV Guidelines**	2006	MSC 79/23, paragraph 20.8
H.9	**Amendments to the Guidelines for partially weathertight hatchway covers on board containerships**	2005	MSC 79/23, paragraph 20.6
H.10	**Extension of the BLU Code to include grain**	2006	MSC 79/23, paragraph 20.7
H.11	**Guidance on providing a safe working conditions for securing of containers**	2006	MSC 80/24, paragraph 21.8

SUB-COMMITTEE ON FIRE PROTECTION (FP)

		Target completion date/number of sessions needed for completion	Reference
1	**Analysis of fire casualty records**	Continuous	MSC 75/24, paragraph 22.18; FP 49/17, section 11
2	**Consideration of IACS unified interpretations**	Continuous	MSC 78/26, paragraph 22.12; FP 49/17, section 13
H.1	**Passenger ship safety**	2006	MSC 74/24, paragraph 21.4; FP 49/17, section 3
H.2	**Performance testing and approval standards for fire safety systems**	2009	MSC 74/24, paragraph 21.12; FP 49/17, section 4
H.3	**Amendments to resolution A.754(18) relating to performance criteria for fire doors**	2006	MSC 77/26, paragraph 23.12; FP 49/17, section 7
H.4	**Comprehensive review on the Fire Test Procedures Code**	2008	MSC 80/24, paragraph 21.11
H.5	**Recommendation on evacuation analysis for new and existing passenger ships**	2006	MSC 73/21, paragraph 4.16; FP 49/17, section 10 and paragraph 14.2.4
H.6	**Review of the SPS Code** (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.9; FP 49/17, paragraph 14.1.3
H.7	**Development of provisions for gas-fuelled ships** (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.19

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2 Items printed in bold letters have been selected for the provisional agenda for FP 50.

Sub-Committee on Fire Protection (FP) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.8	**Measures to prevent fires in engine-rooms and cargo pump-rooms**	2009	MSC 79/23, paragraph 20.11; FP 49/17, paragraph 14.1.3
L.1	Smoke control and ventilation	2 sessions	FP 39/19, section 9; FP 46/16, section 4

SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION (FSI)

		Target completion date/number of sessions needed for completion	Reference
1	**Mandatory reports under MARPOL 73/78**	Continuous	MSC 70/23, paragraph 20.12.1; FSI 13/23, section 3
2	**Casualty statistics and investigations**	Continuous	MSC 68/23, paragraphs 7.16 to 7.24; FSI 13/23, section 4
3	**Harmonization of port State control activities**	Continuous	MSC 71/23, paragraph 20.16; FSI 13/23, sections 6 and 7; FSI 13/23, paragraph 7.6; MSC 80/24, paragraph 21.16
4	**Responsibilities of Governments and measures to encourage flag State compliance**	Continuous	MSC 68/23, paragraphs 7.2 to 7.8; FSI 13/23, section 10
5	**Comprehensive analysis of difficulties encountered in the implementation of IMO instruments**	Continuous	MSC 69/22, paragraph 20.28; FSI 8/19, paragraph 4.3; FSI 13/23, section 11
6	**Review of the Survey Guidelines under the HSSC (resolution A.948(23))**	Continuous	MSC 72/23, paragraph 21.27; FSI 13/23, section 12
7	**Consideration of IACS unified interpretations**	Continuous	MSC 78/26, paragraph 22.12; FSI 13/23, section 18

Notes: 1 "H" means a high priority item. However, the items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for FSI 14.

Sub-Committee on Flag State Implementation (FSI) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.1	**PSC on seafarers' working hours**	2006	MSC 70/23, paragraph 20.12.3; FSI 7/14, paragraphs 7.11 to 7.13; MSC 71/23, paragraph 13.13; FSI 13/23, section 14
H.2	**Illegal, unregulated and unreported (IUU) fishing and implementation of resolution A.925(22)**	2007	MSC 72/23, paragraph 21.28; FSI 10/17, section 11; MSC 75/24, paragraphs 13.11 and 22.25.3; FSI 13/23, section 15
H.3	**Development of survey guidelines required by regulation E-1 of the 2004 BWM Convention**	2006	MEPC 51/22, paragraph 2.11.6 ; FSI 13/23, section 13
H.4	**Development of guidelines on port State control under the 2004 BWM Convention**	2006	MEPC 52/24, paragraph 2.21.2 ; FSI 13/23, section 8
H.5	**Review of the Code for the investigation of marine casualties and incidents**	2007	MSC 79/23, paragraphs 20.15 to 20.18; FSI 13/23, section 5

