

# Pistonphone Type 42AA

## Product Data and Specifications

### Typical applications

- *Reference calibration source*
- *Precision microphone calibrations*
- *Microphone comparisons*
- *P-I index measurement at 250 Hz*

The G.R.A.S. Pistonphone Type 42AA (Fig. 1) is a battery-operated, precision sound source for accurate and reliable calibration of measurement microphones, sound level meters, and other sound measuring equipment.

With a microphone placed in the coupler of the pistonphone, the calibration level is:

- 114 dB<sup>1</sup> re. 20 µPa
- 105.4 dBA re. 20 µPa (with A-weighting applied)

At a static ambient pressure of 101.3 kPa, no further correction factors need be applied.

The Type 42AA is an extremely stable laboratory-standard sound source which can also be used for field calibrations – it retains its high accuracy even under hostile environmental conditions.

The Type 42AA complies with all the requirements of IEC Standard 942 (1988) Sound Calibrators Class 1 when corrected with barometer ZC0002K as well as Class 0 when corrected with barometer RA0168. Type 42AA includes ZC0002K and Type 42AA-S1 includes RA0168.

The Type 42AA is normally delivered for calibrating ½" microphones directly since these are most commonly used, but can be delivered with a 1" coupler (RA0023) for calibrating 1" microphones directly if preferred. Please state preference when ordering.

The pistonphone works on the principle of two recip-



*Fig. 1 Pistonphone Type 42AA  
114 dB at 250 Hz. Shown with Barometer ZC0002K - for applying corrections for ambient pressure*

rocating pistons actuated by a precision-machined cam with a sinusoidal profile. The rotation speed of the cam is controlled to within 0.5% via a tachometer signal in a feed-back loop. The Type 42AA has a dual-colour LED above the ON/OFF switch to indicate both battery condition and stable operation. When the pistonphone is operating properly, the LED shows green, indicating that the speed of the cam is correctly locked to give 250 Hz. If it shows red while the pistonphone is switched on, the speed is incorrect; most likely because of low batteries.

The operating procedure is straight forward, simply fit the microphone into the coupler of the pistonphone and switch on. The pistonphone will now produce a constant sound pressure level on the diaphragm of the microphone.

<sup>1</sup> 114 dB is equivalent to 10 Pa

# Pistonphone Type 42AA

The Pistonphone Type 42AA is compatible with G.R.A.S. 1/2", 1/4", and 1/8" microphones and all other microphones having the same standard diameters. Adapters are included for calibrating 1/4" and 1/8" microphones. Where applicable, the coupler RA0023 is also available for calibrating 1" microphones.

Each pistonphone is factory calibrated with an accuracy of  $\pm 0.09$  dB re. 20  $\mu$ Pa and is supplied with an individual calibration certificate stating the exact value and test condition. The exact value is adjusted to be 114 dB within  $\pm 0.05$  dB under reference conditions. Since the output level of a pistonphone depends on the static ambient pressure, the Type 42AA is delivered with a barometer (Fig. 1) which shows directly on a printed scale what must be added or subtracted to the output level of the pistonphone.

For use as a Class 0 calibrator, a precision barometer (not included) with an accuracy of  $\pm 1$  hPa or better should be used. The barometric correction at a given altitude very seldom varies by more than  $\pm 0.2$  dB.

Adapters for the G.R.A.S. Environmental Microphone Type 41AL and Outdoor Microphone Systems Types 41AM and 41CN are available for use with Pistonphone Type 42AA fitted with a 1" microphone coupler RA0023.

A two-port calibration coupler for 1/2" microphones (RA0024) is available for making comparison calibrations with a reference microphone. This can also be used for measuring the P-I (Pressure-Intensity) index of intensity systems at 250 Hz.

Octopus couplers are also available for simultaneously calibrating up to 8 microphones.

## Specifications

<p><b>Sound pressure level:</b>  Nominal: ..... 114 dB re. 20 <math>\mu</math>Pa  Individually calibrated under the following reference conditions:  Ambient pressure: ..... 101.3 kPa  Ambient temperature: ..... 20 °C  Ambient humidity: ..... 65 % RH</p> <p><b>Calibration accuracy:</b>  Absolute: ..... <math>\pm 0.09</math> dB at reference conditions  Accuracy when corrected for ambient pressure with:  RA0168 ..... <math>\pm 0.1</math>  ZC0002K ..... <math>\pm 0.15</math> dB</p> <p><b>Frequency:</b>  ..... 250 Hz <math>\pm 0.5</math> %</p> <p><b>Distortion:</b>  ..... &lt; 1.5 %</p> <p><b>Nominal effective coupler volume:</b>  15540 mm<sup>3</sup> (including effective load volume of microphone type 40AG)</p> <p><b>Temperature range:</b>  Batteries permitting: ..... -10 °C to +55 °C</p> <p><b>Batteries:</b>  Four standard LR6-AA alkaline batteries</p>	<p><b>Dimensions:</b>  Length: ..... 175 mm (6.89 in)  Width: ..... 35 mm (1.38 in)  Height: ..... 35 mm (1.38 in)  Weight: ..... 325 g (0.7 lbs)</p> <p><b>Accessories included:</b>  Adapter for 1/4" microphones: ..... RA0049  Adapter for 1/8" microphones: ..... RA0069  Barometer: ..... ZC0002K  Coupler for 1/2" microphones: ..... RA0048  Four LR6-AA alkaline batteries: ..... EL0001</p> <p><b>Optional accessories:</b>  Adapter for Outdoor Microphone System<sup>1</sup>:  Type 41AM: ..... RA0009  Type 41CN: ..... RA0041  Adapter for Environmental Microphone<sup>1</sup>:  Type 41AL: ..... RA0010  Two-port calibration coupler: ..... RA0024  Octopus coupler (1/2" microphones): ..... RA0072  Coupler for 1" microphones: ..... RA0023  94 dB Pistonphone coupler ..... RA0090  Digital precision barometer (included with 42AA-S1).  ..... RA0168</p> <p><sup>1</sup> Applies only to pistonphones fitted with a 1-inch microphone coupler RA0023</p>
---	---

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

**G.R.A.S.**  
**Sound & Vibration**

Skovlytoften 33  
2840 Holte, Denmark  
Tel +45 45 66 40 46 Fax +45 45 66 40 47  
e-mail: gras@gras.dk www.gras.dk