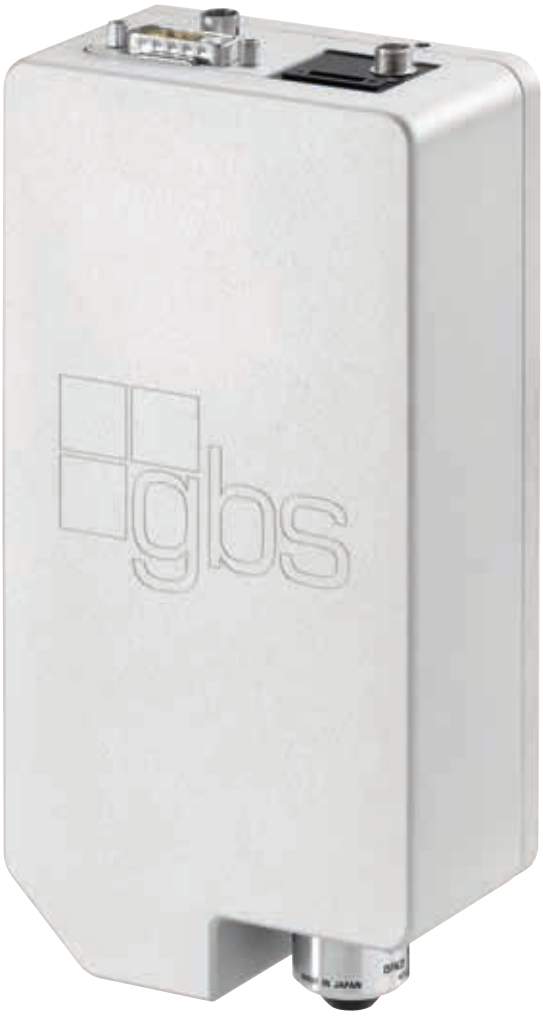
product catalog



roughness standard, Ra 25 nm, 5 x 4 mm²

insert, 15 x 15 mm²

white-light interferometers for high speed measurements

GBS – experts for image and signal processing

GBS Ilmenau

Torsten Machleidt Managing Director

Ilmenau University of Technology

Short introduction of the GBS

- located in the Goethe and University City Ilmenau
- founded 1997 as subsidiary of the ZBS
- with the roots and close contacts to the academic research
- focus on the smartWLI technology

Speedytec

- image processing on graphic boards
- massive parallel processing
- app. 20x faster as CPU's
- real time 3D calculation
- advanced algorithms
- improved data quality
- fast autofocus

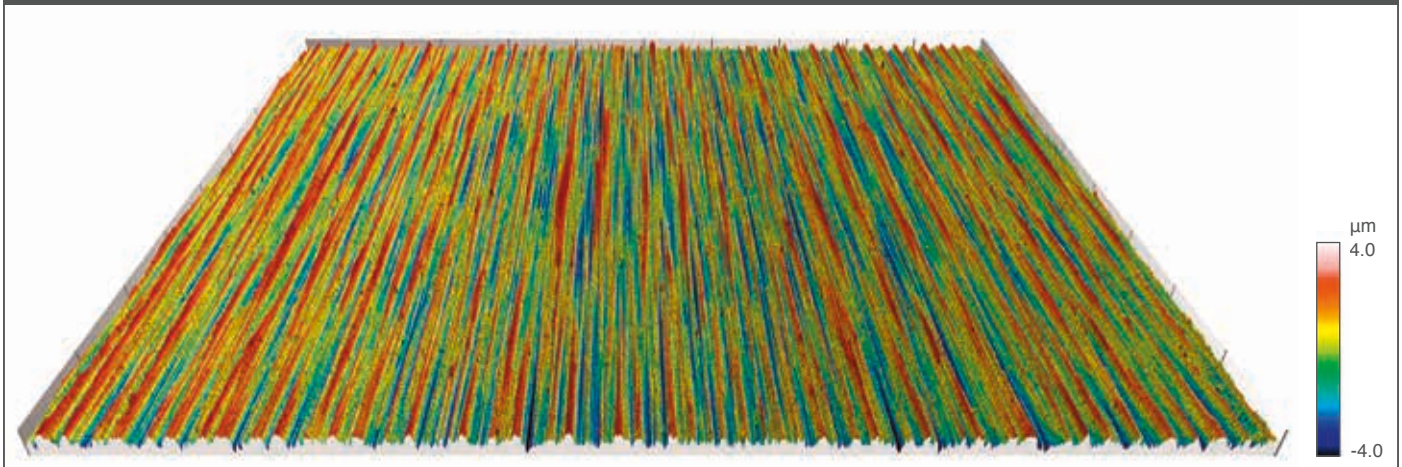
Advanced white-light interferometry with the following intentions:

