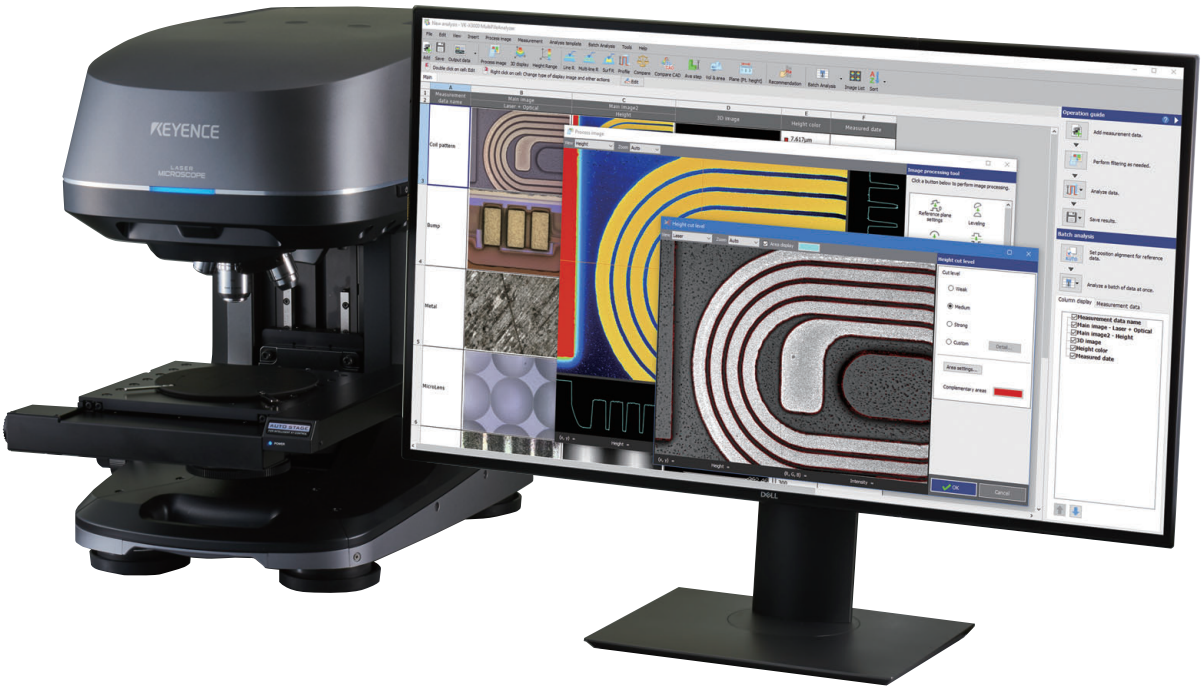
KEYENCE

96M16474



3D Surface Profiler

Quick Start Guide

- Process Image -

KEYENCE CORPORATION

Introduction

Thank you for your purchase of the VK-X3000 Series 3D Surface Profiler.
First, we will introduce basic operation.
You can understand basic operation using a common object such as a coin.

This manual describes some basic processing and filtering procedures to be done before analysis.

Contents

Chapter 1

Before Starting Operation

1-1 Understanding the Operation Flow

The operation flow of the VK-X3000 Series is as follows.

Step 1: New data acquisition → Obtain a 3D image by measuring a sample
Step 2: Measurement preprocessing → Remove the tilt and noise of the obtained 3D image
Step 3: Use the measurement function → Measure preprocessed data using various functions
Step 4: Export measurement result → Output a measurement result to a report or Excel

This manual describes Step 2-1 and Step 2-2.

Step 1

New data acquisition

Step 2-1

Noise removal

Height cut level/Smoothing/DCL or BCL

Step 2-2

Reference plane settings or Surface shape correction

Reference plane settings/Surface shape correction

Step 3

Use the measurement function

Step 4

Output the measurement result

● **New data acquisition**

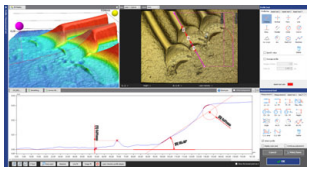
Measure an object and obtain a 3D image including color information.

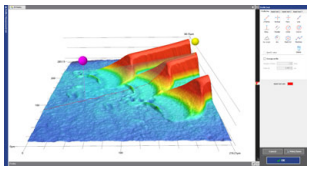
For details, see "Quick Start Guide: Gathering New Data using Focus Variation/White Light Interferometer", and "Quick Start Guide: Gathering New Data using Laser Confocal".

● **Using the measurement function**

Perform various measurements from an obtained 3D image.

