Constant cooling of the diamond tip is necessary during surface dressing and profiling in order to prevent changes of the diamond properties.

Surface dressing of grinding wheels:

Once the sharp edges of the grinding wheel cutting surface are worn out (as indicated by an increase in the normal force $F_n$, and an inefficient and loud grinding wheel), they need to be restored, i.e. surface dressed. Various surface dressing tools are used for dressing of grinding wheels:

Manual surface dressing:

Depending on the required accuracy, surface dressing may be performed with:
- vitrified bonded dressing tools,
- little metal wheels,
- single grit diamond dressing tools,
- multigrit diamond dressing tools.

Machine surface dressing:

- single grit dressing tools (with bases of different shapes),
- multigrit surface dressing tools (with bases of different shapes),
- dialettes (attached to holders of different shapes),
- diamond rolls (attached to holders of different shapes).

When a grinding wheel is mounted onto the machine spindle, it needs to be dressed for as long as it takes to level the entire grinding surface. If surface dressing is done during grinding, correct selection of the dressing parameters is important.

Dressing depth depends on the grit size in the grinding wheel, and is the same for all types of dressing tools.

<table>
<thead>
<tr>
<th>Grit size according to FEPA</th>
<th>Dressing depth $a$ (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>0.35</td>
</tr>
<tr>
<td>60</td>
<td>0.30</td>
</tr>
<tr>
<td>80</td>
<td>0.25</td>
</tr>
<tr>
<td>120</td>
<td>0.10</td>
</tr>
<tr>
<td>150</td>
<td>0.08</td>
</tr>
<tr>
<td>220</td>
<td>0.06</td>
</tr>
<tr>
<td>320</td>
<td>0.03</td>
</tr>
<tr>
<td>400</td>
<td>0.02</td>
</tr>
</tbody>
</table>

The other parameters are determined with respect to the dressing tool type.
Surface dressing with single grit diamond dressing tools

Selection of diamond grit size:
The grit size of a single grit surface dressing tool depends on the grinding wheel size, and is determined using an equation or a diagram.

\[ K_t = \frac{D + 2S}{400} \]

- \( K_t \) - diamond grit size
- \( D \) - grinding wheel diameter
- \( S \) - grinding wheel width
- 400 - constant

Depending on the shape, diamond grits for dressing tools are classified into four basic types.

<table>
<thead>
<tr>
<th>No. of tips</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2</td>
<td>standard</td>
</tr>
<tr>
<td>2 to 3</td>
<td>extra</td>
</tr>
<tr>
<td>1 to 2 (one ground)</td>
<td>standard +</td>
</tr>
<tr>
<td>2 to 3 (one ground)</td>
<td>extra +</td>
</tr>
</tbody>
</table>

\[ b = \max(2 \cdot a) \]
**Dressing tool’s transverse stroke:**
Transverse stroke during dressing (mm/min) with single grit surface dressing tools depends on the type of grinding and the external grinding wheel diameter. The recommendations are as follows:

<table>
<thead>
<tr>
<th>Type of grinding</th>
<th>Ø 200</th>
<th>Ø 300</th>
<th>Ø 400</th>
<th>Ø 500</th>
<th>Ø 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse grinding</td>
<td>780</td>
<td>520</td>
<td>400</td>
<td>300</td>
<td>260</td>
</tr>
<tr>
<td>Normal grinding</td>
<td>380</td>
<td>260</td>
<td>200</td>
<td>150</td>
<td>130</td>
</tr>
<tr>
<td>Fine grinding</td>
<td>280</td>
<td>150</td>
<td>120</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>

At operating speed of 35 m/s

<table>
<thead>
<tr>
<th>Type of grinding</th>
<th>Ø 200</th>
<th>Ø 300</th>
<th>Ø 400</th>
<th>Ø 500</th>
<th>Ø 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse grinding</td>
<td>1000</td>
<td>730</td>
<td>560</td>
<td>420</td>
<td>360</td>
</tr>
<tr>
<td>Normal grinding</td>
<td>530</td>
<td>360</td>
<td>280</td>
<td>210</td>
<td>180</td>
</tr>
<tr>
<td>Fine grinding</td>
<td>390</td>
<td>210</td>
<td>170</td>
<td>140</td>
<td>110</td>
</tr>
</tbody>
</table>

At operating speed of 50 m/s

**Restoration of single grit surface dressing tools**

Once the surface dressing tip has become worn out (i.e. when the contact surface area exceeds 1 mm²), the dressing tool needs to be restored. Restoration turns the grit around or grinds it and turns it around.

