

PART 11

OUTFIT AND STRUCTURAL FIRE PROTECTION

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OUTFIT AND STRUCTURAL FIRE PROTECTION

Section 11.1 - Paintwork

Painting general

- 11.1.1 All paints, varnishes, anti-fouling and bitumen based compositions are to be of an approved marine commercial standard and quality, and of adequate film thickness in accordance with the paint Manufacturer's specification, and be fully compatible with previously coated surfaces.
- 11.1.2 Anti-fouling paints, where used, are to comply with current statutory and environmental regulations.
- 11.1.3 Timber and GRP surfaced decks may be left unpainted, but where these are painted, the paint should be of the non-slip type.
- 11.1.4 All tanks, pipework and fittings except where they are of non-ferrous material or galvanised, are to be painted externally with at least three coats of anti-corrosive paint.
- 11.1.5 All engine room pipework systems are to be colour coded in accordance with Part 9, Table 9.5 or identified by a painted or taped band on each side of every joint.
- 11.1.6 When painting aluminium structures, care should be taken that the paint Manufacturer's procedures are strictly adhered to. All surfaces should be thoroughly degreased, etch primed and coated with an appropriate primer 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.

Painting steel vessels

- 11.1.7 Whenever possible, all steel plate and sections should 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 high duty steel primer at the Builders yard, prior to or during construction.
- 11.1.8 During construction, all weld damaged paint areas, cut edges or other breaks in previously primed surfaces are to be thoroughly cleansed and re-coated with a compatible primer. Paint should not be applied to continuously welded connections subject to air pressure or water testing until inspection and testing is completed.
- 11.1.9 On completion of construction, the hull is to be thoroughly cleaned and painted in accordance with the selected paint specification. Steelwork behind linings and in way of bilge areas may be painted with an

approved bitumen based composition, subject to compliance with these Standards and statutory requirements concerning flamespread characteristics.

- 11.1.10 Steelwork that is neither galvanised or shot-blasted is to be thoroughly cleaned of all rust and scale, and painted in accordance with paint Manufacturer's specification.

Painting GRP vessels

- 11.1.11 In all GRP vessels, paints used internally in the engine room and accommodation spaces are to be of low flame spread characteristics.
- 11.1.12 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.

Painting wood vessels

- 11.1.13 Before the application of paint, all timber fitted in positions liable to rot, which has not been previously pressure impregnated with preservative, is to receive not less than three coats of preservative. All straight lengths of timber such as decking, bulkhead timbers, floors and ceilings, etc., should, where practical, be pressure treated with preservative before fitting.
- 11.1.14 On completion of construction, the external and internal surfaces of the hull are to be painted in accordance with the paint Manufacturer's specification.

Section 11.2 - Structural fire protection

Steel and aluminium vessels

- 11.2.1 Vessels which have the machinery space boundaries constructed of steel or aluminium, require no additional fire protection. However, the interior surface finish of all engine rooms and surfaces directly on the opposite side which are used as accommodation or control spaces, are to be coated with a Class 1 surface spread of flame rating paint.

GRP vessels

- 11.2.2 The engine space boundaries of decked GRP vessels are to meet a Class 0 standard of fire protection (BS476, parts 6 and 7). This level of protection is to apply to the deckhead and bulkheads in their entirety, and hull boundaries from 300mm below the waterline to the deckhead.

Where it is proposed that the engine space boundaries will not meet Class 0 standard of fire protection, an approved fixed fire extinguisher system may be fitted as an alternative.

Wood vessels

- 11.2.3 The engine space boundaries of decked wood vessels are to meet the same level of fire protection as stated in 11.2.2.

Vessels where the total installed power exceeds 400kW

- 11.2.4 Steel vessels are not required to be fitted with any further structural fire protection other than an approved fixed fire extinguishing system.

For aluminium, GRP and wood vessels where the total installed power exceeds 400kW a B15 standard of fire protection is to be supplied in the machinery space. This level of protection is to apply to the deckhead and bulkheads in their entirety, and hull boundaries from 300mm below the waterline to the deckhead. In addition, an approved fixed fire extinguishing system is to be installed in the engine room.

