

**BROCO**  
**UNDERWATER**<sup>™</sup>  
CUTTING & WELDING SOLUTIONS

*Our experience runs deep*



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

***BROCO  
UNDERWATER***



## ***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.

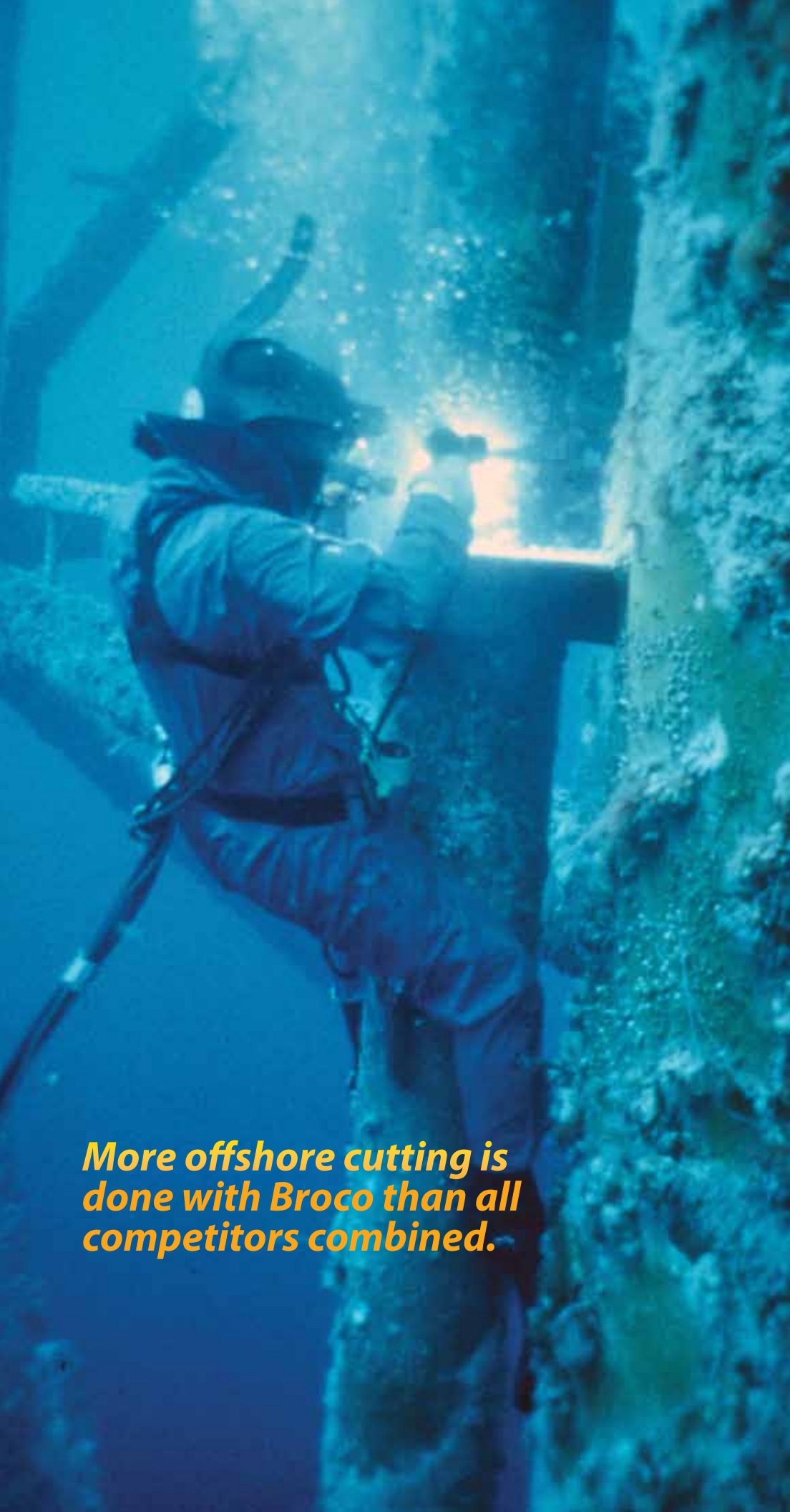
## Safer, Easier Use

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.



