

POCKET SURF® III | ABSOLUTE MOBILITY



FOR SURFACE ROUGHNESS MEASUREMENTS

- 0 +

Mahr

EXACTLY

Important Definitions and Surface Parameters

Real surface separates a body from the surrounding medium. (DIN EN ISO 4287)

Stylus instrument enables two-dimensional tracing of a surface. The stylus is traversed normal to the surface at constant speed. (DIN EN ISO 3274)

Traced Profile is the enveloping profile of the real surface acquired by means of a stylus instrument.

Parameters usually are defined over the sampling length. An average parameter estimate is calculated by taking the arithmetic mean of the parameter estimates from all the individual sampling lengths. For roughness profile parameters the standard number of sampling lengths is five.

R_a Mean roughness DIN EN ISO 4287, ASME B46.1

Roughness average R_a is the arithmetic average of the absolute values of the roughness profile ordinates.

$$R_a = \frac{1}{L} \int_0^L |Z(x)| dx$$

$Z(x)$ = profile ordinates of the roughness profile.
 R_a is also called AA and CLA.

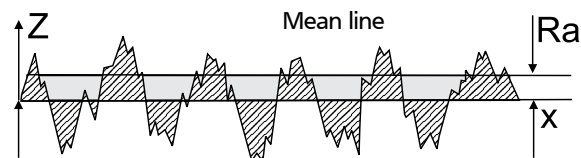
Traversing length l_t is the overall length traveled by the stylus when acquiring the traced profile. It is the sum of the pre-travel, evaluation length l_n and post-travel.

Cutoff λ_c of a profile filter determines which wavelengths belong to roughness and which ones to waviness.

Sampling length l_r is the reference for roughness evaluation. Its length is equal to the cutoff wavelength λ_c .

Evaluation length l_n is that part of the traversing length l_t over which the values of surface parameters are determined. The standard roughness evaluation length comprises five consecutive sampling lengths.

Pre-travel is the first part of the traversing length l_t .
Post-travel is the last part of the traversing length l_t .



R_z , R_{max} Roughness depth DIN ISO 4287, ASME B46.1

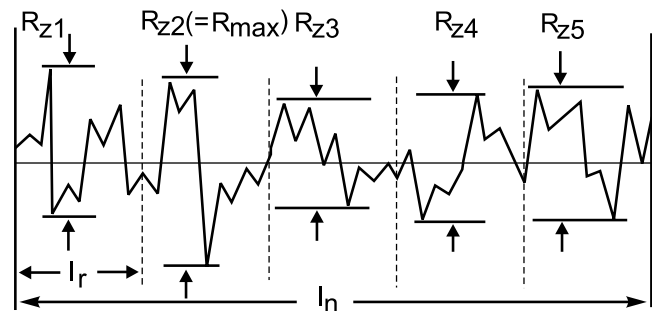
Single roughness depth R_{zi} is the vertical distance between the highest peak and the deepest valley within a sampling length.

Mean roughness depth R_z is the arithmetic mean value of the single roughness depths R_{zi} of consecutive sampling lengths:

$$R_z = \frac{1}{5} (R_{z1} + R_{z2} + \dots + R_{z5})$$

The R_z definition is identical to the definition in DIN4768: 1990. The ten point height R_z as well as the parameter symbol R_y of ISO 4287:1984 has been canceled.

Maximum roughness depth R_{max} is the the largest single roughness depth with the evaluation length. (DIN EN ISO 4288; R_{max} is also called R_{z1max}).



Selection of cutoff according to DIN EN ISO 4287, ASME B46.1

Periodic profile	Non-periodic profile		Cutoff	Sample/Evaluation length
R_{sm} (mm/in)	R_z ($\mu\text{m}/\mu\text{in}$)	R_a ($\mu\text{m}/\mu\text{in}$)	R_λ (mm/in)	l_r / l_n (mm/in)
> 0.13 to 0.4/.005 to .016	> 0.5 to 10/20 to 400	> 0.1 to 2/4 to 80	0.8/.030	0.8/4.0 ; .030/.150

Pocket Surf®* the portable surface roughness gage



Optional Accessory:
Statistics Printer MSP 2,
Order No. 4102040

Requires connection cable
Order No. 4102046



* US-patent no. 4.776.212

Features

- Pocket-sized economically priced, completely portable instrument which performs traceable surface roughness measurements on a wide variety of surfaces; can be used confidently in production, on the shop floor and in the laboratory
 - Solidly built, with a durable cast aluminum housing, to provide years of accurate, reliable surface finish gaging.
 - Can be used to measure any one of four, switch-selectable, parameters: R_a , R_{max}/R_y , R_z
 - Selectable traverse length 1, 3 or 5 cut-offs of 0.8 mm/.030"
 - Operates in any position – horizontal, vertical, and upside down
 - Four switchable probe positions – axial (folded) or at 90°, 180° or 270°
 - Even difficult-to-reach surfaces such as inside and outside diameters are accessible
 - Integrated data output for SPC-processing units that is compatible with the most common data processing systems
 - Easy-to-read LCD readout
- presents the measured roughness value, in microinches or micrometers, within half a second after the surface is traversed.
- Out-of-range (high or low) and "battery low" signals are also displayed

