

PART 9

OUTFIT AND STRUCTURAL FIRE PROTECTION

PART 9

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OUTFIT AND STRUCTURAL FIRE PROTECTION

Section 9.1 – Paintwork

Painting steel vessels

- 9.1.1 It is recommended that all steel plate and sections be shot-blasted and primed prior to delivery to the Builders yard. Alternatively, the steel may be shot-blasted and metal sprayed or coated with an epoxy-resin based, or other approved high duty steel primer at the Builders yard, prior to or during construction.
- 9.1.2 During the course of construction, all weld damaged paint areas, burn backs and cut edges or other breaks in previously primed surfaces are to be thoroughly re-blasted or mechanically cleaned and re-coated with primer or first coat of surrounding system. Paint is not to be applied in way of welded connections forming tanks subject to air pressure or water testing inspection until authorised by the Surveyor after testing.
- 9.1.3 As surface preparation is vital to the performance of the paint system on completion of construction, the hull is to be thoroughly cleaned and painted in accordance with the paint Manufacturer's specification to the approved dry film thicknesses. Steelwork behind linings and in way of bilge areas may be painted with approved bitumen based composition, subject to compliance with these Standards and statutory requirements concerning flame spread characteristics.
- 9.1.4 Minor steelwork that is neither galvanised nor shot-blasted is to be thoroughly cleaned of all rust and scale, and painted in accordance with paint Manufacturer's specification.

Painting GRP vessels

- 9.1.5 In all GRP vessels, paints used internally in the engine room and accommodation spaces are to be of low flame spread characteristics.
- 9.1.6 Where the painting of a GRP hull may be considered necessary, painting should not be carried out until the moulding has completely cured. Prior to the application of paint, the gelcoat surface should be treated with approved solvent to remove any residue of release agent or wax, and then washed. The GRP surface should then be lightly abraded prior to being coated with etching primer and final paint system to Manufacturer's specification.

General

- 9.1.7 All paints, varnishes, anti-fouling and bitumen based compositions shall be of an approved marine commercial standard and quality, and applied to an adequate film thickness in accordance with the Manufacturer's paint system and specification, and be fully compatible with primary coated surfaces.

- 9.1.8 When painting aluminium structures, care should be taken that the paint Manufacturer's procedures are strictly adhered to. All surfaces should be thoroughly degreased, primed and coated with a zinc chromate wash primer, or equivalent, prior to applying undercoats and finishing coats. The paints used for aluminium structures should not contain lead, mercury, copper, or other metals which would lead to degradation of the aluminium alloy surfaces.
- 9.1.9 Timber and composition surfaced decks may be left unpainted, but where these are painted, the paint is to be of the non-slip type.
- 9.1.10 All tanks, pipework and fittings except where they are of non-ferrous material or galvanised, are to be painted externally with anti-corrosive paint in accordance with the approved paint system.
- 9.1.11 All engine room pipework systems are to be colour coded in accordance with Table 7.11.1, or identified by a painted or taped band on each side of every joint to the colour coding requirements.

Section 9.2 – Accommodation

General

- 9.2.1 The direct responsibility for the arrangement, layout and appearance remains with the Builders and/or Designers to ensure that the agreed specification is complied with by ensuring that an adequate standard of accommodation is provided for the comfort, recreation, health and safety of all persons onboard.
- 9.2.2 Attention is drawn to the achievement of appropriate safety standards for means of access and escape, lighting, heating, food preparation and storage, safety of movement about the vessel, ventilation and water services.
- 9.2.3 It is recommended that accommodation standards for the crew be at least equivalent to the standards set by the International Labour Organisation conventions for crew accommodation in merchant ships. On smaller vessels, when it is neither reasonable nor practicable to site crew sleeping accommodation amidships or aft and above the deepest waterline as required, measures should be taken to ensure an equivalent level of crew health and safety.

Section 9.3 – Escape arrangements

- 9.3.1 On all vessels, emergency escape routes are to be provided from the wheelhouse and sleeping accommodation. An escape route is defined as an alternative means of exit, which is unobstructed, easily accessible, and leads out as directly as possible to an open deck. An escape may be through any hatch, door, window or skylight which has a minimum clear opening of not less than 500mm x 380mm, and in the case of portlights, 400mm minimum diameter. In exceptional

circumstances, one means of access/escape may be considered. Escape arrangements from engine rooms are to be as defined in Part 6, Paragraph 6.2.1.

- 9.3.2 Emergency escape hatches or doors must be capable of easy opening from both sides without the use of special keys or tools, and must not be fitted with padlocks or locked closed when the vessel is occupied. Escape routes and exits must be indicated by permanent signs.
- 9.3.3 In sleeping accommodation, efficient fire detectors must be provided to enable early warning of a fire emergency.
- 9.3.4 All spaces must be fitted with sufficient ladders, steps, hand rails and grips as deemed necessary to facilitate easy access and escape.
- 9.3.5 In addition to the above, also see paragraphs 9.29.59 – 9.29.62.

Section 9.4 – Lighting

- 9.4.1 An electric lighting system is to be provided and installed to the requirements of Part 8 of these Standards 'Electrical Installations'. The lighting system must be capable of supplying adequate light to all enclosed accommodation and working spaces, escape routes and life-saving appliance stowage positions.

Section 9.5 – Heating

- 9.5.1 As considered appropriate, an adequate heating installation should be provided.

