

CHAPTER 2

INSTRUCTIONS IN RELATION TO SPECIFIC REGULATIONS

2.1 Plans

2.1.1 Plans of the ship and the crew accommodation should be submitted to the surveyor at the earliest opportunity to enable an assessment of the crew accommodation to be made for compliance with the Regulations. Work on the ship should await the acceptance of the submitted plans and particulars as inconvenience and delay may arise if alterations to the proposals are considered necessary.

2.1.2 The receipt of all plans and documents should be acknowledged. Surveyors should make every endeavour to ensure the expeditious return of submitted plans and documents and/or comments appropriate to them.

2.1.3 As the construction of the ship proceeds, the surveyor should ensure that the arrangements and details are in accordance with the accepted plans and particulars.

2.2 General Requirements

See Regulation 4 noting that:

Equipment, furniture, fittings etc. should comply or be equivalent to the British Standard Specifications where these are relevant.

2.2.1 *Siting of accommodation*

See Regulation 4(1) noting that:

2.2.1.1 In ships where, by virtue of the design and operational features, much of the space below and above deck amidships or aft is needed to accommodate special facilities and storage space associated with the operation of the ship and which cannot be situated forward, the MCA would consider it impracticable to provide accommodation amidships or aft. However, the MCA would not expect difficulties to arise in providing accommodation amidships or aft in the majority of ships.

2.2.1.2 The Regulation 4(1)(b) reference to the position of the accommodation to be above the Summer Load Line is mandatory. However, the MCA is willing to consider granting exemption from this Regulation in the case of small ships and of ships not engaged in the carriage of cargo. Small ships are those of the order of 200 gross tons, while examples of non-cargo carrying ships are passenger only, tug, cable,

salvage, crane or dredger type ships, cargo being defined as in the Merchant Shipping (Load Line) Regulations.

2.2.2 *Noise levels*

See Regulation 4(2) noting that:

2.2.2.1 It is important that the crew accommodation be so sited as to provide as quiet an environment as practicable within that accommodation and in particular sleeping rooms should be sited so that the occupant(s) is not affected by undue noise originating either from spaces outside the confines of the crew accommodation or from other parts of the crew accommodation.

2.2.2.2 Acoustic insulation should be fitted where sleeping rooms are affected by local or ambient noise. Such insulation may also be necessary in respect of the hospital areas and where beds in sleeping rooms are positioned close to bulkheads separating such rooms from washing, sanitary and similar spaces.

2.2.2.3 The desirable upper limits of noise in accommodation are specified in the 'Code of Practice for Noise Levels in Ships' (now out of print but still available from MCA for reference). The noise levels contained in this Code should be used for guidance by designers and wherever practicable noise levels should be within the limits specified.

2.2.3 *Passageway handrails*

See Regulation 4(4) noting that where a passageway exceeds 1 metre in width, a handrail should be fitted on one side. Where the width exceeds 1.8 metres, handrails should be fitted on both sides.

2.2.4 *Clear headroom*

See Regulation 4(5) noting that a clear 1.98 metres headroom is required at every point in a space where full and free movement is necessary. However, the Regulation does permit this figure to be reduced if reasonable to so do in specific circumstances where any such reduction will not cause difficulties for the crew. In such cases, particular attention should be given to electric lights, ventilation trunks and any other local projections which might infringe on the clear headroom.

2.2.5 *Sole usage*

See Regulation 4(6) noting that it is not permitted to use crew accommodation areas for the benefit of passengers, except that on passenger ships any hospital provided may serve both crew and passengers, see Regulation 32(23). However, if the areas concerned have been designed such that provisions for

the crew are of no less a standard than that required by these Regulations then the MCA will consider applications for exemptions from this Regulation.

2.3 Divisions Between the Crew Accommodation and Other Parts of the Ship

See Regulation 5 noting that:

2.3.1 In ships which trade or operate in cold climates the boundaries of accommodation should be protected against cold in a similar way to that in respect of protection from overheating.

2.3.2 Insulation materials used in accommodation spaces should be approved by the MCA or a Nominated Body as defined in Merchant Shipping Notice No. M.1645, or acceptable to the MCA or Nominated Body as achieving an equivalent standard.

2.3.3 In deciding what, if any, protective covering against condensation is required, any case put forward by the builders/owners should be considered and regard should be paid to the standard of ventilation installed.

2.4 Interior Bulkheads

2.4.1 With reference to Regulation 4(8) "suitable material" for inside panelling should have the following properties:-

- (i) easy to keep clean;
- (ii) hard wearing; and
- (iii) discourages condensation.

2.4.2 With regard to Regulation 6(1) the MCA will accept, subject to the requirements of the relevant Merchant Shipping (Fire Protection) Regulations as applicable, materials which have been specifically approved as suitable for the construction of internal bulkheads in crew accommodation. However, in sanitary accommodation, laundries, drying rooms, cold store rooms or dry provision store rooms, any bulkhead formed by material which can absorb water should be faced with hard plastic or other material impervious to water.

2.4.3 Notwithstanding the above, and subject to Regulation 6(3), Regulation 6(2)(b) requires that boundary bulkheads of sanitary accommodation, laundries, drying rooms, galleys and cold store rooms should be watertight to the heights specified and hence steel (or where permitted under the relevant regulations, aluminium) should be used for this portion of the bulkhead. The watertight heights should be measured above the top of the deck covering in the 'wet space'.

2.4.4 Boundary bulkheads of galleys, including doors and shutters, should be constructed of steel.

2.4.5 Internal bulkheads are not to be constructed of a material containing asbestos.

2.5 Overhead Decks

See Regulation 7 noting that:

2.5.1 The deck forming the crown of the crew accommodation (i.e. an overhead deck) must be properly insulated to prevent condensation and overheating. The deck material and construction should be capable of preventing leakage of water into the crew accommodation. The surveyor should be satisfied that any welding forming part of a metal deck is fully adequate and completely continuous to ensure watertightness.

2.5.2 A metal overhead deck which is exposed to the weather should typically **either** be covered on its upper side with wood not less than 57 millimetres thick and properly laid and caulked or alternatively covered with a material complying with the requirements given at paragraph 2.5.3.1 below and properly laid, **or** the deck should be insulated on its underside with a material complying with the requirements given at paragraph 2.5.3.2 below.

2.5.3 In a ship not constructed of metal and with a wooden overhead deck, that deck should typically be not less than 63 millimetres thick, and be properly laid and caulked.

2.5.3.1 The material used as a deck covering, or for the covering of an overhead deck, should:-

- (i) provide a good foothold when both wet and dry;
- (ii) if covering a deck exposed to the weather, provide thermal insulation not less than that provided by a wooden deck 57 millimetres thick;
- (iii) if covering any other deck, provide a warm and comfortable surface;
- (iv) be such that it will not readily ignite;
- (v) be such that after being immersed in water for 48 hours, its moisture content will not exceed 7 per cent of its dry weight;
- (vi) not be such that it might be injurious to health;
- (vii) be sufficiently hard and strong to withstand all reasonable conditions of service and sufficiently flexible not to crack in those conditions;

(viii) if laid in a permanent hospital, be such that it will not be readily susceptible to damage by liquids which are likely to be used in the hospital;

(ix) if it is laid directly on top of an oil tank, be such that if it is immersed in fuel oil for 24 hours at a temperature of 66°C it will not be penetrated by the oil and its weight will not increase by more than 1 per cent;

(x) either not contain any substance which may cause corrosion of the deck on which it is laid, or be fitted only to a deck which is protected from corrosion by a coating supplied for that purpose; and

(xi) be fitted by means of an adhesive or otherwise so as to affix it securely to the deck.

2.5.3.2 The insulating material used for the underside of decks should:-

(i) provide thermal insulation not less than that provided by a wooden deck 57 millimetres thick;

(ii) be such that it is non-combustible, which when heated to a temperature of 750°C (1382°F) neither flames for longer than 10 seconds duration, nor raises either its internal temperature or the temperature of the test furnace more than 50°C (90°F) above 750°C (1382°F) when tested in accordance with BS 476: Part 4: 1970(1984);

(iii) should not contain any substance which may cause corrosion of the deck on which it is laid;

(iv) be fitted only to a deck which is protected from corrosion by a coating supplied for that purpose; and

(v) be fitted by means of an adhesive or otherwise so as to affix it securely to the deck.

2.5.4 Regulation 36(1) requires floor coverings to be of an approved type. Annex 1 of these Instructions gives guidance on the approval process which should be adopted, but note that Merchant Shipping Notice No. M.1645 describes how this process is now undertaken on MCA's behalf by Nominated Bodies.

2.5.5 Details of the underdeck coverings and insulating materials should be submitted to the surveyor for agreement to their use.

2.6 Floor Coverings

See Regulation 8 noting that:

2.6.1 To meet Regulations 8(1) and 36(1)(a) it is essential that all floor coverings are of an approved type for their particular circumstances, see paragraph 2.5.3.1 for guidance on the criteria which a covering would be expected to be able to meet. Annex 1 of these Instructions gives guidance on the approval process which should be adopted, but note also that Merchant Shipping Notice No. M.1645 describes how this process is now undertaken on MCA's behalf by Nominated Bodies.

2.6.2 The main object of the Regulation is that the floor is to be soundly constructed and that its surface is such as to provide a good foothold and that it can easily be kept clean. Particular care should be taken if any of the crew accommodation is situated over an oil tank or coal bunker to prevent oil or gas leakage.

2.6.3 Any carpet fitted in the crew accommodation (Regulation 8(3)) shall be of a type that will not readily ignite (see paragraph 2.5.3.1) and be approved under the relevant Merchant Shipping (Fire Protection) Regulations. The MCA's 'List of Approved Fire Resisting Materials' gives details of such carpets. Other properties of the carpet such as durability, ease of cleaning, colour fastness and anti-static properties are at the owner's discretion.

2.6.4 The Regulations are specific in stating that decks in sanitary accommodation, galley and laundries are required to be covered with terrazzo, tiles or other hard material, see Regulation 8(4). The tiles referred to mean tiles of the ceramic type and not those made of plastic material or a PVC type, and there is no specific approval by the MCA required for these materials. However, it should be noted that MCA has previously accepted for some wet spaces the application of certain non-hard coverings which have been approved to MCA standards, where the use of a floor covering manufactured from modern materials and appropriately installed with the minimum of joints can be justified. The surveyor should be satisfied that the finished covering is impervious to liquids, can easily be kept clean and provides a good foothold in addition to being generally satisfactory having regard to the space in which it is fitted. It is recommended that appropriate samples of the material are forwarded to the surveyor at the same time as the plan of the floor covering is submitted.

2.6.5 Where a hard type of covering is used, consideration should be given to the fitting of drainage channels if spillage can be expected.

2.7 Access and Escape Arrangements

See Regulation 9 noting that:

2.7.1 General

2.7.1.1 In dealing with escapes from crew accommodation the surveyor should also refer to the relevant Merchant Shipping (Fire Protection) Regulations which also deal with this subject.

2.7.1.2 Particular care should be taken in the positioning of escapes. As a general principle it can be assumed that escapes will need to be used in the case of explosion or fire or in the case of physical damage to the ship caused by collision.

2.7.1.3 In the case of a ship where crew accommodation is situated below the weather deck, it is preferable for the two means of escape from compartments between two main bulkheads to be by means of well sloped stairways. It is realised that this is not always practicable and in such a case the escape arrangements will be acceptable provided that:-

(i) one of the escapes is by means of a stairway to the deck over and the other is by way of a readily openable doorway to an adjacent compartment provided that in the adjacent compartment there is a stairway leading to the deck over; or

(ii) one of the escapes is by means of a stairway to the deck over and the other is by ladder to an escape hatch (see paragraph 2.7.6) to the deck over. It may be necessary to provide in addition to a stairway, two escape hatches, one port and one starboard so as to cover the whole block of accommodation being considered.

2.7.1.4 Wherever possible stairways and ladderways should be arranged to be climbed in the forward and aft direction to provide the best opportunity for escape when the vessel is heeled. Doorways leading from the upper level of ladderways are preferable to exits provided by a hatch.

2.7.1.5 The surveyor should critically examine the opening/closing arrangement of all escape doors and especially hatches to ensure that when needed they can easily be operated, particularly when the vessel is heeled.

2.7.1.6 Where accommodation spaces are arranged in several tiers, as is generally the case, the surveyor should ensure that even though the lowest tier has two means of escape in a vertical direction, in higher tiers 'funnelling' of escapes does not occur so that there is virtually only one means of escape. Passageways and stairs shall be of suitable width to ensure ready transit of the maximum number of personnel anticipated.

2.7.1.7 The means of escape should be sited as far away as practicable from each other, compatible with serving the compartment they are meant to cover and suitable in size and arrangement to ensure ready escape of the maximum number of personnel anticipated.

2.7.1.8 Lighting from an alternative source of power should be suitably positioned along all escape routes, see paragraph 2.11.2.4.

2.7.2 *Dead-end corridors*

2.7.2.1 Although every endeavour should be made to provide two means of escape from passageways, it is realised that in isolated cases this may not be possible. Therefore for guidance in such cases a dead-end corridor might be considered as acceptable, subject to the provisions of the relevant Merchant Shipping (Fire Protection) Regulations and provided that it is not more than 7 metres in length in cargo vessels.

