

CHAPTER 8

SPECIALISED SHIPS, TANKERS, CHEMICAL CARRIERS, LIQUEFIED GAS CARRIERS, DANGEROUS GOODS AND OFFSHORE INSTALLATIONS

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8.1 Fire safety measures for tankers

8.1.1 Application

8.1.1.1 This section concerns details, relevant to fire protection on tankers and tanker safety as a whole, which are not specifically dealt with elsewhere in these Instructions or in the regulations. It may also be applicable to ships which are not normally operated as tankers but which may be engaged in the carriage of flammable liquids in bulk.

8.1.1.2 SOLAS I Reg 2 defines a tanker as “a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable¹ nature”. SOLAS II-2 Reg 1.6.1 clarifies the meaning of ‘inflammable/flammable’ by stating “Requirements for tankers in this chapter shall apply to tankers carrying crude oil or petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below the atmospheric pressure or other liquid products having a similar fire hazard” (the MS (Large Ships..) Regulations call these category A tankers) The same definitions can be assumed for non SOLAS ships.

8.1.1.3 In matters of tanker safety reference should be made to the 'International Safety Guide for Oil Tankers and Terminals' (ISGOTT Guide) published by the International Chamber of Shipping, Oil Companies International Marine Forum and the International Association of Ports and Harbours.

CHEMICAL TANKERS

8.1.1.4 These Instructions apply in general to chemical tankers although provisions of the 'Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk' or the 'International Code for the Construction and Equipment of Ships Dangerous Chemicals in Bulk' as appropriate should be taken into account, see the Instructions to Surveyors on Chemical Tankers. Should any difficulty arise in complying with both the regulations and the above Codes the matter should be referred to the appropriate Headquarters Branch.

LIQUEFIED GAS CARRIERS

8.1.1.5 Liquefied gas carriers which have a valid Certificate of Fitness need not be provided with a fixed deck foam system or an inert gas system other than as required in accordance with the provisions of the 'Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk' or the 'International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk' as appropriate, see the Instructions to Surveyors on Gas Carriers.

¹ "Inflammable" has the same meaning as "flammable"

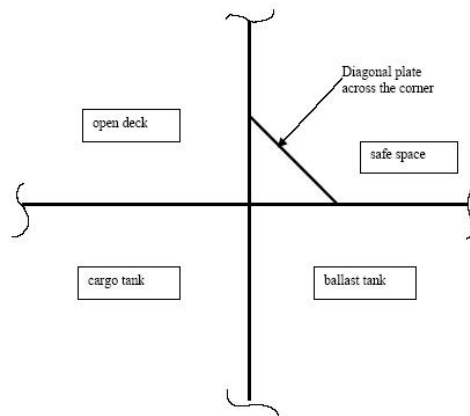
8.1.2 Location and separation of spaces (ships constructed on or after 1 February 1992)

8.1.2.1 The regulations place restrictions on the types of spaces which can be located near to cargo and slop tanks and requires separation from possible sources of flammable gases by a cofferdam, cargo pump room, oil fuel bunker or ballast tank. Interpretations of these requirements follow:

8.1.2.2 Construction of 'cofferdams' and prohibition of containment of cargo, wastes and goods (SOLAS II-2 Reg. 4.5.1):

The expression 'cofferdam' is meant, for the purposes of the regulations, an isolating space between two adjacent steel bulkheads or decks. The minimum distance between two bulkheads or decks, should be sufficient for safe access and inspection. In order to meet the single failure principle, in the particular case when a corner-to-corner situation occurs, this principle may be met by welding a diagonal plate across the corner (see figure below). No cargo, wastes or other goods should be contained in cofferdams.

(Unified Interpretation - MSC/Circ. 1120)



CORNER-TO-CORNER SITUATION IN A COFFERDAM

8.1.2.3 Safety aspects of double bottoms and duct keels under cargo oil tanks (SOLAS II-2 Reg. 4.5.2.4):

Pipe ducts in the double bottom shall comply with the following requirements:

- (i) They should not communicate with the engine room.*
- (ii) Provision shall be made for at least two exits to the open deck arranged at a maximum distance from each other. One of these exits fitted with a watertight closure may lead to the cargo pumproom.*

(iii) In the duct, provision shall be made for adequate mechanical ventilation.

(IACS Unified Rule F 26)

8.1.2.4 Separation of cargo oil tanks (SOLAS II-2 Reg. 4.5.1):

Pump-rooms intended solely for ballast transfer need not comply with the requirements of regulation 4.5.10. The requirements of regulation 4.5.10 are only applicable to the pumprooms where pumps for cargo, such as cargo pumps, stripping pumps, pumps for slop tanks, pumps for COW or similar pumps are provided.

(Unified Interpretation - MSC/Circ. 1120)

8.1.2.5 Restriction on boundary openings (SOLAS II-2 Reg 4.5.2, IBC Code 3.2.3, IGC Code 3.2.4)

Access to forecastle spaces containing sources of ignition may be permitted through doors facing cargo area provided the doors are located outside hazardous areas as defined in IEC Publication 60092-502.