- high speed data acquisition
  - integration of the smartWLI sensors in production lines
  - short cycle times
- using high resolution cameras
  - acquiring of more details
  - simplified handling
- improved performance
  - reduced influence of vibrations and thermal drift
  - higher data quality on steep structures, transparent and crystalline objects through advanced algorithms
- cost saving factors
  - reduced cost of operation
  - high resolution cameras allow to use objectives with a lower magnification and make zoom tubes and occasionally xy-stages obsolete

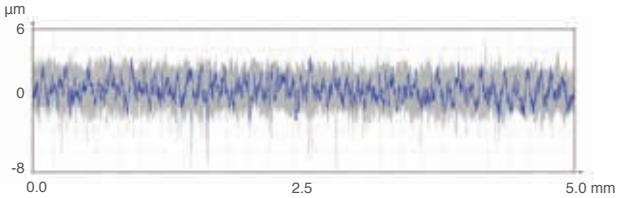
ISO conform

The instant evaluation of several thousand profiles provide high significant results.

grinded surface, 5 x 4 mm²

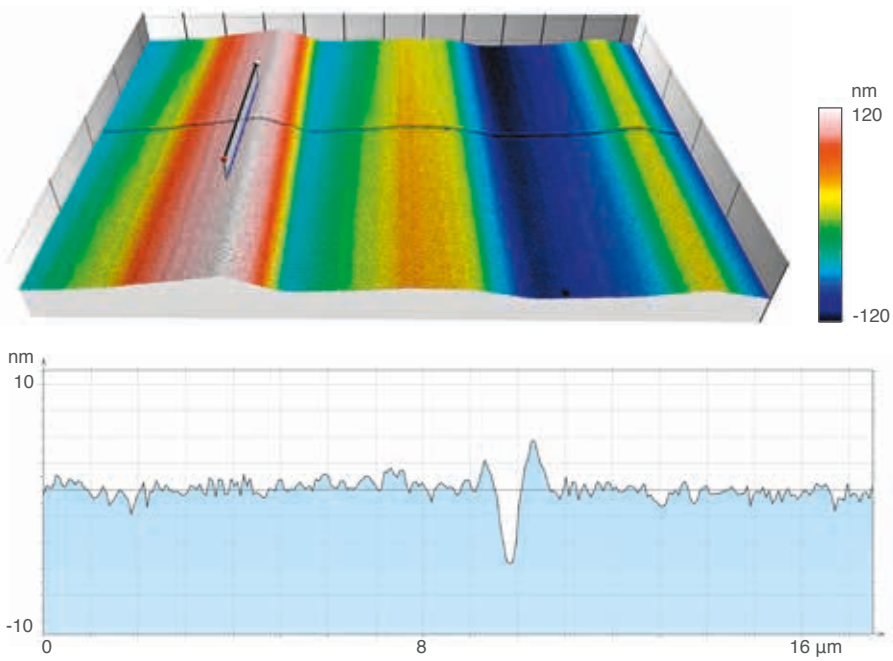


ISO 4287						
amplitude parameters – Roughness profile			mean	std dev	min	max
Rp	µm	*gaussian filter 0.8 mm*	2.63	0.15	2.22	3.10
Rv	µm	*gaussian filter 0.8 mm*	2.73	0.19	2.29	3.77
Rz	µm	*gaussian filter 0.8 mm*	5.37	0.25	4.85	6.46
Rt	µm	*gaussian filter 0.8 mm*	6.16	0.61	5.32	10.93
Ra	µm	*gaussian filter 0.8 mm*	0.80	0.05	0.71	0.92
Rq	µm	*gaussian filter 0.8 mm*	0.98	0.05	0.88	1.11
ISO 13565						
ISO 13565-2						
Rk	µm	*gaussian filter 0.8 mm*	2.62	0.20	2.17	3.12
Rpk	µm	*gaussian filter 0.8 mm*	0.82	0.09	0.55	1.08
Rvk	µm	*gaussian filter 0.8 mm*	0.84	0.09	0.58	1.23
Mr1	%	*gaussian filter 0.8 mm*	10.52	1.55	6.65	14.54
Mr2	%	*gaussian filter 0.8 mm*	91.22	1.23	87.93	95.01



