

placed, and so connected that all voltage may thereby be cut off from the motor and all apparatus including any automatic circuit-breaker used therewith.

(c) The means of isolation referred to in subclause 5(b) of this clause may be the fuses in each live pole or phase, provided they are so arranged that they can be readily and safely removed.

(d) Means for the automatic disconnecting of the supply in the event of current becoming excessive owing to mechanical overloading of the motor.

(e) When fuses are employed to protect polyphase motor circuits, means shall be provided to open the circuit automatically if the current in any phase becomes excessive owing to the interruption of only one phase by the blowing of a fuse.

(6) Emergency-stop control for motor-driven fuel oil pressure pumps and power ventilation systems shall be provided at a readily accessible point outside the compartment in which the pump or fan is situated. This requirement does not apply to small fans connected to the lighting circuits.

**41. Heating and Cooking Appliances—**(1) The heating elements of heating appliances shall be suitably guarded. The protecting guards shall be strong enough to resist being forced against any current-carrying part. The openings shall be of small size to prevent the heating elements from being short circuited or damaged by accident.

(2) Every heating and cooking appliance, whether portable or fixed, shall be controlled locally by a fixed switch, and where a socket outlet is provided it shall be connected between the switch and the appliance.

(3) All portable heating and cooking appliances shall be of such shape or so weighted that they cannot easily be overturned and suitable stowage positions shall be provided for them.

(4) Heaters shall be so constructed, installed, and protected that clothing, bedding, curtains, or other flammable material cannot be placed over them in such a manner as to cause scorching or risk of fire.

(5) Electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. Space heaters in cabins, lockers, and similar enclosed spaces shall be of the convector type.

(6) Appliances shall be so constructed and mounted that there will be no excessive heating of adjacent decks or bulkheads.

**42. Accessories—**(1) Where differing distribution systems supplying socket outlets are in use, the socket outlets and plugs shall be of such design that an incorrect connection between differing systems cannot be made.

(2) Every socket outlet of rating exceeding 15 amperes shall be provided with a switch so interlocked that the plug cannot be inserted or withdrawn when the switch is in the "ON" position.

(3) Socket outlets shall not be fitted in bathrooms, showers, lavatories, and similar places.

(4) Socket outlets for supplying electric dry-shavers shall be as remote as practicable from washbasins, unless in the case of A.C. supplies they comply with the relevant New Zealand Standard.

(5) On weatherdecks, in engine rooms, and wherever they are exposed to drip or condensed moisture, socket outlets and plugs shall be weatherproof.

(6) Weatherproof socket outlets and plugs shall be of robust construction and shall be provided with effective means to maintain the weatherproof properties of the socket outlet after removal of the plug, e.g., a loose cover anchored by means of a chain. When the plug is inserted in the socket outlet, the combined fitting and interlocking switch, if any, shall also be waterproof.

(7) In wet situations such as galleys, laundries, and bathrooms, switches shall be of watertight construction.

**43. Lightning Protection—**(1) If there is a metal to metal connection between the metal hull and a metal mast or other metallic superstructure, no further protection against lightning is necessary.

(2) In the event of a wooden mast being fitted to a metal hull a lightning conductor shall be fitted to the mast. The lightning conductor shall consist of a copper tape or wire of not less than 100mm<sup>2</sup> cross section connected to a 12mm diameter copper spike affixed to and projecting at least 150mm above the top of the mast.

The lightning conductor shall be run as straight as possible and be connected to the metal hull or metal superstructure.

(3) A lightning conductor shall be fitted to each mast of a non-metal ship:

(a) The lightning conductor shall consist of a copper tape or wire of not less than 100mm<sup>2</sup> cross section connected to a 12mm diameter copper spike affixed to and projecting at least 150mm above the top of the mast.

(b) The lightning conductor shall be run as straight as possible and be connected to a copper earth plate not less than 1860 cm<sup>2</sup> in area and 3mm thickness attached to the outside of the hull well below the waterline.

(c) Where a steel mast is fitted a lightning conductor is not necessary provided the base of the mast is well bonded to the earth plate referred to above.

#### **44. Earthing**

(1) On metal vessels the enclosures and frames of all major electrical equipment shall be permanently earthed to the hull of the vessel by the mounting bolts or other means. The term "earthed" means that a normally non-current carrying conductor is used to connect the non-current carrying metal enclosures or frames of the electrical equipment to a metal area which is electrically continuous with the wetted surface of the hull (for example, a metal enclosure would be considered as earthed if it was attached to a metal bulkhead by metal bolts, and if the bulkhead was welded or bolted to the metal hull).

(2) The non-current carrying metal parts of all major electrical equipment, the metal sheaths of all cables, and any isolated metallic masses (e.g., fuel tanks, main and auxiliary engines, etc) shall be effectively and permanently connected to a common earth in non-metal ships.

(3) This common earth shall consist of a copper strip or wire at least 14.5mm<sup>2</sup> cross sectional area running fore and aft in the vessel and connected to an earth plate on the hull.

**45. Shore Power—**(1) Where arrangements are made for the supply of electricity from an external source on shore or elsewhere, a suitable connection box shall be installed in a position on the vessel suitable for the convenient reception of flexible cables from the external source.

(2) Means shall be provided to disconnect simultaneously all current-carrying conductors from ashore as close to the boat's shore-power disconnect plug as possible.

(3) For a system that is supplied from both ashore and by means of an onboard generator, a 3-position switch (2-position and on-off) totally enclosed shall be provided, so that only one power source can be used at one time.

(4) For shore supplies with earthed neutral, an earth terminal shall be provided for connecting the hull to the shore earth.

(5) The shore connection shall be provided with an indicator at the main switchboard, in order to show when the cable is energised.

(6) Means shall be provided for checking, where necessary, the polarity (for D.C.) or the phase sequence (for 3 phase A.C.) of the incoming supply, in relation to the ship's system.