

# How to judge the surface roughness of CNC machining parts

## Detail Introduction :

### How to see the surface roughness of CNC machining parts?

After the part's surface is processed, it looks smooth, but it is uneven after magnification. We often hear that many people are used to using the "surface finish" indicator in daily life. What we call "surface finish" is based on the human visual point of view, while "surface roughness" is based on the actual microscopic geometry of the surface.

## What is Surface Roughness?

The machined surface has small spacing and small peak-to-valley unevenness. The distance (wave pitch) between the two wave crests or two wave troughs is very small (below 1mm), which belongs to the micro-geometric error.

## Surface Roughness Forming Factors

Surface roughness is generally formed by the processing method employed and other factors. For example, the friction between the tool and the part's surface during the **machining process**, the plastic deformation of the metal on the surface layer when the chips are separated, the high-frequency vibration in the processing system, and the discharge pits electrical machining. Due to different processing methods and workpiece materials, the depth, density, shape, and texture of marks left on the machined surface are different.

## What is the surface roughness based on?

1. Sampling length: the unit length of each parameter. The sampling length is a reference line specified for evaluating the surface roughness. Under the ISO1997 standard, 0.08mm, 0.25mm, 0.8mm, 2.5mm, and 8mm are generally used as reference lengths.
2. Evaluation length: it consists of N reference lengths. The surface roughness of each part of the component's surface cannot truly reflect the true parameters of the roughness on a reference length. Still, N sampling lengths need to be taken to evaluate the surface roughness. Under the ISO1997 standard, the evaluation length is generally N equal to 5.
3. Reference line: The reference line is the midline of the profile used to evaluate the surface roughness parameters.

## Surface Roughness Evaluation Parameters

1. Height characteristic parameter: Ra Contour arithmetic mean deviation: the arithmetic mean of the absolute value of contour deviation within the sampling length (LR). The more the number of measurement points in the actual measurement, the more accurate Ra is.
2. Spacing feature parameter: Rsm The average width of contour elements. The average value of the microscopic roughness spacing of the profile within the sampling length. The micro-roughness

spacing refers to the length of a profile peak and an adjacent profile valley on the midline.

## **Summarize**

Surface smoothness is the old standard for surface roughness. The evaluation of surface roughness should not be based on the visual point of view but Ra's number.

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