(IACS Unified Interpretation SC 120)

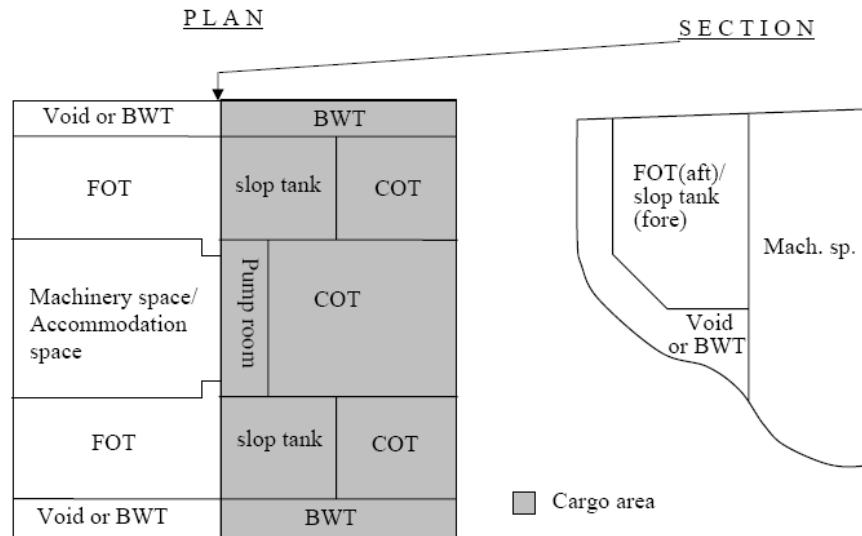
8.1.2.6 Cargo areas (SOLAS II-2 Reg 3.6 and 4.5.1.1)

For ships constructed on or after 5 October 2007:

1 A void space or ballast water tank protecting a fuel oil tank, in accordance with MARPOL, as shown in figure 1, need not be considered as a "cargo area" as defined in SOLAS regulation II-2/3.6 even though they have a cruciform contact with the cargo oil tank or slop tank.²

2 The void space protecting a fuel oil tank, in accordance with MARPOL, is not considered as a cofferdam as specified in SOLAS regulation II-2/4.5.1.1. Therefore, location of the void space shown in figure 1 should be considered acceptable even though they have a cruciform contact with the slop tank.

² As defined by MARPOL 73/78.



BALLAST WATER TANK (BWT) FUEL OIL TANK (FOT) CARGO OIL TANK (COT)

Figure 1

(Unified Interpretation - MSC/Circ. 1239)

8.1.2.7 Cargo openings in the bottoms of topside tanks of ships carrying alternatively oil and grain on ships carrying alternatively oil having a flash point not exceeding 60°C (closed cup test) or other cargoes.

When ships are designed to transport alternatively oil or dry cargoes, openings which may be used for cargo operations are not permitted in bulkheads and decks separating oil cargo spaces from other spaces not designed and equipped for the carriage of oil cargoes unless alternative approved means are provided to ensure equivalent integrity.

(IACS Unified Rule F 27)

8.1.2.8 Bow and stern loading and unloading arrangements on oil tankers

Where a cargo hose connection is arranged outside the cargo tank area, the pipe leading to such connections is to be provided with means of segregation such as a spectacle flange, removable spool piece or equivalent³ located within the cargo area. The space within 3 m of the manifold is to be considered as a dangerous area with regard to electrical or incendive equipment.

(IACS Unified rule F 16)

8.1.2.9 Fore peak ballast system on oil tankers

³ See MSC/Circ. 474.

The fore peak can be ballasted with the system serving ballast tanks within the cargo area, provided :

- *The tank is considered as hazardous;*
- *The vent pipe openings are located on open deck 3 m away from sources of ignition;*
- *Means are provided, on the open deck, to allow measurement of flammable gas concentrations within the tank by a suitable portable instrument;*
- *The access to the fore peak and sounding arrangements are direct from open deck. In case the fore peak tank is separated by cofferdams from the cargo tanks, an access through a gas tight bolted manhole located in an enclosed space may be accepted. In that case, a warning sign is to be provided at the manhole stating that the tank may only be opened after it has been proven to be gas free or the electrical equipment which is not electrically safe in the enclosed space is isolated.*

(IACS Unified rule F 44)

8.1.2.10 Location of paint lockers within the cargo block (SOLAS II-2 Reg 4.5.1.2 and .3)

Paint lockers, regardless of their use, should not be located above the tanks and spaces defined in SOLAS regulation II-2/4.5.1.2 for oil tankers. (Unified Interpretation - MSC/Circ. 1239)

8.1.2.11 An access to a deck foam system room (including the foam tank and the control station) can be permitted within the limits, provided the regulations are complied with and the door is located flush with the bulkhead.

8.1.2.12 The navigation bridge external doors and windows which are located within the limits should be tested for gas tightness. If a water hose test is applied the following may be taken as a guide:

- (a) nozzle diameter; minimum 12mm;
- (b) water pressure just before the nozzle; not less than 2 bar; and
- (c) distance between the nozzle and the doors or windows; maximum 1.5 m.

8.1.3 Venting, purging, gas-freeing and ventilation

8.1.3.1 High velocity devices to prevent the passage of flame into cargo tanks in oil tankers are now approved under the MED. Other types should take into account MSC/Circ. 677, as amended by MSC/Circ.1009, and MSC/Circ. 731

8.1.3.2 Secondary means of venting cargo tanks (SOLAS II-2 Reg 4.5.3.2.2 and 11.6.3.2)

1. A P/V breaker fitted on the IG main may be utilised as the required secondary means of venting.

2. The height requirements of Reg. II-2/4.5.3.4.1 and 11.6.2 and the requirements for devices to prevent the passage of flame of Reg. II-2/4.5.3.3 are not applicable to the P/V breaker provided the settings are above those of the venting arrangements required by Reg. II-2/11.6.1.

3. Where the venting arrangements are of the free flow type and the masthead isolation valve is closed for the unloading condition, the IG systems will serve as the primary underpressure protection with the P/V breaker serving as the secondary means.