2.7.2.2 However, even when a dead-end corridor meets the above criteria, where such a passageway leads to messrooms, recreation rooms, cinemas or other communal spaces in which personnel congregate the arrangement should not be accepted unless additional satisfactory emergency escapes are provided from such spaces, see also paragraphs 2.7.4, 2.7.6, 2.7.7 and 2.7.8.

2.7.3 *Sleeping rooms*

It is necessary to provide an emergency means of escape from a sleeping room where access to such a sleeping room is by way of a dayroom, there being no direct access by means of a door to the sleeping room from a lobby or passageway. Ideally, the crew accommodation should be designed so that a sleeping room is so positioned that an emergency escape therefrom is not required. Where there is a need to provide an emergency means of escape from a sleeping room this should be achieved by fitting a clearly marked crash panel to an adjacent room or passageway. Where this is not possible grab steel rungs and grab rails may alternatively be fixed on the outside of the structure in the vicinity of a fully opening window or a 400 millimetre diameter opening sidescuttle, provided that the window or sidescuttle is not close to the waterline of the ship and that the fixed steel rungs lead to an open deck from which ready access to lifeboats or liferafts is available.

2.7.4 *Messrooms, recreational rooms etc.*

In ships in which messrooms, recreation rooms, cinemas, television rooms and other communal spaces are provided to accommodate more than 15 personnel at any one time, two doors should be provided to an adjacent passageway. In some ships, by virtue of the layout of the accommodation, it will not be possible to provide two doors to an adjacent passageway. In such cases in addition to the door to a passageway, a door to an open deck (or if this is not possible an opening type window or 400 millimetre diameter sidescuttle(s) provided that escape through the window or sidescuttle leads to an open deck) may be permitted in lieu from which ready access to lifeboats or liferafts is available.

2.7.5 *Doors*

All doors to crew accommodation should, in general, be of the hinged type. Where from space considerations it is not practicable to provide this type of door, a sliding door may be permitted provided it can be readily removed from the rail from either side of the space or that a crash panel is fitted in the door which can be "kicked out" with a minimum of effort from either side. In this

context “readily removed” would mean that the sliding doors must be fitted with lifting handles on both sides. Intermediate doors in passageways should not be capable of being locked. The door handles and locks on all sleeping cabin doors should be of a type which allow the door to be opened from the inside without using a key even when locked from the outside.

2.7.6 Hatches

2.7.6.1 Where small hatches or trunks are used to provide an alternative means of escape they should be not less than 400 millimetres square. The hatch should not be capable of being locked and should be operable from below and above. Such a hatch should be provided with a counterbalance weight for ease of opening. Access to the hatch should be by means of a fixed steel ladder.

2.7.6.2 It should be ensured that hatches are so sited that they cannot be overstowed with deck cargo or stores or in the case of crew accommodation sited below vehicle decks in Ro-Ro ships that vehicles cannot be parked over them. In some cases it will be necessary for hatches to be sited on raised kerbs or be protected by tubular stanchions and rails. The painting of white lines is not to be accepted as the only means of protection to escape hatches.

2.7.7 Escape sidescuttles or windows

2.7.7.1 Opening type sidescuttles or windows can with advantage be provided in certain instances to effect an alternative means of escape. Sidescuttles provided for escape purposes should not be less than 400 millimetres in diameter and windows should be of the fully opening type of dimensions compatible with use as an escape. Where such a sidescuttle or window is locked by a cone nut to prevent unauthorised opening, e.g. in lieu of mosquito protection on air conditioned ships, a special key should be placed in a glass box adjacent to the sidescuttle or window complete with small hammer. Suitable notices should be displayed.

2.7.7.2 Escape sidescuttles or windows should not be allowed at the ship's side, or in structures in line with the ship's side, in:-

- (i) positions close to the waterline; or
- (ii) positions such that the person escaping will be required to enter the sea.

2.7.7.3 When escape sidescuttles or windows are accepted, fixed steel rungs should be provided which lead to an open deck from which ready access to lifeboats or liferafts is available.

2.7.8 Crash panels

2.7.8.1 Crash panels can be used with advantage to provide an alternative means of escape in certain circumstances. Nevertheless, an escape route should not involve more than one such crash panel.

2.7.8.2 The crash panel should be fitted so that it can be “kicked out” with a minimum of effort and should be clearly marked to indicate its purpose. Where a crash panel is utilised to provide an escape to another compartment the surveyor should ensure that the door to that compartment opens on to a passageway and is, under all conditions, capable of being opened from the inside. When a crash panel is used, access to it should not be restricted by any furniture or fittings.

2.8 Pipes etc.

See Regulation 10 noting that:

2.8.1 Where steam pipes are permitted by regulation to pass through crew accommodation passageways the following precautions should be observed:

2.8.1.1 If the steam supply from the boiler passes through a reducing valve, such valve should be of accepted design and suitably sited. Preferably, the valve should be situated in the engine room. Even if a reducing valve is fitted, all steam pipes and attachments should be designed for the full boiler pressure.

2.8.1.2 Copper is not considered a suitable material.

2.8.1.3 The number of pipe joints should be kept to a minimum and as far as is practicable, there should be no joints within the principal crew accommodation areas.

2.8.1.4 All steam pipes and attachments should be designed for the maximum pressure of the ship's boiler system.

2.8.1.5 The bends should be 'ordinary' bends with large radii, and not fabricated. Efficient drainage arrangements should be provided. A steam trap should preferably be fitted to the steam pipe at the lowest point. Drains should be connected to the exhaust steam line.

2.8.2 The regulation requires that both supply and exhaust steam pipes shall be 'properly encased' and in this context efficient encasement in suitable insulation will be accepted as complying with this requirement. If flange joints are unavoidable then the flanges should be protected by a steel band to prevent steam escaping out directly. All flanges should also be fully insulated and covered.

2.8.3 Facilities for cleaning soil and waste pipes, see Regulation 10(5), are as far as practicable not to be positioned in the accommodation spaces.

2.8.4 Where it is impracticable to comply with Regulation 10(6) the joints should be suitably sited and no joints should be placed over:-

2.8.4.1 in messrooms - any table;

2.8.4.2 in sleeping rooms - any bed;

2.8.4.3 in dry provisions storerooms - any rack, shelf or bin required for the storage of provisions;

2.8.4.4 in galleys - any cooking range or any other piece of apparatus used for preparation or cooking of food or any food preparation space; and

2.8.4.5 in hospitals - any bed.

2.8.5 Where CO₂ pipes of fixed fire extinguishing systems pass through accommodation spaces, the surveyor's attention is drawn to the requirements of the MCA "Survey of Fire Protection Arrangements - Instructions for the Guidance of Surveyors".

2.8.6 Plastic piping and associated fittings of a suitable type approved to ISO/BS standards may be used for domestic cold fresh water systems, salt water systems, drains from washbasins, baths, showers, deck scuppers from sanitary accommodation and soil pipes subject to compliance with the appropriate regulations regarding structural fire protection and the structural and watertight integrity of the ship. However, plastic piping should not pass through machinery spaces, galleys or other heat producing spaces, nor should it be led within the boundaries of refrigerated chambers.

2.8.7 Plastic piping should be adequately but freely supported with suitable provision for expansion and contraction to allow for large movements between plastic piping and steel structures. Hot and cold water piping should be run sufficiently apart or be suitably insulated to avoid heat transfer.

2.9 Awnings

See Regulation 11 noting that:

2.9.1 Awnings should be constructed of canvas, other suitable fabric, aluminium or other rigid sheeting subject to the surveyor's satisfaction. The use of non-combustible materials should be required as considered relevant, e.g. in way of safety equipment.

2.9.2 Since there is a risk of injury to personnel and damage to instruments and equipment by metal or other rigid sheeting which might work loose in a gale, the surveyor should be satisfied that the construction is adequate for such conditions, paying particular attention to the need to provide efficient fastenings where the edges of the sheets overlap. Dismantling methods for any such awnings should be safe and easy.

2.9.3 Notices should be displayed where rigid awnings are not suitable for walking on.

2.10 Heating

See Regulation 12 noting that:

2.10.1 General

Subject to the requirements of other relevant Merchant Shipping Regulations:

2.10.1.1 Where a combination of the various types or a novel design of heating system is proposed it will require to be specifically considered by the MCA.

2.10.1.2 Heating boilers should be effectively insulated. They should be sited in a steel or equivalent enclosed and suitably ventilated compartment, clear of the accommodation wherever practical. Doors to the compartment shall be self-closing steel arranged such that they are well clear of escape routes.

2.10.1.3 Filling arrangements for fuel should be provided from the open deck, and storage facilities and capacity are to be to the surveyors satisfaction.

2.10.1.4 Any fuel tank fitted with a vertical type gauge glass should have its bottom connection of the 'spring shut' type.

2.10.2 Central hot water heating installations

2.10.2.1 These should preferably be on the two pipe system. The flow pipe should be run at a sufficiently high level without long horizontal leads as far as may be practicable and ventilated independently of air cocks on radiators or on the circuits, except that these arrangements are not necessary where the water is circulated by means of a power operated pump or pumps. Except where pumps are provided to circulate the water, radiators should be kept off the floor, but no higher than necessary to provide a good slope for the return to the boiler in the worst condition of trim. Screw plugs or cocks should be fitted to each radiator to allow the radiator to be ventilated. A make-up tank of adequate capacity should be provided and should have a permanent connection for automatically filling from the fresh water system. The fitting of a steam coil or anti freeze additive in the make-up tank to gravity fed systems is a means of ensuring maintenance of supply of the essential heating medium in ships which operate in cold climates and should be provided where the make-up tank is sited in an exposed position.

2.10.2.2 Exposed pipes and tanks should be lagged or insulated and the maker's instructions and a diagram of the installation should be carried on the ship.

2.10.2.3 If a single pipe system is used particular care should be taken to ensure that there is an adequate circulation head under the worst condition of trim, either by gravity or by a power operated pump or pumps.

2.10.3 *Steam systems*

Should be self-draining as far as is practicable and should be suitably vented and trapped where necessary. If a single pipe system is used, steam and condensate should flow in the same direction. There should be ample safeguard against overpressure.

2.10.4 *Radiators*

Should be provided with independent control and should be designed with a view to economy in space and uniformity in room temperature. In large rooms, there should be two or more radiators to ensure a reasonably uniform distribution of heat.

2.10.5 *Guards*

Of a suitable type should be fitted to prevent radiators with high surface temperatures coming into contact with any occupant(s) of the space or coming into contact with bedding or other material which might accidentally fall and smother the radiator and cause a fire. Guards should always be fitted in way of electric radiators together with suitable notices e.g. 'DO NOT COVER'.

2.10.6 *Performance of heating system*

Any heating system should be capable of producing the required temperature (from the ambient) within 24 hours. Central hot water systems using solid fuel should be capable of maintaining the required water temperature with fires banked for a period of at least 6 hours, unless the fuel can be fed automatically.

2.10.7 *In port arrangements*

Particulars of the arrangements for heating the ship in port when the heating system is not in operation is the responsibility of the owner or his representative. The system adopted should not present a fire hazard.

2.10.8 *Testing on completion*

The heating system and its ability to comply in full with all requirements should be demonstrated to the surveyor on completion.

During test on board the ship:

2.10.8.1 Doors, sidescuttles, windows and skylights may be kept closed.

2.10.8.2 In the case of a ship provided with a heating system supplying warm air by means of a mechanically trunked ventilation system the ventilation system need supply only 25 cubic metres of fresh air per person per hour even though the system may be capable of providing quantities of fresh air in excess of this figure.

2.10.8.3 Mechanical ventilation systems, if fitted, should be in operation during the heating test.

2.10.8.4 All natural ventilators should remain open unless extremely draughty conditions prevail when ventilators fitted with locally operated means of closing may be closed, e.g. slides or hand wheels.

2.10.8.5 The reduction in emissivity due to an increase in ambient temperature, and therefore room temperature, is allowed for in the following formula which may be used to obtain the temperature required in the crew accommodation under test:

$$T = 21.8 + 0.8 t$$

where T is the required temperature in °C and where t is the ambient temperature in °C.

Note: The formula is only valid for ambient temperatures down to -1°C; if lower temperatures are anticipated in the normal operating schedule of the ship practical tests supported by heat calculations are to be agreed by the surveyor.

2.10.8.6 Temperatures should be taken in the centre of the space at approximately 1 metre above the floor using a suitable thermometer. An adequate number of spaces should be tested to ensure that the Regulations are complied with throughout the ship.

2.10.8.7 All crew accommodation spaces which are required by the Regulations to be provided with means of heating should be inspected while the heat is being supplied. Particular attention should be paid to the hospital ward and to spaces subject to heat leakage from ventilation trunking, piping, machinery spaces, calorifiers, drying rooms etc.

2.10.8.8 Where excessive temperatures are recorded, steps should be taken to ensure there will be no grounds for complaint on account of overheating.

2.10.8.9 If, after test, radiators are painted with metallic paint or enclosed with shields, grilles or other means the surveyor should carry out a further test unless there is obviously an adequate margin of performance.

2.11 Lighting

See Regulation 13 noting that:

2.11.1 Natural lighting

2.11.1.1 With regard to natural lighting the intensity of daylight varies considerably from summer to winter and therefore clear winter weather conditions are to be taken as the criterion.

2.11.1.2 Natural lighting should normally be provided by sidescuttles, windows or skylights. Skylights should not be placed over beds and should be weathertight. Although glass prisms may be used as aids to the primary sources of natural lighting their use is not recommended by the MCA since they can be a constant source of trouble due to the difficulty involved in maintaining weathertightness.

