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NZEC 29:1993

NEW ZEALAND ELECTRICAL CODE OF PRACTICE

for

ELECTRICAL INSTALLATIONS

OF BOAT MARINAS AND PLEASURE VESSELS

Issued by the Office of
The Chief Electrical Inspector,
Energy and Resources Division, Ministry of Commerce

THE ELECTRICITY ACT 1992

APPROVAL OF ELECTRICAL CODE OF PRACTICE

FOR

ELECTRICAL INSTALLATIONS OF BOAT MARINAS AND PLEASURE VESSELS

Pursuant to Section 36 of the Electricity Act 1992 ("the Act")

On the 1st day of February 1993, the Secretary of Commerce issued the Electrical Code of Practice for Electrical Installations of Boat Marinas and Pleasure Vessels ("the Code")

On the 4th day of February 1993, pursuant to Section 38 of the Act the Secretary published in the Gazette a notice of intention to apply to me for approval of the code, and there has been consultations with such persons (or their representatives) as will be affected by the Code and they have had the opportunity to consider possible effects and comment on those effects.

I have considered the comments concerning those effects and where necessary amendments were made to the Code.

Therefore Pursuant to Section 38 of the Act, I, John Luxton, Minister of Energy, have this day approved the Code as attached to this approval, which Code shall come into force on the 1st day of April 1993.

Dated this 18th day of March 1993.

John Luxton
Minister of Energy.

COMMITTEE REPRESENTATION

This Code of Practice was prepared by the Ministry of Commerce, Chief Electrical Inspector's Office with reference to the following organisations:

Electrical Inspectors' Association
New Zealand Electrical Institute
Ebbett Automation
Santon (NZ) Limited
Electricity Supply Association of NZ Inc.
Electrical Contractors' Association of NZ Inc.
Ministry of Transport, Maritime Transport Division

ACKNOWLEDGEMENT

It should be noted that the source material for this Code was derived from the following documentation, Fishing Boat Regulations, IEC 364 Section 709, Electrical Installations In Boat Marinas and Pleasure vessel.

With reference to KZ7 we gratefully acknowledge the permission of Messrs Fay and Richwhite.

REVIEW

This Code of Practice will be revised as occasions arise. Suggestions for improvement of this Code will be welcomed. They should be sent to the Chief Electrical Inspector's Office, Energy and Resources Division, Ministry of Commerce, P O Box 1473, WELLINGTON.

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INTRODUCTION

New Zealand is a country with a rich history of involvement of nautical pursuits. With the rapid expansion of marina facility installations, has come the need to provide a safe electrical supply for both maintenance purposes and power to electrical appliances on board pleasure vessel.

This Code of Practice has been produced to set the essential safety requirements for both marinas and pleasure vessel intended to be connected thereto. This Code also establishes a consistent plug/socket configuration for all marina installations.

This Code also formalises the acceptability of pleasure vessel being connected to a boat marina supply on a continuous basis to supply on board appliances.

ELECTRICAL INSTALLATIONS OF BOAT MARINAS AND PLEASURE VESSELS

SECTION 1

SCOPE, APPLICATION, INTERPRETATIONS, GLOSSARY AND NUMBERING

1.1 SCOPE

- 1.1.1 This Code of Practice specifies requirements for electrical connectable installations of pleasure vessel for connection to a marina electrical supply.
- 1.1.2 This Code of Practice specifies the electrical installations of marinas providing facilities for such connections.
- 1.1.3 This Code also applies to that portion of the electrical installation on marinas for the connection of portable appliances used on a temporary basis.
- 1.1.4 This Code does not apply to low or extra low voltage supply generated on-board a pleasure vessel where no connection is made to a boat marina supply.

1.2 APPLICATION

Electrical installations of boat marinas and connectable portions of a pleasure vessel connected to the marina supply shall comply with the requirements of this Code of Practice.

1.3 INTERPRETATIONS

For the purposes of this Code, the definitions given below shall apply.

- 1.3.1 Barrier - means a part providing protection against direct contact from any usual direction of access.
- 1.3.2 Distribution switchboard - means a switchboard which has no link between neutral and earth.
- 1.3.3 Linked busbar switchboard - means a switchboard which has a removable link between earth and neutral for the purpose of returning earth fault currents to the supply neutral.
- 1.3.4 Main switchboard - means in respect of an electrical installation, that switchboard which provides the greatest degree of control of the supply of electricity to that installation.

