

# **BROCO**<sup>®</sup>

## **UNDERWATER CUTTING & WELDING SOLUTIONS**

*Our experience runs deep*

# **BROCO UNDERWATER**

A close-up photograph of a diver's gloved hand holding a Broco underwater cutting tool. The tool is emitting a bright orange flame and a shower of sparks, cutting through a metal surface. The background is a dark, murky blue, suggesting an underwater environment. The diver's white helmet and part of their gear are visible on the left side of the frame.

**Broco® sets the world standard in underwater welding, Ultrathermic cutting products, and customer satisfaction.**

## **Developed by Divers for Divers**

*Innovation has always been at the core of Broco. Our first products were developed by working divers in 1975. Broco's success in the underwater frontier is based on that foundation—a deep understanding of the requirements of the working diver. Today we continue to work with divers and world-class engineers to refine and develop products that set the standard for underwater operations.*

*Broco's expertise is trusted by professional divers and underwater service companies. Our experience runs deep and so does our commitment to superior product performance and total customer satisfaction.*

## **Ultimate Underwater Cutting**



The Broco Underwater Ultrathermic Cutting System is the most widely used and highly recommended underwater cutting tool.

The Broco system provides the fastest, most efficient and cost effective means of completing underwater jobs involving cutting and piercing.

### **Proven Performance**

The Ultrathermic cutting rod produces a temperature in excess of 10,000°F— hot enough to quickly melt almost anything including cast iron, stainless steel, brass and other ferrous and non-ferrous metals, as well as concrete. Divers can cut sheet pile, remove tubular supports and trim damaged props.

### **Safer, Easier Use**

The Broco Underwater Ultrathermic Cutting System uses only oxygen and a maximum of 150 amps to cut (compared to 300 - 500 amps for other systems). The Ultrathermic cutting rod ignites readily from a 12 to 24 volt auto or marine battery. The rod will continue to burn with electrical current removed until the flow of oxygen is stopped or the rod is consumed. The need for expensive support equipment is reduced and a safer diving environment is maintained.

### **Approved for Navy Use**

Approved for Navy Use (ANU) designated and featured in the U.S. Navy's Underwater Welding and Cutting manual, the Broco Underwater Ultrathermic Cutting System is used by navies and commercial customers around the world.

More offshore cutting is done with Broco than with all competitors combined. Broco Ultrathermic is the ultimate cutting system.

# Broco® Underwater Products

## BR-22 PLUS Cutting Torch

The BR-22 PLUS features 21 design improvements, including the removal of all rubber from direct oxygen pathway, a PTFE lined fiberglass reinforced coupler hose, improved flash arrestor with higher oxygen flow rate and better flash back protection, non-return valve to prevent back flow, and improved collet and collet washer design.

## BR-22 Cutting Torch

The BR-22 Cutting Torch is ergonomically designed for diver comfort and reducing forearm fatigue. The torch is constructed from durable high-impact and corrosion resistant materials. All metal parts are brass. The BR-22's engineered safety features are unique and found only in the Broco torch design.

All connections are threaded for maintenance ease. The solid brass flash arrestor with internal filter protects the diver and torch without restricting oxygen flow. The large collet nut is knurled to assure the diver a solid grasp. Acme threads prevent binding from mud or other debris insuring quick, reliable rod insertion and retention. Interchangeable collets accommodate 3/8 inch, 5/16 inch or 1/4 inch diameter cutting rods.

The BR-22 PLUS and BR-22 can also be used as a welding electrode holder, and in that use can accommodate 1/8 inch, 5/32 inch, and 3/16 inch diameters. Broco torches are built to deliver years of trouble-free performance at minimum cost. Spare parts kits are available.



## Broco® Ultrathermic Cutting Rods PLUS

Broco® Underwater's new Ultrathermic Cutting Rods PLUS are the latest advancement in underwater cutting. The new design delivers 20% more cutting and burn time than the same size prior generation Broco underwater cutting rod, increasing performance and value. The new rods also burn more evenly than any rod on the market.