Section 9.6 – Food preparation and storage

- 9.6.1 The galley should be provided with a cooking stove fitted with fiddle bars and a sink, and have adequate working surface for the preparation of food.
- 9.6.2 The galley floor should be provided with a non-slip surface and provide a good foothold.

Section 9.7 – Temperature

- 9.7.1 Where practicable, the temperature within accommodation spaces and enclosed work areas is to be kept within a comfortable range, having regard to the physical demands placed on the crew, and the actual or potential weather conditions in the area in which the vessel is designed to operate.

Section 9.8 – Hand holds and grab rails

- 9.8.1 Sufficient hand holds and grab rails are to be provided to allow safe movement around the accommodation and working spaces. Stormrails

and hand holds should be fitted on the outside of deckhouses and casings to enable the safe movement of the crew on all working deck areas when the vessel is in a seaway.

- 9.8.2 The perimeter of any exposed deck and the top of any deckhouse is to be provided with a combination of bulwarks, guardrails or taut wires of sufficient strength and at a height of at least 1m (See Figure 9.31.1). Bulwarks, rails or wires must be supported efficiently by stays or stanchions. The openings between the courses of any rail or wires should not exceed 230mm for the lowest course and 380mm for any other course. When application of such measures would impede the proper working of the vessel, equivalent safety measures may be considered.
- 9.8.3 Where there is a risk of any member of the crew falling through an opening in the deck, or from one deck to another, then so far as is reasonably practical protection, as in Paragraph 9.8.2, is to be provided.
- 9.8.4 Access to installations above the deck for operations or maintenance purposes is to be provided with guardrails or similar protection to prevent falls and to ensure the crew's safety. Where guardrails provide such protection, they are to be of appropriate height.
- 9.8.5 Where required for fishing operations, the height of the fixed bulwarks may be reduced providing portable rail arrangements are installed when not fishing to the regulatory height.

Section 9.9 – Securement of heavy items

- 9.9.1 All heavy items of equipment such as batteries, gas bottles, cooking appliances and spare gear must be securely fastened in position to prevent movement when the vessel is at sea. All lockers and stowage cupboards containing heavy items must have a lid or doors with secure fastening arrangements.

Section 9.10 – Ventilation

- 9.10.1 An effective means of ventilation is to be provided to all enclosed spaces, which under normal operating conditions may be entered by persons onboard. All ventilators are to meet the requirements stated at Part 3, Section 3.4 for weathertight integrity.
- 9.10.2 Engine rooms are to be adequately ventilated in accordance with Section 6.8.
- 9.10.3 When an LPG system is fitted, ventilation is to be in accordance with Section 9.29.
- 9.10.4 In vessels where sleeping accommodation is provided below the weather deck, the space is to be adequately ventilated to provide a

minimum of six complete air changes per hour when the access openings to the space are closed.

- 9.10.5 Toilet and shower spaces are to be fitted with separate exhaust ventilation direct to open air.

Section 9.11 – Water services

- 9.11.1 An adequate supply of cold fresh drinking water is to be provided to meet the requirements of the number of crew onboard. Fresh water tanks may be integral with the hull or separate tanks securely fitted in position. The tanks are to be constructed complete with baffles, access manholes for cleaning, and all necessary valves, air pipes and fillers.
- 9.11.2 Steel fabricated tanks are to be continuously welded inside and out. When independent tanks are constructed of mild steel, it is recommended that they be galvanised on completion. Internal coatings are to be non-toxic and suitable for use with potable water. Fresh water tanks are not to have a common bulkhead with fuel or lubricating oil tanks.

Section 9.12 – Sleeping accommodation

- 9.12.1 A bed (bunk or cot) should be provided for every person onboard. Means for preventing the occupants from falling out should be provided.

Section 9.13 – Toilet facilities

- 9.13.1 Adequate sanitary toilet facilities should be provided onboard. Where practicable, the facilities should be at least one water closet, one wash-hand basin and one shower.
- 9.13.2 In vessels where a sanitary system, including a holding tank, are provided, care should be taken to ensure that there is no possibility of fumes from the tank finding their way back to a toilet, should the water seal at the toilet be broken.
- 9.13.3 Water closets are to be an approved commercial marine standard type, and be complete with all necessary inlet, discharge valves, and pipework. The shipside valves are to be fitted in a readily accessible position to enable easy closing in an emergency and, depending on their location, an automatic non-return valve is to be fitted adjacent to the closing valve. Alternatively the valve fitted at the hull may be of the screw down non-return type. An anti-siphon device is to be fitted to the discharge pipe where the rim of the toilet is less than 300mm above the deepest operational waterline of the vessel.

Section 9.14 – Stowage facilities for personal effects

- 9.14.1 Adequate stowage facilities for clothing and personal effects should be provided for every person onboard.

Section 9.15 – Deckhouses and superstructures

- 9.15.1 The structural strength of any deckhouse or superstructure should comply with the requirements of Part 4, Section 4.19 as appropriate to the vessel and its areas of operation.

Section 9.16 – Noise

- 9.16.1 Builders, skippers and owners should be aware of current statutory regulations relating to noise control on-board vessels, including SI 2007 No.3075 The Merchant Shipping and Fishing Vessels (Control of Noise at Work) Regulations, as amended by SI 2010, No.1110 and any subsequent amendments.

Section 9.17 – Medical stores

- 9.17.1 Builders, skippers and owners should be aware of current statutory regulations relating to the carriage of medical stores, including SI 1995, No. 1802 The Merchant Shipping and Fishing Vessels (Medical Stores) Regulations as amended by SI 1996 No.2821 and any subsequent amendments.

