

GRAS 147EB CCP X-RUGGED MICROPHONE SET

# Wheelhouse Brake Noise Microphone



**ACOUSTIC  
SENSORS  
FOR PREMIUM  
NVH DATA**



# Microphone for wheelhouse brake noise testing

GRAS 147EB CCP X-Rugged Microphone Set

## **Prolonged on-road testing on all surfaces and in all climate zones and weather conditions**

Silent brakes are important to car owners and noisy brakes quickly translate into costly after-sales service for the manufacturer. This is why brake noise testing is so important to auto manufacturers and subsuppliers of brake components.

Testing of brakes is not complete without comprehensive road testing. The countless different conditions that arise during real-life

use need to be investigated. To enable more efficient road testing of brakes, an extremely robust microphone that can survive thousands of miles of road testing is needed.

This is why we at GRAS have developed a new rugged microphone optimized for the rough conditions in the wheelhouse. A robust microphone that can withstand prolonged exposure to extreme temperature variations, water, salt, dust, snow and impacts from gravel.





## THE CHALLENGE

Due to the rough environment, recording of brake noise in the wheelhouse during on-road testing is very demanding.

When mounted close to the wheel, in real-life driving tests on public roads, the microphone is subjected to harsh conditions that will decrease the performance and shorten the lifetime of any ordinary measurement microphone:

- Vibrations
- Dirt, dust and impacts from gravel
- Extreme temperatures
- Rain, salt, snow and ice

The use of traditional ½" microphone sets mounted in the wheelhouse has major drawbacks leading to low-quality measurements in addition to damaged microphones, which must be replaced often.

## THE SOLUTION

The 147EB is optimized to withstand the challenging conditions found close to the wheels.

This has been achieved by combining the basic ruggedness of the new generation of GRAS automotive microphones for noise, vibration and harshness (NVH) with additional protection of the diaphragm.

- ✓ The ruggedness of the microphone set makes it resistant to shock and vibration, extreme temperatures, salt, water and oil.
- ✓ Two grids with built-in filters and an optional windscreen protect the diaphragm against moisture and particles, e.g. impacts from gravel.
- ✓ The microphone set is certified according to IP67.
- ✓ Online calibration data with correction factors for the protection grid.

# Explore the benefits

– the details that make all the difference...

## Waterproof

Can safely be used in wet and splashy conditions – the microphone preamplifier housing is certified watertight according to IP67.

## Shock-absorbing Design

Innovative design ensures accurate data even during rough testing, e.g. on proving grounds or public roads.

## Extreme Temperature Performance

Optimized for extreme temperatures without compromising sensitivity. It is the most temperature-stable CCP microphone on the market.

## Windscreen

A customized and easily replaceable windscreen constitutes the outer layer of protection and guards against rain, snow and impacts from gravel, etc.

## Water, Oil and Dust-resistant Replaceable Grid

Two grids – fitted simultaneously – with built-in filters ensure that it can be used in heavily contaminated environments with dust, dirt, water, snow and ice. Easy replacement.

## Waterproof Connection

Can safely be used in wet and splashy conditions. A rubber-sleeved connection ensures data integrity and survivability during outdoor tests in all types of weather.

## Protected Venting

Dual, protected venting prevents moisture from blocking the venting and ruining your measurements.

## Online Calibration Data

Calibration data for each specific microphone can be assessed at [gras.dk/e-data](http://gras.dk/e-data).



## THOROUGH PROTECTION

In addition to the basic ruggedness of the 147EB, we have furnished the diaphragm with three layers of protection. A ½" protective grid with a built-in filter that protects the diaphragm from water, oil, dust and high-velocity particles constitutes the first layer. On top of this, sits a 1" protective grid adding another layer of protection. This grid also has a built-in filter.

Both filters are made from a fabric that is water and oil repellent. If the filters become clogged, the grids can easily be exchanged, reducing downtime and costs. Corrections for the acoustic influence of the filters are included.

A large windscreen completes the third layer of protection. It will reduce the influence of wind-induced turbulence, but it also provides a further layer of protection against water, dirt, particles and stones, e.g. impacts from gravel.

Provided the grids and windscreen are cleaned or replaced at appropriate intervals, they ensure problem-free testing for prolonged periods of time.

To ensure watertight connection, the BNC connector is protected by a large rubber sleeve.



½" grid with filter – inside 1" grid with filter



Large, custom-designed windscreen



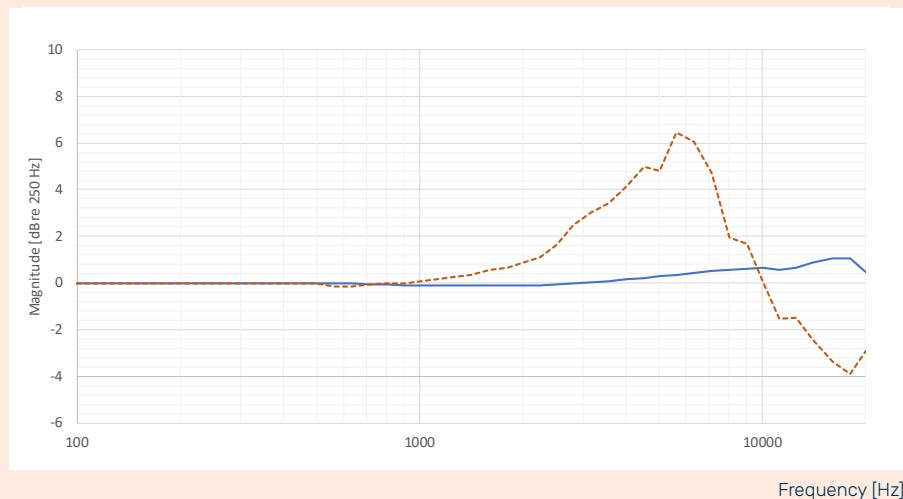
Rubber-sleeved, watertight cable



# Specifications

With the ½" protection grid, the 147EB performs as a ½" free-field microphone. The same flat frequency response can be obtained with the 1" protection grid using the grid's transfer function as compensation.

## 147EB Typical Free-field Frequency Response at 0 Degree Incidence



## MODEL SPECIFICATIONS

147EB CCP X-Rugged Microphone Set

IEC 61672 class 2

Frequency range:  
3.15 Hz to 20 kHz

DYNAMIC RANGE:  
18 dB(A) to 133 dB

SENSITIVITY:  
50 mV/Pa

Microphone with ½" protection grid

Microphone with 1" protection grid\*

\* The orange curve is prior to compensation. When using the transfer function of the 1" grid as compensation, the resulting frequency response equals the blue curve.

## ACCESSORIES

- > **RA0360 ½" Protection Grid**  
½" protection grid with built-in filters.



- > **High-temperature Windscreen, Click-mount**  
This windscreen offers added protection. AM0387-1 (1 pc), AM0387-4 (20 pcs.)



- > **RA0355 1" Protection Grid**  
1" protection grid with built-in filters.



- > **RA0341 ½" Calibration Adapter**  
For use with ½" protection grid.



- > **Watertight and Heat-resistant Rubber-sleeved Cable**  
AA0121 5 m BNC to BNC cable.



- > **Watertight and Heat-resistant Extension Cables**  
AA0108 3 m BNC to BNC cable.  
AA0109 10 m BNC to BNC cable.



For full information about included and optional accessories, please refer to the 147EB product page at [www.grasacoustics.com](http://www.grasacoustics.com)



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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 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.

[www.GRASacoustics.com](http://www.GRASacoustics.com)

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