



**“Proserv Offshore offer Friction Welding Systems which are unrivalled anywhere”**

**PROSERV OFFSHORE HAVE PIONEERED** the development of portable friction stud welding systems, allowing this time proven welding technique to be used in the field and subsea environments. Friction welding is a long established joining process which is widely utilised in the automotive, aerospace and oil and gas industries.

# PROSERV OFFSHORE

## FRICITION WELDING SYSTEMS

### Friction Welding Equipment

The Proserv Offshore Friction stud welding system consists of a welding head, a reaction clamp and either compressed air or hydraulic power.



### The Friction Welding Process

Friction welding is a solid-state (no melting of materials) welding process that produces a fine grain forged weld by using the heat generated between a rotating part under an axial load and a fixed substrate.

Heat for welding is generated by direct conversion of mechanical energy to thermal energy at the interface of the work pieces without the need for the application of electrical energy or heat from other sources.

The axial loads exerted during the welding cycle (10 to 15 seconds) requires the welding head to be secured to the surface to which the stud is being welded. A range of mechanical, electromagnetic and vacuum clamps have been developed by Proserv Offshore, while some other work scopes require the engineering of special purpose clamps.

Systems available will weld from  $\frac{3}{16}$ " to  $1\frac{1}{2}$ " inch diameter studs and tubulars up to  $2\frac{1}{2}$ " inch diameters.

## Friction Welding Underwater

When welding underwater, the stud is encapsulated in a foam shroud that prevents quenching by the surrounding water. At depths greater than 22.9 meters other shrouding methods are used.

### Advantages

- Fine grained forged weld that is stronger than the parent material.
- No porosity, slag inclusion, hot cracking, cold (hydrogen) cracking, consumable related entrapment, dilution etc
- In air or underwater application
- Can be used in deep water
- Suitable for remote operation by ROV
- Divers or rope access personnel can be easily trained to operate the equipment
- Can be used in zoned areas on offshore structures and onshore facilities
- Minimal surface preparation – Can weld through most paints, coatings and oxidised surfaces
- Low heat input produces a small HAZ
- Highly repeatable process
- Can join dissimilar materials

ROV Mounted Friction Welding System



### Applications:

- **Anode attachment**
- **Hull Repair**
- **Hot tapping**
- **Cable tray, pipe hanger attachment**
- **Grating tie down**



**Friction welding can be safely used to weld onto live pipelines as it doesn't require preheat.**

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