

## New era of oxygen weld monitors

The perfect weld. A universal truth within the welding industry, its achievement is the sought after 'prize' for welders worldwide. Sadly, a perfect weld does not materialise on its own. Rather, it is the culmination of several properly executed steps; one of which is known as 'pipe purging'. Pipe purging occurs before any actual welding takes place and is the process by which inert gases (e.g. Argon) are introduced into the welding zone to displace the oxygen and create a pure welding environment.

Since weld quality is always a primary concern, welders must be equipped with the most advanced and reliable technology. The demand for such technology has led the Aquasol Corporation to introduce the new "PRO OX-100" programmable digital oxygen monitor. This state-of-

the-art oxygen weld monitor has garnered international recognition for its advanced features and low cost.

### The pipe purging process

Before welding can begin, it is customary to purge the weld zone of all oxygen to protect the root gap from oxidation and ensure a high-quality weld. Purging is accomplished by introducing inert gases, such as argon, into the weld zone. The argon gas displaces the existing atmosphere, including the oxygen, thereby evacuating it from the weld zone. This process is then continued until the required level of oxygen is reached and a pure welding environment is secured.

If the root gap is not adequately protected, problems may arise which can threaten the integrity of the weld. Oxidation can cause discolouration which not only looks displeasing but also leads to metallurgical imbalances, especially in some stainless steels. Another threat to weld integrity comes in the form of gross oxidation which can degrade the mechanical properties of a pipe and significant-

The oxygen weld monitor "PRO OX-100" is equipped with an array of accessories and capabilities.



Furnished with a slender stainless probe and neoprene extension tubing, the "PRO OX-100" can be used for remote monitoring.

ly reduce its resistance to corrosion. Precise monitoring of the oxygen levels can be reliably and efficiently accomplished through the use of an oxygen weld monitor.

### Time for a change

Oxygen weld monitors enable welders to know when sufficient oxygen has been evacuated from the weld zone so that work can begin without any fear of threats to the welding operation such as discolouration, oxidation or coking. To commence welding, typically the required oxygen level needs to be reduced to between 0.1 and 0.01%.

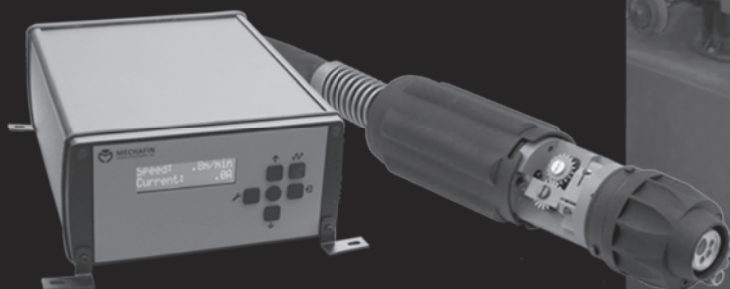
The industry has responded to the need for oxygen monitoring with simplified solutions. First-generation oxygen weld monitors



Mechafin AG (Head-Office)  
Chrummacherstrasse 3  
CH-8954 Geroldswil  
Switzerland  
Fon 0041 44 749 30 60  
Fax 0041 44 749 30 70

Mechafin (U.K) Limited  
Leigh Street  
High Wycombe  
Bucks. HP11 2QU  
England  
Fon 0044 1494 44 11 10  
Fax 0044 1494 47 30 49

Upgrade your favorite welding tool with a Push-Pull from Mechafin. Attach every kind of feeder with the new electronic controller.