Technical Data

Dimensions	140 mm x 76 mm x 25 mm/ 5.5" x 3" x 1"
Weight	435 g / 14 oz
Measuring Ranges	R_a 0.03 μm to 6.35 μm / 1 μinch to 250 μinch R_y 0.2 μm to 25.3 μm / 8 μinch to 999 μinch R_{max} 0.2 μm to 25.3 μm / 8 μinch to 999 μinch R_z 0.2 μm to 25.3 μm / 8 μinch to 999 μinch
Display Resolution	0.01 μm / 1 μin
Measurement Accuracy	Meets ASME-B46.1, ISO, DIN standards and MIL specifications
Digital Readout	LCD with, "Battery low" signal; "H" and "L" (measured values out-of-range)

Pocket Surf

Technical Data

Probing and Traverse Lengths

Parameters	Traverse Length (Nominal)	Evaluation Length	Number of Cutoffs/ Switch Position
R_a/R_y	2.0 mm/ .075" 3.5 mm/ .135"	0.8 mm/ .030" 2.4 mm/ .090"	1 3
$R_a/R_z/R_{max}$	5.0 mm/ .195"	4.0 mm/ .150"	5
Traverse Speed	5.08 mm/ .2" per second		
Cutoff	0.8 mm/ .030" ASME 2 RC-filter		
Probe Type	Piezoelectric		
Maximum Stylus Force	15.0 mN / 1500 mgf		
Power	Consumer-type alkaline battery, 9 Volt		
Battery Capacity	Approx. 2500 measurements, depending on frequency of use and output option		
Operating Temperature	10° to 45°C / 50° to 113° F		
Storage Temperature	-20° to 65°C / -4° to 149° F		

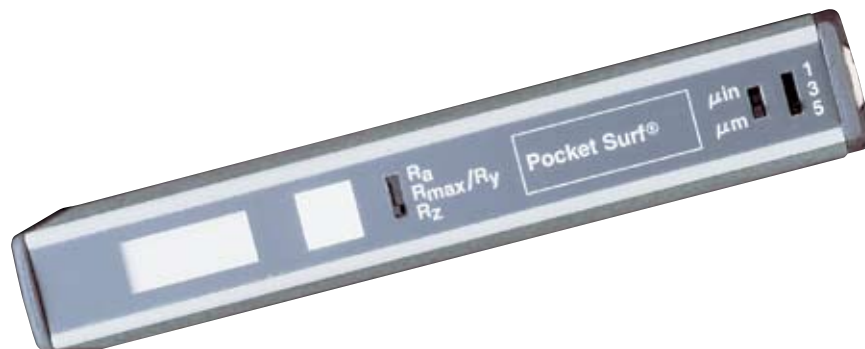
Pocket Surf Sets

Order no.

EMD-1500-311	EGH-1019	Probe, 90°, 10 μ m radius, PMD-90101 Certified Specimen, incl. Test Certificate
EMD-1500-312	EGH-1019	Probe, 90°, 10 μ m radius, EMD-90010 Precision Specimen
EMD-1500-321	EGH-1026	Probe, 90°, 5 μ m radius, PMD-90101, Certified Specimen, incl. Test Certificate
EMD-1500-322	EGH-1026	Probe, 90°, 5 μ m radius, EMD-90010 Precision Specimen

A Pocket Surf kit is furnished complete in a fitted case, and includes a Pocket Surf unit with a General Purpose Probe** and a 3.2 μ m/**125 μ inch** (nominal) Reference Specimen**, 9 Volt battery, Riser Plate and screwdriver.

** Part Numbers listed in table above.



Probes

General Purpose Probes

EGH-1019/EGH-1026

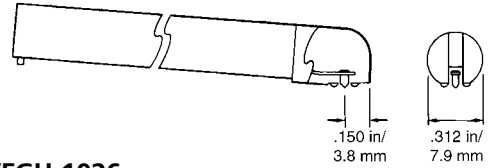
For most surface roughness applications.

EGH-1026

With a 90° conical diamond stylus, 5 μm / .0002" radius*.

EGH-1019

With a 90° conical diamond stylus, 10 μm / .0004" radius.

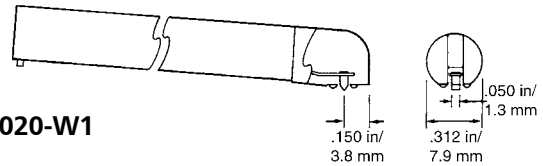


EGH-1019/EGH-1026

Transverse Chisel Probe

EGH-1020-W1

For gaging sharp edges or small O.D.'s where probe is aligned with (in 180° or closed position) to axis of traverse. 90° sapphire chisel, 10 μm / .0004" radius.

