

Comments to:

2.2. Technical specification of the subject of the public contract

IN BLU ARE REPORTED NANOVEA TECHNICAL SPECS

The system must include all components listed below and must fulfil the following minimal requirements set by the Contracting Authority:

- Compact measuring head, non-contact measuring technology.
- Nanovea Jr25 has a head with XY motors and sensor that can be placed in different positions. The XY Motors can be umounted from the motor holder and this consitute the smallest dimension path of the head of about 15x25cm. The smallest on the market. The head mounts a non-contact optical pen with chromatic confocal technology.
- The design of the instrument allows it to be placed directly on the surface without damaging the area to be measured. The instrument allows it to be mounted on the machining head of the CNC (Computer Numerical Control) machine (CNC machine is not included in the delivery). The instrument mounted on the CNC machine head is then not in direct contact with the surface to be measured.

The head has small rubber feet to place it on delicate parts. It can be integrated in machining heads by creating the proper support for the motors and optical pen. We will supply the scheme of the holes on the motor on request. The customer will integrate the instrument on their own paying attention that the instrument must be keep clean, avoiding liquid and moisture in contact and in an environment compatible with the stages (HR 5-80%, no condensation), stable temperature, 18-25°C suggested for proper best performance.

- The instrument must allow the measurement of the surface in 2D by means of a single linear scan over the surface to be examined. At the same time, the instrument must be capable of producing 3D surface profiles of the size and accuracy specified below.

Customer can choose 2D and 3D area scan.

- Scanning speed: at least between 1 µm/s and 20 mm/s.

Scanning range of speed 0.01um/s to 20mm/s

- Can be installed on the head of the CNC machine, CAD model of the CNC machine is attached in Annex 4 of this Documentation (browsers are available e.g. here <https://3d-viewers.com/en/download-step-stl-iges-viewer.html>).

We checked the CAD that looks like a simplified version, there is space next to the turret or in front. We don't know which parts are moving. We assume you have ideas on where is possible to create the mounting for fixing the instrument and to access the area to scan. In the CAD there were no info about the range of moving parts so i tis not possible to evaluate where to place it, but seems that there is enough space to place somewhere the Jr25.

- The weight of the integrated head can be max. 6 kg.

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Head weight of motors + optical pen unmounted from the holder, to be integrated, is about 5-6kg.

- The electronics and control unit must be placed at a distance of at least 3 m from the measuring head. The connection of the measuring head to the electronic control and evaluation unit shall be flexible and allow free movement of the measuring head in the internal space of machine within a minimum range of XYZ axes (1x1x0.5 m).

We will provide a 3m long connection cable for motors and 3m long optical fiber.

- Dimension of tested area min. 25x25 mm.

Max area scan 25x25mm

- P_t (P-V highest to the lowest point difference) from raw data on minimum 10pts AVG 100 of Z static measurement better than 15nm measured on an antivibration table – stable temperature – no air flow.

Ok, see attached document for evidence

- P_a (Arithmetic average of the profile point) from raw data on minimum 10 pts AVG 100 of Z static measurement better than 5 nm measured on an antivibration table – stable temperature – no air flow.

Ok, see attached document for evidence

- Z-axis measurement resolution shall be better than 0,1 nm.

Z nominal resolution is $300\mu\text{m} / 2^{24} = 0.01\text{nm}$

- The positioning accuracy of the measuring head shall be not less than 1,2 μm .

Yes it is <1 μm

- The repeatability of the measuring head positioning shall be better than 0,2 μm .

Yes it is <0.2 μm

- The measurement resolution of the measuring head position shall be better than 0,1 μm .

Yes it is <0.1 μm

- Min. measurement frequency from 100 Hz to 2000 Hz.

Yes from 100Hz to 2000Hz, including dual frequency possible

- Measurable materials: transparent (glass), translucent (glass-ceramic), opaque (ceramic).

Yes with possibility to take the first peak of reflection or the highest

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- Required range of measured roughness parameters of the inspected surfaces:
 - For rough surfaces, a maximum roughness value of at least $R_a = 10 \mu\text{m}$ is required.
 - For polished surfaces, a minimum roughness value of maximum $R_a = 1 \text{ nm}$ is required.