4. Inadvertent closure or mechanical failure of the isolation valves required by SOLAS Reg. II- 2/4.5.3.2.2 and the FSS Code, Ch. 15, 2.3.2.2 need not be considered in establishing the secondary means since:

a) The valves are operated under the control of the responsible ships officer and a clear visual indication of the operational status of the valves is required by SOLAS Reg. II-2/4.5.3.2.2, as amended, and

b) The possibility of mechanical failure of the valves is remote due to their simplicity.

(IACS Unified Interpretation SC 140)

8.1.3.3 Safety devices in venting systems (SOLAS II-2 Reg 4.5.3.3)

1 Ullage openings do not include cargo tank openings that are fitted with standpipe arrangements with their own manually operated shutoff valves.

2 Examples include the common 2.54 cm (1") and 5.08 cm (2") diameter standpipe arrangements that are used for sampling, monitoring or measuring of ullage/ temperature/ interface, oxygen, liquid and hand dipping in the cargo tank.

(Unified Interpretation - MSC/Circ. 1169)

Ullage plugs, sighting ports and tank cleaning openings are not to be arranged in enclosed spaces.

(IACS Unified Rule F3)

8.1.3.4 Due to the practical difficulties of protecting openings into cargo tanks when using portable tank washing machines, such openings are not required to be fitted with devices to prevent the passage of flame provided all tank cleaning operations are performed in accordance with accepted industry practices outlined in the ISGOTT Guide.

8.1.3.5 The following **gas-freeing** arrangements may be accepted on tankers which are not fitted with inert gas systems:

(a) when using centrifugal portable or fixed gas-freeing fans, gas freeing may be done through outlets having a height of at least 2 m above the cargo tank deck which are protected by devices to prevent the passage of flame, which have not undergone the endurance burning test, provided a minimum discharge velocity of 20m/sec is maintained;

(b) when using portable axial flow gas-freeing fans, gas freeing may be done through outlets having a height of at least 2 m above the cargo tank deck without any device to prevent the passage of flame provided a minimum discharge velocity of 30m/sec is maintained at all times;

(c) the arrangements stated in sub-paragraphs (a) and (b) of this paragraph apply only whilst gas-freeing, during which time due regard should be given to the required operational procedures to ensure an acceptable level of safety;

(d) portable gas-freeing fans need not be fitted with a device to prevent the passage of flame at the inlet of the fan provided that when, in the event of loading and ballasting operations taking place concurrently with gas-freeing operations, gas monitoring at cargo tank deck level is carried out and where concentrations exceeding 30 per cent of the lower explosive limits are detected near the gas freeing inlet the gas freeing operation is stopped; and

(e) all operational procedures associated with gas-freeing should be stated in the ship's Standing Orders/ISM procedures.

8.1.4 Ignition sources

8.1.4.1 Anchor windlass and chain locker openings constitute ignition hazards. They are to be located at the distance required by the regulations.

Electrical equipment fitted in compliance with IEC Publication 60092- Electrical installations in ships - Part 502: Tankers - Special features is not considered a source of ignition or ignition hazard.

IACS Unified Interpretation SC 57)

8.1.4.2 Openings for pressure release, permitted electrical equipment (**SOLAS II-2 Reg. 11.6.2.2**):

*1 Areas on open deck, or semi-enclosed spaces on open deck, within 3 m of cargo tank ventilation outlets which permit the flow of **small volumes** of vapour, air or inert gas mixtures caused by thermal variation are defined as Zone 1. Permitted electrical equipment:*

- Certified safe type equipment for Zone 1.

2 Areas within 2 m beyond the zone specified in 1 above are defined as Zone 2. Permitted electrical equipment:

- Certified safe type equipment for Zone 1,
- Equipment of a type, which ensures the absence of sparks, "hot spots" during its normal operation,
- Equipment having an enclosure filled with a liquid dielectric, the application, or encapsulated,
- Pressurised equipment,
- Equipment specifically designed for Zone 2 (for example type "n" protection in accordance with IEC Publication 60079-15).

Note:

Zones 1 and 2 are those defined in IEC Publication IEC 60092 Electrical installations in ships - Part 502: Tankers - Special features.

(Unified Interpretation - MSC/Circ. 1120)

8.1.4.3 Vent outlets for cargo loading, discharging and ballast, permitted electrical equipment:

1 Areas on open deck, or semi-enclosed spaces on open deck, within a vertical cylinder of unlimited height and 6m radius centred upon the center of the outlet, and within a hemisphere of 6m radius below the outlet which permit the flow of **large volumes** of vapour, air or inert gas mixtures during loading/discharging/ballasting are defined as Zone 1.

Permitted electrical equipment:

- Certified safe type equipment for Zone 1.

2 Areas within 4 m beyond the zone specified in 1 above are defined as Zone 2.

Permitted electrical equipment:

- Certified safe type equipment for Zone 1;
- Equipment of a type, which ensures the absence of sparks, "hot spots", during its normal operation;
- Equipment having an enclosure filled with a liquid dielectric, the application, or encapsulated;
- Pressurized equipment; and
- Equipment specifically designed for Zone 2 (for example type "n" protection in accordance with IEC 60079-15).

Note: Zones 1 and 2 are those defined in IEC Publication IEC 60092 Electrical installations in ships - Part 502: Tankers - Special features. IACS Unified Interpretation SC 70)

8.1.4.4 Where there is a possibility that cargo flow will generate static electrical charges IACS Unified Rule E 9 should be complied with.

