

**GUIDE FOR HEAVY DUTY COATINGS** 



### THE WORLD'S BEST COATINGS DESERVE THE WORLD'S BEST SURFACE PREPARATION



This pictorial guide addresses the Bristle Blasting method of surface preparation with MontiPower® tools using carbon or stainless steel spring wire belts. Marketed under the trade names Bristle Blaster® or MBX®, Montipower's power tools are used for weld seam preparation, spot repair, and maintenance or rehabilitation. We provide an alternative to abrasive blasting, hand tool cleaning, and other power tools like grinders, sanders, and needle guns.

This guide focuses on the removal of heavy-duty coating systems, specifically using steel panels from leading heavy-duty coating manufacturers such as Carboline, PPG, and Akzo International. We describe the Bristle Blasting surface preparation method using MontiPower's Bristle Blaster® and MBX® tools.

The results of the Bristle Blasting method are showcased for various common substrates, including verification of different parameters through 3D scans using a Keyence machine.



Surface preparation is about:

- Removing millscale
- Eliminating contaminants
- Stripping existing coatings or foils
- Profiling the surface without creating a flat area between peaks and valleys
- Correcting or removing surface imperfections

SURFACE PREPARATION GUIDE - PAGE 2

In addition to Bristle Blasting steel panels, we also address surface preparation for various other materials, including wood, stone, composite, aluminum, and stainless steel.

- **O** EPOXY PNENOLIC
- **O EPOXY SILOXANE**
- SILICONE ACRYLICS
- ZINC WITH SILICONE TOPCOATS
- NORSOK 2 LAYER SYSTEM
- MILLSCALE
- ORGANIC ZINC COATING
- **INORGANIC ZINC COATING**
- 3 LAYER PE/PP
- **O** THERMAL SPRAY ALUMINIUM
- HOT-DIPPED GALVANIZED STEEL
- **•** PAINTED SURFACES

A proper surface preparation is essential for ensuring that applied coating systems achieve their optimal performance in terms of adhesion and corrosion prevention.

Surface preparation requirements encompass both cleanliness and the desired surface profile.

The cleanliness and roughness profile for a coating system should be as prescribed for the primer (first layer) of the system.



The Bristle Blaster® is the world's first and only handheld power tool that can achieve a surface profile auality comparable to that of grit blasting.

It offers an innovative 'grit-free' alternative for surface preparation, resulting in surface cleanliness similar to ISO 8501-1 Sa 2.5 or an SSPC SP 10 near-white metal finish.

The Bristle Blaster® tool has been developed and enhanced over the years and today a wide range of Bristle Blasting tools are available:

- Bristle Blaster® Pneumatic: This model is ATEX approved for use in Zone 1 and Atex Zone II, suitable for potentially explosive atmospheres
- Bristle Blaster® Electric single: 110V and 240V units designed for standard electric power sources
- Bristle Blaster® Cordless: This model is powered by electric batteries for use in remote locations and for rope-access work

- Bristle Blaster® Double: 110V and 240V units, this option offers larger belts for extended surface coverage and increased productivity
- Bristle Blaster® Axial: Specifically designed for difficult-to-reach areas such as weld seams, corners, flanges, and more
- Bristle Blaster® Subsea: Ideal for underwater surface preparation

The MBX® range includes fine, medium, and coarse carbon steel belts, as well as stainless steel belts, available in both straight and bent-knee formats. These belts provide excellent surface preparation and cleanliness, particularly when a deep roughness profile is not required.

Both the Bristle Blaster® and MBX® tools are designed to operate with low vibration and low speed at approximately 2500 RPM.

### **BRISTLE BLASTING PROCESS**

The Bristle Blasting process is an innovative method that not only removes corrosion but also generates a surface profile. It accomplishes this by utilizing specially designed rotary carbon and stainless steel Bristle Blaster® belts.

A Bristle Blaster® belt consists of spring steel wire bristle tips that are bended and dynamically tuned to the handheld power tool. The bristle tips are specially designed and sharpened to strike the corroded surface with kinetic energy that is equivalent to conventional blasting processes that use grit blast media.

Immediately after the bristle tips strike the corroded steel surface, they retract from the substrate. This action effectively removes mill scale, rust, and existing paints while creating a new surface profile in which peaks and valleys form a continuous pattern, eliminating smooth, unprofiled areas.