Section 9.18 – Cathodic protection

- 9.18.1 An approved method of cathodic protection is to be fitted to all vessels to eliminate or reduce corrosion. The anodes should be of the correct surface area as recommended by the Manufacturer, bonded with correctly sized wires, and continuity bridges are to be fitted at flexible pipe positions, engines, stern gear, rudder and seacocks.

Section 9.19 – Galvanic action

- 9.19.1 Where connections of dissimilar metals are made, special consideration is to be given to hull fittings and penetrations, bulkhead and deck penetrations and attachment of equipment, in order to prevent any galvanic corrosion.

Section 9.20 – Steel/wood connections

- 9.20.1 Wood connections directly to steel structure and vice versa are to be protected against corrosion. The wood is to be primed and painted, or the surface connecting to the steel structure or fitting is to be coated with an approved non-hardening sealant.

Section 9.21 – Fish room insulation and lining

- 9.21.1 Organic foam insulation is not to be used outside the fish room. When used in the fish room, it is to be covered with close fitting wooden boards, plywood, metal, or GRP sheathing to the approval of the Surveyor, and in accordance with current statutory requirements. Where linings are fitted in the fish hold, they are to be of an approved material. Void spaces are to incorporate suitable ventilation arrangements.

Section 9.22 – Fishing equipment, winches and lifting gear

General

- 9.22.1 It is the responsibility of the Builder/Designer and Owner to ensure that all equipment necessary for the operation and use of the vessel meets the requirements as laid out in **PUWER: Provision and Use of Work Equipment Regulations** and **LOLER: Lifting Operations and Lifting Equipment Requirements**. These regulations cover any equipment that is used in the course of the work aboard the vessel, including all equipment used in any way for lifting operations including attachments for anchoring, fixing or supporting structures and equipment used in conjunction with the operation of the vessel.
- 9.22.2 Masts, derricks and lifting equipment on fishing vessels should be of steel or other approved material, securely fastened to the vessel's structure suitable for the intended purpose, and of adequate strength for the anticipated loads.
- 9.22.3 It is the responsibility of the Builder/Designer to ensure that the maximum safe working load and maximum radius of operation of all derricks and lifting equipment are stated in the building specification or approved constructional drawings. The associated ropes, wires, and guys, eyeplates, shackles and blocks are to be designed to meet these loads and to be appropriate for its particular position in the rig for which they were originally designed.
- 9.22.4 Derricks are to be tested as rigged for service to not less than the appropriate National Standards or equivalent requirement by applying a proof load of 25% in excess of the SWL (Safe Working Load). This may be applied by hoisting moveable weights with the derrick at the appropriate designed working angle and swung as far as possible in both directions.
- 9.22.5 Derrick booms are to be marked with the permissible safe working load of the derrick as rigged. The safe working load is to be marked near the heel of the derrick boom with (75mm) letters and numbers in white paint on a dark background or black paint on a pale background.
- 9.22.6 All items of lifting or hauling gear such as shackles and blocks are to be marked with their safe working load with an identification mark to

enable them to be readily related to their appropriate test certificates, and with the mark of the Surveyor or Manufacturer who carried out the proof test.

- 9.22.7 Moving parts of winches, deck machinery and of warp and chain leads which may present a hazard, should be as far as practicable adequately guarded. Warp guards should be fitted where practicable between warp lead rollers or sheaves.
- 9.22.8 Controls of deck machinery should be so placed that operators have ample room for their unimpeded operation and have as unobstructed a view as possible of the working area. Where practicable, control should be arranged to return to the stop position when released and be provided, where necessary, with a suitable locking device to prevent accidental movements, displacement or unauthorised use.
- 9.22.9 Winches should be provided with means to prevent overhoisting and to prevent the accidental release of a load if the power supply fails. Where practicable, winches with wire storage drums should be fitted to avoid the need to use warping heads.
- 9.22.10 Winches and deck machinery should be equipped with brakes capable of effectively arresting and holding the safe working load. The brakes should be proof-tested with static loads at Manufacturer's works before installation, suitably in excess of the maximum safe working load to the satisfaction of the Surveyor. Brakes should be provided with simple and easily accessible means of adjustment. Every winch drum which could be uncoupled from the drive should be furnished with a separate brake independent of the brake connected with the drive. Where practicable, winches should be reversible. The use of basic dog clutch arrangements should be avoided whenever practical.
- 9.22.11 An emergency stop facility should be provided at the helm position for all hydraulically operated deck equipment. Where a winch or hauler is controlled from the helm position, a local emergency stop device is to be fitted at the winch or hauler.
- 9.22.12 Where manually operated 'guiding on' gear is installed, the operating mechanism should be without open spokes or protrusions that could cause injury to the operator, and should be capable of being disengaged when the warps are paying out. Preferably the 'guiding on' gear should be capable of being disengaged when the warps are paying out.
- 9.22.13 Winch barrels should be provided with means for fastening wire ends, for instance clamps, shackles or other equally effective method which should be so designed as to prevent kinking of the wires.
- 9.22.14 Where practicable, provision should be made to stop trawl boards swinging inboard, such as the fitting of a portable prevention bar at the

gallows aperture, or other equally effective means. Chains or other suitable devices should be provided for 'stopping off'.

