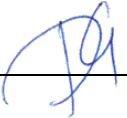


TECHNICAL REPORT

No. : 42233

Client	Electrical Safety Council 1.10, Canterbury Court 1-3 Brixton Road London SW9 6DE
Client contact	Stephen Curtler
Scope of report	Safety Screening of Health and Beauty Products - Hair straighteners
Sample/s tested / Condition	5 samples / new, boxed
Reference Standards	EN 60335-2-23:2003 +A1:08 +A11:10 used with EN 60335-1:2002 +A11:04 +A1:04 +A12:06 +A2:06 +A13:08 +A14:10
Date sample received	10 January 2011
Test period	14 January 2011 to 24 January 2011
Date of issue	09 February 2011
Tests carried out at	20 ± 5°C
Testing Officer	 _____ <i>Paul Artopoulos</i>
Verified by	 _____ <i>Peter Cross</i>

Form No: QF102-2
Issue No: 1
Issue Date: 03.08.07



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THIS REPORT APPLIES ONLY TO THE PARTICULAR SAMPLE UNIT(S) TESTED AND TO THE SPECIFIC TESTS CARRIED OUT AS DETAILED IN THIS REPORT.

Introduction

The Electrical Safety Council established a safety screening testing project for household electrical health and beauty products, (see appendix A), and commissioned Nemko Ltd to carry out electrical safety screening tests on five Hair Straighteners, purchased by the Council, under the general safety provisions of the following safety standards:-

EN 60335-1:2002 +A11:04 +A1:04 +A12:06 +A2:06 +A13:08 +A14:10

Household and similar electrical appliances – Safety
Part 1: General requirements

EN 60335-2-23:2003 +A1:08 +A11:10

Household and similar electrical appliances – Safety –
Part 2-23: Particular requirements for appliances for skin or hair care

The Hair Straighteners tested are listed below and illustrated on page 3.

The electrical safety screening tests have been carried out under various headings taken from EN 60335-1 with some additions and consist of inspections and measurement with limited testing. Nemko engineers applied their professional judgement in deciding upon the limited tests carried out and it must be stressed that full testing to the above safety standards is outside the scope of this project.

Summary

One of the five models passed the screening test with some minor criticisms, but the other four all failed for various reasons, including marking, dielectric strength, possible burn hazards and more. None of the instruction leaflets included text contained in the recently published A11 to EN 60335-2-23. This has not been classed as a non-compliance, as this amendment does not become mandatory until 14-04-2013.

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

<u>Sample Code</u>	<u>Description</u>		<u>Assessment result</u>
10	20 Watt Hair Straightener	Brightly coloured model	FAIL
11	65 Watt Hair Straightener	Model with electronic control	FAIL
12	30 Watt Hair Straightener	Model with removable plates	*PASS
13	160 Watt Hair Straightener	“Professional” model	FAIL
14	150 Watt Hair Straightener	Model from brand leader	FAIL

* denotes generally “PASS” but with observations in report details section

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Project Samples

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



Sample code 10



Sample code 11



Sample code 12



Sample code 13



Sample code 14

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Electrical Safety Screening Tests – Report Details

20 Watt Hair Straightener – Brightly coloured model (Sample code 10)



Test summary

Safety Criteria	Results
Plug and fuse	Pass
Classification	Pass
Initial operation	Pass
Marking and instructions	Fail
Protection against access to live parts	Pass
Power input and current	Pass
Heating	Fail
Leakage current and electric strength	Pass
Abnormal operation	Pass
Mechanical strength	Pass
Construction	*Pass
Internal wiring	Pass
Supply connection and external flexible cords	Pass
Provision for earthing	Pass
Clearance, creepage distances and solid insulation	Fail

Additional Heading

Components	Fail
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Details of non-compliance

- Marking The appliance is not marked with it's model name, class II symbol, AC symbol (or 50Hz as an alternative) and the wheelie bin symbol. A warning and symbol not to use near a bathtub is shown on label stuck to the mains lead, rather than on the appliance itself, but the symbol used is not according to the standard.
- Instructions The instructions do not include the substance of the text:- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