As a result, surfaces that have been treated by Bristle Blasting have a texture and visual cleanliness that mimics those obtained by conventional grit blasting processes.

The tools should be used with the accelerator bar when higher surface profiles depths are required or without the accelerator bar when lower surface profile depths are specified or for softer ferrous and non-ferrous substrates, including composites

and aluminum.

SURFACE PREPARATION GUIDE - PAGE 5

The Bristle Blaster® with the accelerator bar can consistently achieve roughness profiles exceeding 75 microns (3 mil), while the tool without the accelerator bar typically achieves around 25 microns (1 mil).

Standard pneumatic and electric variomatic (including cordless) drive units without the accelerator bar are available as MBX®.

The MBX® wire bristle tips are shorter than those of the Bristle Blaster®. The MBX® carbon brush bristle tips are hardened. MBX® bristles are available with a knee, similar to the Bristle Blaster® belts, as well as in a straight variant, for achieving finer homogeneous surface profiles grades. MBX® is available in coarse, medium, and fine variants, similar to sanding machines.

Bristle Blasting simplifies the surface preparation process and reduces costs in comparison to abrasive blasting. This reduction in costs is achieved by eliminating the need for expensive equipment, abrasive media, and extensive environmental and safety measures.

Although the Bristle Blasting process is ideally suited for spot repair applications, it can also be readily applied to larger surface areas where the use of other metal cleaning processes may be prohibited or where power tool cleaning is simply a better option for the application.

For any coating job, it's advisable to assess the appropriate tool and belt for the desired surface and application.

This assessment is particularly important for challenging areas like corners, edges, and weld seams. When working on flat surfaces, tools like the Bristle Blaster® Double or Prepper® Quattro can significantly improve efficiency in terms of both time and costs.



An assessment of the operating area should be taken into consideration, even though the Bristle Blaster® or MBX® is specially designed to function in a wide range of environments:

- Bristle Blasting does not use or produce hazardous materials – steel bridges can be Bristle Blasted safely while passenger trains continue to operate
- Bristle Blasting is a green alternative with low vibration levels and sound, pressure - pipelines in environmentally protected areas can be safely prepared with the Bristle Blaster® and the consumed belts can be recycled
- Bristle Blasting is a cost-efficient alternative set-up is quick and easy and there is no need for protective enclosures, waste media recovery, breathing apparatus or other complex equipment.
- Bristle Blasters are portable and lightweight weighing as little as 1.1kg and vacuum control units (also cordless) can be easily connected
- New features are regularly being introduced such as dead man's switch, safety caps, and rope access fittings. Continually making Bristle Blasters even safer and more convenient on the job

Bristles are available in carbon steel and stainless steel, with belts available in a range of sizes from 43mm, 23mm, 11mm and half 11mm bristles. Additionally, vinyl Zapper wheels in grey silicone, suitable for use on cordless tools at 1300 RPM, or yellow hardened rubber erasers for use at up to 3500 RPM, are available for tasks like edge feathering of thick polyethylene or polypropylene surfaces, as well as the removal of foils, stickers, glue, and adhesive from surfaces.

MontiPower® surface preparation equipment is also available for use with drones, magnetic wall crawlers or walk-behind solutions, ideal for decks and floors.

Before using MontiPower® tools, it is highly recommended that the user be trained by qualified individuals. Understanding the proper tools for use in different applications and the proper technique for use of the tools is essential for achieving best results in terms of efficient tool use and best possible coating or sealant adhesion.

### ADVANTAGES OF THE BRISTLE BLASTING METHOD

- No special skills required (training recommended for best use)
- Minimal safety and hazmat requirements when compared to abrasive blasting
- Much smaller environmental footprint when compared to abrasive blasting
- Cleanliness grades similar to ISO 8501-1 Sa2.5/SSPC-VIS1 SP 10/Nace No.2
- Complimentary to abrasive blast cleaning for critical areas such as weld seams and hard to reach areas
- Low noise, low vibration and low rotational speeds of approximately 2500 RPM
- Versatile with different tool configurations and different sized belts for different applications
- Efficient surface profiling solutions in combination with other methods such as induction coating removal or water jetting
- Bristles can be resharpened for longer use, and bristles can be recycled
- Removes mill scale
- Bristle Blaster® Axial drive units are specially designed for difficult to reach areas

- Bristle Blaster® Pneumatic units are ATEX approved for surface preparation in potentially explosive environments
- No burnishing, polishing or smearing effect

### **SUITED FOR**

Whether removing, cleaning or profiling, the Bristle Blaster® is a powerful technology ideally suited to a wide range of fabricating and infrastructure-support operations such as onshore/offshore well drilling installations, bridge refurbishment, the fabrication and repair of naval / marine vessels and industrial maintenance applications.