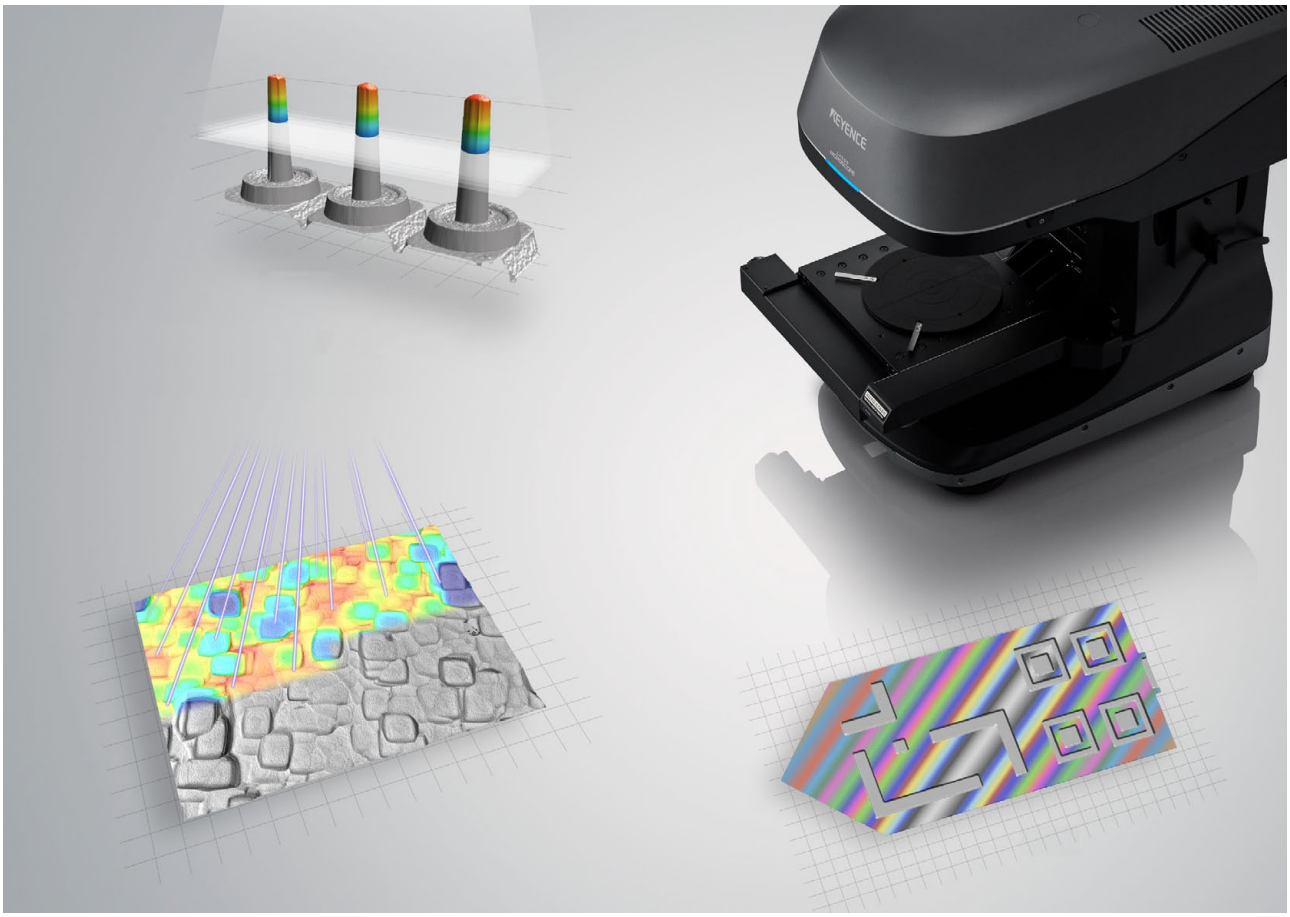
- Cross section shape measurement
- Roughness measurement
- Comparison of two types of data
- Film thickness measurement





Chapter 2

Conducting Image Processing



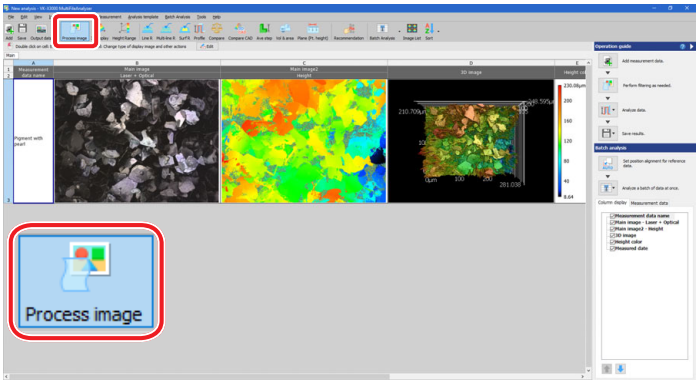
2-1 Removing Noise from Height Data (Height Cut Level)

This manual assumes that the 3D image is already open in the Multifile Analyzer.