Possible, see annex

- Accessories: software for acquisition and evaluation of measured data.

Nanovea software for acquisition, OSS Gwyddion software for analysis

- Electrical requirements: 230 V supply voltage.

System operates 220-230V 50-60Hz

- Verification of functionality after delivery and installation:

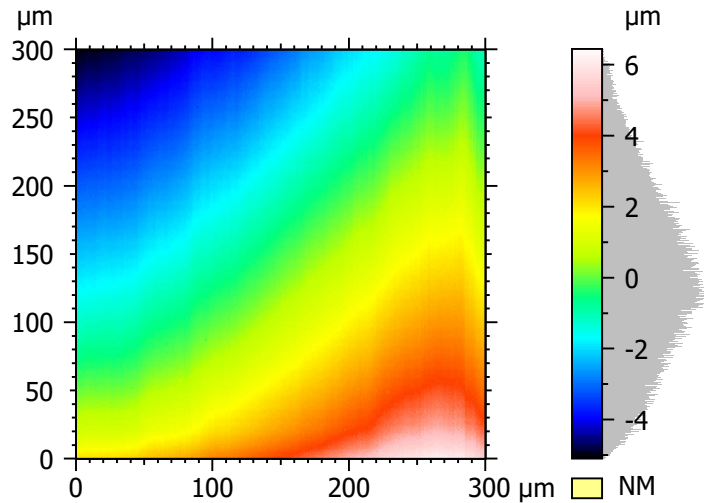
The seller will provide certificated caliber for high control measurement. Caliber will be step-shaped with a suitable height. The maximal deviation from the nominal value of the step has to be $\pm 5 \text{ nm}$.

We will bring with us our certified standard glass step height $15.007 \mu\text{m}$ for on-site tests.

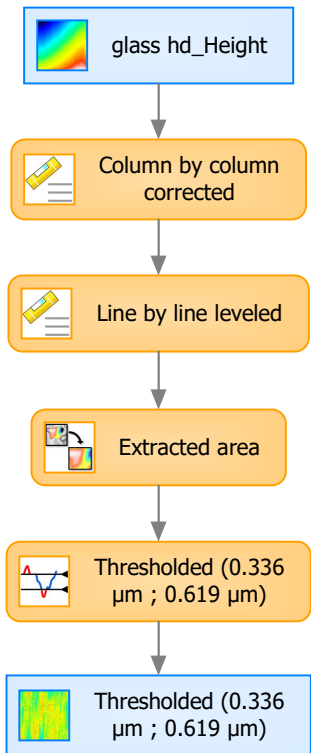
Instrument	S/N	Certification (date)	Value [μm]	Expanded uncertainty [μm]
P1-SHT6	Sht-17-0021	S024_SHT-17-0021_20230524 (24/05/2023)	15.007	0.600

RAW DATA

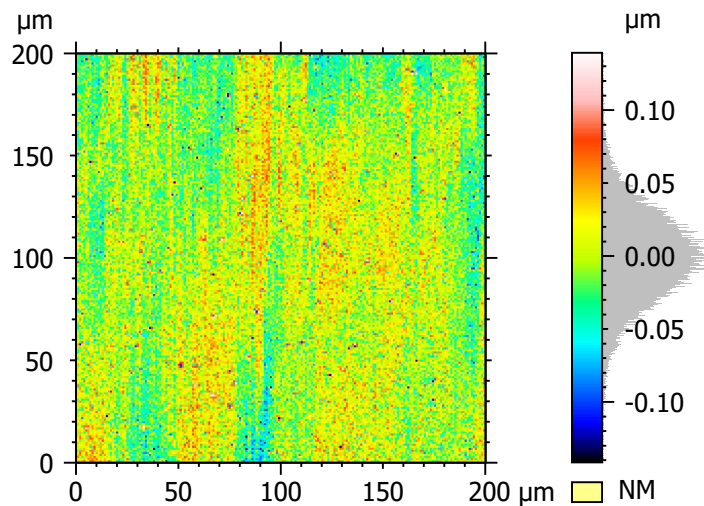
Created on:	6/5/2024 12:48:08 AM		
Duration of the measurement:	48 m 8.21 s		
Axis:	X		
Length:	300.000	µm	
Spacing:	1.000	µm	
Axis:	Y		
Length:	300.000	µm	
Spacing:	1.000	µm	
Axis:	Height (Z)		
Spacing:	5.653e-07	µm	
NM-points ratio:	0.003 % (3 Pts)		