2.11.1.3 Sidescuttles and windows should be spaced and sited, so far as practicable, to be of maximum benefit to the occupants. In general, and wherever service conditions permit, sidescuttles or windows should be fitted whether skylights are fitted or not.

2.11.2 Electric lighting

2.11.2.1 Electric lighting can either be of the incandescent or fluorescent type; the latter normally gives a better standard of lighting with conservation of power. The overall standard of lighting to be provided is given in the schedule entitled ELECTRIC LIGHTING in the Regulations.

2.11.2.2 When considering the number of lighting points, surveyors should seek to establish the placing and the type of shade fitted so that the luminance provided is well diffused and that glare and deep shadow are avoided so far as is practicable. In the case of incandescent lighting unshaded bulbs and/or clear glass shades should not be used, except in the case of pearl lamps of 60 watts or lower power or in the case of other lamps having a finish giving equal diffusion.

2.11.2.3 Individual lights should not in general exceed 100 watts having regard to any limitation indicated on the shade, although a higher figure may be accepted in a messroom or galley. Bed lights of 40 watts, tungsten filament are acceptable as satisfying the requirements of the Regulations in respect of the electric reading lamp for each bed.

2.11.2.4 The regulations require an efficient alternative lighting system or an alternative supply of electrical power to be provided. This requirement will be considered as being met if there are two generators provided or one generator together with storage batteries. Oil lamps will not be permitted, however MCA approved constantly charged supplementary emergency

lighting units may be considered for fitting on ships of less than 200 gross tons or in areas on larger ships where exemption has been granted from the requirement of the Regulations for natural light.

2.11.3 Testing on completion

2.11.3.1 For natural lighting the ability to comply in full with the Regulations should be demonstrated to the surveyor on completion.

2.11.3.2 It is preferable that electric lighting tests be carried out during the hours of darkness but they may be carried out during daylight provided suitable screens are used over sidescuttles, windows and skylights to prevent the ingress of daylight. The ability to comply should be demonstrated to the surveyor on completion by means of a direct reading light meter, the accuracy of which has been certified by a reliable authority.

2.11.3.3 Surveyors should note that tests with electric light photometers should give direct reading in lux to facilitate a comparison with the requirements of the schedule in the Regulations.

2.11.3.4 Tests should be carried out using the ship's power and not shore supply.

2.11.3.5 Test results should be prepared in tabular form by the builder or contractor and should contain the designation of the sample spaces tests, the wattage and number of lamps fitted, the illuminance required by the Schedule to the Regulations, and the illuminance recorded during test.

2.12 Ventilation

2.12.1 General

See Regulation 14 noting that:

2.12.1.1 Every enclosed crew accommodation place (except a cold-storage room) must be provided with an adequate ventilation system, the adequacy of which depending upon the size of ship, the type of voyage, and the climate and weather likely to be encountered.

2.12.1.2 All ships of over 500 tons must be fitted with either an air-conditioning plant or a trunked mechanical ventilation system, see Regulation 14(5).

2.12.1.3 With some exceptions, foreign going ships (as defined in the Regulations) of 1000 tons or over must be fitted with an air-conditioning system, see Regulation 14(3)(a).

2.12.1.4 All ships, irrespective of tonnage, regularly engaged on voyages solely within the Tropics or Gulfs area must be fitted with an air-conditioning plant.

2.12.1.5 All crew accommodation spaces should be provided with exhaust ventilation even if situated on an open deck.

2.12.1.6 If crew accommodation is situated near heat producing spaces, the size and type of ventilator should receive special consideration in conjunction with the heat insulation in order to ensure a satisfactory rate of heat dissipation.

2.12.1.7 Means should be provided, where necessary, to enable lengths of ventilation trunking to be cleaned internally.

2.12.1.8 Where screening is required to prevent the admission of mosquitoes, it should be readily portable or hinged, or able to slide into a position clear of the orifice. It should be noted that where screening is fitted to ventilation trunks it will be necessary to increase the inlet area of the trunks by approximately one-third above that required for ventilation purposes only.

2.12.1.9 Ventilation trunking should as far as practicable be kept outside the confines of the propelling machinery casings. If this is not possible and ventilation trunks pierce propelling machinery casings, then the requirements of other relevant Merchant Shipping Regulations may apply. As a minimum the trunking within the casings should be constructed of steel, be adequately supported and the minimum thickness of plating should be 5 millimetres for a trunk 750 millimetres in width or diameter and 3.2 millimetres for 300 millimetres or smaller, the thickness for intermediate widths being obtained by interpolation. The provision of fire resisting shutters in association with ventilation trunking of less thickness than specified is not to be accepted.

2.12.1.10 Mechanical or air-conditioned ventilation systems should be designed to minimise bacterial growth. Intakes should be designed to minimise the risk of rain water being driven into filters and these should be readily accessible to enable cleaning of the washable type or replacement as necessary if of the fibreglass variety or similar. If the air intake to the system is from inside a ventilation machinery casing, adequate drainage of the space should be provided if rainwater which may become stagnant is able to enter.

2.12.1.11 In air-conditioning systems the cooler unit (de-humidifier) should be fitted with an efficient drain and the condensate sump should be capable of being cleansed to ensure that stagnant condensate cannot accumulate. An effective moisture eliminator should be fitted in the distribution air stream where necessary. The insulation of the air-conditioning unit plenum chamber should be fitted with a waterproof facing.

2.12.1.12 Adiabatic spray type humidifiers are not acceptable as they are considered prone to generating air carried water droplets which may support bacteria etc.

2.12.2 *Natural ventilation*

2.12.2.1 All enclosed crew spaces in every ship not ventilated by a trunked-mechanical or air-conditioning system must be provided with adequate natural ventilation, see Regulation 14(7).

2.12.2.2 Natural ventilation must also be provided to every hospital in addition to any air-conditioning or trunked mechanical system, see Regulation 32(11).

2.12.2.3 Inlet ventilators which are situated in the open air should be of the cowl or other equally efficient type of ventilator, and if possible should be so placed that it is not screened from the wind in any direction. The inlet ventilation to the space should not be placed near any outlet from the space, i.e. over a doorway, nor near a stairway or exhaust opening, and should as far as is practicable be sheltered from the sea.

2.12.2.4 Special difficulties in fitting cowl type ventilators in small ships will be dealt with on their merits. It should be noted that experience has shown that the inflow of air through mushroom, goose-neck, torpedo or other similar type of ventilators is uncertain. Disk or butterfly ventilators should be fitted as inlets only to single or double berth sleeping rooms suitably situated on an open deck.

2.12.2.5 An acceptable standard of natural ventilation to each space except drying rooms or lockers may be attained by a system of passageway ventilation with two cowl ventilators each having an area of not less than 0.002 square metres per person, with adequate openings at the top and bottom of the bulkheads dividing the rooms from the passageways, and an exhaust ventilator in each room.

2.12.2.6 Wherever ventilators open directly into a sleeping room, messroom, washplace, galley or pantry, means should be provided to regulate and diffuse the flow of air as widely as possible.

2.12.2.7 The lead for ventilation trunks to any compartment should be as short and direct as possible, but if bends or knees are unavoidable then extra-sized trunking may be required.

2.12.2.8 The natural supply to hospitals, see Regulation 32(11), is to be trunked to within 300 millimetres above the floor. Where, due to the design of ship, the hospital is sited such that natural ventilation is not practicable, other suitable back-up ventilation arrangements will be considered.

2.12.2.9 With regard to electric table fans (see Regulation 32(9) and paragraph 2.30.6 of these Instructions), note that in ships provided only

with natural ventilation it is also recommended that consideration be given to providing electric table fans in all accommodation spaces. The fans should:-

- (i) be quiet in operation and fixed in position on 'semi-rigid' mountings;
- (ii) in a mess room or galley, be provided with an oscillating mechanism which will operate automatically and rotate the axis through an angle of 90 degrees, otherwise additional fans should be fitted;
- (iii) be provided with a speed regulator capable of providing at least two running speeds;
- (iv) have the mounting, blades and guards (if necessary) of rust proof construction; and
- (v) be fitted so as to prevent interference with the ship's radio, compasses, or any other navigational aid.

2.12.3 Mechanical ventilation

2.12.3.1 The MCA may permit a ship, which is required by regulation to be provided with mechanical ventilation, to be air conditioned, and grant the necessary exemption provided that the air-conditioning arrangements comply with the requirements of the Regulations and these Instructions (see paragraph 2.12.4).

2.12.3.2 From noise and vibration considerations if it is proposed to use fans of the propeller type in crew accommodation trunking, fans specially designed for the purpose should be fitted.

2.12.3.3 Except when cooled air is delivered or when electric table fans are fitted in addition, louvers capable of delivering a jet of air controllable as regards volume and direction (but not necessarily independently) should be fitted in all sleeping rooms, messrooms and washplaces. The position of any louver should ensure an adequate air movement throughout the room in which they are fitted.

2.12.3.4 Non-return nozzles or flaps should be fitted in supply trunking to water closets, store rooms and other spaces where effluvia may occur, unless supplied from independent branches. In the case of a hospital ward, washplace, galley or pantry, directional louvers should be fitted in supply trunking and non-return flaps should be used.

2.12.3.5 The provision of a high standard of ventilation in dry provision store rooms necessarily sited over heat producing spaces will not justify omission of heat insulation unless a system of air-conditioning, including temperature and humidity control, is fitted.

2.12.3.6 Suitable filters for the removal of dirt, dust or grease should be provided where the conditions of service make this desirable, for example galley exhaust systems. Fan inlets should be so sited and protected as to permit, as far as possible, the full operation of the fans in all weathers.

2.12.3.7 Typical standards for a trunked mechanical ventilation system to attain are:

- (i) Number of changes and volume of fresh air

Note: A relates to fresh air changes per hour, B relates to volume of fresh air in cubic metres per minute per person likely to use the room at any one time;

- (a) Accommodation above the Upper Deck

Room	A	B
mess rooms, smoking rooms, recreation rooms not adjoining machinery casings	15	0.71*
mess rooms, smoking rooms, recreation rooms adjoining machinery casings	18	0.71*
outside rooms not adjoining machinery casings	12	1.42
inside rooms and rooms adjoining casings	15	1.42

* but note that the total volume of fresh air per minute does not need to exceed the equivalent of 20 fresh air changes per hour.

- (b) Accommodation below the Upper Deck of Motor Vessels

Room	A	B
mess rooms, smoking rooms, recreation rooms not adjoining machinery casings	15	0.71
mess rooms, smoking rooms, recreation rooms adjoining machinery casing	18	0.71
outside rooms not adjoining machinery casings	12	1.42
inside rooms and rooms adjoining casings	15	1.70

(c)Accommodation below the Upper Deck of Steam Ships

Room	A	B
mess rooms, smoking rooms, recreation rooms not adjoining machinery casings	18	0.85 **
mess rooms, smoking rooms, recreation rooms adjoining machinery casings	20	0.85 **
outside rooms not immediately above or adjoining machinery casings	12	1.42
inside rooms and rooms immediately above or adjoining machinery casings	18	1.70
Passageways above and below the Upper Deck adjoining machinery casings	4	-

** but note that the total volume of fresh air per minute does not need to exceed the equivalent of 25 fresh air changes per hour.

(ii) Fresh air changes per hour, supply/exhaust

Note: C relates to fresh air changes per hour of supply, D relates to exhaust.

Room	C	D
Galleys	20#	40
Sanitary accommodation, laundries, drying rooms, pantries	##	15
Private or semi-private toilets	##	10
Wards in permanent hospitals	12 minimum	-
(so that not less than 1.42 cubic metres of fresh air per minute for each bed in the ward)		
Dry provisions storerooms (but not more than 20 depending on the provisions of Regulation 31)	10 minimum	-

but note 15 if at least two sides of the galley are exposed to the weather.

but note mechanical supply ventilation may be fitted in addition to the mechanical exhaust ventilation, provided that the mechanical volume of air supplied does not exceed that provided by the exhaust.

2.12.4 Air-conditioning

2.12.4.1 General

(i) British and ISO Standards give guidance on design conditions to be assumed and the basis of calculations for ships' air-conditioning systems.

(ii) The system should be capable of maintaining its designed standard if the refrigerating machinery is out of action in port.

2.12.4.2 Overall requirements

(i) The air-conditioning system as a whole should be so designed that it is capable of maintaining the following conditions:

	Dry Bulb °C	Relative Humidity Per Cent	Derived Wet Bulb °C
Ambient	32	78	28.7
Internal	29	50	21.4

(ii) When the internal conditions are specified against a different ambient temperature the surveyor should ensure that relevant calculations are submitted to confirm that the system will be capable of maintaining the above conditions. A full calculation involves heat load/loss calculations, however a ready check method can be undertaken using psychrometric charts. Whichever method is adopted the surveyor should be satisfied with the calculations.

2.12.4.3 Control system

Adequate controls should be provided to enable comfortable conditions to be maintained within the accommodation when the less onerous ambient conditions prevail and also where the capacity of the plant exceeds the minimum requirements.

2.12.4.4 Thermal insulation

The capacity of the air-conditioning plant and the performance of the plant will be affected by the provision of thermal insulation or lack of such insulation provided to the external boundaries of the crew accommodation and to heat producing spaces within the confines of the crew accommodation. Hence the builder or sub-contractor responsible for the design of the system should confirm that his proposed design specification takes into account the thermal insulation proposed for the ship.