General

- 11.2.5 Insulation materials in engine rooms are to be covered by a surface layer impermeable to oil.
- 11.2.6 The structure above and surrounding the galley/cooker area is to be effectively insulated with non-combustible materials or sheathing.
- 11.2.7 Fabrics used for curtains, upholstery and bunk mattresses, etc. are to be fire-retardant.
- 11.2.8 Exhaust pipes and ducts which are liable to become hot, are to be adequately insulated and positioned clear of combustible surfaces. Unprotected combustible materials are not to be fitted within 300mm of any exhaust pipe, cooker, heater or duct.
- 11.2.9 Interior lining materials fitted to the hull or superstructure are to be of marine grade plywood, composite plastic faced boards or other approved material.

11.2.10 Ventilators serving machinery and accommodation spaces are to be fitted with a manual closure outside the compartment for use in the case of fire.

Fire detection

11.2.11 Sleeping accommodation, galley, machinery space and any spaces containing open flame devices are to be fitted with efficient fire/smoke detectors to give an audible warning in the space they are protecting and at the helm position.

Section 11.3 - LPG installations

11.3.1 **Where liquid petroleum gas appliances are to be fitted, the appliance and its associated fittings are to be installed by a registered certified gas technician with the addition of the requirements stated below. Copies of certificates are to be provided to the Surveyor on completion of installation.**

11.3.2 When a liquid petroleum gas type appliance is to be fitted, the appliance and its associated fittings are to be installed in accordance with current statutory requirements and be fitted with an approved device at the gas container in the supply pipe to the consuming appliance, which will shut off the gas pressure automatically in the event of loss of pressure in the supply line. This device is to be of a type which requires a deliberate manual operation to re-set it in order to restore the gas supply. A gas warning notice is to be exhibited near to each appliance, and is to include the following advice:-

- i) To be ever alert for gas leakage.
- ii) Where leakage is detected or suspected, to shut off **all** gas consuming appliances at the main supply from the container(s) and to refrain from smoking until safe to do so.
- iii) **NEVER TO USE NAKED LIGHTS AS A MEANS OF LOCATING GAS LEAKS.**

11.3.3 In every vessel, cylinders containing flammable, toxic, or other dangerous gases, and any expended cylinders, are to be stowed and secured on the open deck, and all valves, pressure regulators and pipes leading from such cylinders protected against damage. Such cylinders may be stowed in separate boxes, ventilated and draining to the outside deck. Containers are to be indelibly marked as to their contents and colour coded to statutory requirements.

11.3.4 A gas detector with audible and visual alarm system is to be installed in every compartment in which a gas appliance is fitted. The sensing device is to be fitted near to the appliance and as low down as is possible. Where there is a direct access to the spaces below the compartment in which the gas appliance is sited, an additional sensor

and audible warning unit is to be fitted in the lower space. The detector is to be provided with facilities for frequent testing when in service. The visual alarm is to be sited where it can be plainly seen, as high up and as far away from the sensing device as it is reasonably practicable, and, where possible, outside the compartment in which the gas appliance is fitted.

- 11.3.5 Where gas appliances are fitted in compartments above or below the main deck, such compartments are to be provided with an approved type fan exhaust system trunked to within 300mm of the floor level adjacent to the appliance. Where the fan is of a mechanical type, the fan motor is to be of an approved spark-proof type, and be controlled by a switch from outside the compartment. Alternatively, the ventilator may be fitted with a rotating wind operated head at the outlet top.
- 11.3.6 Where oil-fired appliances are fitted, the supply tank is to be sited outside the compartment containing the appliance(s) together with a means of closing the oil supply to the appliance. Such means is to require manual re-setting in order to restore the oil supply. Appliances using fuel oil having a flash point of less than 60°C (closed test) are not to be fitted.
- 11.3.7 The piping for liquid petroleum gas installations shall be of solid drawn copper or stainless steel throughout, except that connections to storage bottles and appliances may be of an approved metallic flexible hose. The use of rubber or plastic piping is not permitted. Containers shall be securely stowed in place and where stowage boxes are used they shall be fitted with adequate drains and ventilators. (See Paragraph 11.3.4)
- 11.3.8 LPG cookers and heaters are to have flame failure devices fitted at each ring or burner. Oil-fired cookers and heaters are to have a melt valve or fusible link weighted lever valve adjacent to the appliance to isolate the fuel supply in the event of fire.

Section 11.4 - Toilets

- 11.4.1 All vessels 10m LOA and above with sleeping accommodation, are to be fitted with an approved commercial marine standard type toilet and be complete with all necessary inlet, and discharge valves, and pipework. The shipside valves are to be fitted in a readily accessible position to enable their operation 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.
As an alternative to having a fixed toilet for vessels less than 10m LOA, a suitable portable toilet may be accepted at the discretion of the surveyor.