Burning in excess of 10,000°F at the tip, Broco underwater cutting rods cut and melt virtually any known material. Broco's patented rod design features alloy core wires retained by circular crimps, and a safety design to prevent burnback into the torch. Broco rods can be bent 90 degrees or more to access hard to reach places without restricting oxygen flow or causing insulation to split or flake off.

Broco Ultrathermic cutting rods may be used with a maximum of 150 amps to assist in the burning process, though there is no electrical requirement. Once ignited, they continue to burn as long as oxygen is supplied or until the rod is consumed.

Broco® Underwater Ultrathermic Cutting Rods PLUS are available in 3/8 inch diameter by 18 inch and 36 inch lengths. Broco standard cutting rods are still available in 1/4" diameter by 18" length.

## HVR-4401 Oxygen Regulator and HVR-FBS

The Broco® Underwater High-Volume Oxygen Regulator is a multi-stage unit delivering the constant flow and high volume required for underwater burning. Broco's research demonstrates cutting efficiency depends more on oxygen flow than oxygen pressure. Broco's High-Volume Regulator is offered to meet this basic requirement. Designed and manufactured for ease of operation, maximum efficiency, and years of rugged use, the Broco Underwater High-Volume Oxygen Regulator is Underwriters Laboratories Listed.



HVR-4401



HVR-FBS

The Broco HVR-FBS flashback suppressor and pressure relief valve assembly is also available and easily can be installed onto the regulator for added safety.



**Broco® Underwater  
makes cutting and  
welding jobs safer,  
faster, and more  
economical.**

# The Wet Welding Standard

Broco Underwater welding electrodes set the standard for commercially available mild and stainless steel wet welding electrodes, and more recently, nickel based wet welding electrodes have been added to our line. SofTouch, EasyTouch, Ni-Touch and specialty stainless electrodes assure engineers, diving companies and clients that Broco offers the right electrodes for their job's criteria.

## Easier Certifiable Welds

Use BR-20 and BR-21 welding stingers with SofTouch and wet welding is easier and safer. Whether using the manipulative or self-consuming technique, these smooth running electrodes require little or no pressure. SofTouch electrodes produce a hotter arc, better flow, correct penetration and a higher deposition rate. Broco's flux coating effectively reduces hydrogen cracking. EasyTouch wet welding electrodes have been formulated with performance and value in mind offering both superior strength and good weld integrity.

## Superior Maintenance and Repair

Since 1986 SofTouch has been listed as ANU (Approved for Navy Use). U.S Navy commands and Navy shipyards have been using SofTouch for repair and maintenance on vessels worldwide. Welding assignments on structures, vessels, in nuclear power plants and other applications require the proven performance of Broco Underwater wet welding products.



## BR-20 Welding Stinger

The BR-20 welding stinger is designed to hold the electrode at the optimum angle to the work piece delivering quality welds while reducing operator fatigue. The movable jaw design accepts a wide range of electrode diameters. The BR-20 Welding Stinger meets Mil-H-865D and is Approved for Navy Use (ANU). All-brass parts last longer under extreme conditions.

## BR-21 Welding Stinger

This compression welding stinger is engineered with superior features. The BR-21 is lightweight, durable and designed to hold the electrode at the optimum angle to reduce diver fatigue.

Selected features of the BR-21 include an index notch on the head to help divers find the hole which improves rod insertion even in a low-visibility environment. The beveled seat keeps the electrode at the ideal angle and the groove eliminates electrode wiggle. The over-sized head is easier to hold and the handle and head are from hexagonal stock for sure gripping by a gloved hand. The BR-21 also includes a resistance O-ring on the shoulder to ensure tension when the head is tightened and increase head life.



**Broco stands for quality wet welds done right the first time in all positions.**

## Ni-Touch™ Electrodes

Broco's Ni-Touch™ nickel wet welding electrode was developed to allow underwater wet welding of higher carbon and high tensile steels which would normally require the use of more expensive dry chamber welding. Ni-Touch electrodes produce welds with less porosity, while allowing deeper welding in the overhead position than similar electrodes. They are appropriate for all position groove and fillet welds. Test results exceed the requirements of the American Welding Society (AWS) Specification D3.6-99 for Class B underwater wet welds. Yield strengths typically exceeding 70 ksi and tensile strengths exceeding 80 ksi can be expected from the nickel weld metal in the as-welded condition. Ni-Touch is presently qualified at a water depth of 33 feet.