2.12.4.5 Number of conditioned air changes

(i) The number of changes of conditioned air in each compartment or space should be calculated by the builder or company supplying the plant having regard to the heat transfer into the space via the boundaries. Any assumptions about this aspect should be carefully recorded. Typically, the minimum number of changes is eight per hour in mess or recreation rooms and six per hour in other spaces.

(ii) When air changes are specified which approach these minimum figures, the system should be carefully balanced on completion to ensure that the air changes in each individual space do not fall below those quoted.

(iii) The system should have its own cooling machinery, and not be connected to any refrigerating machinery provided in the ship for other purposes.

2.12.4.6 Recirculation of supplied air

(i) Recirculation of supply air may be permitted provided that sanitary accommodation is provided with mechanical exhaust ventilation and that the fresh air content of the supply to the accommodation is not less than:-

(a) 25 cubic metres per hour for each person for whom accommodation is provided; or

(b) the total capacity of the sanitary and any other accommodation exhaust fans, excluding the galley, whichever is the greater.

(ii) Additional natural exhaust with damper controls should be provided in order that the system can be balanced when recirculation is not in operation. Particular care should be exercised in the siting of the inlets to the recirculation systems. The grilles are to extract only from accommodation passageways and should be fitted on more than one tier of the accommodation, if practicable. They should be sited in positions which are not adjacent to a doorway to a galley, laundry, sanitary accommodation or to a similar space. In such cases it is unnecessary to have a direct supply to these passageways.

(iii) Care should be taken to ensure that noise originating from the air-conditioning plant is not transmitted to the accommodation via recirculation inlets which are unduly large or sited in close proximity to the fan room.

(iv) Notwithstanding the above it may be necessary in certain ambient conditions when tankers, gas carriers and chemical carriers are loading or discharging cargo for all air intakes and exhaust outlets to be closed and the air conditioning system to be operated on 100 per cent recirculation, for safety reasons. This may be accepted and the system designed accordingly provided the following is carried out:

(a) that 100 per cent recirculation will only be employed during loading or discharging cargo and at no other time. Accordingly, where surveyors know that systems are being designed for this purpose they are to inform owners in writing of the above, so that the owners can in turn inform their masters;

(b) that the ventilation system to cabins and mess rooms is by air-conditioned supply with natural exhaust from these spaces to adjacent passageways;

(c) that a CO₂ monitoring device is fitted with audible and visible alarms in each recirculation trunk. The monitoring device is to be so calibrated that it will be activated when the CO₂ content reaches 1,200 ppm by volume;

(d) that the master is informed by standing instructions that if and when the alarms are activated loading or discharging of cargo is to be discontinued and that when it is safe to do so the accommodation spaces should be thoroughly ventilated with fresh air before recirculation is recommenced; and

(e) that monitoring devices are kept in full working order and regularly maintained.

Note: Provided the CO₂ content of the recirculated air-conditioned air does not exceed 1,200 ppm by volume it is considered on the basis of medical advice that the CO₂ will not have any adverse effect on personnel.

2.12.4.7 Mechanical exhaust

(i) When mechanical exhaust is provided for washing and sanitary accommodation, laundries, drying rooms, pantries and changing rooms, as a guide the exhaust system is to provide air changes not less than:

(a) 10 per hour for private bathrooms;

(b) 15 per hour for other spaces; and

(c) 25 per cent in excess of any mechanical air supply which may be fitted for heating or any other purpose.

(ii) Where a water closet compartment opens directly from an accommodation passageway the door is to be self-closing and close-fitting without apertures unless the mechanical exhaust ventilation provides for 30 changes of air per hour.

2.12.4.8 Doors, sidescuttles, windows, etc.

To ensure that the air-conditioning plant will maintain its designed performance doors leading from the accommodation to the open deck should be of the self closing type. Notices should be displayed in prominent positions in passageways to the effect that the ship is provided

with an air-conditioning system and when this system is in operation sidescuttles, windows and skylights should be kept closed.

2.12.4.9 Air terminals

Air terminals in sleeping rooms and messrooms may be of the grille, diffusing louvre, ceiling diffusion or other acceptable pattern. They are to be sited so as to minimise noise, ensure uniform distribution throughout the space and avoid short circuiting to the exhaust.

2.12.4.10 Transfer openings

A correct balance between the supply and exhaust is to be achieved in each space by the provision of suitable transfer openings. Sufficient area can normally be achieved in these cases by allowing an opening not exceeding 25 millimetres under the doors to each room. If in extreme cases it is necessary to supplement this area, louvres with sliding shutters may be permitted in the lower portion of the door, subject to the requirements of the relevant Merchant Shipping (Fire Protection) Regulations.

2.12.4.11 Non-return valve

A non-return valve is to be fitted in the air-conditioning supply to the hospital and associated spaces. Non-return flaps should also be fitted as necessary to supply and exhaust systems to any other spaces where there is a risk of effluvia passing to the living spaces when fans are stopped.

2.12.4.12 Refrigeration machinery

(i) All air-conditioning systems should have their refrigeration machinery independent of cargo plant. The refrigeration machinery should be designed with sea water for condenser cooling purposes at a minimum temperature of 32°C. The fouling factor of the condensers could be taken as 0.001.

(ii) It should not be possible for any toxic gas to pass, by leakage or otherwise, into the supply air stream.

2.12.4.13 Spare gear

Spare gear should be provided for each ship, due consideration being given to the type of machinery fitted, length of voyage, and ambient temperatures expected. The following list typically illustrates the spare gear that should be carried:

(i) For air conditioning units, supply and exhaust fans, refrigerating machinery and seawater pumps:

1 set of bearings for each size of motor fitted

1 set of contacts, springs and 1 operating coil for each size of starter fitted
1 set of wearing rings and seal parts for each size of pump

(ii) For air conditioning units:

1 set of (throw away type) air filter cells
1 set of fan bearings
1 set of Vee belts for each size and type fitted

(iii) For refrigerating machinery:

(a) (for each size of compressor fitted)

1 shaft seal replacement
1 set of gaskets, piston rings, connecting rod bolts and nuts, connecting rod bearings, discharge valve discs, discharge valve springs, suction valve discs, suction valve springs
1 main bearing for each of pump end and seal end
2 bronze bearing washers for each of pump end and seal end
2 seal end steel thrust washers
1 oil filter

(b) (For each size of condenser fitted)

1 set of end cover gaskets and condenser anodes
1 tube cleansing brush

(c)(miscellaneous)

1 of oil differential switch, high/low switch, relief valve, expansion valve of each size fitted, leak detector
1 set of drier cores, Vee belts of each size fitted, packing for refrigerating line valves.

2.12.5 Testing mechanical ventilation/A.C systems on completion

2.12.5.1 In ships provided with a trunked mechanical ventilation system or an air conditioning system tests should be carried out on completion by the builder or contractor to demonstrate to the surveyor that the requirements of the Regulations are being met.

2.12.5.2 It is only necessary to take readings in selected spaces but before these are taken all louvres etc. in all spaces should be opened. All spaces should be checked even if readings are not recorded.

2.12.5.3 In a ship in which the trunked mechanical ventilation system supplies warm air for heating purposes, heating may be by-passed for tests under ambient conditions.

2.12.5.4 The apparatus and methods used for the purpose of measuring air volumes should be certified correct with a tolerance of 3 per cent. The certificate should be issued by a recognised authority.

2.12.5.5 Test results should be prepared by the builder or contractor and should show in respect of the various spaces tested the designed air changes per hour and the corresponding air changes per hour achieved under test.

2.13 Sidescuttles and Windows

See Regulation 15 noting that,

2.13.1 Its requirements may be overridden by the requirements of other Merchant Shipping Regulations, directly relating to safety, for particular arrangements and ship types and that:

2.13.1.1 It is essential that all sidescuttles and windows are of an approved type, see Regulation 36(1)(b).

2.13.1.2 Sidescuttles and windows should comply with the relevant Merchant Shipping (Fire Protection) Regulations and The Merchant Shipping (Load Line) Regulations 1998.

2.13.1.3 Where an owner requires, for additional safety, all sidescuttles and windows in the types of ships referred to above to be of the non-opening type the MCA will accept the arrangement provided the following applies:

(i) the ship is air-conditioned and two air-conditioning units are fitted onboard which are cross connected by ducting so that in the event of one of the units failing the other unit will supply air for all the accommodation at reduced air changes;

(ii) in addition to the maker's normal recommended spares, a spare motor should be supplied for the air-conditioning unit so that any loss of air supply would be for a short period only; and

(iii) The mechanical exhaust system from private or semi-private toilets is operated separately, thus ensuring further movement of air.

2.14 Drainage

See Regulation 16 noting that:

2.14.1 When liable to flooding in heavy weather, floors should be drained by one of the following means:

2.14.1.1 overboard through a grating in the floor with a storm valve at the ship's side;

2.14.1.2 to a pump suction; or

2.14.1.3 from deckhouses to the open deck with captive screwed caps or plugs.

2.14.2 The floors of wash places, bathrooms and water closet compartments, unless draining to a pump suction, should be provided with scuppers of at least 50 millimetres in diameter, have gratings in the lowest part at floor level and storm valves at the ship's side if lead directly overboard, except that in the case of a private bathroom provided solely for the use of one person scuppers need not be fitted.

2.14.3 Scuppers draining external open decks should not be combined with those provided within accommodation spaces.

2.14.4 The internal drainage arrangements should be so designed as to prevent effluvia in the accommodation, whether by siphonage or by blow back, see Regulation 16(1)(b). Hence drains from washbasins, baths, shower trays and sinks should be trapped with water seals of at least 75 millimetres and provided with air vent and storm valves at the ship's side if led directly overboard.

2.14.5 Main drains which are employed to collect discharges from numerous fittings should be ventilated to the open air by one or more pipes. One such pipe should be situated above any storm valve fitted and if the main drain is extensive in length another pipe should be provided at the extremity of the drain. The area of the pipe or the combined area of the pipes, as the case may be, should not be less than the area of the main drain.

2.14.6 Piping used for drainage purposes should, as far as is practicable, be carried well clear of the deck to facilitate cleaning. Clearing plugs or caps should be provided at traps and elsewhere as necessary, and the pipes should, wherever practicable, have a good fall.

2.14.7 Due regard should be paid to the avoidance of sharp bends or knees and to varying inclinations of the ship.

2.14.8 Where a collecting tank or a sewage treatment plant into which drains pass is installed, scuppers should be trapped with water seals of at least 75 millimetres. Suitable alternative arrangements should be made for waste disposal in the event of failure of pumps provided for emptying the collecting tank or sewage treatment plant.

2.14.9 The arrangement of a common one pipe waste line for drainage from washbasins, sinks, showers, scuppers and WCs may be accepted provided that each individual drainage pipe is fitted with an anti-siphonic vent so arranged as to eliminate the risk of seal breakage from induced syphonage,

back pressure or self-siphonage. Except where fitted with anti-siphonic arrangements as above, waste pipes should not share a discharge with soil pipes.

2.14.10 Where it can be anticipated that contents of drainage from any space might be particularly odorous, such systems shall be independent of other systems, e.g. galley, dry cleaning room.

2.14.11 With regard to the use of plastic piping for drain pipes and soil pipes see paragraph 2.8.6 of these Instructions.

2.15 Interior Finishes

See Regulation 17 noting that:

2.15.1 Finishes are also subject to the relevant Merchant Shipping (Fire Protection) Regulations.

2.15.2 Regulation 17(1) requires light colours to be used for walls and ceilings. However, the use of materials other than of light colours which in general improve the practicality and decor of the space can exceptionally be considered. It should be noted that where surface finishes are other than light in colour additional lighting may be necessary to achieve the standard required by the Regulations.

2.15.3 Paints, including those having a metallic base, should not be applied on steel furniture, unless the surfaces have first been galvanised or rust-proofed. Painting will not be accepted as a substitute for such galvanising or rust-proofing.

2.15.4 Paints, varnishes and other surface finishes used in the crew accommodation must not have a nitro-cellulose base, Regulation 17(2).

2.16 Marking

See Regulation 18 noting that:

2.16.1 Only sleeping rooms require marking. The marking should be in the form of:

"Certified for (*) seamen"

where * is the maximum number who may be accommodated in the room in accordance with the Regulations.

2.16.2 In crew accommodation spaces with a highly decorative finish, cutting in on the structure will not be appropriate. In these cases, the marking may either be cut in under the door lintel or if this is not possible "label plates" may be affixed to the structure. If the latter are used they are to be attached in such

a manner that they cannot readily be removed. If attached by screws, the slots in the screws should be removed after fixing, and when through bolts are used the ends should be clenched over.

2.16.3 When the builder or owner has carried out the markings indicated, the surveyor should inspect each of the markings to ensure they are permanent and legible. His completion report on the CM23/01 file should confirm that all the markings are complete and satisfactory.

2.17 Sleeping Rooms

See Regulation 19 noting that:

2.17.1 Each crew member should have his own sleeping room as far as practicable, see Regulation 19(2). Cadets should have their own room as far as practicable but in any case not more than two cadets per room.

