# GRAS 45CC

## Headphone Test Fixture



IEC 60318-1 ear simulators
IEC 60318-4 ear simulators
Human-like pinna
Easy in situ calibration

45CC with TEDS is a flexible and configurable platform for dual-channel testing of headphones and headsets. It has multiple configuration options: microphones, IEC 60318-1 and IEC 60318-4 ear simulators, anthropometric pinnae and optional ITU-T P.51 mouth simulator. It can be adjusted very precisely to support different headphone/headset designs and sizes for high accuracy and repeatability. It is well suited for Research and Development, Production Engineering, Quality Control and Production Line testing.

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# GRAS 45CC Headphone Test Fixture

The GRAS 45CC Headphone Test Fixture is for dual-channel testing of headphones and headsets and is built on our vast experience in the field. With a focus on multiple configuration options and accurate, reproducible, and repeatable test results, the test fixture can easily be adapted to many different headphone/headset designs and sizes.

### Main features

- Dual-channel testing of headphones and headsets, from 3.15 Hz to 70 kHz
- Realistic human-like pinna for testing in-ear and insert earphones
- Multiple configuration options: microphones, IEC 60318-1 and IEC 60318-4 ear simulators, and human-like pinnae—with or without the optional mouth simulator
- Distance between ears adjustable from 130 to 170 mm
- Headband holder height adjustable from 75 to 135 mm
- Reproducible and repeatable positioning of DUT using 45CC's unique positioning guides
- High-quality measurement microphones
- Expand testing to headsets with the optional ITU-T Rec. P51 mouth simulator

All adjustments to headband position and height, as well as the distance between the ear plates, can be done quickly and accurately.

Precise scales make it easy to document all settings accurately, be it the headband position, the width between ears, or the position of the positioning guide. This makes it easy to set up other 45CCs across multiple test stations as duplicates of the original setup used in specifying testing.

Once the test fixture has been adjusted to fit a certain headphone, the design of the headband holder, ear plates and the unique positioning system ensure that when testing identical headphones you will get the same positioning and fit from one test to the next. Therefore repeatability in a production line testing environment will be second to none with the 45CC. This makes the 45CC the unrivaled choice for demanding Quality Control and Production Line applications, but can also be used for Research and Development.

## TEDS Compatibility

All 45CC configurations are IEEE 1451.4 TEDS v. 1.0 compliant. If your measurement platform supports Transducer Electronic Data Sheets (TEDS), you will be able to read and write data like properties and calibration data.

## The Configurations

For your convenience, we have made 45CC available in a number of configurations to suit specific testing needs. Each configuration comes with the mounting needed to incorporate the optional mouth simulator for testing headsets.

The configurations are:

### Basic 2-channel acoustic headphone and headset test fixture for basic tests where no acoustic loading is needed

Flush-mounted ½ microphones: Excellent for scenarios such as quick turnaround prototype refinement

*45CC-1 with Externally Polarized ½ Microphones*
*45CC-2 with Prepolarized ½ Microphones*

GRAS 45CC test fixtures configured with ½ externally polarized or prepolarized microphones that are primarily intended as tools for Quality Control and Production Line testing of headphones.

## Basic 2-channel acoustic headphone and headset test fixture for basic tests where no acoustic loading is needed but where frequencies above 20 kHz (up to 70 kHz) are also of interest

Flush-mounted ¼ microphones: Ideal for quick prototype refinement of hi-res on- or around-ear headphones.

*45CC-9 with Externally Polarized ¼ Microphones*
*45CC-10 with Prepolarized ¼ Microphones*

GRAS 45CC Headphone Test Fixtures configured with ¼ externally polarized or prepolarized microphones extend the frequency range to 70 kHz for high-frequency testing.

