TECHNICAL REPORT

Client: Stephen Curtler
Electrical Safety Council
18 Buckingham Gate
London
SW1E 6LB

Report issued by:

Intertek ETL SEMKO
Research & Performance Testing

Davy Avenue
Knowlhill
Milton Keynes
MK5 8NL

Tel. +44 (0)1908 857777
Fax. +44 (0)1908 857830

AUTHORISED FOR ISSUE: .....

Tony Parkinson
Appliances Manager

DATE: 8th May 2007

TEST ENGINEER: Bryan McPhee
REVIEWED BY: Andrew Gordon

S64604 Issue 1

Travel Adaptors: Safety Assessments

Introduction

The Electrical Safety Council commissioned Intertek Research and Performance Testing (Intertek RPT) to select several Travel adaptor products for testing under the general safety provisions of the relevant standards.

All project samples were purchased in the UK. Seven products were obtained in total, six from high street retailers and one from an established market trader. All traders have an established track record for traceability purposes (see page 3 for an overview of the products).

The safety assessments have been carried out under the terms of reference in Appendix I, and as such, the results are only applicable to the samples tested and the conditions of the tests. Sample variability and changes in test conditions could influence some results, and the result(s) as stated may not be representative of the mean result if a number of different samples were tested under a variety of test conditions.

The assessments were carried out at Intertek RPT during April/May 2007.

Summary

Five of the samples tested failed the Intertek RPT safety assessment with standard departures including accessible current carrying parts and a minor marking omission. An observation for the socket-outlet apertures was also noted for four of the samples. Sample code AG01 was not tested, as it was electrically identical to sample code AF01. However, it may be assumed that departures noted for sample code AF01 also apply for sample code AG01. Sample AB01 passed with no departures or observations being noted.

The table below contains the sample details and the assessment results.

Intertek RPT sample code	Product type	Model N°	Assessment results
AA01a & b	UK to European	6605	**FAIL**
AB01a & b	UK to European	UK to World	Pass
AC01	European to UK	A134	**FAIL**
AD01a & b	UK to European	Adaptour 2000	**FAIL**
AE01	UK to European	A135	**FAIL**
AF01a & b	UK to European	Not stated	**FAIL**
AG01a & b	UK to European	Not stated	Not tested – electrically identical to AF01

Project Samples Overview

The following seven samples were purchased for testing under this project:

Sample codes AA01, AD01, AE01 and AF01 (shown below) were found to have an access to live parts issue, while both the line and neutral pin apertures were all found to exceed dimensional requirements.

Sample code AA01

Sample code AD01

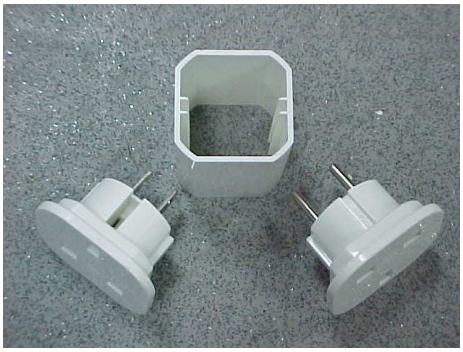
Sample code AE01

Sample code AF01

Sample code AC01 (shown left) is marked “BS 5733” instead of the appropriate British Standard “BS 1363-3”.

Sample code AG01 (shown left) was found to be electrically identical to sample AF01 and was therefore not tested.

Project Samples Overview (cont'd)



Sample code AB01 (shown left) passed with no departures or observations being noted.

Electrical Safety Assessment Rationalle

The UK Plugs and Sockets etc (Safety) Regulations 1994 (Statutory Instrument number 1768) contains the following exclusion for travel adaptors under Schedule 1:

> *"Any travel adaptor (that is to say an adaptor which enables a plug designed for use in the United Kingdom to be connected to a socket used outside the United Kingdom)."*

The Regulations also state that adaptors, other than those excluded in Schedule 1, are within the scope of BS 5733 Specification for general requirements for electrical accessories.

Six of the adaptor samples purchased for this project are "travel adapters", as defined by the above Regulations and are therefore excluded from those Regulations.

The scope of this project is therefore limited to the following aspects:

- The socket-outlet portion of the adaptor, which will accept a UK 3-pin plug
- The UK 13A plug portion where applicable
- Internal construction elements of adaptors having non-UK plug portions

In particular, Intertek RPT has assessed the socket-outlet portion of the adaptors under BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1. In general, the non-UK plug portion of the adaptors should be assessed under their respective national standards and Regulations. However, Intertek RPT has referred to BS 5733 when assessing internal construction elements of the plug portions.