This section describes the procedure for removing noise generated in the height data.

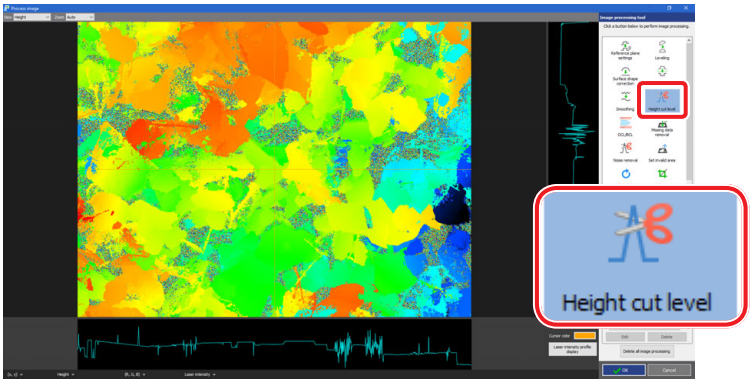
1. Select measurement data and click the [Process image] button.

Click the [Process image] button on the toolbar. Alternatively, select [Process image] from the [Process image] menu.



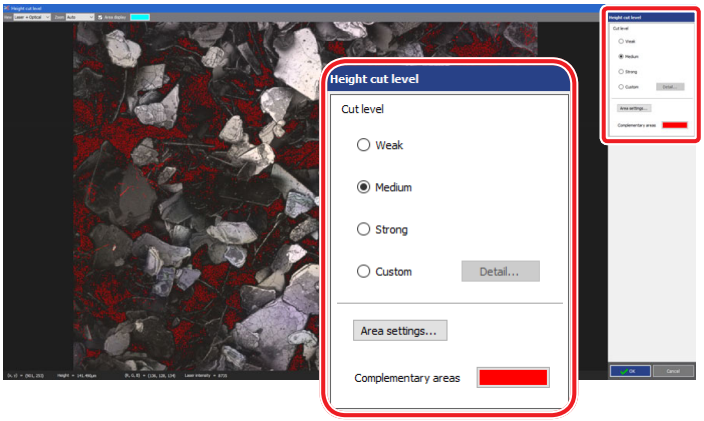
2. Click the [Height cut level] button.

The [Height cut level] window appears.

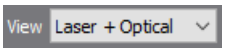


3. Determine the degree of filtering.

Use the [Height cut level] radio button to select the strength of noise removal.



- **[View] box**
  Select image type.

- **[Zoom] box**
  You can select a zoom level for the image.

- **[Area display] checkbox**
  Select whether or not to use the area display.

- **[Area display] color palette**
  When [Specify area] is selected as the method of specifying the reference plane, this allows you to select a color for the set area.

- **[Weak] radio button**
  Lower the cut level threshold value, limiting the interpolation area.
- **[Medium] radio button**
  It is the standard cut level.
- **[Strong] radio button**
  Raise the cut level threshold value, expanding the interpolation area.

● **[Cut level settings] slider**
Set the cut level threshold value within a range of 0 to 100.

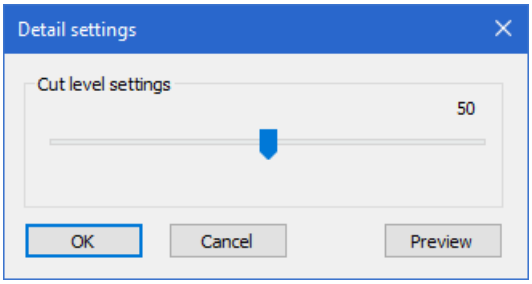
The weak, medium, and strong radio buttons are equivalent to the sliders weak: 20, medium: 50, and strong: 80.

● **[Preview] button**
Click this button to check the processing result in the [Height cut level] window.

● **Reference**

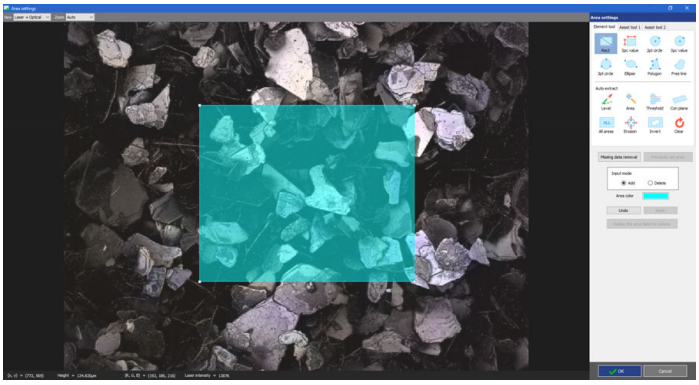
[Custom] radio button

Click the [Detail] button to display the [Detail settings] dialog box. After setting up the cut level, click the [OK] button to close the dialog box.