SUB-COMMITTEE ON RADIOCOMMUNICATIONS AND SEARCH AND RESCUE (COMSAR)

			Target completion date/number of sessions needed for completion	Reference
1	**Global Maritime Distress and Safety System (GMDSS)**			COMSAR 9/19, section 3
	.1	**matters relating to the GMDSS Master Plan**	Continuous	COMSAR 9/19, paragraphs 3.1 to 3.3
	.2	exemptions from radio requirements	Continuous	COMSAR 4/14, paragraphs 3.38 to 3.41
2	Promulgation of maritime safety information (MSI) (in co-operation with ITU, IHO, WMO and IMSO)			
	.1	**operational and technical co-ordination provisions of maritime safety information (MSI) services, including review of the related documents**	Continuous	COMSAR 9/19, paragraphs 3.4 and 3.5
3	**ITU World Radiocommunication Conference matters**		Continuous	COMSAR 9/19, paragraphs 4.5, 4.6 and 4.12 to 4.16
4	**Radiocommunication ITU-R Study Group 8 matters**		Continuous	COMSAR 9/19, paragraphs 4.1 to 4.4 and 4.8 to 4.11
5	**Satellite services (Inmarsat and COSPAS-SARSAT)**		Continuous	COMSAR 9/19, section 5

Notes: 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for COMSAR 10.

Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) (continued)

			Target completion date/number of sessions needed for completion	Reference
6	**Matters concerning search and rescue, including those related to the 1979 SAR Conference and the implementation of the GMDSS**			
	.1	**harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters**	2006	COMSAR 9/19, paragraphs 7.1 to 7.5 and 7.8 to 7.13
	.2	**plan for the provision of maritime SAR services, including procedures for routeing distress information in the GMDSS**	Continuous	COMSAR 9/19, paragraphs 7.14 to 7.20
	.3	**revision of the IAMSAR Manual**	Continuous	MSC 71/23, paragraph 20.2; COMSAR 9/19, section 9
	.4	**medical assistance in SAR services**	2006	MSC 75/24, paragraph 22.29; COMSAR 9/19, paragraphs 7.23 to 7.27
7	Casualty analysis (co-ordinated by FSI)		Continuous	MSC 70/23, paragraphs 9.17 and 20.4; MSC 78/26, paragraph 24.8
H.1	Amendments to SOLAS chapter IV pursuant to the criteria set out in resolution A.888(21)		3 sessions	MSC 72/23, paragraph 21.33.1.2
H.2	**Developments in maritime radio-communication systems and technology**		2006	MSC 74/24, paragraph 21.25.1; COMSAR 9/19, section 8

Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.3	**Measures to enhance maritime security**	2006	MSC 75/24, paragraph 22.9; COMSAR 9/19, section 12
H.4	**Review of the SPS Code** (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.9
H.5	**Revision of the performance standards for SART**	2007	MSC 78/26, paragraph 24.26
H.6	**Passenger ship safety**	2006	MSC 78/26, paragraph 4.45; MSC 79/23, paragraph 4.12; COMSAR 9/19, section 13

SUB-COMMITTEE ON SAFETY OF NAVIGATION (NAV)

			Target completion date/number of sessions needed for completion	Reference
1	**Routeing of ships, ship reporting and related matters**		Continuous	MSC 72/23, paragraphs 10.69 to 10.71, 20.41 and 20.42; NAV 49/19, section 3
2	**Casualty analysis** (co-ordinated by FSI)		Continuous	MSC 70/23, paragraphs 9.17 and 20.4; NAV 49/19, section 14
3	**Consideration of IACS unified interpretations**		Continuous	MSC 78/26, paragraph 22.12; NAV 50/19, paragraphs 16.2 and 18.42 to 18.44
H.1	**World-wide radionavigation system (WWRNS)**		2005	MSC 75/24, paragraph 22.37
	.1	new developments in the field of GNSS, especially Galileo	2005	NAV 50/19, paragraphs 13.1 to 13.3
	.2	review and amendment of IMO policy for GNSS (resolution A.915(22))	2005	NAV 48/19, paragraph 16.3.2
	.3	recognition of radionavigation systems as components of the WWRNS (resolution A.953(23))	2005	NAV 48/19, paragraph 16.3.3

Notes: 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for NAV 51.