Section 9.23 – Ballast

9.23.1 Loose ballast is to be firmly secured to prevent movement. Due consideration is to be given to the possibility of corrosion at the ballast position, and suitable preventative measure such as painting or sealing should be carried out to ensure interior hull protection. Where concrete ballast is fitted, care should be taken to ensure the drainage of bilge water remains effective.

Section 9.24 – Recovery of persons from the sea

9.24.1 Means should be provided for the recovery of a person from the sea to the vessel. The means should allow that the person is unconscious or unable to assist in the rescue.

9.24.2 The means of recovery should be demonstrated to the satisfaction of an authorised Surveyor.

9.24.3 If an over side boarding ladder or scrambling net is provided to assist in the recovery of an unconscious person from the water, the ladder or net should extend from the weather deck to at least 600mm below the lowest operational waterline.

Section 9.25 – Anchors and cables

General

9.25.1 All vessels are to have an efficient means of anchoring. The requirements shown in the Anchors and cables Table 9.30.1 are for a vessel of displacement mono-hull form which may be expected to ride out storms whilst at anchor, and when seabed conditions are favourable.

9.25.2 The anchor(s) is to be arranged such that it can be deployed from a dead ship condition.

Anchor cables

9.25.3 The length of the anchor cable attached to the anchor is to be appropriate to the holding ground and depth of water in the area of the operation of the vessel, but in no case less than that shown in the Table, Section 9.30.1.

9.25.4 All vessels must be provided with a means of being towed.

Section 9.26 – Spare gear

- 9.26.1 Every vessel built to these Standards shall have an adequate outfit of spare gear for main and auxiliary machinery and electrical equipment appropriate to the intended service of the vessel, and in accordance with the equipment Manufacturer's recommendation for short voyages.

Section 9.27 – Navigation lights, shapes and sound signals

- 9.27.1 All vessels are to comply with the International Regulations for Preventing Collisions at Sea, which are laid down in the Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996.

Section 9.28 – Navigational equipment

- 9.28.1 All vessels are to be fitted with a magnetic compass, adjusted prior to handover of the vessel, with the deviation card mounted in an adjacent position.
- 9.28.2 The position of the helm or control position is to provide all round vision, and is to comply with current statutory requirements.
- 9.28.3 All vessels are to be fitted with an efficient means acceptable to the Certifying Authority for:-
- a) Locating position;
 - b) Measuring speed and distance; and
 - c) Measuring the depth of water.

Section 9.29 – Structural fire protection, fire detection and LPG installations

General

- 9.29.1 Every vessel built to these Construction Standards is to be so constructed and equipped that there is no substantial fire risk to the vessel or to persons onboard the vessel. The following requirements are in accordance with the statutory requirements as detailed in the MCA "Code of Safe Working Practice for the Construction and Use of Fishing Vessels 15m Length Overall to Less Than 24m Registered Length" or with any additional statutory requirements subsequently coming into force.

FIRE

General

- 9.29.2 Every vessel should be so constructed and equipped such that there is no substantial fire risk to the vessel or to persons onboard the vessel.

- 9.29.3 Consideration should be given to reducing the use of combustible construction materials when non-combustible equivalents are readily available.
- 9.29.4 The insulating materials used in accommodation spaces, service spaces, control stations and machinery spaces should be non-combustible. The surface of any insulation fitted on the internal boundaries of machinery spaces should be impervious to oil or oil vapours.
- 9.29.5 Within refrigerating compartments, any combustible insulation should be protected by close fitting linings.
- 9.29.6 Exposed surfaces within accommodation spaces, service spaces, control stations, corridor and stairway enclosures and the concealed surfaces behind bulkheads, suspended ceilings, panelling and linings fitted within those spaces, should have low flame spread characteristics.
- 9.29.7 Support structure (grounds) to linings and ceilings etc. should be constructed of non-combustible material. Where it is not practicable to use non-combustible material, the material used should be treated with a suitable fire-retarding treatment.
- 9.29.8 Air spaces enclosed behind suspended ceilings, panelling or linings in accommodation spaces, service spaces and control stations should be divided by close fitting draught stops spaced not more than 7m apart.
- 9.29.9 Paints, varnishes and other finishes used on exposed interior surfaces should not constitute a fire hazard and should not, in a fire, produce excessive quantities of smoke, toxic gases or vapour to the satisfaction of the Surveyor.
- 9.29.10 In new vessels this should be determined in accordance with the Fire Test Procedures Code.
- 9.29.11 Primary deck coverings within accommodation and service spaces and control stations, should be of materials which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures to the satisfaction of the Surveyor.
- 9.29.12 In new vessels this should be determined in accordance with the Fire Test Procedures Code.
- 9.29.13 Curtains, floor coverings and furnishings should be resistant to flame and ignition to the satisfaction of the Surveyor.
- i) curtains should be resistant to flame propagation in accordance with the Fire Test Procedures Code;
 - ii) all surface floor coverings should have low flame spread; and

iii) the upholstered parts of furniture should be resistant to ignition and flame propagation, in accordance with the Fire Test Procedures Code.