## 2-channel acoustic headphone and headset test fixture with artificial ear simulators for test scenarios that require acoustic loading and adherence with IEC 60318-1

Ear simulators and ½ microphones: Designed for testing on-ear and around-ear headphones in environments that require a highly durable ear simulator

*45CC-3 with IEC 60318-1 Ear Simulators and Ext. Polarized ½ Microphones*
*45CC-4 with IEC 60318-1 Ear Simulators and Prepolarized ½ Microphones*

GRAS 45CC Headphone Test Fixture configurations with IEC60318-1 ear simulators and ½ externally polarized or prepolarized microphones are primarily intended as tools for Quality Control, Production Engineering and Production Line headphone testing. When testing according to IEC 60318-1 the acoustical load from an ear simulator is required.

## Human-like 2-channel acoustic headphone and headset test fixture with ear simulators and realistic pinnae for test scenarios that require acoustic loading and adherence with IEC60318-4

Pinnae and ear simulators: Designed for testing any headphone type, including in-ear and inserts, requiring realistic human acoustic loading and ear geometry

*45CC-14 with IEC 60318-4 Ear Simulators, Pinnae and Ext. Polarized Microphones*
*45CC-15 with IEC 60318-4 Ear Simulators, Pinnae and Prepolarized Microphones*

GRAS 45CC Headphone Test Fixture configurations with IEC60318-4 ear simulators and realistic pinnae with accurate ear geometry are available with externally polarized or prepolarized microphones. They are primarily intended as tools for Quality Control and Production Engineering when testing according to IEC 60318-4 the acoustical load from an ear simulator is required. These configurations can be used to test any style of headphone or headset (with the optional GRAS 44AA or 44AB Mouth Simulator), including in-ear and insert earphones.

## Human-like high-frequency 2-channel acoustic headphone

## and headset test fixture with ear simulators and realistic pinnae for test scenarios that require acoustic loading and adherence with IEC60318-4 at higher frequencies

Pinnae and ear simulators: Designed for high-frequency testing of any headphone type, including in-ear and inserts, requiring realistic human acoustic loading and ear geometry

*45CC-16 with High-frequency IEC 60318-4 Ear Simulators, Pinnae and Ext. Polarized Microphones*
*45CC-17 with High-frequency IEC 60318-4 Ear Simulators, Pinnae and Prepolarized Microphones*

GRAS 45CC Headphone Test Fixture configurations with IEC60318-4 ear simulators and realistic pinnae with accurate ear geometry are available with externally polarized or prepolarized microphones. They are primarily intended as tools for Quality Control and Production Engineering when testing according to IEC 60318-4 the acoustical load from an ear simulator is required. These configurations can be used to test any style of headphone or headset (with the optional GRAS 44AA or 44AB Mouth Simulator), including in-ear and insert earphones.

## Human-like high-resolution 2-channel acoustic headphone and headset test fixture with ear simulators and realistic pinnae for test scenarios that require acoustic loading and adherence with IEC60318-4 at higher resolutions

Pinnae and ear simulators: Designed for high-resolution testing of any headphone type, including in-ear and inserts, requiring realistic human acoustic loading and ear geometry

*45CC-18 with High-resolution IEC 60318-4 Ear Simulators, Pinnae and Ext. Polarized Microphones*
*45CC-19 with High-resolution IEC 60318-4 Ear Simulators, Pinnae and Prepolarized Microphones*

GRAS 45CC Headphone Test Fixture configurations with IEC60318-4 ear simulators and realistic pinnae with accurate ear geometry are available with externally polarized or prepolarized microphones. They are primarily intended as tools for Quality Control and Production Engineering when testing according to IEC 60318-4 the acoustical load from an ear simulator is required. These configurations can be used to test any style of headphone or headset (with the optional GRAS 44AA or 44AB Mouth Simulator), including in-ear and insert earphones.

## Warranty

GRAS offers a five-year warranty against defective materials and workmanship.

## Service

If you accidentally damage the diaphragm on a GRAS microphone, we can—in most cases—replace it at a very reasonable cost and with a short turn-around time. This not only protects your investment but also pleases your quality assurance department because you don’t have to worry about new serial numbers, etc.