Sub-Committee on Safety of Navigation (NAV) (continued)

		Target **completion date/number of sessions needed for completion**	***Reference***
H.2	**Passenger ship safety: effective voyage planning for passenger ships**	2006	MSC 73/21, paragraph 18.23; MSC 74/24, paragraph 21.4; NAV 50/19, section 11; MSC 79/23, paragraph 4.12
H.3	**Review of the OSV Guidelines** (co-ordinated by SLF)	2005	MSC 75/24, paragraph 22.4; NAV 50/19, paragraph 16.2
H.4	**Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code** (co-ordinated by DE)	2005	MSC 75/24, paragraphs 12.22 and 2.8; MSC 76/23, paragraphs 8.19 and 20.4; NAV 50/19, section 5
H.5	**Measures to enhance maritime security**	2005	MSC 75/24, paragraph 22.9; NAV 50/19, section 12
H.6	**ITU matters, including Radio-communication ITU-R Study Group 8 matters**	2006	MSC 69/22, paragraphs 5.69 and 5.70; NAV 50/19, section 10
H.7	**Review of the SPS Code** (co-ordinated by DE)	2006	MSC 78/26, paragraph 24.9; NAV 50/19, paragraph 16.2

Sub-Committee on Safety of Navigation (NAV) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.8	**Revision of the performance standards for INS and IBS**	2006	MSC 78/26, paragraph 24.30; NAV 50/19, paragraphs 16.2 and 18.19 to 18.21
H.9	**Evaluation of the use of ECDIS and ENC development**	2006	MSC 78/26, paragraph 24.33; NAV 50/19, paragraphs 16.2 and 18.31 to 18.37
H.10	**Revision of the performance standards for VDRs and S-VDRs**	2006	MSC 79/23, paragraph 20.24
H.11	Amendments to the ECDIS performance standards	2 sessions	MSC 80/24, paragraph 21.22
H.12	Development of guidelines for the installation of shipborne radar equipment	3 sessions	MSC 80/24, paragraph 21.23
H.13	Amendments to COLREGs Annex I related to colour specification of lights	2 sessions	MSC 80/24, paragraph 21.24.1
H.14	Development of performance standards for navigation lights, navigation light controllers and associated equipment	2 sessions	MSC 80/24, paragraph 21.24.2

SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT (DE)

		Target completion date/number of sessions needed for completion	Reference
1	**Casualty analysis** (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4
2	**Consideration of IACS unified interpretations**	Continuous	MSC 78/26, paragraph 22.12
H.1	**Amendments to resolution A.744(18)**	2006	DE 45/27, paragraphs 7.18 and 7.19; DE 48/25, section 3
H.2	**Safety aspects of ballast water management***	2006** [2 sessions]**	MSC 71/23, paragraph 9.11; DE 48/25, section 17
H.3	**Passenger ship safety**	2006	MSC 74/24, paragraph 21.4; MSC 79/23, paragraph 4.12; DE 48/25, section 4
H.4	**Measures to prevent accidents with lifeboats***** (in co-operation with FSI, NAV and STW)	2006	MSC 74/24, paragraph 21.34; DE 48/25, section 5

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2 Items printed in bold letters (except for items H.2, H.4, H.9, H.10, H.11.1, H.14 and H.16) have been selected for the provisional agenda for DE 49 (see also paragraph 21.30 of document MSC 80/24).

* The item has been included in the provisional agenda for BLG 10 (see also paragraph 21.5.1 of document MSC 80/24).

** Subject to the relevant decision by the MEPC.

*** The item has been included in the provisional agenda for FP 50 (see also paragraph 21.14 of document MSC 80/24).

Sub-Committee on Ship Design and Equipment (DE) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.5	**Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code** (in co-operation with FP, COMSAR, NAV and SLF)	2006	MSC 75/24, paragraph 12.22; MSC 76/23, paragraphs 8.19 and 20.4; DE 48/25, section 11
H.6	**Performance standards for protective coatings**	2006	MSC 76/23, paragraphs 20.41.2 and 20.48; DE 48/25, section 12
H.7	**Inspection and survey requirements for accommodation ladders**	2006	MSC 77/26, paragraph 23.32; DE 48/25, section 16
H.8	**Mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt**	2006	MSC 77/26, paragraph 23.33; DE 48/25, section 14
H.9	**Compatibility of life-saving appliances**[*]	2006	DE 47/15, paragraph 5.3; MSC 78/26, paragraph 24.37.1; DE 48/25, section 8
H.10	**Inconsistencies in IMO instruments regarding requirements for life-saving appliances**[*]	2006	DE 42/15, paragraph 9.7; MSC 78/26, paragraph 24.37.2; DE 48/25, section 10

* The item has been included in the provisional agenda for FP 50 (see also paragraph 21.14 of document MSC 80/24).

