

Surface Roughness Testing



Roughness Parameters Commonly Used in Short

Mean roughness R_a (ISO 4287, DIN 4768)

The mean roughness R_a matches the arithmetical mean of the absolute values related to the profile deviation y within the reference length l .

Max. profile valley depth R_{max} (DIN 4768)

The max. profile valley depth R_{max} counts for the most significant single roughness depths Z_i within the total length l_m .

According to ISO 4288 and DIN 4287 - Part 1, this parameter is also specified as $R_y \max$.

Mean roughness depth R_z DIN (DIN 4768)

The mean roughness depth R_z is the arithmetical mean of single roughness depths of successive sampling lengths l_e .

According to ISO 4287 and DIN 4762, the parameter R_z DIN is also specified as R_y5 .

Since R_z changes its name in both DIN 4768 and ISO 4287, this parameter is also specified as R_z DIN or R_z ISO.

If the parameter R_z is measured according to DIN, it is generally admitted that the extreme value specified by ISO is matched providing that R_z ISO does not exceed R_z DIN.

Use of Roughness Comparison Specimens

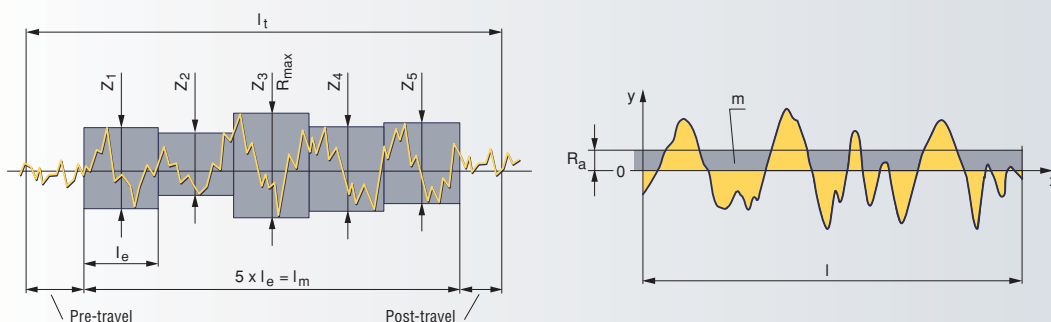
These specimens used for testing any surface finish quality have long proven their value in praxis.

They serve for touch and/or sight comparisons with the surface of work pieces that are produced using the same manufacturing process. Condition is that materials have to be comparable.

When comparing the workpiece surface against the specimen, roughness is not quantitatively expressed. The assessment of the extent to which the surface finish of both is alike can only be subjective.

Sight comparison requires optimum light source angle. For small surfaces, the use of a magnifying glass with up to 8x magnification is recommended.

Touch comparison is made using the finger nail or a small cooper piece like a coin, for instance.



TESA RUGOSURF 10 Roughness Gauge

Robust, versatile and compact gauge unit designed for inspecting any work piece surface finish and capturing roughness parameter values – Wide variety of probes for the most varied applications – Possible tolerancing of each parameter available.

- Interchangeable probe, swivelling through to 90° to let you measure even in hard-to-reach recesses.
- Extended autonomy. Can equally be connected to the mains adapter or the battery pack for direct use on a machine-tool.
- Value storage, output or transfer to a PC (up to 30 values).
- RS 232 data output for full use and further storage of the measurement results.
- Automatic switch over to idle mode if left unused for 40 seconds. Preserve the battery pack.
- Fast and easy analysis of the results obtained from the measured parameters with assigned tolerances.



RS 232

10°C to 40°C

-10°C to +50°C

120 x 55 x 80 mm
(gauge unit alone)

590 g



Suited plastic case

Declaration of conformity



06930010 TESA RUGOSURF 10 roughness gauge

delivered with the following standard accessories:

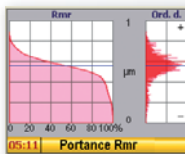
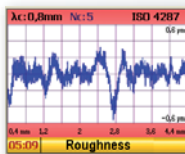
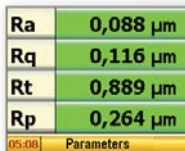
- Roughness standard, nominal value Ra = 2,97 µm / 117 µin
- Rechargeable battery, 8,4 V, 120/250 mAh, NiCd or NiMH, PP3 format
- Standard probe, type **SB10**
- Battery charger
- Adaptor for universal stand, 8 mm diameter
- Positioning support



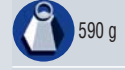
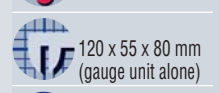
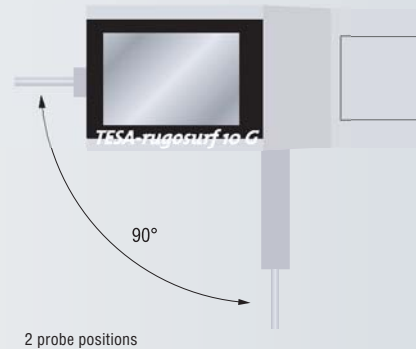
TESA RUGOSURF 10G Roughness Gauge

Portable, versatile gauge unit with compact design well suited for receiving inspection or for use in the production area or the measurement laboratory.