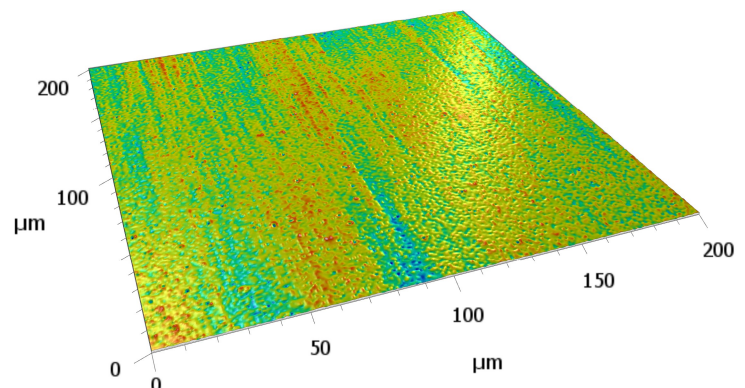
PROCESS



PROCESSED

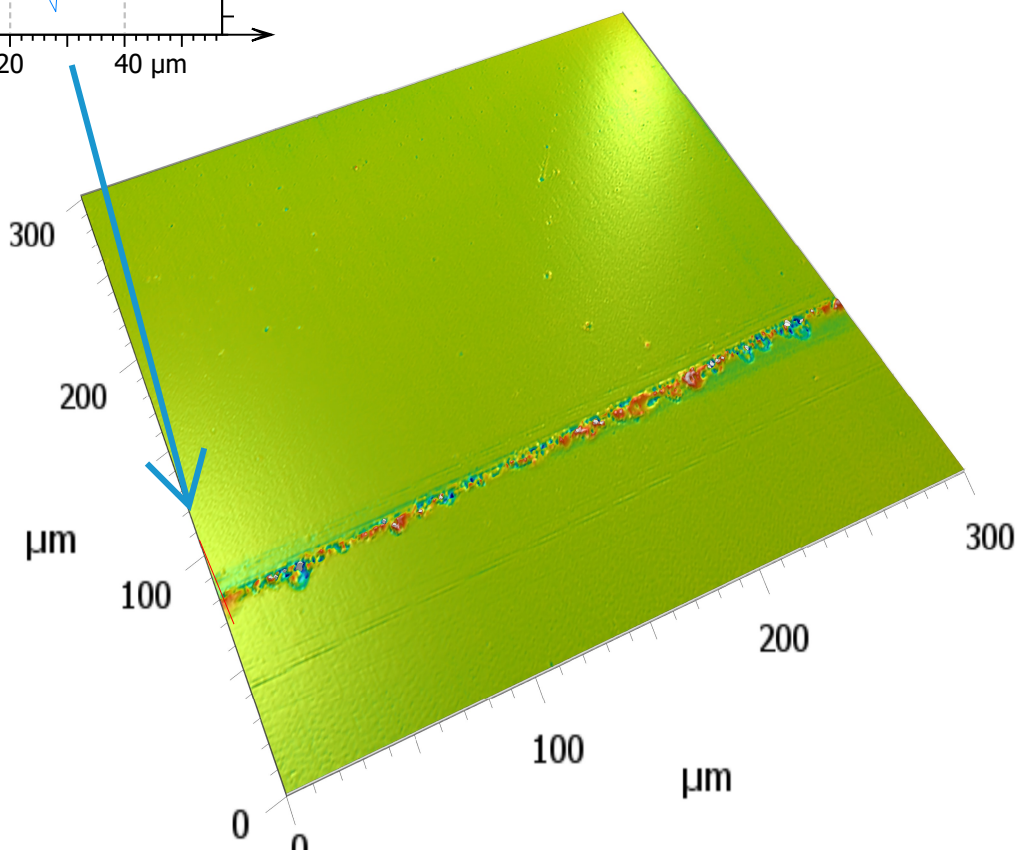