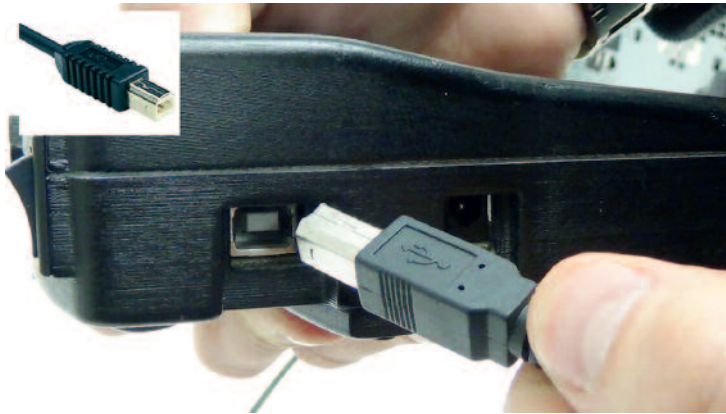


# Zero defects in TIG welding & cladding

**Brau  
Beviale  
2014**

**Stand-No.  
6 - 449**

11<sup>th</sup> - 13<sup>th</sup>  
November



The data logging capabilities allow users to export up to 50 data points to Microsoft Excel or plain text format.

merely provided a reading of the oxygen level and have not met the needs of welders today. But as the industry advances, the oxygen monitor can be used as a critical tool in the quality control process meaning its technological capabilities must be highly advanced. The Aquasol Corporation understood the direction in which the welding industry is moving and introduced the "PRO OX-100": a battery powered, rechargeable, programmable, handheld digital oxygen monitor that offers the exact solution for today's pipe purging needs.

### Importance of purge quality

The overall quality of an oxygen weld monitor is largely dependent on the quality of the oxygen sensor contained within the monitor. A superior oxygen sensor leads to more precise readings which, ultimately, leads to a higher quality weld. Welders know that a proper purge is not possible if the oxygen level reading is unreliable. An inaccurate reading can result in a substandard weld or the unnecessary waste and cost of inert gases. An improper reading of the oxygen level could result in too much oxygen still being present in the weld zone which can lead to oxidation, corrosion and the possible contamination of joints. These options are not desirable and therefore it is important that the manufacturer rigorously test the accuracy of the sensors.

Aquasol certifies that their claimed accuracy capabilities are, in fact, supported by how the "PRO OX-100" performs in the field. Each customer is provided with a calibration certificate acknowledging that the product has been thoroughly tested and inspected by an Aquasol engineer to meet claimed accuracy capabilities of 99.995%, Ar +/- 0.01 and to meet the requirements specified by the National Institute of Standards and Technology as well as Aquasol's own quality assurance regulations.

The "PRO OX-100" features an internal pump that allows for hands-free maneuvering when monitoring oxygen levels. This pump draws an oxygen sample from the environment and the monitor quickly provides an easy to read digital LCD display of 0.00-21.00% oxygen with 0.01% (100 PPM) resolution. Aquasol Corporation Electrical Engineer Dipayan Majumder noted that "other oxygen monitors use a hand aspirator to sample gas from the root gap. This creates variable pressure pulses on the sensor. All oxygen sensors are affected by such pressure pulses and read incorrectly. Hand aspiration also brings fatigue to the operators during long purge operations. The ,PRO OX-100' uses a constant-flow pump to sample gas uniformly and provide the most accurate result."

### Data logging capability

The "PRO OX-100" allows for increased accuracy in oxygen monitoring with its unique data logging capability. Welders can create permanent records of real time data (at 15 second intervals) of oxygen levels for critical welding operations. The user is enabled to capture and export up to 50 data points, with just a few clicks, to Microsoft Excel and plain text format. Additionally, high-speed data offloading to a PC via a USB interface is offered which helps to ensure data integrity at all times and allows welders to adhere to any quality control regulations their company or client might have.

To increase efficiency the weld monitor is equipped with an audiovisual alarm. Since oxygen contamination is one of the most common causes of substandard welds, having absolute confidence in knowing when the desired oxygen level has been reached is critical. The "PRO OX-100" allows the user to program the alarm to a specific O<sub>2</sub> PPM value. Once the target value is reached, the alarm reaches both the eyes and ears as it

Orbital welding & cladding



Mechanised welding & cladding



A member of



FROM COMPANIES

alerts the user by emitting an intermittent beep simultaneously as a green light flashes. This feature allows users to perform other weld preparations while the weld zone is being purified.