## Calibration

Before leaving the factory, all GRAS microphones are calibrated in a controlled laboratory environment using traceable calibration equipment.

Depending on the use, measurement environment, and internal quality control programs, we recommend recalibrating the microphone at least

once a year.

# Specifications

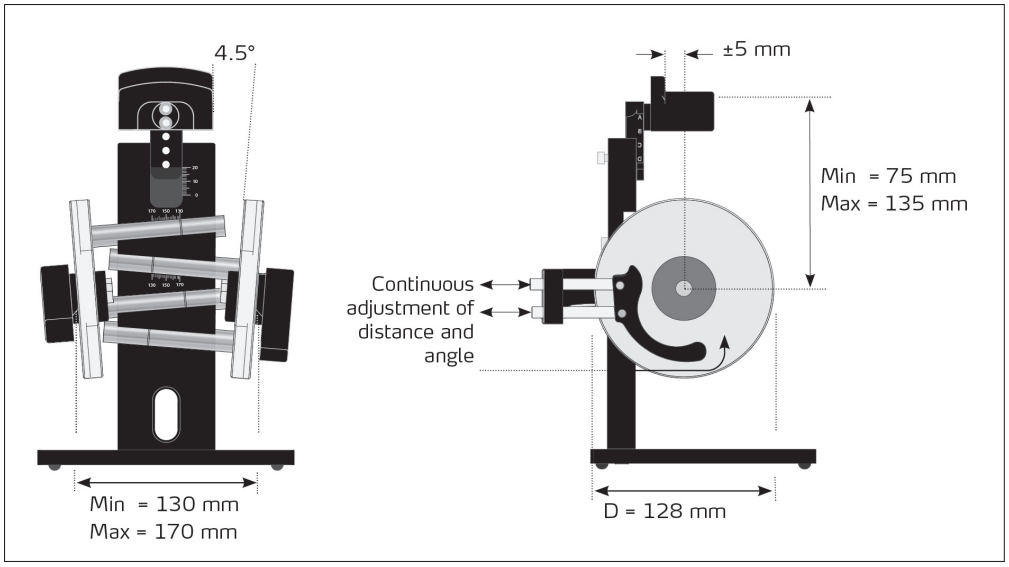
| | | |
|---|---|---|
| CE/RoHS compliant/WEEE registered | | yes/yes/yes |
| **CONFIGURATIONS 1–4 and 14–17** | | |
| Microphone Size | | ½ |
| Sensitivity | mV/Pa | 12.5 |
| Frequency Response (±2 dB) | Hz | 3.15 - 20 k |
| Dynamic range - 40AG (with 26AC preamp) | dB | 25 dB(A) - 164 |
| Dynamic range - 40AO (with 26CK preamp) | dB | 25 dB(A) - 150 |
| **Applicable Standards for Configurations 3 and 4** | | WS2P<br>ANSI S3.7<br>IEC 60318-1<br>ITU-T Rec. P.57 type 1 artificial ear |
| **Applicable Standards for:**<br>**GRAS RA0045 Ear Simulator (Config. 14)**<br>**GRAS RA0045-S1 Ear Simulator (Config. 15)**<br>**GRAS RA0401 Ear Simulator (Config. 16)**<br>**GRAS RA0402 Ear Simulator (Config. 17)** | | WS2P<br>ANSI S3.7<br>IEC 60318-4<br>ITU-T Rec. P.57 type 3.3 artificial ear |
| **CONFIGURATIONS 9 and 10** | | |
| Microphone Size | | ¼ |
| Sensitivity | mV/Pa | 1.6 |
| Frequency Response (±2 dB) | Hz | 4 - 70 k |
| Dynamic range - 40BP (with 26AC preamp) | dB | 39 dB(A) - 169 |
| Dynamic range - 40BD (with 26CS preamp) | dB | 44 dB(A) - 166 |
| **Standard** | | WS3P |
| **CONFIGURATIONS 18 and 19** | | |
| Microphone Size | | ¼ |
| Sensitivity | mV/Pa | 1.6 |
| Frequency Response (±2 dB) | Hz | 100 - 50 k |
| Dynamic range - matching 26AC-1 preamp | dB | 44 dB(A) - 169 |
| Dynamic range - matching 26CB preamp | dB | 44 dB(A) - 166 |

