



## G.R.A.S. 46AF 1/2" LEMO Free-field Standard Microphone Set

Freq range: 3.15 Hz to 20 kHz  
Dyn range: 17 dB(A) to 154 dB  
Sensitivity: 50 mV/Pa  
Use: For general acoustic diagnostics

The G.R.A.S. 46AF is a 1/2" Traditional Power (LEMO) free-field microphone set for measuring medium sound pressure levels at medium frequencies. It is terminated with a 7-pin LEMO connector and is TEDS compatible. The equivalent Constant Current Power (CCP) type is G.R.A.S. 46AE.

### Technology

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#### Introduction

To overcome that unsuited and unreliable sensors determine whether your project turns into a success or failure we safeguard data.

For our users, data safety translates directly into requests for easier microphone selection, simple system configuration and reduction of measurement errors.

To meet these requirements, we invented the microphone set concept. It is simple, reliable and robust and consists of a microphone cartridge and preamplifier combination, which is calibrated as one unit. This eliminates errors because there is only one sensitivity value to account for and the risk of contaminating the interface is eliminated. Combine this with our unique and proven design and you have the most reliable measurement microphone sets available in the industry today.

**G.R.A.S.**  
SOUND & VIBRATION

## Typical applications and use

The 46AF is a free-field microphone set and as such optimized for all acoustic applications, where the location of the main sound source is known and the microphone can be pointed directly at it ensuring 0° incidence.

The medium frequency makes it ideal for general diagnostics.

The microphone set can be used in temperatures up to 60 °C. Should higher temperatures be required, we recommend using the G.R.A.S. probe microphones where the microphone and preamplifier can be isolated from the hot source.

## Design

The G.R.A.S. 46AF is a high-performance 1/2" free-field standard microphone set for measuring medium sound pressure levels at medium frequencies. In our clean-room environment the set is assembled and sealed with a label. However, the microphone set can be dismantled, if you wish to use the components separately.

### Microphone

The microphone cartridge is the high-quality IEC 61094 WS3F standardized [G.R.A.S. 40AF](#) 1/2" Externally Polarized Free-Field Microphone, designed for long-term reliability in multiple environments.

### Preamplifier

The preamplifier is the G.R.A.S. 26TK Preamplifier which is a special version inclusive TEDS of the [G.R.A.S. 26AK](#) 1/2" Standard Preamplifier with 7-pin LEMO connector, and based on our wellknown circuit board substrates. In the industry these are famous for their low self-noise, wide frequency and excellent slew rate performance.

## Compatibility

To perform as specified, the G.R.A.S. 46AF microphone set requires a power module or an analyzer input which can supply the preamplifier with power as well as 200 V polarization. If the power supply is lower, the capability of driving long cables is reduced and consequently the upper frequency is reduced. If the voltage supply is lower it will influence the upper dynamic range.

The microphone set is terminated with a 7-pin LEMO connector. Cables with LEMO connectors of various types and lengths are available in standard as well as customized lengths.

The 46AF is IEEE 1451.4 TEDS v. 1.0 compliant. If your measurement platform supports Transducer Electronic Data Sheets you will be able to read and write data like properties and calibration data.

## System verification

The functionality of TEDS is very useful to determine which microphone is connected to which input channel. However, it is not a check of whether the microphone is within specifications or not. For daily verification and check of your measurement setup, we therefore recommend using a sound source like the [G.R.A.S. 42AB](#) Sound Calibrator.

For proper sensitivity calibration we recommend using a reference sound source like the [G.R.A.S. 42AP](#) Intelligent Pistonphone.

## Service

Should you by mistake damage the diaphragm on a G.R.A.S. microphone we will in most cases be able to exchange it at a very reasonable cost and short turn-around time. This not only protects your investment but also meets your quality assurance department since you do not have to worry about new serial numbers etc.

## Calibration

When leaving the factory, all G.R.A.S. microphones have been calibrated in a controlled laboratory environment using traceable calibration equipment. Depending on the use, measurement environment and internal quality control programs we recommend that the microphone is recalibrated at least once a year.