- 1.3.5 Marinas - means places situated at fixed or floating installations that are suitable for one or more craft unit for berthing or mooring purposes (eg, wharf, jetty, pier or floating pontoon).
- 1.3.6 MEN switchboard - means a switchboard which has a connection to an earth electrode via an earthing lead, and a connection between earth and neutral made by a removable link, for the purposes of an MEN system.
- 1.3.7 Pleasure vessel - means a boat that is used exclusively for the owner's pleasure or as the owners residence, and is not offered or used for hire or reward, but does not include:
- (a) A boat that is provided for transport or sport or recreation by or on behalf of any institution, hotel, motel, place of entertainment, or other establishment; or
 - (b) A boat that is used or any voyage for pleasure if it is normally used or intended to be normally used as a fishing vessel or for the carriage of passengers or cargo or for hire or reward; or
 - (c) A boat that is operated or provided by any club, incorporated society, trust, or business under any time share, charter or similar arrangement.
- 1.3.8 Prospective touch voltage - means the highest touch voltage liable to appear in the event of a fault of negligible impedance in the electrical installation.

1.4 GLOSSARY OF ABBREVIATIONS USED IN THIS CODE

AS	Australian Standard
BS	British Standard
C	Celsius
IP	Ingress protection code (IP)
MIMS	Mineral insulated mineral sheathed cable
mm	Millimetres
mm ²	Square millimetres
PVC	Poly vinyl chloride
RCD	Residual Current Device
TN-S	A system of supply
V	Voltage

1.5 NUMBERING SYSTEM OF THIS CODE

- 1.5.1 Sections are numbered from 1 to 7.
- 1.5.2 Subsections are numbered by one full stop between two numbers, (e.g., 1.6)
- 1.5.3 Clauses are numbered by two full stops between three numbers, (e.g., 4.18.3)

- 1.5.4 Subclauses are numbered by three full stops between four numbers, (e.g., 3.2.1.1)
- 1.5.5 Paragraphs contain numbering punctuated by one or more full stops together with a parenthesised letter.
- 1.5.6 Subparagraphs are represented by lower case roman numerals enclosed in parenthesis following paragraphs.

SECTION 2

GENERAL REQUIREMENTS FOR LOW VOLTAGE SUPPLIES TO BOAT MARINAS AND PLEASURE VESSEL

2.1 INSTALLATIONS

- 2.1.1 Connectable electrical installations of pleasure vessels and that portion of the power supply system located at boat marinas for the supply of electricity for pleasure vessels shall be installed to the requirements of this Code and the fittings so selected that no person will be exposed to risk of shock, and that no explosion or fire hazard can occur.

2.2 VOLTAGE

The rated voltage for the supply of pleasure vessels and boat marina installations shall not exceed 250V phase to earth, or 440V phase to phase.

2.3 ENVIRONMENTAL CONDITIONS

- 2.3.1 All electrical fittings shall be selected so as to withstand safely the stresses and environmental conditions characteristic of its location and to which it may be exposed.
- 2.3.2 Where the conditions comprise exposure to flammable surroundings or a explosive atmosphere, the conductor or apparatus shall be protected by an enclosure of an appropriate standard of construction.

2.4 PROTECTION AGAINST DIRECT OR INDIRECT CONTACT (ELECTRIC SHOCK)

- 2.4.1 Persons shall be protected against dangers that may arise from contact with live or exposed parts of the installation.
This protection can be achieved by one of the following methods:
- (a) Preventing a current from passing through the body of any person.
 - (b) Limiting the current which can pass through a body to a value lower than shock value.
 - (c) Automatic disconnection of the supply on the occurrence of a fault likely to cause a current to flow through the body in contact with exposed conductive parts, where the value of that current is equal to or greater than the shock current.
- 2.4.2 All socket-outlets on boat marinas used for the supply of low voltage to pleasure vessel electrical systems shall be protected by a residual-current device affording personal protection, having a residual operating current not exceeding 30mA.

2.4.2.1 Socket outlets intended for the purpose of subclause 2.4.2 shall comply with IEC 309.

2.4.3 General purpose socket-outlets (of the three pin flat pin type) on marinas shall be protected by:

- (a) A residual-current device affording personal protection, and having a residual operating current not exceeding 30mA; or
- (b) A supply from an individual isolating transformer affording personal protection.

Only one general purpose socket-outlet is permitted on any winding of an isolating transformer.

SECTION 3

WIRING SYSTEMS FOR BOAT MARINAS

3.1 MEN SWITCHBOARDS

- 3.1.1 For the purposes of this code; MEN switchboards of an electrical installation shall:
- (a) Be supplied with electricity from an electricity supply system, a generator, or another MEN switchboard;
 - (b) Have a connection to the earth electrode made to the earth busbar;
 - (c) Have a removable link between the earth continuity busbar and the neutral busbar;
 - (d) Not be supplied from either a linked busbar or distribution switchboard.
- 3.1.2 MEN switchboards may:
- (a) Have an earth continuity conductor linking its earth continuity busbar with the earth continuity busbar of the switchboard from which that MEN switchboard derives a supply of electricity; and
 - (b) For the purposes of equipotential bonding, have conductive parts which have an electrical path to earth connected to the earth continuity busbar.