# Specifications

| | | |
|---|---|---|
| **Applicable Standards for:**<br>**GRAS RA0401 Ear Simulator (Config. 18)**<br>**GRAS RA0402 Ear Simulator (Config. 19)** | | WS2P<br>ANSI S3.7<br>IEC 60318-4<br>ITU-T Rec. P.57 type 3.3 artificial ear |
| **TEST FIXTURE** | | |
| Width between ears | mm | Adjustable from 130 to 170 |
| Height of headband holder | mm | Adjustable from 75 to 135 |
| Horizontal position of headband holder | mm | Adjustable +/- 5 |
| Ear plate angle | ° | 4.5 (ISO 4869-3) |
| Diameter of ear plate | mm | 128 |
| Positioning guides | | Continuous adjustment of horizontal and vertical position. Two-point support for all headphone sizes |
| Weight | kg | 3 |

GRAS Sound & Vibration reserves the right to change specifications without notice.

# Dimensions


4.5°
Min = 130 mm
Max = 170 mm
±5 mm
Min = 75 mm
Max = 135 mm
Continuous
adjustment of
distance and
angle
D = 128 mm

# Included items

## 45CC-1—with Externally Polarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS 69CC-1 | LEMO Pressure Mic. Set for 45CC , 2 pcs, each comprising: |
| GRAS 40AG | ½ Ext. Polarized Pressure Microphone |
| GRAS 26AC-1 | Standard Preamplifier with 3 m Integrated Cable |
| GRAS GR0010 | Adapter for ¼ preamplifier and ½ microphone |

## 45CC-2—with Prepolarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS 69CC-2 | Pressure Mic. Set for 45CC, 2 pcs, each comprising: |
| GRAS 40A0 | ½ Prepolarized Pressure Microphone |
| GRAS 26CK | ½ CCP Preamplifier with Microdot Connector, Very Short |
| GRAS AA0070 | 3 m Microdot-BNC Cable, 2 pcs |

## 45CC-3—with IEC 60318-1 Ear Simulators and Externally Polarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS RA0039 | IEC 60318-1 Ear Simulator, 2 pcs |
| GRAS 69CC-1 | LEMO Pressure Mic. Set for 45CC, 2 pcs, each comprising: |
| GRAS 40AG | ½ Ext. Polarized Pressure Microphone |
| GRAS 26AC-1 | Standard Preamplifier with 3 m Integrated Cable |
| GRAS GR0010 | Adapter for ¼ preamplifier and ½ microphone |

## 45CC-4—with IEC 60318-1 Ear Simulators and Prepolarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS RA0039 | IEC 60318-1 Ear Simulator, 2 pcs |
| GRAS 69CC-2 | CCP Pressure Mic. Set for 45CC, 2 pcs, each comprising: |

| | |
|---|---|
| GRAS 40AO | ½ Prepolarized Pressure Microphone |
| GRAS 26CK | ½ CCP Preamplifier with Microdot Connector, Very Short |
| GRAS AA0070 | 3 m Microdot-BNC Cable, 2 pcs |

## 45CC-9—with Externally Polarized 1/4" Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS 69CC-3 | LEMO Pressure Mic. Set for 45CC, 2 pcs, each comprising: |
| GRAS 40BP | ¼ Ext. Polarized Pressure Microphone |
| GRAS 26AC-1 | Standard ¼ Preamplifier with 3 m Integrated Cable |
| GRAS GR2039 | ¼ Microphone Holder |

