



M+P | Member of
Müller-BBM group
The solution people



DaSH

**Sound Absorption Measurement
system**

Background

Acoustic absorption is an important property of noise reducing road surfaces, like porous asphalt. But also for test tracks with dense asphalt, where only a certain degree of absorption is allowed (eg. ISO 10844).

M+P's DaSH Sound Absorption Measurement system makes it easy to measure and assess the absorptive qualities of road surfaces, whether in the lab (using test cores) or in-situ.

DaSH is designed in compliance with ISO 10534-2 "Acoustics -- Determination of sound absorption coefficient and impedance in impedance tubes -- Part 2: Transfer-function method" and ISO 13472-2 "Acoustics -- Measurement of sound absorption properties of road surfaces in situ -- Part 2: Spot method for reflective surfaces".

Using our wealth of experience in the field of noise reducing pavements, we've designed a measurement system that quickly and reliably assesses the absorptive qualities of noise reducing surfaces, in the lab using test cores, or in-situ.

The portable system can easily be connected to a laptop. It uses a high-quality data acquisition system to capture sound data from all three microphones simultaneously.

A unique feature of the system is the use of the three-microphone method. An extended method, developed by M+P, to suppress the influence of interference at the microphone positions.

As member of ISO WG 38, M+P contributed to the method of determination of sound absorption properties.



DaSH Sound Absorption

Properties

Using our experiences with absorption measurements since many years, we've developed a measurement system with the following characteristics:

- **All-in-one:** integrated measurement system that quickly delivers final results on-site and in the lab.
- **Accurate:** the system uses the three-microphone method, an extended method developed by M+P to suppress the effect of interference at the microphone positions.
- **Practical:** the entire system fits in one flight case.
- **Reliable:** the system is used extensively in various projects over many years.

Applications

DaSH has been used successfully for the following applications:

- Absorption measurements of test cores in the lab according to ISO 10534-2.
- Absorption measurements of reflective surfaces in-situ according to ISO 13472-2.
- Development and optimization of noise reducing pavements.



Specifications

DaSH is a turnkey system including all the hardware and software needed to perform sound absorption measurements, both in-situ and in the laboratory.

DaSH base package

Impedance tube fitted with three microphones and a speaker, a data acquisition system connected via USB and a tube mounting device for ISO 13472-2 (spot method for reflective surfaces).

Included is also a one-day training at our office and one year of software support and updates.

Hardware specifications

Tube length	680 mm
Tube diameter	100 mm
Frequency range	100 – 1900 Hz

Speaker impedance	8 Ω
Speaker power (norm/max)	30 / 50 W

Microphone free-field response ± 1 dB (50Hz - 8kHz)

Microphone power supply	IEPE (via USB DAQ)
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Other tube diameters are available on request.

Software specifications

AbsorptionRecorder software

The AbsorptionRecorder software is used to perform the measurements. A noise signal is played and simultaneously the signal of all three microphones are logged. The result is saved to a file.

AbsorptionInspector software

The AbsorptionInspector software is used to read the raw data files and perform the analysis according to the ISO-standards. After reading the calibration files and measurement files, the user can view:

- The absorption spectrum in 1/3 oct or narrow bands ranging from 100 Hz to 1900 Hz (2500 Hz for a 80 mm tube diameter).
- The transfer function between all microphone pairs.
- The coherence function between all microphone pairs.

The results of the analysis can optionally be exported to Microsoft Excel format.

Conditions

Delivery time

DaSH Sound Absorption system will be delivered approximately 3 months after ordering. We will provide you with an exact delivery date when you place your order.

Support

Hardware

DaSH Sound Absorption system is composed of a custom-made impedance tube, fitted with microphones and a separate data acquisition system. In case of a defect, the whole system or the defective part can be sent to M+P. We will assist in repair or replacement of the components during a period of two years.

Software

The standard support period for the software is one year after delivery. During this period you will receive free access to the M+P support desk and you will receive free software updates. After this year you can extend the support period by ordering a software maintenance contract.

Warranty

Hardware

The hardware is covered by a limited warranty of 24 months.

Software

The warranty of the AbsorptionRecorder and AbsorptionInspector software is described in the license agreements that you'll receive on delivery. We guarantee to rectify any software problems within 12 months of delivery.

About M+P

Since 1972, we have studied and developed solutions relating to noise, vibration and air quality. With our expertise and communicative approach, we are a respected consultancy firm that is always open to our customer's specific needs. Based in the Netherlands, our team of 40 professionals are trained in a range of fields to serve our clients. We are backed up by more than 1200 specialists in the Müller-BBM companies. M+P is a member of the Müller-BBM Group.

The Solution People

At M+P, we use a four-pillar approach to projects:

- **There is always a solution:** When doing business with us, you will notice our dedication. Your project becomes our project. From environmental permits, reports, complex calculation models to policy advice, we always work with you to find a solution and how to achieve it. Our path to the solution may be fast and direct, or it could be winding and filled with new discoveries. And should we discover that a new path should instead be pursued, we will always inform you about what we have learned.
- **If it doesn't exist, we'll invent it:** We love to be at the forefront and we employ state-of-the-art technology in our work. And we never shy away from new approaches when the situation demands it. Is it something that's never been done? We won't hesitate to try our hand at it. Where possible, we contribute to the behind-the-scenes development of new standards and methods. We actively participate in ISO, national and European committees. This way, we can help boost developments that are beneficial to all parties in the industry. And we are the first to apply these innovations in practice.
- **Versatile and agile:** Although we conduct large (government) projects, we are and always will be a small-scale enterprise with a personal approach: direct communication with no intermediaries, clear reports, and tangible results. We are a pool of experts specialising not only in measurement technology and services but also in the development of instruments, software and geographic information systems. We have the team that your project needs.
- **We will step into your world:** We are eager to understand your work so that we can find the solutions you need. It makes no difference whether or not you are knowledgeable in the area of acoustics, vibration, or air quality. We will work with you to find the best way of accomplishing your goals.

For more on M+P, visit us at www.mplusp.eu and for more on the Müller-BBM Group, visit www.mbbm.com

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