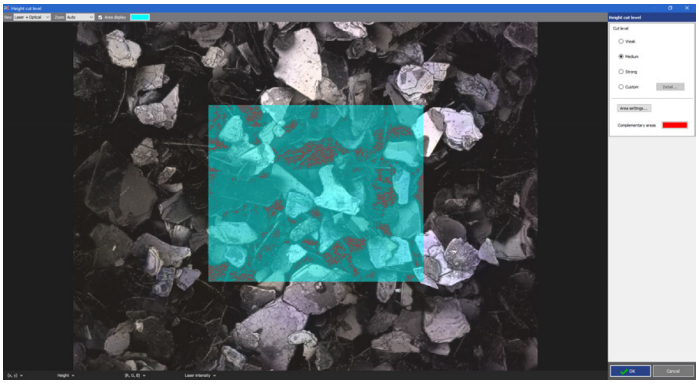
4. Where required, click the [Area settings] button to set the area.

Set the area in the [Area settings] window and click the [OK] button.



5. Click the [OK] button.

The [Height cut level] window closes, and the processing results are reflected in the image processing window.



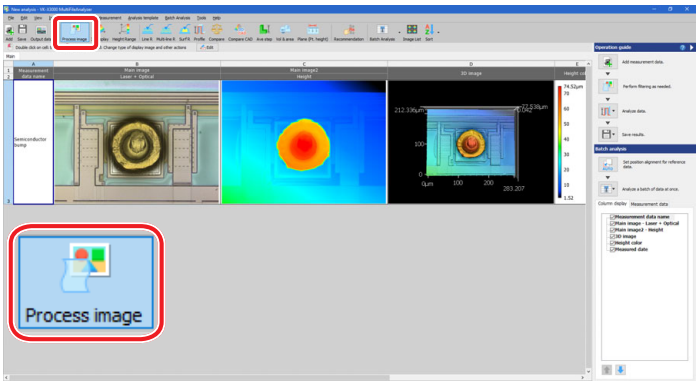
2-2 Setting the Reference Plane

Next, set a surface to be referred to for measurement (reference plane) in height data.

The entire height data is rotated so that the determined reference surface is horizontal, and the height data is offset in the height direction so that the height of the reference plane is zero (0).

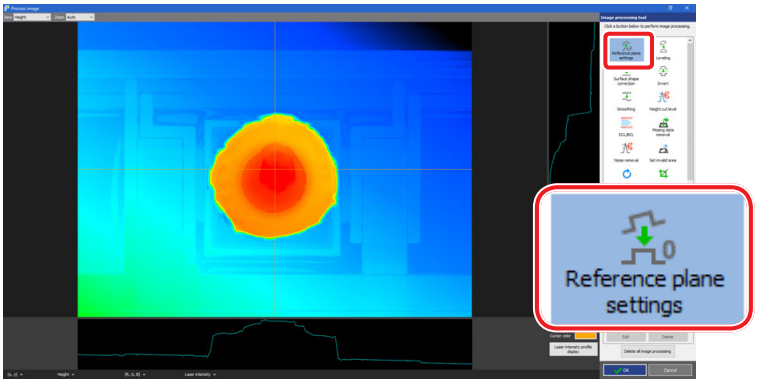
1. Select measurement data and click the [Process image] button.

Click the [Process image] button on the toolbar. Alternatively, select [Process image] from the [Process image] menu.



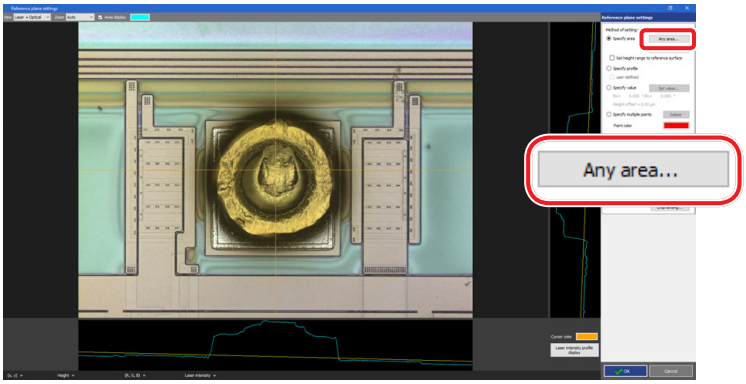
2. Click the [Reference plane settings] button.

The [Reference plane settings] window appears.



3. Click the [Specify area] radio button in [Method of setting reference surface], and then click the [Any area...] button.

The [Area settings] window appears.