## 45CC-10—with Prepolarized ¼″ Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS 69CC-4 | CCP Pressure Mic. Set for 45CC, 2 pcs, each comprising: |
| GRAS 40BD | ¼ Prepolarized Pressure Microphone |
| GRAS 26CS | ¼ CCP Preamplifier with Microdot Connector, Very Short |
| GRAS AA0070 | 3 m Microdot-BNC Cable, 2 pcs |

## 45CC-14—with IEC 60318-4 Ear Simulators, Pinnae and Externally Polarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS AA0035 | BNC-BNC Cable |
| GRAS 69CC-5 | Exteranlly Polarized IEC 60318-4 Ear Simulator incl. Angle Adaptor and Preamplifier, 2 pcs, each comprising: |
| GRAS RA0045 | IEC 60318-4 Ear Simulator, Externally Polorized |
| RA0002 | Right-angled Adjustable adator for ½ microphone and ¼ Preamplifier |
| GRAS 40AG | ½ Externally Polarized Pressure Microphone |

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|---|---|
| 26AC-1 UN | ¼ Standard Preamplifier with Integ Connector |
| AA0091 | 3 m LEMO 5-pin to LEMO 7-pin Cable |

### 45CC-15—with IEC 60318-4 Ear Simulators, Pinnae and Prepolarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS AA0035 | BNC-BNC Cable |
| GRAS 69CC-6 | Prepolarized IEC 60318-4 Ear Simulator incl. Angle Adaptor and Preamplifier, 2 pcs, each comprising |
| GRAS RA0045-S1 | IEC 60318-4 Ear Simulator, Prepolarized |
| RA0002 | Right-angled Adjustable adator for ½ microphone and ¼ Preamplifier |
| GRAS 40AO | ½ Prepolarized Pressure Microphone |
| 26CB UN | ¼ CCP Preamplifier |
| AA0070 | 3 m Microdot-BNC Cable |

### 45CC-16—with High-frequency Ear Simulators, Pinnae and Externally Polarized Microphones

| | |
|---|---|
| 45CC | Test fixture |
| GRAS AA0035 | BNC-BNC Cable |
| GRAS 69CC-7 | Exteranlly Polarized High-frequency 711 Ear Simulator assembly, 2 pcs, each comprising: |
| GRAS RA0401 | High-frequency Ear Simulator, Externally polorized |
| RA0002 | Right-angled Adjustable adator for ½ microphone and ¼ Preamplifier |
| GRAS 40AG | ½ Ext. Polarized Pressure Microphone |
| 26AC-1 UN | ¼ Standard Preamplifier with Integ Connector |
| AA0091 | 3 m LEMO 5-pin to LEMO 7-pin Cable |

### 45CC-17—with High-frequency Ear Simulators, Pinnae and Prepolarized Microphones

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|---|---|
| 45CC | Test fixture |
| GRAS AA0035 | BNC-BNC Cable |

| | |
|---|---|
| GRAS 69CC-8 | Prepolarized High-frequency 711 Ear Simulator assembly, 2 pcs, each comprising: |
| GRAS RA0402 | High-frequency Ear Simulator, Prepolarized |
| RA0002 | Right-angled Adjustable adator for ½ microphone and ¼ Preamplifier |
| GRAS 40AO | ½ Prepolarized Pressure Microphone |
| 26CB UN | ¼ CCP Preamplifier |
| AA0070 | 3 m Microdot-BNC Cable |

## Optional items

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|---|---|
| GRAS 44AA-1 | Mouth Simulator according to ITU-T Rec. P51 with built-in power amplifier |
| GRAS 44AB-1 | Mouth Simulator according to ITU-T Rec. P51 |

**GRAS Sound & Vibration reserves the right to change accessories without notice.**

# GRAS Worldwide

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### 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 and related equipment for industries where acoustic measuring accuracy and repeatability are of the utmost importance. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, consumer electronics and other highly demanding industries. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect, trust and require.
GRAS Sound & Vibration is represented through subsidiaries and distributors in more than 40 countries and is part of Axiometrix Solutions, a leading test solutions provider comprised of globally recognized measurement brands. Read more at www.grasacoustics.com

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