

# GRAS 45BB-2

KEMAR Head & Torso for Hearing Aid Test, 1-Ch CCP



Connection: 0 V/CCP  
ANSI: S3.36, S3.25  
IEC: 60318-7, 60318-4  
ITU-T Rec. P.57 Type 3.3  
based on ITU-T Rec. P.58

The 45BB-2 Head & Torso with TEDS for Hearing Aid test is configured with pinnae and with IEC 60318-4 Ear Simulator and ear canal extension in the right ear for hearing aid testing. Due to the design of KEMAR, realistic measurement in a sound environment as experienced by a human being using a hearing aid is possible. Its LEMO equivalent is [GRAS 45BB-1 KEMAR Head & Torso for Hearing Aid test, 1-Ch LEMO](#).

## The KEMAR head and torso simulator

The KEMAR head and torso simulator was introduced by Knowles in 1972 and quickly became the industry standard for hearing-aid manufacturers and research audiologists (visit [KEMAR.us](https://www.kemar.us) to read the full story). It is based on worldwide average human male and female head and torso dimensions. It meets the requirements of ANSI S3.36/ASA58-2012 and IEC 60318-7:2011.

The current KEMAR Head and Torso has the same dimensions and acoustical properties as the original KEMAR but has been developed further by GRAS to meet the industry's demand for realistic measurements of hearing aids, headphones, and headsets. It provides acoustic diffraction similar to that encountered around the median human head and torso, both in proximity and in far-field.

As all the preconfigured 45BB KEMARs consist of the same basic 45BB KEMAR Non-configured, plus a set of application-specific accessories, the full information about a given KEMAR configuration is obtained by combining the information about the 45BB KEMAR Non-configured and the information for a given configured version as found in the present text. Read about the non-configured KEMAR [here](#).

## TEDS Compatibility

All CCP-based KEMAR 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.

### Design

The 45BB-2 is a KEMAR head and torso for 1-channel hearing-aid test, with prepolarized ear

simulator and large 55 Shore 00 pinnae.

It is delivered fully configured, individually calibrated and ready for use. In addition to a system calibration certificate, a USB flash memory with simulation data is included.

The main configuration-specific components of the 45BB-2 are the GRAS RA0045-S1 Ear Simulator According to 60318-4 and the KB0065/KB0066 large pinnae.

### *The 60318-4 Ear Simulator*

The acoustic input impedance of the RA0045-S1 Ear Simulator closely resembles that of the human ear and, as a result, loads a sound source in very much the same way.

It complies with IEC 60318-4 and is measured and calibrated according to ITU-T P.57. It 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.

Read more about RA0045-S1 [here](#).

### *The KB0065/KB0066 Pinna*

The KB0065 and KB0066 are large straight pinnae for use with a straight ear canal extension. The hardness is 55 Shore 00. They comply with the IEC and ITU-T recommendations.

Even though 45BB-2 is configured for single-channel testing, both pinnae must be used to obtain correct diffraction around the head.

Other accessories for this configuration are listed in the Ordering Info tab.

## Performance and warranty

KEMAR is made of components from our standard portfolio, all manufactured of high-quality material and branded parts chosen and processed to ensure life-long stability and robustness. This enables us to offer two years warranty against defective materials and workmanship.

Exceptions: Microphones included in KEMAR as for these our standard five-year warranty apply. The warranty period for cables is six months.