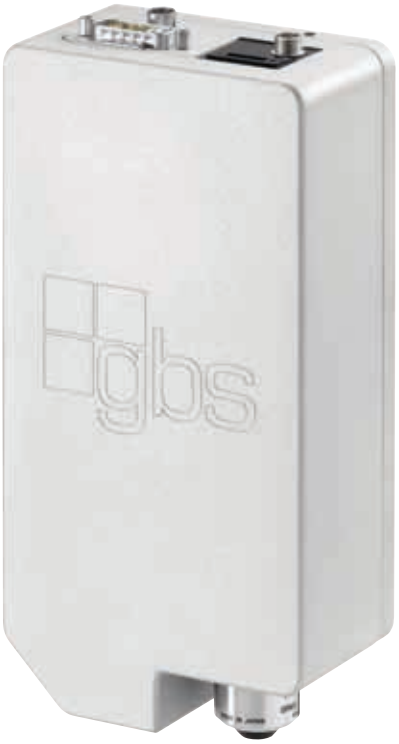
and without the limits of tactile measuring systems

scratch on the roughness standard, 60 x 40 µm²

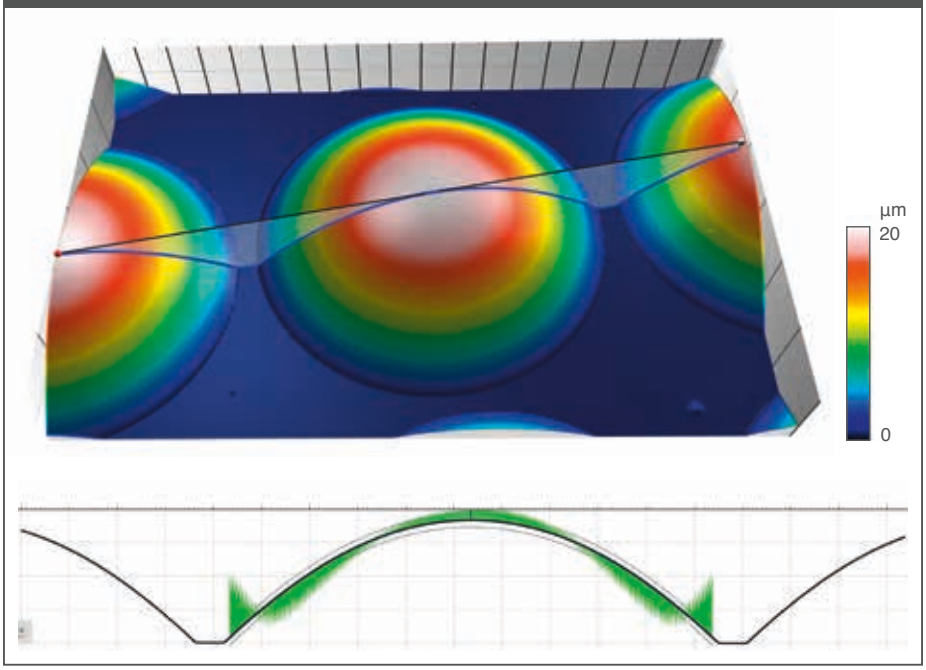


smart WLI compact

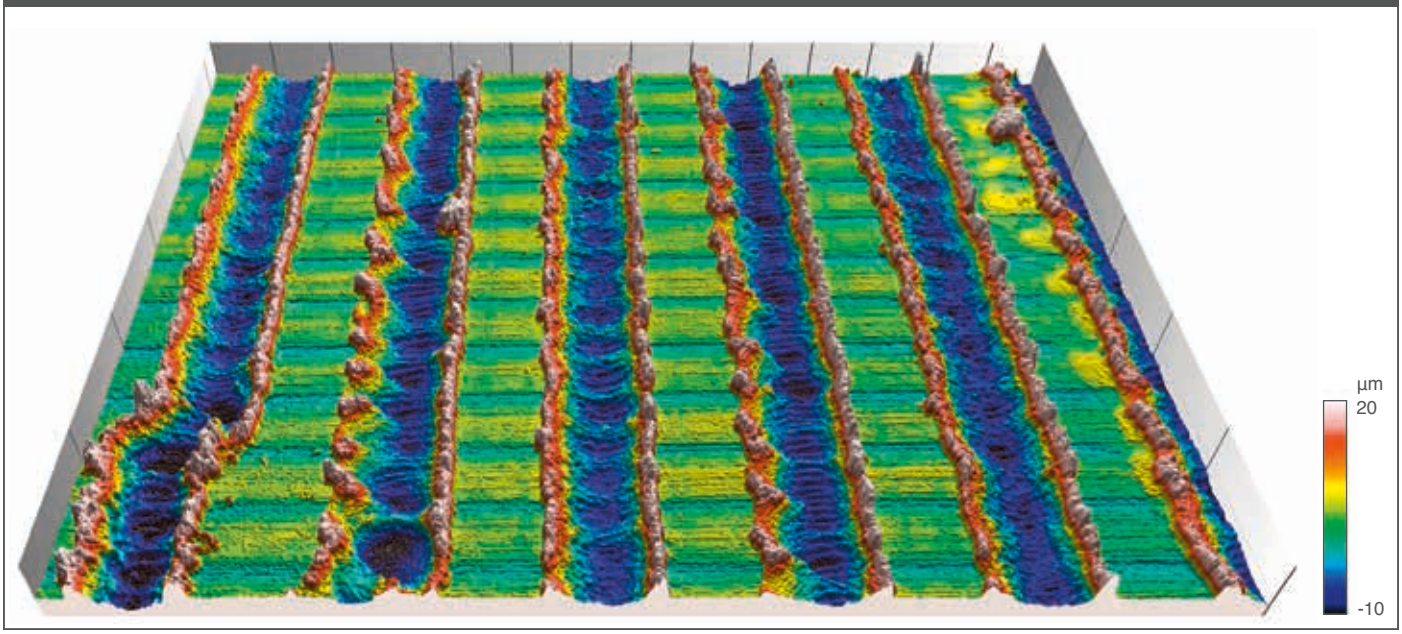
inline 3D sensor