- 9.29.14 Pipes conveying oil, combustible liquids or flammable gases should be constructed from steel or other suitable material. Jointing materials should not be rendered ineffective by heat.
- 9.29.15 Plastic piping may be used for services other than those specified in the above paragraph provided that appropriate fire testing, in accordance with the requirements of the Fire Test Procedures Code, has been carried out to the satisfaction of the Surveyor. The integrity of watertight or fire divisions when penetrated by such pipes should be maintained to the satisfaction of the Surveyor.
- 9.29.16 Flammable liquids should always be carried in suitably sealed containers and stowed in a safe position.
- 9.29.17 Fire-fighting equipment should always be kept in its proper location, maintained in good working order, and be available for immediate use.
- 9.29.18 The crew should be familiar with the locations of fire-fighting equipment, the way it works, and how it should be used.
- 9.29.19 The presence of extinguishers and other portable fire-fighting equipment should always be checked before the vessel gets underway.
- 9.29.20 Manually operated fire-fighting equipment should be readily accessible, simple to use and should be indicated by signs of durable construction and appropriately positioned. Reference may be made to The Merchant Shipping and Fishing Vessels (Safety Signs and Signals) Regulations SI 2001, No. 3444.
- 9.29.21 Fire detection and alarm systems should be regularly tested and well maintained.
- 9.29.22 Fire-fighting drills should be carried out at regular intervals.

The following requirements are in accordance with the statutory requirements as detailed in the MCA “Code of Safe Working Practice for the Construction and Use of Fishing Vessels 15m Length Overall to Less Than 24m Registered Length” or with any additional statutory requirements subsequently coming into force.

Structural fire protection for vessels with hulls constructed of steel or other equivalent material

- 9.29.23 In every vessel the superstructure, structural bulkheads, decks and deckhouses should be constructed of steel or other equivalent material, having due regard to the risk of fire.

- 9.29.24 Subject to Paragraphs 9.29.26 and 9.29.30, bulkheads and decks bounding main machinery spaces should be constructed to “A-0” standard.
- 9.29.25 Bulkheads and decks, which separate galleys (or combined galley/mess rooms) from accommodation spaces, service spaces or control stations should be constructed to “A-30” standard. Alternatively, and subject to Paragraph 9.29.30, where an appropriate fixed fire extinguishing system is fitted, such bulkheads and decks may be constructed to “A-0” standard.
- 9.29.26 Where fish rooms are fitted with combustible insulation, bulkheads and decks separating such spaces from main machinery spaces or galleys (or combined galley/mess rooms) should be constructed to “A-30” standard.
- 9.29.27 Bulkheads of corridors serving accommodation spaces, service spaces and control stations, other than bulkheads required to meet the provisions of Paragraphs 9.29.24 and 9.29.25 should extend from deck to deck and should be formed of steel, “B-15” class divisions or equivalent.
- 9.29.28 Interior stairways serving accommodation spaces, service spaces or control stations should be constructed of steel. The enclosures to such stairways should be of steel, “B-15” class or equivalent and be fitted with a “B-15” class closing arrangement at one end of each stairway.
- 9.29.29 The number of openings in the bulkheads and decks referred to in Paragraphs 9.29.24 and 9.29.25 should be the minimum practicable. Such openings should be fitted with closing arrangements that provide fire protection equivalent to the surrounding structure. Any access doors provided in the casing of the main machinery space or galley (or combined galley/mess) should be of “A-30” standard and be self-closing except when such a door is required to be of weathertight construction.
- 9.29.30 Where, due to constraints of design or layout, a liferaft or EPIRB is required to be stowed over the galley or machinery space, such stowage areas and associated access routes should be insulated to “A-30” standard.
- 9.29.31 Where combustible material is fitted to boundary bulkheads and decks of spaces adjoining galleys (or combined galley/mess rooms) and main machinery spaces, it should be protected from the effects of heat that may result from a fire in those spaces.
- 9.29.32 Where bulkheads or decks, that are required to be of “A” or “B” class divisions, are penetrated by pipes, cables, trunks, ducts etc., arrangements should be made to insure that the fire integrity of the division is not impaired.

Structural Fire Protection for Vessels with Hulls Constructed of Combustible Materials

- 9.29.33 For vessels primarily constructed of wood and where the superstructure, structural bulkheads and decks over machinery spaces are constructed of steel or other equivalent material, fire protection arrangements should be fitted as for steel vessels in sections 9.29.23 to 10.29.32 above.
- 9.29.34 Subject to section 9.29.33 in every vessel, the hull of which is constructed of combustible materials, the decks and bulkheads of machinery spaces and galleys (or a combined galley/mess), should be constructed to meet “F” or “B-15” class standard or equivalent. In addition, such boundaries should as far as practicable prevent the passage of smoke.
- 9.29.35 Decks and bulkheads separating control stations from accommodation spaces, service spaces or main machinery spaces should be constructed to meet “F” class standard or equivalent.
- 9.29.36 Bulkheads of corridors serving accommodation spaces, service spaces and control stations should extend from deck to deck and be formed of “F” or “B-15” class divisions or equivalent.
- 9.29.37 Interior stairways serving accommodation spaces, service spaces or control stations should be constructed of steel. The enclosures to such stairways should be of “F” class divisions or equivalent and be fitted with an appropriate “F” or “B-15” class closing arrangement at one end of each stairway.
- 9.29.38 The number of openings in the bulkheads and decks referred to in sections 9.29.34 and 9.29.35 should be the minimum practicable. Such openings should be fitted with closing arrangements that provide fire protection equivalent to the surrounding structure. Any access doors provided in the casing of the main propelling machinery space should be of “F” or “B-15” class and be self-closing except when such a door is required to be of weathertight construction.
- 9.29.39 Where bulkheads or decks, that are required to be of “F” or “B” class divisions, are penetrated by pipes, cables, trunks, ducts etc., arrangements should be made to ensure that the fire integrity of the division is not impaired.
- 9.29.40 All exposed surfaces of glass reinforced plastic construction within accommodation and service spaces, control stations, main machinery spaces and other machinery spaces of similar fire risk should have the final lay-up layer of resin having inherent fire retarding properties or be coated with a suitable fire retardant paint or be protected by non-combustible materials.