|   |   |                          |
|---|---|--------------------------|
| Connector type  |   | BNC                      |
| Set sensitivity @ 250 Hz ( $\pm 2$ dB)  | mV/Pa                                   | 12.5                     |
| Set sensitivity @ 250 Hz ( $\pm 2$ dB)  | dB re 1V/Pa                             | -38.5                    |
| Theoretical dynamic range lower limit with GRAS preamplifier                                      | dB(A)                                   | 25                       |
| Theoretical dynamic range upper limit with GRAS preamplifier @<br>+28 V / $\pm 14$ V power supply | dB                                      | 151                      |
| Theoretical dynamic range upper limit with GRAS CCP preamplifier                                  | dB                                      | 146                      |
| Resonance frequency   | kHz                                     | 13.5                     |
| Temperature range, operation  | $^{\circ}\text{C}$ / $^{\circ}\text{F}$ | - 30 to 60 / - 22 to 140 |
| Temperature range, storage  | $^{\circ}\text{C}$ / $^{\circ}\text{F}$ | - 40 to 65 / - 40 to 149 |
| Humidity range non condensing   | % RH                                    | 0 to 95%                 |
| ANSI standard   |   | S3.36, S3.25             |
| IEC standard  |   | 60318-7                  |
| CE/RoHS compliant/WEEE registered   |   | Yes/Yes/Yes              |
| Weight  | g / oz                                  | 11.45 k / 404            |

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

## Included items

|                                |   |
|--------------------------------|---|
| <a href="#">GRAS 45BB</a>      | KEMAR Head & Torso, non-configured                |
| <a href="#">GRAS KB0065</a>    | KEMAR Large Right Ear 55 Shore 00                 |
| <a href="#">GRAS KB0066</a>    | KEMAR Large Left Ear 55 Shore 00                  |
| GRAS RA0237                    | Straight Ear Canal Extension Kit for KEMAR        |
| <a href="#">GRAS RA0045-S1</a> | IEC 60318-4 Ear Simulator (Prepol. version)       |
| <a href="#">GRAS KB0110</a>    | Ear-mould Simulator for 2 mm I.D. Tubing          |
| GRAS GR0408                    | Exterior Ear Canal                                |
| GRAS GR0409                    | Union Nut   |
| <a href="#">GRAS KB0111</a>    | Ear-mould Simulator for 3 mm I.D. Tubing          |
| <a href="#">GRAS 26CS</a>      | 1/4" CCP Preamplifier, short                      |
| <a href="#">GRAS RA0001</a>    | Adapter for 1/2" Microphone and 1/4" Preamplifier |
| <a href="#">GRAS AA0018-S</a>  | Microdot-BNC Cable, 35 cm                         |
| <a href="#">GRAS AA0035</a>    | BNC-BNC Cable, 3 m                                |

## Optional items

### Power Modules for Pre-polarized Ear Simulators and Microphones

|                           |  |
|---------------------------|--|
| <a href="#">GRAS 12AL</a> | 1-Channel CCP Power Module with A-weighting filter                         |
| <a href="#">GRAS 12AQ</a> | 2-Channel Universal Power Module with signal conditioning and PC interface |

## For Ear Simulator Calibration

|                             |  |
|-----------------------------|--|
| <a href="#">GRAS 42AP</a>   | Intelligent Pistonphone (250 Hz or 251.2 Hz, 114 dB +/- 0.05 dB) |
| <a href="#">GRAS 42AA</a>   | Pistonphone (250 Hz, 114 dB +/- 0.08 dB)                         |
| <a href="#">GRAS RA0157</a> | 1/2" Calibration Adapter for KEMAR Pinna                         |

## Pinna Simulators

|                             |  |
|-----------------------------|--|
| <a href="#">GRAS KB0060</a> | KEMAR Small Right Ear 55 Shore 00                  |
| <a href="#">GRAS KB0061</a> | KEMAR Small Left Ear 55 Shore 00                   |
| <a href="#">GRAS KB0065</a> | KEMAR Large Right Ear 55 Shore 00                  |
| <a href="#">GRAS KB0066</a> | KEMAR Large Left Ear 55 Shore 00                   |
| <a href="#">GRAS KB1060</a> | KEMAR Small Right Ear, 35 Shore 00                 |
| <a href="#">GRAS KB1061</a> | KEMAR Small Left Ear 35 Shore 00                   |
| <a href="#">GRAS KB1065</a> | KEMAR Large Right Ear 35 Shore 00                  |
| <a href="#">GRAS KB1066</a> | KEMAR Large Left Ear 35 Shore 00                   |
| <a href="#">GRAS KB0090</a> | KEMAR Large Right Ear (VA-Style/SQ) 55 Shore 00    |
| <a href="#">GRAS KB0091</a> | KEMAR Large Left Ear (VA-Style/SQ) 55 Shore 00     |
| <a href="#">GRAS KB1090</a> | KEMAR Large Right Ear (VA-Style) 35 Shore 00       |
| <a href="#">GRAS KB1091</a> | KEMAR Large Left Ear (VA-Style) 35 Shore 00        |
| GRAS KB5000                 | KEMAR Large Right Anthropometric Pinna 35 Shore 00 |
| <a href="#">GRAS KB5001</a> | KEMAR Large Left Anthropometric Pinna 35 Shore 00  |