micro lense, 400 x 300 µm² – form deviation



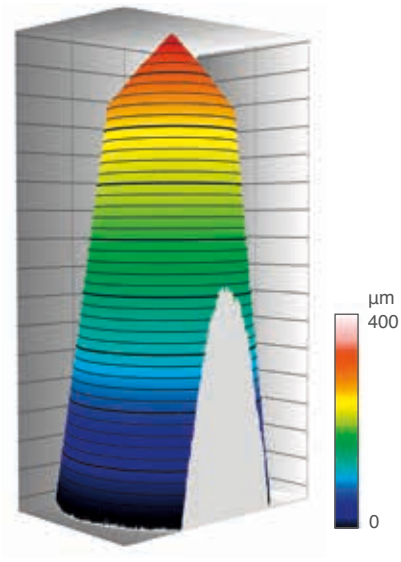
laser structure, 2.0 x 1.5 mm²

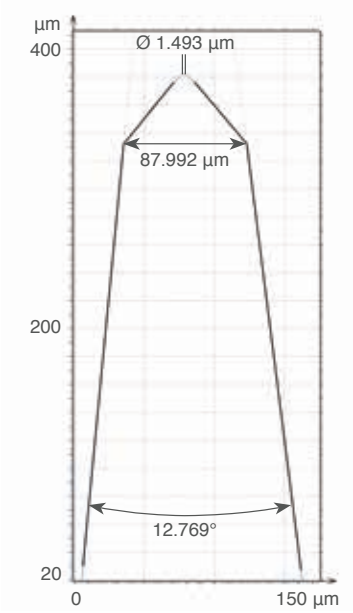


smart WLI prime

shop floor quality control

measurement of highly sloped tools, 200 x 150 µm²