8.1.4.5 Cathodic protection on oil tankers

F1.1 Impressed current systems are not permitted in oil cargo tanks.

F1.2 Magnesium or magnesium alloy anodes are not permitted in oil cargo tanks and tanks adjacent to cargo tanks.

F1.3 Aluminium anodes are only permitted in cargo tanks and tanks adjacent to cargo tanks in locations where the potential energy does not exceed 28 kg m (200 ft lb). The height of the anode is to be measured from the bottom of the tank to the centre of the anode, and its weight is to be taken as the weight of the anode as fitted, including the fitting devices and inserts. However, where aluminium anodes are located on horizontal surfaces such as bulkhead girders and stringers not less than 1 m wide and fitted with an upstanding flange or face flat projecting not less than 75 mm above the horizontal surface, the height of the anode may be measured from this surface. Aluminium anodes are not to be located under tank hatches or Butterworth openings (in order to avoid any metal parts falling on the fitted anodes), unless protected by adjacent structure.

F1.4 There is no restriction on the positioning of zinc anodes.

F1.5 The anodes should have steel cores and these should be sufficiently rigid to avoid resonance in the anode support and be designed so that they retain the anode even when it is wasted.

F1.6 The steel inserts are to be attached to the structure by means of a continuous weld of adequate section. Alternatively they may be attached to separate supports by bolting, provided a minimum of two bolts with locknuts are used. However, approved mechanical means of clamping will be accepted.

F1.7 The supports at each end of an anode should not be attached to separate items which are likely to move independently.

F1.8 When anode inserts or supports are welded to the structure, they should be arranged so that the welds are clear of stress raisers.

(IACS Unified Rule F1)

8.1.4.6 Temperature of steam and heating media within the cargo area

On oil tankers, the steam and heating media temperature within the cargo area is not to exceed 220°C.

On gas carriers and chemical tankers, the maximum temperature is to be adjusted to take into account the temperature class of the cargoes.

(IACS Unified Rule F24)

8.1.4.7 Aluminium coatings on board oil tankers and chemical tankers

The use of aluminium coatings is prohibited in cargo tanks, cargo tank deck area, pump rooms, cofferdams or any other area where cargo vapour may accumulate.

Aluminised pipes may be permitted in ballast tanks, in inerted cargo tanks and, provided the pipes are protected from accidental impact, in hazardous areas on open deck.

(IACS Unified Rule F2)

8.1.5 Fixed deck foam system

Refer to chapter 7.

8.1.6 Fixed dry powder system

8.1.6.1 The specification for fixed dry powder systems are contained in the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), as amplified by MSC Circular 1315, and are not currently covered by the MED.

8.1.6.2 Testing of new installations should comply with part 4 of MSC Circular 1315. A short test discharge may be considered necessary to verify monitor throw/positioning or the ability of the crew to control hose applicators.

8.1.6.3 At resurvey surveyors should ensure that the maintenance specified in MGN 355 has been carried out and that visual examination shows no defects.

8.1.7 Protection of cargo pump rooms

8.1.7.1 Designation as "pump rooms"

SOLAS Reg. II-2/4.5.1.1 states:

"Pump-rooms, containing pumps and their accessories for ballasting those spaces situated adjacent to cargo tanks and slop tanks and pumps for oil fuel

transfer shall be considered as equivalent to a cargo pump room within the context of this regulation provided that such pump-rooms have the same safety standard as that required for cargo pump rooms." However relaxations can be made in certain circumstances whilst maintaining "the same safety standard as that required for cargo pump rooms":-

Pump rooms intended solely for ballast transfer need not comply with the requirements of regulation II-2/4.5.10. The requirements of regulation II - 2/4.5.10 are only applicable to the pump rooms where pumps for cargo, such as cargo pumps, stripping pumps, pumps for slop tanks, pumps for COW or similar pumps are provided.

(Unified Interpretation - MSC/Circ. 1120)

Pump-rooms intended for fuel oil transfer need not comply with the requirements of regulation II-2/4.5.10.

(IACS Unified Interpretation SC 188)

8.1.7.2 Pump room ventilation

With the following arrangement of exhaust trunking there should be 20 air changes per hour on the total volume of the pump room:

(i) In the pump room bilges just above the transverse floor plates on bottom longitudinals, so that air can flow over the top from adjacent spaces.

(ii) An emergency intake located about 2 m above the pump room lower grating. This emergency intake would be used when the lower intakes are sealed off due to flooding in the bilges. The emergency intake should have a damper fitted which is capable of being opened or closed from the exposed main deck and lower grating level.

(iii) The foregoing exhaust system is in association with open grating floor plates to allow the free flow of air.

(iv) Arrangements involving a specific ratio of areas of upper emergency and lower main ventilator openings, which can be shown to result in at least the required 20 air changes per hour through the lower inlets, can be adopted without the use of dampers. When the lower access inlets are closed then at least 15 air changes per hour should be obtained through the upper inlets.

(IACS Unified Rule F 21)

8.1.7.3 Emergency lighting (SOLAS II-2 Reg. 4.5.10.1.2):

Where the lighting in cargo pump-rooms can be commonly used as the emergency lighting, this lighting should be interlocked with the ventilation systems. However, this interlock should not prevent operation of the emergency lighting in case of the loss of the main source of electrical power.

(Unified Interpretation - MSC/Circ. 1120)

8.1.7.4 Monitoring the concentration of hydrocarbon gases in cargo pump-rooms on oil tankers (SOLAS II-2 Reg. 4.5.10.1.3):

1 Sequential sampling is acceptable as long as it is dedicated for the pump room only, including exhaust ducts, and the sampling time is reasonably short.