3.2 LINKED BUSBAR SWITCHBOARDS

- 3.2.1 Linked busbar switchboards of an electrical installation shall:
- (a) Not be supplied from a distribution switchboard;
 - (b) Have an earth continuity conductor linking its earth continuity busbar with the earth continuity busbar of the switchboard from which that linked busbar switchboard derives a supply of electricity;
 - (c) Have a removable link between the earth continuity busbar and the neutral busbar; and
 - (d) Not supply an MEN or distribution switchboard.
- 3.2.2 Linked busbar switchboards may, for the purposes of equipotential bonding, have conductive parts which have an electrical path to earth, connected to the earth continuity busbar.

3.3 DISTRIBUTION SWITCHBOARDS

- 3.3.1 Distribution switchboards of an electrical installation shall:
- (a) Not be supplied from a linked busbar switchboard;
 - (b) Have an earth continuity conductor linking its earth continuity busbar with the earth continuity busbar of the switchboard from which that distribution switchboard derives a supply of electricity;

- (c) Not be supplied with electricity from more than one switchboard (this does not prevent the total segregation of a single physical switchboard assembly into two separate sections); and
- (d) Not supply a main or linked busbar switchboard; and
- (e) Not have a link between any neutral and earth conductors.

3.3.2 Distribution switchboards may, for the purposes of equipotential bonding, have conductive parts which have an electrical path to earth connected to the earth continuity busbar.

3.4 SWITCHBOARDS INSTALLED PRIOR TO 1 APRIL 1994

3.4.1 Any switchboard installed prior to 1 April 1994 in which the connection to the mass of earth is made onto the supply neutral is deemed to be in conformity with these requirements and is deemed to constitute a MEN Switchboard.

3.5 MARINA SUPPLIES

3.5.1 All marinas supplied with electricity from an MEN system shall have a MEN Switchboard.

3.5.2 In every marina supplied with electricity from an MEN system, the switchboard electrically closest to the point of supply shall be a MEN Switchboard.

3.5.3 Any marina supplied with electricity from an MEN system may include any number of MEN, Linked busbar or Distribution Switchboards in accordance with the limitations applying to the interconnection of such switchboards.

3.5.4 A distribution switchboard may be used for the supply of electricity to a pleasure vessel.

3.5.5 A Linked busbar switchboard shall not be used for the supply of electricity to any pleasure vessel.

3.5.6 The characteristics of the protective devices, the earthing arrangements for the installation, and the relevant impedances of any submain feeding a distribution switchboard shall be coordinated so that during an earth fault the simultaneous voltages between accessible exposed conductive parts occurring anywhere in the installation shall be of a magnitude and duration as not to cause danger.

3.5.6.1 This is deemed to be met when the earth fault loop impedance of every circuit of the installation or part of installation is such that disconnection occurs within 0.4 of a second and the prospective touch voltage does not exceed 50 volts.

3.6 CABLES

All cables and conductors shall be:

- (a) Of sufficient capacity for the purposes for which the supply of energy is to be used; and
- (b) Of adequate size to withstand all stresses likely to be encountered in service and during fault conditions; and
- (c) Constructed, installed, and protected, so as to prevent danger so far as reasonably practicable and to allow for safe maintenance, inspection, and testing.

3.7 RETICULATION

3.7.1 The following wiring systems are suitable for floating and fixed boat marinas:

- (a) Thermoplastic or elastomeric insulated and sheathed copper cables and cords enclosed in:
 - (i) flexible non-metallic conduit;
 - (ii) heavy duty rigid non-metallic conduit; or
 - (iii) medium or heavy tube.
- (b) Mineral-insulated copper-sheathed cables protected by a serving of PVC or polyethylene.
- (c) Armoured cable sheathed overall with thermoplastic or elastomeric sheathing material.

3.7.2 Wiring between the sections of a floating boat marina and between a floating section and a fixed section of a boat marina shall be of the flexible trailing type having suitable mechanical protection.

3.7.3 Metallic pipes or conduits shall not be used as an earthing continuity conductor. All metallic pipes and conduits shall be bonded to earth.

3.8 PROHIBITED USE

3.8.1 Aerial conductors and catenary wiring of any type shall not be used on a boat marina.

3.8.2 Conductors of aluminium, copper-clad aluminium or aluminium clad with other metals shall not be used for fixed wiring on a boat marina.

