The correct alignment of the roll cooling nozzles on the spray header is essential for optimal roll cooling. Flat jets are the preferred spray pattern for roll cooling, therefore only a self-aligning nozzle design provides the operation safety required in a modern rolling mill. All flat jet nozzles of the Lechler series 6E4 and 6E5 come with an automatic self-aligning feature which ensures that every nozzle will always be installed under the correct spray offset angle towards the roll center line.

No welding nipple is required for the 6E nozzle series because the tip geometry can be machined directly into a front plate of a box type spray header. A hollow nozzle nut holds the nozzle tip in place. This simple but innovative design does make all the welding nipples and the intermediate nozzle plate obsolete resulting in significant cost savings. Another positive aspect is the reduction of the overall weight and outer dimensions of box type headers. The correct offset angle is machined directly into the header front plate and does not depend on the nozzle tip. The two keys on the nozzle tip are always in line with the flat jet spray axis.

This prevents wrong fabrication caused by design mistakes. The nozzle tip seals metalically against the bottom of the header plate machined surface. The Spray has a parabolic liquid distribution which is ideal for a multi nozzle header arrangement.

- Parabolic liquid distribution
- Automatic nozzle alignment
- High operation safety
- No welding nipples required
- Simplifies the design of box type headers because:
  - No welding nipples required
  - Reduces header weight
  - Reduces outer header dimension
  - Reduces header costs significantly
### Hollow-core screw

**Ordering-no.**
- **06E.400.11** (AISI 430 F)
- **06E.400.17** (316 SS)
- **06E.400.30** (brass)

**Material AISI 430 F:**
Non austenitic stainless steel

### Table: Spray width [B] at p=3 bar

<table>
<thead>
<tr>
<th>H</th>
<th>250 mm</th>
<th>500 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>6E4.721 - 6E4.921</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>6E4.941 - 6E5.201</td>
<td>115</td>
<td>210</td>
</tr>
<tr>
<td>6E4.722 - 6E4.962</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>6E4.982 - 6E5.202</td>
<td>160</td>
<td>310</td>
</tr>
<tr>
<td>6E4.723 - 6E5.963</td>
<td>220</td>
<td>440</td>
</tr>
<tr>
<td>6E4.983 - 6E5.203</td>
<td>250</td>
<td>490</td>
</tr>
<tr>
<td>6E4.724 - 6E4.964</td>
<td>330</td>
<td>630</td>
</tr>
<tr>
<td>6E4.984 - 6E5.204</td>
<td>340</td>
<td>640</td>
</tr>
</tbody>
</table>

### Conversional formula

\[ V_2 = V_1 \times \sqrt{\frac{p_2}{p_1}} \]

**Example Type + Material-no. = Ordering no. for Ordering:**
- **6E4.721 + 17 = 6E4.721.17**

---

**Blind tip for pressure testing**

---

**Nozzle series 6E4/6E5**

Weight: 28 g

---

**Hollow-core screw**

Weight: 41 g

---

**Ordering no. 06E.490.1Y**

**Weight:** 28 g

---

**Weight:** 41 g

---

**Weight:** 28 g

---

**Weight:** 41 g
The correct alignment of the roll cooling nozzles on the spray header is essential for optimal roll cooling. Flat jets are the preferred spray pattern for roll cooling, therefore only a self aligning nozzle design provides the operation safety required in a modern rolling mill.

All flat jet nozzles of the Lechler series 6F4 and 6F5 come with an automatic self aligning feature which ensures that every nozzle will always be installed under the correct spray offset angle towards the roll center line. The nozzle tip has two locating lugs for self alignment and seals metallically with a circular surface against the welding nipple when the nut is tightened. No torque is applied on the lugs themselves preventing mechanical damage due to overtightening of the nut. The 6F nozzle series are ideal for mounting when space is limited.

Unlike the dove tail assemblies the tip is put in in axial direction of the welding nipple. Safe and one-handed nozzle tip mounting is guaranteed because thread engagement does not take place before the two location lugs have been correctly positioned on the opposite nipple side. The 6F nozzle series is available with a wide variety of standard offset angles which simplifies spray header fabrication significantly. It also helps to prevent wrong fabrication of headers.

The spray has a parabolic liquid distribution which is ideal for a multi nozzle header arrangement.
**Accessories**

- **Welding nipple**
- **Retaining nut**

**Ordering-no. 06F.490.1Y**

**Welding nipple**

- **Technical data and ordering data for accessories see page 13.**

---

**Example**

**Type** + **Material-no.** + **Offset angle** = **Ordering no.**

- For Ordering: 6F4.721 + 17 + 15 = 6F4.721.17.15

---

**Conversion formula for the above series:**

\[
V_2 = V_1 \cdot \sqrt{\frac{P_2}{P_1}}
\]
The 660 series nozzles come with the conventional, automatic self aligning dovetail connection which ensures that every nozzle will always be installed under the correct spray offset angle towards the roll center line.

