BÖHLER Ti 60 T-FD
Seamless Cored Wire

All-positional rutile flux-cored wire for high strength steel, using M21 shielding gas.

<table>
<thead>
<tr>
<th>Features</th>
<th>User benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast freezing rutile slag system</td>
<td>Productive positional welding</td>
</tr>
<tr>
<td>Welder-friendly</td>
<td>Low defect rate</td>
</tr>
<tr>
<td>Deep penetration</td>
<td>Low defect rate</td>
</tr>
<tr>
<td>Smooth wetting</td>
<td>Good fatigue resistance</td>
</tr>
<tr>
<td>Low spatter</td>
<td>Less post weld cleaning</td>
</tr>
<tr>
<td>Dependable feedability</td>
<td>Increased arc time</td>
</tr>
<tr>
<td>Copper-coated seamless cored wire</td>
<td>Excellent current transfer</td>
</tr>
<tr>
<td></td>
<td>Resistance to moisture absorption</td>
</tr>
<tr>
<td>Low-hydrogen weld metal</td>
<td>Low risk of HAC</td>
</tr>
<tr>
<td>CTOD tested at -10°C</td>
<td>Excellent mechanical properties</td>
</tr>
</tbody>
</table>

For offshore and other demanding industries with impact requirements down to -40 °C

Seamless tubular, copper-coated cored from the Diamond Spark range. For single- or multi-layer welding of low-temperature steels up to 500 MPa yield strength and impact requirements down to -60 °C, also after post weld heat treatment. Alloyed with < 1 % Ni to meet the NACE MR0175 requirement for SSC safe service in sour environments in oil and gas exploration and processing.

Superb weldability in all welding positions. Seamless wire design, giving optimal protection against moisture reabsorption, assuring very low-hydrogen weld metal. CTOD tested at -10 °C.

Exceptional weldability, productivity and low-hydrogen performance

BÖHLER Ti 60 T-FD is an all-positional rutile cored wire with excellent weldability. It is characterized by a smooth spray-arc droplet transfer in all welding positions, with very low spatter losses. Slag is easily removed. Welds have a deep penetration and a nice appearance with smooth wetting onto plate edges. If desired, a single current/voltage setting can be applied for all welding positions. Its fast freezing slag enables deposition rates in positional welding up to three times as high as obtainable with any other manual arc welding process. Root runs are welded economically on ceramic weld metal support. The seamless, copper-coated wire design adds sufficient stiffness and glide to overcome friction in liners, welding guns and contact tips.

The copper-coating enhances current transfer between contact tip and wire resulting in a stable arc. Controlled wire cast and helix largely avoids “dog tailing”, promoting straight, well positioned welds. The seamless design offers the best possible protection against moisture reabsorption during storage and use of the wires and thereby against hydrogen induced cracking. Diffusible hydrogen level is typically 2 - 3 ml/ 100 g weld metal.

Typical applications in offshore fabrication
- TKY-joints
- Offshore structures
- Foundation piles
## BÖHLER Ti 60 T-FD

### Classifications

<table>
<thead>
<tr>
<th>EN ISO 17632-A</th>
<th>AWS A5.36</th>
</tr>
</thead>
<tbody>
<tr>
<td>T50 6 1Ni P M 1 H5</td>
<td>E81T1-M21A8-Ni1-H4</td>
</tr>
</tbody>
</table>

### Operating data

<table>
<thead>
<tr>
<th>Welding positions</th>
<th>Polarity</th>
<th>Shielding gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EN ISO 14175: M21, M33</td>
</tr>
</tbody>
</table>

### Typical chemical composition, all weld metal, wt. %

<table>
<thead>
<tr>
<th>Shielding gas</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td>M21</td>
<td>0.07</td>
<td>0.45</td>
<td>1.3</td>
<td>0.85</td>
</tr>
</tbody>
</table>

### Mechanical properties, all weld metal (single values typical)

<table>
<thead>
<tr>
<th>Shielding gas</th>
<th>Condition</th>
<th>Yield strength R_p0.2% MPa</th>
<th>Tensile strength R_m MPa</th>
<th>Elongation A5 %</th>
<th>CVN Impact toughness ISO-V KV J -40 °C</th>
<th>-60 °C</th>
<th>CTOD tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>M21</td>
<td>as welded</td>
<td>550 (≥ 500)</td>
<td>610 (560 - 690)</td>
<td>25 (≥18)</td>
<td>100</td>
<td>75 (≥47)</td>
<td>-10°C</td>
</tr>
<tr>
<td>M21</td>
<td>PWHT: 550 - 600 °C / 2h</td>
<td>520 (≥ 500)</td>
<td>580 (560 - 690)</td>
<td>29 (≥18)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Steels to be welded

<table>
<thead>
<tr>
<th>EN</th>
<th>ASTM</th>
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</thead>
</table>

### Approvals

TÜV, DB, DNV-GL, ABS, LR, BV, RINA, RS, CWB, CE

### Overview spool types

#### Plastic spool D200

- **Dimensions:**
  - Ø external: 200 mm
  - Ø internal: 52 mm
  - Width: 47 mm
- **Available spool weight:** 5 kg
- **Available diameters:**
  - 1.0 mm
  - 1.2 mm

#### Wire basket spool BS300

- **Dimensions:**
  - Ø external: 300 mm
  - Ø internal: 52 mm
  - Width: 100 mm
- **Available spool weight:** 15 kg
- **Available diameters:**
  - 1.2 mm
  - 1.4 mm
  - 1.6 mm

#### Wire basket spool K300

- **Dimensions:**
  - Ø external: 300 mm
  - Ø internal: 180 mm
  - Width: 100 mm
- **Available spool weight:** 16 kg
- **Available diameters:**
  - 1.2 mm
  - 1.4 mm
  - 1.6 mm

#### Plastic spool D300

- **Dimensions:**
  - Ø external: 520 mm
  - Ø internal: 100 mm
- **Available spool weight:** 15 kg
- **Available diameters:**
  - 1.2 mm
  - 1.3 mm
  - 1.4 mm
  - 1.6 mm

#### Round drum

- **Weight:** app. 230 kg flux cored wire
- **Dimensions:**
  - Ø external: 520 mm
- **Available diameters:**
  - 1.2 mm
  - 1.4 mm
  - 1.6 mm