Sub-Committee on Ship Design and Equipment (DE) (continued)

			Target completion date/number of sessions needed for completion	Reference
H.11	Guidelines under MARPOL Annex VI on prevention of air pollution from ships			MEPC 41/20, paragraph 8.22.1; DE 42/15, paragraphs 10.2 to 10.4
	.1	**Guidelines on equivalent methods to reduce on-board NO_x emission***	2007	DE 48/25, paragraphs 13.5, 22.1.4.1 and 22.3
	.2	Guidelines on other technological methods verifiable or enforceable to limit SO_x emission	2 sessions	
H.12	**Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235)**		2006	MEPC 51/22, paragraph 20.5
H.13	**Review of the SPS Code** (in co-operation with DSC, FP, NAV, COMSAR and SLF)		2007	MSC 78/26, paragraph 24.9; DE 48/25, paragraph 22.1.4.2
H.14	**Amendments to resolution A.761(18)****		2007	MSC 78/26, paragraph 24.38; DE 48/25, paragraph 22.1.4.3
H.15	**Development of provisions for gas-fuelled ships** (in co-operation with BLG and FP)		2007	MSC 78/26, paragraph 24.39; DE 48/25, section 19
H.16	**Test standards for extended service intervals of inflatable liferafts****		2007	MSC 78/26, paragraph 24.41; DE 48/25, section 20

Sub-Committee on Ship Design and Equipment (DE) (continued)

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* The item has been included in the provisional agenda for BLG 10 (see also paragraph 21.5.2 of document MSC 80/24).

** The item has been included in the provisional agenda for FP 50 (see also paragraph 21.14 of document MSC 80/24).

		Target completion date/number of sessions needed for completion	Reference
H.17	Amendments to the Guidelines for ships operating in Arctic ice-covered waters (in co-operation with SLF, as necessary)	2 sessions	MSC 79/23, paragraph 8.25
H.18	**Revision of the Code on alarms and indicators** (in co-operation with appropriate sub-committees, as necessary)	2007	MSC 79/23, paragraph 20.28; DE 48/25, paragraph 22.1.4.4
H.19	**Amendments to the MODU Code**	2007	MSC 79/23, paragraph 22.51; DE 48/25, paragraph 22.1.4.5
H.20	**Review of requirements on relevant equipment for the revision of the Intact Stability Code**	2006	MSC 80/24, paragraphs 9.2.1 and 21.27
L.1	Revision of resolution A.760(18)	2 sessions	DE 46/32, paragraph 31.23; DE 47/25, paragraph 22.6
L.2	Free-fall lifeboats with float-free capabilities	1 session	MSC 76/23, paragraphs 20.41.3 and 20.48; DE 47/25, paragraph 22.6

SUB-COMMITTEE ON STABILITY AND LOAD LINES AND ON FISHING VESSELS SAFETY (SLF)

		Target completion date/number of sessions needed for completion	Reference
1	Analysis of intact stability casualty records	Continuous	MSC 70/23, paragraph 20.4; SLF 30/18, paragraphs 4.16 and 4.17
2	**Analysis of damage cards**	Continuous	MSC 70/23, paragraph 20.4; SLF 41/18, paragraph 17.5; MSC 78/26, paragraph 12.10; SLF 47/17, paragraph 14.2
	.1 revision of the IMO damage card	2006	
3	**Consideration of IACS unified interpretations**	Continuous	MSC 78/26, paragraph 22.12
H.1	**Development of explanatory notes for harmonized SOLAS chapter II-1**	2006	MSC 69/22, paragraph 20.60.1; SLF 47/17, section 4
H.2	**Safety of small fishing vessels** (in co-operation with DE, COMSAR, FP, NAV and STW, as necessary)	2009	SLF 47/17, paragraph 14.1; MSC 79/23, paragraph 11.15
H.3	**Safety aspects of ballast water management**	2005	MSC 71/23, paragraph 9.11; SLF 47/17, paragraph 16.3

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2 Items printed in bold letters have been selected for inclusion in the provisional agenda for SLF 48.

Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.4	**Passenger ship safety**	2006	MSC 74/24, paragraph 21.4; SLF 47/17, section 8; MSC 79/23, paragraph 4.12
H.5	**Revision of the Intact Stability Code**	2007	SLF 41/18, paragraph 3.14; SLF 47/17, section 6
H.6	**Review of the LHNS and OSV Guidelines** (in co-operation with BLG, DSC, COMSAR, DE and NAV)	2005	MSC 75/24, paragraph 22.4; SLF 47/17, section 7; MSC 78/26, paragraph 12.5
H.7	**Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code** (co-ordinated by DE)	2005	MSC 76/23, paragraphs 8.19 and 20.4; SLF 47/17, section 13
H.8	**Revision of technical regulations of the 1966 LL Convention**	2005	MSC 76/23, paragraph 20.51; SLF 47/17, section 11
H.9	**Review of the SPS Code** (co-ordinated by DE)	2006	MSC 78/26, paragraph 24.9
L.1	**Harmonization of damage stability provisions in other IMO instruments, including the 1993 Torremolinos Protocol (probabilistic method)**	2005	MSC 62/25, paragraph 21.23; SLF 47/17, section 9
L.2	**Revision of resolution A.266(VIII)**	2006	SLF 45/14, paragraphs 3.19 and 11.1.4.1; MSC 76/23, paragraph 20.50; SLF 47/17, paragraph 14.2

Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF) (continued)

		Target completion date/number of sessions needed for completion	Reference
L.3	**Tonnage measurement of open-top containerships**	2006	MSC 78/26, paragraph 24.50; SLF 47/17, paragraph 14.2
L.4	**Revision of MSC/Circ.650**	2006	SLF 47/17, paragraph 3.8

SUB-COMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING (STW)

		Target completion date/number of sessions needed for completion	Reference
1	**Validation of model training courses**	Continuous	STW 31/17, paragraph 14.4; STW 35/19, section 3
2	**Casualty analysis** (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; MSC 77/26, paragraphs 18.10 and 23.40.2
H.1	**Unlawful practices associated with certificates of competency**	Continuous	MSC 71/23, paragraph 20.55.2; STW 35/19, section 5; STW 36/17, section 4
H.2	**Passenger ship safety**	2006	MSC 74/24, paragraph 21.4; STW 36/17, section 5
H.3	**Measures to prevent accidents with lifeboats** (co-ordinated by DE)	2007	MSC 74/24, paragraph 21.34; STW 36/17, section 7
H.4	**Measures to enhance maritime security**	2006	MSC 75/24, paragraphs 22.9 and 22.45; STW 36/17, sections 8 and 13

Notes: 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for STW 37.

Sub-Committee on Standards of Training and Watchkeeping (STW) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.5	**Education and training requirements for fatigue prevention, mitigation and management**	2006	MSC 75/24, paragraph 22.48; STW 36/17, section 9
H.6	**Development of training requirements for the control and management of ships' ballast water and sediments**	2007	MSC 71/23, paragraph 20.55.3; STW 36/17, section 11
H.7	**Development of competences for ratings**	2007	MSC 77/26, paragraph 23.40.1; STW 36/17, section 12
H.8	**Revalidation of GMDSS operator's certificate**	2007	STW 36/17, sections 14 and16; MSC 80/24, paragraph 21.35.1
H.9	**Amendment to the STCW Convention chapter III**	2007	MSC 80/24, paragraph 21.41
H.10	**Review of operational and training requirements for the revision of the Intact Stability Code**	2006	MSC 80/24, paragraph 21.36
L.1	Review of the implementation of STCW chapter VII	2 sessions	MSC 72/23, paragraph 21.56; STW 35/19, section 14
L.2	Clarification of the STCW-F Convention provisions and follow-up action to the associated Conference resolutions	2 sessions	STW 34/14, paragraph 11.8

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ANNEX 19

PROVISIONAL AGENDAS FOR THE FORTHCOMING SESSIONS OF THE SUB-COMMITTEES

SUB-COMMITTEE ON BULK LIQUIDS AND GASES (BLG) – 10TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments