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- Heating The appliance is so small that there is no delineation of which parts should be treated as the “handle”. Therefore, when pushing the jaws together it is possible to inadvertently touch parts of the casing with a temperature rise of over 100°K. The limit for handles touched for short periods is 60°K maximum. Additionally, as the jaws do not open very widely, a user could suffer burns from the heated plates (~190°K) when attempting to operate the on-off switch.
- Clearance, creepage distances and solid insulation The creepage distance between live parts of opposite polarity on the LED printed circuit board measured 1.65mm. (Limit 2mm minimum). The creepage distance between live parts and a the accessible surface of the enclosure in the vicinity of the on-off switch knob measured 4.1mm. (Limit 5mm minimum).
- Components The miniature on-off switch has no marking and does not appear to be suitable for use as a mains switch.

Observations (denoted by * in above table)

- The hair straightener is not shaped or decorated like a toy and so complies with clause 22.44 of EN 60335-1. Nevertheless, the brightly coloured enclosure might still be considered appealing as a plaything by young children. As noted above, there is no warning in the instruction leaflet about supervising children to ensure that they do not play with the appliance.

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- **65 Watt Hair Straightener – Model with electronic control** (Sample code 11)



Test summary

Safety Criteria	Results
Plug and fuse	Pass
Classification	Pass
Initial operation	Pass
Marking and instructions*	Fail
Protection against access to live parts	Pass
Power input and current	Pass
Heating	Pass
Leakage current and electric strength	Pass
Abnormal operation	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	Pass
Provision for earthing	Pass
Clearance, creepage distances and solid insulation	Fail

Additional Heading

Components	Pass
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Details of non-compliance

- Marking The appliance is not marked with the vendors' name or trademark and the wheelie bin symbol is missing.
- Clearance, creepage distances and solid insulation The creepage distance between live parts of opposite polarity on the swivel connector assembly and on the electronic control PCB measured 1.3mm & 1.5mm respectively, (Limit 2mm minimum).

Observations (denoted by * in above table)

- The substance of most of the EN 60335-1 clause 7.12 requirement is included in the instructions but there is no specific instruction that children should be supervised to ensure that they do not **play** with the appliance.

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30 Watt Hair Straightener – Model with removable plates (Sample code 12)



Test summary

Safety Criteria	Results
Plug and fuse	Pass
Classification	Pass
Initial operation	Pass
Marking and instructions	*Pass
Protection against access to live parts	Pass
Power input and current	Pass
Heating	Pass
Leakage current and electric strength	Pass
Abnormal operation	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	Pass
Provision for earthing	Pass
Clearance, creepage distances and solid insulation	*Pass

Additional Heading

Components	Pass
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Details of non-compliance

none

Observations

- Only part of the EN 60335-1 clause 7.12 requirement is included in the instruction leaflet, and there is no specific instruction that children should be supervised to ensure that they do not **play** with the appliance.
- The substance of “If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.” is missing from the instruction leaflet.
- Although the appliance was generally well constructed, the insulation sleeve on the mains lead neutral connection was not positioned correctly. In the case of the sample, this poor workmanship did not lead to a reduction in creepage distances and clearances below minimum requirements.

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160 Watt Hair Straightener – “Professional” model (Sample code 13)



Test summary

Safety Criteria	Results
Plug and fuse	Pass
Classification	Pass
Initial operation	Pass
Marking and instructions	Fail
Protection against access to live parts	Pass
Power input and current	Pass
Heating	Pass
Leakage current and electric strength	Fail
Abnormal operation	Pass
Mechanical strength	Pass
Construction	Pass
Internal wiring	Pass
Supply connection and external flexible cords	Fail
Provision for earthing	Pass
Clearance, creepage distances and solid insulation	Fail

Additional Heading

Components	Pass
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Details of non-compliance

- **Marking** The diameter of the “bath & shower” warning symbol measured 7.25mm ($\geq 10\text{mm}$ required) and the wheelie bin symbol is missing.
- **Instructions** The instructions do not include the substance of:- 1) “*This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance*” and 2) “*If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard*”
- **Leakage current and electric strength** The appliance failed a dielectric strength test between the accessible plates and live parts at 1000V. (3000V required). This was due to an assembly fault in that the pointed end of one of the internal screws was piercing the insulation sleeve around the thermal fuse.