3.9 SOCKET-OUTLET ENCLOSURES

3.9.1 Socket-outlet enclosures on boat marinas shall be arranged as close as possible to the berths to be supplied.

- 3.9.2 Socket-outlet enclosures shall be of robust corrosion resistant weatherproof boxes which will effectively protect the sockets-outlets and associated switchgear from the weather and against mechanical damage. Such protection shall remain effective when a socket-outlet is in use.
- 3.9.3 The design of the enclosure shall be such as to prevent damage to the supply cable.
- 3.9.4 All subcircuits shall be protected by close excess protection and be provided with a means of isolation located adjacent to the socket-outlets.
- 3.9.5 The means of isolation may control a number of socket-outlets.

3.10 SUPPLY LEAD

- 3.10.1 Provision shall be made for the supply lead to be attached to the boat marina and to the pleasure vessel by means of suitable fittings located adjacent to the supply socket-outlet and the appliance inlet, for strain relief on connections and support of the lead. A bracket and insulator, or hook and thimble, or non-perishing guy rope tensioner are suitable ways of meeting this requirement.
- 3.10.2 The supply lead shall be arranged to:
- (a) Permit normal movement of a craft at its mooring without undue stress;
 - (b) Prevent water flowing along the supply lead from reaching the appliance inlet;
 - (c) Reduce the likelihood of the plug or appliance socket falling in the water;
 - (d) Minimise the possibility of accidental disconnection.

SECTION 4

CONNECTION TO PLEASURE VESSELS

4.1 SUPPLY LEAD

- 4.1.1 All components of the supply lead shall be appropriately rated for the demands likely to be imposed on them.
- 4.1.2 The supply lead shall be in one continuous length, and shall not exceed 20 metres in length.
- 4.1.3 The flexible cord or cable shall be a heavy duty tough rubber sheathed, or tough plastic sheathed construction, with all conductors (including the protective earthing conductor) integral within the sheathing.
- 4.1.4 Plugs and cord extension sockets used for the connection of a pleasure vessel to the supply shall be of the type complying IEC 309, and protected against the ingress of moisture with a minimum degree of protection IP56.

4.2 CONNECTING FACILITY ON PLEASURE VESSELS

- 4.2.1 Provision shall be made for only one means of power supply, (i.e., one supply lead) to a pleasure vessel from a boat marina.
- 4.2.2 Connection of the supply lead to the pleasure vessel wiring shall be by means of an appliance inlet connector and appliance inlet complying with IEC 309, NZS 6216 or AS 3123, or be permanently wired, with a weatherproof compartment being provided for the storage of the lead when not in use.
- 4.2.3 The appliance inlet shall be protected against the ingress of moisture with a minimum degree of protection IP56. This degree of protection shall be present both when the cord connector is inserted and withdrawn.
- 4.2.4 The appliance inlet shall be located at a point where the inlet itself, including the connecting cable cannot be damaged due to movements of the pleasure vessel, touching, scratching (rubbing) of other movable parts, including any auxiliary vessel.

SECTION 5**PLEASURE VESSEL CONNECTABLE ELECTRICAL INSTALLATIONS**

The installation of electrical wiring and fittings, including on-board isolating transformers, shall be carried out by competent persons experienced in electrical and marine work.

5.1 LOW VOLTAGE DUAL SUPPLIES

- 5.1.1 Pleasure vessels that are supplied from both a boat marina and by means of an on board generator, a changeover switch, accessible, with terminals totally enclosed, shall be provided so that only one power source can be used at one time.
- 5.1.2 Change over devices shall totally isolate each individual source of supply.
- 5.1.3 Change over switches without an intermediate off position shall be rated at the maximum voltage that is generated between contacts.
- 5.1.4 Where contactors are used they shall be mechanically or electrically interlocked and be rated at the maximum voltage that is generated between contacts.

5.2 SWITCHBOARDS

- 5.2.1 Pleasure vessels shall contain a switchboard controlled by a suitably rated circuit breaker to limit the current in the supply lead / connectors to their safe working value. The switchboard shall provide suitable protection for the circuits contained within, and shall be so selected and located that it is unaffected by sea, air, water, oil or fumes to which it is likely to be exposed.

Where the circuit breaker is not accessible, a main switch shall be provided in an accessible position to isolate all circuits.

- 5.2.2 Switchboards, distribution boards, switchgear and control gear shall:
 - (a) Be accessible; and
 - (b) Be permanently labelled; and
 - (c) Be made of metal or a material that is flame-retardant and self-extinguishing.
- 5.2.2.1 Each sub circuit shall be protected against excess current by a circuit breaker of appropriate rating.

