

SECTION 5 TESTING

1 General

1.1 Rule application

1.1.1 Before a new installation, or any alteration or addition to an existing installation, is put into service, the electrical installation is to be tested in accordance with [3], [4] and [5] to the satisfaction of the Surveyor in charge.

Such tests are intended to indicate the general condition of the installation at the time of completion; however satisfactory results do not in themselves necessarily ensure that the installation is satisfactory in all respects.

2 Type approved components

2.1

2.1.1 The following components are to be type approved or in accordance with [2.1.2]:

- electrical cables
- switching devices (circuit-breakers, contactors, disconnectors, etc.) and overcurrent protective devices
- computer based systems used for tasks essential to safety.

2.1.2 Case by case approval based on submission of adequate documentation and execution of tests may also be granted at the discretion of the Society.

3 Insulation resistance

3.1 Insulation-testing instruments

3.1.1 It is recommended that insulation resistance be measured by self contained instruments such as a direct reading ohmmeter of the generator type, applying a voltage of at least 500 V. The measurement is to be taken when the deviation of the measuring device is stabilised and recorded.

Note 1: Any electronic devices present in the installation are to be disconnected prior to the test in order to prevent damage.

3.2 Switchboards

3.2.1 Before switchboards or panel boards and distribution boards are put into service, their insulation resistance between each busbar and earth and between each insulated busbar and the busbars connected to the other poles (or phases) is to be measured. The insulation resistance is to be not less than 1 MΩ.

3.2.2 The test is to be performed with all circuit-breakers and switches open, all fuse-links for pilot lamps, earth fault-indicating lamps, voltmeters, etc. removed and voltage coils temporarily disconnected where otherwise damage may result.

3.3 Lighting and power circuits

3.3.1 A test for insulation resistance between all insulated poles (or phases) and earth and, where practicable, between poles (or phases), is to be applied to all permanent wiring. A minimum value of 1 MΩ is to be obtained.

3.4 Generators and motors

3.4.1 The insulation resistance of generators and motors, is to be measured in normal working condition with all parts in place.

3.4.2 The test is to be carried out with the machine hot immediately after running with normal load.

3.4.3 The embedded temperature sensors of the machine, if any, are connected to earth during testing.

3.4.4 The insulation resistance of generator and motor connection cables, field windings and starters is to be at least 1 MΩ.

3.5 Internal communication circuits

3.5.1 Circuits operating at a voltage of 50 V and above are to have an insulation resistance between conductors and between each conductor and earth of not less than 1 MΩ.

3.5.2 For circuits operating at voltages below 50 V, the insulation resistance is not to be less than 0,33 MΩ.

3.5.3 If necessary, any or all appliances connected to the circuit may be disconnected while the test is being conducted.

4 Earth

4.1 Electrical constructions

4.1.1 Tests are to be carried out, by visual inspection or by means of a tester, to verify that all earth-continuity conductors and earthing leads are connected to the frames of apparatus and to the hull or to the earthing plate, and that earth contacts in socket-outlets are connected to earth. The maximum value of the resistance to earth is to be 1,0 Ω.

4.2 Metal-sheathed cables, metal pipes or conduits

4.2.1 Tests are to be performed, by visual inspection or by means of a tester, to verify that the metal coverings of cables and associated metal pipes, conduits, trunking and casings are electrically continuous and effectively earthed.

5 Operational tests

5.1 General

5.1.1 Tests specified in [5.3] to [5.4] are applicable to all yachts of 24 metres and over.

5.1.2 Tests specified in [5.5] to [5.7] apply to yachts of 500 gross tonnage and above only.

5.2 Voltage drop

5.2.1 Where it is deemed necessary by the attending Surveyor, the voltage drop is to be measured to verify that the permissible limits are not exceeded (see Ch 2, Sec 2, [7.8.4] and Ch 2, Sec 2, [7.8.5]).

5.3 Emergency source of electrical power

5.3.1 The satisfactory operation of the emergency source of power, when required, is to be tested. In particular, the automatic starting and the automatic connection to the emergency switchboard, in case of failure of the main source of electrical power, are to be tested.

5.4 Other systems

5.4.1 Each system is to be tested to validate its suitability and to verify its operation to specification. Particular attention should be paid to the testing of communication systems, emergency lighting and fire detection and alarm system.

5.5 Generating sets and their protective devices

5.5.1 Generating sets are to be run at full rated load to verify that the following are satisfactory:

- electrical characteristics
- commutation (if any)
- lubrication
- ventilation
- noise and vibration level.

5.5.2 Suitable load variations are to be applied to verify the satisfactory operation under steady state and transient conditions (see Ch 2, Sec 3, [3]) of:

- voltage regulators
- speed governors.

5.5.3 Generating sets intended to operate in parallel are to be tested over a range of loading up to full load to verify that the following are satisfactory:

- parallel operation
- sharing of the active load
- sharing of the reactive load (for a.c. generators).

Synchronising devices are also to be tested.

5.5.4 The satisfactory operation of the following protective devices is to be verified:

- overspeed protection
- overcurrent protection (see Note 1)
- any other safety devices.

For sets intended to operate in parallel, the correct operation of the following is also to be verified:

- reverse-power protection for a.c. installations (or reverse-current protection for d.c. installations)
- minimum voltage protection.

Note 1: Simulated tests may be used to carry out this check where appropriate.

5.6 Switchgear

5.6.1 All switchboard or panel boards and distribution boards are to be loaded as near as practicable to their normal working load in order to ensure that no overheating occurs due to faulty connections or incorrect rating.

When found necessary by the attending Surveyor, switches, circuit-breakers and controls are to be operated on load to test their suitability and to demonstrate that the operation of overcurrent protective devices are electrically and mechanically satisfactory.

Note 1: The workshop test is generally considered sufficient to ensure that such apparatus will perform as required while in operation.

5.7 Consuming devices

5.7.1 Electrical equipment is to be operated under normal service conditions (though not necessarily at full load or simultaneously) to verify that it is suitable and satisfactory for its purpose.

5.7.2 Motors and their starters are to be tested under normal operating conditions to verify that the following are satisfactory:

- power
- operating characteristics
- commutation (if any)
- speed
- direction of rotation
- alignment.

5.7.3 The remote stops foreseen are to be tested.

5.7.4 Lighting fittings, heating appliances etc. are to be tested under operating conditions to verify that they are suitable and satisfactory for their purposes.

