TECHNICAL REPORT

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Mains Socket-outlet Mounted Air Fresheners: Safety Assessments

Introduction

The Electrical Safety Council commissioned Intertek to carry out electrical safety assessments on a selection of mains socket-outlet mounted air fresheners under the general safety provisions of the relevant standards.

In particular, Intertek purchased six samples for testing, which are shown on page 3.

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 during September 2008.

Summary

Two of the samples tested failed the Intertek safety assessment with standard departures, namely the absence of an appropriate warning in the user instruction manual and a mechanical strength test failure resulting in accessible live parts. The four remaining samples passed the Intertek safety assessment with no departures or observations being recorded. General advice for the safe use and installation of these product types can be found in Appendix II.

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

Intertek sample code	Product type	Assessment results
EI1	Plug-in air freshener	**FAIL**
ES1	Plug-in air freshener	**FAIL**
ET1	Plug-in air freshener	Pass
EU1	Plug-in air freshener	Pass
EV1	Plug-in air freshener	Pass
EW1	Plug-in air freshener	Pass

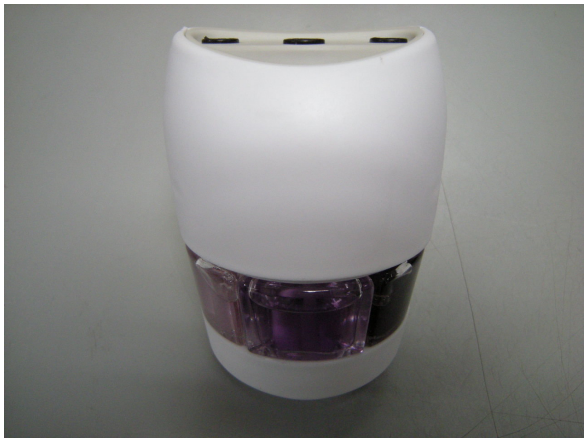
Project Samples

The following six samples were selected for testing under this project:

Sample code EI1

Sample code ES1

Sample code ET1



Sample code EU1

Sample code EV1

Sample code EW1

Electrical Safety Assessment

The samples have been subjected to a safety assessment under the general safety provisions of the following standards:

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating amendments A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1:
  Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2

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

Electrical Safety Assessments

Plug-in air freshener (Sample code EI1)

Figure 1 *Sample EI1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	**FAIL**
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Sample code EI1 - Electrical Safety Assessment Departure

Marking and instructions

EN 60335-2-101:2002, clause 7.12
The above clause says:

> *The instruction shall be include the substance of the following:*
>
> *The appliance is only to be used with the recommended vaporizing medium. The use of other substances may give rise to a toxic or fire risk*.

The instructions provided do not contain the substance of the above warning.

Plug-in air freshener (Sample code ES1)

Figure 2 *Sample ES1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	**FAIL**
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	**FAIL**
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Sample code ES1 - Electrical Safety Assessment Departures

Marking and instructions

EN 60335-2-101:2002, clause 7.12
The above clause says:

> *The instruction shall be include the substance of the following:*
>
> *The appliance is only to be used with the recommended vaporizing medium. The use of other substances may give rise to a toxic or fire risk.*

The instructions provided do not contain the substance of the above warning.

Mechanical strength

EN 60335-1:2002, clause 21.1 & EN 60335-2-101:2002, clause 21.1
The above clause states:

> *Appliances shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use.*
>
> *Compliance is checked by applying blows to the appliance in accordance with test Ehb of IEC 60068-2-75, the spring hammer test.*
>
> *The appliance is rigidly held by its contact pins and subjected to three blows, having an impact energy of 0.5J, applied to every point of the enclosure that is likely to be weak.*
>
> *If necessary, the blows are also applied to handles, levers, knobs and similar parts and to signal lamps and their covers but only if the lamps or covers protrude from the enclosure by more than 10mm or if their surface area exceeds 4 cm².*
>
> *After the test, the appliance shall show no damage that could impair compliance with this standard and compliance with 8.1, 15.1 and clause 29 shall not be impaired.*

Inspection after the above test revealed enclosure damage allowing access with the standard test finger of clause 8.1 of EN 60335-1 where it was possible to contact live parts (see Figure 3 & 4).

Figure 3 *Access to live parts with test finger*

Figure 4 *View of accessible live parts*

Plug-in air freshener *Duo* (Sample code ET1)

Figure 5 *Sample ET1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	Pass
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Plug-in air freshener *Trio* (Sample code EU1)

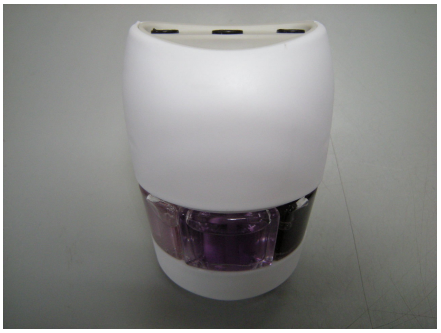


Figure 6 *Sample EU1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	Pass
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Plug-in air freshener (Sample code EV1)

Figure 7 *Sample EV1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	Pass
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Plug-in air freshener (Sample code EW1)

Figure 8 *Sample EW1*

Initial Inspection and Functional Check

The sample was undamaged and a functional check proved satisfactory.

Electrical Safety Assessment

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

- EN 60335-1:2002 Household and similar electrical appliances – Safety
  Part 1: General requirements, incorporating A1, A2, A11 and A12

- EN 60335-2-101:2002 Household and similar electrical appliances – Safety –
  Part 2-101: Particular requirements for vaporizers

Safety criteria	Results
Functional check	Pass
Marking and instructions	Pass
Protection against access to live parts	Pass
Leakage current and electric strength	Pass
Stability and mechanical hazards	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	NA
Provision for earthing	NA
Clearance, creepage distances and solid insulation	Pass

Additional testing

- BS 1363-1:1995 13A Plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13 A fused plugs, incorporating Amendments 1 and 2.

Construction of plugs	Pass

Appendix I

Terms of Reference for the Intertek Electrical Safety Assesssment

The Intertek 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 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

Appendix II

General advice for the safe use of mains socket-outlet mounted air fresheners

- Read carefully all instructions and warnings provided with the product
- Ensure that the product is installed as per the manufacturer's instructions. For example, the product may be inserted into a trailing socket and therefore in a horizontal position rather than a vertical position, as intended. Installing in a horizontal position might increase the risk of liquid leakage onto internal live parts, Under certain circumstances the liquid might compromise the electrical insulation resulting in a potentially hazardous condition
- Ensure that the product is used only with the recommended vaporizing solution
- Be aware that the product has hot surfaces to evaporate the active ingredients and these surfaces should not be touched during normal conditions of use

End of report