4 Development of guidelines for uniform implementation of the 2004 BWM Convention

5 Requirements for protection of personnel involved in the transport of cargoes containing toxic substances in all types of tankers

6 Development of provisions for gas-fuelled ships

7 Amendments to resolution MEPC.2(VI)

8 Development of standards regarding rate of discharge for sewage

9 Consideration of IACS unified interpretations

10 Casualty analysis

11 Safety aspects of ballast water management**

12 Guidelines on equivalent methods to reduce on-board NO_x emission**

13 Work programme and agenda for BLG 11

14 Election of Chairman and Vice-Chairman for 2007

15 Any other business

16 Report to the Committees

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* Agenda item numbers do not necessarily indicate priority.

** The item has been transferred from the provisional agenda for DE 49.

SUB-COMMITTEE ON DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS (DSC) – 10TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Amendments to the IMDG Code and supplements, including harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods

   .1 harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods

   .2 amendment (33-06) to the IMDG Code and supplements

   .3 review of Annex III of MARPOL 73/78

4 Amendments to the BC Code, including evaluation of properties of solid bulk cargoes

5 Mandatory application of the BC Code

   .1 identification of mandatory and recommendatory parts of the BC Code, including consequential amendments

   .2 amendments to SOLAS chapters VI and VII on making the BC Code mandatory

6 Casualty and incident reports and analysis

7 Amendments to the CSS Code

8 Guidance on serious structural deficiencies in containers: reporting procedure on serious structural deficiencies

9 Measures to enhance maritime security

10 Revision of the LHNS and OSV Guidelines

11 Amendments to the Guidelines for partially weathertight hatchway covers on board containerships

12 Extension of the BLU Code to include grain

13 Guidance on providing a safe working conditions for securing of containers

14 Work programme and agenda for DSC 11

15 Election of Chairman and Vice-Chairman for 2006

16 Any other business

17 Report to the Maritime Safety Committee

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* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON FIRE PROTECTION (FP) – 50TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Passenger ship safety

4 Performance testing and approval standards for fire safety systems

5 Recommendation on evacuation analysis for new and existing passenger ships

6 Development of provisions for gas-fuelled ships

7 Measures to prevent fires in engine-rooms and cargo pump-rooms

8 Review of the SPS Code

9 Amendments to resolution A.754(18) relating to performance criteria for fire doors

10 Comprehensive review on the Fire Test Procedures Code

11 Consideration of IACS unified interpretations**

12 Analysis of fire casualty records**

13 Measures to prevent accidents with lifeboats***

14 Compatibility of life-saving appliances***

15 Inconsistencies in IMO instruments regarding requirements for life-saving appliances***

16 Test standards for extended services intervals of inflatable liferafts***

17 Amendments to resolution A.761(18)***

18 Work programme and agenda for FP 51

19 Election of Chairman and Vice-Chairman for 2007

20 Any other business

21 Report to the Maritime Safety Committee

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* Agenda item numbers do not necessarily indicate priority.
** Item under continuous review.
*** The item has been transferred from the provisional agenda for DE 49.

SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION (FSI) – 14TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Responsibilities of Governments and measures to encourage flag State compliance**

4 Mandatory reports under MARPOL 73/78**

5 Casualty statistics and investigations**

6 Review of the Code for the investigation of marine casualties and incidents

7 Harmonization of port State control activities**

8 PSC on seafarers' working hours

9 Development of guidelines on port State control under the 2004 BWM Convention

10 Comprehensive analysis of difficulties encountered in the implementation of IMO instruments**

11 Review of the Survey Guidelines under the HSSC (resolution A.948(23))**

12 Development of survey guidelines required by regulation E-1 of the 2004 BWM Convention

13 Consideration of IACS unified interpretations**

14 Illegal, unregulated and unreported (IUU) fishing and implementation of resolution A.925(22)

15 Work programme and agenda for FSI 15

16 Election of Chairman and Vice-Chairman for 2006 and 2007

17 Any other business

18 Report to the Committees

* Agenda item numbers do not necessarily indicate priority.