2 Detection positions are the zones where air circulation is reduced (e.g. recessed corners).

(Unified Interpretation - MSC/Circ. 1120)

8.1.7.5 Bilge level monitoring devices (SOLAS II-2 Reg. 4.5.10.1.4):

Bilge high-level alarms are acceptable as an alternative means for the level monitoring devices.

(Unified Interpretation - MSC/Circ. 1120)

8.1.7.6 Pump room alarms

Where audible alarms are fitted to warn of the release of fire extinguishing medium into pump rooms, they may be of the pneumatic type or electric type.

(a) Pneumatically operated alarms

In cases where the periodic testing of such alarms is required, CO₂ operated alarms should not be used owing to the possibility of the generation of static electricity in the CO₂ cloud. Air operated alarms may be used provided the air supply is clean and dry.

(b) Electrically operated alarms

When electrically operated alarms are used, the arrangements are to be such that the electric actuating mechanism is located outside the pump room except where the alarms are certified intrinsically safe.

(IACS Unified Rule F5)

8.1.8 Instruments for measuring oxygen and flammable vapour concentrations

8.1.8.1 Fixed gas detection systems:

This UR applies to gas analysing units of the sampling type located outside gas dangerous zones and fitted on board gas carriers or on board oil/chemical tankers.

Gas analysing units with non-explosion proof measuring equipment may be located in areas outside cargo areas, e.g. in cargo control room, navigation bridge or engine room when mounted on the forward bulkhead provided the following requirements are observed:

1. Sampling lines shall not run through gas safe spaces, except where permitted under 5.

2. The gas sampling pipes shall be equipped with flame arresters. Sample gas is to be led to the atmosphere with outlets arranged in a safe location.

3. Bulkhead penetrations of sample pipes between safe and dangerous areas shall be of approved type and have same fire integrity as the division penetrated. A manual isolating valve shall be fitted in each of the sampling lines at the bulkhead on the gas safe side.

4. The gas detection equipment including sample piping, sample pumps, solenoids, analysing units etc. shall be located in a reasonably gas tight enclosure (e.g. a fully enclosed steel cabinet with a gasketed door) which is to be monitored by its own sampling point. At gas concentrations above 30% LFL inside the enclosure the entire gas analysing unit is to be automatically shut down.

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

(IACS Unified Rule F43)

8.1.8.2 Portable gas detection (SOLAS II-2 Reg 4.5.7.1)

To meet the requirement for “sufficient set of spares”:

Every oil tanker is to be provided with at least two portable gas detectors capable of measuring flammable vapour concentrations in air and at least two portable O₂ analysers.

(IACS Unified Rule F7)

In addition, for tankers fitted with inert gas systems, it is recommended that at least two portable gas detectors are to be capable of measuring concentrations of flammable vapours in inerted atmosphere.

8.2 Inert gas Installations

Inert gas system components are now covered by the Marine Equipment Directive. IACS Unified Rule F20 contains more detailed requirements than those in the FSS Code for boiler flue, oil fired gas generator and nitrogen generator systems.

8.2.1 Oil and petroleum tankers

8.2.1.1 L.S. Regulation 30(1) and SOLAS Ch II-2 Regulation 4.5.5 require tankers of 20,000 tons or over carrying flammable bulk liquid cargoes, ie. crude oil and petroleum products having a flashpoint not exceeding 60°C, to be provided with an inert gas system complying with the requirements contained in Schedule 9 of MSN 1666(M) or the FSS Code, dependent on date of build.

8.2.1.2 Reference is made to MSC/Cir.731 - Revised factors to be taken into consideration when designing cargo tank venting and gas freeing arrangements, MSC/Cir.485 - Clarification of inert gas system requirements under SOLAS 1974, as amended (for tankers between 20,000 and 40,000 tonnes deadweight constructed before 1 September 1984), and MSC/Cir.387 - Revised guidelines for inert gas systems. The term cargo tank includes slop tanks.

8.2.2 Chemical tankers and gas carriers

8.2.2.1 It should be remembered that the International Codes for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk and Liquefied Gases in Bulk are applicable to such ships regardless of size including those of less than 500 GT. They in turn apply most of SOLAS Ch II-2 to chemical tankers and gas carriers regardless of size.

8.2.2.2 Chemical tankers having valid Certificates of Fitness for the Carriage of Dangerous Chemicals in Bulk or gas carriers having valid Certificates of Fitness for the Carriage of Liquefied Gases in Bulk should comply with the following:

8.2.2.3 Chemical tankers, when carrying crude oil or flammable petroleum products should comply with the alternative requirements for inert gas systems contained in A 567(14) (Schedule 10 of MSN 1666(M)) unless they comply with the FSS Code (or Schedule 9 of MSN 1666 for pre 2002 ships). Inert gas may be nitrogen gas from nitrogen generators subject to the application of IMO Resolution A 567(14).

8.2.2.4 Gas carriers when carrying flammable cargoes described in 8.2.1.1 should be provided with cargo tank inerting arrangements equivalent to those specified in Schedules 9 or 10 of MSN 1666(M); or

8.2.2.5 Chemical tankers and gas carriers, if constructed before 1 July 1986, when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in Chapter VII of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk or Chapters 17 and 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals In Bulk are not required to be inerted; or

8.2.2.6 Chemical tankers and gas carriers, if constructed on or after 1 July 1986, when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in Chapter VI and VII of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk or Chapters 17 and 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, are not required to be provided with an inert gas system if the capacity of tanks, used for the carriage of these cargoes, does not exceed 3,000 m³, the individual nozzle capacities of tank washing machines do not exceed 17.5 m³ per hour and the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 cubic metres per hour.