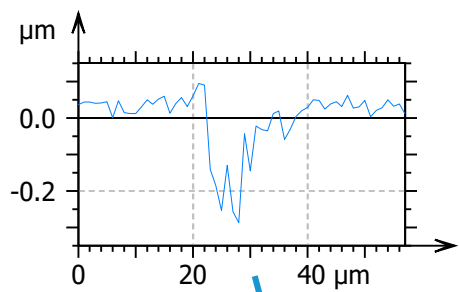
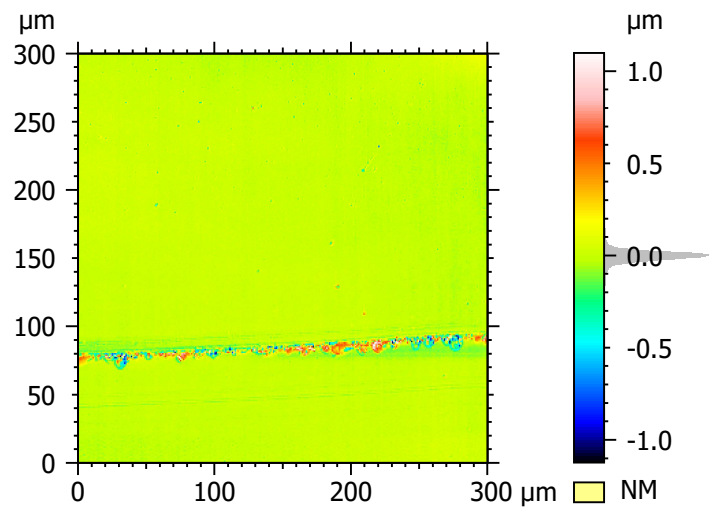


