POCKET SURF® IV I 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 etimates from all the individual sampling lengths. For roughness profile parameters the standard number of sampling lengths is five.

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.

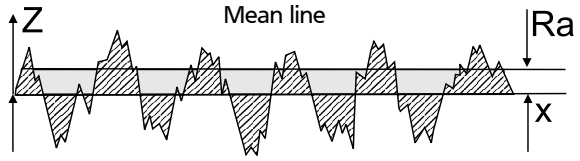
Pre-travel is the first part of the traversing length l_t.
Post-travel is the last part of the traversing length l_t.

R_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.



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

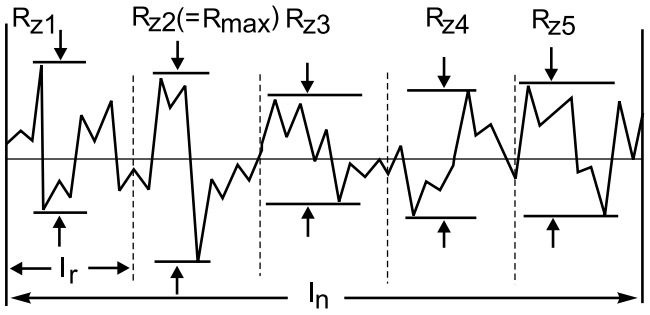
Single roughness depth R_{zi} is the vertical distance between the highest peak and the deepest valley within a sampling length.

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

$$Rz = \frac{1}{5}\,(R_{z1} + R_{z2} + \ldots + R_{z5})$$

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 evalution 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/ Evalution length
R_{Sm} (mm/in)	R_z (µm/µin)	R_a (µm/µin)	R_λ (mm/in)	l_r / l_n (mm/in)
> 0.13 to 0.4/.005 to.016	> 0.5 to10/20 to 400	> 0.1 to 2/4 to 80	0.8/.030	0.8/4.0 ; .030/.150

Pocket Surf® IV the portable surface roughness gage

A 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

Features

- 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
- Then review any of the parameters after the measurement is complete
- Selectable traverse length 1, 3 or 5 cut-offs of 0.8 mm/0.030"
- 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
- MarConnect data output for easy SPC-processing 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
- Improved digital calibration process eliminate screwdrivers and potentiometers to simplify and enhance the calibration process
- Improved battery life with easy to replace standard 9V battery

Nothing is easier than Pocket Surf IV's single button operation

Economical and simple to replace battery

Built in measurement output

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® IV

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"***	0.8 mm/ ***.030"***	1
	3.5 mm/ ***.135"***	2.4 mm/ ***.090"***	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

* *Othercutoff/switch positions may be used*

Pocket Surf Sets

Order no.		
2191800	EGH-1019	Probe, 90°, 10 µm radius, PMD-90101 Certified Specimen, incl. Test Certificate
2191802	EGH-1026	Probe , 90°, 5 µm radius, PMD-90101, Certified Specimen, incl. Test Certificate

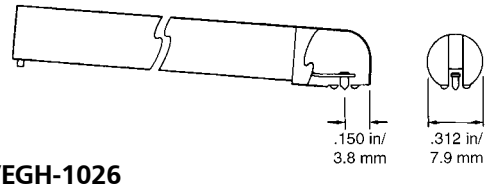
A Pocket Surf kit is furnished complete in a fitted case, and includes a Pocket Surf unit with a General Purpose Probe** and a 3.2 µm/***125 µinch*** (nominal) Reference Specimen**, 9 Volt battery and Riser Plate.

** *Part Numbers listed in table above.*

Probes

General Purpose Probes

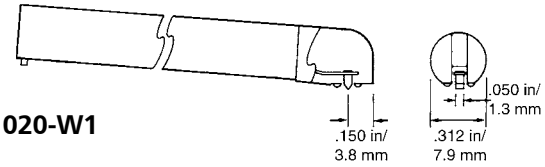
EGH-1019/EGH-1026
For most surface roughness applications.
EGH-1026
With a 90° conical diamond stylus, 5 µm/ .0002" radius*.
EGH-1019
With a 90° conical diamond stylus, 10 µm/ .0004" radius.



EGH-1019/EGH-1026

Transverse Chisel Probe

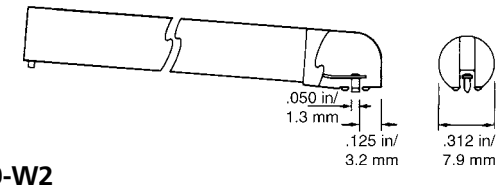
EGH-1020-W1
For gaging sharp edges or small O.D.'s where probe is aligned with (in 180° or closed position) to axis of traverse. 90° sapphire chisel, 10 µm./ .0004" radius.