2.17.2 In deriving the floor area of sleeping rooms, spaces occupied by berths, lockers, seats, chests of drawers and other furniture should be included in the area but spaces which by reason of their small size or irregular shape cannot accommodate furniture and do not contribute to the area available for free movement should not be included. The space occupied by frame chocks and the space between frame brackets if it is not covered or occupied by fixed furniture and is not available for free movement should not be included in the area. If the sides tumble home, a vertical line which meets the side at a height of 1.98 metres above the floor is to be the outer boundary of the measurements, the 'side' being either the framing, lining or other structural material as the case may be.

2.17.3 The radio officer's sleeping room should be sufficiently near the radio room for the radio officer to reach his post in 30 seconds. In calculating this figure, an unobstructed route of 46 metres should be regarded as equivalent to 30 seconds travelling time between the two points. "Unobstructed" should be interpreted as referring to a route which is accessible at all times when the ship is at sea. When measuring the route, vertical distances at ladders should be multiplied by 3.

2.17.4 Wherever practicable a day room, adjoining their sleeping room, is to be provided for officers. However, in ships over 3000 tons Regulation 19(7) requires a day room to be provided for the Chief Officer and Chief Engineer.

2.18 Beds

See Regulation 20 noting that:

2.18.1 Where avoidable, beds should not be placed below pipes carrying water, particularly soil water, being discharged from other accommodation (see also paragraph 2.8).

2.18.2 It is a requirement, Regulation 20(3), that there should be unobstructed access to at least one side of each bed. Where two separate beds are in one room they should be sited as far from each other as practicable. In particular if the adjacent sides or two beds in the room are parallel to each other or, when projected, make an angle of less than 90 degrees with each other, the distance between those sides at any point should not be less, wherever practicable, than 760 millimetres if the beds are in single tier and not less than 910 millimetres if they are in double tier.

2.18.3 Where screens are required they should be fitted for the full length of the bed or the full width of the bed dependent upon whether the sides or ends abut and should extend from the bottom of the bed upwards for a height of at least 600 millimetres.

2.18.4 With regard to the position of beds, accepted good practice is:

2.18.4.1 beds should wherever practicable be positioned fore and aft;

2.18.4.2 at least 100 millimetres clear of ventilation trunks, service piping and the like;

2.18.4.3 at least 50 millimetres clear of bulkheads or the ships side, unless so fitted as to facilitate the bedding being kept clean and dry while preventing the harbouring of dirt or vermin; and

2.18.4.4 with suitable air space around the mattress.

2.18.5 Lee rails or leeboards on the side or sides which may be used for access or for sitting should not be higher than the top of the mattress, excepting at the head and foot.

2.18.6 Consideration should be given to fitting wider beds where the size or service of the particular ship justifies.

2.18.7 Mattresses should be of a proprietary make and in no case be less than 100 millimetres in thickness.

2.19 Furniture and Fittings in Sleeping Rooms

See Regulation 21 noting that:

2.19.1 Additional equipment to that specified in the Regulations may be fitted provided that it does not interfere with the general comfort or reasonable free movement of the occupant(s) and facilitates tidiness.

2.19.2 To facilitate cleaning and to prevent the harbouring of dirt and vermin, furniture should either be arranged so that the base rests on the floor of the room or be provided with a space between the base and the floor, such space being not less than 150 millimetres.

2.19.3 Furniture not built in, or fixed in such a way that vermin and dirt could be harboured should be moveable or should stand sufficiently far from bulkheads to enable cleaning and painting to be carried out as necessary.

2.19.4 Chests of drawers placed below beds should be readily portable. Alternatively, a clear space of 50 millimetres should be left between drawers and bed to facilitate cleaning.

2.19.5 The easy chair referred to in Regulation 21(5)(e)(ii) should be fully sprung and upholstered on the seat, back and arms; the seat should be low and not less than 525 millimetres deep and 500 millimetres wide; the back should be high enough and set at such an angle as to ensure comfort. There should be no crevices which cannot be readily cleaned and provision should be made for security in rough sea conditions. It may be found advantageous to arrange for the back of the chair to be detachable. A bed spread or cover should be provided for the bed if an easy chair is provided in lieu of a settee.

2.19.6 Sidescuttle or window curtains should be such as to ensure a suitable standard of 'black out' when closed and be provided with means for securing them in the open position clear of the glass.

2.19.7 The mirror and cabinet for toilet requisites may be combined for the purpose of compliance with the Regulations.

2.20 Mess Rooms

See Regulation 22 noting that:

2.20.1 As far as the MCA is concerned any one of the mess room arrangements permitted by the Regulations is acceptable and hence the choice of which scheme should be used is a matter for the builder and/or the owner to decide.

2.20.2 In determining the minimum total area of mess rooms the number of persons likely to use the room at any one time should be taken to be:-

2.20.2.1 where no separate recreation room is provided the total complement entitled to use the mess room; or

2.20.2.2 where a separate recreation room is provided at least two thirds of the total complement entitled to use the mess room.

2.20.3 It is realised that in passenger ships in certain cases it will be impracticable to adopt these standards. In such a case and provided the owner is prepared to serve all meals at more than one sitting the number of persons likely to use the room at any one time may be taken to be:-

2.20.3.1 where no separate recreation room is provided at least one-half the total complement entitled to use the mess room; or

2.20.3.2 where a separate recreation room is provided at least one-third the total complement entitled to use the mess room.

2.20.4 In deriving the floor area of a mess room space occupied by tables, chairs, sideboards and other furniture should be included in the area but spaces which by reason of their small size or irregular shape cannot accommodate furniture and do not contribute to the area available for free movement should not be included. The space occupied by frame chocks and the space between frame brackets, if it is not covered or occupied by fixed furniture and is not available for free movement, should not be included in the area. If the sides tumble home, a vertical line which meets the side at a height of 1.98 metres above the floor is to be the outer boundary of the measurement, the "side" being either the framing, lining or other structural material as the case may be.

2.20.5 Duty mess rooms may be provided for officers and ratings subject to there being no reduction in area of the principal mess rooms required by the Regulation.

2.21 Furniture and Fittings in Mess Rooms

See Regulation 23 noting that:

2.21.1 In determining the minimum number of seats required the number of persons likely to use the room at any one time should be taken to be the same as that outlined in paragraph 2.20.2.

2.21.2 A hot press (or its equivalent) is to be an item of equipment designed to keep food that has already been cooked in a hot condition and ready for eating; it should not be capable of cooking food.

2.21.3 No objection is raised to the provision of coffee-making machines or apparatus; however, means for boiling water for making tea should also be provided, therefore hot water boilers should normally be fitted. In ships with a small complement, an electric kettle or kettles of suitable capacity are acceptable.

2.22 Recreational Spaces

See Regulation 24 noting that:

2.22.1 Where the size or service of a ship or the number of crew justify, consideration should be given to providing recreation rooms separate from the mess.

2.22.2 Where no separate recreation room is provided, it is recommended that a separate portion of the mess room be set aside for recreational purposes and furnished with settees, easy chairs and occasional tables.

2.22.3 Recreation or mess rooms should also incorporate suitable game playing facilities, unless these are provided in other agreed spaces.

2.22.4 Although separate spaces for film and television facilities are preferable officers' and ratings' recreation or mess rooms may be used for this purpose.

2.23 Offices

See Regulation 25 noting that:

2.23.1 The offices specified should not be combined with any other space and should be suitably equipped and furnished compatible with their function.

2.23.2 Additional offices for the master, chief steward and seafarers' organisations representatives etc. may also be provided.

2.23.3 Offices should, wherever practicable, not be sited adjacent to or near sleeping rooms other than that of the user.

2.24 Sanitary Accommodation

See Regulation 26 noting that:

2.24.1 General

2.24.1.1 Normally wash basins will be made of vitreous china and baths of vitreous enamelled iron or coated pressed steel. However, no objection will be raised to the use of other materials, such as plastic, provided the material satisfies the requirements of Regulation 26(11)(a), the surveyor is satisfied that they are sufficiently robust for their purpose and that relevant notices or advice are provided on board for the reference of the crew, detailing recommended cleaning methods.

2.24.1.2 It is recommended that wash basins and baths be fitted with suitable overflow arrangements. The tap outlets should be at least 25 millimetres higher than the rim of wash basins or baths.

2.24.1.3 Taps which provide other than fresh water should be labelled accordingly.

2.24.1.4 In a space containing a fixed bath or shower there should be no socket or provision for the connection of portable electrical appliances except for low voltage (50 volts AC with a maximum voltage of 30 volts to earth or 50 volts DC) units. An exception to the above is a shower electrical supply socket complying with the relevant standards. In general all switches or other means of control or adjustment of electrical apparatus

should be so situated as to be normally inaccessible to a person using a fixed bath or shower and should be of watertight construction.

2.24.2 Baths

2.24.2.1 Should be at least 1.35 metres internal length except when fitted supplementary to a shower in which case they may be shorter.

2.24.2.2 Should be rigidly fixed to prevent movement in a seaway and should not rely solely on fixation by the plumbing arrangements.

2.24.2.3 Where baths are provided with showers the mixing valves for the showers should meet the requirements specified in paragraph 2.24.3 below. In such cases the surveyor should ensure that the hot water being supplied to the bath is independent of the shower mixing valve so that the temperature of the hot water for the bath can comply with the requirement of the relevant Regulations.

2.24.3 Showers

See Regulation 26(15) noting that:

2.24.3.1 Mixing valves which are not of the thermostatic type should be provided with arrangements such that the supply of hot and cold may be adjusted on completion so that the temperature requirement of the Regulations can be met. Such arrangements should not consist of taps and should be such that once set they cannot be readily tampered with by unauthorised persons. Hence adjustment controls should be concealed with covering devices.

2.24.3.2 The surveyor should be satisfied that pressure alterations due to other off-takes do not drastically interfere with temperature settings.

2.24.3.3 Shower spaces provided with mixing valves which are of the thermostatic type should be provided with suitable warning notices advising users against the danger of scalding in the event of failure of the cold water supply.

2.24.3.4 Mixing valves of the thermostatic type must be of an approved type (see Regulation 36(1)(d)).

2.24.3.5 In approving thermostatic anti-scalding mixing valves the MCA or a Nominated Body (see Merchant Shipping Notice No. M.1645) will require manufacturers to:-

- (i) adjust each valve before its dispatch from their works so that the maximum shower water temperature will not exceed 43°C; and

- (ii) provide a copy of instructions for installing, operating and servicing for the retention and reference of the crew on board the ship.

2.24.3.6 Attention is drawn to the different temperature requirements of other mixing valves, see Regulation 26(15)(c)(ii).

2.24.3.7 Screening to shower spaces for the purpose of dressing or undressing will be considered as being large enough provided the dimensions of the screened off space are of the order of 1.52 metres by 750 millimetres including the shower tray. Screening is not required in private or semi-private bathrooms.

2.24.4 *Wash basins*

2.24.4.1 There is no specific capacity requirements for wash basins but the use they are likely to be put to should be considered when agreeing to their size and placement.

2.24.4.2 Should be spaced so as to afford adequate room for washing and, wherever practicable, in communal washplaces be spaced not less than approximately 750 millimetres apart centre to centre. If this is not practicable a smaller spacing may be adopted but the minimum which should be accepted is 550 millimetres. Single basins are preferable to a range but where two or more basins are combined in a single unit, arrangements should be provided to prevent water in one basin splashing over into another.

2.24.5 *Water closets and sewage disposal*

2.24.5.1 *Water closets*

(i) Gravity tanks or enclosed pressure systems supplying flush water to water closets should be filled by a designated sanitary pump on ships with power driven pumps. In very small ships with few crew a hand operated pump may be acceptable for flush water. It is good practice to have cross connection pipes fitted to the sanitary pump with another sea water pump so that in the event of the designated pump breaking down essential flush water can be supplied.

(ii) Service tanks should be fitted with suitable overflows. Their capacity should be commensurate with the size of the installation, and with the arrangements for replenishment.

(iii) Enclosed pressure systems should have automatic controls for the pumps. The reservoir should be of a capacity adequate for peak demands.

(iv) Ships intended for service in very cold climates should have suitable protection against freezing up.

(v) In view of the uses to which sea water is put onboard ships, such as for making fresh water from fresh water generators and/or reverse osmosis plants, sanitary discharges should be situated aft of and on the opposite side of the ship to such sea inlets. In any case sanitary discharges should be sited well below and, as far as possible, from any sea inlet.

(vi) Service pipes from any salt water service tanks or pressure systems should be independent of the wash deck or fire mains but small draw off taps may be provided in the service pipes for washing down floors of washplaces and water closets.

(vii) Water closet pedestals and flushing arrangements should be so designed as to ensure the complete clearance of the bowl and trap. On completion this should be demonstrated to the satisfaction of the surveyor.

(viii) Where fresh water, whether drinking and/or washing, is to be used for flushing water closets arrangements should be made to prevent possible contamination of the water by back-siphonage. Typical arrangements that may be accepted for this purpose, are as follows:

(a) a vacuum breaker should be fitted between the flushing valve and the water closet pan at least 100 millimetres above the rim of the pan; or

(b) a suitable type of cistern should be provided.