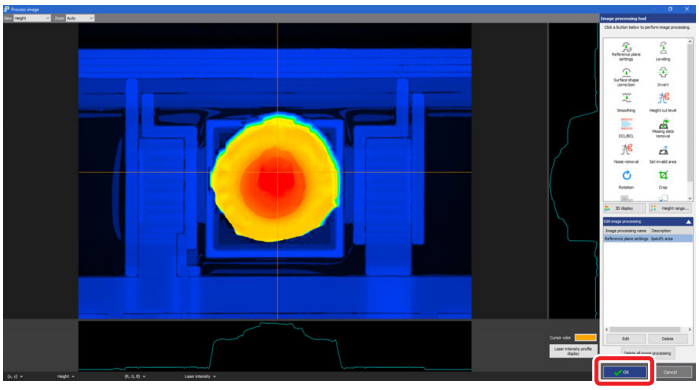


4. Click an area setting button for figure drawing and set an area on the image.

Click the [Rect] button. Click the mouse at the first point of the rectangle, and move the mouse. Next, when clicking the second apex of the rectangle, the rectangle specified with the range is set as an area.

5. Check that a reference plane has been specified, and click the [OK] button.

The [Reference plane settings] window closes, and the results of the processing are reflected in the image processing window.



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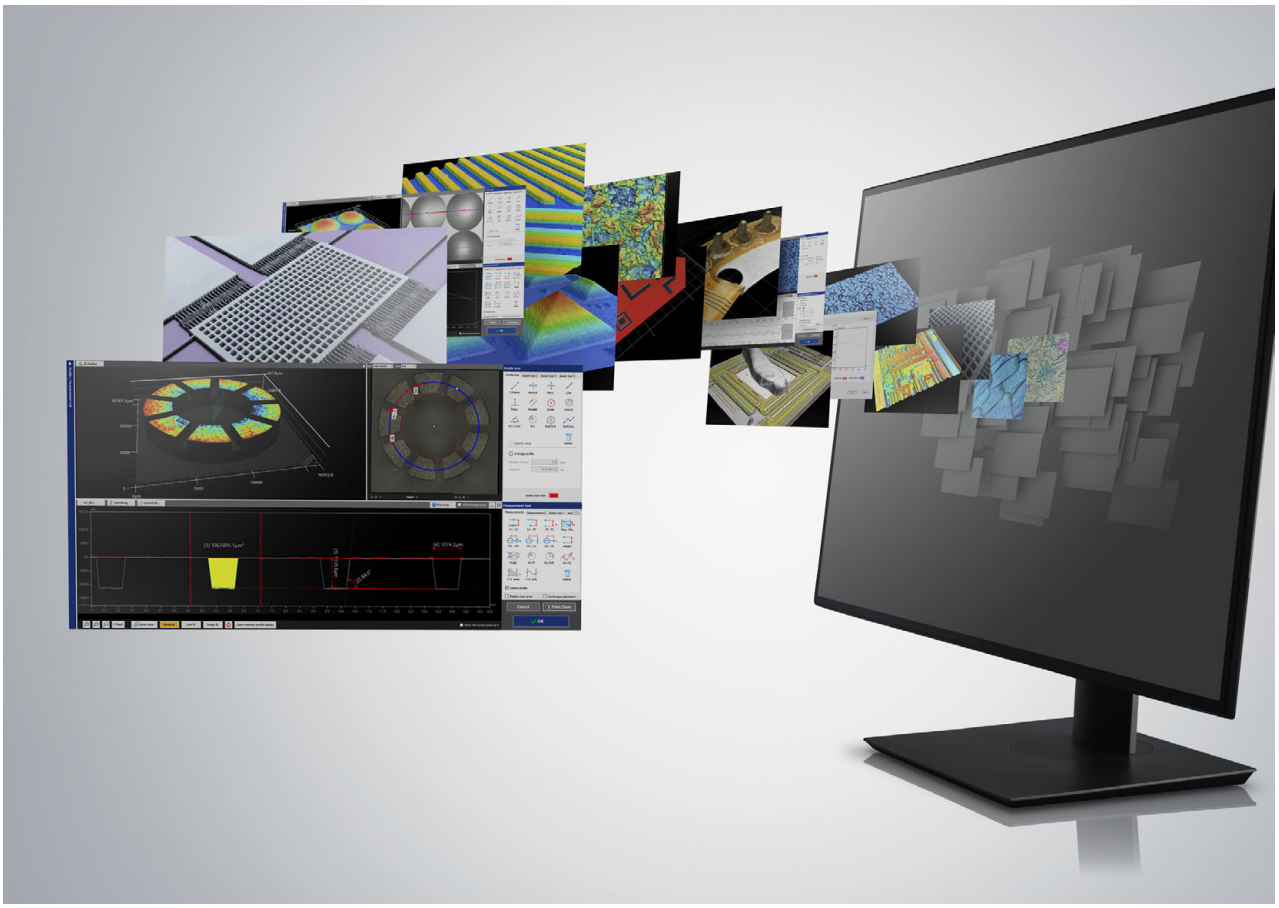
Chapter 3