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

# Broco® Underwater Products



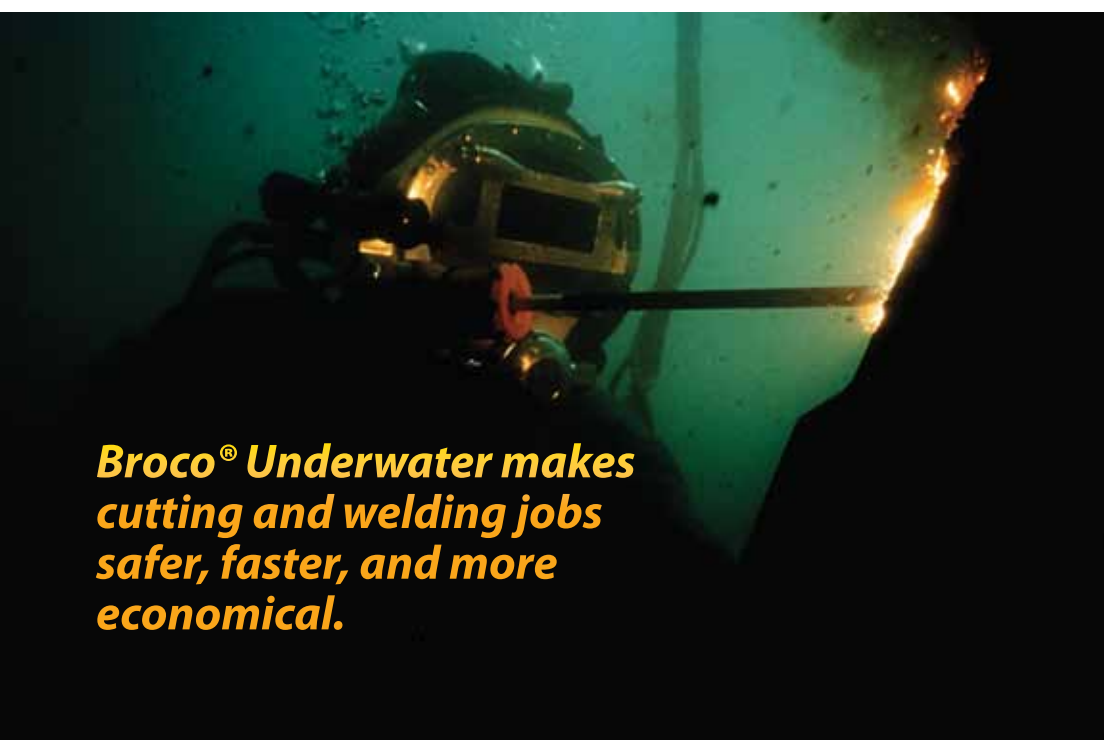
## BR-22 Cutting Torch

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 can also be used as a welding electrode holder and in that use will accommodate 1/8 inch, 5/32 inch, and 3/16 inch diameters.

The BR-22 Cutting Torch is built to deliver years of trouble-free performance at minimum cost. Spare parts kits are available.

A diver is shown underwater, using a Broco BR-22 Cutting Torch to cut through a metal structure. The diver is wearing a full diving suit and a mask. The torch is held in the diver's hand, and a bright orange flame is visible at the tip of the cutting rod. The background is a dark, greenish-blue underwater environment.

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



### **Ultrathermic™ Cutting Rods**

Burning in excess of 10,000°F at the tip, Broco Underwater Ultrathermic Cutting Rods cut or melt virtually any known material. Broco's rod design features alloy core wires retained by circular crimps. A safety design prevents burnback into the torch, making Broco Underwater Ultrathermic Cutting Rods the safest on the market. Ultrathermic Cutting 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.