The terms of reference for the Intertek RPT safety assessment can be found in Appendix I.

Electrical Safety Assessments

3-pin UK plug to 2-pin European plug (Sample codes AA01a & AA01b)

Figure 1 *AA01a & AA01b*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

UK visitors to Europe

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 5733:1995 Specification for general requirements for electrical accessories, incorporating amendment 1

Safety criteria	Results	
	AA01a	AA01b
Functional check	Pass	Pass
Marking	Pass	Pass
Creepage distances and clearances in air	Pass	Pass
Accessibility of live parts	Pass	Pass
Provision for earthing	Pass	Pass
Construction	Pass	Pass
Provisions for cables and cords	NA	NA
Insulation resistance and electric strength	Pass	Pass
Mechanical strength	Pass	Pass

With reference to:
BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Construction of adaptors (socket-outlet portion)	**FAIL**	**FAIL**

Sample codes AA01a & AA01b - Electrical Safety Assessment Departures

Construction (adaptor socket-outlet portion)

Clause 13.7 of BS 1363-3
The above clause says:

> *"The construction of the adaptor shall be such that when a plug is withdrawn from it, the current- carrying socket contacts are automatically screened by shutters. The shutters shall be operated either by the insertion of the earthing pin or by the simultaneous insertion of any two or more pins of the plug, provided that any one corresponding single pin inserted into any current-carrying socket aperture shall not open the shutter."*

Inspection of both samples revealed that when a single pin is inserted into either current-carrying socket apertures, it is possible to touch the current-carrying parts of the other socket aperture with the test pin (see Figures 2 & 3).

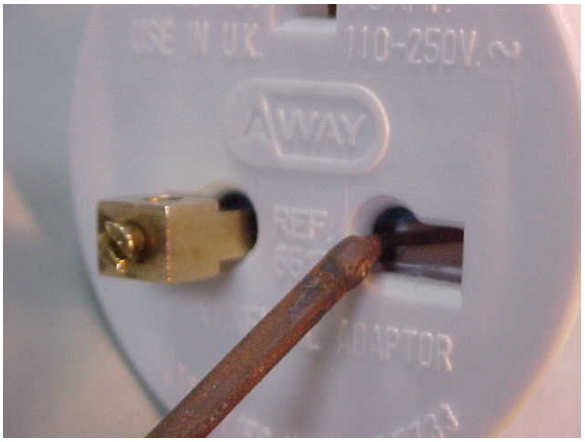


Figure 2 *AA01a* - a*ccess to current-carrying parts*

Figure 3 *AA01b* - a*ccess to current-carrying parts*

Observation

BS 1363-3, clause 13.8 states that *"For adaptors with adaptor socket-outlets for BS 1363 plugs, apertures for the reception of the line and neutral plug pins shall not exceed 7.2 mm x 4.8 mm and for the earthing plug pin 8.8 mm x 4.8 mm."*

The apertures on this sample measured 9.0 mm x 5.5 mm, as they also accept the UK type plug under BS 4573, which has larger diameter pins and a shorter distance between pins than the so-called *Europlug* pin configuration.

3-pin UK plug to 2-pin European plug (Sample codes AB01a & AB01b)

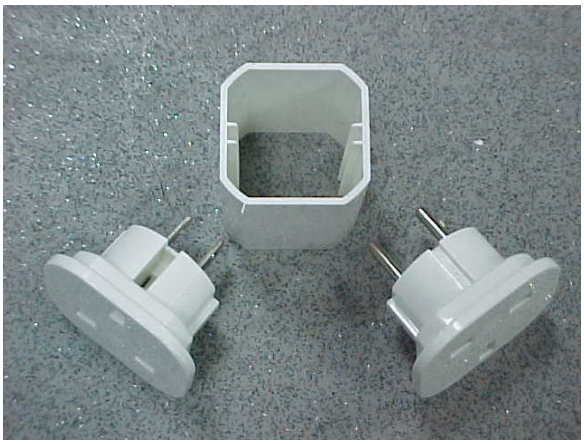


Figure 4 *AB01a & AB01b*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

UK visitors to Europe

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 5733:1995 Specification for general requirements for electrical accessories, incorporating amendment 1

Safety criteria	Results	
	AB01a	AB01b
Functional check	Pass	Pass
Marking	Pass	Pass
Creepage distances and clearances in air	Pass	Pass
Accessibility of live parts	Pass	Pass
Provision for earthing	Pass	Pass
Construction	Pass	Pass
Provisions for cables and cords	NA	NA
Insulation resistance and electric strength	Pass	Pass
Mechanical strength	Pass	Pass

With reference to:
BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Construction of adaptors (socket-outlet portion)	Pass	Pass