![New dressing tool](image1)
![Worn out dressing tool](image2)
![Useless dressing tool](image3)

**Surface dressing with multigrit surface dressing tools**

**Multigrit dressing tools:**

**Dialettes:**

**Diamond rolls:**

**Profiling of grinding tools**

**Single grit surface dressing (profiling) tools:** These are used for profiling vitrified bonded grinding wheels and are named according to the profiling device or machine.
**Flat surface dressing tools—Dialettes:** These are classified according to the shape and quality of the integrated diamond grit.

Rotating diamond surface dressing tools:

Depending on the dressing method, rotating diamond surface dressing tools are produced:
- with the entire profile shape (without transverse motion):
- with the same profile as the model (with transverse motion):

Depending on the bond type, rotating surface dressing tools may be produced with:
- galvanic bond,
- metal bond.

When profiling is done using a template (programme), the dressing wheel’s profile must be the same as that of the model. The dressing tool moves along a template, creating the same profile along the grinding wheel circumference.

**Dressing of vitrified bonded diamond and CBN grinding tools**

Vitrified bonded grinding wheels may be dressed with:

- Multigrit sintered dressing tools
- Dialettes with MC grit
- Diamond rolls
- PKD profiling grinding wheels
- Dressing tools with rotating wings
- Universal WST surface dressing tools
- Dressing tools with centrifugal brake
SINGLE GRIT DIAMOND SURFACE DRESSING TOOLS

**K101 MK1**
Order printout sample: K101 MK1-2.5 kt - standard

**K102 MK1-G**
Order printout sample: K102 MK1-G-2.5 kt - standard

**K103 MK0**
Order printout sample: K103 MK0-1.0 kt - extra

**K104 MK0-G**
Order printout sample: K104 MK0-G-2.5 kt - standard+

**K105 DECKEL**
Order printout sample: K105 DECKEL 1.0 kt - standard

**K106 ZYLINDER**
Order printout sample: K106 ZYLINDER (Ø8x50) 1.5 kt - standard

**K107 YUNG**
Order printout sample: K107 YUNG 1.0 kt - extra+

**K108 YUNG**
Order printout sample: K108 YUNG 1.0 kt - extra

**K109 YUNG**
Order printout sample: K109 YUNG 1.0 kt - standard

**K110 YUNG**
Order printout sample: K110 YUNG 0.5 kt - standard+
Order printout sample:
K111 YUNG - 0.75 kt - standard

Order printout sample:
K112 YUNG - 0.5 kt - extra

Order printout sample:
K113 KOLB - 1.0 kt - standard

Order printout sample:
K114 LANDIS (Ø6.5) - 1.5 kt - standard

Order printout sample:
K115 NILES 0.5 kt - extra

Order printout sample:
K116 NILES 0.75 kt - extra

Order printout sample:
K117 DECKEL 1.0 kt - standard

Order printout sample:
K119 1.0 kt - standard
DIAMOND ROLLS

Diamond roll clamping

HOLDER MK1, MK0, ...

Standard types can also be used
(see single grit surface dressing tools)
DIAMOND DIALETTES

**DIALETTE 10xL**

Order printout sample:
Dialette 10xL D350

**DIALETTE 15xL**

Order printout sample:
Dialette 15xL D711

**DIALETTE 20xL**

Order printout sample:
Dialette 20xL D711

Fixed clamping into a holder

[Images of fixed clamping into a holder]

Standard types can also be used
(see single grit surface dressing tools)

Clamping into screw holders

[Images of clamping into screw holders]

Standard types can also be used
(see single grit surface dressing tools)
DIAMOND INSERTS FOR MULTIGRIT SURFACE DRESSING TOOLS

Types of multigrit dressing tools

**HOLDER: MK0, MK1, ...**

```
Order printout sample: K404 MK0 8x8 1 kt
```

**MK0-G, MK1-G, ...**

```
Order printout sample: K406 MK1-G/10x10 1.5 kt
```

**CYLINDRIC HOLDER**

```
Order printout sample: K401 8x80/6x8 0.75 kt
```
PROFILE DIAMOND SURFACE DRESSING TOOLS

**K201 DIAFORM**

Order printout sample:
K201 DIAFORM - 1.0 kt

**K202 FORTUNA**

Order printout sample:
K202 FORTUNA (Ø6.5) - 1.5 kt

**K203 SCHAUDT**

Order printout sample:
K203 SCHAUDT 1.25 kt