ER90S-B3 CR-MO WELDING WIRE

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APPLICATION:
90S-B3 is used to weld such alloys as 2 1/4% Cr-1% Mo steels, which are found in high temperature and high pressure piping and vessels. May also be used on carbon steels to Cr-Mo steels but should always have careful control of preheat, inter-pass and post-heat to avoid cracking. Use with a pre-heat and inter-pass temperature of 375°F minimum.

NOMINAL CHEMICAL COMPOSITION:

<table>
<thead>
<tr>
<th>Element</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus</td>
<td>.025% max</td>
</tr>
<tr>
<td>Copper</td>
<td>.50% max</td>
</tr>
<tr>
<td>Other Totals</td>
<td>.50 % max</td>
</tr>
<tr>
<td>Nickel</td>
<td>.20% max</td>
</tr>
<tr>
<td>Iron</td>
<td>Balance</td>
</tr>
<tr>
<td>Chromium</td>
<td>2.30-2.70%</td>
</tr>
<tr>
<td>Carbon</td>
<td>.07-.12%</td>
</tr>
<tr>
<td>Manganese</td>
<td>.40-.70%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>.025% max</td>
</tr>
<tr>
<td>Silicon</td>
<td>.40-70%</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>.90-1.20%</td>
</tr>
</tbody>
</table>

TYPICAL MECHANICAL PROPERTIES AS WELDED:
(Post weld heat treatment 1250—1300°F for 1 hour)

- Tensile Strength (psi) 94,000
- Elongation % in 2" 19%
- Yield Strength (psi) 80,500

* RECOMMENDED WELDING PARAMETERS:

GMAW(MIG) Parameters (DC Reverse Polarity) Electrode Positive Spray transfer

<table>
<thead>
<tr>
<th>Wire Diameter</th>
<th>AMPS</th>
<th>VOLTS</th>
<th>Argon/ 2% O2</th>
<th>Wire Feed imp</th>
</tr>
</thead>
<tbody>
<tr>
<td>.030</td>
<td>135-230</td>
<td>24-28</td>
<td>25</td>
<td>390-670</td>
</tr>
<tr>
<td>.035</td>
<td>165-300</td>
<td>24-28</td>
<td>30</td>
<td>360-520</td>
</tr>
<tr>
<td>.045</td>
<td>200-375</td>
<td>24-30</td>
<td>30-35</td>
<td>210-390</td>
</tr>
<tr>
<td>1/16</td>
<td>275-500</td>
<td>24-32</td>
<td>40</td>
<td>150-360</td>
</tr>
<tr>
<td>3/32</td>
<td>300-600</td>
<td>24-33</td>
<td>50</td>
<td>75-125</td>
</tr>
</tbody>
</table>

GMAW(MIG) Parameters (DC Reverse Polarity) Electrode Positive short-circuiting

<table>
<thead>
<tr>
<th>Wire Diameter</th>
<th>AMPS</th>
<th>VOLTS</th>
<th>(3) CO2/ Ar-CO2 (cfh)</th>
<th>Wire Feed imp</th>
</tr>
</thead>
<tbody>
<tr>
<td>.023</td>
<td>30-90</td>
<td>14-19</td>
<td>20-25</td>
<td>100-400</td>
</tr>
<tr>
<td>.035</td>
<td>50-180</td>
<td>16-22</td>
<td>20-25</td>
<td>150-340</td>
</tr>
<tr>
<td>.045</td>
<td>75-250</td>
<td>17-22</td>
<td>20-25</td>
<td>100-220</td>
</tr>
</tbody>
</table>

(3) Setting based on CO2 for mild steel, Ar-CO2 for low alloy steel
GTAW (Tig) Parameters  (DCSP) 2 %Thoriated Tungsten Electrode negative  

<table>
<thead>
<tr>
<th>Material</th>
<th>Tungsten dia. (1)</th>
<th>Filler Wire Size</th>
<th>Amps</th>
<th>Gas Cup</th>
<th>Argon (cfh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16&quot;</td>
<td>1/16&quot;</td>
<td>1/16&quot;</td>
<td>100-140</td>
<td>3/8</td>
<td>20</td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>1/16&quot;</td>
<td>1/16&quot;</td>
<td>100-160</td>
<td>3/8</td>
<td>20</td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>3/32&quot;</td>
<td>1/16&quot;</td>
<td>125-200</td>
<td>7/16</td>
<td>20</td>
</tr>
<tr>
<td>3/16&quot;</td>
<td>3/32&quot;</td>
<td>3/32&quot;</td>
<td>150-250</td>
<td>7/16</td>
<td>25</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>150-250</td>
<td>1/2</td>
<td>25</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>150-275</td>
<td>1/2</td>
<td>25</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>150-300</td>
<td>1/2</td>
<td>25</td>
</tr>
</tbody>
</table>

* All parameters are suggested as basic guidelines and will vary depending on joint design number of passes, and other factors.

SPECIFICATION COMPLIANCE :  AISI/AWS A5.28 & ASME SFA 5.28  ER 90S-B3

WARNING: PROTECT yourself and others. Read and understand this information.
FUMES AND GASES can be hazardous to your health.
ARC RAYS can injure eyes and burn skin.
ELECTRIC SHOCK can KILL.

- Before use, read and understand the manufacturer's instructions, Material Safety Data Sheets (MSDS), and your employer's safety practices.
- Keep your head out of fumes.
- Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.
- Wear correct eye, ear, and body protection.
- Do not touch live electrical parts.