8.2.3 Isolation arrangements in inert gas main

The following satisfies FSS Code Chapter 15, paragraph 2.3.2.7:

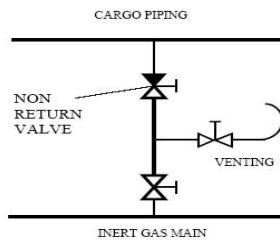


Figure 1

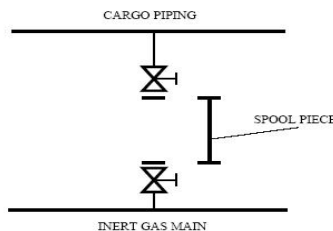


Figure 2

(Unified Interpretation - MSC/Circ. 1120)

8.2.4 Testing

8.2.4.1 The surveyor should witness such tests as are necessary to ensure gas of the right quality and, so far as is practicable, the appropriate quantity is produced. Although oxygen content of less than 1 per cent by volume can be achieved 5 per cent may be regarded as acceptable. Special attention should be paid to the automatic regulating and sensing valves, to the oxygen or carbon dioxide recorder, to alarms and to the necessary water supplies.

8.2.4.2 At initial survey a full scale test should be carried out to demonstrate the following:

- (a) a positive pressure can be maintained on all cargo and slop tanks during the maximum discharge rate attainable;
- (b) the oxygen content in the cargo tanks is acceptable during the maximum discharge and also during the topping up phase when no cargo is being discharged;
- (c) all alarms operate at the stipulated pressures, temperature levels and flow rates;
- (d) all required shut down facilities are activated at the stipulated pressures, temperatures, levels and flow rates; and
- (e) the effectiveness of the instrumentation, including recorders for the oxygen content and pressure in the cargo tanks.

8.2.4.3 During renewal survey it may be impractical to inspect the scrubber, deck water seal and the pressure vacuum release arrangements. Furthermore it is not usually possible to test the 'back flow prevention' function of the deck water seal during the time the cargo tanks need to be kept inerted. The integrity of the deck water seal can only be established by a thorough internal examination for corrosion and erosion, particularly those dimensions in the structure necessary to form the required levels in the seal. Thus the survey of the deck seal can only be undertaken when the ship is gas free or when it can be established with some degree of confidence that the deck isolating and non-return valve or valves are sufficiently gas tight to enable such examination to be undertaken in safety. Where it is impracticable to inspect such items at the time of survey, it is in order for the surveyor to accept a report by the ship's Chief Engineer, provided the inspection, maintenance, repair and operation of the inert gas system is fully documented. Surveyors should ensure however that all major items are seen within any 5 year period.

8.3 Special requirements for ships carrying dangerous goods

8.3.1 Statutory requirements

8.3.1.1 L.S. Regulation 103, S.S. Regulation 45 and SOLAS II-2 Regulation 19 applies the statutory requirements to ships which carry dangerous goods. Dangerous goods are those defined as such by the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. The effect of these requirements is to require certain additional precautions when certain classes of dangerous goods are carried. Any requests for reduced protective requirements, allowed for cargo ships under 500 gt., should be referred to HQ.

8.3.1.2 Chapter 7 of the International Maritime Dangerous Goods Code (IMDG Code) contains operational measures which must be taken in addition to the ship requirements. Refer to chapter 3 of the International Maritime Dangerous Goods Code (IMDG Code) for a description of the term "limited quantities".

8.3.2.3 Surveyors should note that the voluntary Code of Safe Practice for Solid Bulk Cargoes (BC Code) is being replaced by the International Maritime Solid Bulk Cargoes (IMSBC) Code on a voluntary basis from July 2009 however this is due to become mandatory by 1 January 2011.

8.3.2 Interpretations

8.3.2.1 Interpretation of Table 1 of MSN 1669(M):

*A "purpose built container space" is a cargo space fitted with cell guides for stowage securing of containers.
(Unified Interpretation - MSC/Circ. 1120)*

*"Ro-Ro spaces" include special category and vehicle deck spaces.
(Unified Interpretation - MSC/Circ. 1120)*

Weather decks (SOLAS II-2 Reg 19, Table 19.1)

*For the purposes of Reg. II-2/19 a ro-ro space fully open above and with full openings in both ends may be treated as a weather deck.
(IACS Unified Interpretation SC 86)*

8.3.3 Fire extinguishing

8.3.3.1 Water supplies, for open top container ships:

The water spray system required by items 9.2, 9.3 and 9.4 of MSC/Circ 608/Rev 1 "Interim Guidelines for Open Top Container Ships" will also satisfy the requirements for dangerous goods.

The amount of water required for fire fighting purposes in the largest hold is to satisfy simultaneous use from the water spray system plus four jets of water from nozzles.

(Unified Interpretation - MSC/Circ. 1120)

8.3.3.2 Equivalent protection (SOLAS II-2 Reg 10.7.2)

Water supplies defined in regulation 19.3.1.2 are considered as an acceptable protection for cargoes listed in table 2 of MSC/Circ.671.

(MSC Circular 671 has been replaced by MSC Circular 1146 which should be used instead.)

Ships carrying dangerous goods on deck only:-

Any cargo space in a ship engaged in the carriage of dangerous goods on deck or in cargo spaces should be provided with a fixed gas fire-extinguishing system complying with the provisions of the FSS Code or with a fire-extinguishing system which, in the opinion of the Administration, gives equivalent protection for the cargoes carried.