Universal 2-pin/3-pin to UK 3-pin plug (Sample code AC01)

Figure 5 *AC01*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

Visitors to UK adaptor

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Safety criteria	Results
Functional check	Pass
Marking and labelling	**FAIL**
Clearances, creepage distances and solid insulation	Pass
Accessibility of live parts	Pass
Provision for earthing	Pass
Terminals and terminations of intermediate adaptors and adaptor plugs	Pass
Construction of adaptors (plug portion)	Pass
Construction of adaptors (socket-outlet portion)	Pass
Insulation resistance and electric strength	Pass
Mechanical strength	Pass
Screws, current-carrying parts and connections	Pass

Sample code AC01 - Electrical Safety Assessment Departure

Marking and labelling

Clause 7.1 b) of BS EN 1363-3

The above clause requires that appropriate information shall be legibly and durably marked on the adaptor, including the number of the appropriate British Standard.

The adaptor is marked “BS 5733”. It should also be marked with the British Standard “BS 1363-3”.

3-pin UK plug to 2-pin European plug (Sample codes AD01a & AD01b)

Figure 6 *AD01a & AD01b*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

UK visitors to Europe

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 5733:1995 Specification for general requirements for electrical accessories, incorporating amendment 1

Safety criteria	Results	
	AD01a	AD01b
Functional check	Pass	Pass
Marking	Pass	Pass
Creepage distances and clearances in air	Pass	Pass
Accessibility of live parts	Pass	Pass
Provision for earthing	Pass	Pass
Construction	Pass	Pass
Provisions for cables and cords	NA	NA
Insulation resistance and electric strength	Pass	Pass
Mechanical strength	Pass	Pass

With reference to:
BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Construction of adaptors (socket-outlet portion)	**FAIL**	**FAIL**

Sample codes AD01a & AD01b - Electrical Safety Assessment Departures

Construction (adaptor socket-outlet portion)

Clause 13.7 of BS 1363-3
The above clause says:

> *"The construction of the adaptor shall be such that when a plug is withdrawn from it, the current- carrying socket contacts are automatically screened by shutters. The shutters shall be operated either by the insertion of the earthing pin or by the simultaneous insertion of any two or more pins of the plug, provided that any one corresponding single pin inserted into any current-carrying socket aperture shall not open the shutter."*

Inspection of both samples revealed that when a single pin is inserted into either current-carrying socket apertures, it is possible to touch the current-carrying parts of the other socket aperture with the test pin (see Figures 7 & 8).

Figure 7 *AD01a* - a*ccess to current-carrying parts*

Figure 8 *AD01b* - a*ccess to current-carrying parts*

Observation

BS 1363-3, clause 13.8 states that *"For adaptors with adaptor socket-outlets for BS 1363 plugs, apertures for the reception of the line and neutral plug pins shall not exceed 7.2 mm x 4.8 mm and for the earthing plug pin 8.8 mm x 4.8 mm."*

The apertures on this sample measured 9.2 mm x 5.6 mm, as they also accept the UK type plug under BS 4573, which has larger diameter pins and a shorter distance between pins than the so-called *Europlug* pin configuration.

3-pin UK plug to 2-pin European plug (Sample code AE01)

Figure 9 *AE01*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

UK visitors to Europe

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 5733:1995 Specification for general requirements for electrical accessories, incorporating amendment 1

Safety criteria	Results
Functional check	Pass
Marking	Pass
Creepage distances and clearances in air	Pass
Accessibility of live parts	Pass
Provision for earthing	Pass
Construction	Pass
Provisions for cables and cords	NA
Insulation resistance and electric strength	Pass
Mechanical strength	Pass

With reference to:
BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Construction of adaptors (socket-outlet portion)	**FAIL**

Sample code AE01 - Electrical Safety Assessment Departure

Construction (adaptor socket-outlet portion)

Clause 13.7 of BS 1363-3
The above clause says:

> *"The construction of the adaptor shall be such that when a plug is withdrawn from it, the current- carrying socket contacts are automatically screened by shutters. The shutters shall be operated either by the insertion of the earthing pin or by the simultaneous insertion of any two or more pins of the plug, provided that any one corresponding single pin inserted into any current-carrying socket aperture shall not open the shutter."*

Inspection revealed that when a single pin is inserted into either current-carrying socket apertures, it is possible to touch the current-carrying parts of the other socket aperture with the test pin (see Figure 10).