Similar to Aquasol's other environmentally-friendly products like the "EZ Purge" water soluble purge dam or their "SoluGap" socket weld spacer rings, the "PRO OX-100" is also environmentally friendly as it leaves minimal carbon footprint behind after use. It comes equipped with a rechargeable 9 V battery and charger. Designed for universal voltage, it is compatible with different voltages and frequency specifications from around the world as it operates on 100 VAC/60 Hz, 120 VAC/60 Hz and 220 VAC/50 Hz configurations.

While Aquasol is a U.S. based company, they recognise that English is not the first language of much of its international client base. The "PRO OX-100" offers a built-in, multi-language feature with on-screen instructions that are available in English, German, Portuguese and Spanish. Aquasol debuted their "PRO OX-100" at the international trade fair "Schweissen & Schneiden 2013" in Essen/Germany which featured 1,017 exhibitors from over 40 countries and 55,000 visitors from over 130 countries. This premier event reinforced the need for Aquasol to incorporate other languages into the monitor's on-screen language capabilities.

Zach Carr, Aquasol Corporation,  
North Tonawanda, NY/USA

References

"Batteries." RethinkRecycling.com. Accessed 13 June 2014.  
<http://www.rethinkrecycling.com/residents/materials-name/batteries>

LNG World News Staff. "HFT Introduces New Weld Purge Monitor for Welding LNG Tube and Pipes (UK)" LNGworldnews.com. Last modified 29 February 2012.  
<http://www.lngworldnews.com/hft-introduces-new-weld-purge-monitor-for-welding-lng-tubes-and-pipes>

Robert Brooks. "New Model Purge Monitor." Welding Design and Fabrication. Last modified 20 March 2012. <http://weldingdesign.com/equipment-automation/new-model-weld-purge-monitor>

## Advanced materials conditioning facility expands exposure testing opportunities

Six large-volume autoclaves commissioned at TWI are expanding the company's existing capability for exposure testing of polymeric, composite and metallic test specimens together with larger components. Early tests, carried out during a recent joint industry project, have demonstrated the new facility's potential for extended research of materials' behaviour in supercritical environments.

The long-term performance of polymeric, composite, cementitious and metallic materials in oilfield, construction and automotive applications is of interest to many of TWI's Industrial Member organisations. Until now, it has been difficult to test large com-

ponents in a maintained constant test environment. Recently, TWI and a subcontractor designed a new series of autoclaves to exacting specifications. This new facility was installed in the harsh environment (H<sub>2</sub>S sour service and corrosive produced fluids) testing laboratory in Cambridge/UK and expands the exposure testing opportunities.

The autoclaves have already been used in a joint industry project on materials selection for transport of supercritical carbon dioxide (MASCOC<sub>2</sub>T), investigating the conditioning of large polymeric tensile specimens in supercritical CO<sub>2</sub> and H<sub>2</sub>S mixes at elevated temperatures and pressures. Also

included in the test programme for the project was a metre-long section of composite tube, which could be aged for the customer for extended periods while keeping the ratio of fluid reservoir volume to surface area at 25 cm (as specified by oilfield standards including ISO 23936).

Five of the autoclaves have an internal depth of 600 mm and two of these are lined with C276. A resulting 19.4L volume allows application of testing standards where the ratio of the fluid volume to the sample surface area is specified as 25 cm. The sixth C276-lined autoclave has an internal depth of 1,000 mm making it ideal for conditioning

## Stud Welding – The Best Joint Within Milliseconds!

- Manual Units
- Semi-automatic Systems
- Automated CNC Machines
- Welding Elements



[hbs-info.de](http://hbs-info.de)





Quality meets Innovation.

HBS Bolzenschweiss-Systeme GmbH & Co. KG | Phone: + 49 (0) 8131 511- 0

Visit us at EuroBLECH, Hannover (21.-25. October 2014) Hall 13, Booth D35  
Visit us at FABTECH, Atlanta/USA (11. -13. November 2014) Booth C3629