### SURFACE PREPARATION THROUGH BRISTLE BLASTING



Removal of rustgrade C



Removal of inorganic high temperature resistant coating



Removal of inorganic zinc primer



Removal of epoxy coating



Removal of epoxy pnenolic



Removal of epoxy siloxane



Removal of silicone acrylics



Removal of inorganic zinc with silicone topcoats



Removal of NORSOK M-501 three-layer system



Removal of Rustgrade A



Removal of rustgrade B



Substrate preparation of SS304



Wood Cleaning and Roughening



Removal of concrete staining



Roughening of composite



Surface preparation of thermal zinc coating



Removal of ioz zinc primer

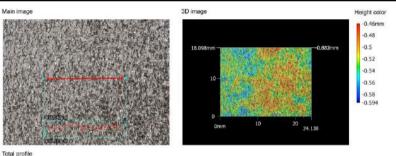


Removal of composite gel coat

# **BEFORE** REMOVAL OF RUSTGRADE C

### Line roughness measurement

### KEYENCE VR-5000 series

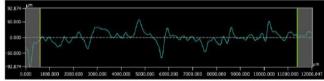


Analysis condition	
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### | No. | Measurement name | Measured value | Unit | 1 | Ra | 13.408 | µm | 2 | Rz | 120.804 | µm |

550 000-550 000-90 000 1900 000 2000 000 3000.000 4000.000 5000.000 8000.000 8000.000 9000.000 11000.000 11000.000 12000.047

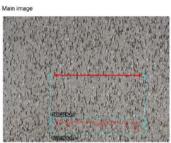
Roughness/Primary/Waviness profile

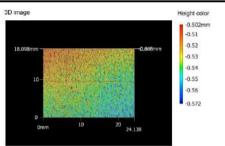


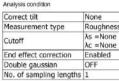
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### Line roughness measurement

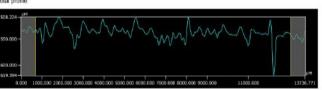
KEYENCE VR-5000 series



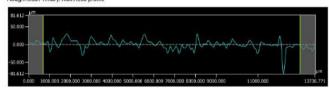




Total profile







Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### Measurement result

	Measurement name	Measured value	Unit
1	Ra Rz	8.893	um
2	Rz	111.169	um

REMOVAL OF INORGANIC HIGH TEMPERATURE **RESISTANT** COATING

**AFTER** 

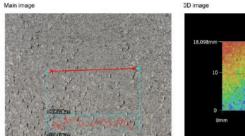
**BEFORE** 

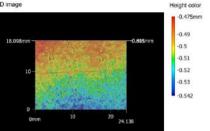
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### **BEFORE AFTER** REMOVAL OF INORGANIC ZINC PRIMER

### Line roughness measurement

### KEYENCE VR-5000 series





Correct tilt Measurement type Cutoff End effect correction Double gaussian No. of sampling lengths 1

Analysis condition

Measurement result			
No.	Measurement name	Measured value	Unit
1	Ra	4.095	μm
2	Rz	28.978	pm

None

Roughness

λs =None

λc =None

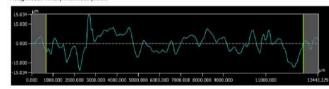
Enabled

OFF

0.000 1000.000 2000.000 3000.000 4000.000 5000.000 6000.000 7000.000 8000.000 9000.000

Roughness/Primary/Waviness profile

Total profile

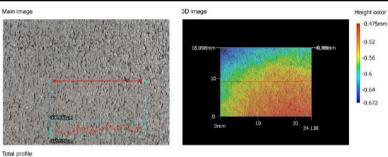


Measurement date and time: 24/01/2023 16:06:47 Measurement conditions: 12x Auto

## **BEFORE AFTER** REMOVAL OF EPOXY COATING

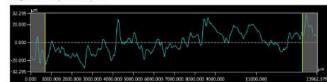
### Line roughness measurement

### KEYENCE VR-5000 series



Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

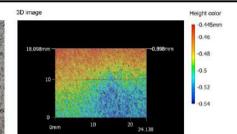
### | No. | Measurement name | Measured value | Unit | 1 | Ra | 9,252 | µm | 2 | Rz | 55,344 | µm |



