Ear Simulator Type RA0039

Product Data and Specifications

Typical applications

- ***Telephone-handset measurements***
- ***Earphone tests***
- ***IEC 60318 Standard measurenents***
- ***ITU-T P.57 Type 1 Rec. measurements***

Fig. 1 Ear Simulator Type RA0039

The Ear Simulator Type RA0039 (Fig. 1) is for use in acoustic measurements on telephone handsets and earphones. The acoustic input impedance of the RA0039 closely resembles that of the human ear and, as a result, loads a sound source in the same way as the human ear. It uses a ½-inch pressure microphone such as the G.R.A.S. Type 40AG with either a ½-inch Preamplifier Type 26AK or ¼-inch Preamplifier Type 26AC fitted with Adapter RA0001. If ordered with a microphone, the RA0039 will be calibrated with the specific microphone and be delivered with the resulting calibration chart.

The RA0039 complies with the specifications in IEC 60318 – *Electroacoustics – Simulators of human head and ear - Part 1: Ear simulator for the calibration of supra-aural earphones, 1998-07*.

The RA0039 is measured and calibrated according to the ITU-T Recommendations P.57 (08/96) *Series P: Telephone transmission quality, Objective measuring apparatus: Artificial ears*.

The RA0039 embodies a number of carefully designed volumes connected via well-defined and precisely tuned capillary tubes. In an equivalent electrical circuit (Fig. 4), capacitors would represent the volumes, and inductance and resistance would represent respectively air mass and airflow within the capillary tubes. The input impedance (Fig. 3) is measured using a special impedance probe as described in ITU-T Recommendations P.57 (08/96). This measures the impedance of the RA0039 as seen from the Ear Reference Point (ERP). The impedance is defined as the ratio of the sound pressure at the ERP to the corresponding particle velocity. The sound pressure is measured with a probe microphone while a constant particle velocity is maintained via a high acoustic impedance sound source.

The absolute sensitivity of the RA0039 at 1 kHz is given both as the Open Ear Sensitivity and the Closed Ear Sensitivity. The Open Ear Sensitivity is the ratio of the output signal from the preamplifier to the input pressure signal at the ERP with open coupler. The Closed Ear Sensitivity is the ratio of the output signal from the preamplifier to the input pressure signal at the ERP with closed coupler.

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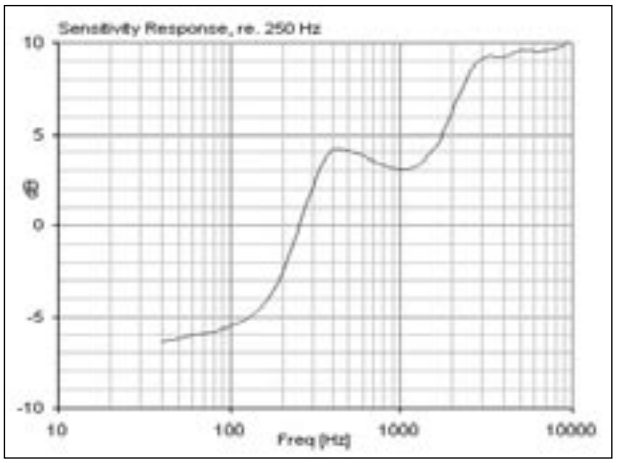

Fig. 2 Type RA0039 closed-coupler frequency response

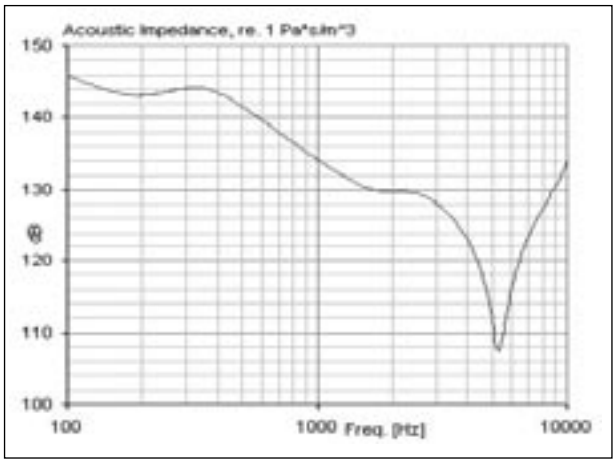

Fig. 3 Type RA0039 acoustic input impedance

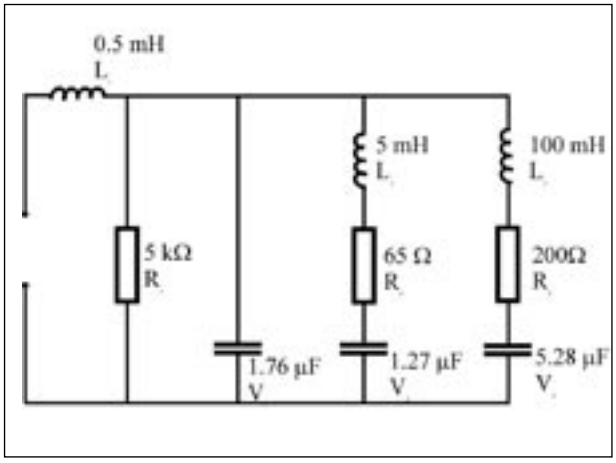

Fig. 4 Type RA0039 lumped parameter model

Specifications

Standards:

IEC 60318-1 (1998-07) : Electroacoustics – Simulators of human head and ear, Part 1 : Ear simulator for the calibration of supra-aural earphones

ITU-T Recommendation P.57 (08/96) "Series P: Telephone transmission quality, Objective measuring apparatus : Artificial ears"

Frequency range:

100 Hz to 4 kHz

Dimensions:

Height: . . . . . 19.8 mm
Diameter : . . . . . .60 mm
Weight: . . . . . 137 gm

Environmental calibration conditions:

Temperature : . . . . . 23 ± 3 °C
Relative humidity : . . . . . 60 ± 20 %
Barometric pressure : . . . . . .101.3 ± 3 kPa

Available Accessories:

Test Jig: RA0052
Snap Couplings: . . . . . .GR0332 and GR0336
Circumaural Test Plates:. . . . .GR0337 and GR0339

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