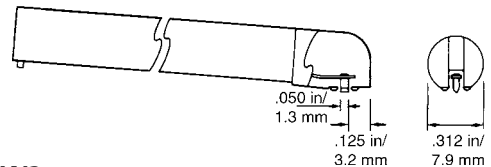


EGH-1020-W1

Parallel Chisel Probe

EGH-1020-W2

For gaging sharp edges or small O.D.'s where probe is perpendicular (in 90°- or 270° position) to axis of traverse. 90° sapphire chisel, 10 μm / .0004" radius. Also used with EAS-2421 Vee fixture for O.D.'s smaller than 6,35 mm, / .25".



EGH-1020-W2

Small Bore Probe

EGH-1021/EGH-1027

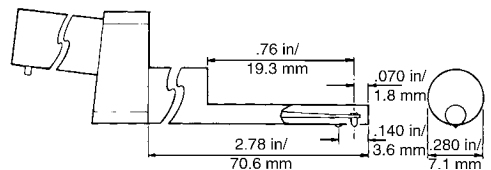
For gaging small bores (3,2 mm / .125" minimum I.D.) up to a depth of 19 mm / .75".

EGH-1027

With a 90° conical diamond stylus, 5 μm / .0002" radius*.

EGH-1021

With a 90° conical diamond stylus, 10 μm / .0004" radius.



EGH-1021/EGH-1027

Groove Bottom Probe

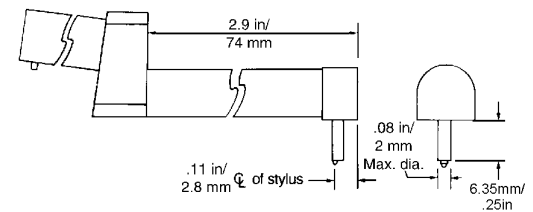
EGH-1028

For measuring the bottom of grooves, recesses and small holes to depths of 6.35 mm / .25".

Also used for short lands and shoulders.

With 90° conical diamond stylus, 10 μm / .0004" radius.

NOTE: Small Bore and Groove Bottom Probes can only be used in 180° position with the Pocket Surf unit supported in a height stand or other fixture.



EGH-1028

* Yellow dot at connector end signifies 5 μm / .0002" radius.

Using the Groove Bottom Probe to check an "O" ring groove.



Applications and Accessories

Height Stand EAS-2496

A compact, convenient fixture with a bracket to hold the Pocket Surf gage. Designed for making measurements on a granite surface plate or on any suitable, flat working surface to a maximum height of about 111mm/4.375".

Order no. EAS-2496



Bore Adapter Kit EAS-2839

For timesaving hand-held measurement of bores without having to fix the workpiece. Accommodates all inside diameters from 25 mm/ 1" to 150 mm/ 6"; depths from 25 mm/ 1" to 60 mm/ 2.4".

Order no. EAS-2839



Vee-Adapter Kit EAS-2739

Attaches to bottom of Pocket Surf unit, permitting convenient, hand-held measurements of hard-to-reach cylindrical surfaces, such as crankshaft journals without having to fix the workpiece. Suitable for parts with diameters from 5.0 mm/ .19" to 125 mm/ 5".

Order no. EAS-2739



Universal Stand EAS-2426

A heavy-duty stand equipped with an adjustable bracket to hold the Pocket Surf for measuring of workpieces, up to 213 mm / 8.375 in tall.

Order no. EAS-2426



Applications and Accessories

Portable vee fixture EAS-2421

For measuring small parts with outside diameters from 3.1 mm/.125" to 25 mm/ 1" for lengths of 25 mm/ 1" minimum - includes PS-145 setting pin.

Order no. **EAS-2421**



Bottom Plate EAS-2584

For measuring cylindrical workpieces too short (less than 89 mm/3.5" long) for the "closed" probe position; for workpieces with short O.D.'s from 6.35 mm/ .25" (minimum 38 mm/ 1.5" long).

Order no. **EAS-2584**



EAS-3048 Mounting Bracket for use with height gages

For mounting the Pocket Surf to most standard height gages. The bracket includes a rectangular bar that is 11.5 mm x 6.35 mm (0.45" x 0.25") to fit the holder of the height gage. A swivel feature is included to permit the Pocket Surf to be set anywhere within a 360° rotation.

Order no. **EAS-3048**



Height Stand with Swivel

A compact, convenient fixture with an adjustable bracket to hold the Pocket Surf, anywhere within a 360° rotation, for making measurements on a surface plate or on any suitable, flat working surface.

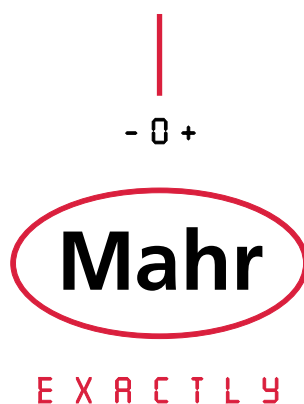
Order no. **2236687**



-



WWW.MAHR.COM



Mahr Federal Inc.

1144 Eddy Street
Providence, RI 02905, USA
Phone: +1 (401) 784-3100
Toll Free: 1-800-343-2050
Fax: +1 (401) 784-3246
information@mahr.com, www.mahr.com

We reserve the right to make changes to our products, especially due to technical improvements and further developments. All illustrations and technical data are therefore without guarantee.

© by Mahr Federal Inc.