**Roughness measuring conditions (DIN EN ISO 4288:1998)**

- Non-periodic profiles
- Periodic profiles
- Measuring conditions as per DIN EN ISO 4288 and DIN EN ISO 3274

| Measuring method | Long-wave profile segments | Cutoff-wavelength criterion | Parameters | Summary
|-------------------|---------------------------|---------------------------|-----------|---------|
| Grinding, honing, lapping, sanding | > 0.25 mm | 0.05 % = 5 45% of the measured value | Rz, Rz1max | Width of the zone where a deviation occurs.
| Turning, milling, planning | > 0.05 mm | 0.001 % = 0.05 % of the measured value | Ra, Rz | Conventional surface roughness parameters.

**Roughness measuring devices**

- Practical tip 1: There is sufficient space on the workpiece surface for the required traversing length Rk. The number of evaluation lengths must be reduced and indicated in the drawing.
- Practical tip 2: There is still insufficient space, the total height of the primary profile Pt is measured over the available length instead of Rz or Rz1max. Pt is equal to Rz, but defined at the primary profile, and the measurement value is always larger.


Roughness measurement values, particularly the vertical parameter Rz, Rz1max, Pt are always a sum. The average value is calculated by the additivity of the roughness elements. The mean height of profile Pt is defined as the arithmetic mean of the sums of all profile values.

**Symbols for direction of lay (position d, bottom)**

- d → parallel d
- d⊥ → perpendicular d
- δ → undirected

**Preferred parameters**

- Material removal
- Production process (e.g., turning, grinding, chroming)
- Machining allowance (in mm)
- Identification of all surfaces
- Symbol for direction of lay (surface grooves)
- Letter for simplified benchmarking, if space is limited

**Related symbols**

- Basic symbol
- Additional surface requirement
- Production process (e.g., turning, grinding, chroming-plate)
- Machining allowance (in mm)
- Symbol for direction of lay (surface grooves)
- Identifiers of all surfaces
- Letter for simplified benchmarking, if space is limited


- Ra: Arithmetic average roughness value, arithmetic mean of the sums of all profile values
- Rz: Maximum of single profile sections from the five of the mean values of the profile elements as the specified section length 1 mm and of the measurement length is specified (see parameter)
- Rz1max: Maximum groove width: mean value of the width of the profile elements. Ra (previously Rz): The maximum mean value of five individual measurements has been defined for the measurement length 5 mm
- R1: Total height of the roughness profile: Sum of the 1 mm highest profile peak and the depth Z1 of the lowest profile valley within the evaluation length
- R2: Maximum height of the roughness profile: 5 mm highest profile peak and the depth of the lowest profile valley within a sampling length 10 mm
- R3: Maximum roughness depth: Largest of five Ra values for the five sampling lengths within the evaluation length
- R4: Mean roughness depth: mean value of the five Ra values for the five sampling lengths

**Material removal**

- Material: Federal Republic of Germany
- Production process
- Machining allowance (in mm)
- Surface grooves: Symbol for direction of lay (surface grooves)
- Identifiers of all surfaces
- Letter for simplified benchmarking, if space is limited