Ultrathermic Cutting Rods may be used with a maximum of 150 amps to assist in the burning process but have 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 are available in 1/4 inch and 3/8 inch diameters. Standard length is 18 inches. Broco offers 36 inch Ultrathermic Cutting Rods for heavier jobs allowing more burn time between rod changes.

### **Bro-Cut™ Steel Tubular Electrodes**

Bro-Cut™ is the choice for cutting ferrous metals only and when a clean, precise cut is required. High production cutting requires Ultrathermic burning to maximize productivity while holding operating costs down. The control of steel tubular oxy-arc cutting is preferred for some jobs. Bro-Cut™ steel tubular electrodes are flux-coated for arc stability resulting in a smooth long-lasting burn. The 5/16 inch by 14 inch electrodes' large bore assures optimum oxygen flow. High visibility white electrodes are packaged in quantities of 50 in a resealable plastic tube.

### **HVR-4401 Oxygen Regulator**

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.



# 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.



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





### **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 new generation 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 oversized 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.



## 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.



# BROCO UNDERWATER

## Underwater Cutting

| PROD. NUMBER | DESCRIPTION  | UNIT |
|--------------|--|------|
| 3818UW-25    | Broco Ultrathermic Cutting Rods<br>3/8"x18", 25lb. box (66rods)    | Bx   |
| 3836UW-25    | Broco Ultrathermic Cutting Rods<br>3/8"x36", 25lb. box (31rods)    | Bx   |
| 1418UW-25    | Broco Ultrathermic Cutting Rods<br>1/4"x18", 25 lb. box (131 rods) | Bx   |
| BRO-CUT      | Oxy-Arc Steel Tubular Cutting Rod                                  | Tb   |
| BR-22        | Underwater Oxy-Arc Cutting Torch                                   | Ea   |
| TA22XX       | Collet and Washer Kit. Order by size                               | Ea   |
| SPK-C        | Complete Spare Parts Kit (For BR-22)                               | Ea   |
| SPK-M        | Mini Spare Parts Kit (For BR-22)                                   | Ea   |
| BR-20        | Underwater Welding Stinger   | Ea   |
| BR-21        | Underwater Welding Stinger   | Ea   |
| HVR-4401     | High Volume Oxygen Regulator                                       | Ea   |
| UW/KS        | 400 amp Single Pole Knife Switch                                   | Ea   |

## Underwater Welding

| PROD. NUMBER | DESCRIPTION  | UNIT |
|--------------|--|------|
| UW/CS-1      | SofTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 1/8"(3.20mm) 8-lb.<br>Tube Approx. 95 Electrodes            | Tb   |
| UW/CS-2      | SofTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 5/32"(3.97mm)<br>8-lb. Tube Approx. 69 Electrodes           | Tb   |
| UW/CS-3      | SofTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 3/16"(4.76mm)<br>8-lb. Tube Approx. 48 Electrodes           | Tb   |
| UW/SS-1      | SofTouch Wet Welding Electrodes<br>AWS E312-16 Stainless Steel,<br>1/8"(3.20mm) 8-lb. Tube Approx. 95<br>Electrodes  | Tb   |
| UW/SS-2      | SofTouch Wet Welding Electrodes<br>AWS E312-16 Stainless Steel,<br>5/32"(3.97mm) 8-lb. Tube Approx. 69<br>Electrodes | Tb   |
| UW/EZ-1      | EazyTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 1/8"(3.20mm) 8-lb.<br>Tube Approx. 95 Electrodes           | Tb   |

|          |   |    |
|----------|---|----|
| UW/EZ-2  | EazyTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 5/32"(3.97mm)<br>8-lb. Tube Approx. 69 Electrodes | Tb |
| UW/EZ-3  | EazyTouch Wet Welding Electrodes<br>AWS E7014 Mild Steel, 3/16"(4.76mm)<br>8-lb. Tube Approx. 48 Electrodes | Tb |
| UW/HN332 | High Nickel Electrodes, 3/32" ( 2.38mm)<br>5lb. Tube Approx. 75 Electrodes                                  | Tb |

## Spare Parts

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

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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.