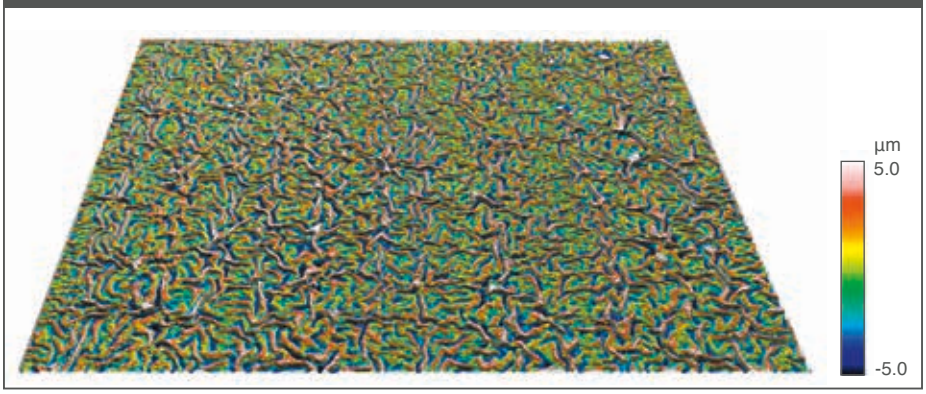


fast inspection of electronic components, 800 x 600 µm²

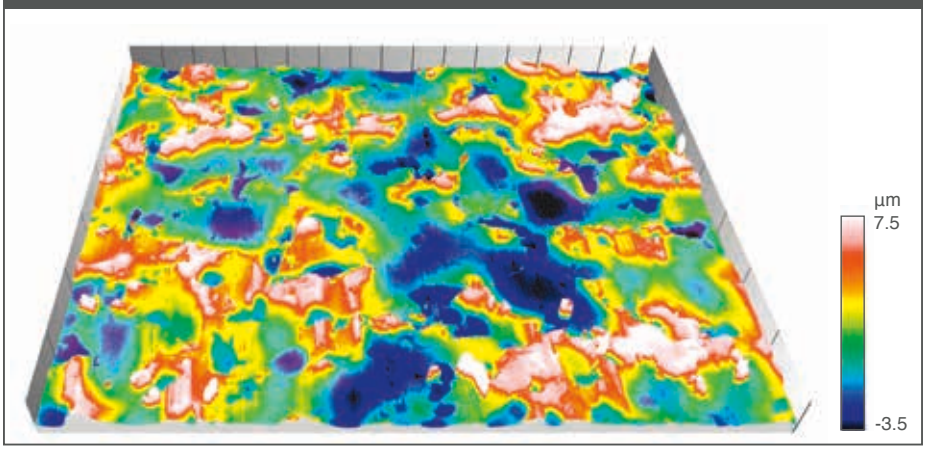
smart WLI extended

labor measuring system

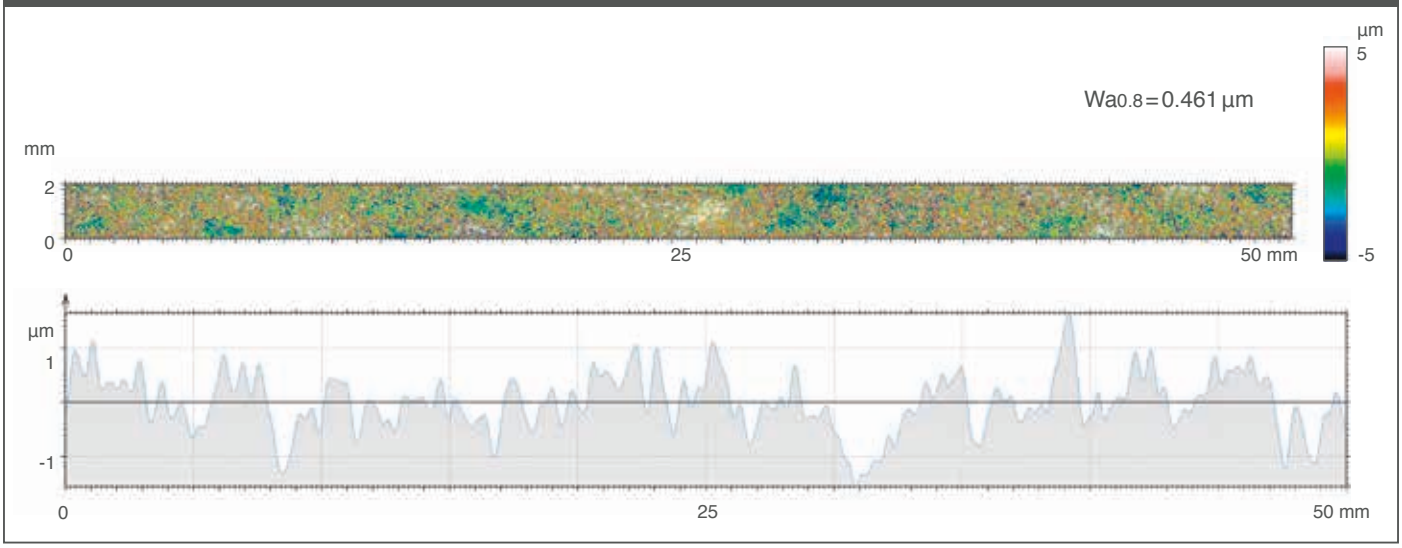
structured transparent film, 2.0 x 1.5 mm²



