High Temperature and Creep-resistant Filler Metals – SMAW Stick Electrodes

BÖHLER FOX C 9 MV
SMAW stick electrode, high-alloyed, creep resistant

Description
Basic coated core wire alloyed electrode suited for high temperature martensitic 9-12 % chromium steels, especially for T 91 and P91 steels and operating temperatures up to +620 °C (approved up to +650 °C). High creep rupture strength and good toughness properties under long term stresses. Low hydrogen content. The electrode is suitable in all positions except vertical down. It features excellent striking and re-striking properties.

Typical Composition of All-weld Metal

<table>
<thead>
<tr>
<th>wt-%</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
<th>Nb</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.09</td>
<td>0.3</td>
<td>0.5</td>
<td>9.0</td>
<td>0.9</td>
<td>0.9</td>
<td>0.05</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Mechanical Properties of All-weld Metal

(*)

- Yield strength Rₑ N/mm²: 500 (≥ 415)
- Tensile strength Rₘ N/mm²: 720 (≥ 585)
- Elongation A (L₀ = 5d₀) %: 19 (≥ 17)
- Impact work ISO-V KV J + 20 °C: 60 (≥ 41)

(*) a1 annealed, 760 °C/2 h/furnace down to 300 °C/air

Operating Data

- re-drying if necessary: ø mm L mm amps A
- 300 - 350 °C, min. 2 h: 2.5 250 60 - 80
- FOX C 9 MV 9015-B9 E CrMo91 B: 4.0 350 110 - 140
- 5.0 450 150 - 180

Preheating and interpass temperature 200-300 °C. After welding the joint should be cooled down below 80 °C to finish the martensite transformation. A cooling down to room temperature is possible up to a wall thickness of 45 mm. In case of greater wall thickness or complex components the possibility of residual stresses must be considered. The following post weld heat treatment is recommended: annealing 760 °C/min. 2 hrs, max. 10 hrs, heating and cooling rates up to 550 °C max. 150 °C/h, above 550 °C max. 80 °C/h. For optimised toughness values a welding technology should be applied which produces thin welding layers (app. 2 mm).

Base Materials
similar alloyed creep resistant steels
1.4903 X10CrMoVNb9-1
ASTM A199 Gr. T91; A335 Gr. P91 (T91); A213/213M Gr. T91

Approvals and Certificates
TÜV-D (6762.), CL (1267), UDT, SEPROZ

Same Alloy Filler Metals

- GTAW rod: C 9 MV-IG
- GMAW wire: C 9 MV-IG
- GMAW solid wire: C 9 MV-IG
- GMAW metal cored wire: C 9 MV-MC
- SAW combination: C 9 MV-UP/BB 910

EN 1599:1997: E CrMo91 B 4 2 H5
AWS A5.5-96: E9015-B9