Measure roughness parameters according to ISO 4287:1997/ JIS B0601:2001, DIN and ISO 12085:1998 (MOTIF or CNOMO).



- TFT graphic colour display for optimum visual representation, of the measured parameters and work piece profiles, size 2".
- Direct displaying of the measured values and computed profiles.
- 33 roughness parameters available.
- Wide autonomy through mains adapter or battery pack.
- Possible storage, output or transfer to a PC of the results obtained from at least 1000 measurements.
- Possible tolerancing of all parameter values.
- Multilingual function menus.
- RS 232 data output enabling a direct connection to the printer unit or a conventional PC equipped with the RUGOSOFT 10 software (optional for both).





06930011 TESA RUGOSURF 10G roughness gauge

Delivered with the following standard accessories:

- Roughness standard, nominal value Ra = 2,97 µm / 117 µin
- Rechargeable battery, 7,2 V, 300 mAh, NiMH PP3 format
- Standard probe, type SB10
- Battery charger
- Adaptor for universal stand, 8 mm diameter
- Positioning support

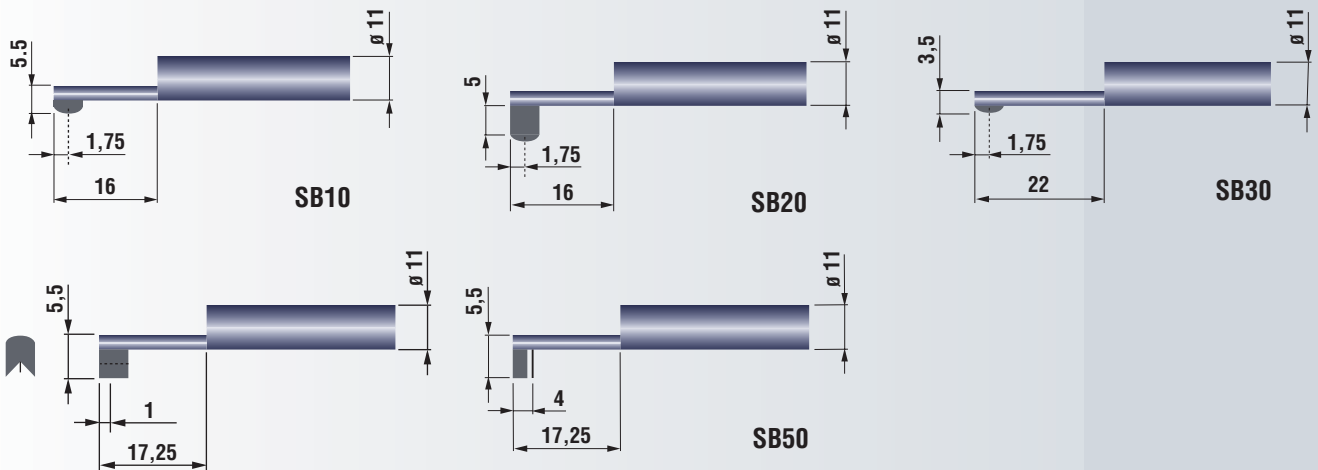
Technical Data

	 06930010	06930011
	 RUGOSURF 10	RUGOSURF 10G
Display	LCD, 2 lines of 16 characters	TFT colour display, 2" in size
Roughness parameters	according to ISO 4287-1997/JIS B0601 Ra - Rq (RMS) - Rt - Rz - Rc - Rsm - Rmr according to ISO 12085 (CNOMO) Pt - R - Rx - AR	according to ISO 4287-1997/JIS B0601:2001 Ra - Rq (RMS) - Rt - Rz - Rp - Rc - Rv - Rsm - Rδc - Rmr - Pa - Pq - Pt - Pp - Pc - Pv - Psm - Pδc according to PrEN 10049 R _{Pc} - P _{Pc} according to ISO 13565 Rk - R _{pk} - R _{vk} - Mr1 - Mr2 according to DIN 4776 R _{max} according to DB N31007 R3z - R3zm according to ISO 12085 (CNOMO) Pt - R - Rx - AR
Measuring span		
X-axis	16 mm	16 mm (0.63 in)
Z-axis	160 μm	300 μm (11810 μin)
Unit system	mm	mm / in
Range of indication	Ra 0 ÷ 40 μm Rt 0,05 ÷ 160 μm	Ra 0 ÷ 75 μm (0 ÷ 2952 μin) Rt 0,05 ÷ 300 μm (0 ÷ 11810 μin)
Resolution	0,01 μm	0,001 μm (0.01 μin)
Cut-off length	0,25-0,8-2,5 mm	0,25-0,8-2,5 mm (0.01-0.03-0.1 inch)
Numerical filter	Gaussian as per ISO 11562	Gauss as per ISO 11562
Traversing length l _t	(number of cut-offs + 1) x λ _c	(number of cut-offs + 1) x λ _c
Cut-off l _c	number of cut-offs x λ _c	number of cut-offs x λ _c
Number of selectable cut-offs	2 to 5	1 to 10 = 0,25 and 0,8 mm 1 to 5 = 2,5 mm
Keypad	4-key pad, membrane-type, protected against dust particles and liquids	4-key version, membrane-type, protected against dust particles and liquids
Probe type	Inductive probe	Inductive probe
Stylus tip	Diamond tip	Diamond tip
Tip radius	5 μm, 90°	5 μm, 90°
Measuring force	0,75 mN (ISO 3274)	0,75 mN (ISO 3274)
Languages	English, French, German, Spanish, Italian, Portuguese	English, French, German, Spanish, Italian, Portuguese
Autonomy	up to 200 measurements	up to 999 measurements
Power supply	Battery pack, 8,4 V – 170 mAh	Battery pack, 7,2V – 300 mAh
Power consumption	3 VA max., 220 V	6,5 VA max., 220 V
Overall dimensions	120 x 55 x 80 mm	120 x 55 x 80 mm
Weight	590 g	590 g