sheet metal, partial area, 800 x 600 µm²



sheet metal, 50 x 2 mm²

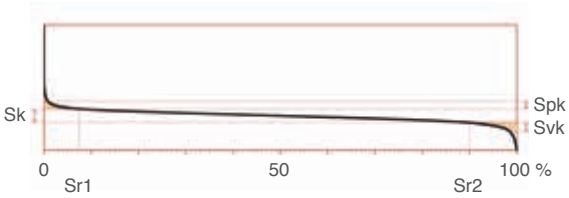


smart WLI

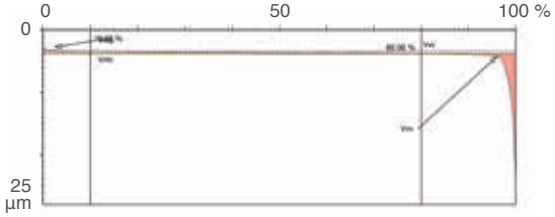
CylinderInspector 3d

customized solutions

3d roughness parameter



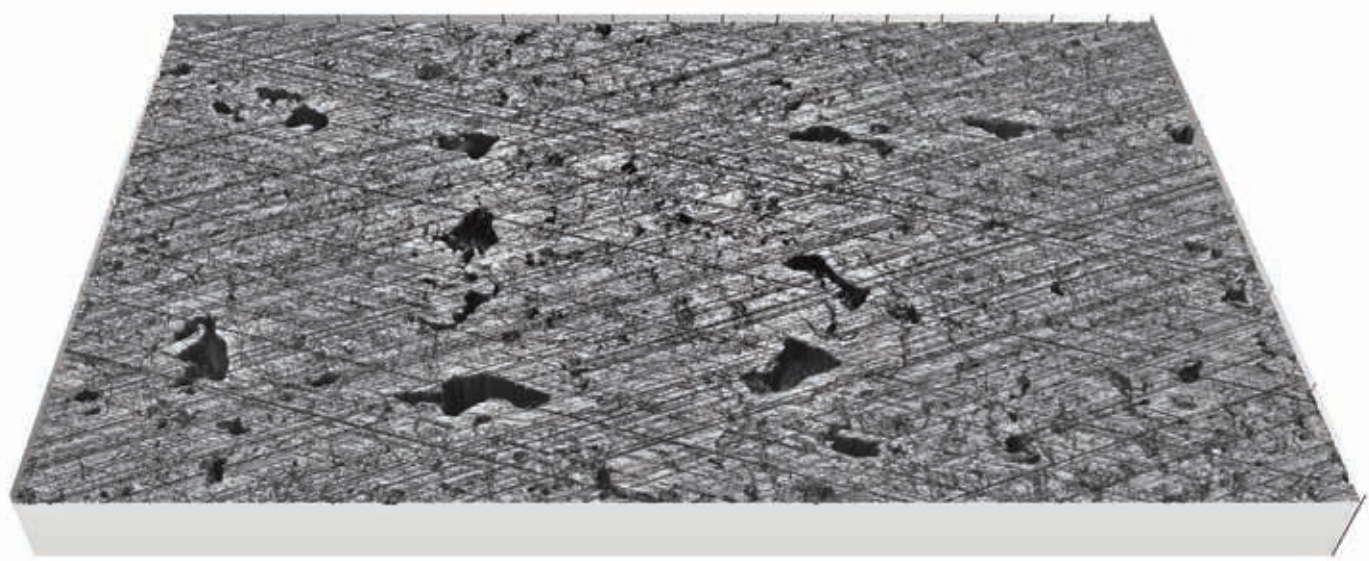
parameters	value	unit
Sk	0.48	µm
Spk	0.27	µm
Svk	0.32	µm
Sr1	7.55	%
Sr2	89.84	%
Sa1	10072.15	$\mu m^3/mm^2$
Sa2	16156.22	$\mu m^3/mm^2$



