Agglomerated Welding Flux BF 3

**Flux type:** Aluminate-Basic

**Classification:**
ISO 14174 – S A AB 1 67 AC H5 *)

(EN 760 – SA AB 1 67 AC H5)

**Characteristics:**
BF 3 is an agglomerated aluminate-basic flux with high current-carrying capacity, specially designed for the welding of wind towers by tandem arc. It is also suitable for joint welding of unalloyed and low alloy structural steels, pipe steels, boiler steels and fine grain steels. The flux is suitable for single and multilayer welding of longitudinal, circumferential and fillet welds. It can be used for single, tandem, twin and multi wire welding systems. Excellent slag removal in narrow groove welds of thick wall sections. Typical characteristic of this flux is a medium Mn and Si pick up as well as very low diffusible hydrogen level. It is suitable for both AC and DC welding.

**Application:**
Joint welding of non-alloy and low alloy structural steels acc. to EN 10025. Fine-grain structural steels with YS < 420 MPa and boiler steels such as P265GH (H II) and 16Mo3/A335 grade 91

**Characteristic chemical Constituents:**

<table>
<thead>
<tr>
<th>SiO₂ + TiO₂</th>
<th>Al₂O₃ + MnO</th>
<th>CaO + MgO</th>
<th>CaF₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 %</td>
<td>30 %</td>
<td>35 %</td>
<td>10 %</td>
</tr>
</tbody>
</table>

Basicity according to Boniszewski: ~1.9

**Metallurgical behaviour acc. to ISO 14174 type of current DC:**

<table>
<thead>
<tr>
<th>Si-content in the wire electrode (%)</th>
<th>Pick-up Silicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 to 0.25</td>
<td>0.2 to 0.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mn-content in the wire electrode (%)</th>
<th>Pick-up / Burn-out Manganese</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 to 2</td>
<td>-0.2 to 0.4</td>
</tr>
</tbody>
</table>

**Flux density:**
1.1 kg/dm³ (l)

**Grain size acc. to ISO 14174:**
2 – 20 (Tyler 8 x 48)

**Current-carrying capacity:**
up to 1,500 A (DC or AC) using one wire

**Packaging:**
25 kg PE-bags or 500-1,250 kg Big Bags

**Storage and redrying:**
Unopened originally packed flux bags can be stored up to 1 year in dry storage rooms after date of delivery ex factory.
Redrying conditions specific to the flux: 200 ± 50 °C effective flux temperature.

*) Diffusible hydrogen content H5: determined in deposited metal acc. to the method described in ISO 3690 Type of current DC; redrying conditions 200 ± 50 °C
### All-weld metal multiple pass classification of wire-flux combinations:

<table>
<thead>
<tr>
<th>Wire electrode (ISO 14171-A</th>
<th>AWS A5.17/.2</th>
<th>Test assembly ISO 15792-1: type 1.3</th>
<th>AWS A5.17M/5.23M</th>
<th>AWS A5.17/5.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA-S1</td>
<td>EL12</td>
<td>ISO 14171-A S 38 2 AB S1</td>
<td>F48A2-EL12</td>
<td>F7A0-EL12</td>
</tr>
<tr>
<td>BA-S2</td>
<td>EM12(K)</td>
<td>ISO 14171-A S 42 4 AB S2</td>
<td>F48A4/P4-EM12(K)</td>
<td>F7A4/P4-EM12(K)</td>
</tr>
<tr>
<td>BA-S2Si</td>
<td>EM12K</td>
<td>ISO 14171-A S 42 4 AB S2Si</td>
<td>F48A4/P4-EM12K</td>
<td>F7A4/P4-EM12K</td>
</tr>
<tr>
<td>BA-S3Si</td>
<td>EH12K</td>
<td>ISO 14171-A S 46 4 AB S3Si</td>
<td>F55A4/F49P4-EH12K</td>
<td>F8A5/F7P4-EH12K</td>
</tr>
<tr>
<td>BA-S2Mo</td>
<td>EA2</td>
<td>ISO 14171-A S 46 4 AB S2Mo</td>
<td>F55A4/P4-EA2-A2</td>
<td>F8A4/P4-EA2-A2</td>
</tr>
<tr>
<td>BA-S2Ni2</td>
<td>ENi2</td>
<td>ISO 14171-A S 50 5 AB S2Ni2</td>
<td>F62A5/F55P5-ENi2-Ni2</td>
<td>F9A6/F8P6-ENi2-Ni2</td>
</tr>
</tbody>
</table>