(ix) When considering 2.24.5.1 (viii)(b) the surveyor in examining the cisterns should take the following into account:-

(a) it should be of robust construction such that it is suitable for use of ships;

(b) no silencer tube should be fitted but arrangements should be made to diffuse the water entering the cistern;

(c) the normal water level should be at least 50 millimetres below the point of entry of the water;

(d) the over flow should be so positioned within the cistern that if the cistern should fill with water without the cut-off valve operating it would discharge over the weir of the siphon and flow into the water closet pan. Overflow should occur when the water level is approximately halfway between the normal water level and the point of entry;

(e) the cistern should be adequately ventilated in order not to impede rapid discharge when flushing;

- (f) the lid should be adequately secured and sealed;
- (g) the aperture for the operating handle should be watertight against the surging of the water; and
- (h) it should operate satisfactorily with the ship having a list of 15 degrees in either direction with the water level at all times below the inlet.

2.24.5.2 Sewage disposal

- (i) A sewage treatment plant if fitted should be of a type approved by the MCA, based on the standards and test methods developed by the International Maritime Organisation (IMO).
- (ii) A sewage collecting and disinfecting system if fitted should be of a type approved by the MCA based on the standards and test methods developed by the IMO.
- (iii) Relevant IMO guidelines should be used as available in the approval of holding tanks/ disinfecting systems.
- (iv) Where it is proposed to install a sewage plant which uses treated effluent for flushing water closets or is designed with novel features, details should be obtained for consideration prior to installation.
- (v) Sewage tanks, whether they be of the collecting type only or combine collection with treatment, should be sited as far as practicable from fresh water tanks. In no circumstances should they be located above a fresh water tank even though a cofferdam is provided.
- (vi) When a sewage tank is sited in the same compartment as a fresh water tank as sometimes unavoidably happens in the case of passenger ships, the longitudinal separation should be as great as practicable. Where the tanks are sited in close proximity to each other a cofferdam should be provided between them. To prevent possibility of contamination in such a case the access to the fresh water tank should not be in the same compartment as the access to the sewage tank. If this cannot be achieved by suitable siting of access manholes, a trunked water tight access or similar should be provided leading to the fresh water tank.
- (vii) Where water closets are not connected to an approved vacuum discharge pipe system the soil pipes diameter should be taken as the bore of the pipe which should be maintained throughout the length of the pipe except that when main drains are employed the bore of the main drains should be suitably increased in zones commensurate with providing efficient and effective drainage. Soil pipes should have a continuous fall to the discharge. Alternatively, other arrangements

should be provided to ensure that the water closet will function effectively, even if the ship has a list or trim of 10 degrees. They should be suitably ventilated to prevent blow backs in the accommodation, see also paragraph 2.14 above.

2.24.5.3 Testing

On completion the surveyor should test hot and cold water supplies to wash basins, baths and showers and in particular be satisfied that the temperature requirements of the Regulations can be met. Water closets and the sewage disposal system should also be tested to ensure that they function correctly and in accordance with any relevant conditions of approval; for example vacuum sewage systems are type approved.

2.25 Supply of Drinking and Fresh Water

See Regulation 27 noting that:

2.25.1 General

Distinctions between the drinking and fresh washing water with reference to the water quality desired, having regard to all types of dangerous water borne bacteria, are now non-existent. Most dangerous bacteria in water affecting humans are ingested in drinking water but, significantly, legionella bacteria can gain entry to the respiratory system from water suspended in air in the form of a fine mist created by shower, tap sprays etc. Whenever possible the fresh water systems should be independent of any other services, for example engine room systems, and it is important that the design, construction and materials used facilitate cleaning and minimise the risks of contamination.

2.25.2 Fittings and accessories

All fittings and accessories used in the construction of ships' freshwater plumbing systems should be of a type which do not leach out toxic constituents or provide a habitat for bacteria which can occur in the case of natural rubber, various plastics, and fibre accessories. It is required therefore in line with the policy adopted by all shore side Water Authorities in the United Kingdom (under the United Kingdom Water Fittings Bylaws Scheme), that all materials used in freshwater systems should be attested. These are listed in the current edition of the Water Fittings and Materials Directory (revised annually) prepared by the Water Research Centre, Henley Road, Medmenham, Marlow, Bucks SL7 2HD. Such materials would include: pumps, valves, 'o' rings, seatings, compounds, pipes, shower mixers, taps, calorifiers and all other sundry items. When a vessel is constructed or refitted abroad, fittings or materials validated by a local material agency to be of an equivalent standard may be acceptable, given that suitable documentary attestation is available.

2.25.3 Storage tanks

2.25.3.1 Capacity

Regulation 27(2) requires the fresh water tanks to have at least a two day capacity for all crew.

A suitable capacity for fresh water storage tanks can be calculated as follows:-

- (i) for drinking water allow not less than 18 litres for each member of the crew for each day likely to elapse between successive replenishments of water;
- (ii) similarly for washing water allow not less than 72 litres per day between replenishments for each member of the crew;
- (iii) noting the common standard of fresh water required for domestic purposes, see paragraph 2.25.1 above, tanks for drinking and washing water may be combined to produce a capacity of 90 litres per person per day. Consideration should be given to increasing these figures for ships operating in the Tropics;
- (iv) in ships over 1000 tons chilled drinking water points should be available, see Regulation 27(5). The bridge, engine room, and crew mess rooms are positions that would meet the "readily available" criteria of the Regulation;
- (v) any plant used on board to produce drinking water and/or fresh water must be of an approved type; and
- (vi) where plant producing fresh water is provided on board so allowing the storage capacity to be reduced, the capacity of tanks is still required to be sufficient for at least two days.

2.25.3.2 Siting

- (i) Tanks intended for domestic fresh water should normally be sited above the inner bottom and independent of the hull but tanks other than peak tanks (which are difficult to clean) not independent of the hull may be utilised if they are of all welded construction and suitable in all other respects. All fresh water tanks should be so sited and be of such dimensions that they are readily accessible to facilitate inspection, cleaning and coating.
- (ii) Where it is necessary to use double bottom tanks they should not be less than 900 millimetres depth and be arranged to facilitate inspection, cleaning and coating. In ships with only one fresh water storage tank sited in the double bottom an alternative reserve drinking water tank should be provided for use in an emergency.

(iii) In ships of less than 2,500 gross tons where the use of an aft peak tank cannot be avoided particular attention should be given to filling and smoothing the bottom recesses in the tank with cement or other suitable non-toxic composition. Fore peak tanks, which are susceptible to damage and contamination, should not be used.

(iv) WCs, laundries or any other facilities likely to contaminate fresh water should be positioned clear of the crown of fresh water tanks.

(v) No domestic fresh water tank should have a common boundary with any tank used other than for fresh or salt clean water ballast.

(vi) Manhole accesses should be of adequate size, sited clear of possible sources of contamination and where sited in tank crowns should be fitted with raised coamings.

2.25.3.3 Construction

(i) The internal structure of all fresh water tanks should be designed to ensure efficient drainage through adequate limber holes to the suction. Continuous welding should be used throughout the tank construction.

(ii) When new or on completion of repairs in an existing ship a pressure test of all freshwater tanks boundaries including the outer shell of the ship where this applies, should be conducted to ensure that there is no seepage into the fresh water tanks from the sea or adjacent water ballast tanks.

(iii) No piping other than piping containing fresh water of the same standard should pass through a fresh water tank.

(iv) Air, filling and where practicable sounding pipes, should stand sufficiently high above the deck or tankcrown to prevent fouling. Air pipes should be of the swan neck type fitted with a wire gauge and should be sited in a protected position where the entry of sea water on deck is prevented.

(v) Sight glasses, gauges, or one of the modern hydraulic/electronic systems should be provided where practicable to indicate the water level in the storage tanks in order to avoid as far as possible the use of sounding rods.

2.25.3.4 Coatings

Freshwater tank steel structure when new should be thoroughly wire brushed, scrubbed and primed before coating with cement wash or a proprietary coating system and should be thoroughly aired and dried before filling. When coating systems other than cement wash are used such as epoxy finishes specially developed for fresh water tanks it is essential that

the coatings are applied and allowed to cure strictly in accordance with the manufacturers instructions otherwise the water can subsequently become unfit for use. The manufacturer's advice on filling, flushing and employing fresh water tanks before they are connected to the distribution system should be closely adhered to.

2.25.3.5 Filling arrangements

- (i) Fresh water obtained from shore mains or water barge should be transferred by a hose exclusively used for that purpose. Hoses where carried on board ships should be suitably marked and should be provided with closing caps at each end and should be stowed in a position clear of the deck where they are not subject to contamination.
- (ii) Fresh water producing plants such as low pressure generators or reverse osmosis plants shall be of an approved type.

2.25.4 Disinfection of domestic water systems

2.25.4.1 Where fresh water producing plant is fitted this is commonly achieved by the installation of an automatic chlorination unit in the delivery line between the plant and the storage tank(s). Another accepted means is an approved silver ions discharge unit similarly fitted.

2.25.4.2 It should be particularly noted that since June 1986 ultra violet sterilizer units alone are no longer acceptable in lieu of an automatic means of sterilization involving chemical treatment as described above, although they are accepted as a supplementary treatment system.

2.25.4.3 Shore mains water in the United Kingdom normally contains only a very low concentration of free chlorine and the ship environment decreases this further. In foreign countries there may be no free chlorine content at all. All fresh water taken from shore or water barge should therefore be chlorinated on loading. Chlorination may be achieved by the traditional manual method using the revised formulae given in the Ship Captain's Medical Guide or by using an automatic chlorination unit in the ship's deck filling line.

2.25.4.4 Disinfection of shipboard domestic water, and the associated system, using chlorine, should be such that a residual free chlorine concentration at all outlets of 0.2 ppm is achieved. The concentration may be checked by means of a Lovibond comparator kit.

2.25.4.5 Where other means of disinfection are proposed the procedures are to be approved by the MCA.

2.25.5 Distribution system

2.25.5.1 General

(i) Unless a gravity supply direct from the storage tanks can be obtained at the draw-off points, distribution of water should be achieved by pumps reserved for that purpose. Such pumps should have permanent connections to the service tanks, which should be fitted with overflows led back to the storage tanks.

(ii) Where service tanks are fitted they should be of a size sufficient to meet peak demands and adequate for the capacity and method of operating the pumps.

(iii) Alternative pumping arrangements should be made in the event of a breakdown of a power pump and such reserve pump may, in smaller systems be a self-priming hand operating pump.

(iv) Where an enclosed pressure system is employed, suitable arrangements should be made for pumping by power in the event of breakdown. The reservoirs or pressure tanks should be of a size adequate for peak demands.

(v) Where compressed air supply is fitted to a reservoir or pressure tank the air supply line should be entirely separate from that provided for any other purpose and a screw down non-return valve should be arranged in the line.

(vi) A non-return valve should be fitted in the delivery line from the pressure tank to the hot fresh water system where this service is shared.

2.25.5.2 *Calorifiers*

(i) These should be designed to avoid stagnant zones forming and should be fitted with efficient connections at the lowest point of the unit to ensure that all loose scale, or sludge can be completely drained off after cleaning and maintenance. In addition adequate access should be provided to enable scale deposits or products of corrosion to be removed and cleaning to be facilitated.

(ii) Should be so sited as to minimise discomfort to the crew. Calorifiers and boilers should either be vented to the open air or provided with a safety valve adjusted to suit the working pressure except that ships operating in cold climates where the water might freeze if a vent pipe was fitted should be provided with a safety valve or equivalent means for limiting pressure.

(iii) Suitable alternative arrangements should be made to ensure that when in port, the supply of hot fresh water can be maintained. Where hot water is supplied in association with a central heating plant, the water for washing purposes should be drawn from an individual cylinder, or calorifier, and the size of the heating boiler should be suitably increased.

2.25.5.3 Piping

- (i) Hot and cold water pipes should be kept sufficiently separated or be adequately insulated to prevent transfer of heat from hot to cold lines. The distribution system should be designed to provide constant circulation of the systems and to avoid deadlegs.
- (ii) In ships with sleeping accommodation for more than 100 persons it is recommended that a pressure main system with circulation pumps be provided in both hot and cold water lines.
- (iii) Draw off taps which provide water for washing purposes which is not fresh water quality, should be suitably labelled.

2.25.5.4 Corrosion and scale inhibitors

It is often the practice to add scale or corrosion chemical inhibitors to the main or auxiliary diesel engine fresh jacket cooling water which is used as the heating medium in the case of a low pressure evaporator. As there is a risk of leakage of such water into the distilled side of the evaporator it is required that such inhibitors are of a type which is acceptable to the MCA. Details of such products should be submitted to MCA Headquarters for consideration.

2.25.5.5 Sea suction to fresh water producing plants

- (i) These should be sited forward and on the opposite side of the ship from any bilge or sanitary water discharges. Where this is impracticable they should be sited so that they are in a boundary flow stream in the ship's bottom well clear of that from dirty waste outlets.
- (ii) The fresh water producing plant sea suction should not share an inlet well with sea suction intended for any other purposes other than domestic services noting that chemical injection systems are sometimes installed in seawater inlet wells for machinery. Chemical injection systems are sometimes fitted in the sea inlet wells of main and auxiliary machinery to inhibit the growth of weed or molluscs which would otherwise tend to choke the inflow. Details of any chemicals proposed for use in such systems should be submitted to MCA Headquarters for consideration.

2.26 Facilities for Washing and Drying Clothes and for Hanging Oilskins and Working Clothes

See Regulation 28 noting that:

2.26.1 Washing and drying arrangements

2.26.1.1 Where practicable separate facilities for washing and drying clothes shall be provided for officers and ratings and if a communal laundry is provided a rota system must be implemented. Separate drying facilities for female members of the crew should be provided where practicable.