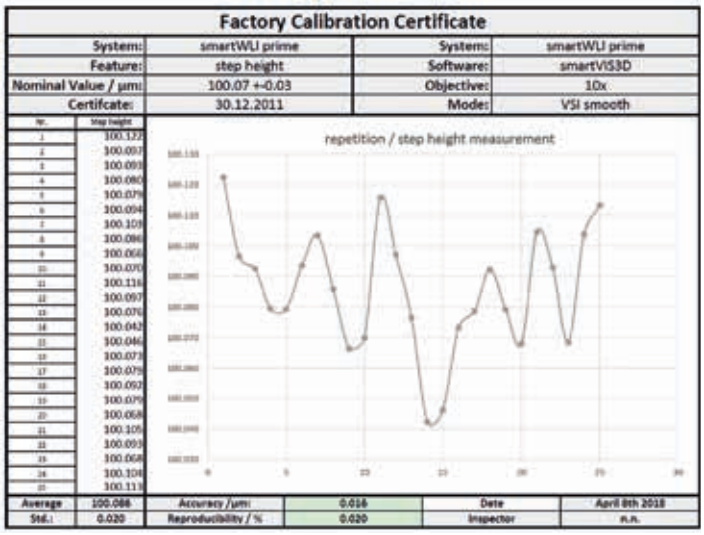
parameters	value	unit
Vmp	9.93e-03	ml/m^2
Vmc	0.16	ml/m^2
Vvc	0.22	ml/m^2
Vvv	0.22	ml/m^2

parameters	value	unit
honing angle – honing structure FFT analysis	20.80	°
rising grooves – honing structure FFT analysis	22.60	°
falling grooves – honing structure FFT analysis	19.00	°
rising structures – honing structure FFT analysis	12.54	%
falling structures – honing structure FFT analysis	10.17	%
cross structures – honing structure FFT analysis	8.13	%
closed structures – honing structure FFT analysis	69.16	%

plasma sprayed surface, 2.0 x 1.5 mm^2



certified repeatability and reproducibility



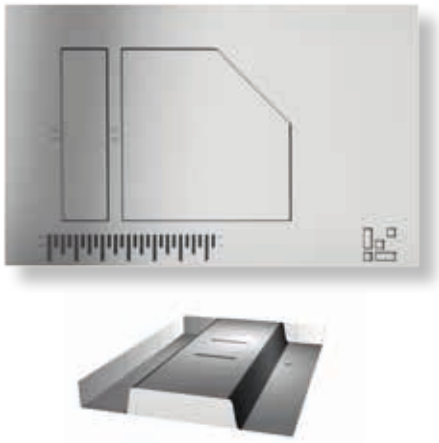
Factory Calibration Certificate

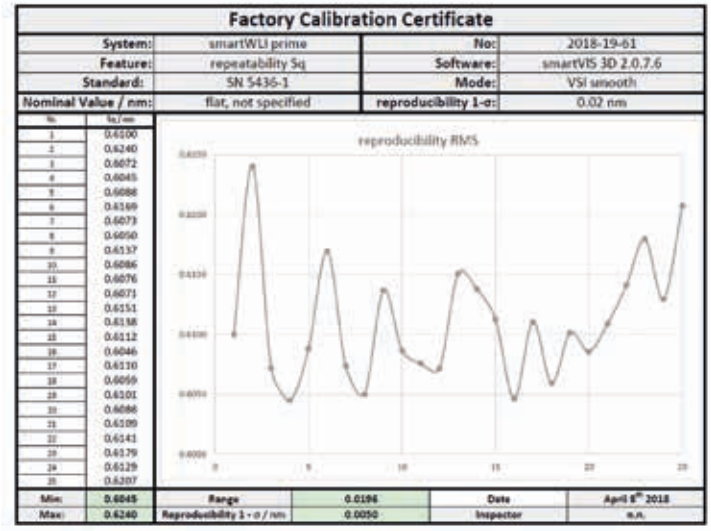
System:	smartWLI prime	System:	smartWLI prime
Feature:	step height	Software:	smartVIS3D
Nominal Value / µm:	100.07 +-0.03	Objective:	10x
Certifcate:	30.12.2011	Mode:	VSI smooth