With Ni-Touch™ the nickel electrode mitigates the effect of hydrogen. This results in successful underwater wet welds involving a broad range of high carbon equivalent steels, including HY-80 quenched, and tempered steel used in Naval ships with carbon equivalents exceeding 0.50 percent. Ni-Touch meets the more stringent requirements of the Navy's Naval Ship Technical Manual NSTM 074.

## SofTouch®

Broco's proprietary flux enhancing formulation, BroCote™, makes this electrode particularly impervious to water penetration and denigration and ensures consistent certifiable underwater weld quality eliminating costly rework.

SofTouch electrodes are used for wet welding repairs in many applications where steel must be joined underwater according to code specifications. SofTouch welds consistently meet or exceed AWS D3.6-99 specifications for Class B welds in all positions (flat, horizontal, vertical and overhead). SofTouch is designed to pass all AWS test requirements, including radiograph, tensiles, bends and hardness.

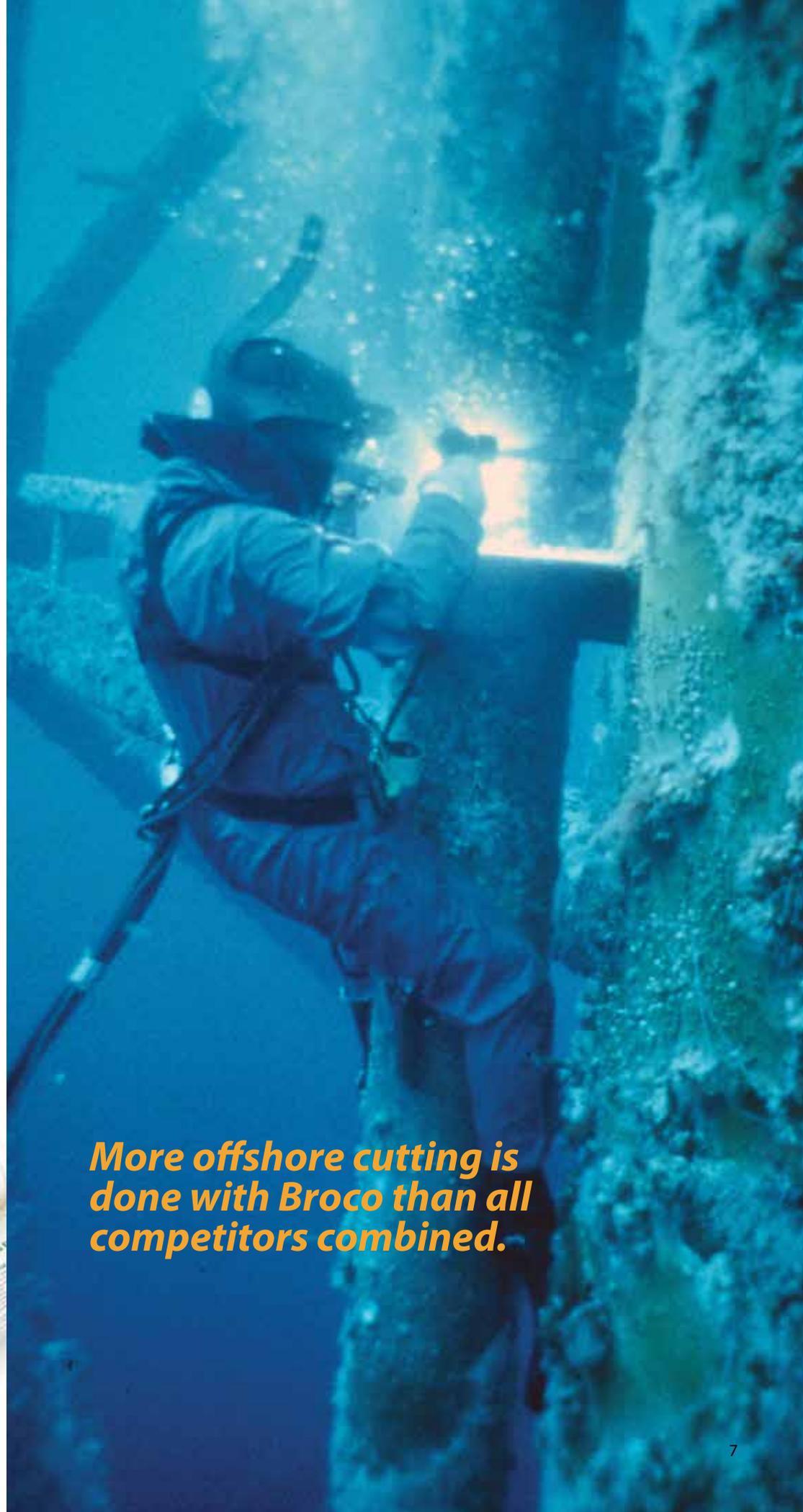
Since 1989, SofTouch electrodes have been specified in the U.S. Navy's Ships Husbandry Manual Chapter 11, "Underwater Wet and Dry Chamber Welding."