ISO 25178 - Roughness (S-L)			
<i>S-filter (λs): Gaussian, 2.5 µm</i>			
<i>F: Leveled (LS), Angle 1.747e-04°, 0.003°</i>			
<i>L-filter (λc): Gaussian, 0.008 mm</i>			
Height parameters			
Sz	0.150	µm	
Sa	0.010	µm	

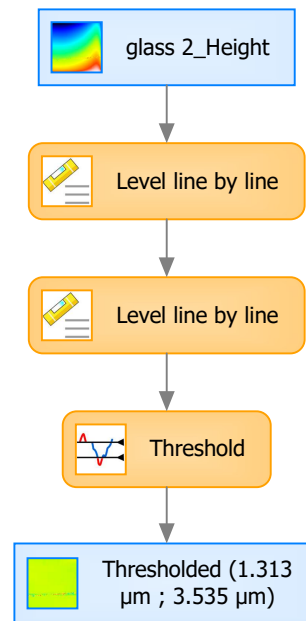


For demonstration purposes only!

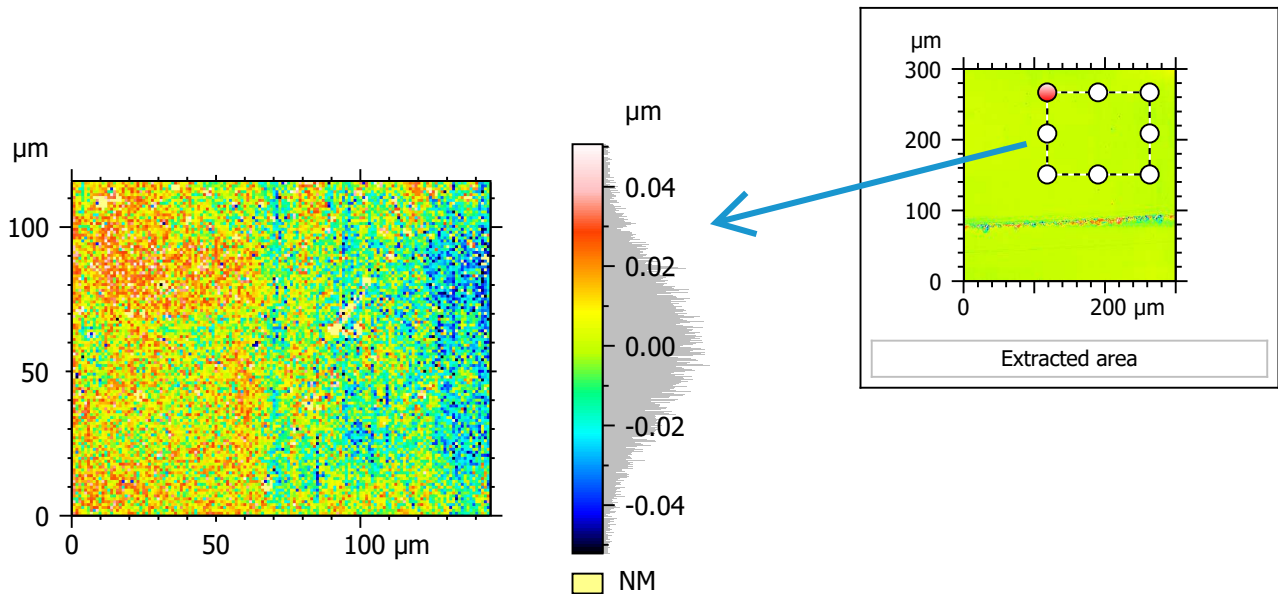
PROCESSED



PROCESS



For demonstration purposes only!



ISO 25178 - Roughness (S-L)			
<i>S-filter (λ_s): Gaussian, 2.5 μm</i>			
<i>F: Leveled (LS), Angle -0.012°, $-3.31\text{e-}04^\circ$</i>			
<i>L-filter (λ_c): Gaussian, 0.008 mm</i>			
Height parameters			
Sz	0.065	μm	
Sa	0.006	μm	

FLAT GLASS
TESTED WITH NANOVEA JR25
ON A LABORATORY TABLE - NO ANTIVIBRATION
AVG ON INSTRUMENT SET TO 10
OPTICAL PEN PS2 300μm Z RANGE

For demonstration purposes only!