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- Supply connection and external flexible cords Five minutes after unplugging the appliance following the heating test, the temperature rise of the edge of the heated plates measured 95°K. Referring to EN 60335-2-23 clause 25.7, the maximum permitted temperature rise is 75°K because the mains cord is ordinary PVC insulated.
- Clearance, creepage distances and solid insulation The thermostat is not rigidly mounted in that it is only held in position by a coiled spring. This method does not ensure that the creepage distance and clearance between it's live connections and part of the accessible plate on which it is mounted are reliably maintained after assembly.

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150 Watt Hair Straightener – Model from brand leader (Sample code 14)



Test summary

Safety Criteria	Results
Plug and fuse	Pass
Classification	Pass
Initial operation	Pass
Marking and instructions	Pass
Protection against access to live parts	Pass
Power input and current	Pass
Heating	Pass
Leakage current and electric strength	Pass
Abnormal operation	Pass
Mechanical strength	Pass
Construction	Fail
Internal wiring	Pass
Supply connection and external flexible cords	Pass
Provision for earthing	Pass
Clearance, creepage distances and solid insulation	Pass

Additional Heading

Components	Pass
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Details of non-compliance

- Construction The ceramic heating elements are directly in contact with the accessible metal heating plates. This is not acceptable because the insulation material in which the element is embedded is being used as reinforced insulation. Such material can only be considered as basic insulation according to EN 60335-1 clause 22.32.

----- **End of Report** -----

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Appendix A

Electrical Safety Council Screening Test for Household Health and Beauty Products

Plug and fuse

Check for fitting of approved plug and fuse link including counterfeit indications. Visual inspection and measurement of essential plug pin and fuse link dimensions.

Classification

Confirm the classification, as defined in the standard.

Initial operation

A functional test is required to establish whether the product operates, as intended by the manufacturer and as described in the user instructions.

Marking and instructions

Confirm the presence of standard markings either on the product or the rating label, or both. User instructions must also be checked for the presence of standard warnings, in particular EN 60335-1, clause 7.12, referring to the use of products by persons (including children) with reduced physical, sensory or mental capabilities etc.

Protection against access to live parts

Inspection for access to live parts particularly after removal of detachable parts.

Power input and current

Measurement required confirming that product is within standard permissible power input and current deviations.

Heating

Limited to the measurement, under steady state conditions, for hotplates of hair straightening irons and curling tongs only.

Leakage current and electric strength

Testing required determining adequate electrical insulation properties.

Abnormal operation

This may consist of very limited testing perhaps ensuring only that the thermal cut-out operates in a hairdryer as an example.

Mechanical strength

Carry out impact testing on parts liable to be weak with emphasis on mould lines. The drop test of EN 60335-2-23, clause 21.101 may also be required.

Construction

Inspection is required confirming the product can be properly assembled and connected with particular comments required in the following areas:

Construction of swivel connections with consideration to the environment in which they may be used.

Amendment A2 modifies EN 60335-1, clause 22.32 and states that *“insulating material in which heating conductors are embedded is considered to be basic insulation and not reinforced insulation”*. Hair straightening irons are to be examined and tested for evidence of adequate supplementary insulation.

Clause 22.44 states that *“appliances shall not have an enclosure that is shaped or decorated like a toy”*. A decision is required against this clause.

Internal wiring

Basic inspection only.

Supply connection and external flexible cords

Inspect for marking of cross sectional area and measure conductors in cases of doubt. For products having a swivel connection, the additional requirements in EN 60335-2-23, clause 25.14 and 25.15 may be required.

Provision for earthing

Check essential earthing requirements, although it is expected that the products will be class II in construction.

Clearance, creepage distances and solid insulation

Inspection with measurement only in cases of doubt.

Particular emphasis is required under EN 60335-1, clause 29.3, which states that *“supplementary insulation and reinforced insulation shall have adequate thickness, or have a sufficient number of layers, to withstand the electrical stresses that can be expected during the use of the appliance”*.