(Unified Interpretation - MSC/Circ. 1120)

8.3.3.3 Cargo space water spray systems are covered in chapter 7.

8.3.3.4 Hydrants for dangerous goods (SOLAS II-2 Reg 19.3.1.2)

The number and position of hydrants should be such that at least two of the required four jets of water, when supplied by single lengths of hose, may reach any part of the cargo space when empty; and all four jets of water, each supplied by single lengths of hose may reach any part of ro-ro cargo spaces.

(Unified Interpretation - MSC/Circ. 1120)

Note that SOLAS Reg 10.2.3.1.1 specifies maximum hose lengths for ships >July 2002. UK regulations for older SOLAS and for all non SOLAS ships have different maximum lengths.

8.3.3.5 Replacement of water with foam:

A high expansion foam system complying with the FSS Code, chapter 6, section 2.2, is acceptable as an alternative to the water application system required by SOLAS II-2 Reg 19.3.1.3 and .4 except if cargoes dangerously react with water (see IMDG Code).

(Unified Interpretation - MSC/Circ. 1120)

8.3.4 Sources of ignition

8.3.4.1 Sources of ignition (SOLAS II-2 Reg 19.3.2)

1. Reference should be made to IEC 60092-506 standard, Special features - Ships carrying specific dangerous goods and materials hazardous only in bulk.

2. For pipes having open ends (e.g., ventilation and bilge pipes, etc.) in a hazardous area, the pipe itself should be classified as a hazardous area. See IEC 60092-506 table B1, item B.

3. Enclosed spaces (e.g., pipe tunnels, bilge pump-rooms, etc.) containing such pipes with equipment such as flanges, valves, pumps, etc., should be regarded as an extended hazardous area, unless provided with overpressure in accordance with IEC 60092-506 clause 7.

(Unified Interpretation - MSC/Circ. 1203)

8.3.4.2 Bilge pumping for open top container ships:

Bilge systems for cargo holds should be independent of the machinery space bilge system and be located outside of the machinery space.

(IACS Unified Interpretation SC 111)

8.3.4.3 Arrangements for enclosed spaces containing bilge pumps serving cargo spaces (SOLAS II-2 Reg 19.3.5.4)

Electrical equipment in the space should comply with IEC Publication 60092- 506 standard.- Electrical installations in ships.

(Unified Interpretation - MSC/Circ. 1120)

8.3.4.4 Exhaust fans:

1 Exhaust fans should be of non-sparking type in accordance with IACS Requirement F 29, as revised.

2 The purpose of suitable wire mesh guards is to prevent foreign objects from entering into the fan casing. The standard wire mesh guard should have a size of 13mm x 13mm.

(Unified Interpretation - MSC/Circ. 1120)

8.3.5 Ventilation

8.3.5.1 Ventilation requirements for individual cargoes and open-top container cargo holds (SOLAS II-2 Reg 19.3.4)

1 General

If adjacent spaces are not separated from cargo spaces by gastight bulkheads or decks, ventilation requirements should apply as for the cargo space itself, required under regulation 19.3.4.2 and its interpretations.

2 Requirements for individual cargoes:

.1 Cargoes liable to give off vapours or gases which can form an explosive mixture with air (See the BC Code, Appendix B, e.g. IMO Class 4.3 materials):

Two separate fans should be permanently fitted or being of a portable type adapted for being permanently fitted prior to loading and during voyage. The fans should be either explosion proof or arranged such that the escaping gas flow is separated from electrical cables and components. The total ventilation should be at least six air changes per hour, based upon the empty space. Ventilation should be such that any escaping gases cannot reach living spaces on or under deck.

.2 Cargoes liable to spontaneous combustion (only applicable to seed cake (b) and (c)):

Two separate fans should be permanently fitted or being of a portable type adapted for being permanently fitted prior to loading and during voyage. The fans should be either explosion proof or arranged such that the escaping gas flow is separated from electrical cables and components. The total ventilation should be at least six air changes per hour, based upon the empty space. Ventilation should be such that any escaping gases cannot reach living spaces on or under deck.

(Unified Interpretation - MSC/Circ. 1120)

Note 8.3.2.3, above, on the replacement of the BC Code by the IMSBC Code.

3 For open-top containerships

Power ventilation should be required only for the lower part of the cargo hold for which purpose ducting is required. The ventilation capacity should be at least two air changes per hour, based on the empty hold volume below weather deck.

(Unified Interpretation - MSC/Circ. 1120)

8.3.6 Insulation of machinery space boundaries (SOLAS II-2 Reg 19.3.8)

In the case that a closed or semi-closed cargo space is located partly above a machinery space and the deck above the machinery space is not insulated, dangerous goods are prohibited in the whole of that cargo space. If the uninsulated deck above the machinery space is a weather deck, dangerous goods are prohibited only for the portion of the deck located above the machinery space.

(IACS Unified Interpretation SC 103)

8.3.7 Personnel protection

8.3.7.1 Type and suitability of protective clothing:

1 When selecting the protective clothing the danger of the chemicals according to the class and liquid or gaseous state should be taken into account.

2 The required protective clothing is for emergency purposes. For solid bulk cargoes the protective clothing is to satisfy the equipment requirements specified in Appendix E of the BC Code for the individual substances. For packaged goods the protective clothing is to satisfy the equipment requirements specified in emergency procedures (EmS) of the Supplement to IMDG Code for the individual substances.