## Ear Mould Simulators

|                             |  |
|-----------------------------|--|
| <a href="#">GRAS KB0110</a> | Ear Mould Simulator for 2 mm Inner diameter tubing |
| <a href="#">GRAS KB0111</a> | Ear Mould Simulator for 3 mm Inner diameter tubing |

## Ear Canal Extension and Microphone Holder Kits (kits with 2 pcs and O-rings)

|                             |  |
|-----------------------------|--|
| GRAS RA0237                 | Straight Ear Canal Extension Kit for KEMAR           |
| <a href="#">GRAS RA0238</a> | VA-tapered Ear Canal Extension Kit for KEMAR         |
| GRAS RA0239                 | Ear canal Extension Kit w. silicone lining for KEMAR |
| GRAS RA0240                 | Holder for long 1/2" microphone Kit for KEMAR        |
| GRAS RA0241                 | Holder for short 1/2" microphone Kit for KEMAR       |
| GRAS RA0243                 | Holder for 1/2" microphone Kit for KEMAR             |
| GRAS RA0244                 | O-ring kit for KEMAR, 2 pcs.                         |

|             |  |
|-------------|--|
| GRAS RA0249 | Straight Ear Canal Extension Kit for KEMAR, made of POM, for binaural hearing aid test |
| GRAS RA0250 | Tapered Ear Canal Extension Kit for KEMAR, made of POM, for binaural hearing aid test  |

## KEMAR Retrofit Kit for Binaural Hearing Aid Test

|                             |   |
|-----------------------------|---|
| <a href="#">GRAS RA0251</a> | KEMAR Retrofit Kit for Binaural Hearing Aid Test:<br>The Kit includes Ear Holder Plates, mounting bolts and the RA0249 and RA0250 Ear Canal Extension Kits. Included items are made of POM, Nylon and Teflon. |
|-----------------------------|---|

## KEMAR Retrofit Kit for Anthropometric Pinna

|                             |  |
|-----------------------------|--|
| <a href="#">GRAS RA0311</a> | KEMAR Retrofit Kit for Anthropometric Pinna.<br>The Kit includes Ear Simulator Holder, 2 finger screws and a 3 mm Allen Key. |
|-----------------------------|--|

## Extension Cables

|                             |                     |
|-----------------------------|---------------------|
| GRAS AA0034                 | BNC-BNC Cable, 2 m  |
| <a href="#">GRAS AA0035</a> | BNC-BNC Cable, 3 m  |
| GRAS AA0036                 | BNC-BNC Cable, 5 m  |
| <a href="#">GRAS AA0037</a> | BNC-BNC Cable, 10 m |

## Flight Case

|             |                     |
|-------------|---------------------|
| GRAS KM0094 | PELI Case for KEMAR |
|-------------|---------------------|

## Simulation Model of KEMAR

|             |   |
|-------------|---|
| GRAS KB3000 | Simulation Model of KEMAR with large pinnae |
| GRAS KB3001 | Simulation Model of KEMAR with small pinnae |

## Stand for KEMAR

|             |                                      |
|-------------|--------------------------------------|
| GRAS AL0026 | Loudspeaker stand for KEMAR, Ø 35 mm |
|-------------|--------------------------------------|

## Miscellaneous

|             |                   |
|-------------|-------------------|
| GRAS KB0000 | KEMAR Handbook    |
| GRAS KB0010 | T-Shirt for KEMAR |

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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](http://www.grasacoustics.com)

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