Section 11.5 - Ballast

11.5.1 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 measures 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 11.6 - Escape arrangements

11.6.1 On all vessels of 10m LOA and above, where practicable, emergency escape routes are to be provided from the wheelhouse and sleeping accommodation.

11.6.2 In vessels 10m LOA and over with an enclosed machinery space, at least two means of escape from the engine room should be provided, separated as far apart as practicable, except that, where the size of the machinery space renders this impracticable, one escape only may be fitted, subject to approval.

11.6.3 In the case of vessels fitted with an enclosed shelter, an additional access from within to the shelter top is to be fitted to facilitate escape in an emergency. The position of the escape is to be agreed with the Surveyor and dimensions are to be not less than 600mm x 600mm.

11.6.4 Escape routes are defined as a 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, or skylight which has a minimum clear opening of not less than 500mm x 500mm, and in the case of portlights, 400mm minimum diameter. Where windows are to be utilised as escapes, the minimum opening should be no less than 500mm x 380mm. Where the arrangement of the vessel or compartment renders a secondary escape impractical, details are to be submitted for approval.

11.6.5 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.

11.6.6 All spaces must be fitted with sufficient ladders, steps, hand rails and grips as deemed necessary to facilitate easy access and escape. Ladders are normally to be of steel construction.

Section 11.7 - Ventilation

11.7.1 An effective means of ventilation is to be provided to all enclosed accommodation spaces, and service spaces which under normal operating conditions may be entered by persons on board. All ventilators

are to meet the requirements stated at Part 3, Section 3.3 for hull integrity and arrangement.

- 11.7.2 Engine rooms are to be adequately ventilated to meet the engine Manufacturer's recommendations for engine air supply and exhaust requirements. Where auxiliary engines are fitted, extra ventilation is to be provided to ensure sufficient total air capacity for both engines. Where electric ventilation fans are provided to the engine space, a means of stopping the fans, operable from outside the engine space, must be provided.
- 11.7.3 When an LPG system is fitted, adequate supply ventilation is to be provided to any compartment containing an LPG appliance, to meet the requirements of Paragraph 11.3.5.
- 11.7.4 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.
- 11.7.5 Toilet and shower spaces are to be fitted with separate exhaust ventilation direct to open air.

Section 11.8 - Water services

- 11.8.1 An adequate supply of cold fresh drinking water is to be provided to meet the requirements of the number of crew on board. Freshwater 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. Built-in tanks in GRP vessels are to be coated internally with a non-toxic approved composition or paint to prevent styrene contamination and to seal the GRP hull laminate. Steel fabricated tanks are to be continuously welded inside and out. Internal coatings are to be non-toxic and suitable for use with potable water.

Section 11.9 - Lighting

- 11.9.1 Wherever possible, in decked vessels 7m LOA and over, an electric lighting system is to be provided and installed to the requirements of Part 10 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 11.10 - Temperature

- 11.10.1 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 11.11 – Handrails, hand holds and grab rails

- 11.11.1 On decked or partially decked vessels, the perimeter of the exposed deck is to be fitted with fixed bulwarks, guardrails or wires, or a combination of these. The height of the bulwark, guardrail, or wire is to be not less than 1m, where there is unreasonable interference with efficient operation of the vessel, this height for fixed bulwarks, rails, and wires, may be reduced, and the required height of 1m maintained by the use of portable wires and stanchions. See Figure 11.19.1.
- 11.11.2 Where tubular guardrails or wires are fitted, the lower course of rails or wire is to have a clearance of not more than 230mm above the deck, with remaining courses evenly spaced at a distance not more than 400mm apart.
- 11.11.3 Where an exposed raised deck is not to be accessed for any reason whilst at sea, then hand rails may be omitted around this area. In such cases, access to the raised deck from the working deck should be prevented by use of rails, wires or chains fitted in accordance with the Standards to maintain a top rail height of 1000mm above the working deck (or step if fitted), and notices should be fitted at the adjoining boundary stating “No access beyond this point.” If any form of hatch, skylight or door provides access to the exposed raised deck then handrails must be fitted around the raised deck in accordance with the Standards.
- 11.11.4 Where an exposed raised deck is not to be accessed for any reason whilst at sea except for anchor release and retrieval, then handrails may be omitted from the perimeter of this area and a suitable rail system fitted to allow the use of a safety harness and tether. In such cases, access to the raised deck from the working deck should be restricted using removable wires or chains fitted in accordance with the Standards to maintain a height of 1000mm above the working deck (or step if fitted), and notices should be fitted at the adjoining boundary stating “Safety harness must be worn beyond this point.” If any form of hatch, skylight or door provides access to the exposed raised deck then handrails must be fitted around the raised deck in accordance with the Standards.
- 11.11.5 Sufficient hand holds and grab rails must be provided to allow safe movement around the accommodation and working spaces. Storm rails and hand holds are to be fitted in 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.
- 11.11.6 All vessels are to be fitted with a permanently mounted boarding ladder that can be deployed from a man overboard position. The ladder is to be

