

DEEPZ

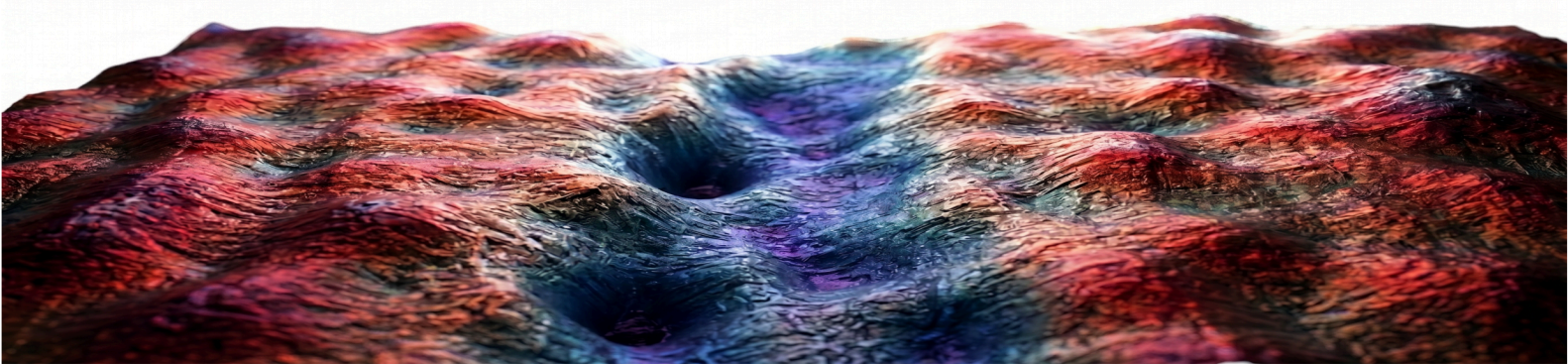
3D WEAR & SCRATCH MEASUREMENT STATION

Professional Metrology. Industrial Ruggedness. Disruptive Value.

PSARON

Quantitative 3D surface metrology for

**wear
scratches
coating damage
surface defects**



Designed for quality control, R&D and tribology laboratories requiring fast, quantitative 3D wear and scratch analysis

MICRON-SCALE HIGH PRECISION MEASUREMENT

High-resolution 3D surface measurement for quantitative depth, profile, area and volume analysis using certified calibration samples.

EXTENDED-AREA 3D MEASUREMENT

3D stitching extends the measurement area beyond the native field of view, enabling complete analysis of larger wear tracks and surface damage.

EFFICIENT & REPEATABLE WORKFLOW

Reusable sample-specific measurement settings, intuitive analysis tools and configurable reporting support consistent measurements from sample to sample.

APPLICATIONS

Wear testing · Scratch analysis · Coating evaluation · Abrasion studies · Surface damage characterization · Microscopic dimensional inspection

Schedule a Demo: info@psaron.com

General

Specification	DEEPZ
System type	Optical 3D wear and scratch analysis station
Primary purpose	Quantitative measurement and analysis of wear tracks, scratches, coating damage, abrasion marks and localized surface defects
Typical environments	Quality control, R&D, tribology and industrial laboratories
Typical applications	Pin-on-disk wear, linear/reciprocating wear, scratch testing, abrasion studies, coating evaluation, surface damage analysis and microscopic dimensional inspection
Measurement principle	Optical 3D surface measurement
Native field of view	1.9 × 1.1 mm
Extended field of view	3D stitching
Lateral sampling	Approx. 1 µm/pixel
Nominal Z sampling interval	0.8 µm
Motorized Z-axis travel	50 mm

Measurement Performance

Metrological Characteristic	Performance
Lateral sampling	Approx. 1 µm/pixel
Lateral measurement accuracy	1.3 µm over 1 mm ^a
Lateral measurement repeatability	0.15 µm, 1σ ^a
Nominal Z sampling interval	0.8 µm
Height measurement accuracy	5 µm ^b
Height measurement repeatability	1.3 µm, 1σ ^c
Typical measurement noise, Sq	≤ 0.5 µm ^d
Wear-volume repeatability	≤ 4% CV ^e
Pile-up volume repeatability	≤ 3% CV ^e

a Verified using a traceably calibrated dimensional artefact at multiple field positions and orientations, with reference to ISO 25178-600 and ISO 25178-700. Repeatability is stated as 1σ.

