INSPEC

UKAS TESTING 0316

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Test Report

EN 352-2 : 2002

Report no:	03.06.49
Client:	INSPEC Certification Services Upper Wingbury Courtyard Wingrave Aylesbury Buckinghamshire HP22 4LW
Manufacturer:	Howard Leight Industries / Bacou-Dalloz 7828 Waterville Road San Diego CA 92154 USA
Model:	reusable Smartfit
Order received:	14 May 2003
Date(s) tested:	28 May to 30 June 2003

Conditions:

Opinions, comments and interpretations expressed herein are outside the scope of UKAS accreditation are shown in italics in this report.

Tests marked ☒ are not included in the UKAS accreditation schedule for INSPEC.

Samples will be disposed of within one month of this report unless alternative instructions are received.

Checked: ..... A. NELSON Approved: ..... M. K. VINE

Issued: 30 June 2003

Testing requested

Type of test: Mandatory

Stated product characteristics :	
Product type	Standard (corded and uncorded)
Wearing mode(s)	Not applicable
Size range	Not applicable
Adjustable force	Not applicable
Disposable / Re-usable	Re-usable

Sample details

Product	Submitter	Quantity	Received	INSPEC no.
reusable Smartfit (corded)	Manufacturer	30 pairs	16 May. 03	N24901 to N24908, N24922, N24924, N24927 and N24928
reusable Smartfit (uncorded)		30 pairs		N24909 to N24916, N24921, N24923, N24925 and N24926
User instructions		1	11 Jun. 03	-

Samples used for isolated testing were randomly selected by INSPEC from the submission detailed above. Those samples used for assessment in groups, e.g. drop testing, were not identified.

Summary of assessment*

Clause		Samples	Result
4	Requirements		
4.1	Sizing and adjustability		
4.1.1	Aural ear-plugs	21 to 24	-
4.1.2	Headband ear-plugs	-	NAP
4.2	Materials and construction		
4.2.1	Material	01 to 16	MFR
4.2.2	Construction	01 to 16	MFR
4.3	Performance		
4.3.2	Resistance to damage when dropped	28 pairs of each type	PASS
4.3.3	Resistance to damage when dropped at low temperature (optional)	-	NR
4.3.4	Cleaning and disinfection	All	PASS
4.3.5	Ignitability	25 to 28	PASS
4.3.6	Minimum attenuation ☒	01 to 16	PASS
5	Marking		
5	Marking	All	FAIL
6	Information supplied by the manufacturer		
6.1	General	All	PASS
6.2	Wearer information		FAIL
6.3	Additional information	-	MFR

Key

PASS = the product satisfied the requirement.
FAIL = the product did not satisfy the requirement. Refer to the "Result detail" section for more information.
NAP = the requirement was not applicable to this product.
NR = the requirement was not requested for assessment.
MFR = the requirement could not be assessed and the manufacturer must certify against this requirement.

* Assessment relates only to those items tested in this report.

Procedures

Testing was performed in accordance with EN 352-2 : 2002 (BS EN 352-2 : 2002), unless stated otherwise below.

1. Sound attenuation testing was performed at the University of Salford's School of Acoustics and Electronic Engineering and was conducted by INSPEC Testing Services' personnel.

2. The client requested that the variants be split as evenly as possible within the tests performed.

Result detail

4.1.1 Aural ear-plugs

Table 1 : Sizing

Sample	21	22	23	24
	Smallest fitted*		Largest fitted**	
Nominal diameter	6	6	12	12

* - smallest flange ** - largest flange

4.2.1 Materials

a) *There were no adverse comments made during laboratory and wearer tests.*

Manufacturer to certify whether or not, within the lifetime of use of the ear-plugs, the materials are known to be likely to cause skin irritation, skin disorders, allergic reactions or any other adverse effects to health.

b) *Following wearer tests there was no visible effect on the materials that would lead to alteration in the properties of the ear-plugs as regards compliance with Clauses 4.2 and 4.3.*

Manufacturer to certify whether or not, within the lifetime of use of the ear-plugs, contact with sweat, ear wax or other materials likely to be found in the ear canal would result in significant alteration to those properties of the ear-plugs assessed for compliance with Clauses 4.2 and 4.3.

4.2.2 Construction

4.2.2.4 The ear-plugs were not marked "reusable", however, the provided user information stated that they were. Each pair of corded ear-plugs was submitted in a re-closable plastic container and the uncorded ear-plugs were supplied grouped in resealable plastic bags . The hygienic nature of the packaging was not assessed – manufacturer to certify.

4.3.6 Minimum attenuation ☒

Refer to the University of Salford's Test Report, No: HP/03/11, which is contained in the Annex to this report.

Table 2 : Attenuation

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Measured attenuation (M_f - s_f) (dB)	24.1	19.9	24.4	26.5	31.3	33.3	36.9

5 Marking

The ear-plugs or smallest quantity packaging were not marked.

6 Information supplied by the manufacturer

The instructions to users have been assessed as detailed below, with reference only to the relevant requirements of the Standard.

INSPEC Testing Services has not assessed these instructions with respect to claims made by the manufacturer outside of these requirements, and therefore accepts no responsibility for the legitimacy of any such claims.

6.1 General

Information was provided in the English language.

6.2 Wearer information

Information was not provided with the samples. One set of user information entitled "AirSoft, D-Tek, SureFit" was provided against which assessment was performed.

a) Standard number not included.
b) Manufacturer/authorised representative identification included – "Howard Leight".
c) Model designation not included.
d) Not applicable.
e) Not applicable.
f) Fitting/adjustment instructions included.
g) Nominal diameter / range of diameters not included.
h) Not applicable.
i) Attenuation values not included.
j) Recommendations were included.
k) Adhering to the recommendations warning included.
l) Interconnecting cord warning not included.
m) Not applicable.
n) Cleaning included.
The instructions stated "do not use disinfectants" – not applicable.
o) Chemical substances statement included.
p) Storage conditions included.
q) Not applicable.
r) Address included.

