



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



FLaSH

FLaSH stationary and mobile
pavement texture systems

Background

Pavement texture is an important property that provides civil and acoustic engineers with valuable information on road surfaces with respect to road noise, fuel consumption and road maintenance. M+P's family of FLaSH pavement texture systems is designed to accurately capture and analyse texture data. Measuring road texture with FLaSH is a straightforward process. Analysis is clear and yields solid, reproducible results.

The FLaSH pavement texture systems are designed in compliance with ISO 13473 "Characterization of pavement texture using surface profiles".

Based on ISO 13473, we have created compact and reliable texture measurement systems. The systems are designed for evaluating the acoustic quality of road texture but are equally well suited for civil engineering applications.

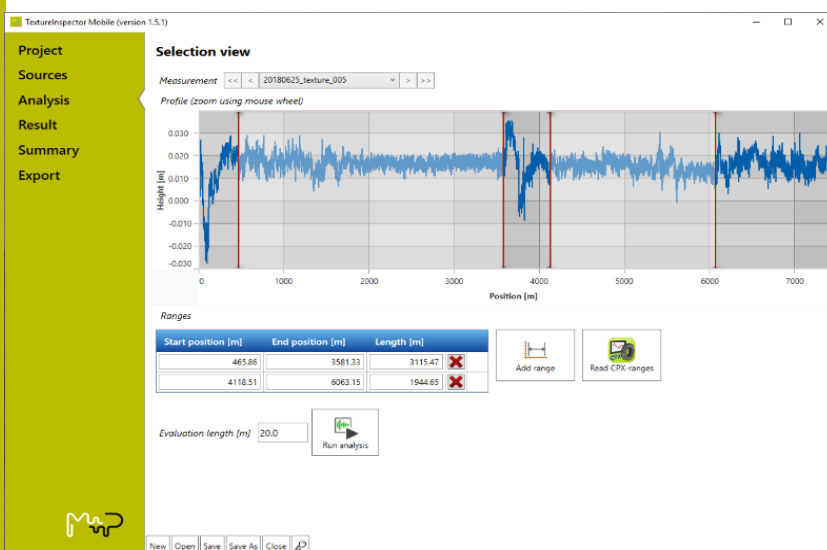
Currently, two different versions of FLaSH are available:

- **FLaSH|S** for stationary measurements
- **FLaSH|M** for mobile measurements at traffic speeds up to 100 km/h

The results of the analysis are the texture parameters MPD, ETD, RMS and skewness. The FLaSH systems also offer the analysis of texture wavelength spectra.

We use our own FLaSH systems for road surveys, road-related research & development, and automotive test track certification. For more details and efficiency, we also combine it with our CoMeT CPX measurement system for tyre-road noise. FLaSH systems are operational worldwide.

M+P is a long-term member of ISO WG 39 and made significant contributions to the development of texture-based measuring methods.



FLaSH|S texture system

FLaSH|S is a turnkey system for measuring pavement textures, whether on-site or in a laboratory environment.

A precision portal beam moves a laser-based profile sensor across the road surface measuring the 3D depth profile of the pavement.

The data can be immediately viewed and analysed resulting in the texture parameters MPD, ETD, RMS and skewness.

Properties

With many years of road texture measurements, we have been able to identify the key characteristics of a road texture measurement system. We developed the FLaSH|S system with the following features in mind:

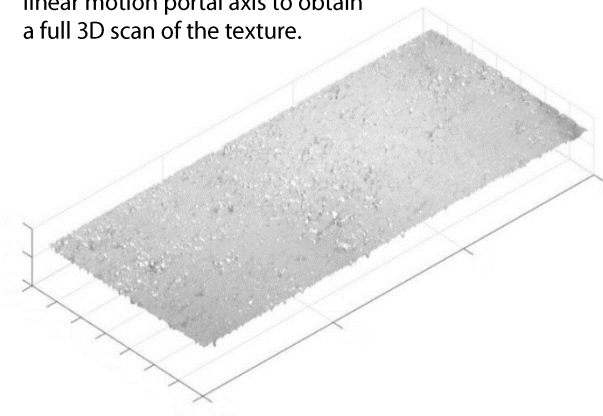
- **All-in-one:** integrated measurement system that provides final results on site
- **Portable:** low weight measurement system to allow easy handling
- **High-end-equipment:** all components comply with the applicable measurement standards
- **Flexible:** the modular design of hardware and software allows client-specific requirements to be integrated into the system
- **Reliable:** FLaSH|S has been tested in practice in various projects over many years

Applications

FLaSH|S has been used successfully in the following applications:

- Acoustic optimization of road surfaces
- Road profile measurements with an effective measurement length up to 2.5 m
- Texture measurements of road surface samples in laboratory environments
- Characterisation and certification of automotive test tracks for various vehicle and tyre manufacturers
- 3D measurements and acoustic optimization of bridge joints

FLaSH|S uses a line laser on a linear motion portal axis to obtain a full 3D scan of the texture.



FLaSH|S - Specifications

FLaSH|S is a turnkey system including all the hardware and software needed to perform stationary laser texture measurements on-site or in a laboratory.

FLaSH|S base package

Laser-based scanning sensor mounted on a linear motion portal axis including driver, power supply, FLaSH|S software (compatible with Windows 10, 64 bit) and transportation case. Included is also a one-day training at our office and one year software support and updates.

Hardware specifications

Profile length (X-axis)	2000 mm (default)
Field of view (Y-axis)	96–194 mm ^{*)}
Measurement range (Z-axis)	210 mm
X-resolution	0.25 mm
Y-resolution	0.25 mm
Z-resolution	0.0135 – 0.037 mm
Typical scan speed (full 3D profile)	15–30 s
Standard laser class:	3B
Power supply	24V DC, max 100 W
ISO 13473-3:2002 classification:	
Principle of operation	Laser profilometer
Mobility class	Stationary fast
Wavelength range class	CF
Pavement contact	Contactless

Software specifications

TextureRecorder|S software

The TextureRecorder|S software is used for the surface texture measurements. The user can:

- enter project, surface and location details, and edit and save the measurement settings
- start and stop the measurement, and monitor the data acquisition process
- save the texture profile

TextureInspector|S software

The TextureInspector|S software is used for the surface texture analyses. The user can:

- view the texture profile
- perform the data analysis according to ISO 13473:
 - automatic drop-out and spike correction
 - calculation of Mean Profile Depth (MPD), Estimated Texture Depth (ETD), Root-Mean Square (RMS) and Skewness
 - calculation of texture wavelength spectrum in 1/3-octave bands from 1–250 mm (accuracy of longer wavelengths depends on portal axis length)

^{*)} Actual range depends on the surface depths that have to be measured. Typically 150 mm.

FLaSH|M texture system

FLaSH|M is a rugged system for comfortably capturing many kilometers of pavement texture. In normal traffic at speeds up to 100 km/h, FLaSH|M records road textures at a rate of one sample per millimeter. During the measurements, the operator can monitor the signal quality and verify the plausibility of the recorded profile data. Afterwards the data can be analysed with the TextureInspector software.

