

Warrants of Electrical Fitness for Recreational Vehicles or Caravans having electrical systems that operate at 110 volts.

Energy Safety is giving advice that it intends to take such steps as it considers necessary to protect persons and property from the dangers associated with the use of unsafe connectable installations of Recreational Vehicles or Caravans.

This information release is part of a program to ensure electrical workers know their responsibilities with respect to the issue of WEOFs.

Once this programme is underway, any licensed electrical inspectors, or persons authorised by the Secretary, who issue a warrant of electrical fitness to a connectable installation that is not in compliance with NZS 3019, or, does not meet the fundamental safety requirements of AS/NZS 3001 and AS/NZS 3000 may be subject to disciplinary action.

Background

The Electricity Regulations require that all electrical installations and appliances are designed, constructed, and used so that they are electrically safe.

Recreational Vehicles or Caravans, as Connectable Installations (including their appliances), are recognised to pose a higher risk from both electric shock and fire and as a consequence these installations are subject to additional safety provisions including ongoing safety re-verification. (Warrant of Electrical Fitness)

While the Regulations make provision for alternative systems to be employed, these departures are expected to be made as a result of the application of new technologies rather than a desire to reduce costs by utilising practices that deliver a lesser level of safety. A level safety playing field is a necessary part of an effective Regulatory environment.

The Ministry is concerned that the importation and use of Recreational Vehicles or Caravans containing wiring systems and appliances not designed to meet NZ's Regulatory expectations creates safety risks that exceed the level generally expected by the NZ society and constitute an electrical hazard as a result of four factors:

- The small space and close conditions inside a connectable installation,
- The presence of expanses of conductive materials,
- The supply of electricity through a plug and socket arrangement, and
- The use of the vehicle as sleeping accommodation.

Appliance Safety

New Zealand has some specific mandatory requirements for the construction of electrical appliances and fittings that deviate (extend) from the relevant international Standards.

- Household and similar appliances are required to pass additional tests for Resistance to Flame and Ignition (Clause 30 AS/NZS 60335.1),
- Lighting fittings and appliances for domestic and similar use are required to pass additional requirements for Resistance to Flame and Ignition (Sub-clause 13.3 of AS/NZS 60598),
- Audio and Video Appliances for domestic and similar use are required to pass additional tests for Resistance to Flame and Ignition (Sub-clause 20.021 of AS/NZS 60065).
- Class 0 and 01 appliances and fittings are not allowed in NZ,
- Portable Low Voltage Appliances are required to be fitted with plugs (AS/NZS 3820),
- Low voltage (< 1000 Volts) plugs are required to have insulated pins that comply with Appendix J of AS/NZS 3112 and meet with the safety dimensional requirements of AS/NZS 3112.

Equipment designed to operate at 110 volts, 60 Hz in the North American, Japanese and other markets, is not likely to meet with these requirements and, unless it does so, its use is unsafe and its sale constitutes an offence.

Installation Safety

New Zealand has some specific mandatory requirements for the construction of installations that deviate from the relevant North American and Japanese Standards.

Recreational Vehicles or Caravans converted to operate at 230 Volts are likely to have safety deficiencies:

Operation of protective devices (Circuit Breakers)

Protective devices used to protect against fire and electric shock due to overloads, short circuits and earth faults are required to operate within specified operating times. In the case of earth faults the operating time is required (by Regulation 69A (1)) to be less than 0.4 seconds (AS/NZS 3000 1.7.4.3.4).

Where a transformer is installed, the available fault current would not be adequate for any standard protective device to function within an acceptable time.

RCD's

New Zealand has specific requirements for the operational characteristics of RCDs. GFCIs (Ground Fault Current Interrupters) used in North America and RCDs (Earth Leakage Circuit Breakers) used in Japan are not likely to meet with the requirements applying in NZ.

Rating of wiring insulation (Cables)

All wiring systems have a rated voltage above which the insulation properties are not adequate. The minimum rated voltage for 230 volt ac systems recognised for safety is 450 volts ac. Only cables rated at or above 450 volts ac could be retained for use on circuits reconfigured to supply NZ fittings at 230 volts ac. *The use of single strand cables is not generally considered to be a safety deficiency provided the cable is constructed and installed to reduce the effects of movement, although not in accordance with AS/NZS 3001.*

Standards for isolation

If a transformer, or converter, is being used to reduce the voltage to 110 volts the transformer must be designed to a Standard that ensures appropriate and reliable separation of the primary and secondary. Type test results and production testing information is critical in establishing the compliance of any transformer/converter used.

Requirements for isolated supplies

Two options are available for the configuration of the 110 volt supply if derived from a converter or transformer:

- Floating (Isolated) – in which case all switches and protective devices **must** be two pole and co-incidentally interrupt both the two current carrying conductors.
- Earthed – in which case the earth connection **must** be referenced correctly to the incoming earth connection in the same way as a main switchboard in an ordinary installation.

Certification

All wiring work above Extra Low Voltage (230 and 110 volts) must be performed by a licensed worker – the “home owner” exemption does not apply to Connectable Installations. Any installation work requires certification, which covers the safety of the installation, including appliances connected to it.

To be acceptable as a safe installation, any Recreational Vehicle or Caravan must be demonstrably able to meet all of the mandatory requirements of the Electricity Regulations, AS/NZS 3000 and AS/NZS 3001, and all the appliances that form part of that connectable installation, or are supplied with it, must comply with AS/NZS 3820 and the Declared Article and Supplier Declaration Regulations. Where this is not the case, the supplier, and user, and any party supplying electricity to the Recreational Vehicles or Caravans risk compliance and enforcement action.

Warrants of Electrical fitness

The application of NZS 3019 to issue a WOEf makes the assumption that the Connectable Installation was compliant with the technical wiring requirements of AS/NZS 3001 (or one of its predecessors (including ECP 1)) at the time of its construction. NZS 3019 has not been written to have a particular focus on the requirements for 110 volt vehicles. It is important therefore to understand how the critical safety requirements should be applied in respect to 110 volt vehicles.

Any WOEf issued for a Recreational Vehicle or Caravan must be issued in accordance with NZS 3019.

The critically important requirements of NZS 3019 for 110 volt systems are:

7.3.2 Exposed live parts

In this regard the safety dimensions of any appliance plug are critical. The distance set in AS/NZS 3112 for the separation of the pins from the plug edge is required to be no less than 9 mm.

Exposed live part evaluation also applies to the isolation capacity of any transformer used. It is critical that the transformer's compliance with safety isolation Standard is verified to ensure that 230 volts does not appear during any faults on the 110 volt circuit. The recognised Standards are AS/NZS 61558 and AS/NZS 3108 (now superseded).

7.4.6 Continuity of socket outlets

NZ installation rules require that socket outlets used with polarised supplies be polarised, (NZS 3019). Any socket outlet that is not polarised that is used with a polarised supply is in contravention to that requirement. A socket outlet that allows the use of reversible plugs does not meet this requirement.

In addition, NZS 3019 requires socket outlets to have an earthing connection. (Note this is also relevant to the class 0 / class 01 restriction).

Non-polarised, or reversible, socket outlets, and socket outlets without an earthing connection are not compliant with the requirements for a WOEf.

7.4.9 RCD operation

The performance of any RCD must be completely checked by testing, unless the RCD has confirmed compliance with one of NZ's RCD Standards, such as AS/NZS 3190, AS/NZS 61008 and AS/NZS 61009.

Future changes

The Ministry is currently investigating how the WOEf requirements should be amended to better clarify the requirements for issuing a WOEf.