capable of extending from the gunwale/bulwark top to 600mm below the waterline. Rope ladders are not regarded as permanently mounted.

- 11.11.7 Safe access by means of steps, ladders and hand holds/rails is to be provided to wheelhouses and deckhouse top areas which are to have a non-slip finish.
- 11.11.8 It is recommended that all single handed operated vessels are fitted with an emergency kill system for the main engine, in case of a man overboard situation.

Section 11.12 - Securement of heavy items

- 11.12.1 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 11.13 – Fishing equipment

- 11.13.1 Masts, derricks and lifting equipment may be of suitable timber, steel or other approved material and securely fastened to the vessel's structure. The maximum safe working load and maximum radius of operation of all derricks and lifting equipment is to be stated in the building specification or approved constructional drawings, and are the responsibility of the vessel Builder.
- 11.13.2 The associated ropes, wires and guys, eyeplates, shackles and blocks are to be designed to meet these loads. Derricks should be tested as rigged for services to not less than the appropriate British Standards or equivalent requirement, and the maximum safe working load is to be permanently indicated on the derrick. In all cases the LOLER and PUWER regulation referenced in Paragraph 11.13.4 shall apply.
- 11.13.3 Where practical, warp rollers and leads are to be fitted with guards and be positioned to enable safe passage by crew members. All deck machinery is to be of a good marine standard and be suitable for the size of vessel and type of fishing to be prosecuted. The controls of all equipment are to be arranged adjacent to the operator's position to enable a clear view of the gear being hauled. An emergency stop facility is to be provided at the helm position for all hydraulically operated deck equipment and in addition a local emergency stop device is to be fitted at the winch or hauler.
- 11.13.4 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.

Section 11.14 - Cathodic protection

11.14.1 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. Continuity bridges are to be fitted at flexible pipe positions, engines, stern gear, rudder and seacocks.

Section 11.15 - Galvanic action

11.15.1 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 11.16 - Steel/wood connections

11.16.1 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 a compatible non-hardening sealant.

Section 11.17 - Anchors and cables

11.17.1 Every vessel should be equipped with anchors and chain cables sufficient in weight and strength, having regard to the vessel's size and intended service. Wire rope of suitable strength (e.g. trawl warps) may be substituted for chain cable provided that a length of chain cable is attached between the wire rope and the anchor. The size of this chain cable should be appropriate to the anchor weight, and the length of the chain cable should not be less than the LOA of the vessel. The anchor(s) with the associated cable should be stowed to enable rapid deployment and be provided with means of retrieval.

11.17.2 The requirements shown in the Anchors and Cables Table below 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. The anchor sizes shown in the Table are for high holding power types. Where a fisherman type anchor is provided, it is recommended that the weight given in the Table is increased by 25%, but the diameter of the anchor cable need not be increased.

11.17.3 Where a vessel has an unusual hull form and an unusually high windage area, due to high freeboard or large superstructure, the weight of the anchor is to be increased to take account of the increase in wind loading.

The diameter of the anchor cable is to be appropriate for the increase in weight of the anchor.

11.17.4 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 Table 11.18.1.