## Performance and warranty

G.R.A.S. microphone sets are made of components from our proven standard portfolio and are all manufactured of high-quality material and branded parts that were chosen and processed to ensure life-long stability and robustness.

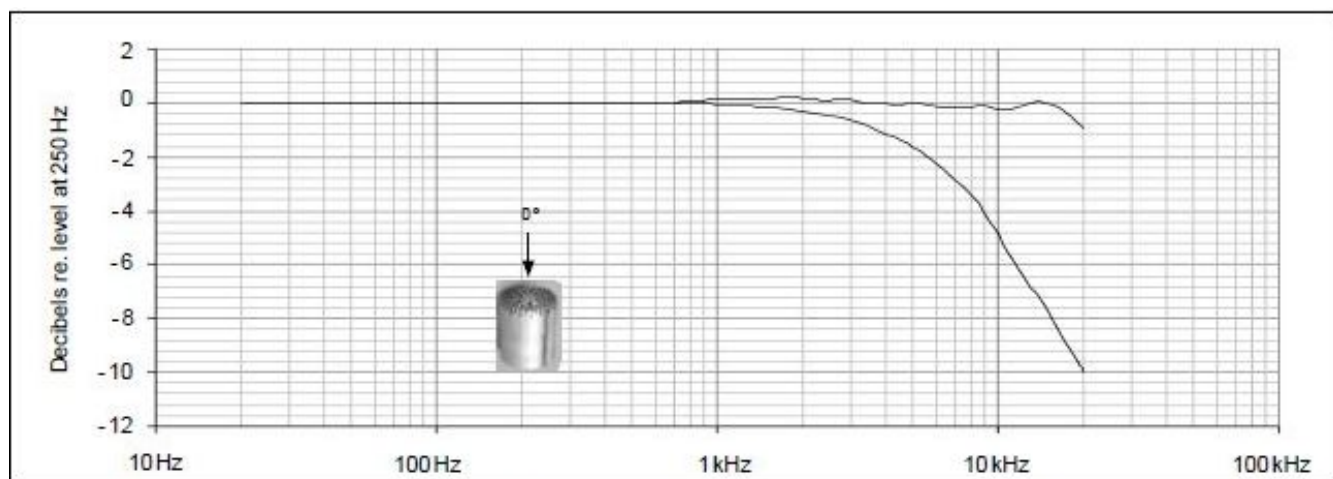
All parts are manufactured and assembled at the factory in Denmark by skilled and dedicated operators in a verified clean-room environment. The microphone diaphragm, body and unique protection grid are made of high-grade stainless steel and make the microphone set resistant to physical damage as well as corrosion caused by aggressive air or gasses.

This, together with the enforced gold-plated microphone terminal which guarantees a highly reliable connection, enables us to offer 5 years warranty against defective materials and workmanship.

## Specifications

|   |       |              |
|---|-------|--------------|
| Frequency range ( $\pm 1$ dB)   | Hz    | 5 to 10 k    |
| Frequency range ( $\pm 2$ dB)   | Hz    | 3.15 to 20 k |
| Dynamic range lower limit with G.R.A.S. preamplifier                                    | dB(A) | 17           |
| Dynamic range upper limit with G.R.A.S. preamplifier @ +28 V / $\pm 14$ V power supply  | dB    | 142          |
| Dynamic range upper limit with G.R.A.S. preamplifier @ +120 V / $\pm 60$ V power supply | dB    | 154          |
| Set sensitivity @ 250 Hz ( $\pm 2$ dB)  | mV/Pa | 50           |