Figure 10 *Access to current-carrying parts*

Observation

BS 1363-3, clause 13.8 states that *"For adaptors with adaptor socket-outlets for BS 1363 plugs, apertures for the reception of the line and neutral plug pins shall not exceed 7.2 mm x 4.8 mm and for the earthing plug pin 8.8 mm x 4.8 mm."*

The apertures on this sample measured 9.2 mm x 5.7 mm, as they also accept the UK type plug under BS 4573, which has larger diameter pins and a shorter distance between pins than the so-called *Europlug* pin configuration.

3-pin UK plug to 2-pin European plug (Sample codes AF01a & AF01b)

Figure 11 *AF01a & AF01b*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

UK visitors to Europe

The following standards were used for the electrical safety assessment. Results of the safety assessment are shown in the table below.

- BS 5733:1995 Specification for general requirements for electrical accessories, incorporating amendment 1

Safety criteria	Results	
	AF01a	AF01b
Functional check	Pass	Pass
Marking	Pass	Pass
Creepage distances and clearances in air	Pass	Pass
Accessibility of live parts	Pass	Pass
Provision for earthing	Pass	Pass
Construction	Pass	Pass
Provisions for cables and cords	NA	NA
Insulation resistance and electric strength	Pass	Pass
Mechanical strength	Pass	Pass

With reference to:
BS 1363-3:1995 13 A plugs, socket-outlets, adaptors and connection units - Part 3: Specification for adaptors, incorporating amendments 1 and 2 and corrigenda 1

Construction of adaptors (socket-outlet portion)	**FAIL**	**FAIL**

Sample codes AF01a & AF01b - Electrical Safety Assessment Departures

Construction (adaptor socket-outlet portion)

Clause 13.7 of BS 1363-3
The above clause says:

> *"The construction of the adaptor shall be such that when a plug is withdrawn from it, the current- carrying socket contacts are automatically screened by shutters. The shutters shall be operated either by the insertion of the earthing pin or by the simultaneous insertion of any two or more pins of the plug, provided that any one corresponding single pin inserted into any current-carrying socket aperture shall not open the shutter."*

Inspection of both samples revealed that when a single pin is inserted into either current-carrying socket apertures, it is possible to touch the current-carrying parts of the other socket aperture with the test pin (see Figures 12 & 13).

Figure 12 *AF01a* - a*ccess to current-carrying parts*

Figure 13 *AF01b* - a*ccess to current-carrying parts*

Observation

BS 1363-3, clause 13.8 states that *"For adaptors with adaptor socket-outlets for BS 1363 plugs, apertures for the reception of the line and neutral plug pins shall not exceed 7.2 mm x 4.8 mm and for the earthing plug pin 8.8 mm x 4.8 mm."*

The apertures on this sample measured 8.8 mm x 5.35 mm, as they also accept the UK type plug under BS 4573, which has larger diameter pins and a shorter distance between pins than the so-called *Europlug* pin configuration.

Appendix I

Terms of Reference for the Intertek RPT Electrical Safety Assesssment

The Intertek RPT electrical safety assessment consists primarily of visual inspections and basic electrical safety tests. It relies on the test engineer's knowledge and expertise of testing a broad range of electrical products. However, the inspections and tests are based upon the latest safety standards. The headings below are taken from EN 60335-1:2002 (Safety of household and similar electrical appliances. Part 1: General requirements) and generally form the criteria for the screening test. The clause headings may change if another standard is used, e.g. EN 60598 for Luminaires.

The Intertek RPT safety assessment is most usefully applied where a product already complies with a safety standard. It is not suitable for inclusion in a technical file as a justification for CE marking under the Electrical Equipment (Safety) Regulations 1994.

Marking and instructions - Inspection of *pictorial* and *written warnings* on the appliance and in the instructions. Look for CE and approval marks.

Protection against access to live parts - Inspection for *access* to live parts after removal of *detachable parts*. ***From EN 60335-1: clause 8***

Leakage current and electric strength - Carry out *leakage current* test and *electric strength* test. ***From EN 60335-1: clause 13 and 16.3***

Stability and mechanical hazards - Inspect for *access* to *dangerous moving parts*.

Mechanical strength - Carry out *impact and/or drop* tests

Construction - Inspect for *basic* constructional requirements

Internal wiring - Inspect for *basic* wiring requirements.

Supply connection and external flexible cords - Inspect cord for marking of *cross sectional area* and *cord anchorage*. Carry out tests in cases of doubt.

Provision for earthing - Inspect *earthing* system and carry out *25 Amp* test if applicable.

Clearances, creepage distances and solid insulation - Inspect *creepage* and *clearances*, measure only in cases of doubt.

Other tests and inspections

- ***Functional check*** – Carried out at rated voltage after product has stabilized.
- ***Plug and fuse*** - Inspect pins of plug-in devices and plugs for fuse rating, wiring and BS1363 mark

End of report