

# Methods of Measuring Surface Finish

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## **Scratch Inspection:**

The materials like lead, plastics rubbed on surface are inspected by this method. The impression of this scratches on the surface produced is then visualized.

## **Micro-Interferometer**

Optical flat is placed on the surface to be inspected and illuminated by a monochromatic source of light.

## **Surface Photographs**

Magnified photographs of the surface are taken with different types of illumination. The defects like irregularities are appear as dark spots and flat portion of the surface appears as bright.





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## Reflected light Intensity

A beam of light is projected on the surface to be inspected and the light intensity variation on the surface is measured by a photocell and this measured value is calibrated

## Wallace surface Dynamometer:

It consists of a pendulum in which the testing shoes are clamped to a bearing surface and a pre determined spring pressure can be applied and then, the pendulum is lifted to its initial starting position and allowed to swing over the surface to be tested.





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## Direct instrument measurements

Direct methods enable to determine a numerical value of the surface finish of any surface. These methods are quantitative analysis methods and the output is used to operate recording or indicating instrument. Direct Instruments are operated by electrical principles. These instruments are classified into two types according to the operating principle. In this is operated by carrier-modulating principle and the other is operated by voltage-generating principle, and in the both types the output is amplified.

**Some of the direct measurement instruments are**

- 1. Stylus probe instruments.**
- 2. Tomlinson surface meter.**
- 3. Profilometer.**
- 4. Taylor-Hobson**





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## Stylus probe type instrument

### Principle

When the stylus is moved over the surface which is to be measured, the irregularities in the surface texture are measured and it is used to assess the surface finish of the work piece.

### Working

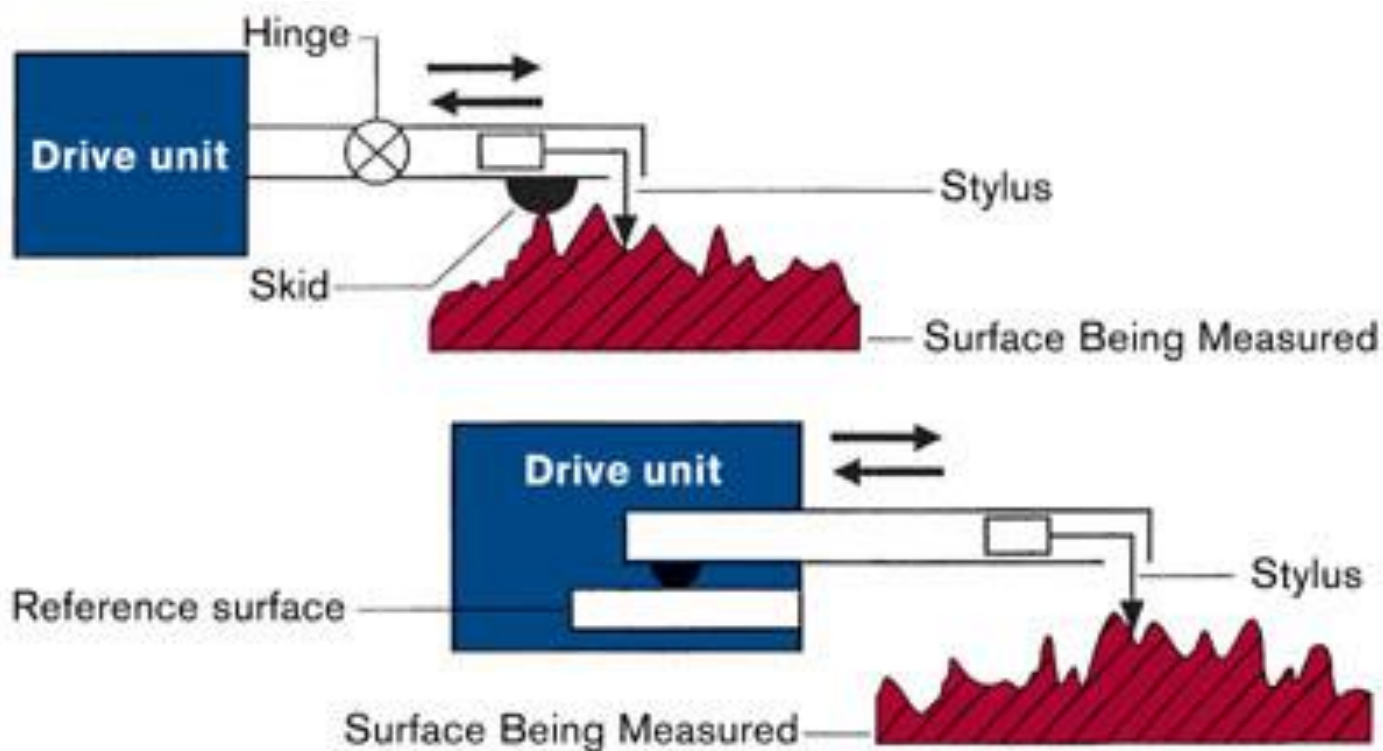
The stylus type instruments consist of skid, stylus, amplifying device and recording device. The skid is slowly moved over the surface by hand or by motor drive. The skid follows the irregularities of the surface and the stylus moves along with skid. When the stylus moves vertically up and down and the stylus movements are magnified, amplified and recorded to produce a trace. Then it is analyzed by automatic device.