2.26.1.2 In passenger ships where a laundry is provided principally for dealing with the ships linen this will not be accepted as meeting the requirement of the Regulation and laundry facilities for use by officers and ratings should be provided.

2.26.1.3 Since in most ships laundry equipment will be available for use by every member of the crew, washing machines provided should be of the ordinary domestic type. Suitable instruction on the correct operation should be displayed adjacent to each machine.

2.26.1.4 Drying machines of the type which dry clothes completely shall be of the heated tumbler drier type. Ordinary spin dryers are not accepted as drying clothes completely.

2.26.1.5 Washing and drying machines should be rigidly fixed in position so as to prevent movement in rough weather conditions and prevent movement due to their rotary action.

2.26.1.6 No objection will be raised to the provision of rotary ironing machines provided that ordinary domestic type hand irons and ironing boards are provided in addition for the purpose of compliance with the Regulations.

2.26.1.7 The heating arrangements in drying rooms shall be capable of being controlled independently of the heating of all other spaces in the ship. If electrical heaters are provided they should be of the 'black heat' type, being suitably sited and guarded to prevent clothes coming into contact with the heater.

2.26.2 *Working clothes lockers*

Ventilated compartments or lockers should be provided for hanging oilskins, and these should be separate from those provided for other working clothes. Such compartments/lockers are to be positioned adjacent to the sleeping rooms. It is preferable that individual lockers be provided and allocated to each member of the crew for these purposes but where lack of space prohibits this arrangement no objection will be raised to communal spaces provided these are separate for officers and ratings.

2.27 **Galleys**

See Regulation 29 noting that:

2.27.1 *General*

2.27.1.1 Where a galley is situated on an open deck consideration should be given to the provision of a horizontally divided weather door.

2.27.1.2 If a skylight is provided it should in general be capable of being opened, but if there are grounds for objection to opening lights, fixed lights may be accepted provided there is adequate mechanical supply and exhaust ventilation and suitable natural ventilation. Opening flaps to skylights should be accessible from inside the galley, provided with handy regulating devices and closeable from outside the galley.

2.27.1.3 The provision of ample supply ventilation including spot cooling as necessary and of openings for the outlet of moist warm air should be provided such that over-heating of local areas in the galley is minimised. If the natural ventilation is insufficient to provide sufficient air movement and no other steps are practicable mechanical exhaust ventilation should be fitted to ensure the rapid extraction of heat and fumes and the attainment of reasonable working conditions.

2.27.1.4 Special care should be taken to ensure that electric lighting and supply fittings in the galley are adequate and suitable for their purpose.

2.27.1.5 See Regulation 29(9) reference the requirement that a fresh water hose connection be fitted at a minimum height of 450 millimetre.

2.27.2 *Equipment*

It is realised that the type of equipment, size and function will vary from ship to ship and that many owners will provide a greater variety of equipment. Nevertheless the undermentioned equipment is a basis on which a galley should be equipped:-

2.27.2.1 a dresser of ample size with a hardwood top, drawers and an open front cupboard under which should be fitted portable shelves. One shelf for cook's condiments, etc. over the dresser;

2.27.2.2 a dresser with a stainless steel top having a sink of such dimensions as will allow the preparation of food and washing up of crockery and cooking utensils. The bottom of the sink should have rounded corners. Portable sparred shelves should be fitted under the dresser and a shelf or rack for washing-up liquids etc. above. The waste pipe from the sink should be of adequate diameter and should lead through a sludge box on the galley floor. Where considered necessary a portable sludge strainer should be fitted over the drain in the sink;

2.27.2.3 a baking board and a dough trough with filleted corners inside and hinged top made of hardwood or heavily tinned or rust-proof metal or glazed fireclay. A proving cupboard of capacity sufficient for the amount of bread required by the ship's complement except that in small ships where

proving can adequately be carried out in front of the galley range a proving cupboard need not be provided;

2.27.2.4 a hinged or portable serving table, if dresser space is inconveniently placed or insufficient for serving purposes;

2.27.2.5 a seat, which may be hinged if necessary for better access;

2.27.2.6 a small stool;

2.27.2.7 a clock of the enclosed bulkhead type fixed to a bulkhead;

2.27.2.8 metal shelves with storm rails fitted at a convenient height above the deck over dressers;

2.27.2.9 a steam or electrically heated drinking water boiler of adequate capacity fitted over the galley sink, with a lid, a gauge glass, a draw off tap and an overflow pipe led into the sink. The boiler should be mounted such that the adjacent areas can be readily kept clean;

2.27.2.10 drinking water should be led from the drinking water system to a position over the hot water boiler with a tap for filling. Spring-loaded, or where an owner requires, screw-down, hot fresh and cold drinking water non-concussive taps should be fitted over the sink. There should be an ample supply of fresh hot water for washing up purposes;

2.27.2.11 an independent steamer of adequate size fitted with necessary trays. The use of a perforated steam coil supplied by steam direct from the ship's boiler or any other fitting using ordinary boiler steam which comes in contact with food is not permitted;

2.27.2.12 a steel cupboard, full height if possible with portable shelves;

2.27.2.13 unless meat and similar stores are provided pre-prepared a heavy portable chopping and cutting board in addition to a chopping block near the refrigerated storeroom;

2.27.2.14 panracks of metal bars fitted close to the range but not above it;

2.27.2.15 adequate arrangement for heating plates;

2.27.2.16 where space does not permit the fitting of separate dressers outlined in paragraphs 2.27.2.1 and 2.27.2.2 above they may be combined in one unit provided that the sink and surround are of stainless steel;

2.27.2.17 the metal parts of the dressers and any cupboards clear of the wash-up sink and surround may be heavily galvanised;

2.27.2.18 where the bottom of dressers and any cupboards are not flush with the deck, a clearance of at least 300 millimetres should be provided in order to facilitate cleaning; and

2.27.2.19 the equipment for baking is best kept in a separate compartment if space permits, otherwise it should be on one side of the galley to promote cleanliness.

2.27.3 Detailed requirements

2.27.3.1 General

(i) Every galley shall be provided with one or more cooking appliances, usually fitted transversely, and as a general guide where the galley is for a traditional type of cooking then approximately one oven will be required per 20 persons, two ovens for 20-60 persons, and three ovens for more than 60 persons.

(ii) An area of top-plate or boiling plate should be provided.

2.27.3.2 Capacities and areas

The following figures are given for guidance:-

(i) Oven(s) for combined roasting and baking in galleys intended to serve:-

(a) no more than 60 persons, 0.007 cubic metres per person;
or

(b) more than 60 persons, 0.0056 cubic metres per person subject to a minimum of 0.42 cubic metres and 0.022 square metres shelf area subject to a minimum of 1.8 square metres.

(ii) For roasting only:

(a) when the total complement served by the galley is more than 60 but less than 121, 0.0028 cubic metres should be allowed for every member of the total complement, subject to a minimum of 0.21 cubic metres;

(b) when the total complement served by the galley is more than 120 but less than 400, 0.0023 cubic metres should be allowed for every member of the total complement; or

(c) when the total complement served by the galley is 400 or over, 0.0018 cubic metres should be allowed for every member of the total complement.

(iii) Baking only: 0.015 square metres per person of shelf area but a small figure will be accepted in passenger ships if the staffing arrangements permit more than one baking a day; when separate provision is made for baking, a reasonable reduction will be allowed in the size of range top plates or boiling table provided there is independent boiling or steaming apparatus.

(iv) In cases where the crew do not generally eat food roasted or baked in ovens, the ranges provided for their use need not be fitted with ovens. The area of the top plate or boiling table should, however, be maintained.

2.27.3.3 Note

(i) The term 'top plate' and 'boiling table area' refers to the whole area of the top of the cooking appliances.

(ii) The oven(s) and the boiling table may be separate appliances where this is desired.

(iii) There should be ample clear space in front of the cooking appliance to provide a clear passage of at least 900 millimetres when the oven doors are fully open.

(iv) Electric cooking appliances should have switches which will permit the amount of heat to be varied. The size and disposition of the heating elements should ensure that adequate heat is available on demand.

(v) Where an oil fired cooking appliance is provided special precautions may be necessary in connection with the heating arrangements in the fuel system. The fuel tank, filling, venting and the overflow from the fuel tank should be situated outside the galley and it should be possible to shut off the supply of fuel from the weather deck or other safe position outside the galley. Reference should also be made to the relevant Merchant Shipping (Fire Protection) Regulations.

(vi) Where a cooking appliance is provided using liquefied petroleum gas as fuel the arrangements should comply with the requirements specified in the latest relevant standards.

2.27.4 Exceptions

In those ships where the cooking facilities, if provided in accordance with above, would be inappropriate having regard to the distinctive national habits and customs of the crew, there shall be provided agreed alternative facilities.

2.27.5 Microwave ovens

2.27.5.1 These may be provided and when fitted in galleys the MCA may be prepared to vary the requirements in respect of cooking appliances. If fitted in pantries or messes there will be no reduction in the requirements with regard to the galley.

2.27.5.2 Where micro-wave ovens are provided the following should apply:-

- (i) they should comply with the latest relevant standards;
- (ii) they should be suitable for the maximum ambient temperature which will be encountered in the spaces in which they are to be fitted;
- (iii) they should be fitted with a thermal protective device arranged to interrupt the supply to the oven in the event of overheating, for example, should a timer failure occur;
- (iv) a permanent notice should be displayed at each micro-wave oven to the effect that the machine must never be operated if the door interlock is inoperative, the door is damaged or ill fitting or the door seals are damaged; and
- (v) they should be tested periodically for radiation leakage in service to ensure that the leakage levels do not exceed those allowed by the standards referred to in sub-paragraph (i) above. Such tests should be carried out by a person having the necessary specialist knowledge and equipment.

2.28 Dry Provision Store Rooms

See Regulation 30 noting that:

2.28.1 Internal access to store rooms should be convenient to the galley. Shelves and other fittings should be so arranged as to avoid or minimise the lodgement of dust and vermin and to facilitate cleaning. Shelves should be of sparring of moderate width or of galvanised steel or other suitable material. Portable securing battens are preferable to fixed front ledges. The width of the shelves and the height between them should not be excessive so that all parts of the shelves are readily accessible.

2.28.2 Racks should be large enough to take all the stores, leaving the floor clear for access and handling. Sufficient space for cleaning should be allowed between lower shelves or racks and the floor. Provisions should not be stowed against exposed steel bulkheads or ship's side.

2.28.3 Circular galvanised removable bins with lids are preferable to fixed rectangular bins for cereals and they should be fitted conveniently for inspection and secured in place by removal bars.

2.28.4 Where provision is made for hanging sides of bacon in the dry store room a rigid bar slotted or holed for hooks at intervals not exceeding 300 millimetres should be fitted.

2.28.5 Stores which are likely to deteriorate, such as flour in bags, should be carried in fixed racks set 300 millimetres above the floor. In order to facilitate cleaning and inspection floor gratings should not be fitted. Where flour is carried in barrels there should be ample clearance from racks or shelves above so as to allow for easy storage and removal of barrels.

2.28.6 Where access to a dry provision store room is by means of a hatch and stairway a lifting appliance should be fitted over the hatchway for storing the ship. Side boards which may be made to slip over the stairs should be fitted to minimise damage to stores by the stair treads when storing the ship.

2.28.7 Precautions should be taken to prevent possible theft from store rooms by the provision of suitable padlocks for all solid and grating doors and hatch covers and by fitting closely spaced steel bars across the outside of sidescuttles and windows.

2.28.8 Whenever practicable store rooms should be sited clear of heat producing spaces such as engine rooms, engine casings, boiler rooms and cargo or fuel oil tanks fitted with heating coils. Where this is not practicable the division between the store room and the heat producing space should be adequately insulated as follows:

2.28.8.1 Floor coverings

The steel deck forming the floor of the dry store room should be insulated with a suitable material and the top surface of the insulation provided with a suitable deck covering such that the combined insulation and covering will withstand the heavy usage associated with the transference of stores. Where the floor is situated over the propulsion machinery spaces the underside of the deck should be insulated with non-combustible material, and lined with galvanised sheet metal or other suitable non-combustible material. Where such linings have perforations, oil impervious membranes should be fitted on the face of the insulation. Where a store room adjoins the propulsion machinery spaces the upper side of the steel floor should be suitably insulated for a distance equal to approximately one beam space from the dividing bulkhead or casing.

2.28.8.2 Boundary bulkheads

Where adjoining the propulsion machinery spaces, boundary bulkheads should be insulated with suitable non-combustible material on the dry store side and lined with plywood, hardwood or other durable material on grounds. A pad of non-combustible insulation should be fitted between the grounds and the steel work of the bulkhead.

2.28.8.3 Overhead deck

The overhead deck in a storeroom, where connected to propulsion machinery casing or bulkheads should be suitably insulated for a distance equal to approximately one beam space from the casing or bulkhead.

2.28.8.4 Materials

Organic foam materials should not be used as insulating media in store rooms.

2.28.9 Steam pipes should not pass through provision store rooms.

2.28.10 Boundaries of dry provision store rooms exposed to the weather or sea in the case of a ship operating outside home trade limits or adjoining a refrigerated space in any ship should be suitably lined or insulated. The only exception to this might be where air conditioning is provided.