Nr.	Step height
1	100.122
2	100.097
3	100.093
4	100.080
5	100.079
6	100.094
7	100.103
8	100.086
9	100.064
10	100.070
11	100.116
12	100.097
13	100.076
14	100.042
15	100.046
16	100.073
17	100.079
18	100.097
19	100.079
20	100.068
21	100.105
22	100.093
23	100.068
24	100.104
25	100.113
Average	100.086
Std.	0.020

Accuracy /µm:	0.016	Date	April 8th 2018
Reproducibility / %	0.020	Inspector	n.n.

step standard, height 100 µm





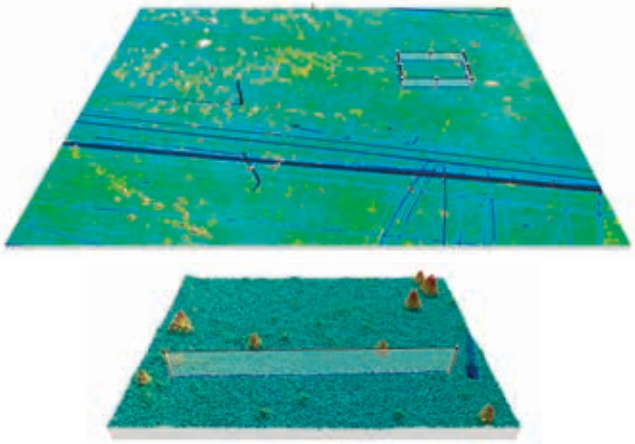
Factory Calibration Certificate

System:	smartWLI prime	No:	2018-19-61
Feature:	repeatability Sq	Software:	smartVIS 3D 2.0.7.6
Standard:	SN 5436-1	Mode:	VSI smooth
Nominal Value / nm:	flat, not specified	reproducibility 1-σ:	0.02 nm

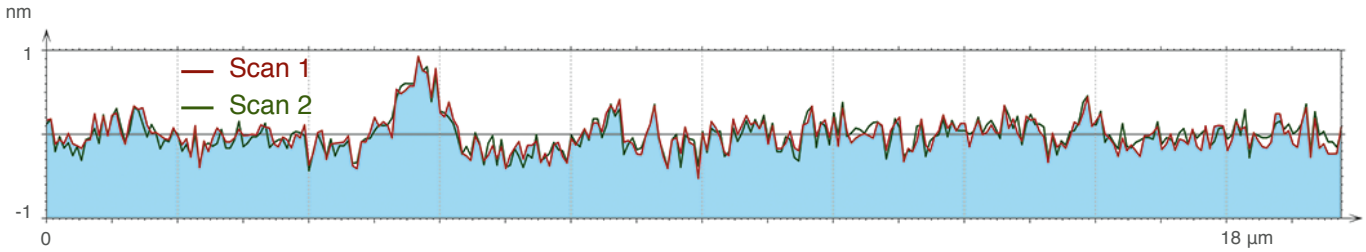
No.	Sq / nm
1	0.6100
2	0.6240
3	0.6072
4	0.6045
5	0.6088
6	0.6169
7	0.6073
8	0.6050
9	0.6137
10	0.6086
11	0.6076
12	0.6071
13	0.6151
14	0.6158
15	0.6112
16	0.6046
17	0.6110
18	0.6059
19	0.6101
20	0.6086
21	0.6109
22	0.6141
23	0.6179
24	0.6129
25	0.6207
Min:	0.6045
Max:	0.6240

Range	0.0196	Date	April 8th 2018
Reproducibility 1 - σ / nm	0.0050	Inspector	n.n.

glass plate, 160 x 120 µm²



repeated scans of the glass plate



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EUROPÄISCHER FONDS FÜR REGIONALE ENTWICKLUNG

EUROPÄISCHE UNION

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