Measurement date and time: 24/01/2023 16:09:32
Measurement conditions: 12x Auto

### **BEFORE AFTER** REMOVAL OF EPOXY PNENOLIC

### Line roughness measurement



### KEYENCE VR-5000 series

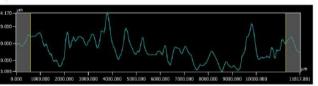
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### Measurement result

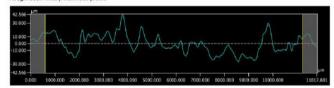
No.	Measurement name	Measured value	Unit
1	Ra Rz	11.362	μm
2	Rz	68.925	Lim

Total profile

Main image



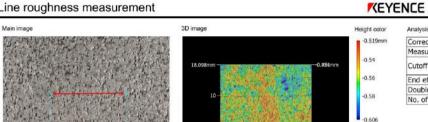
Roughness/Primary/Waviness profile



Measurement date and time: 24/01/2023 16:12:40
Measurement conditions: 12x Auto

### **AFTER BEFORE** REMOVAL OF EPOXY SILOXANE

### Line roughness measurement



### Measurement result

Analysis condition

Measurement type

End effect correction

No. of sampling lengths 1

Double gaussian

Correct tilt

Cutoff

No.	Measurement name	Measured value	Unit
	Ra	12.701	μm
2	Rz	59.787	pm

VR-5000 series

None

Roughness

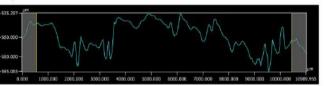
λs =None

λc =None

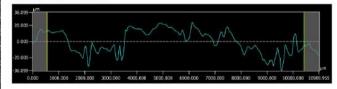
Enabled

OFF

Total profile



Roughness/Primary/Waviness profile

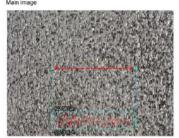


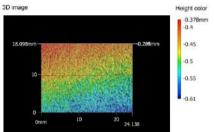
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### **BEFORE AFTER** REMOVAL OF SILICONE ACRYLICS

### Line roughness measurement

### Main image





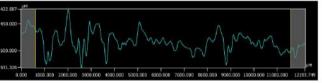
### Analysis condition Correct tilt None Measurement type Roughness Cutoff \( \lambda \) \( \lambda \)

VR-5000 series

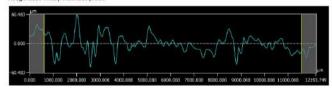
KEYENCE

### | No. | Measurement name | Measured value | Unit | 1 | Rs | 13.292 | µm | 2 | Rz | 108.739 | µm |

Total profile



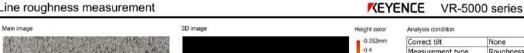
Roughness/Primary/Waviness profile

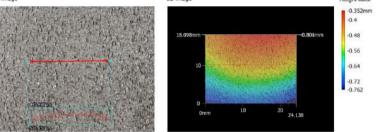


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Measurement conditions: 12x Auto

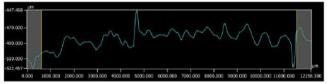
### **BEFORE AFTER** REMOVAL OF INORGANIC ZINC WITH SILICONE TOPCOATS

### Line roughness measurement

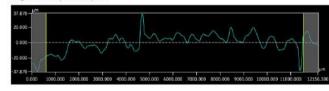




Total profile



Roughness/Primary/Waviness profile



Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

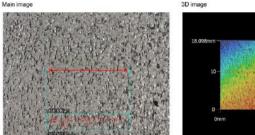
### Measurement result

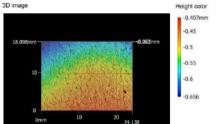
No.	Measurement name	Measured value	Unit
	Ra	8.161	μm
	Rz	73.530	μm

Measurement date and time: 24/01/2023 16:18:34 Measurement conditions: 12x Auto

### AFTER **BEFORE** REMOVAL OF NORSOK M-501 THREE-LAYER SYSTEM

### Line roughness measurement





### Analysis condition

KEYENCE

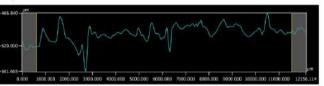
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