2.28.11 Where linings are provided they should be of suitable materials and the surface should be hard and without crevices. Seams and butts should be adequately and effectively sealed. Tongued and grooved wood should not be used for linings.

2.28.12 Guidance on mechanical ventilation is given in paragraph 2.12.3. Natural ventilation in vessels not provided with mechanical ventilation should provide an area of at least $6.83V$ square centimetres supply and the same exhaust, where V is the volume of the store in cubic metres. At least one of the natural ventilators should have a cowl head and should be led down to near floor level. The exhaust ventilator should have local means of regulation and the air supply should be suitably diffused in order to avoid excessive drying of the stores exposed to a direct jet of air at a relatively high speed.

2.28.13 Particular care should be taken to ensure that the ventilation of the store rooms is adequate but in the case of a bonded store the security necessary for customs purposes should not be impaired. Attention is drawn to the remarks given in paragraph 3.2 of these Instructions ratproofing of stores.

2.28.14 If storerooms are served from an air-conditioning system, agreed temperature and humidity control and monitoring will be required.

2.29 Cold Store Rooms and Refrigerating Equipment

See Regulation 31 noting that:

2.29.1 General

Each insulated room should have a separate electric light of robust construction with an outside switch and a pilot light. A watertight switch or push button should be fitted in each room for use in the event of a person being inadvertently locked in the cold chambers and it should be connected up

to an alarm gong sited in the crew's living quarters so that it may attract immediate attention. The alarm gong should be suitably marked to show its purpose. The switches or buttons should be situated near the side of the doorways and should be distinguishable in the dark. In addition a red light outside the chamber should be included in the lighting circuit of the cold chambers with a watertight switch in the handling room controlling the circuit as well as the outside switch or switches. Means should be provided for releasing the door fastenings from the inside of every cold room.

2.29.2 Alternative arrangements

Deep freezers and refrigerators can be considered suitable for the purpose of providing adequate alternative cold storage arrangements; in such cases the following should apply:

2.29.2.1 the size and number of deep freezers and refrigerators should be compatible with the period likely to elapse between successive replenishments of stores, and the number of crew, and shall be such that the risk of total loss of use is minimised;

2.29.2.2 refrigerators should be used for the storage of ready use stores, butter, cheese, eggs etc.;

2.29.2.3 deep freezers and refrigerators should be suitably sited, where practicable for reasons of hygiene, in a separate compartment solely used for that purpose;

2.29.2.4 all meat would require to be delivered to the ship as prepared joints and not in carcass form; and

2.29.2.5 all matters of detail such as ventilation, insulation having regard to the siting of the units, deck coverings, means of keeping the compartment clean, access and means of transporting food to the galley should be to the satisfaction of the surveyor.

2.29.3 Purpose-built rooms

2.29.3.1 General

(i) Purpose-built cold store rooms will be regarded as adequate if they provide:-

(a) a meat room with a capacity of 0.17 cubic metres per man per month;

(b) a vegetable room with a capacity of 0.113 cubic metres per man per month; and

(c) whenever practicable a handling room should be provided; alternatively the capacity of the vegetable room should be increased to 0.14 cubic metres per man per month.

(ii) With regard to Regulation 31(6), with the machinery working not more than 12 hours a day the refrigerating equipment should be capable of maintaining a maximum temperature in a cold store room of:-

(a) -10°C in a store room intended to be used only for the storage of meat;

(b) -18°C in a store room intended to be used for deep frozen foods, or for the storage of meat and deep frozen foods; and

(c) 7°C in a store room intended to be used for the storage of fresh vegetables.

(iii) Where grids are used for cooling they should be well distributed over the boundaries in order to promote economy in refrigeration and uniformity of temperature. Meat rooms should have grids overhead in addition to grids on the walls and should have thermostatic control so that the machine will cut in at the maximum permitted temperatures. If roof grids cannot be fitted in a meat room exceeding 10 cubic metres capacity, then either:-

(a) an air circulating fan should be installed to promote uniformity of temperature; or

(b) the thermostat should be so positioned and set as to ensure that the maximum permitted temperature is not exceeded.

Failing the above, the thermostat should be set so that the machine will cut in at a temperature of at least 2°C less than the maximum permitted temperature.

(iv) Proper arrangements should be made for hanging meat in the meat room, and for thawing it out after removal. A metal bar with hooks and a drip tray underneath is recommended. A chopping block of vertical grained wood should be provided in a convenient position. If practicable shelves should be fitted in the handling room for 'ready use' purposes; if there is no handling room they should be fitted in the vegetable room or a thermostatically controlled refrigerated cupboard in the galley.

(v) Vegetable rooms exceeding 7 cubic metres capacity should preferably be air cooled by single bulkhead cooling battery and an ordinary 200 millimetre to 300 millimetre propeller type fan. A separate thermostat should be provided in the vegetable room.

(vi) With regard to Regulation 31(5)(b), cold store rooms should be adequately ventilated by at least two ventilators to the open air, one of which should be fitted with an exhaust fan with its inlet near the bottom of the space.

2.29.3.2 Insulation

(i) The boundary bulkheads, divisional bulkheads, floors and overhead decks of the cold rooms should be suitably insulated to maintain the temperature specified for the proper storage of food in conjunction with the design of the ventilation/air-conditioning plant. Where adjacent spaces have a high fire risk rating, for example machinery spaces, the insulating medium should be of acceptable non-flammable material.

(ii) Where it is proposed to use organic foam materials as the insulation medium, cold store rooms should be located as far as practicable from other accommodation spaces and should be separated therefrom by steel gastight bulkheads. Doors giving direct access from cold store room areas to other accommodation spaces should be of steel, gastight and self closing. Notices suitably positioned shall indicate 'POLYURETHANE FOAM. NO BURNING OR WELDING WITHOUT PERMISSION'. Bulkheads dividing other accommodation spaces or propulsion machinery spaces from cold store rooms should have fire insulation fitted on the accommodation or propulsion machinery boundaries to A60 standard. If the cold store rooms are sited over propulsion machinery spaces the underside of the deck should be insulated to A60 standard. The organic foam insulation should be covered within the cold store rooms by a non-combustible material e.g. stainless steel at least 1.0 millimetre thick or aluminium at least 1.6 millimetres thick.

2.29.3.3 Structure

(i) Grounds should be of timber 50 millimetres thick, bolted at 900 millimetres intervals to stiffeners, beams or lugs. Where no stiffeners are fitted the grounds should be spaced approximately 750 millimetres apart. Grounds for division bulkheads should be spaced 450 millimetres apart.

(ii) The most satisfactory and hygienic lining is galvanised sheet steel or aluminium alloy but alternative materials may be fitted provided they have a hard face and are sufficiently robust to withstand usage associated with cold store rooms. Linings should be adequately secured to the grounds and if nails are used for this purpose they should be galvanised. Care should be taken to insulate linings from the ship's steelwork by fitting, where necessary, suitable insulation between the steelwork and the linings.

(iii) The insulation on the floor of the cold store rooms should be covered with a suitable deck covering so that together with the materials used for the construction of the floor they will withstand the heavy usage associated with the storage and transference of provisions.

(iv) Strong battens or gratings of suitable material should be fitted over the whole of the floors. They should be of simple construction and if of whitewood be formed of 50 millimetre x 50 millimetre runners overlaid with 75 millimetre x 25 millimetre boards, in convenient portable sections, with a 25 millimetre gap between boards.

2.29.3.4 Doors

(i) Doors should preferably not be of the plug type but should have a full 3 millimetre clearance all round so as not to jam. They should rely for tightness on the facing action of a felt strip at least 6 millimetres thick, or preferably, a spongy round gasket about 13 millimetres in diameter secured round the outside edge of the top sides of the door and, in the case of meat and vegetable room doors, an additional strip or gasket secured to a rebate on the door frame, the doorway frame being rebated to suit. A large size gasket wiper should be fitted to the bottom of the door.

(ii) Should be as light in weight as possible to facilitate opening and closing. Devices should be provided so that when closed pressure may be exerted on the gaskets.

(iii) Where a handling room is provided the outside door to such a room should be quick acting and fitted with substantial slam type fasteners with wedge action.

(iv) Hinges and other door fittings should be through fastened and doors should be capable of being opened from both sides.

2.29.3.5 Scuppers

A 65 millimetre trapped scupper should, where practicable, be led from each cold room either overboard or into the bilge or a 50 millimetre drain fitted through the divisional bulkheads to permit free draining to a 65 millimetre scupper in the meat room. A small suction pump will be accepted as an alternative. Each scupper pipe should be fitted with a grating and a swivelled plate cover for closing. On the inside of the cold rooms a wood plug should be fitted to each drain tube.

2.29.3.6 Temperature indication

A dial type thermometer should where possible be placed in each room to indicate the temperature in a particular position (e.g. at the centre of the meat room). Alternatively, a thermometer tube with a screwed cap should

be fitted in each room. A thermometer should be supplied for each tube together with 6 spare thermometers.

2.29.3.7 Shelving and battens

(i) White wood vertical sparring or dunnage battens, 50 millimetres x 50 millimetres, with chamfered out edges, should be fitted approximately 370 millimetres apart on the bulkheads of the meat room clear of refrigeration pipes and shelving. Vertical battens, 25 millimetres x 25 millimetres, should be fitted approximately 370 millimetres apart from floor to ceiling in the vegetable room on the inside linings of the boundary bulkheads.

(ii) Shelving and battens should be varnished before erection.

2.30 Hospitals

See Regulation 32 noting that:

2.30.1 In passenger ships provided with a hospital complex which includes wards for passengers and crew, note that sanitary accommodation for the exclusive use of the crew must be provided as specified in Regulation 32(23). When an operating theatre, consulting room, bathroom, etc. are provided it is recommended that the owners and/or builders request the service of a medical practitioner with reference to the design of the facilities.

2.30.2 In cases where paragraph 2.30.1 above applies, special pantry facilities should be provided for the hospital. These should include a hot water boiler, domestic refrigerator, dresser, sink and cold drinking water. Alternatively, the hospital should be so sited that the serving of hot food and drink can be conveniently arranged.

2.30.3 The interior finish of the bulkheads of the hospital ward should be light and restful in colour.

2.30.4 The portable electric lamp required by Regulation 32(13) should be provided with such accessories as are necessary for its practical use.

2.30.5 In ships in which the Regulations do not require a permanent hospital see Regulation 32(2), but require the provision of a temporary hospital the owner's or pilot's room, if any, can be considered for use as a temporary hospital if required. If a spare room can be provided only by reducing the size of the crew accommodation, arrangements might be made for one sleeping room to be fitted with a spare bed to be used in an emergency by the occupant of a single berth room which would then be used as a temporary hospital.

2.30.6 Attention is drawn to Regulation 32(9) with regard to the provision of electric fans, and to paragraph 2.12.2.9 of these Instructions in this respect.

2.31 Medical Cabinet

See Regulation 33 noting that:

2.31.1 A suitably equipped dispensary will be acceptable in place of the medical cabinet required by the Regulations.

2.31.2 In no circumstances should the medical cabinet be sited in the hospital ward(s). It should be sited in a passageway adjacent to the hospital or other suitable place. Many modern medicines have limits regarding storage temperature so careful siting of the cabinet with regard to ventilation is important.

2.31.3 The Merchant Shipping and Fishing Vessels (Medical Stores) Regulations 1995 require vessels carrying medical stores category A and B to have on board a copy of the Ship Captain's Medical Guide. Unless a ship has a duly qualified doctor or qualified nurse on board or the medical cabinet is under the supervision of the master it is recommended that the Medical Guide be carried in the medical cabinet and provision should therefore be made for its storage.

2.31.4 Ventilation of the medical cabinet will be considered as being suitable if holes (1 centimetre diameter) protected by fine gauze are provided in the top of the outer door.

2.32 Protection from Mosquitoes

See Regulation 34 noting that:

2.32.1 Screens, when fitted, should fit tightly and be provided with a positive means of security. In the case of sidescuttle openings the foregoing requirements would be satisfied by fitting metal lugs on the edge of the screen frame to engage with the toggle bolts which are provided for securing the glass holder, together with a light clip at the appropriate point to fit behind the hinge of the glass part. The clip can be used for hanging the screen adjacent to the sidescuttle when not in use. The screen frame should be rebated so that the full clamping effect of the bolts can be obtained and it should fit snugly on the ridge around the inside edge of the sidescuttle rim.

2.32.2 All natural ventilators should have either a framed shutter, hinged or sliding, or a suitable gauze, positively secured in place, or a box fastened to the underside of the deck with gauze sides and a trap door at the bottom for cleaning purposes.

2.32.3 The area of the screen should be large enough to compensate for the ventilation area lost on account of the wire mesh of the protective gauze. The arrangement in addition to allowing for cleaning the gauze should permit the full area of the ventilator to be available when the gauze is not required.

2.32.4 Screen doors or panels should be fitted to the doorways of all doors to crew accommodation spaces, unless they are fitted to the doorways of the passageways leading to the open air.

2.32.5 Screened doors fitted in passageways leading to the open air should be self closing.

2.32.6.1 Where metal screens are used, the metal should be copper, bronze or monel metal, the last two being more resistant to sea atmosphere than copper. Wire of either 28 SWG (0.375 millimetres diameter) or 30 SWG (0.314 millimetres diameter) is recommended and the apertures of the gauze should be 1.219 millimetres, this combination giving approximately 6 apertures to the centimetre.