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## Advantage

Any desired roughness parameter can be recorded.

## Disadvantages

1. Fragile material cannot be measured.
2. High initial cost.
3. Skilled operators are needed to operate.





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## Tomlinson Surface meter

This instrument uses mechanical-cum-optical means for magnification.

### Construction

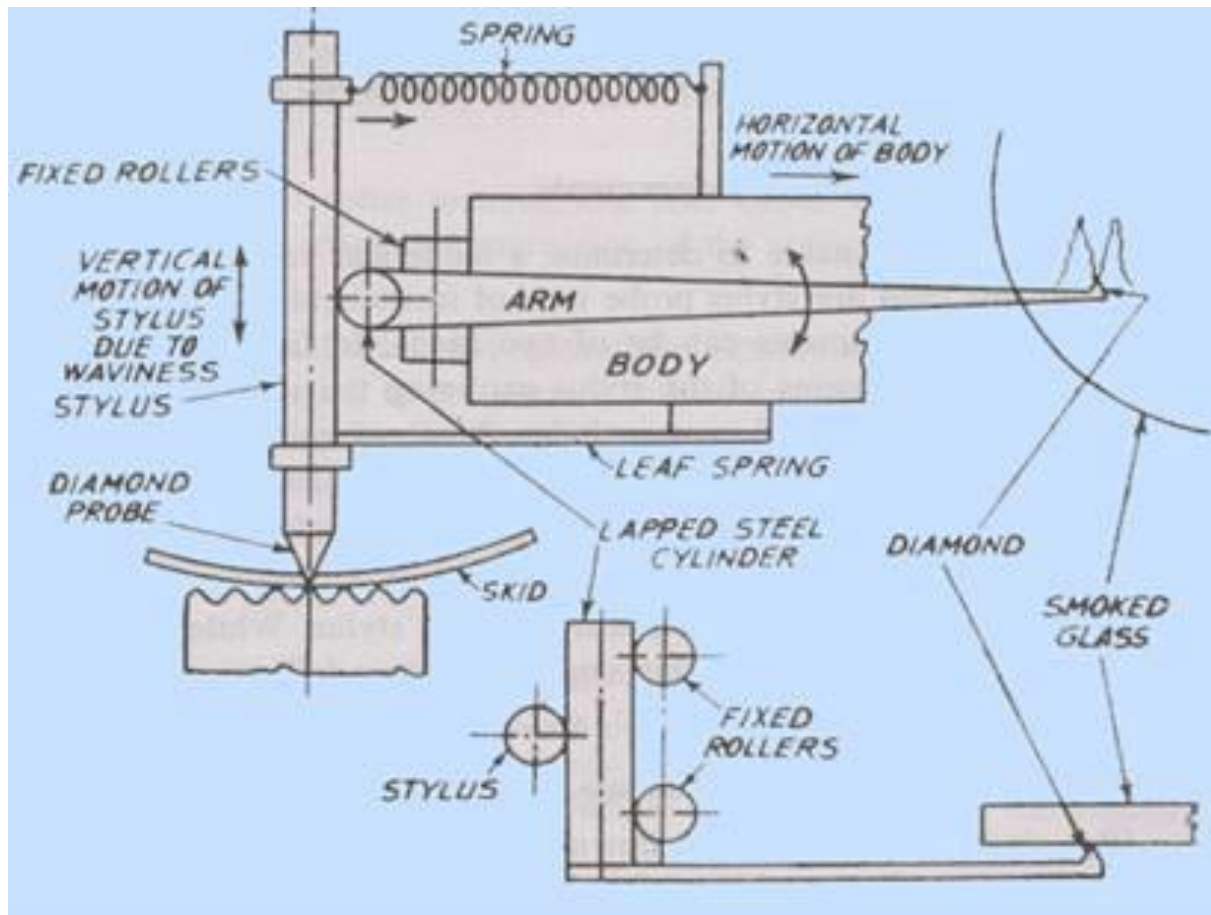
In this the diamond stylus on the surface finish recorder is held by spring pressure against the surface of a lapped cylinder. The lapped cylinder is supported one side by probe and other side by rollers. The stylus is also attached to the body of the instrument by a leaf spring and its height is adjustable to enable the diamond to be positioned and the light spring steel arm is attached to the lapped cylinder. The spring arm has a diamond scribe at the end and smoked glass is rest on the arm.





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## Working

When measuring surface finish the body of the instrument is moved across the surface by a screw rotation. The vertical movement of the probe caused by the surface irregularities makes the horizontal lapped cylinder to roll. This rolling of lapped cylinder causes the movement of the arm. So this movement induces the diamond scribe on smoked glass. Finally the movement of scribe together with horizontal movement produces a trace on the smoked glass plate and this trace is magnified by an optical projector.