VR-5000 series

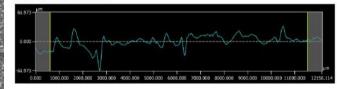
### Measurement result

No.	Measurement name	Measured value	Unit
1	Ra	9.626	μm
2	Rz	94.825	um

Total profile



Roughness/Primary/Waviness profile

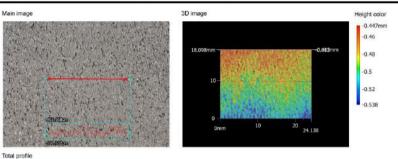


Measurement date and time: 24/01/2023 16:23:30 Measurement conditions: 12x Auto

## **BEFORE AFTER** REMOVAL OF RUSTGRADE A

### Line roughness measurement

### KEYENCE VR-5000 series

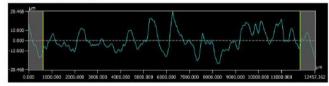


Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### 

90 0000-90 0000 12000.000 2000.000 3000.000 4000.000 5000.000 7000.000 8000.000 9000.000 12000.000 12045/362

Roughness/Primary/Waviness profile

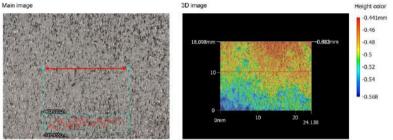


Measurement date and time: 24/01/2023 16:25:42
Measurement conditions: 12x Auto

### **BEFORE AFTER** REMOVAL OF RUSTGRADE B

### Line roughness measurement

### KEYENCE VR-5000 series

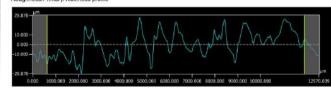


Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

11 - µm		Λ	Α	V.	1 6	^	
00-	M	1/	1/1	Mark	1/M	NY	
00-WW	NI	NLM	V	2 M	V		

Roughness/Primary/Waviness profile

Total profile

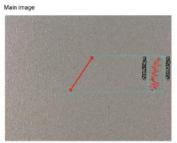


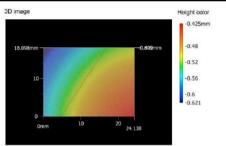
Measurement result

Measurement date and time: 24/01/2023 16:27:38 Measurement conditions: 12x Auto

### Line roughness measurement





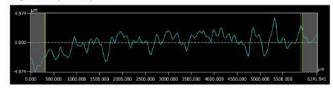


Total profile

**AFTER** 

1.035 Jun 1.035

Roughness/Primary/Waviness profile



Measurement result

No.	Measurement name	Measured value	Unit
1	Ra	1.099	μm
2	R7	7.417	Dim

Measurement date and time: 24/01/2023 16:31:27
Measurement conditions: 12x Auto

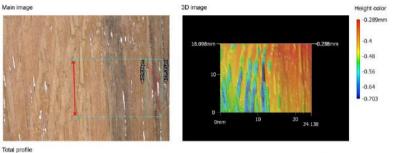
SUBSTRATE PREPARATION OF SS304

**BEFORE** 

## **AFTER BEFORE** WOOD CLEANING AND ROUGHENING

### Line roughness measurement

### KEYENCE VR-5000 series

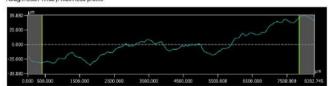


Correct tilt	None
Measurement type	Roughnes
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### 

Measurement result

+05.839 JIII +40.000 -+60.000 -+60.000 1500.000 1500.000 2500.000 3500.000 4500.000 5500.000 6500.000 7500.000 8182.745 Roughness/Primary/Wavness profile

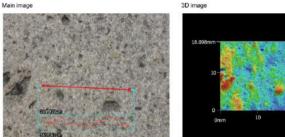


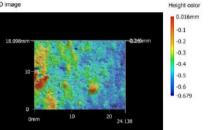
Measurement date and time: 24/01/2023 17:22:40
Measurement conditions: 12x Auto