### Two-run classification of wire-flux combinations:

<table>
<thead>
<tr>
<th>Wire electrode (ISO 14171-A</th>
<th>AWS A5.17/.2</th>
<th>Two-run / ISO 15792-2: type 2.5</th>
<th>AWS A5.17M/5.23M</th>
<th>AWS A5.17/5.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA-S1</td>
<td>EL12</td>
<td>ISO 14171-A S 2T 2 AB S1</td>
<td>F43TA2-EL12</td>
<td>F6TA0-EL12</td>
</tr>
<tr>
<td>BA-S2</td>
<td>EM12(K)</td>
<td>ISO 14171-A S 3T 2 AB S2</td>
<td>F49TA2-EM12(K)</td>
<td>F7TA0-EM12(K)</td>
</tr>
<tr>
<td>BA-S2Si</td>
<td>EM12K</td>
<td>ISO 14171-A S 3T 2 AB S2Si</td>
<td>F49TA2-EM12K</td>
<td>F7TA0-EM12K</td>
</tr>
<tr>
<td>BA-S3Si</td>
<td>EH12K</td>
<td>ISO 14171-A S 4T 3 AB S3Si</td>
<td>F55TA3-EH12K</td>
<td>F8TA2-EH12K</td>
</tr>
<tr>
<td>BA-S2Mo</td>
<td>EA2</td>
<td>ISO 14171-A S 4T 2 AB S2Mo</td>
<td>F55TA2-EA2</td>
<td>F8TA2-EA2</td>
</tr>
<tr>
<td>BA-S2Ni2</td>
<td>ENi2</td>
<td>ISO 14171-A S 4T 2 AB S2Ni2</td>
<td>F55TA2-EA2</td>
<td>F8TA2-EA2</td>
</tr>
</tbody>
</table>

### Chemical composition of all-weld metal acc. to EN ISO 15792-1 and AWS A5.17/5.23: (characteristical values in wt. %)

<table>
<thead>
<tr>
<th>Wire electrode</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>Mo</th>
<th>Ni</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA-S1</td>
<td>0.05-0.08</td>
<td>0.2-0.4</td>
<td>0.9-1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2</td>
<td>0.05-0.08</td>
<td>0.2-0.4</td>
<td>1.4-1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2Si</td>
<td>0.05-0.08</td>
<td>0.2-0.5</td>
<td>1.4-1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA-S3Si</td>
<td>0.05-0.08</td>
<td>0.2-0.5</td>
<td>1.6-2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2Mo</td>
<td>0.04-0.08</td>
<td>0.2-0.4</td>
<td>1.3-1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2Ni2</td>
<td>0.05-0.08</td>
<td>0.2-0.4</td>
<td>1.1-1.5</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical properties of all-weld metal acc. to EN ISO 15792-1 and AWS A5.17/5.23: (characteristical values)

<table>
<thead>
<tr>
<th>Wire electrode</th>
<th>Heat treatment</th>
<th>YS MPa</th>
<th>UTS MPa</th>
<th>Elong. %</th>
<th>Impact ISO-V (J)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>± 0 °C</td>
<td>-20 °C</td>
<td>-40 °C</td>
<td>-51 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+32 °F</td>
<td>-4 °F</td>
<td>-10 °F</td>
<td>-60 °F</td>
</tr>
<tr>
<td>BA-S1</td>
<td>EL12</td>
<td>AW</td>
<td>&gt;400</td>
<td>&gt;510</td>
<td>&gt;24</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2</td>
<td>EM12(K)</td>
<td>AW</td>
<td>&gt;420</td>
<td>&gt;500</td>
<td>&gt;22</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>BA-S2Si</td>
<td>EM12K</td>
<td>AW</td>
<td>&gt;430</td>
<td>&gt;520</td>
<td>&gt;22</td>
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</tr>
<tr>
<td>BA-S3Si</td>
<td>EH12K</td>
<td>AW</td>
<td>&gt;470</td>
<td>&gt;560</td>
<td>&gt;22</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>BA-S2Mo</td>
<td>EA2</td>
<td>AW</td>
<td>&gt;500</td>
<td>&gt;570</td>
<td>&gt;20</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>BA-S2Ni2</td>
<td>ENi2</td>
<td>AW</td>
<td>&gt;540</td>
<td>&gt;570</td>
<td>&gt;22</td>
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Post Weld Heat Treatment: *) 580 °C / 1 h **) 620 °C / 15 h

**Approvals:**
- with wire electrodes:
  - VdTUEV 1153 / TÜV Wien: S2, S2Si, S2Mo, S2Ni2
  - Deutsche Bahn: S2, S2Si, S2Mo

**BAVARIA SCHWEISSTECHNIK**