(Unified Interpretation - MSC/Circ. 1120)

8.3.7.2 Self-Contained Breathing Apparatus (SCBA) (SOLAS II-2 Reg 19.3.6.1)

Where dangerous goods are carried the self-contained breathing apparatus should be of positive pressure type, according to the MED, and should be suitable for use together with the chemical protection clothing on board. For each item of breathing apparatus, two complete sets of air bottles are required. These spare bottles are to be in addition to the spare bottles required for the fireman's outfit.

8.3.7.3 Application of the requirements to different classes of dangerous goods:

Certification for carriage of solid dangerous bulk cargoes covers only those cargoes listed in Appendix B of the BC Code except cargoes of MHB. Other solid dangerous bulk cargoes may only be permitted subject to acceptance by the Administrations involved.

(Unified Interpretation - MSC/Circ. 1120)

8.4 Ships carrying explosives

8.4.1 L.S. Regulation 102(1) contains the requirements for ships which carry explosives of such nature and such quantity as are not permitted to be carried in passenger ships by Regulation 16(1) of the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997.

8.4.2 In all cases reference should be made to MSN 1706 'The Carriage of Military and Commercial Explosives' and the 'International Maritime Dangerous Goods Code' (IMDG Code).

8.5 Vehicle, special category and ro-ro spaces

8.5.1 Fire extinguishing

8.5.1.1 Fire protection of weather decks (SOLAS II-2 Reg 20.4 and 20.6)

The requirements for a fixed fire extinguishing system, fire detection, foam applicators and portable extinguishers need not apply to weather decks used for the carriage of vehicle with fuel in their tanks.

(IACS Unified Interpretation SC 73)

8.5.1.2 Portable fire extinguishers on weather decks used as ro-ro cargo space (SOLAS II-2 Reg 20.2.6.1)

The requirements set out in this regulation need not be applied to weather decks used as ro-ro cargo spaces.

(Unified Interpretation - MSC/Circ. 1120)

8.5.1.3 Portable fire-fighting appliances in cargo holds loaded with vehicles with fuel in their tanks (SOLAS II-2 Reg 20.6.2)

Cargo holds, loaded with vehicles with fuel in their tanks and stowed in open or closed containers need not be provided with the portable fire extinguishers, waterfog applicators and foam applicator unit.

(IACS Unified Interpretation SC 205)

8.5.2 Sources of ignition

8.5.2.1 To prevent ignition of flammable vapours, the electrical equipment less than 450 mm from the deck should be of certified safe type and wiring, if fitted, should be suitable for use in zone 1 areas (gas group II(A) and temperature class T3), as defined by the IEC. Refer to IEC Publication 60079 Part 14 for types of protection suitable for use in Zone 1 areas.

8.5.2.2 Electrical equipment fitted above a height of 450mm from the deck:

For equipment above a height of 450 mm above deck the degree of protection of electrical equipment required by this regulation will be realized:

.1 by an enclosure of at least IP 55 as defined in IEC Publication 600529 - Classification of Degree of Protection Provided by Enclosures; or

.2 by apparatus for use in zone 2 areas as defined in Publication 60079 - Electrical Apparatus for Explosive Gas Atmospheres (Temperature class T3).

(Unified Interpretation - MSC/Circ. 1120)

8.5.2.3 Electrical equipment and wiring in exhaust ventilation ducts:

1 The electrical equipment referred to in these regulations should be of certified safe type and wiring, if fitted, and should be suitable for use in zone 1 areas as defined in IEC Publication 60079 - Electrical Apparatus for Explosive Gas Atmospheres (Gas group II A and temperature class T3).

2 Exhaust fans should be of non-sparking type in accordance with IACS Requirement F 29, as revised.

(Unified Interpretation - MSC/Circ. 1120)

8.5.3 Ventilation

8.5.3.1 Capacity of ventilation systems (SOLAS II-2 Reg 20.3.1.1)

Reference is made to MSC/Circ.729 - Design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces.

(Unified Interpretation - MSC/Circ. 1120)

8.5.3.2 Alarm in case of loss of ventilation capacity (SOLAS II-2 Reg 20.3.1.3)

The requirement to indicate any loss of ventilating capacity is considered complied with by an alarm on the bridge, initiated by fall-out of starter relay of fan motor.

(Unified Interpretation - MSC/Circ. 1120)

8.5.4 Horizontal fire zone concept (SOLAS II-2 Reg 20.2.2.1)

The "total overall clear height" is the sum of distances between deck and web frames of the decks forming one horizontal zone.
(Unified Interpretation - MSC/Circ. 1120)

8.6 Offshore support vessels

8.6.1 Carriage of flammable liquids

These may be engaged in oil recovery, well stimulation, offshore supply work or similar operations. When it is intended to construct or convert such vessels for the carriage of flammable liquids in bulk a submission should be made to Headquarters at an early stage. The requirements for oil recovery vessels are set out in a code of practice entitled - "Code of Practice For Vessels Engaged in Oil Recovery Operations", MSN 1663 refers. Other vessels used intermittently for the carriage of flammable liquids in bulk will be treated in a similar manner.

8.6.2 Carriage of dangerous goods and noxious liquids

The special nature of offshore support vessels has been recognised and MGN 282 contains permissible variations to the normal requirements for carriage of packaged dangerous goods. In addition MSN 1458 contains a general exemption from the UK regulations for noxious liquid substances, dangerous goods and marine pollutants if Resolution A673(16) "Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk on Offshore Support Vessels" is complied with. These guidelines have been amended by MEPC. 158(55), MSC.184(79) and MSC.236(82).