Ventilation systems

- 9.29.41 Means should be provided to stop fans and close all main openings to ventilation systems from outside the spaces served. Means should also be provided for closing funnel ventilation openings.
- 9.29.42 Ventilation openings may be provided in and under the doors in corridor bulkheads, but excluding any doors to stairway enclosures or the machinery space. The net area of any such opening should not exceed 0.05m^2 .
- 9.29.43 Ventilation ducts for main machinery spaces or galleys should not in general pass through accommodation spaces, service spaces or control stations, however they may pass through fish processing or similar spaces having a low fire risk. Similarly ventilation ducts for accommodation spaces, service spaces or control stations should not pass through main machinery spaces or galleys. Where the Surveyor permits such arrangements, the ducts should be constructed of steel or a similar material and be arranged to preserve the integrity of the divisions concerned.
- 9.29.44 Ventilation systems serving machinery spaces should be independent of systems serving other spaces.
- 9.29.45 Ventilation systems to spaces containing appreciable quantities of highly flammable products should be separate from other ventilation systems. Ventilation should be provided at high and low levels within the space and the external inlets and outlets of such vents should be positioned in safe areas on open deck away from any source of ignition. Vent motors and equipment provided within the system should be intrinsically safe.
- 9.29.46 When trunks or ducts cross a fire rated division then manual fire dampers should be fitted to prevent the passage of smoke and flame across the division; the dampers should be capable of operation from both sides of the bulkhead or deck when the cross-sectional area of any trunk or duct exceeds 0.02m^2 then the damper should additionally be of the automatic self-closing type.
- 9.29.47 Fire dampers may be omitted if the ducting is of substantial construction and equivalent arrangements have been provided to the satisfaction of the Surveyor.
- 9.29.48 Refer also to ventilation Section 9.10.

Fire detection

- 9.29.49 All vessels should be fitted with automatic fire detection and alarm systems covering the machinery spaces, galley and accommodation spaces.

- 9.29.50 The fire detection system should be fit for its intended service and be capable of automatically indicating, in the wheelhouse, the presence and location of fire.
- 9.29.51 The indicating system for the detection system should comprise of both an audible and visual alarm within the wheelhouse.

Fire extinction

- 9.29.52 Vessels should be provided with:-
- i) a fixed fire extinguishing system for the main machinery space;
 - ii) a fixed fire extinguishing system for the galley (or combined galley/mess) subject to Paragraph 9.29.25;
 - iii) a power operated fire pump, delivering a minimum of 15m³/h at a pressure of not less than 2kg/m², supplying a hose or hoses such that a jet of water can reach any part of the vessel accessible to the crew. This pump may be either a general service pump or a bilge pump;
 - iv) at least three portable fire extinguishers situated for use in the accommodation and service spaces with an extinguishing medium suitable to the fire risk involved;
 - v) at least two portable fire extinguishers suitable for extinguishing oil fires should be provided within the machinery space;
 - vi) a fire blanket for the galley.

Fire extinguishing equipment

- 9.29.53 A fixed fire extinguishing system for the machinery space should be either:-
- i) a fire smothering gas installation; or
 - ii) a high expansion foam installation; or
 - iii) a stored pressure water spraying installation; or
 - iv) any other fixed fire extinguishing system acceptable to the MCA.
- 9.29.54 The equipment, capacities, controls and alarms for such a system should be arranged and installed to the satisfaction of the Surveyor.
- 9.29.55 Where air pressure systems and storage bottles in machinery spaces are not vented externally to the machinery space, an appropriate allowance should be made when calculating the required volume of the extinguishing medium required for such spaces.
- 9.29.56 Operation of such equipment should be from a position of safety and preferably on the open deck.
- 9.29.57 Piping systems and fittings for fire services should be of materials that are not rendered ineffective by heat. Pipes made of steel should be

galvanised and suitable drainage provided in deck lines to guard against the possibility of frost damage. A valve or cock should be provided at each delivery position.

9.29.58 Portable fire extinguishers should be to BS EN 3 (1996) standard with the following capacities:-

- i) water of at least 9 litres capacity;
- ii) foam of at least 9 litres capacity;
- iii) CO₂ of at least 3kg capacity;
- iv) Dry powder of at least 4.5kg capacity;
- v) Multi-purpose with a capacity at least equivalent to a 9 litre fluid fire extinguisher.

Note: Extinguishers and equipment carrying the Marine Equipment Directive Stamp (“wheelmark”) are acceptable.

Means of escape and emergency exits

9.29.59 Stairways, ladders and passageways should be arranged to provide ready means of escape from accommodation spaces, and spaces in which the crew is normally employed to the open deck where the life-saving appliances will be available for use (see Section 9.3).

9.29.60 Hatches and doors forming part of an escape route should be readily operable from both sides by any person or by rescue teams.

9.29.61 All escape routes should be kept clear of obstructions, and the clear access and dimensions of such routes should allow for rapid and safe evacuation.

9.29.62 Emergency routes and exits should be indicated by signs in accordance with the The Merchant Shipping and Fishing Vessels (Safety Signs and Signals) Regulations SI 2001, No. 3444).

