REPORT

No. 60056264-556924

ISSUED TO : AQUA MUSIQUE
C/CATALINA ALBERT N°5
ENT B 17001 GIRONA
ESPAGNE

SUBJECT: SAFETY TEST OF UNDERWATER TRANSDUCERS

Equipment tested

Description: Underwater loudspeaker
Brand: AQUA MUSIQUE
Models: H062 m and H062 e

Date of the testing: March 2007

This document comprises 7 pages.

Fontenay-aux-Roses, 2 April 2007

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Results of the tests in the verdict box	
Non applicable tests ..... :	N(.A.)
Tests compliant with the requirements :	C(compliant)
Tests not compliant with the requirements ..... :	NC (Non-Compliant)

Tests

Date device received ..... : 26 March 2007

Testing date(s) ..... : March to April 2007

General remarks

"(see remark #)" see remark no. # at the end of the report.

"(see attached table)" see table with same article number attached to the report

List of the measuring devices used for the tests

Device	Type	Device No.	Calibration date		Remarks
			Last[1]	Due date	
Dielectric strength device	SEFELEC PCA5-200A	A6602038	11/06	11/07	None
Insulation resistance device	SEFELEC M4UC	A1304012	08/06	08/08	None
Chronometer	OREGON	B2040086	10/06	10/08	None
Impact hammer	NEMKO No. 474	D2124003	04/07	04/08	None

1) or interval between calibrations.

TABLE OF MAXIMUM MEASUREMENT UNCERTAINTIES

This table shows the maximum testing measurement uncertainties that may be present in this document.

Type of test	Measurement uncertainty (k = 2)
Measurement of the current-limiting circuits - capacity of the circuit	± 5.2%
Measurement of the energy discharge of a circuit	± 5.2%
Measurement of the circuit currents	± 2.1%
Measurement of the input power	± 2%
Measurement of the input current	± 2.1%
Measurement of the TRT TNV circuit voltages in a faulty state	± 3.2%
Measurement of the voltages • by a device other than an oscilloscope • by an oscilloscope probe	 ± 2.1% ± 5.2%
Measurement of the resistance	± 2%
Measurement of the leakage current	± 2%
Measurement of the temperature (direct by thermocouples) (conditioning, measurements of prevailing temperature, measurement of temperature directly on devices)	± 2.8°C
Measurement of the temperature rise by thermocouples (calculation of the difference between two temperatures in K)	± 4 K
Time or time interval (application/cycle measurements, conditioning) • Range from 1 s to 9 min • Range > 9 min	 ± 0.3 s ± 0.1%
Measurement of the resistance to earth	± 2%
Verification of the dielectric strength	± 4.5%
Measurement of the force (dynanometer) for the mechanical resistance, tension and penetration tests	± 2.5%
Measurement of the mass (weight) • 0 g to 5 kg (0 N to 4.55 N) • 5 kg to 9 kg (4.55 N to 88.29 N) • 9 kg to 50 kg (88.29 N to 490.5 N)	 ± 0.2% ± 3 g (± 0.03 N) ± 14 g (± 0.14 N)
Hammer shock testing - Energy applied	± 0.013 J
Steel sphere shock testing - Energy applied	± 0.06 J
Measurement of the leakage paths and distances and other dimensional measurements by calipers	± 0.13 mm
Measurement of the dimensions by steel rule	± 0.7 mm
Ball test – Measurement of the imprint	- 0 mm + 0.25 mm
Needle or flame burner test - height of flame	± 1.8 mm
Measurement of the track resistance index	± 25 V
Measurement of humidity (hygroscopic test, conditioning) • 50% RH to 90% RH • > 90% RH	 ± 3% RH ± 4% RH
Measurement of the volume of capacitators or RC cells(volume < 1,750 mm^3)	± 60 mm^3
Impulse wave test (measurement of rise and discharge)	± 3.5%
Measurement of the insulation resistance	± 6%
Measurement of the torsion torque applied to the sockets by the plug-in parts	± 3.1%

k = expansion factor

1 - Equipment tested

The AQUA MUSIQUE brand underwater transducers are made from fibreglass reinforced polyester resin. They are watertight and shock resistant.

They are available in the following two versions:

- Version 1: H062 m (60W-8Ω) model: Underwater loudspeaker that can be immerged in existing swimming pools.
- Version 2: H062 e (60W-8Ω) model: Underwater loudspeaker that can be fitted into swimming pools under construction.

These two transducers are fitted with a HO7RN-F - 2 x 1.5 mm² cable (LYONISUB brand) and electrical protection by means of a F2AL250V fuse (for model H062 m).

2 - Testing schedule

Due to the way they are constructed and used in water, these transducers must meet the same safety requirements as those applied to e.g. underwater light fittings.

As a result, the following tests were carried out:

- Immersion test (IPX8) pursuant to article 14.2.8 of the NF EN 60529 - 2000 standard,
- Mechanical impact test (0.7 Nm) pursuant to article 4.13.1 of the EN 60598-1 - 1999 standard,
- Checking of the wiring pursuant to article 8.11 and dielectric strength and insulation resistance tests pursuant to article 10.3 of the EN 60065 - 2002 standard.

3 - Test results

H062 m model

Tests	Results
Article 14.2.8 – Immersion (IPX8) (24 h under 1 m of water)	Compliant
Article 4.13.1 – Mechanical impacts (0.7 Nm)	Compliant
Article 10.3 – Dielectric strength at 2000 V continuous (between the wiring and the enclosure covered by an aluminium sheet)	Compliant no insulation breast down
Article 10.3 – Insulation resistance at 500 V continuous	Compliant (value measured: $50X10^3$ MΩ for a prescribed minimum value of 4 MΩ)

H062 e model

Tests	Results
Article 14.2.8 – Immersion (IPX8) (24 h under 1 m of water)	Compliant
Article 4.13.1 – Mechanical impacts (0.7 Nm)	Compliant
Article 10.3 – Dielectric strength at 2000 V continuous (between the wiring and the enclosure covered by an aluminium sheet)	Compliant no insulation breast down
Article 10.3 – Insulation resistance at 500 V continuous	Compliant (value measured: $30X10^4$ MΩ for a prescribed minimum value of 4 MΩ)

4 - Conclusion

The AQUA MUSIQUE brand H062 m and H062 e transducers are compliant with the prescriptions of the articles mentioned on page 4 of this document.

PHOTOS

H062m model

H062 e model