EGH-1020-W1

Parallel Chisel Probe

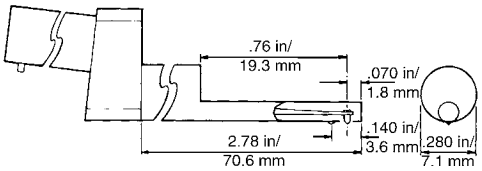
EGH-1020-W2
For gaging sharp edges or small O.D.'s where probe is perpendicular (in 90°- or 270° position) to axis of traverse. 90° sapphire chisel, 10 µm. / .0004" radius. Also used with EAS-2421 Vee fixture for O.D.'s smaller than 6,35 mm, / .25".



EGH-1020-W2

Small Bore Probe

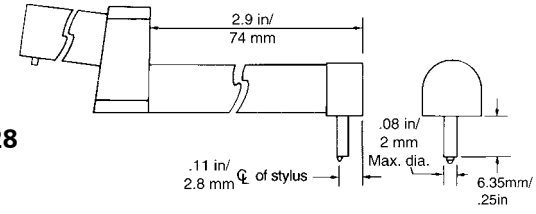
EGH-1021/EGH-1027
For gaging small bores (3,2 mm/ .125" minimum I.D.) up to a depth of 19 mm/ .75".
EGH-1027
With a 90° conical diamond stylus, 5 µm/ .0002" radius*.
EGH-1021
With a 90° conical diamond stylus, 10 µm/ .0004" radius.



EGH-1021/EGH-1027

Groove Bottom Probe

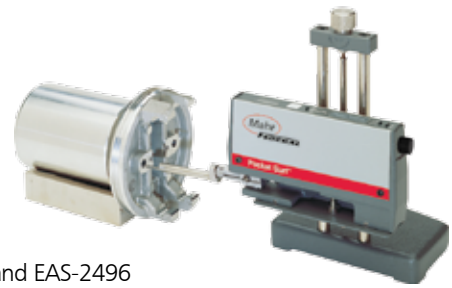
EGH-1028
For measuring the bottom of grooves, recesses and small holes to depths of 6.35 mm/ .25".
Also used for short lands and shoulders.
With 90° conical diamond stylus, 10 µm/ .0004" radius.
NOTE: Small Bore and Groove Bottom Probes can only be used in 180° position with the Pocket Surf unit supported 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.



Shown with optional height stand EAS-2496

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**

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

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

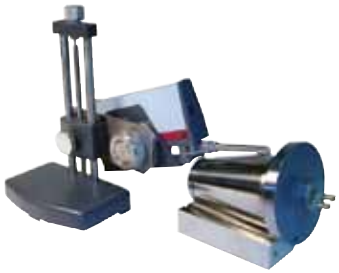
For mounting the Pocket Surf to most standard height gages. The bracket includes a rectangular bar that is 11.5 mm x 6.35 mm (0.45" x 0.25") to fit the holder of the height gage. A swivel feature is included to permit the Pocket Surf to be set anywhere within a 360° rotation.

Order no. **EAS-3048**

Height Stand with Swivel

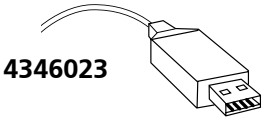
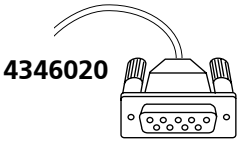
A compact, convenient fixture with an adjustable bracket to hold the Pocket Surf, anywhere within a 360° rotation, for making measurements on a surface plate or on any suitable, flat working surface.

Order no. **2236687**



MarConnect - USB ready

The Pocket Surf IV® employs the MarConnect interface from Mahr. Marconnect simplifies data transmission to a PC and enables quick and universal assembly of a multiple measuring station.

			Order no.
 4346023	**Data Connection Cable** USB (2 m) incl. MarCom Standard	**16 EXu**	**4346023**
 4346020	**Data Connection Cable** Opto RS232C (2 m), with SUB-D jack 9-pin	**16 EXr**	**4346020**
	**Software MarCom Professional 4.0** Allows for up to 68 wired devices		**4102552**
	Software MarCom Standard 3.1 Allows for 1 wired device		**4102551**

Accessories for Data Processing, see Dimensional Metrology Catalog Chapter 11

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