The small tip dimensions make this nozzle series ideal for roll cooling and strip cooling headers when space is limited especially in small rolling mills for non ferrous metals.

All tips have an automatically built in 5° offset angle if the welding nipple is welded in line with the centre line of the spray header. Any other offset angle has to be compensated for by welding the nipple under a different angle (minus the 5° inbuilt offset angle).

The spray has a parabolic liquid distribution which is ideal for a multi nozzle header arrangement.

<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>E  [°]</th>
<th>Ø [mm]</th>
<th>V [l/min]</th>
<th>p [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>660.301</td>
<td>660.302</td>
<td>660.303</td>
<td>660.304</td>
<td>0.4 - 0.6</td>
<td>0.16</td>
</tr>
<tr>
<td>660.331</td>
<td>660.332</td>
<td>660.333</td>
<td>660.334</td>
<td>0.5 - 0.7</td>
<td>0.22</td>
</tr>
<tr>
<td>660.361</td>
<td>660.362</td>
<td>660.363</td>
<td>660.364</td>
<td>0.6 - 0.8</td>
<td>0.31</td>
</tr>
<tr>
<td>660.401</td>
<td>660.402</td>
<td>660.403</td>
<td>660.404</td>
<td>0.8 - 1.0</td>
<td>0.50</td>
</tr>
<tr>
<td>660.441</td>
<td>660.442</td>
<td>660.443</td>
<td>660.444</td>
<td>1.0 - 1.2</td>
<td>0.80</td>
</tr>
<tr>
<td>660.511</td>
<td>660.512</td>
<td>660.513</td>
<td>660.514</td>
<td>1.1 - 1.4</td>
<td>0.95</td>
</tr>
<tr>
<td>660.561</td>
<td>660.562</td>
<td>660.563</td>
<td>660.564</td>
<td>1.3 - 1.5</td>
<td>1.25</td>
</tr>
<tr>
<td>660.601</td>
<td>660.602</td>
<td>660.603</td>
<td>660.604</td>
<td>1.5 - 1.7</td>
<td>1.57</td>
</tr>
<tr>
<td>660.641</td>
<td>660.642</td>
<td>660.643</td>
<td>660.644</td>
<td>1.6 - 1.9</td>
<td>2.00</td>
</tr>
<tr>
<td>660.671</td>
<td>660.672</td>
<td>660.673</td>
<td>660.674</td>
<td>1.8 - 2.2</td>
<td>2.37</td>
</tr>
<tr>
<td>660.721</td>
<td>660.722</td>
<td>660.723</td>
<td>660.724</td>
<td>2.1 - 2.5</td>
<td>2.75</td>
</tr>
<tr>
<td>660.761</td>
<td>660.762</td>
<td>660.763</td>
<td>660.764</td>
<td>2.3 - 2.8</td>
<td>3.19</td>
</tr>
<tr>
<td>660.801</td>
<td>660.802</td>
<td>660.803</td>
<td>660.804</td>
<td>2.6 - 3.2</td>
<td>3.62</td>
</tr>
<tr>
<td>660.841</td>
<td>660.842</td>
<td>660.843</td>
<td>660.844</td>
<td>3.0 - 3.6</td>
<td>4.00</td>
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<tr>
<td>660.881</td>
<td>660.882</td>
<td>660.883</td>
<td>660.884</td>
<td>3.4 - 4.0</td>
<td>4.34</td>
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<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>660.923</td>
<td>4.1 - 4.4</td>
<td>5.00</td>
</tr>
</tbody>
</table>

E = Narrowest free cross section. * US gal/min

Subject to technical modifications

Conversional formula for the above series:

\[ V_2 = V_1 \cdot \sqrt{\frac{p_2}{p_1}} \]

Example: Type + Material-no. = Ordering no. for Ordering: 660.301 + 17 = 660.301.17

Accessories

- Welding nipple
- Retaining nut

Technical data and ordering data for accessories see page 13.
The 664 and 665 series nozzles come with the conventional, automatic self aligning dovetail connection which ensures that every nozzle will always be installed under the correct spray offset angle towards the roll center line.

