

SPECIFICATION

Mains Input	240V 50Hz 5A fused mains plug. Rear panel fuse - 2A quickblow.
Earth Bond Test	Test voltage - 6V a.c. nominal Short circuit current = 36A Two shrouded test sockets: 25A - pass limit = $<0.1\Omega$ 10A - pass limit = $<0.45\Omega$
Insulation Test	Test voltage 500-600V d.c. load dependent Short circuit current $<0.5\text{mA}$ Class 1 - pass limit = $>2\text{M}\Omega$ Class 2 - pass limit = $>7\text{M}\Omega$
IEC and Kettle Lead Tests	25A Earth Bond and $2/7\text{M}\Omega$ insulation tests
Extension Lead Test	10/25A Earth Bond and $2/7\text{M}\Omega$ insulation tests
Case	18swg steel 250 x 155 x 135mm powder coated in black with carry handle and rubber feet
Supplied with:	Test lead - 4mm plug to insulated crocodile clip Test lead - 4mm plug to 13A mains plug 50 test result labels, 5 'Faulty' labels Copyright free sample test certificate Instruction booklet

We recommend that the your device should be recalibrated every year. Please telephone **01376 340506** or email sales@irwinscienceeducation.com for pricing.

Or simply download and complete our request from from:
www.irwinscienceeducation.com/calibration



Patch

Portable Appliance Tester & Checker



The PATCH should be connected to a suitable mains supply. The PATCH is switched on using the rocker switch on the front panel which will illuminate. Periodically, upon switching on, the PATCH performs a self test which illuminates one or both of the indicator leds for approximately 5 seconds.

This does not indicate a fault. The PATCH is ready for use at the end of the 5 second test period.

Class 1 Appliance Testing

- * Plug the appliance into the 13A socket on the PATCH.
 - * Select 'Class 1' with the slide switch.
 - * Plug the test lead into the appropriate 4mm socket - generally appliances with a power consumption of 1KW or less should be tested using the 10A socket. All others should be tested using the 25A socket.
 - * Connect the test clip to a part of the metal case that is bare metal - often fixing screws are a convenient point. If there is nothing on which to fasten the clip, it may be pressed firmly against the base metal ensuring that YOU are not touching bare metal. If the case has several sections, a separate test should be performed on each section (e.g. base and lid).
 - * If the appliance has an on/off switch, switch it ON.
- Making sure that you are clear of the appliance, press and hold the test button and observe the blue led above it. Should the led not illuminate then check the fuses and the mains switch. When testing certain items e.g. SMPSUs and electronically controlled drills, the blue led will simply flash rather than stay on. This constitutes a PASS. Releasing the button starts an automatic 5 second test sequence.
- * The results should be interpreted as follows:

Earth Bond Led	Result	
Green	PASS	25A test < 0.1Ω
	PASS	10A test < 0.45Ω
Red	FAIL	
Insulation Led	Result	
Green	PASS	>2MΩ
Red	FAIL	<2MΩ

Example

Patch Portable Appliance Certificate of Inspection

Inspector.....Appliance.....Date.....

Location Serial Number.....

TEST	PASS REQUIREMENT	PASS	FAIL	NOTES
1. Inspection of Cable	No insulation damage BS colour	.....	.....	.....
2. Inspection of plug	No damage Correct fuse	.....	.....	.....
3. Inspection of Male connector	BS type or equivalent	.....	.....	.....
4. Open socket without tool	Unopenable	.....	.....	.....
5. Pull cable from female connector	No movement	.....	.....	.....
6. Cable grommet or clamp	Cable insulation protected Cable pull - no movement Cable twist - no movement	.....	.....	.....
7. Inspection of mains Switch	Correct operation No damage	.....	.....	.....
8a. Case Earth connection (Class 1)	No damage	.....	.....	.....
8b. Fuse/mains switch test	Flash/continuous blue led	.....	.....	.....
8c. Earth Bond (Class 1) Earthed case	<0.1Ω (25A test) <0.45Ω (10A test)	.....	.....	.....
9a. Insulation Test (Class 1)	>2MΩ	.....	.....	.....
9b. Insulation Test (Class 2) Double insulated	>7MΩ	.....	.....	.....
..... accessible fuse	No damage	.....	.....	.....
.....	No access to live parts >50V	.....	.....	.....
	ASSESSMENT	.....	.....	.....

Recommended date for next test/...../.....Signed

Extension Leads - Select Class 1 Testing

The PATCH is supplied with a facility for testing extension leads. Plug the test lead that is terminated in a mains plug into the 25A socket and plug it's mains plug into the extension lead. Plug the extension lead into the 13A socket on the PATCH. Press and release the test button. Should the lead 'fail', plug the test lead into the 10A socket and retest. Extension leads sometimes fail because the resistance of the cable, due to the length, exceeds the cut-off resistance of the PATCH. Under these circumstances, the advice of a qualified electrician should be sought.

As a guide, a 6A cable has a resistance of 28mΩ/m, and a 13A cable has a resistance of 17.5mΩ/m. This means that 6A extensions over 9m and 13A extensions over 5m may fail the test. Similar problems may occur with items having very long leads.

Logging the Results

If the appliance PASSES: The results of the test should be logged onto a Certificate of Inspection and noted on a label affixed to the appliance.

If the appliance FAILS: The results of the test should be logged onto a Certificate of Inspection and noted on a label affixed to the appliance.

The appliance should be clearly marked as being unsafe, taken out of circulation and should be checked and repaired by a qualified electrician prior to retest.

Problems?

* The green switch neon does not illuminate when switched on.

Check the mains plug fuse (3A) and the rear panel fuse (2A).