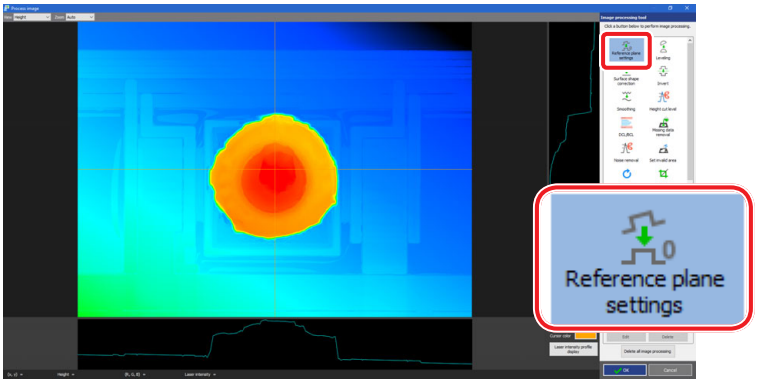
Advanced Settings



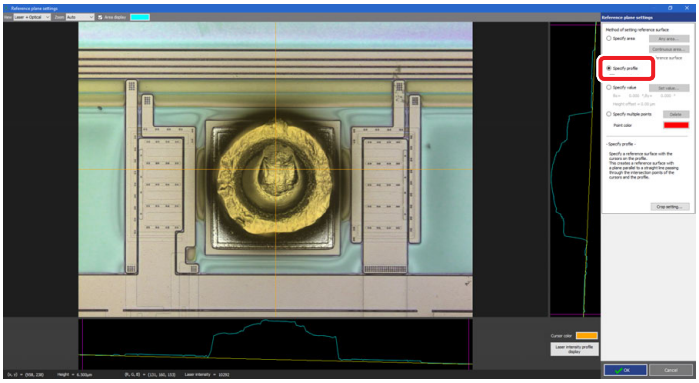
3-1 Setting the Reference Plane by Specifying a Profile

This section describes various configuration methods for the most frequently used “reference plane settings”.

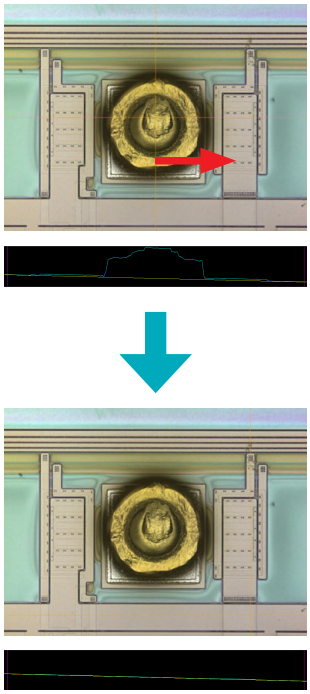
1. Click the [Reference plane settings] button.



2. In [Method of setting reference surface], select the [Specify profile] option button.



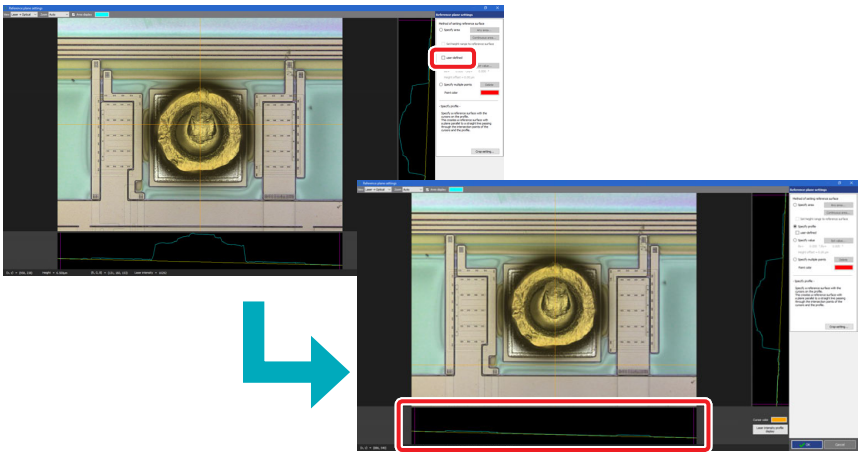
It is convenient to move the vertical/horizontal cursor on the screen to a position where it is easy to adjust the reference plane settings.