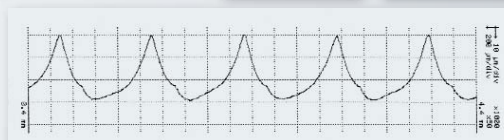
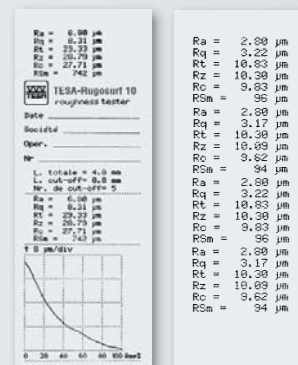


Optional Probes

06960036	SB10	Standard probe for surfaces and bores with diameters to >10 mm (external) or > 6 mm (internal).
06960037	SB20	Probe for grooves, max depth 5 mm.
06960038	SB30	Probe for small bores from 4 mm dia.
06960039	SB40	Probe with V-skid for cables with external diameter to >1 mm.
06960040	SB50	Probe with front mounted contact skid for concave surfaces. Ideal for 90° measurement.
06960056		Extension, 100 mm long.
06960057	SP110	Probe for concave or convex surfaces, min. tip radius to 5 mm.

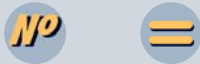


Matrix Printer



06960033	Matrix printer, 24 columns
<i>Provided along with:</i>	
	Rechargeable battery pack
	Connecting cable for Printer to RUGOSURF 10/10G / 90G
06960043	Inked ribbon (3 items)
06960044	Paper roll, 57 mm wide (10 units)

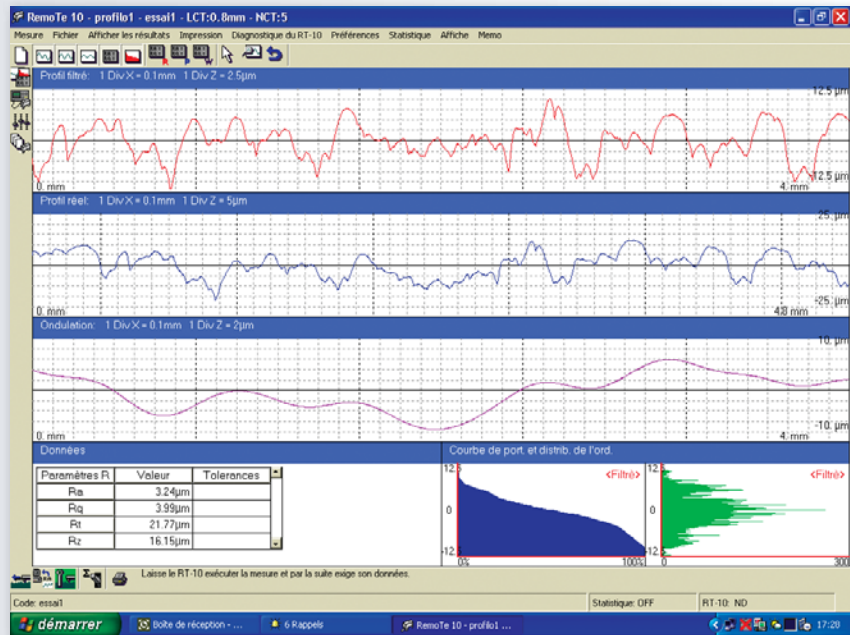
RUGOSOFT 10 Software



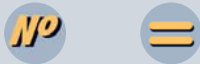
06960034 Rugosoft 10 software

Provided along with:

- CD with all instructions for installation, 6 languages available
- Instruction manual plus on-line help (included on the CD)
- RS 232 connecting cable



Additional Accessories



- 06960035** Support with granite base, 400 x 250 mm
- 06960041** Roughness standard, nominal value Ra = 2,97 µm / 117 µin
- 06960042** Foot switch
- 06960045** Battery pack for powering Rugosurf 10G
- 06960046** Mains adapter, 100 to 240 Vac / 50 to 60 Hz
- 06960047** Suited plastic case for both Rugosurf 10 and 10G

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