b 95% of 240 verification points were within ±5 µm of the reference value over a 310 µm verified vertical range. RMSE over the same verification dataset was 2.5 µm. Verified using a traceably calibrated inclined-plane artefact with reference to ISO 25178-600 and ISO 25178-700.

c Determined from repeated complete measurements at a fixed sample location and fixed scan range. Pooled pointwise repeatability over 480 height points is reported as 1σ, with reference to ISO 25178-600 and ISO 25178-700.

d Determined from repeated pairs of consecutive height maps at a fixed sample location, with reference to ISO 25178-600 and ISO 25178-700.

e Determined from repeated complete 3D measurements of a pin-on-disc wear track with approximately 30 µm maximum depth under fixed acquisition and analysis conditions. Repeatability is reported as 1σ coefficient of variation, with reference to ISO 25178-600/-700 and ISO 5725 statistical principles.



3D WEAR & SCRATCH MEASUREMENT STATION

TECHNICAL SPECIFICATIONS

Physical & Electrical Specifications

Specification	DEEPZ
Design	Compact benchtop measurement station
Width x Depth x Height	185 x 325 x 305 mm
Weight	Approx. 12 kg
Power supply	24 V DC
Maximum power	40 W
Interface	USB 2.0 / USB 3.0

Measurement & Analysis Capabilities

Measurement Group	Available Parameters
Depth	Maximum depth, mean depth, median depth, minimum/maximum height, peak-to-valley depth
Geometry	Track width, track length, projected area, 3D surface area, perimeter
Volume	Material-loss volume, volume below reference, raised-material/pile-up volume, volume gain, net volume change
Cross-section	Cross-section profile, averaged profile, cross-sectional area, profile slope, profile asymmetry
Areal surface parameters	Sa, Sq, Sp, Sv, Sz
Profile parameters	Ra, Rq, Rp, Rv, Rt
Statistical height parameters	Equivalent heights, P5, P50 and P95 percentiles

3D Measurement Tools

Function	Capability
Region analysis	Quantitative analysis of selected 3D regions
Freehand region analysis	User-defined irregular regions of interest
Line profile	Profile extraction along a user-defined line
Custom profile path	Profile extraction along a drawn path
Wear-region analysis	Depth, area and volume evaluation of selected wear regions
Surface rotation	Rotation/alignment of measured topography before analysis
Cropping	User-selectable measurement-area cropping
Depth limits	Adjustable minimum and maximum analysis depths
Depth reference	Mean, median, minimum or maximum reference level
Outlier rejection	Configurable robust outlier rejection



3D WEAR & SCRATCH MEASUREMENT STATION

TECHNICAL SPECIFICATIONS

Extended-Area 3D Measurement

Specification	Capability
Stitching type	3D topography stitching
Purpose	Measurement of wear tracks or surface regions exceeding the native field of view
Native field of view	1.9 × 1.1 mm
Extended field of view	Scalable through multiple stitched measurements
Maximum stitched area	Dependent on acquisition configuration and host-PC processing resources
Post-stitch analysis	Depth, profile, area, volume and surface-parameter analysis

Profile-Based Wear Estimation

Specification	Capability
Analysis method	Wear estimation from measured 2D cross-section profile
Profile source	Individual line profile or averaged profile
Track modes	Circular, linear pass, linear reciprocating
User inputs	Normal load, track radius or stroke length, revolutions/passes/cycles
Calculated results	Sliding distance, material-loss volume, pile-up volume, net volume change
Specific wear rate	mm ³ /N·m

Surface Processing & Form Correction

Function	Capability
Form removal	Planar, quadratic, cylindrical, spherical
Reference correction	Region-based form fitting and unworn baseline subtraction
Combined correction	Baseline subtraction can be combined with form removal
Surface alignment	Rotation and alignment of measured topography
Filtering	Configurable outlier rejection and S-/L-filters
Data preparation	Cropping and adjustable analysis depth limits
Height referencing	Mean, median, minimum or maximum