Means for stopping machinery

9.29.63 Machinery space ventilation fans, oil fuel transfer pumps, and other similar fuel pumps should be fitted with remote controls located outside the spaces in which they are situated. These controls should be capable of stopping the machinery or pumps in the event of fire.

9.29.64 Remote electric stops for ventilation fans serving accommodation spaces should be operable from outside the space.

Miscellaneous fire precautions

Space heaters

- 9.29.65 Electric space heaters, where provided, should be constructed and fitted to reduce the fire risk to a minimum and where such heaters are situated on decks or bulkheads, the structure of such decks or bulkheads should be protected by non-combustible material. Heaters with exposed elements and open flame fuel heaters should not be provided.

Galley area

- 9.29.66 Materials that are in the vicinity of any cooking appliance should be non-combustible, except that combustible materials may be employed when these are faced with stainless steel or a similar non-combustible material.
- 9.29.67 Wherever practicable, electrically powered cooking equipment should be provided in preference to open flame types.
- 9.29.68 Curtains, towel rails, hooks and similar arrangements should be kept well clear of the cooking area. Electric stoves and other cooking appliances should be fitted with an isolation switch outside the galley space.

Oil fuel installations (cooking ranges and heating appliances)

- 9.29.69 Where cooking ranges or heating appliances within crew spaces are supplied with fuel from an oil tank, the tank should be situated outside the space containing the cooking range or heating appliance and the supply of oil to the burners should be capable of being controlled from outside that space. Ranges or burners using oil fuel having a flash point of less than 60°C (Closed Cup Test) should not be fitted. Means should be provided to shut off the fuel supply automatically at the cooking range or heating appliance in the event of fire or if the combustion air supply fails. Such means should require manual resetting in order to restore the fuel supply.
- 9.29.70 Oil tanks supplying the cooking range or heating appliance should be provided with an air pipe leading to the open air, and in such a position that there will be no danger of fire or explosion resulting from the emergence of oil vapour from the open end of the pipe. The open end should be fitted with a detachable wire gauze diaphragm.
- 9.29.71 Adequate means should be provided for filling every such tank and for preventing overpressure.
- 9.29.72 Closed flame diesel heaters should comply with the Manufacturer's instructions. Additional guidance is provided in MGN 192 (F) – The

Use of Heaters, and MGN 312 (F) - Use of liquid petroleum gas (lpg) and diesel fuelled appliances on fishing vessels.

Liquefied Petroleum Gas installations (cooking ranges and heating appliances)

- 9.29.73 Installations using liquefied petroleum gas should be properly and safely fitted and fit for their intended service (guidance may be found in BS EN (ISO) 10239). All valves, pressure regulators and pipes leading from the cylinders should be protected against damage.
- 9.29.74 All liquefied petroleum gas heating appliances used in accommodation spaces, including sleeping quarters, should be fitted with a flue to the exterior of the vessel via a clear unblocked exhaust.
- 9.29.75 Spaces where appliances consuming liquefied petroleum gas are used should be adequately ventilated.
- 9.29.76 Mechanical ventilation systems fitted to any space in which such gas containers or appliances are situated, should be of such design and construction as will eliminate the hazards due to sparking. The ventilation systems serving spaces containing such gas storage containers or gas-consuming appliances should be separate from any other ventilation system.
- 9.29.77 Containers holding liquefied petroleum gas should be clearly marked and securely stowed on deck or in a well ventilated compartment situated on the deck. Where drainage is provided from compartments containing such gas containers, drains should lead directly overboard.
- 9.29.78 Spaces containing cooking ranges or heating appliances that use liquefied petroleum gas should not be fitted with openings leading directly below to accommodation spaces or their passageways, except that where this is not reasonably practicable and such openings are fitted, mechanical exhaust ventilation trunked to within 300mm of the deck adjacent to the appliance, together with adequate supply ventilation and a gas detector, should be fitted with an alarm in the space below.
- 9.29.79 A device should be fitted in the supply pipe from the gas container to the consuming appliance that will shut off the gas automatically in the event of loss of pressure or low pressure in the supply line. The device should be of a type that requires deliberate manual operation to restore the gas supply. An automatic shut-off device that operates in the event of flame failure should be fitted on all appliances consuming liquefied petroleum gas.
- 9.29.80 Open flame gas heating appliances should not be fitted except where used as cooking stoves. Adequate ventilation should be provided to spaces containing cooking stoves. Pipes supplying gas from the container to the cooking stove should be constructed of suitable

material. Arrangements should be provided to ensure automatic cut-off to the supply of gas when there is a loss of pressure or flame failure.

- 9.29.81 Heating stoves and other similar appliances should be secured in position and their exhaust, together with the surrounding structure, provided with adequate fire protection. The exhausts of stoves should be provided with ready means of cleaning. The dampers fitted in exhausts for controlling draught should provide an adequate flow of air when in the closed position. The air supply to these appliances should not be fitted with means of closing.
- 9.29.82 Every space containing a gas-consuming appliance should be provided with gas detection and audible alarm equipment. The gas detection device should be securely fixed in the lower part of the space in the vicinity of the gas-consuming appliance. The alarm unit and indicating panel should be situated outside the spaces containing the appliance.
- 9.29.83 Where gas-consuming appliances are used in sleeping quarters or in adjacent spaces, an audible alarm should be fitted in the sleeping quarters in addition to the alarm required by Paragraph 10.29.82.
- 9.29.84 Atmospheric monitoring devices (i.e. carbon monoxide sensors) should be fitted in all compartments where liquefied petroleum gas heating appliances are fitted.
- 9.29.85 A suitable notice should be displayed prominently in the vessel that details the action to be taken when a gas alarm activates or a gas leak is suspected.

