

Regulations

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1. Approvals

Most electronic equipment will be tested and approved to the Low Voltage Directive (LVD). This ensures that the unit is safe and allows the manufacturer to fix a CE mark on the product.

The LVD is Europe's oldest Directive, it was introduced in 1974 and was upgraded on January 1st 1997. It applies to all electrical products with an intrinsic function and with an input or an output voltage of 50 – 1000 V AC or 75 – 1500 V DC.

The testing is carried out against Product or Industry Specific Standards; unlike EMC, there are no Generic Standards.

2. Testing

There are two types of test. Type testing proves the safety of the product design whilst production testing proves that the product is built correctly. This type of safety testing is usually carried out on all production units. We test to ensure that the product is safe and that there is no risk of electrocution. Testing confirms that the insulation is good enough to prevent contact with voltages and tests that the earth path is good enough in order to enable safety devices to operate and cut power.

There are four main tests, these are:

- Protective Wire (Earth Bond)
- High Voltage (Dielectric Strength Test)
- Insulation Resistance
- Earth Leakage

Protective Wire

This is probably the most important test, as the other tests rely on the earth as part of the circuit. Therefore it must be complete and continuous and able to carry excessive current.

The test is usually carried out by passing 25 A down the earth lead to the 'furthest away' part of the chassis or cover. This ensures that the earth lead is properly fitted and that all parts of the chassis assembly are also fitted properly. The circuit must have a resistance of less than 0.1 Ohms.

High Voltage

This tests the isolation of electrical equipment. The test voltage (usually 2.5 kV) is applied between shorted power lines and the protective earth. No current is allowed to flow between the two points. The test can be destructive in a failure mode. The test is carried out with a DC source as capacitors within the unit may allow AC current to flow.



Insulation Resistance

This test is very similar to the high voltage test but the voltage applied is much lower, usually only 500 V DC. The test is designed to be only a measurement test and not a destructive test. This is ensured by it only being very low power.

When applicable to power supplies this test is usually only performed on the output lines with reference to earth and the resistance measured. In order to pass the test the resistance must be at least 1M Ohm.

Earth Leakage Current

The earth leakage current test is performed to ensure that the current flowing back down the earth wire is within acceptable limits and not likely to cause injury to personnel. It is only required by some specific standards (eg EN61010 and EN60950). Also, depending on the standard will dictate whether it is performed as a type test or a production line test.

The test is performed by applying mains power to the Equipment Under Test (EUT) and measuring the leakage current. Different standards dictate different pass criteria, for example in medical equipment the pass level is only a few uA whereas in IT equipment the pass limit could be as high as 3.5mA.

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3. Production Line Testing

The LVD states that all equipment supplied must conform to the type test documentation and the only way to confirm this is to perform production line testing. This requires a lower level of test in order to prevent damage probably a higher voltage but a much reduced test time.

Cool Power has staff able to provide advice on EMC and related issues. Call your local application engineers on:

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