6.3 Additional information

Not assessed. Manufacturer to certify.

ANNEX

This Annex comprises four sections:-

1. University of Salford, School of Acoustics and Electronic Engineering Report No: HP/03/11 - 3 pages.
2. H-M-L and SNR values calculated from the results detailed in the University's Report - 1 page.
3. Product photographs - 1 page.
4. Estimates of the uncertainty of measurement - 1 page.

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UKAS TESTING 1262

TEST REPORT

SOUND ATTENUATION

OF HEARING PROTECTORS

BS EN 24869-1 : 1993

ISO 4869-1 : 1990

CLIENT:	INSPEC International Limited 56 Leslie Hough Way Salford Greater Manchester M6 6AJ
YOUR ORDER NO:	2/030528-1
TYPE OF HEARING PROTECTOR:	Ear-plug
MODEL:	Reusable Smartfit - corded & uncorded
MANUFACTURER:	Howard Leight Industries / Bacou-Dalloz
DATE RECEIVED:	19 June 2003
DATE(s) OF TESTS:	19, 20, 25 June 2003

Signed: .....
A.Nelson
Test Engineer

Approved: .....
D.J. M°Caul
Laboratory Manager

THE QUEEN'S ANNIVERSARY PRIZES
FOR HIGHER AND FURTHER EDUCATION
2000

School of Acoustics and Electronic Engineering
Head of School: D J Saunders BSc PhD CEng FIOA

INTRODUCTION:

BS EN 24869-1 : ISO 4869-1 specifies a subjective method for measuring the attenuation of hearing protectors at the threshold of hearing. This method, including details of the test signals, site, equipment, subjects and procedure, was applied to the samples tested and the results are presented, as required by the Standard, on the following pages of this Report.
For complete details of the method, please refer to BS EN 24869-1 : ISO 4869-1.

Two variants of ear-plug were submitted for testing; uncorded (8 subjects) and corded (8 subjects). At the clients' request all results have been tabulated together.

TEST SIGNALS, SITE AND EQUIPMENT:

The facilities used for this test are located within the School of Acoustics and Electronic Engineering at the University of Salford.

TEST SUBJECTS:

The 16 test subjects comprised both males and females and covered a wide age range. All subjects were audiometrically screened in accordance with Clause 4.4.1 of BS EN 24869-1 prior to the test. They also satisfied the requirements of Clauses 4.4.2 and 4.4.3.

FITTING:

Manufacturer's instructions were provided and were followed during the fitting of the hearing protectors. Guidance was also available from the test operator.

TEST PROCEDURE:

30 pairs of each variant of ear-plug were supplied by the Laboratory for testing. Each subject randomly selected one pair for practice fitting and testing. Each test subject's protected threshold was assessed once.

The procedures specified in Clause 4.5 were followed.

RESULTS:

See the attached sheet for the attenuation data for each individual subject.

The results here presented relate only to the items tested and described in this report.

Model — Reusable Smartfit uncorded (sample 01 to 08)

Reusable Smartfit corded (sample 09 to 16)

Attenuation results (values in dB) — See below

Test Reference No. — HP/03/06/06

		Frequency (Hz)							
Subject	Sample	63	125	250	500	1000	2000	4000	8000
RF	01	24	26	22	24	24	36	30	32
DW	02	20	22	22	24	24	30	34	38
PD	03	32	32	34	38	42	34	44	48
DMM	04	24	24	20	26	30	34	46	40
RH	05	22	21	16	19	22	32	34	34
JB	06	40	46	48	48	46	48	36	38
JU	07	28	26	20	22	28	38	35	40
CN	08	40	36	30	40	42	36	43	46
SM	09	28	29	30	36	36	32	34	44
ES	10	38	43	34	40	36	40	46	48
RC	11	34	30	30	30	40	32	44	42
AN	12	30	30	18	36	40	34	40	38
CL	13	32	30	26	33	30	34	34	46
DM	14	36	32	32	28	30	38	44	46
HK	15	34	34	38	40	38	34	50	47
MA	16	32	42	40	36	32	38	35	44
Mean Attenuation	(A)	30.9	31.4	28.8	32.5	33.8	35.6	39.3	41.9
Standard Deviation	(B)	6.2	7.3	8.9	8.1	7.3	4.3	6.0	5.0
(A - B)		24.7	24.1	19.9	24.4	26.5	31.3	33.3	36.9

SSV2

(A - B) rounded to one decimal place.

ATTENUATION VALUES CALCULATED FROM
UNIVERSITY OF SALFORD,
SCHOOL OF ACOUSTICS AND ELECTRONIC ENGINEERING
REPORT NO: HP/03/11

H	=	32
M	=	27
L	=	23
SNR	=	30

Howard Leight Industries / Bacou-Dalloz's model reusable Smartfit corded and uncorded ear-plug

INSPEC Testing Services sample number N24929

12 June 2003

EN 352-2 : 2002

Estimates of the uncertainty of measurement

Clause	Test	Uncertainty
	Weighing	1.2%
4.1.1	Sizing - Aural ear-plugs	0.23mm (max)
4.1.2	Adjustability - Headband ear-plugs	0.7%

Values expressed as a percentage (%) are relative.

It should be noted that the above values have not been taken into account when making assessment to the pass/fail criteria.