### **BEFORE** AFTER REMOVAL OF CONCRETE STAINING

### Line roughness measurement

### KEYENCE VR-5000 series

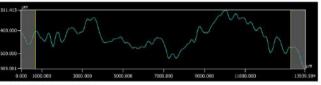




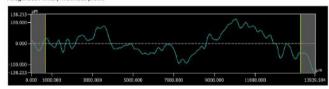
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### | No. | Measurement name | Measured value | Unit | 1 | Ra | 40.885 | µm | 2 | Rz | 210.208 | µm |

Total profile



Roughness/Primary/Waviness profile



Measurement date and time: 24/01/2023 17:25:56

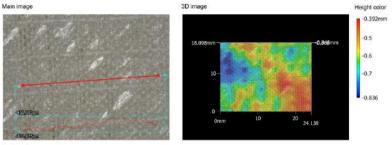
Measurement conditions: 12x Auto

## **BEFORE AFTER**

ROUGHENING OF COMPOSITE

### Line roughness measurement

### KEYENCE VR-5000 series

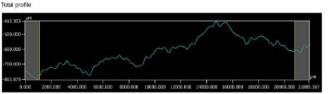


Analysis condition	
Correct tilt	None
Measurement type	Roughnes
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF

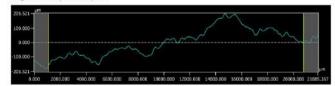
No. of sampling lengths 1

### Measurement result

No.	Measurement name	Measured value	Unit
1	Ra	81.473	μm
2	Rz	365.527	μm



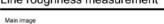
Roughness/Primary/Waviness profile



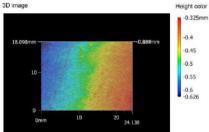
Measurement date and time: 24/01/2023 17:29:09 Measurement conditions: 12x Auto

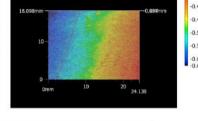
# **BEFORE** SURFACE PREPARATION OF THERMAL ZINC COATING

### Line roughness measurement









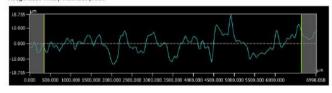
### KEYENCE VR-5000 series

Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### Measurement result

0.000 500.000 1000.000

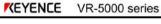
Roughness/Primary/Waviness profile

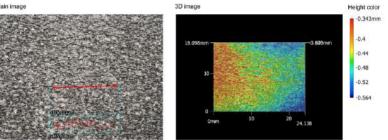


Measurement date and time: 24/01/2023 17:32:45 Measurement conditions: 12x Auto

### **BEFORE** AFTER REMOVAL OF IOZ ZINC PRIMER

### Line roughness measurement

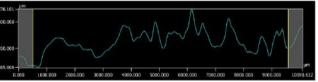




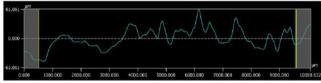
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF
No. of sampling lengths	1

### | No. | Measurement name | Measured value | Unit | 1 | Ra | 15.958 | µm | 2 | Rz | 109.505 | µm |

Total profile



Roughness/Primary/Waviness profile

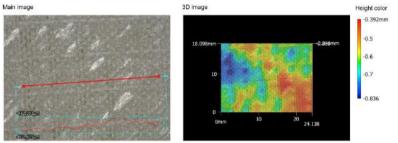


Measurement date and time: 24/01/2023 17:35:56
Measurement conditions: 12x Auto

## **BEFORE AFTER** REMOVAL OF COMPOSITE GEL COAT

### Line roughness measurement

### KEYENCE VR-5000 series

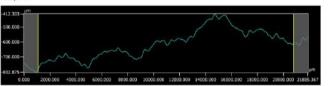


Analysis condition	
Correct tilt	None
Measurement type	Roughness
Cutoff	λs =None λc =None
End effect correction	Enabled
Double gaussian	OFF

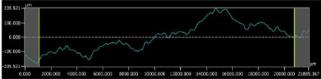
### | No. | Measurement name | Measured value | Unit | 1 | Ra | 81.473 | µm | 2 | Rz | 365.527 | µm |

No. of sampling lengths 1

Total profile



Roughness/Primary/Waviness profile



Measurement date and time: 24/01/2023 17:29:09
Measurement conditions: 12x Auto

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MontiPower - Part of Monti Group MONTI - Werkzeuge GmbH Reisertstr. 21 | 53773 Hennef | Germany T +49 (0) 2242 9090 630 info@montipower.com www.montipower.com

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