5.3 CONNECTABLE WIRING INSTALLATIONS

- 5.3.1 All cables and conductors shall be:
- (a) Of sufficient capacity for the purposes for which the supply of energy is to be used; and
 - (b) Adequate to withstand all stresses likely to be encountered in service and during fault conditions; and
 - (c) Constructed, installed, and protected, so as to prevent danger so far as reasonably practicable and to allow for its safe maintenance, inspection, and testing.
- 5.3.2 All fixed wiring cables and cords shall consist of stranded conductors suitable for the location in which they are used. All cables and cords shall contain an earth-continuity conductor.
- 5.3.3 Protective fittings connected to sub-circuits shall be in accordance with the requirements of subclause 5.2.2.1.
- 5.3.3.1 Cables shall be so laid that mechanical damage due to craft movements is prevented and they shall be kept as high as possible above the bilges.
- 5.3.3.2 Cables are to be laid and fixed in such a manner that they are prevented from being:
- (a) Displaced by movements of the pleasure vessel; and
 - (b) Damaged due to friction, pull or pressure (squashing), and
 - (c) Exposed to inadmissible ambient temperatures.
- 5.3.3.3 Except where they are installed in plastic conduits, cable ducts, stringers and the like, they shall be fixed by means of non-corroding clips or strips at distances of not more than 300 mm. They shall be laid at a safe distance from fuel tanks, exhaust-gas pipes and excessive heat sources.
- 5.3.3.4 Conduits, where installed shall be protected against the ingress of moisture with a minimum degree of protection IPX6.
- 5.3.3.5 The minimum cross sectional conductor area of cables shall be 1.5 mm².
- 5.3.3.6 There shall be no inaccessible cable connections.
- 5.3.3.7 Connection of cables shall be by means of crimped connections, or screwed joints provided with a self-locking means. Terminations and connections of cables shall be located in suitable boxes providing adequate protection. The cover shall be of a type which cannot be removed without the use of a tool.
- 5.3.3.8 Care shall be taken not to compromise water tight integrity where cables pass through decks or bulkheads.

- 5.3.3.9 Cables for extra low and low voltage shall be effectively segregated from each other, unless the extra low voltage cable is insulated to low voltage. This does not apply to equipotential bonding and earthing conductors of the installation.
- 5.3.3.10 There shall be no connection between a neutral conductor and an earth continuity conductor on a pleasure vessel.

5.4 EQUIPOTENTIAL BONDING AND EARTHING

- 5.4.1 Accessible conductive parts of pleasure vessel that are likely to attain fault voltage or earth potential shall be connected to each other and to the earthing conductor through an equipotential bonding conductor. The equipotential bonding conductor shall have a stranded conductor and have a minimum cross-sectional area of 4 mm² copper. This does not apply to metal parts that are insulated to prevent direct contact.
- 5.4.1.1 As complete segregation of the metal parts of a vessel is often difficult to achieve, it is strongly recommended that all metal parts be bonded together and connected to the earth-continuity-conductor busbar. Such metal may include the hull of the pleasure vessel, any metal framework, gas pipes, and the like.
- 5.4.2 The following shall be effectively connected to the earth-continuity-conductor busbar with stranded earthing conductors:
- (a) The earth contact of all socket-outlets;
 - (b) Exposed conductive parts including any metallic sheathing.
- 5.4.3 Where an on board isolating transformer is installed, the earthing contact of socket-outlets shall be in accordance with the safety requirements for the transformer.

5.5 FITTINGS

- 5.5.1 Fittings such as switches, lampholders, socket-outlets and the like used in the vessel installation shall be of a type having a cover which cannot be removed without the use of a tool.
- 5.5.2 Switches shall be of a type having recessed or shrouded terminals where flush boxes are omitted.
- 5.5.3 Where fittings are supplied from an isolated supply, double pole switching shall be used.
- 5.5.4 Low voltage socket-outlets shall be of a type that will accommodate a three-pin flat-pin plug top.

- 5.5.4.1 Socket-outlets shall be of a type having recessed terminals or shrouded terminals where flush boxes are omitted.
- 5.5.4.2 Any extra low voltage socket-outlet installed in a pleasure vessel, shall be of such form that corresponding plugs cannot be inserted into socket-outlets connected to circuits of higher than extra low voltage.

5.6 APPLIANCES

Every appliance which is permanently connected to the fixed wiring shall be controlled by an accessible isolation switch installed on or adjacent to such appliance.

5.7 FINAL SUB-CIRCUITS

Any final sub-circuit may feed any combination of appliances, and including lighting fittings.

5.8 EXTRA LOW VOLTAGE TRANSFORMERS

Any extra low voltage transformer incorporated in a caravan shall comply with the requirements for a transformer for personal protection and shall be protected against overheating.

Non earthed conductors shall be provided with overload protection.

5.9 SEGREGATION

- 5.9.1 All parts of the vessel installation intended for connection to a low voltage supply shall be effectively segregated from any wiring which can be supplied at extra-low voltage either from a battery, generator/alternator, or a transformer. This does not apply to equipotential bonding or earthing conductors of the installation.
- 5.9.2 Where extra low voltage fitting is installed such that it can operate from an a.c. or d.c. supply any associated fitting or electrical appliance, including changeover switches must be capable of switching a.c. and d.c. loading.

