Earth leakage tests of portable appliances

Throughout the UK and Europe, appliance testing is becoming more common to ensure electrical equipment is safe to use. Tests that are usually performed include a visual inspection, earth continuity or earth bond test and an insulation resistance test. Also an operations test and an earth leakage test are often performed to gain further information.

Earth leakage measurements are performed when the equipment is running in its normal operating mode. For appliances that have different settings, e.g. hair dryer, the appliance should be set to its highest setting and be switched on. Earth leakage tests are often performed in place of an insulation test if there is doubt an insulation test could damage the equipment under test.

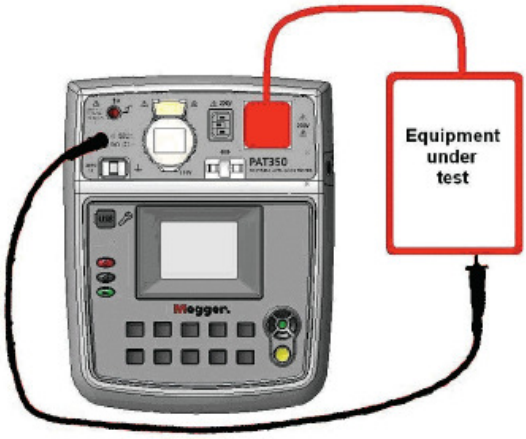
There are various earth leakage tests that can be performed:

Differential Earth Leakage Tests (IDIFF)

This measures the difference in current between the live and neutral conductors. The difference is displayed as the leakage current. The measured value is adjusted to reflect the worst leakage current at the upper operating voltage limit. This test is used when it is safe to run the asset.

Touch Current Test (IF)

Where no earth return path exists, (Class II) one has to be provided to simulate the equipment being held in the hand. The measured value is adjusted to reflect the worst leakage current at the upper operating voltage limit. This is usually used on class II items, as the user has to create an earth path with the bond lead.



Substitute Leakage Test (IPE)

This measures the leakage current in the earth conductor using a low AC voltage (typically 40Vac).
This reduces the risk of electric shock and prevents the equipment from running during the test, where this would otherwise be considered dangerous. The test socket is optional since this test is independent of the supply voltage. The measured value is adjusted to reflect the worst leakage current at the upper operating voltage limit. This is used when it is not safe to run the asset, such as electric drill or power cutter. The lower test voltage is too low to run the asset but works similar to a differential leakage test

Megger Limited manufactures a range of PAT testers that have the ability to test earth leakage, along with earth bond, insulation, operation and flash tests. The below table shows the difference between the PAT testers Megger has to offer.

	PAT320	PAT350	PAT410	PAT420	PAT450
Supply					
230 V	■	■	■	■	■
110 V		■		■	■
Supply measurement	■	■	■	■	■
Earth bond / continuity					
200 mA	■	■	■	■	■
10 A	■	■		■	■
25 A	■	■		■	■
Bond lead null	■	■	■	■	■
Insulation test					
250 V	■	■	■	■	■
500 V	■	■	■	■	■
Functional test					
VA measurement	■	■	■	■	■
Extension lead tests					
Earth bond	■	■	■	■	■
Insulation	■	■	■	■	■
Polarity	■	■	■	■	■
Portable 30 mA RCD test					
1/2 I	■	■	■	■	■
I	■	■	■	■	■
5 I	■	■	■	■	■
Earth leakage tests					
Substitute	■	■	■	■	■
Differential	■	■	■	■	■
Touch current	■	■	■	■	■
Flash test					
1.5 kV		■			■
3.0 kV		■			■
	PAT320	**PAT350**	**PAT410**	**PAT420**	**PAT450**
Other features					
Low weight, low profile	■		■		
110 V test connection					
Auto test routine	■	■	■	■	■
Manual testing	■	■	■	■	■
Configurable test times	■	■	■	■	■
Selectable pass limits	■	■	■	■	■
Fuse check	■	■	■	■	■
Display					
Colour 1/8 VGA	■	■			
Colour 1/4 VGA			■	■	■
Data handling					
10,000 record on-board storage			■	■	■
Download to USB memory stick			■	■	■
PowerSuite compatible			■	■	■
Supplied accessories					
Carry case with lead storage pouch	■	■	■	■	■
Combined continuity, earth bond and insulation test lead	■	■	■	■	■
Extension lead adaptor test lead	■	■	■	■	■
Flash test lead		■			■
Calibration certificate	■	■	■	■	■

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