SofTouch electrodes are lot certified and available in various sizes and mild steel and stainless alloys. Available diameters include 1/8 inch, 5/32 inch, and 3/16 inch. Stainless electrodes are sold in 1/8 inch and 5/32 inch sizes.

Broco Underwater wet welding electrodes are sealed in a Mil-Spec foil pouch to prevent contamination and then inserted in a rigid resealable plastic tube which provides maximum protection. The color-coded end cap denotes mild or stainless steel electrodes type. Operating guidelines are printed on the label.

## EasyTouch®

For many repairs the resultant weld is allowed more leeway in terms of porosity, inclusions, integrity and appearance. To fill the void between "to-code" work and economy, Broco applied its experience and knowledge to the design of a quality electrode specifically for the economy market. The result is EasyTouch, a moderately priced electrode yielding excellent results. It is easy to start, easy to run (a controllable puddle with rippled bead appearance) and easy to clean. EasyTouch is a high deposition all-position electrode.



**More offshore cutting is done with Broco than all competitors combined.**



### Underwater Cutting

PROD. NUMBER	DESCRIPTION
BR-22 PLUS	Upgraded Underwater Oxy-Arc Cutting Torch
BR-22	Underwater Oxy-Arc Cutting Torch
UW/3818-50	Broco Ultrathermic Cutting Rods <i>PLUS</i> 3/8"x18" rods, 50 rods per box
UW/3818-50/QP	QuiverPak with 50 Broco Ultrathermic Cutting Rods <i>PLUS</i> , 3/8"x18"
UW/3836-25	Broco Ultrathermic Cutting Rods <i>PLUS</i> 3/8"x36" rods, 25 rods per box
UW/1418-100	Broco Ultrathermic Cutting Rods 1/4"x18" rods, 100 rods per box
TA22XX	Collet and Washer Kit – Order by size
UWBR22RCSK	Complete Spare Parts Kit for BR-22 <i>PLUS</i>
SPK-C	Complete Spare Parts Kit for BR-22
SPK-M	Mini Spare Parts Kit for BR-22
HVR-4401	High Volume Oxygen Regulator
HVR-FBS	Flash Back Suppressor w/ Pressure Relief Valve
UW/KS	400 amp Single Pole Knife Switch