SECTION 6**ELECTRICAL WARRANTS OF FITNESS FOR PLEASURE VESSELS****6.1 REQUIREMENTS**

- 6.1.1 All pleasure vessels using fittings or electrical appliances, or containing fittings or electrical appliances installed for use in or about the pleasure vessel, may be examined and tested in order to obtain an electrical warrant of fitness.
- 6.1.2 An electrical warrant of fitness shall only be issued in respect of a pleasure vessel which has been examined and tested in accordance with the requirements of this section and shown to be compliant with these requirements.
- 6.1.3 Electrical warrants of fitness for pleasure vessels shall be valid for a period not exceeding 49 months and in any case shall expire on the 31st day of January of the year four years from the year of issue.
- 6.1.4 Electrical warrants of fitness shall be issued on the numbered form supplied by the Secretary of Commerce for this purpose (an example of the electrical warrant of fitness is shown in Appendix C).
- 6.1.5 Electrical warrants of fitness for pleasure vessels shall only be issued by persons holding a registration as an electrical inspector and having a valid practising certificate, or by such persons who are authorised by the Secretary to do so.
- 6.1.6 The person issuing the certificate shall:
- (a) Give a copy to the applicant;
 - (b) Either retain a copy of the certificate for a period not less than five years or supply a copy to the Secretary of Commerce.
- 6.1.7 The inspector shall affix the sticker supplied with the warrant form to a prominent position on the pleasure vessel.
- 6.1.8 The certificate, a copy of the certificate, or the electrical warrant of fitness sticker shall be deemed to be proof of compliance with this section.
- 6.1.9 The form contained in Appendix A of this Code may be used to record the results of the examination and testing of pleasure vessels. A copy of the completed form may be issued to the person requesting the issue of an electrical warrant of fitness.

6.2 EXAMINATION OF PLEASURE VESSELS

The examination of any pleasure vessel for the issue of an electrical warrant of fitness shall verify the following requirements;

6.2.1 **Protection against direct contact (Exposed Live Parts).**

The pleasure vessel, including the supply cables, shall not have any exposed live parts including damaged fittings, or appliances.

6.2.2 **Protection against indirect contact (Unearthed Metallic Parts).**

The pleasure vessel shall not contain any unearthed metallic fittings liable to become alive.

6.2.3 **Protection against indirect contact (Exposed Basic Insulation).**

The pleasure vessel shall not contain any exposed basic insulation protecting live parts.

6.2.4 **Protection against fire (Overcurrent Protection).**

The rating of all protective devices shall not exceed the rating of the cable connected to that protective device.

6.2.5 **Protection against adverse conditions (Protection Against The Ingress of Moisture).**

All external fittings shall have IP ratings in accordance with the requirements of this Code.

6.2.6 **Technical standardisation (Supply Couplers).**

Appliance inlet and supply lead socket shall comply with IEC 309, AS 3123, NZS 6216, BS 4343 or CEE 17.

The supply lead plug (marina plug) shall comply with IEC 309, BS 4343 or CEE 17.

6.3 TESTING OF PLEASURE VESSELS

6.3.1 **Polarity tests (Polarity of Socket-Outlets).**

All socket-outlets shall have the correct polarity.

6.3.2 **Polarity tests (Polarity of Switches).**

All switches shall operate in the phase (active) conductor.

6.3.3 **Polarity tests (Polarity of Supply Lead(s)).**

All supply leads shall have the correct polarity.

6.3.4 **Polarity tests (Appliance Inlet).**

The appliance inlet shall be of the correct polarity.

- 6.3.5 **Continuity (Socket-Outlets).**
All socket-outlets shall have effective continuity of all conductors (phase, neutral and earth) to the switchboard or appliance outlet (Maximum value 1 ohm).
- 6.3.6 **Continuity (Supply Leads).**
All supply leads shall have effective continuity of all conductors (phase, neutral, and earth) between plugs and sockets (Maximum value 1 ohm).
- 6.3.7 **Continuity (Appliance Inlets).**
Appliance inlets shall have effective continuity to the switchboard or fitting containing the link (Maximum value 1 ohm).
- 6.3.8 **Protection against indirect contact (Segregation of ELV and LV).**
The pleasure vessel shall pass a 500v insulation test between phase (active) and each unearthed ELV circuit (minimum value 1 megohm).....
- 6.3.9 **Protection against fire (Insulation Resistance).**
The pleasure vessel shall pass a 500v insulation test with the supply lead connected, between phase and earth (minimum value 1 megohm).
- 6.3.10 **Technical standardisation (Neutral / Earth Links).**
The pleasure vessel shall not have any connections between neutral and earth.