*An appliance with a long lead fails the Earth Bond test but appears to be OK.

The resistance of long cables, particularly if they are of a low current rating, is such that the cable will cause a failure. In this case the advice of a qualified electrician should be sought.

*When performing the tests, an indicator glows red and then turns to green within the timed test period.

This does not indicate a fault; the status of the indicator near the end of the test period should be noted. Once the test period is over, the green 'Test' led will extinguish. As the circuitry powers down, the indicators may momentarily flash red - this should be disregarded.

Patch Testing Notes - Please read carefully before use

1. The testing of portable appliances includes a visual inspection as indicated on the sample Certificate of Inspection. The inspection and tests should only be performed by a competent person.

Further details on inspection standards are available from HSE. Of particular interest is Guidance Note HS(G)107, 2001. Two free leaflets are also available: Maintaining Portable Electric Equipment in Offices and other Low Risk environments and maintaining Portable Electric Equipment in Hotels and Tourist Environments.

2. When testing appliances, the term 'portable' applies to anything fitted with a mains plug including photocopiers, offset litho machines, etc.
3. When performing an insulation test on Class 2 (double insulated) appliances, the test lead crocodile clip should be pressed against various parts of the insulated case e.g. near where the mains supply enters etc. Either of the test sockets may be used for this test. Care should be taken to hold the crocodile clip via the insulating shroud. If the metal of the clip is touched during the test, a mild tingling may be felt - this is unpleasant but not dangerous.

Some double insulated appliances may have an insulating case but metal screws etc. may be visible; these do not necessarily mean that it is Class 1! Provided the screws are driven into enclosed insulating material, Class 2 integrity is maintained.

4. The insulation test applies 500-600V d.c. between the live and neutral conductors and earth. If the appliance is fitted with mains input filter capacitors, this can stress these components. The fitting of filter capacitors may also give misleading results - under these circumstances the manufacturer's advice should be sought.
5. When testing electric kettles, the test lead should be clipped to the kettle element. In hard water areas, this will require you to scrape away scale until the bare metal can be seen.
6. When testing computers, ensure that the earth bond test point is a genuine mains earth and not a signal earth point. If there is any doubt, simply complete a visual inspection and skip the PATCH tests. A note should be made on the Certificate of Inspection.
7. When assessing Class 1 and Class 2 appliances and plug fuse values, the following information may be helpful:

Items fitted with 2 core cable are Class 2 (double insulated). Some Class 2 appliances may be fitted with a 3 core cable, but Class 1 appliances are never fitted with 2 core cable. Plastic electric kettles are Class 1 (see 5 above).

Generally, the only appliances which will require 13A fuses are kettles, water heaters, irons and electric heaters. Colour televisions require a 5A fuse. Most other appliances require a 3A fuse - if in doubt fit a 3A fuse. If this 'blows' try a 5A. If this 'blows', fit a 13A.

Testing Computers with the Patch

Please read the following carefully, and ensure that you fully understand before starting computer testing.

It is possible to use the Patch to test computers?

Normally a PAT test of computer or other IT equipment uses a low current (100mA) test. Whilst this will give an indication of Earth Bond fitness, it is not particularly good as it does not stress the connection with a sufficiently high current to show a fault.

Any PAT tester (including the Patch) can be used to test a computer, but you have to be careful where you connect the Earth Bond test lead.

The computer may have a plastic or metal casing, but the electronics are built on a metal chassis. It is to this chassis that you must connect the test lead. Most computers have a series of serial and parallel ports and printer ports on the back panel. **DO NOT CONNECT TO THESE.** Look for the case securing screws and use one of these to make the connection.

The problem is that computers use two kinds of earth - one which is bonded to the mains earth and the other that is connected via printed circuit board tracks to the ports (the signal earth). If this connection is made, the pat tester puts approximately 15A through this circuitry and the computer will never work again!

MAKE SURE THAT THE EARTH CONNECTION YOU USE IS THE CASE SECURING SCREW - NOTHING ELSE WILL DO!

The simplest way to test is to leave the computer and monitor linked and switched on and to test the whole system together. Select Class 1 test and use the 10A Earth Bond test socket.

If you have any doubts, do not test, do a visual inspection only and mark your paperwork accordingly.

Class 2 Appliance Testing

- * Plug the appliance into the 13A socket on the PATCH.
- * Select 'Class 2' with the slide switch.
- * Plug the test lead into either 4mm socket.
- * Connect the test clip to a part of the insulated case. If there is nothing on which to fasten the clip, it may be pressed firmly against the case ensuring that YOU are not touching the metal of the clip. Several tests should be applied to different parts of the case. If there are metal parts (e.g. the chuck of an electric drill), these should also be tested.
- * If the appliance has an on/off switch, this should be switched ON.
- * Press and hold the test button and observe the blue led above it. Should the led not illuminate then check the fuses and the mains switch. When testing certain items e.g. SMPSUs and electronically controlled drills, the blue led will simply flash rather than stay on. This constitutes a PASS. Releasing the button starts an automatic 5 second test sequence
- * Observe the result led for Insulation during the 5 second test. The Earth Bond led is disabled during Class 2 testing.

The results should be interpreted as follows:

Insulation Led	Result
Green	PASS = $>7M\Omega$
Red	FAIL = $<7M\Omega$

IEC Lead Testing

IEC and high temperature IEC (kettle) leads may be tested independently of the appliance if required. This may be done by connecting the lead between the 13A and IEC connectors on the front panel of the PATCH. The Earth Bond test lead is not used. Class 1 test should be selected and the test button pressed. The results should be interpreted as for Class 1 testing above. Any lead that does not give an unambiguous GREEN result on both Earth Bond and Insulation leads should be carefully checked.