Properties

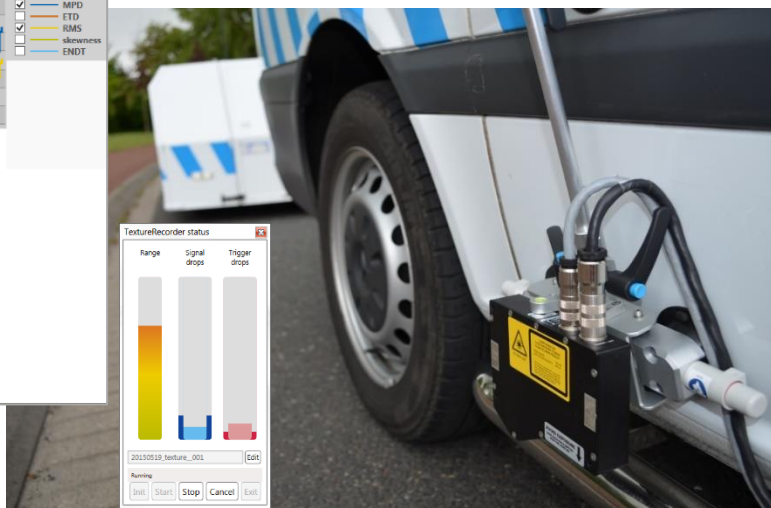
M+P has performed mobile in-traffic measurements of road textures for many years. Based on our long experience, we have developed a data acquisition system that gets the job done safely with:

- **Easy mounting**
- **Concise on-the-road user interface**
- **High-end-equipment**
- **Reliability**

Applications

FLaSH|M has been used successfully in the following applications:

- Road maintenance monitoring
- Performing R&D on road pavements for acoustics and fuel consumption
- Characterisation and certification of automotive test tracks for various vehicle and tyre manufacturers
- Acoustic optimization of road markings
- Efficient and detailed information on the acoustic performance of the pavement combined with our CoMeT CPX-system



FLaSH|M - Specifications

FLaSH|M is a turnkey system including all the hardware and software needed to perform mobile laser texture measurements.

FLaSH|M base package

Laser-based displacement-sensor that can be mounted on a vehicle including power supply, FLaSH|M software (compatible with Windows 10, 64 bit) and transportation case. Included is also a one-day training at our office and one year of software support and updates.

Hardware specifications

Measurement range (Z-axis)	210 mm
X-resolution	1 mm
Z-resolution	$\leq 1 \mu\text{m}$

Standard laser class:	3B
Power supply	12 V DC max 100 W

ISO 13473-3:2002 classification:

Principle of operation	Laser profilometer
Mobility class	Mobile fast
Wavelength range class	CF
Pavement contact	Contactless

Software specifications

TextureRecorder|M software

The TextureRecorder|M software is used for the surface texture measurements. The user can:

- enter project, surface and location details, and edit and save the measurement settings
- start and stop the measurement, and monitor the data acquisition process
- save the texture profile

TextureInspector|M software

The TextureInspector|M software is used for the surface texture analyses. The user can:

- view the texture profile
- perform the data analysis according to ISO 13473:
 - automatic drop-out and spike correction
 - calculation of Mean Profile Depth (MPD), Estimated Texture Depth (ETD), Root-Mean Square (RMS) and Skewness
 - calculation of texture wavelength spectrum in 1/3-octave bands from 1–250 mm (accuracy of longer wavelengths depends on portal axis length)



FLaSH|M texture system with CoMeT CPX-trailer in use by Vilnius Gediminas Technical University in Lithuania

Conditions

Delivery time

FLaSH texture systems will be delivered approximately 3 months after ordering. We will provide you with an exact delivery date when you place your order.

Support

Hardware

FLaSH texture systems are composed of standard components. In case of a defect the whole system or the defect part can be sent to M+P. We will assist in repair or replacement of the components as covered by the supplier warranty.

Software

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

Warranty

Hardware

FLaSH texture systems utilize hardware components from renowned manufacturers and suppliers. The warranty packages offered by each manufacturer is applicable.

Software

The TextureRecorder and TextureInspector software warranty is stipulated in the license agreements that you receive on delivery. We guarantee to address software issues 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 intermediates, clear reports, and tangible results. We are a pool of experts specializing 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

Contact

Contact person:
Fred Reinink
M+P – Office Vught, Netherlands
T: +31 (0)73-658 9050
FredReinink@mp.nl

Office Vught
Wolfskamerweg 47
NL-5262 ES Vught
Netherlands

www.mplusp.eu



A MEMBER OF
MBBM
MÜLLER-BBM GROUP