

Speciality Welds



Hammerhead™ 'Wet-Spot' Welding Electrodes

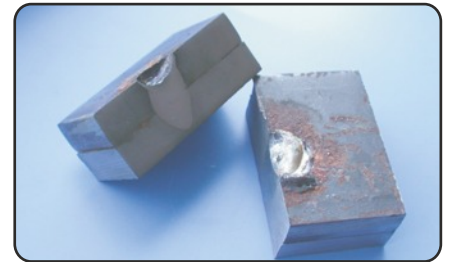
The Hammerhead™ welding electrode is a specially designed and formulated 'wet-spot' electrode for spot/plug welding of steels, which can be used both above and underwater. This permits a real alternative to conventional wet welding, which requires high levels of skill to produce high quality welds. Using the Hammerhead process quality welds can be



produced without the need for any conventional welding skills, as all that is required to produce a weld is for the diver to press the electrode onto the surface of the material, where it will then pierce through the plates to be joined forming a spot/plug weld.

Suitable for any structures where a complete sealing weld is not necessary. Ideal for securing anodes, anchor plates, doubler plates, patches, etc. Can also be used in place of bolts or securing lifting lugs. Saves time on surface preparation and cleaning, as no joints are required and can even be used in poor visibility conditions, as no arc control is required; in terms of arc length, angles and travel speed, etc.

The electrode is best used with our Piranha II control unit as this allows a preset sequence of current and weld cycles to control and maintain weld quality, although it is possible to use the electrodes with nothing more than standard MMA/SMAW power source, although under these circumstance the quality



Technical Data

Weld Metal Properties

Mechanical Analysis	
As welded	
Tensile strength Rm:	> 650 N/mm ² (94ksi)
Proof stress Rp: (0.2%)	> 535 N/mm ² (78ksi)
Shear strength:	> 520 N/mm ² (75ksi)
Elongation:	> 35%
Charpy impacts	75J @ 20°C

Chemical Analysis	
Deposited Weld Metal Analysis	Typical %
Carbon (C)	0.045
Chromium (Cr)	22.5
Nickel (Ni)	12.7
Molybdenum (Mo)	3.6

Welding Parameters

Electrode Dia	3.2mm(1/8")	4.0mm(5/32")
Electrical Characteristics		
Current Type:	DC Only	
Polarity:	DCSP (-Ve) or DCRP (+Ve)	
Amps & material thickness ranges:	170 - 250	250 - 350
	6 - 10mm	10 - 16mm
Volts: (OCV)	70 - 80 (Max)	

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Welding & Usage Guide

Health & Safety

- Take all necessary precautions when welding.
- Follow employer's safety practices.
- Fume and gases can be hazardous to your health.
- Electric shock can kill.
- Arc rays can injure eyes and skin.
- Use adequate ventilation while cutting on the surface.
- Wear suitable eye protection/filter lens and protective clothing.
- Do not touch live electrical parts.
- Wear rubber gloves.
- Use an approved safety circuit breaker
- Only change the electrode when cold.
- Use an approved welding stinger
- Ensure a good safety earth and return connection is made before striking an arc

Safety should always be in the forefront of everybody's mind. The guidelines as specified by the AODC code of practice "Safe use of electricity underwater" should always be followed.

Storage & Care

Any physical damage to the electrode coating will have a detrimental effect on weldability. Electrodes should be handled and stored in a manner that prevents any physical damage. Electrodes should remain in their packaging until required. Other than avoiding prolonged immersion in water, no other special precautions are necessary when using the **Hammerhead™**, as the waterproof coating provides excellent physical protection.

Handling & Transportation

Electrodes may be used directly from the packet and taken into the water in quantities that will allow for their use within a reasonable time. Any unused electrodes should be discarded. Ensure the transportation method allows for the electrodes to arrive at the work site damage free. We recommend that electrodes are not secured together using duct tape, as this may cause damage to the waterproof coating.

DO NOT BEND THE ELECTRODES

Electrodes should be transported in a suitable quiver. Electrodes that have been submerged for longer than 60 minutes should be discarded, as a detrimental effect on both the welding performance and resultant weld quality may ensue.

Operating Instructions

1. Prepare the electrode as recommended
Clean the 'spot-area' to ensure easy arc strike and secure earth return
2. Keep the electrode perpendicular to the workpiece, i.e. 90° +/- 15°.
3. Once arc is struck, apply steady pressure to push the electrode through the material, until 1st current has expired, or required penetration is achieved. Then ease off pressure and start to withdraw electrode from the hole in short sawing type movements until the weld reaches the top of the material, then use small circular motions to finish off weld cap.
(if electrode has become exhausted before the

weld is completed, use fresh electrode to finish off using 2nd background current only)

The process is designed to consume one single electrode, per spot/plug weld. (thickness permitting)

The electrode performs best on DCSP, however DCRP can also be used, but should be restricted to the thinner materials. Ensure welding cables and the remote lead are correctly attached to the welding power source. From the Piranha II control unit select the 1st 'peak' current setting and time cycle to ensure adequate penetration for the materials. Then select the 2nd 'background' welding current to provide a suitable filling current. (This can be achieved by conducting a short trial, or pre-qualifying the necessary welding parameters required). No timer is necessary, on this 2nd 'background' current as either the electrode will become completely consumed or the diver will stop welding as necessary.

Once the 1st current value and timer is set, the diver can commence welding.

Ensure constant pressure is applied while on the 1st 'peak' current setting; no other technique is necessary. The diver should concentrate on pushing the electrode directly through the material. Once the arc is ignited and welding commences the timer will start. After the timer has completed the first weld cycle the welding co-ordinator may need to inform the diver, as in poor visibility conditions it may not be apparent to the diver that the 2nd 'background' current has commenced. The welding co-ordinator can read the current/voltage directly from the Piranha unit for this purpose.

Once the weld is completed satisfactorily, the timer will re-set back to the 1st 'peak' current value ready for the next weld.

If by any means the weld has not completely filled the hole/plug, the diver can start the process again, but using the 2nd 'background' current value only. This can be achieved by isolation the energizer switch on the Piranha Unit.

Electrode Preparation

Ensure the power is COLD.

- Fit a new electrode and gently rub the tip against an abrasive surface, so as to remove the waterproof coating, to provide a good electrical contact.
- Caution must be exercised so as not to unduly damage the flux coating.
- DO NOT BEND THE ELECTRODES
- Carefully place the electrode where required, call to make it HOT, the arc should strike, if not, gently twist the electrode while exerting a slight downward pressure.

Local Representative

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