This nozzle family has become an industrial standard solution for roll cooling applications. All tips have an automatically built in 15° offset angle if the welding nipple is welded in line with the centre line of the spray header. Any other offset angle has to be compensated for by welding the nipple under a different angle (minus the 15° inbuilt offset angle).

The spray has a parabolic liquid distribution which is ideal for a multi nozzle header arrangement.

### Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat. no.</th>
<th>16</th>
<th>17</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø 20</td>
<td>ø 24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Conversional formula

For the above series:

\[ V_2 = V_1 \times \sqrt{\frac{P_2}{P_1}} \]

### Accessories

- Welding nipple
- Retaining nut

Other offset angles are available on request.

Technical data and ordering data for accessories see page 13.
The 669 series nozzles come with the conventional, automatic self aligning dovetail connection which ensures that every nozzle will always be installed under the correct spray offset angle towards the roll center line.

This nozzle family allows very large flow rates for roughing, plate mill and strip cooling applications.

All tips have an automatically built in 15° offset angle if the welding nipple is welded in line with the centre line of the spray header. Any other offset angle has to be compensated for by welding the nipple under a different angle (minus the 15° inbuilt offset angle).

The spray has a parabolic liquid distribution which is ideal for a multi nozzle header arrangement.

Weight brass: 135 g

### Ordering no.

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø20°</td>
<td>669.041</td>
</tr>
<tr>
<td>Ø30°</td>
<td>669.042</td>
</tr>
<tr>
<td>Ø45°</td>
<td>669.043</td>
</tr>
<tr>
<td>Ø60°</td>
<td>669.044</td>
</tr>
<tr>
<td>15°</td>
<td>669.121</td>
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<tr>
<td>30°</td>
<td>669.122</td>
</tr>
<tr>
<td>45°</td>
<td>669.123</td>
</tr>
<tr>
<td>60°</td>
<td>669.124</td>
</tr>
<tr>
<td>90°</td>
<td>669.281</td>
</tr>
<tr>
<td>120°</td>
<td>669.282</td>
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<tr>
<td>150°</td>
<td>669.283</td>
</tr>
<tr>
<td>180°</td>
<td>669.284</td>
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<tr>
<td>15°</td>
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<td>669.282</td>
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<tr>
<td>150°</td>
<td>669.283</td>
</tr>
<tr>
<td>180°</td>
<td>669.284</td>
</tr>
</tbody>
</table>

### Conversional formula for the above series:

\[ V_2 = V_1 \cdot \sqrt{\frac{p_2}{p_1}} \]

**Example** Type + Material-no. = Ordering no. for Ordering: 669.041 + 16 = 669.041.16

### Technical data and ordering data for accessories see page 13.
### Series 6F

- **Hex 32**
- **3/4 BSPP**
- **Weight brass 60 g**
- **Retaining**
  - 065.600.11 (AISI 430 F)
  - 065.600.16 (303 SS)
  - 065.600.17 (316 SS)
  - 065.600.30 (brass)

- **Welding**
  - 06F.410.17.xx (316 SS)
  - 06F.411.17.xx (316 SS)

### Series 660

- **Hex 22**
- **3/8 BSPP**
- **Weight 25 g**
- **Retaining**
  - 065.200.16 (303 SS)
  - 065.200.17 (316 SS)
  - 065.200.30 (brass)

### Series 664/665

- **Hex 32**
- **3/4 BSPP**
- **Weight brass 60 g**
- **Retaining**
  - 065.600.11 (AISI 430 F)
  - 065.600.16 (303 SS)
  - 065.600.17 (316 SS)
  - 065.600.30 (brass)

### Series 669

- **Hex 50**
- **1 1/4 BSPP**
- **Weight brass 205 g**
- **Retaining**
  - 066.900.16 (303 SS)
  - 066.900.17 (316 SS)
  - 066.900.30 (Brass)

### Nipple Length

#### Nipple Length 20 - 99 mm

- **Basic type number**
  - 06F.410.17
- **Length L₁**
  - xx

- **Example for nipple length 35 mm**
  - 06F.410.17
  - 35

#### Nipple Length 100 - 199 mm

- **Basic type number**
  - 06F.411.17
- **Length L₁**
  - xx

- **Example for nipple length 35 mm**
  - 06F.411.17
  - 35

### Other Nipple Lengths

- For all nozzle series on request.

### Alignment Tips

- **Series 6E**: 06E.490.1Y
- **Series 6F**: 06F.490.1Y
- **Series 660**: 066.090.16
  - Offset angle 5°
- **Series 664/665**: 066.490.16
  - Offset angle 15°
- **Series 669**: 066.990.16
  - Offset angle 15°
  - (Other offset angles on request)