### Underwater Welding

PROD. NUMBER	DESCRIPTION
BR-20	Underwater Welding Stinger
BR-21	Underwater Welding Stinger
UW/CS-1	SofTouch Wet Welding Electrodes AWS E7014 Mild Steel, 1/8"(3.20mm) 8-lb. Tube Approx. 95 Electrodes
UW/CS-2	SofTouch Wet Welding Electrodes AWS E7014 Mild Steel, 5/32"(3.97mm) 8-lb. Tube Approx. 69 Electrodes
UW/CS-3	SofTouch Wet Welding Electrodes AWS E7014 Mild Steel, 3/16"(4.76mm) 8-lb. Tube Approx. 48 Electrodes
UW/SS-1	SofTouch Wet Welding Electrodes AWS E312-16 Stainless Steel, 1/8"(3.20mm) 8-lb. Tube Approx. 95 Electrodes
UW/SS-2	SofTouch Wet Welding Electrodes AWS E312-16 Stainless Steel, 5/32"(3.97mm) 8-lb. Tube Approx. 69 Electrodes
UW/EZ-1	EasyTouch Wet Welding Electrodes AWS E7014 Mild Steel, 1/8"(3.20mm) 8-lb. Tube Approx. 95 Electrodes
UW/EZ-2	EasyTouch Wet Welding Electrodes AWS E7014 Mild Steel, 5/32"(3.97mm) 8-lb. Tube Approx. 69 Electrodes
UW/EZ-3	EasyTouch Wet Welding Electrodes AWS E7014 Mild Steel, 3/16"(4.76mm) 8-lb. Tube Approx. 48 Electrodes
UW/HN332	High Nickel Electrodes, 3/32" ( 2.38mm) 5-lb. Tube Approx. 75 Electrodes

### Spare Parts – BR-22 *PLUS*

PROD. NUMBER	DESCRIPTION
UWBR22A01	Replacement Handle Set w/Screw, Nuts & O-Ring
UWBR22A03	Torch Head & Cable Assembly
UWBR22A04	Collet Nut
UWBR22A05	Flash Arrestor
UWBR22A06	Check Valve Assembly
UWBR22A07	Coupler Hose Assembly
UWBR22A08	Control Valve Assembly
UWBR22A09	Valve Lever Set w/ Screw & Nut
UWBR22N014	Dash 014 Neoprene O-Ring Collet to Head Seal
UWBR22N123	Dash 123 Neoprene O-Ring Nut to Handle Seal
UWBR22R02K	Replacement Handle Screw Set w/Nuts
UWBR22R08K	Control Valve Repair Kit
UWBR22ROSK	Replacement O-Ring Set
UWBR22W38	Silicone Rubber Collet Washer for 3/8" Collet
UWBR22W14	Silicone Rubber Collet Washer for 1/4" Collet
UWBR22W516	Silicone Rubber Collet Washer for 5/16" Collet
UWBR22W00	Silicone Rubber Collet Washer for Welding Collets
UWBR22C38K	3/8" UW Collet Kit w/O-Ring & Washers
UWBR22C14K	1/4" UW Collet Kit w/O-Ring & Washers
UWBR22C516K	5/16" UW Collet Kit w/O-Ring & Washers
UWBR22C18K	1/8" UW Collet Kit w/O-Ring
UWBR22C532K	5/32" UW Collet Kit w/O-Ring
UWBR22316K	3/16" UW Collet Kit w/O-Ring

### Spare Parts – BR-22

PROD. NUMBER	DESCRIPTION
UW101/102	Handle Set, Left & Right
UW103/112	Torch Head & Cable Assembly
UW104	Collet Nut
UW105	Neoprene Compression Washer
UW107	Flash Arrestor
UW108	Monel Flash Arrestor Screen
UW109	Lever
UW110	Valve Stem (includes O-Ring)
UW111	Coupler Assembly
UW113	Control Valve Body
UW114	Valve Stem Spring
UW115	Control Valve Nut
UW116	Valve Stem O-Ring
UW117	Neoprene Valve Stem Washer
UW118	Valve Nut Gasket
UW119/120	Brass Screw & Locknut
UW121/122	Nylon Screws & Nuts (Four Each)
UW123	Collet Washer
UW7A	Control Valve Assembly

# ***BROCO***<sup>®</sup>

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CAUTION: This equipment is potentially dangerous to operate and must be used in strict accordance with the instructions provided. Underwater cutting and welding should only be performed by trained professional commercial divers and in accordance to industry accepted safe diving practices.

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