Roughness measuring systems from Jenoptik – Surface parameters in practice

Selection of the cut-off (profile filter) according to ISO 4288:1998 and ISO 3274:1998

The selection of the cut-off depends on the workpiece surface rather than on the edge roughness (either Ra or Rz). At the same time the total evaluation length and the corresponding traverse length are defined according to the standards. Deviations are necessary if the workpiece does not allow the required traverse length. See drawing entries.

### Division of a surface

#### Periodic profiles

<table>
<thead>
<tr>
<th>Avg. turning, milling</th>
<th>Ilsm (mm)</th>
<th>Measuring conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 0.013</td>
<td>&gt; 0.002...0.02</td>
</tr>
<tr>
<td></td>
<td>&gt; 0.013</td>
<td>&gt; 0.02...0.1</td>
</tr>
<tr>
<td></td>
<td>&gt; 0.013</td>
<td>&gt; 0.1...0.5</td>
</tr>
</tbody>
</table>

#### Aperiodic profiles

<table>
<thead>
<tr>
<th>Arithmetic mean deviation of the assessed profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ra (µm)</td>
</tr>
</tbody>
</table>

#### Filtering

- Filtered R-profile
- Filtered W-profile

### Evaluation of measurement results

According to ISO 4288 the surface measurement results made by the highest values are to be expected (visual determination).

#### Maximum value rule

The sample is considered good when the measured value is not more than 16 % of the measured value or of the maximum value.

#### Special rule VDA

The 16 % rule is not used. VDA 2006 assumes that the dispersion of the parameter is taken into account for calculating the material ratio. The maximum value rule applies generally even without the "max" index in the designation.

### Drawing entries according to ISO 1302:2002

#### Surface profiles – total height of the profile

The surface profile is measured two-dimensionally using the tracing system.

#### Measuring conditions

- Sampling length
- Evaluation length
- Traverse length
- Cut-off
- Overall profile filtering
- stylus tip radius
- Digitalization distance

#### Evaluation length – cut-off

- Start-up length
- Run-off length

### The most important roughness parameters according to ISO 4287, ISO 13565 and EN 10049

#### Ra – arithmetic mean deviation of the assessed profile

Ra is the arithmetic mean roughness value from the amount of all profile values. It does not differ between peaks and valleys and has therefore a relative weak information character.

#### Rz, Rz1max, R – parameters according to ISO 4287

Rz is the maximum value of the assessed profile profile. Rz1max is the maximum value of the profile of the total evaluation length ln.

### Specifications for requirements

- Rz, Rz1max, R
- Ra – arithmetical mean deviation of the assessed profile
- Rvk – reduced valley depth
- Rmr(c) – material ratio of the profile

### Parameters of the material surface

- Rk – roughness depth
- Rmr – material ratio

### Drawing entries according to VDA 2007 – dominant waviness

- Rp – roughness depth
- Rvk – reduced valley depth
- Rmr – material ratio

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