SECTION 7

PERIODIC INSPECTION OF BOAT MARINAS

7.1 REQUIREMENTS

- 7.1.1 Certificates of reinspection of boat marinas shall only be issued by persons holding a registration as an electrical inspector and having a valid practising certificate.
- 7.1.2 Certificates of reinspection of boat marinas shall be valid for a period of 5 years.
- 7.1.3 The issuing person shall complete testing and examination in accordance with the requirements of this section. The issuing person may issue a certificate (referred to as a "Certificate of Reinspection") to the client whose boat marina meets the requirements of Section 6.
The certificate issued in accordance with this section shall be in the Form prescribed in Appendix C of this Code.
- 7.1.4 The person issuing the certificate shall:
- (a) Give a copy to the applicant;
 - (b) Either retain a copy of the certificate for a period not less than five years or supply a copy to the Secretary of Commerce.
- 7.1.5 Persons carrying out the examination and testing of boat marinas for the purposes of granting such a certificate may complete the form prescribed in Appendix B of this Code.
- 7.1.6 The form contained in Appendix B of this Code may be used to record the results of the examination and testing of boat marinas. A copy of the completed form may be issued to the client requesting the issue of a certificate of reinspection.

7.2 EXAMINATION OF BOAT MARINAS

- 7.2.1 **Protection against direct contact (Exposed Live Parts).**
The boat marina shall not contain exposed live parts including damaged fittings, cable sheaths, or mechanical protection.
- 7.2.2 **Protection against indirect contact (Unearthed Metallic Parts).**
The boat marina shall not contain any unearthed metallic fittings liable to become alive.

- 7.2.3 **Protection against indirect contact (Exposed Basic Insulation).**
A boat marina shall not contain any exposed basic insulation protecting live parts.
- 7.2.4 **Protection against fire (Overcurrent Protection).**
The rating of all protective devices shall not exceed the rating of the socket-outlet connected to that protective device.
- 7.2.5 **Protection against adverse conditions (Protection Against The Ingress of Moisture).**
All socket-outlets and enclosures shall have appropriate IP ratings.
- 7.2.6 **Technical standardisation (Marina outlet).**
Marina outlet shall comply with IEC 309, BS 4343 or CEE 17.

7.3 TESTING OF BOAT MARINAS

- 7.3.1 **Polarity tests (Polarity of Socket-Outlets).**
All socket-outlets shall have the correct polarity.
- 7.3.2 **Polarity tests (Polarity of Circuit Breakers).**
All Circuit Breakers shall operate in the phase (active) conductor.
- 7.3.3 **Protection against indirect contact (Supply Socket-Outlets).**
All socket-outlets for the supply of electricity to pleasure vessels shall provide personal protection by RCD.
This shall be verified using a proprietary RCD tester or a device designed to introduce a 30mA current between phase (active) and earth to ensure that the RCD operates correctly.
- 7.3.4 **Protection against indirect contact (General Purpose Socket-Outlets).**
All general purpose socket-outlets shall provide personal protection by RCD or isolating transformer.
For RCDs this shall be verified using a proprietary RCD tester or a device designed to introduce a 30mA current between phase (active) and earth to ensure that the RCD operates correctly.
For isolating transformers this shall be verified by a 500v insulation test between the circuit supplying the socket-outlet and earth (minimum value 1 megohm).
- 7.3.5 **Protection against indirect contact / fire (Rating of protective devices).**
The protective devices installed for the protection of supplies to pleasure vessels shall have the correct fault rating. This may be verified using a line loop earth tester or by calculation.

APPENDIX A

EXAMINATION AND TESTING OF PLEASURE VESSELS

PROTECTION AGAINST DIRECT CONTACT

Exposed Live Parts.

The pleasure vessel, including the supply cables, shall not have any exposed live parts including damaged fittings, or appliances.

Pass	Fail

PROTECTION AGAINST INDIRECT CONTACT

Unearthed Metallic Parts.

The pleasure vessel shall not contain any unearthed metallic fittings liable to become alive.

Pass	Fail

Basic Insulation.

The pleasure vessel shall not contain any exposed basic insulation protecting live parts.

Pass	Fail

PROTECTION AGAINST FIRE

Overcurrent Protection.

The rating of all protective devices shall not exceed the rating of the cable connected to that protective device.

Pass	Fail

PROTECTION AGAINST ADVERSE CONDITIONS

Protection Against The Ingress of Moisture.

All external fittings shall have appropriate IP ratings.

Pass	Fail

TECHNICAL STANDARDISATION

Supply Couplers.