Portable plant

- 9.29.86 When portable plant is powered by an engine, the unit should be stored on the weather deck. If such storage is within a deck locker or similar enclosure, then the enclosure should have gas tight boundaries to adjacent spaces. The locker or enclosure should be adequately ventilated and drained.
- 9.29.87 Consideration should be given to the exhaust gases produced by portable plant, and suitable ventilation or exhaust trunking provided where necessary to prevent carbon monoxide poisoning.
- 9.29.88 Fuel tanks should be arranged to the satisfaction of the Surveyor.
- 9.29.89 Portable containers for the carriage of fuel should be:-
- i) kept to a minimum;
 - ii) suitable for the carriage of fuel;
 - iii) stowed on the weather deck where they can readily be jettisoned and where any spillage will drain directly overboard; and

- iv) be clearly marked with their contents.

Storage of flammable liquids, toxic liquids, toxic gases and compressed gases

- 9.29.90 Cylinders containing flammable, toxic or other dangerous gases, and expended cylinders should be clearly marked as to their contents and properly stowed and secured on open decks. All valves, pressure regulators and pipes leading from such cylinders should be protected against damage. Such cylinders may be stowed in compartments that meet the requirements set out in Paragraph 10.29.89.
- 9.29.91 Cylinders and bottles containing flammable, toxic liquids, toxic gases and liquefied gases, other than liquefied petroleum gas should be stored in compartments having direct access from open decks. Such compartments should have boundary bulkheads constructed from non-combustible materials. Pressure adjusting devices and relief valves, if any, should exhaust within the compartment. Where boundary bulkheads of such compartments adjoin other enclosed spaces they should be gas-tight and be provided with ventilation arrangements that are separate from other ventilation systems. Ventilation should be arranged at high and low levels and the inlets and outlets of ventilators should be positioned in safe areas and fitted with spark arresters.
- 9.29.92 Electrical wiring and fittings should not be installed within compartments containing highly flammable liquids or liquefied gases, except where necessary for service within the space. Where such electrical fittings are installed, they should be suitable for use in a flammable atmosphere.
- 9.29.93 Compartments containing compressed gas cylinders should not be used for stowage of other combustible products or for tools or objects not belonging to the gas distribution system.
- 9.29.94 Gas welding and cutting equipment, if carried, should be stowed in a secure manner on the open deck at a safe distance from any potential source of fire and should have the capability of being readily jettisoned overboard if necessary.
- 9.29.95 Any compartment that contains a gas-consuming appliance or any compartment into which flammable gas may leak or accumulate, should be provided with a hydrocarbon gas detector and alarm.

Cleanliness of machinery spaces

- 9.29.96 Machinery spaces should be kept clean, free of rubbish and combustible waste. Bilge levels should be checked regularly, and oily waste and sludge should be collected and properly disposed of ashore.
- 9.29.97 Any oil leakage from machinery, fuel or lubricating oil systems should be promptly identified and rectified.

9.30 Tables

9.30.1 Anchors and cables – requirements

Anchor weights and lengths of cables should comply with the table below subject to notes 1), 2), 3) and 4).

$$\text{Equipment Numeral} = D^{2/3} + 1.6BH + A/10$$

Where:-

A = area (in metres²) in profile view of the hull, superstructures and houses above the deepest operating waterline, having a breadth greater than B/4.

B = breadth of vessel (in metres).

H = freeboard midships (in metres) from the deepest operating waterline to the freeboard deck, plus the sum of the heights, in metres, of each tier of superstructures and houses at the centreline, each tier having a breadth greater than B/4.

D = displacement, in tonnes, to the deepest operating waterline.

Equipment numeral	Total anchors weight kg	Minimum number of anchors	Minimum length of cables m	Size of chain cable mm U2**
Up to 60	95	1	82.5	12
61 - 80	130	1	82.5	12
81 - 90	165	1	82.5	12
91 - 100	190	1	110	14
101 -110	210	1	110	14
111 - 120	245	1	110	15
121 - 130	270	1	110	15
131 - 140	305	1	137.5	16
141 - 150	350	1	137.5	16
151 - 175	435	1	137.5	19
176 - 205	520	1	137.5	20.5
206 - 240	590	1	137.5	22
241 - 290	660	1	165	24

For intermediate values of equipment numeral, linear interpolation may be carried out for anchor weights, cable lengths and sizes.

Refer to Notes on following page.

9.30 Tables

9.30.1 Anchors and cables – requirements (continued)

Notes:-

- 1) Where stud link cable is used, the diameter may be 1.5mm less than the tabular diameter.
- 2) *Where it is proposed to use high holding power anchors, a reduction in anchor weight of up to 20% will be considered.*
- 3) *U2** grade refers to special quality steel (wrought/cast with a tensile strength in the range 490 - 690N/mm²).*
- 4) *Where two anchors are specified, the weight of the main anchor is to be at least 66% of the total weight for the anchors given in the Table.*

Chain cables constructed of mild steel (U1) (tensile strength in the range 300-490N/mm²) should be increased by 14% in diameter.

9.31 Figures and illustrations

9.31.1 Handrail arrangements