|  |   |                                  |
|--|---|----------------------------------|
| Set sensitivity @ 250 Hz ( $\pm 2$ dB)           | dB re 1V/Pa                                     | -26                              |
| Output impedance                                 | $\Omega$  | < 50                             |
| Power supply min. to max. (single/balanced)      | V   | 28 to 120 / $\pm 14$ to $\pm 60$ |
| Microphone venting                               |   | Rear                             |
| IEC 61094 Compliance                             |   | WS2F                             |
| 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 85 / -40 to 185           |
| Temperature coefficient @250 Hz                  | dB/ $^{\circ}\text{C}$ / dB/ $^{\circ}\text{F}$ | -0,01                            |
| Static pressure coefficient @250 Hz              | dB/kPa  | -0,011                           |
| Humidity range non condensing                    | % RH  | 0 to 95                          |
| Humidity coefficient @250 Hz                     | dB/% RH   | -0.001                           |
| Influence of axial vibration @1 m/s <sup>2</sup> | dB re 20 $\mu\text{Pa}$                         | 62                               |
| TEDS UTID (IEEE 1451.4 )                         |   | 27 v. 1.0                        |
| Connector type                                   |   | 7-pin LEMO (FGG.1B.307)          |
| CE/RoHS compliant/WEEE registered                |   | Yes / Yes/Yes                    |
| Weight   | g / oz  | 33 / 1.164                       |



Typical frequency response. Upper curve shows free-field response for 0°, lower curve shows pressure response.

## Ordering info

|                                 |   |
|---------------------------------|---|
| <a href="#">G.R.A.S. 42AA</a>   | Pistonphone   |
| <a href="#">G.R.A.S. 42AP</a>   | Intelligent pistonphone   |
| <a href="#">G.R.A.S. 12AA</a>   | 2-Channel LEMO Power Module with gain, filters and Syscheck generator           |
| <a href="#">G.R.A.S. 12AK</a>   | 1-Channel LEMO Power Module with gain, filters and SysCheck generator           |
| <a href="#">G.R.A.S. 12AQ</a>   | 2-Channel CCP/LEMO Power Module with Signal Conditioning and Computer Interface |
| <a href="#">G.R.A.S. AA0008</a> | 3 m LEMO-to-LEMO cable  |
| <a href="#">G.R.A.S. AA0009</a> | 10 m LEMO-to-LEMO cable   |





## **We make Microphones**

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### **Tradition**

Since the establishment in 1994, G.R.A.S. have been 100% dedicated to developing and manufacturing high-quality measurement microphones and related acoustic equipment. Founded by the Danish acoustics pioneer Gunnar Rasmussen who for more than 60 years has contributed to the world of sound and vibration with his unique ideas and designs. From the first reproducible 1" condenser measurement microphone that enabled quality measurements and instrumentation for acoustic calibration, Mr. Rasmussen's ingenuity and foresight led to the world's most popular acoustic sensor: The 1/2" measurement microphone. Then the 1/4" and 1/8" microphones followed with outstanding dynamic and high-frequency capability that brought higher definition and transparency into impulse noise diagnostics. Many variants have been made available over the years; all based on Gunnar Rasmussen's original 1" pressure microphone design.

### **Innovation**

At G.R.A.S., we and our customers benefit daily from Mr. Rasmussen's exceptional understanding of acoustics, physics, electronics and measurement needs. Not only in R&D but throughout the organisation, we are proud to develop, produce and offer the broadest range of high-quality measurement microphones and accessories in the industry. And as a family company, now owned and managed by the two sons, Per Rasmussen and Peter Wulf-Andersen, we safeguard our heritage and knowledge to help create new opportunities with our customers. We work with everybody with an interest in sound or noise within the fields of aerospace, automotive, audiology, consumer electronics, noise monitoring, building acoustics and telecommunications, metrology, education, consultancy, legislation and system integration.

### **Quality**

All our microphones are solely produced in stainless steel and in a quality that allows for a 5 year warranty. Should you by mistake damage the diaphragm on a G.R.A.S. microphone, our special technique enables repair at very reasonable price.

### **Partners**

G.R.A.S. is represented worldwide in more than 40 countries by subsidiaries and distributors. Whether you are searching for a multi-channel solution or just a replacement microphone for your sound level meter G.R.A.S. will help solve your needs. Visit [gras.dk](http://gras.dk) for your local G.R.A.S. partner.