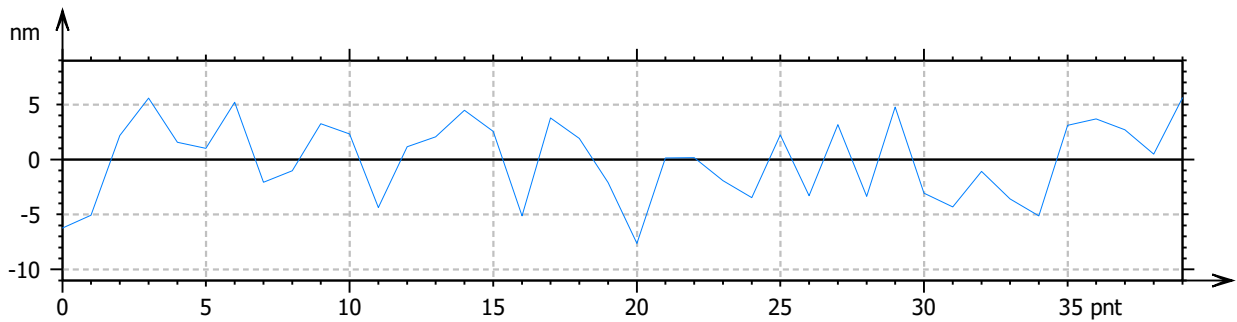
RAW DATA

40 MEASURES (POINTS)

SINGLE POINT STATIC POSITION ON GLASS

ON A STANDARD TABLE

AVG 100 - ACQUISITION RATE 400hz



ISO 4287 - Primary profile

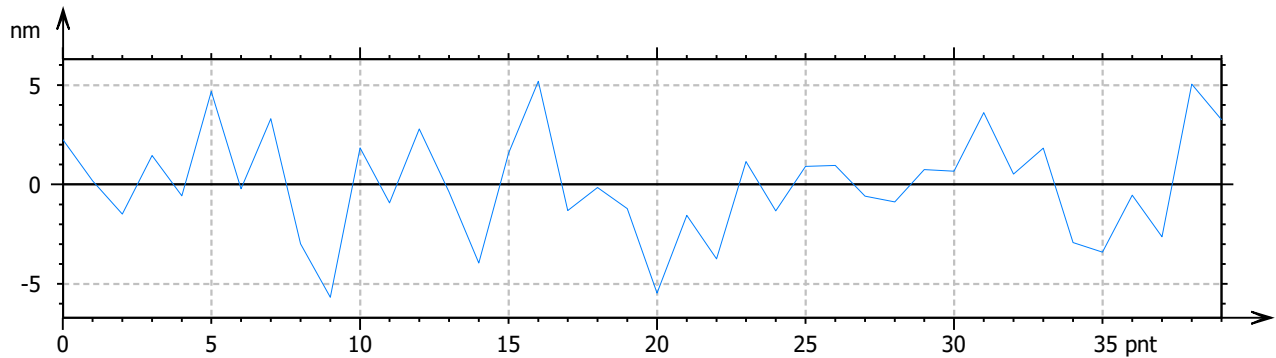
F: None

S-filter (λ s): None

Amplitude parameters

Pt	13.233	nm	
Pa	3.149	nm	

AVG 100 - ACQUISITION RATE 200hz



ISO 4287 - Primary profile

F: [Workflow] Leveled (LS-line)

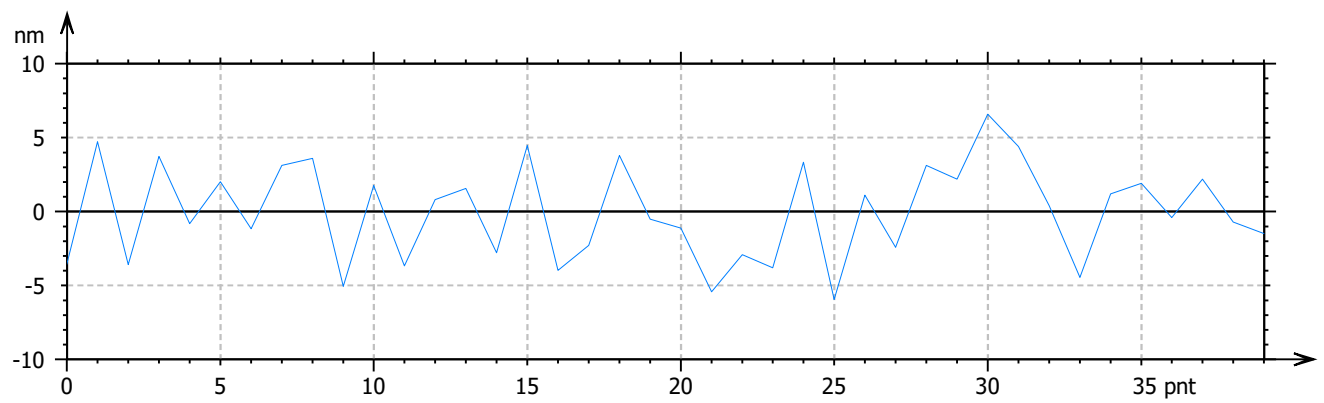
S-filter (λ s): None

Amplitude parameters

Pt	10.871	nm	
Pa	2.098	nm	

For demonstration purposes only!

AVG 50 - ACQUISITION RATE 200hz



ISO 4287 - Primary profile				
F: None				
S-filter (λs): None				
Amplitude parameters				
Pt	12.531	nm		
Pa	2.804	nm		

For demonstration purposes only!