



Socket protectors are widely available, but could they be doing more harm than good?

By Mark Coles

SOCKET PROTECTORS

SOCKET PROTECTORS are intended to stop foreign objects from being inserted into BS 1363, 13A socket-outlets. The socket protector usually takes the form of a dummy 13A plug and is inserted into the socket-outlet. The intention here is to prevent anything else being inserted into the socket-outlet, such as the fingers of children or lengths of metallic objects.

The safe system that is BS 1363

Accessories to BS 1363 are made to exacting requirements so that the plug perfectly fits the socket-outlet. When BS 1363 was defined in the 1940s the designers wanted to make sure that the socket-outlet was very safe. The standard requires that an interlocking shutter system stops random objects from being inserted into the socket-tubes and that all socket-outlets be tested to ensure that a pin has to be inserted a distance of 9.6mm into the socket before it makes contact with

any live parts. The shutter system will operate and open to expose the line and neutral connections only when a plug is inserted. It is actioned by:

- the earth pin of the plug, or
- both the line and neutral pins simultaneously, or
- all three pins; first the earth pin followed by both the line and neutral pins simultaneously.

The shutter mechanism is shown in the diagram on page 30. An earth pin has been inserted into the socket on the left, the shutters which normally cover the socket tubes have opened. There is nothing inserted in the socket-outlet on the right, hence the shutters are closed. BS 1363, therefore, already incorporates a mechanism which stops intentional and unintentional direct contact with live parts.

Dangers

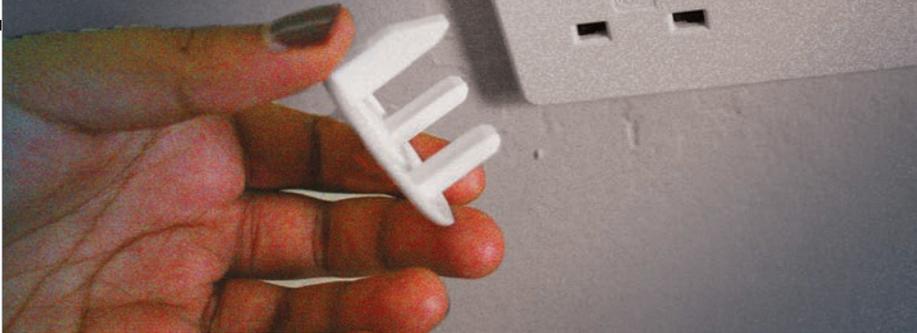
The intended function of the socket protector sounds so simple, but the reality can be quite the opposite.

As there is no standard for socket protectors, products available on the market vary in terms of quality and dimension. The pins of socket protectors are rarely the same size as a plug; they are usually wider or narrower. Where the pins are wider than a 13A plug, the socket protector has the effect of widening the spring contact in the socket tube and, ultimately, results in permanent damage and poor contact with the socket-outlet leading to arcing in normal use.

Also, withdrawing an oversized socket protector is likely to be tricky as it is effectively wedged in. In such cases, forcing the protector out of the socket with whatever tools are to hand can damage the socket-outlet and lead to more danger. Where the pins of the socket protector are narrower than a 13A plug, the socket protector can be easily withdrawn from the socket-outlet.

Beyond the physical dimensions of the socket-protector, the next consideration is the material from which it is made. Should the material be brittle, the socket protector could snap during the withdrawal process, leaving a pin in the socket tube and other socket tubes exposed as the shutter mechanism has been defeated. Where the material is overly malleable, socket protectors can be inserted upside down, which will

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operate the safety shutter mechanism and expose the live parts. Using a non-standard system to protect a long established safe system makes no sense.

What does BS 7671:2008(2011) require?

Regulation 553.1.100 states: "Every socket-outlet for household and similar use shall be of the shuttered type and, for an a.c. installation, shall preferably be of a type complying with BS 1363."

Socket-outlets in excess of 13A, e.g. industrial types to BS EN 60309-2, are available in current ratings of 16, 32, 63, 125A, but are not intended for household or similar use. Generally, these socket-outlets do not incorporate an integral shutter system.

Where did it all start?

During the Second World War, the government commissioned a number of reports which looked at how the country could proceed efficiently once war was over. Discussions on the 'Post-War Building Studies' were convened by the IEE (forerunner of the IET) and the committee was charged with the following:

1 To review existing information and practice concerning installations in buildings for:

a the supply of electricity for all purposes from the point of entry of the current at the property boundary to the

point of its delivery to an appliance;

b electrical household appliances serving the single family dwelling; and

c all forms of electrically operated telecommunications.

2 To review proposals for improved electrical appliances for space heating, cooking, refrigeration, hot-water supply, dish washing, and clothes washing.

3 To make recommendations for practice in post-war building.

Post War Building Study No.11 'Electrical Installations' was published in 1944. Section 76 gave birth to the ring-final circuit:

"We recommend that small dwellings of the types considered should be wired with three separate circuits for lighting, cooking, and socket-outlets respectively, each controlled by a separate single-pole fuse. It is proposed that all socket-outlets should be supplied from a 'ring circuit' which, starting and ending at the fuse terminal at the consumer's supply control will pass through each room in turn. In the small dwellings under consideration it is considered permissible to connect up to 20 of the proposed standard socket-outlets on the ring circuit. At the consumer's supply control the ring circuit will be fused for 30 amperes, a current which is unlikely to be exceeded in the conditions of load diversity met with in small dwellings. At each outlet position on the

ring circuit it will be necessary to provide a cartridge type fuse for local protection. With regard to the socket-outlet circuit, the recommendation to connect a number of standard socket-outlets on a ring circuit represents a departure from existing practice as laid down in the Wiring Regulations (Eleventh Edition)."

With ring-circuits rated at 30A and up to twenty socket-outlets connected to the circuit, it was therefore necessary to incorporate a fuse on the appliance side of the electrical system, this led to the development of British Standard 1363:1947 Fused Plugs and Shuttered Socket Outlets, introduced in 1947.

What does the government say?

The government's advice on the use of socket protectors is posted under the 'Fire safety advice for parents and child carers' section of the Directgov website (www.direct.gov.uk/en/Parents/Yourchildshealthandsafety/Yourchildsafetyinthehome/DG_10038395). This states:

"It is very difficult for a child to get an electric shock by playing with a socket, so you shouldn't need to use socket covers. However, in some instances they may stop young children plugging in heaters or other appliances that could cause burns or start a fire. You should not rely on socket covers as they are not regulated for safety. It's much better to make sure appliances are safely put away."

Last word

Socket-outlets to BS 1363 are the safest in the world and have been since they were first designed in the 1940s. Socket protectors are not regulated for safety, therefore, using a non-standard system to protect a long established safe system is not sensible. ❌

Thanks to David Peacock (Fatally Flawed) and Malcolm Mullins (Honeywell)

Further information

BS 1363-2:1995 +A4 2012 13 A plugs, socket-outlets, adaptors and connection units — Part 2: Specification for 13 A switched and unswitched socket-outlets The Plugs and Sockets etc. (Safety) Regulations 1994: www.legislation.gov.uk/ukxi/1994/1768/contents/made Wiring Matters Issue 18, Spring 2006, "The origin of the BS 7671 Plug and socket outlet system": <http://electrical.theiet.org/wiring-matters/18/plug-origin.cfm?type=pdf> Fatally Flawed: www.fatallyflawed.org.uk

Shutter mechanism