3. Move the markers displayed in the profile graph display area or operate the cursor to specify the reference plane.

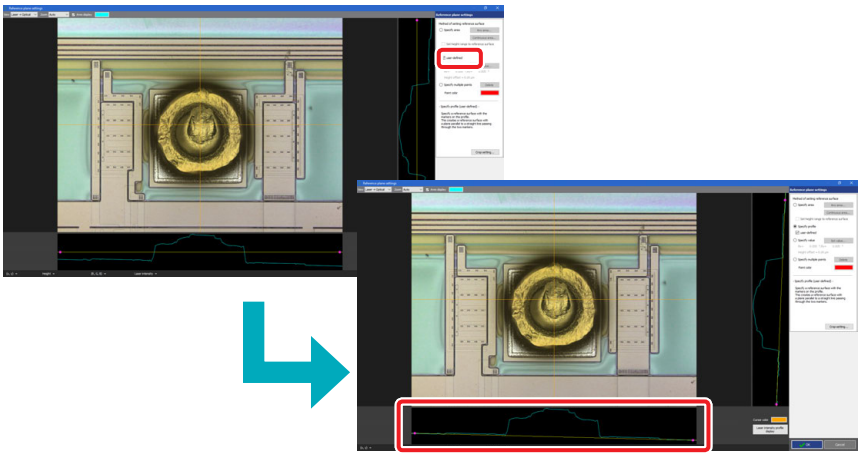
- **When the [user-defined] checkbox is cleared**

  Move the 2 point markers displayed in the profile graph display area to specify a straight line passing between the two intersection points of the cursor and the profile.



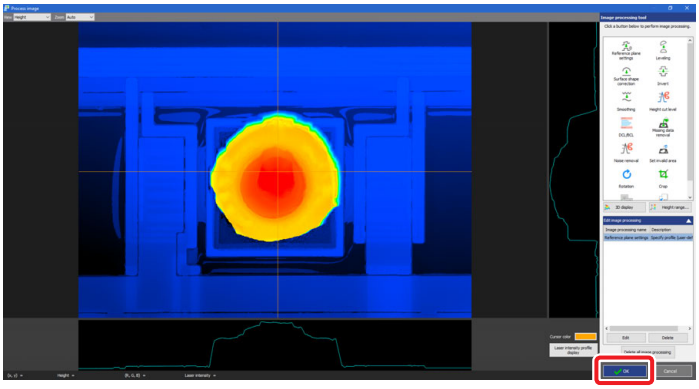
- **When the [user-defined] checkbox is selected.**

  Move the 2 point markers displayed in green in the profile graph display area to specify a straight line passing between the two points.



4. When the reference plane setting ends, click the [OK] button.

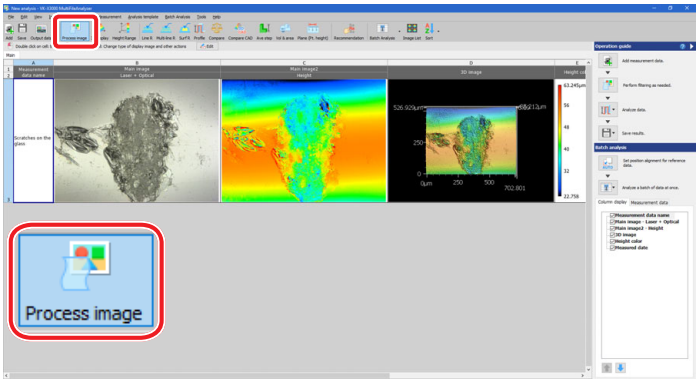
The [Reference plane settings] window closes, and the results of the processing are reflected in the image processing window.



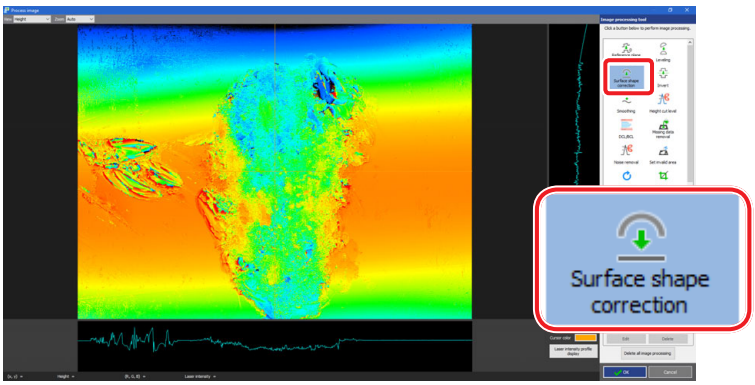
3-2 Setting the Surface Shape Correction

Surface shape correction is a form of processing that creates a plane by performing various types of correction processing on height data.
Whether there are minute structures on a wavy surface or a surface with a large curvature, performing surface shape correction will make the minute structures easier to observe.
This section describes how to use waveform removal.

