

Ear Simulator Type RA0039

Product Data and Specifications

Typical applications

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

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" pressure microphone such as the G.R.A.S. Type 40AG with either a ½" Preamplifier Type 26AK or ¼" 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 is delivered with a Guard Ring GR0606 for substituting the normal protection grid of the Microphone Type 40AG. To be used if requirements call for a LS2aP microphone. Note: this will leave the diaphragm of the microphone exposed!

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.*

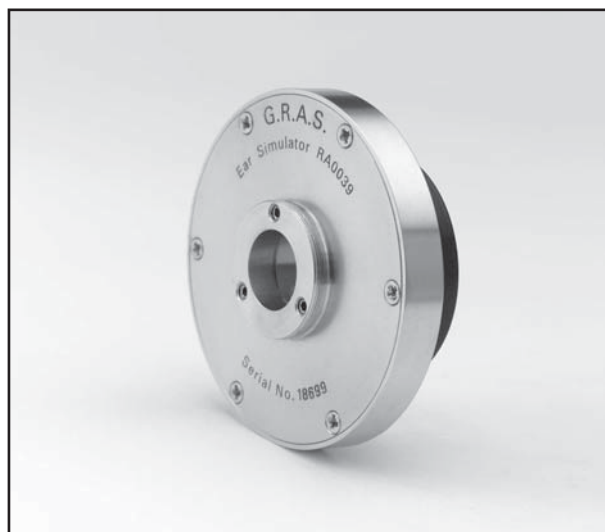


Fig. 1 Ear Simulator Type RA0039

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

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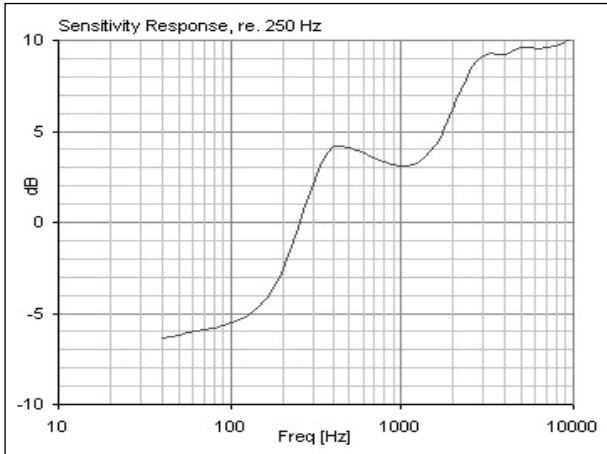


Fig. 2 Type RA0039 closed-coupler frequency response

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.

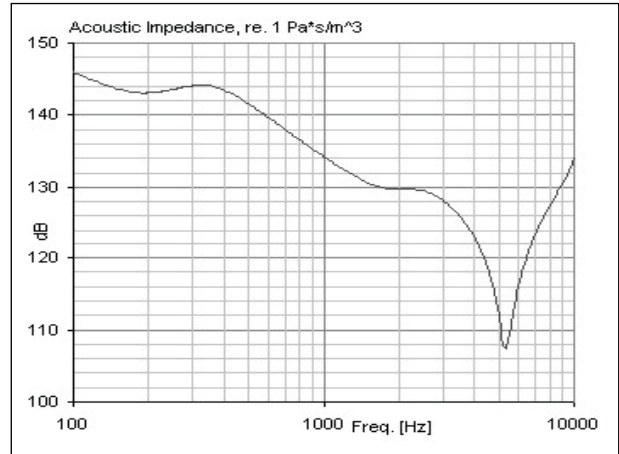


Fig. 3 Type RA0039 acoustic input impedance

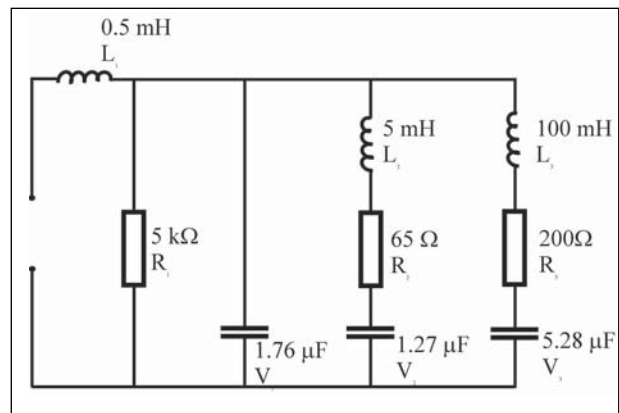


Fig. 4 Type RA0039 lumped parameter model

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

Accessories included:

Ring (hard): GR0338
Ring (soft): GR0402
Guard ring: GR0606

Accessories available:

½" Pressure Microphone: Type 40AG
Test Jig: RA0052
Snap Couplings: GR0332 and GR0336
Circumaural Test Plates: GR0339

G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

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