** Items under continuous review.

SUB-COMMITTEE ON RADIOCOMMUNICATIONS AND SEARCH AND RESCUE (COMSAR) – 10TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Global Maritime Distress and Safety System (GMDSS)

.1 matters relating to the GMDSS Master Plan

.2 operational and technical co-ordination provisions of maritime safety information (MSI) services, including review of the related documents

4 ITU maritime radiocommunication matters

.1 Radiocommunication ITU-R Study Group 8 matters

.2 ITU World Radiocommunication Conference matters

5 Satellite services (Inmarsat and COSPAS-SARSAT)

6 Matters concerning search and rescue, including those related to the 1979 SAR Conference and the implementation of the GMDSS

.1 harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters

.2 plan for the provision of maritime SAR services, including procedures for routeing distress information in the GMDSS

.3 medical assistance in SAR services

7 Developments in maritime radiocommunication systems and technology

8 Revision of the IAMSAR Manual

9 Review of the SPS Code

10 Measures to enhance maritime security

11 Passenger ship safety

12 Revision of the performance standards for SART

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* Agenda item numbers do not necessarily indicate priority.

13 Work programme and agenda for COMSAR 11

14 Election of Chairman and Vice-Chairman for 2007

15 Any other business

16 Report to the Maritime Safety Committee

SUB-COMMITTEE ON SAFETY OF NAVIGATION (NAV) – 51ST SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Routeing of ships, ship reporting and related matters

4 Revision of the performance standards for INS and IBS

5 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code

6 Evaluation of the use of ECDIS and ENC development

7 Review of the OSV Guidelines

8 Review of the SPS Code

9 ITU matters, including Radiocommunication ITU-R Study Group 8 matters

10 Passenger ship safety: effective voyage planning for passenger ships

11 Measures to enhance maritime security

12 World-wide radionavigation system (WWRNS)

13 Casualty analysis

14 Consideration of IACS unified interpretations

15 Revision of the performance standards for VDRs and S-VDRs

16 Work programme and agenda for NAV 52

17 Election of Chairman and Vice-Chairman for 2006

18 Any other business

19 Report to the Maritime Safety Committee

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* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT (DE) – 49TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Amendments to resolution A.744(18)

4 Passenger ship safety

5 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code

6 Performance standards for protective coatings

7 Mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt

8 Inspection and survey requirements for accommodation ladders

9 Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235)

10 Development of provisions for gas-fuelled ships

11 Consideration of IACS unified interpretations

12 Review of the SPS Code

13 Revision of the Code on alarms and indicators

14 Amendments to the MODU Code

15 Review of requirements on relevant equipment for the revision of the Intact Stability Code

16 Casualty analysis

17 Work programme and agenda for DE 50

18 Election of Chairman and Vice-Chairman for 2007

19 Any other business

20 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON STABILITY AND LOAD LINES AND ON FISHING VESSELS SAFETY (SLF) – 48TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Development of explanatory notes for harmonized SOLAS chapter II-1

4 Revision of the Intact Stability Code

5 Review of the LHNS and OSV Guidelines

6 Passenger ship safety

7 Harmonization of damage stability provisions in other IMO instruments

8 Consideration of IACS unified interpretations

9 Revision of technical regulations of the 1966 LL Convention

10 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code

11 Revision of resolution A.266(VIII)

12 Tonnage measurement of open-top containerships

13 Review of the SPS Code

14 Safety aspects of ballast water management

15 Analysis of damage cards: revision of the IMO damage card

16 Safety of small fishing vessels

17 Revision of MSC/Circ.650

18 Work programme and agenda for SLF 49

19 Election of Chairman and Vice-Chairman for 2006

20 Any other business

21 Report to the Maritime Safety Committee

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* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING (STW) – 37TH SESSION*

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Validation of model training courses

4 Unlawful practices associated with certificates of competency

5 Passenger ship safety

6 Measures to prevent accidents with lifeboats

7 Measures to enhance maritime security

8 Education and training requirements for fatigue prevention, mitigation and management

9 Development of training requirements for the control and management of ship's ballast water and sediments

10 Development of competences for ratings

11 Casualty analysis

12 Revalidation of GMDSS operator's certificate

13 Amendment to the STCW Convention chapter III

14 Review of operational and training requirements for the revision of the Intact Stability Code

15 Work programme and agenda for STW 38

16 Election of Chairman and Vice-Chairman for 2007

17 Any other business

18 Report to the Maritime Safety Committee

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* Agenda item numbers do not necessarily indicate priority.