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

11.18 Tables

11.18.1 Table 1: Anchors and cables – requirements

Numeral L x B x D	Total weight of anchors kg	Minimum number of anchors	Length of cable (m)		Diameter of chain mm	Diameter of rope mm
			Minimum chain m	Total length m		
10	9	1	4	25	6	10
15	14	1	5	30	6	12
20	16	1	6	30	6	15
25	18	1	7	35	6	15
35	22	1	8	35	8	18
50	27	1	9	40	8	18
70	34	1	10	45	8	20
90	41	1	12	50	10	20
110	48	1	15	55	10	25
150	62	1	15	60	10	25
200	80	1	15	70	12	30
250	98	1	15	82.5	12	35
300	115	1	15	82.5	12	40
350	133	1	15	82.5	12	40

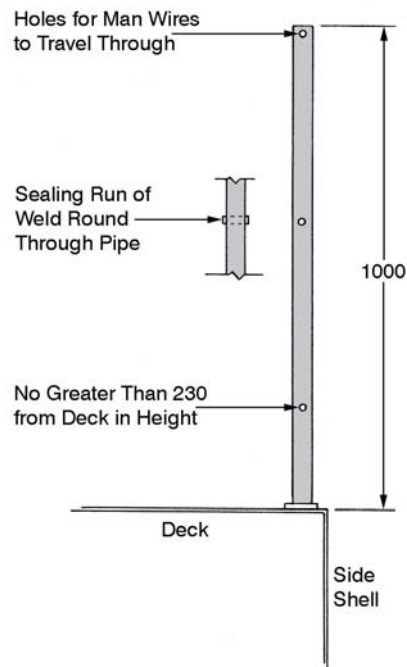
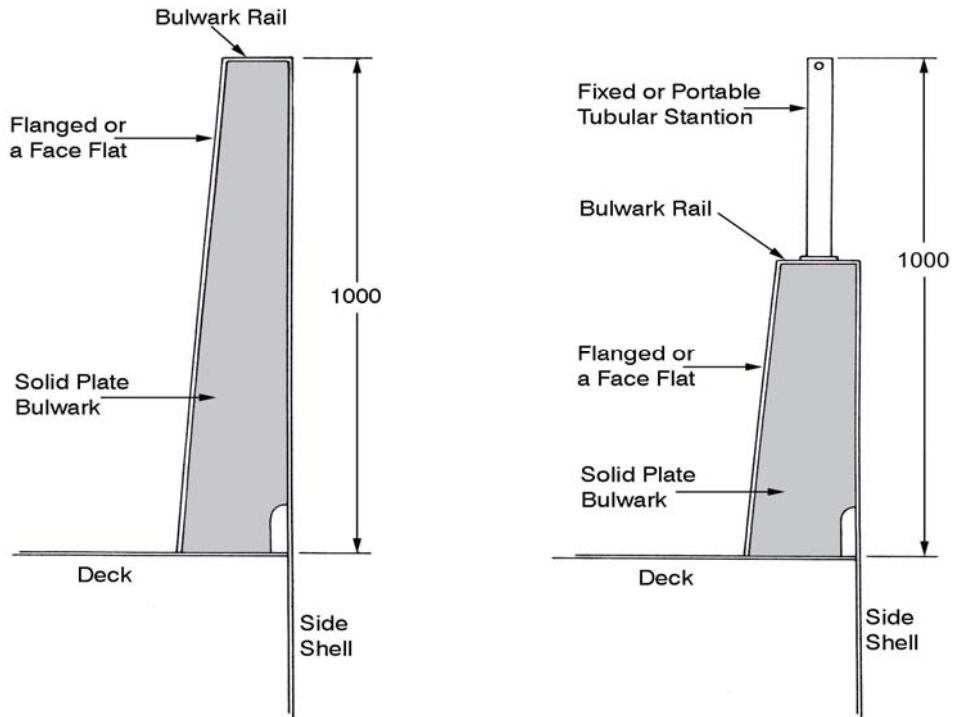
*Requirements for vessels with intermediate numeral value are to be obtained by interpolation.

Notes:-

- Numeral L x B x D is obtained from the following:-
 - L = Overall length in metres
 - B = Beam in metres (maximum - outside planking or plating)
 - D = Depth in metres (maximum - deck at side to moulded line)
- Chain cable diameter is given for short link chain. Chain cable should be sized in accordance with EN 24/565:1989 (ISO 4565:1986 and BS 7160:1990 - Anchor Chains for Small Craft) or equivalent.
- The rope diameter given is for nylon construction. Where rope of differing construction is provided, the breaking load should not be less than that of the diameter of nylon rope specified in the Table.
- Where stud link chain cable is used, the diameter may be 1.5mm less than the tabular diameter stated.
- Where two anchors are used, the weight of the main anchor is to be at least 66% of the total weight for the anchors given in the table

11.19 Figures and illustrations

11.19.1 Handrail arrangements



See section 11.11