



Surface Roughness Evaluation in ZONE3

Non-contact methods of measuring roughness exist and can come in many different forms. ISO 25178 is a collection of standards relating to the analysis of surface texture and includes parts defining nominal characteristics of non-contact instruments including chromatic confocal and interferometric sensors.

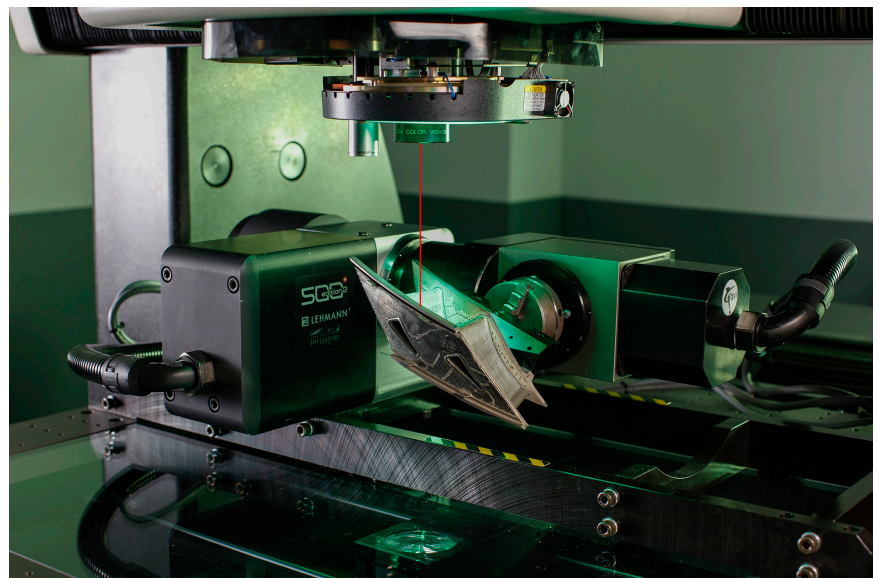
Non-contact measurement of roughness provides advantages in speed, reliability, accessibility, and often spot size. See tables below for the maximum spot sizes and applicable OGP® sensor offerings.

Sensor		Nominal Spot Size (µm)
Rainbow Probe	CL1 (MG420)	1.8
	CL1 (MG210)	2.7
	CL2 (MG140)	5.2
	RP1500	10
	CL3 (MG70)	11.9
	CL4 (MG35)	12.3
TeleStar Probe	P-25-35	5
	P-20	5.8
	P-25-70	9.2
TeleStar Plus TTL	4X	2.4
	2X	3.8
	1X	5
	0.5X	7.3
	0.45X	10

Ra (µm)	Rz (µm)	Max Spot Size (µm)
< 2.0	< 10.0	4
2.0 - 10.0	10.0 - 50.0	10
> 10.0	> 50.0	20

Rainbow Probe™ is a chromatic confocal sensor capable of measuring the smallest roughness evaluations. These probes are offered on OGP metrology systems including **Fusion**, **Benchmark™**, **Pinnacle™**, **Summit**, and **SmartScope® Flash™**, **Quest™**, and **ZIP®** systems.

The **TeleStar® Plus TTL Laser** uses a unique interferometric sensing technology to measure surfaces with up to a 200 mm working distance. Coaxial with system optics, TTL lasers allow for use over the full range of XY travel. TeleStar Plus TTL lasers are offered on OGP metrology machines including **Fusion**, **SmartScope SP**, and **SmartScope Quest** systems.

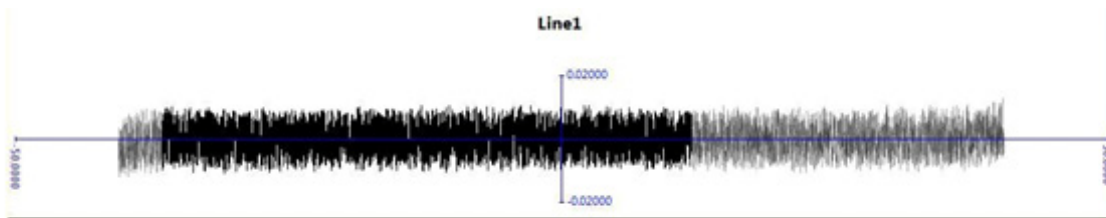


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The **TeleStar Probe** uses the same technology as the TTL version but as a self-contained off-axis sensor. The TeleStar probe can be configured in the VersaFlex™ articulating multisensor array on FlexPoint® coordinate measuring machines, allowing for advanced interferometric technology on a CMM unlike anything else in the industry. TeleStar Probe is also available on SmartScope ZIP systems.

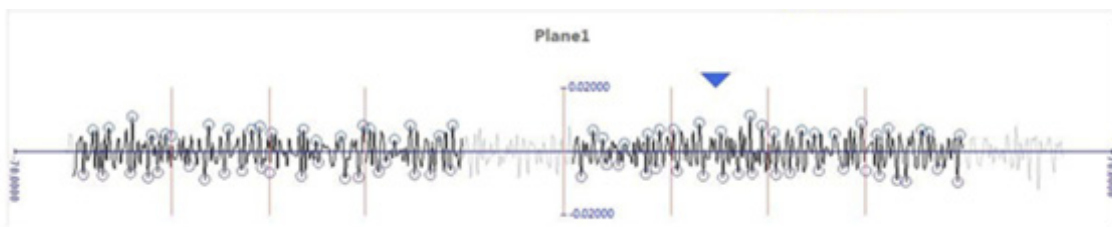
Roughness evaluation in **ZONE3®** supports evaluation of both Ra and Rz based on the ISO 4288:1996 standard which was recently incorporated in the new ISO 21920-3:2021 standard. This provides a set of parameters, such as evaluation length and maximum spot size, which are important for accurate evaluation. These determine different filtering techniques that are used to remove the form and waviness aspects of the measured data as they are not applicable to roughness evaluation.

Arithmetic Average Roughness (Ra) is the average of the absolute values of the profile deviations from the best-fit line over the evaluation length. ZONE3 metrology software returns the largest Ra value over the successive evaluation lengths.



Mean

Roughness Depth (Rz) is the arithmetic average of the successive values calculated over an evaluation length. ZONE3 returns the largest Rz value over the successive evaluation lengths.



Performing roughness evaluations in ZONE3 further enhances the capability of OGP systems to handle a wide variety of measurement needs on one system within a single software package.

ZONE3 is available in different versions, depending on the level of GD&T functionality, CAD capability, and enhanced analysis tools - like Surface Roughness - desired by the user. Roughness evaluation is available in ZONE3 Prime, Pro, and Offline versions.

To learn more about ZONE3, visit www.ogpnet.com/zone3