



Test and Tag Technical Information

Sourced from Workcover NSW frequently asked questions

The requirements of both the Australian Standards and the WHS Regulations Code of Practice 'Managing Electrical Risks in the Workplace' which states:

"Inspection and testing of electrical equipment **should only be carried out by a competent person** who has the relevant knowledge, skills and test instruments to carry out the relevant inspection and testing. The person carrying out any testing of electrical equipment should also be competent to interpret the test results of any equipment they use.

For example, a person carrying out testing should be:

1. a licensed electrician, or
2. a licensed electrical inspector, or
- 3. a person who has successfully completed a structured training course and been deemed competent in the use of a pass-fail type portable applicant tester and the visual inspection of electrical equipment."**

Plugs

The order (polarity) of the pins of a three pin flat pin plug, to their connections, shall be Earth (radial pin – green/yellow wire), Neutral (light blue wire) and then Active (brown wire), in a clockwise direction, when viewed from the front of the plug looking at the pins.

Cord extension sockets

The order (polarity) of the socket apertures of a three pin flat pin socket, to their connections, shall be

- Earth (radial pin – green/yellow wire),
- Active (brown wire) and then
- Neutral (light blue wire)
- in a clockwise direction, when viewed from the front of the socket looking at the apertures.

What is a portable appliance tester?

A Portable Appliance Tester (PAT) is an electronic testing instrument designed to perform a range of automatic tests on plug-in type electrical equipment as outlined in the Standard AS/NZS 3760. The results indicated by a PAT require no technical interpretation, however the instrument must still be used by a 'competent person' trained in its use.

Insulation resistance testing is performed using an ohmmeter or portable appliance tester by applying a nominal voltage to the live conductors (active and neutral) of an appliance, and placing 0 volt reference on the earthed parts of a Class I appliance or the external metal parts of a Class II appliance.

- Nominal voltage is 500V D.C. (250V D.C. may be used for equipment containing MOVs / EMI filtering)

A deficiency of the Insulation Resistance (500V/250V D.C.) test is that the D.C voltage will not activate electromagnetic switches or internal relays that are common in many modern power tools, computers, TVs etc. and therefore it can only test the appliance up to that point. Appliances with these components / design should be tested using the leakage current test.

Insulation resistance test

A leakage current test performed at rated voltage with values not exceeding 5mA for Class I appliances or 1mA for Class II appliances.

Alternatively, measure insulation resistance values are not less than 1M Ω for Class I and Class II appliances at 500V D.C. or alternatively, to avoid the equipment apparently failing the test because the metal oxide varistors (MOVs), or electro-magnetic interference (EMI) suppression has triggered, for equipment containing voltage limiting devices such as MOVs, or EMI suppression, at 250V D.C.

Leakage current testing is performed using a PAT by applying a nominal voltage to the live conductors (active and neutral) of an appliance, and placing 0 volt reference on the earthed parts of a Class I appliance or the external metal parts of a Class II appliance.

- Nominal voltage is 230V AC. (therefore it cannot be performed with a digital multimeter)

Earth continuity test

The equipment shall have a measured resistance of the protective earth circuit, or the earthing conductor of an extension cord or appliance cord set, which does not exceed 1 Ω .

Testing is performed using an ohmmeter or PAT tester:

- Using the ohmmeter to produce a reading
- Using a PAT tester under the following conditions:
 - 12V maximum, test current range 100mA to 200mA - commonly known as "earth continuity test" or "screen test"
 - 12V maximum, test current 10A - commonly known as "routine test" and/or
 - 12V maximum, 1.5 times rated current of appliance or 25A, whichever is greater - commonly known as "type test" or "bond test".

The choice of which test(s) to use is at the operator's discretion as there is merit in each test for given situations, however the 'routine test' is seldom used by competent persons as it simply replicates existing conditions for the (240V/10A) appliance and therefore the results are regarded as being of little test value.

Earth Resistance Test

This test shows the resistance offered by the earthing rods with the connection leads. Various testing instruments are available for earthing resistance tests. The earthing resistance should be less than 5 Ohm.

Does new electrical equipment require testing?

No. With new electrical equipment the supplier is deemed responsible for the electrical safety of the new equipment in accordance with the principles of safe design and manufacture. It is, therefore, not necessary for to test new equipment but the equipment should be checked to ensure no damage has occurred during shipment or commissioning.

Following the inspection and if the item of electrical equipment is to be placed into service in a hostile operating environment or used for construction work the new equipment should be fitted with a tag marked with the date it went into service. This action sets a baseline date to work with for future electrical inspection and testing activities.

How do I test 415V Three Phase electrical equipment?

The Standard AS/NZS 3760 covers testing of both 240 and 415 volt electrical equipment and requires that a range of tests be carried out on the equipment including:

- earthing continuity
- insulation resistance
- leakage current.

Note: Tests performed on 415 volt electrical equipment will require the use of test equipment appropriate to the task. Most Portable Appliance Testers (PATs) are specifically designed to perform tests on 240 volt electrical equipment.

What does the term, 'multiple working environment' mean?

This term relates to diversity in a working environment where electrical equipment is used. A workshop may have a manufacturing area, lunchroom and a low risk office area – these constitute multiple working environments.

Although the area is a workshop, the electrical equipment that is used at each different location should be assessed separately. If any of the electrical equipment has been assessed as operating in a **hostile operating environment** it must be regularly inspected and tested in accordance with the provisions of the Standard, AS/NZS 3760.

Do light fitting in the ceiling fitted with a plug and socket require testing?

No. The Standard AS/NZS 3760 does not apply to equipment such as suspended light fittings or fluorescent light fittings which are above the floor, and not normally able to be touched by a person.

This type of electrical equipment is often fitted with a flexible supply lead and connected via a plug and socket but due to the location of the equipment does not pose a risk and therefore does not require testing and tagging.

Are there any special requirements for serviced or repaired electrical equipment?

Yes. Electrical equipment that has been serviced or repaired, which could have affected electrical safety must be inspected and tested in accordance with the provisions of the Standard, AS/NZS 3760 prior to the equipment being placed back into service at the workplace.

Electrical cords and Extension leads

Tagging and checking of all 'in-service' electrical plug-in equipment in accordance with AS3760 should now be the norm in all workplaces.

If this is not the case you should ensure that it is a mandatory part of your Men's Shed Health & Safety regime.