Appliance inlet and supply lead socket comply to IEC 309, AS 3123, NZS 6216, BS 4343 or CEE 17.

Pass	Fail

Supply Lead Plug.

Marina plug shall comply to IEC 309, BS 4343 or CEE 17

Pass	Fail

TESTING OF PLEASURE VESSELS

POLARITY TESTS

Polarity of Socket-Outlets.

All socket-outlets shall have the correct polarity.

Polarity of Switches.

All switches shall operate in the phase (active) conductor.

Polarity of Supply Lead(s).

All supply leads shall have the correct polarity.

Polarity of Appliance Inlet.

The appliance inlet shall be of the correct polarity.

Pass	Fail

Fail	Fail

Pass	Fail

Pass	Fail

CONTINUITY

Socket-Outlets.

All socket-outlets shall have effective continuity (Maximum value 1 ohm). Earth, neutral, and phase.

Supply Leads.

Continuity of conductors of all supply leads verified (Maximum value 1 ohm).

Appliance Inlets.

All appliance inlets shall have effective continuity (Maximum value 1 ohm). Earth, neutral, and phase.

Pass	Fail

Pass	Fail

Pass	Fail

PROTECTION AGAINST INDIRECT CONTACT

Segregation of ELV and LV.

The pleasure vessel shall pass a 500v insulation test between phase (active) and each unearthed ELV circuit.

Pass	Fail

PROTECTION AGAINST FIRE

Insulation Resistance.

The pleasure vessel shall pass a 500v insulation test with the supply lead connected and link installed, between phase and earth (minimum value 1 megohm).

Insulation minimum resistance obtained with supply lead connected.

Pass	Fail

Pass	Fail

TECHNICAL STANDARDISATION

Neutral / Earth Link.

There shall be no connectors between neutral and earth.

Pass	Fail

APPENDIX B

EXAMINATION AND TESTING OF BOAT MARINAS

PROTECTION AGAINST DIRECT CONTACT

Exposed Live Parts.

The boat marina shall not contain exposed live parts including damaged fittings, cable sheaths, or mechanical protection.

Pass	Fail

PROTECTION AGAINST INDIRECT CONTACT

Unearthed Metallic Parts.

The boat marina shall not contain any unearthed metallic fittings liable to become alive.

Pass	Fail

Exposed Basic Insulation.

A boat marina shall not contain any exposed basic insulation protecting live parts.

Pass	Fail

PROTECTION AGAINST FIRE

Overcurrent Protection.

The rating of all protective devices shall not exceed the rating of the socket-outlet connected to that protective device.

Pass	Fail

PROTECTION AGAINST ADVERSE CONDITIONS

Protection Against The Ingress of Moisture.

All socket enclosures shall have appropriate IP ratings.

Pass	Fail

TECHNICAL STANDARDISATION

Marina Outlet.

Marina outlet shall comply to IEC 309, BS 4343 or CEE 17.

Pass	Fail

TESTING OF BOAT MARINAS

POLARITY TESTS

Polarity of Socket-Outlets.

All socket-outlets shall have the correct polarity.

Pass	Fail

Polarity of Circuit Breakers.

All Circuit Breakers shall operate in the phase (active) conductor.

Pass	Fail

PROTECTION AGAINST INDIRECT CONTACT

Supply Socket-Outlets.

All socket-outlets for the supply of electricity to pleasure vessels shall provide personal protection by RCD.

Pass	Fail

General Purpose Socket-Outlets.

All general purpose socket-outlets shall provide personal protection.

Pass	Fail

PROTECTION AGAINST INDIRECT CONTACT / FIRE

Rating of Protective Devices.

The protective devices installed for the protection of supplies to pleasure vessels shall have the correct fault rating. This may be verified using a line loop earth tester or by calculation.

Pass	Fail

Correct kA Rating

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APPENDIX C

EXAMPLE OF ELECTRICAL WARRANT OF FITNESS

ELECTRICAL WARRANT OF FITNESS

**** number ****

(Please print)

REGISTRATION OR OTHER

IDENTIFICATION :

NAME OF INSPECTOR & REG. NUMBER :

DATE OF EXAMINATION :

I hereby certify that the examination and testing of the connectable installation identified above has been carried out in accordance with the Electricity Regulations, and that the connectable installation meets the requirements of for the issue of an Electrical Warrant of Fitness.

Signed by: (Inspector).

Date: / /

CERTIFICATE OF REINSPECTION

(Please print)

NAME OF MARINA :

LOCATION OF MARINA :

NAME OF INSPECTOR & REG. NUMBER :

DATE OF EXAMINATION :

I hereby certify that the examination and testing of the above marina has been carried out in accordance with Section 7 of ECP 29, and that the marina meets the requirements for the issue of a certificate of reinspection.

Signed by: (Inspector).