

# GRAS RA0045-S6

Prepolarized Ear Simulator Based on IEC 60318-4 (60711),  
High Sensitivity



Standards: IEC 60318-4 (based on), ITU-T  
P.57

Eff vol: 1260 mm<sup>3</sup> @ 500 Hz

Res freq: 13.5 kHz  $\pm$ 1 kHz

The GRAS RA0045-S6 Prepol Ear Sim IEC 60318-4, High Sensitivity is an ear simulator with an acoustic input impedance closely resembling that of an average human ear. The RA0045 includes a 40AD pressure microphone and each RA0045-S6 is individually calibrated with this specific microphone.

## Introduction

The RA0045-S6 Prepol Ear Simulator IEC 60318-4, High Sensitivity is a special type of ear simulator for making low level acoustic measurements on earphones coupled to the human ear by ear inserts such as tubes, ear moulds, or ear tips. It has an input impedance closely resembling that of an average human ear, and, as a result, loads a sound source in very much the same way.

It is based on the requirements of IEC 60318-4 "Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts."

The RA0045-S6 is measured and calibrated according to the ITU-T Recommendation P.57.

## Design

The RA0045-S6 embodies a number of carefully designed volumes connected via well-defined and precisely tuned resistive grooves. In an equivalent electrical circuit, capacitors would represent the volumes, and inductance and resistance would represent respectively air mass and air flow within the resistive grooves.

It includes a [GRAS 40AD 1/2"](#) Pre-polarized Pressure Microphone, High Sensitivity. Each RA0045-S6 is individually calibrated with this specific microphone.

## Typical Applications and Use

The RA0045-S6 is for measurements on earphones and hearing aids coupled to the human ear by ear inserts such as tubes, ear moulds, or ear tips.

In accordance with ITU-T Recommendation P.57, the RA0045-S6 can be used with the following GRAS pinna simulators for testing telephones:

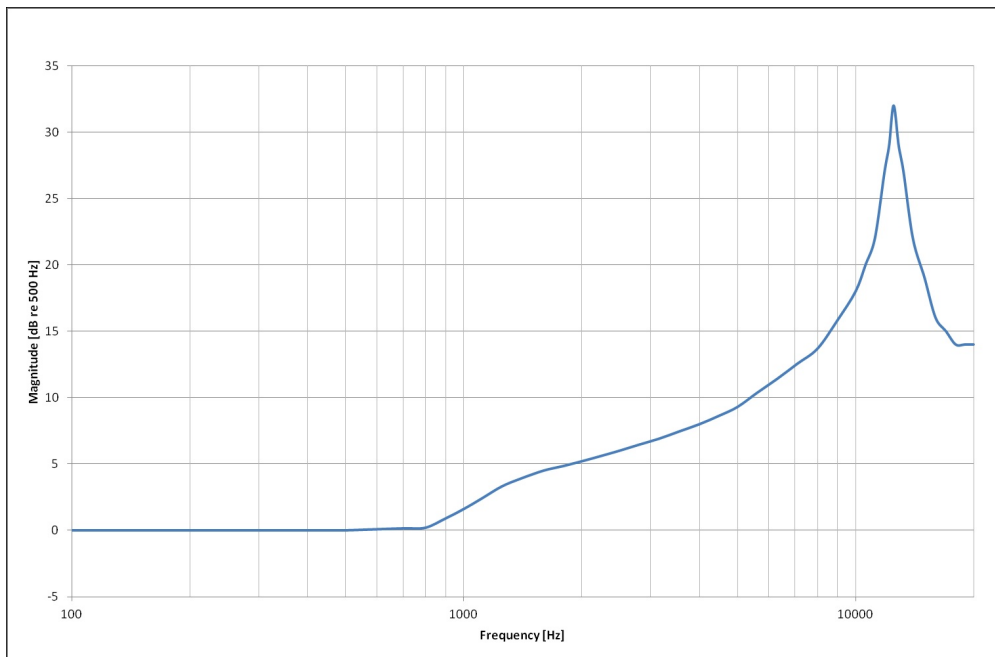
- [GRAS RA0056](#) Low-leak Pinna Simulator.
- [GRAS RA0057](#) High-leak Pinna Simulator.

A comprehensive range of accessories for making measurements in accordance with IEC 60318-4 are available. See the tab Ordering info.

## Compatibility

The RA0045-S6 can be used with a standard CCP preamplifier, e.g. the [GRAS 26CA 1/2"](#) Preamplifier or the [GRAS 26CB 1/4"](#) Preamplifier fitted with an adapter. For the 1/4" preamplifier, use either the straight [GRAS RA0003](#) Adapter or the right-angled [GRAS RA0001](#) Adapter

Polarization/Connection		0 V / CCP
Theoretical dynamic range lower limit with GRAS preamplifier	dB(A)	18
Dynamic range upper limit with GRAS CCP preamplifier	dB	138
Resonance frequency	kHz	13.5
Coupler volume	mm <sup>3</sup>	0.4 ccm
Humidity range non condensing	% RH	0 to 75
ANSI standard		S3.7
IEC standard		Based on 60318-4
ITU-T recommendations		P.57 Type 2
CE/RoHS compliant/WEEE registered		Yes/Yes, Yes
Weight	g / oz	52 / 1.8



Typical frequency response

## Optional items

<a href="#">GRAS RA0088</a>	In Ear Adapter
GRAS GR0433	Calibration Adapter
GRAS GR0434	Stop Washer
GRAS GR0436	Tube Adapter
GRAS GR0437	Ear-mould Simulator
GRAS GR0438	Retention Ring
GRAS GR0440	Tube Adapter
<a href="#">GRAS RA0056</a>	Low-leak Pinna Simulator
<a href="#">GRAS RA0057</a>	High-leak Pinna Simulator
<a href="#">GRAS 26CA</a>	26CA 1/2" CCP Standard Preampfier with BNC Connector
<a href="#">GRAS 26CB</a>	26CB 1/4" CCP Standard Preampfier with Microdot Connector
<a href="#">GRAS RA0001</a>	Right-angled Adapter for 1/2" microphone and 1/4" preampfier
<a href="#">GRAS RA0003</a>	Adapter for 1/2" microphone and 1/4" preampfier

# GRAS Worldwide

Subsidiaries and distributors in more  
than 40 countries

## HEAD OFFICE, DENMARK GRAS SOUND & VIBRATION

Skovlytoften 33  
2840 Holte  
Denmark  
Tel: +45 4566 4046  
[www.grasacoustics.com](http://www.grasacoustics.com)  
[gras@grasacoustics.com](mailto:gras@grasacoustics.com)

## USA GRAS SOUND & VIBRATION

5750 S.W. Arctic Drive  
Beaverton, OR 97005  
Tel: 503-627-0832  
Toll Free: 800-231-7350  
[www.grasacoustics.com](http://www.grasacoustics.com)  
[sales-usa@grasacoustics.com](mailto:sales-usa@grasacoustics.com)

## CHINA GRAS SOUND & VIBRATION

Room 303, Building T6  
Hongqiaohui, 990, Shenchang Road  
Minhang District, Shanghai  
China, 201106  
Tel: +86 21 64203370  
[www.gras.com.cn](http://www.gras.com.cn)  
[cnsales@grasacoustics.com](mailto:cnsales@grasacoustics.com)



## ABOUT GRAS SOUND & VIBRATION

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones to industries where acoustic measuring accuracy and repeatability is of utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.

**GRAS** Sound & Vibration