1. Select measurement data and click the [Process image] button.



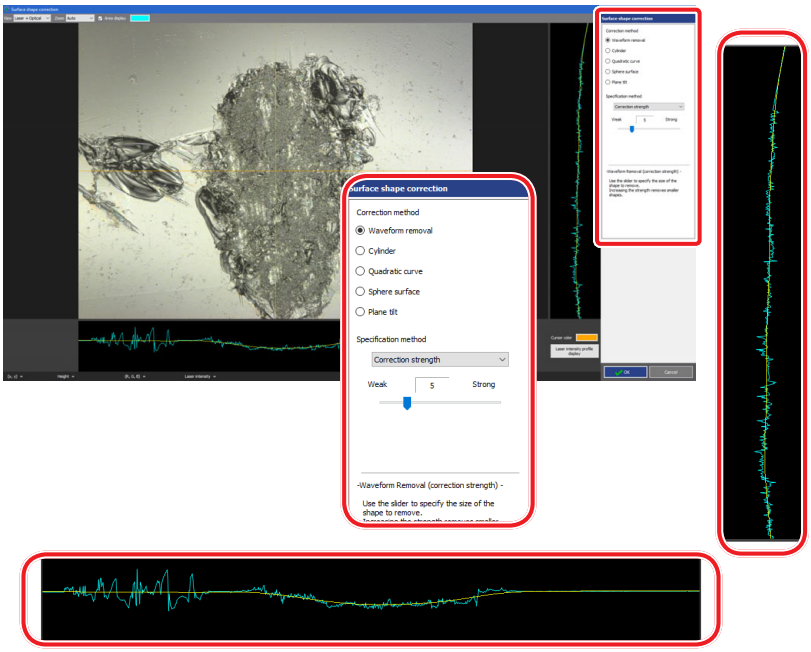
2. Click the [Surface shape correction] button.



● **About the waviness**
Increasing the waveform removal strength will result in smaller waveforms being removed.

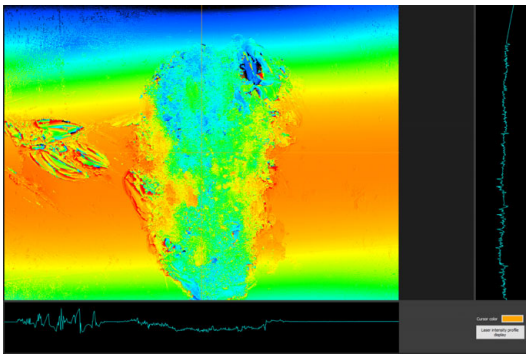
3. Select the [Waveform removal] radio button.

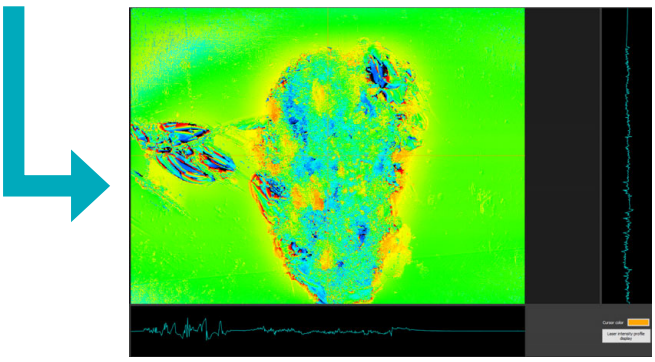
Use the slider to specify the strength of the waveform removal.
The correction tilt (yellow) changes according to the movement of the slider. Adjust the correction tilt to match the profile line (blue).



4. Click the [OK] button.

The [Surface shape correction] window closes, and the results of the processing are reflected in the image processing window.





Specifications are subject to change without notice.

KEYENCE CORPORATION

1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku, Osaka, 533-8555, Japan PHONE: +81-6-6379-2211

www.keyence.com/glb

AUSTRIA
Phone: +43 (0)2236 378266 0

BELGIUM
Phone: +32 (0)15 281 222

BRAZIL
Phone: +55-11-3045-4011

CANADA
Phone: +1-905-366-7655

CHINA
Phone: +86-21-3357-1001

CZECH REPUBLIC
Phone: +420 220 184 700

FRANCE
Phone: +33 1 56 37 78 00

GERMANY
Phone: +49-6102-3689-0

HONG KONG
Phone: +852-3104-1010

HUNGARY
Phone: +36 1 802 7360

INDIA
Phone: +91-44-4963-0900

INDONESIA
Phone: +62-21-2966-0120

ITALY
Phone: +39-02-6688220

KOREA
Phone: +82-31-789-4300

MALAYSIA
Phone: +60-3-7883-2211

MEXICO
Phone: +52-55-8850-0100

NETHERLANDS
Phone: +31 (0)40 206 6100

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ROMANIA
Phone: +40 (0)269 232 808

SINGAPORE
Phone: +65-6392-1011

SLOVAKIA
Phone: +421 (0)2 5939 6461

SLOVENIA
Phone: +386 (0)1 4701 666

SWITZERLAND
Phone: +41 (0)43 455 77 30

TAIWAN
Phone: +886-2-2721-8080

THAILAND
Phone: +66-2-369-2777

UK & IRELAND
Phone: +44 (0)1908-696-900

USA
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VIETNAM
Phone: +84-24-3772-5555

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