WA Applications
for Hydropower
Let the water flow with Welding Alloys!

Hydropower plant equipment is subject to high cavitation, erosion and vibration wear, this type of wear can occur on the scroll casing, guide vanes and runner blades. Welding Alloys has designed special cladding wires and special repair and cladding services to repair damage from wear on turbines and mantles. The combination of these specially-developed products and our Integra™ services results in the equipment achieving a considerably longer lifetime.

Martensitic steel is useful for applications requiring high mechanical strength and moderate, but adequate, corrosion resistance and other forms of wear such as cavitation and erosion.

If you take martensitic steel containing 13% chrome, reduce its carbon content to less than 0.04% and make up for this reduction by adding approximately 4% of nickel, you will obtain a more user-friendly martensitic steel called “soft” martensitic steel (e.g. CA6NM)

### WA Consumables

The go-to provider of advanced Welding Consumables.

This catalogue presents a range of high performance cored wires dedicated to hydropower applications. We will gladly examine any special request, please do not hesitate to contact us.

### WA Consumables

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<tr>
<th>Type</th>
<th>Slag</th>
<th>Product Name</th>
<th>Welding positions</th>
<th>EN ISO</th>
<th>ASME / AWS Standard</th>
<th>Shielding Gas</th>
<th>H_Mn [ml/100g]</th>
<th>Typical CVN [J] After PWHT</th>
<th>PWHT</th>
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<td>Joining &amp; Repairing</td>
<td>Metal cored (No slag)</td>
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<td>All positions</td>
<td>T 13 4 M M12 1</td>
<td>EC410NiMo (modified)</td>
<td>M12 (Ar + 0.5-5% CO₂)</td>
<td>1</td>
<td>&gt;20°C: 65 -20°C: 55</td>
<td>580°C → 8h</td>
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<td>Rutile (fast freezing)</td>
<td>CHROMECORE V 410NiMo-G</td>
<td>All positions</td>
<td>T 13 4 P M21 1</td>
<td>E410NiMoT1-4</td>
<td>M21 (Ar + 15-25% CO₂)</td>
<td>4</td>
<td>&gt;20°C: 50 -20°C: 43</td>
<td>580°C → 8h</td>
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<td></td>
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<td>CHROMECORE B 13 4-G</td>
<td>All positions</td>
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<td>2</td>
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<td>580°C → 8h</td>
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<td>-</td>
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<td>2</td>
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<td>Hardfacing</td>
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<td>-</td>
<td>M12 (Ar + 0.5-5% CO₂)</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
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<td>All positions</td>
<td>T 23 12 L P M21 1 T 23 12 L P C1 1</td>
<td>E309LT1-4</td>
<td>M21 (Ar + 15 - 25% CO₂)</td>
<td>-</td>
<td>-60°C : 35 (Without PWHT)</td>
<td>-</td>
</tr>
</tbody>
</table>

* Position welding is possible using pulsed arc modes of transfer (similar to solid wire)
**CHROMECORE M 410NiMo-G**

Metal cored wire (no slag)
- ASME / AWS → EC410NiMo
- EN ISO → T 13 4 M M12 1

The safest solution for narrow gap welding

**Features**
- Metal cored wire
- Semi or fully automatic process
- Low diffusible hydrogen (~1ml/100g)
- Excellent bead appearance
- Wide range of parameters

**Benefits to You!**
- Slag free deposit
- No defect, easy to operate
- Less preheating required
- One diameter for all purposes
- Also existing to fulfill the 16Cr-5Ni-1Mo chemical analysis (CHROMECORE M 17 6-G)

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**CHROMECORE V 410NiMo-G**

Rutile flux cored wire
- ASME/AWS → E410NiMoT1-4 / E410NiMoT1-1
- EN ISO → T 13 4 P M21 1 / T 13 4 P C1 1

Most suitable solution for all position welding

**Features**
- All position flux cored wire
- Semi or fully automatic process
- Low diffusible hydrogen (~4ml/100g)
- High deposition rate
- Easy slag removal

**Benefits to You!**
- Easy to use
- Nice bead appearance
- No cleaning, no grinding
- Reduce drastically welding time
**CHROMECORE B 13 4-G**

Basic flux cored wire
- ASME / AWS → E410NiMoT0-4
- EN ISO → T 13 4 B M12 2

The only solution providing outstanding toughness results

### Features
- Basic flux cored wire
- Semi or fully automatic process
- Low diffusible hydrogen (~2ml/100g)
- Excellent bead appearance

### Benefits to You!
- Outstanding mechanical properties
- Less preheating required
- Can be used in 45° semi vertical up position
- Also existing to fulfill the 16Cr-5Ni-1Mo chemical analysis (CHROMECORE B 16 5 1-G)

**CAVITALLOY**

Metal cored wire (no slag)
- EN ISO → T Z 18 10 10 CrCoMnN M M12 3

The hardfacing deposit you need to fight cavitation/erosion

### Features
- Metal cored wire
- Semi or fully automatic process
- Cavitation, corrosion and erosion resistant
- Work-hardened welding deposit (240 HB → 50 HRC)

### Benefits to You!
- Slag free deposit – No defects
- Easy to operate
- Increase wear resistance
WA Integra™

The go-to provider of engineered wear protection solutions

WA Integra™ is an integrated part of the Welding Alloys Group specifically set up to support industries that require wear control.

Globally renowned for the quality of service we provide to various industries from our workshops and on-site, WA Integra™ acts as a reliable and cost-effective engineering partner for local and international companies alike, leading the way in advanced welding technologies.

Kaplan turbine - Guide vanes
TETRA V 309L-G
CHROMECORE B 16 5 1-G
On-site building-up operation

Kaplan turbine - Mantle
TETRA V 309L-G
CHROMECORE B 16 5 1-G
On-site cladding operation

Spiral casing - Flange
TETRA V 309L-G
TETRA V 316L-G
On-site machining

Pelton turbine - Bucket
CHROMECORE M 410NiMo-G
Building-up

Francis turbine - Blade
CHROMECORE B 13 4-G
Building-up, grinding and controlling

Kaplan turbine - Blade
TETRA V 309L-G
CAVITALLOY
Hardfacing job
Our Technical ‘Spark’ Solves Your Industrial Challenges

WA Consumables
The go-to provider of advanced welding consumables

WA Machines
The go-to provider of engineered wear protection solutions

WA Integra™
The go-to provider of automated equipment for wear protection

A worldwide presence

www.welding-alloys.com