Weld Purging World

2021 ISSUE 06: JUNE

IN THIS ISSUE:

THE LATEST NEWS FROM OUR UK HQ

SEVEN TIPS FOR INERT GAS PURGING
Dear Reader,

Welcome to the sixth issue of Weld Purging World, which marks midway through 2021.

It was another busy month at our UK HQ, with the largest Inflatable Stopper manufactured to date, a 78” QuickPurge®, custom HotPurge® Systems for a Nuclear application and some Pipe Freezing demonstrations. You can read more about these on pages 3 and 4.

On page 10 you will find our Technical Article Seven Tips for Inert Gas Purging, which outlines some good practices for achieving those sought after, zero colour welds.

If you have any information that you would like to be featured in future issues of this publication, please contact me.

As always, we hope you enjoy the issue.

Best wishes,

Michaela
Marketing and Social Media Manager
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It was another great month at our UK HQ........

The Largest Inflatable Stopper Manufactured To Date:

We recently manufactured the largest Inflatable Stopper to date. A whopping 114” with a 300°C Heat Resistant Cover.

The customer required a large stopper for blocking hot fumes from a chimney stack measuring 114” (2,896 mm) diameter in order to carry out vital maintenance and repair work.

Our Inflatable Stoppers are lightweight, easy to transport and pose little risk to any personnel that may be working below, making a safe working environment.

Using the alternative option of mechanical stoppers would involve heavy machinery to manoeuvre into place, which poses some health and safety concerns.

A Heat Resistant Cover was also required to protect and prevent the Inflatable Stopper from being damaged. The recommended maximum temperature for this type of stopper is 90°C (194°F) but with a heat cover fitted this increases to 300°C (572°F).

78” QuickPurge:

We recently manufactured a 78” ø Argweld® QuickPurge to weld large diameter tankers.

These Inflatable Tube and Pipe Purging Systems dramatically reduce the space that needs to be purged, with huge savings in time and inert gas, pay for the system in just one weld!

All systems are manufactured as standard with a hose for connecting a Weld Purge Monitor® to measure the oxygen level throughout the welding process.
Custom HotPurge®:

Custom HotPurge® Systems were manufactured for a Nuclear application, with 250°C pre-heat temperatures.

Manufactured in diameters 6 to 88" (150 to 2,235 mm) HotPurge® Systems can be used repeatedly for weld purging and can keep the oxygen levels below 100 parts per million (ppm) throughout the welding cycle, ensuring oxidation-free welds, without the metallurgical imperfections caused by exposure to too much oxygen.

Pipe Freezing Demonstration:

A customer who needed to perform site freezing on fire hydrants around the UK recently visited our HQ for a pipe freezing demonstration. Using Qwik-Freezer™, we can freeze their 3" (75mm) diameter, water filled pipe for valve replacement or other work within 20 – 25 minutes.

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CALENDAR: EVENTS IN THE INDUSTRY

**Fabtech**
13 - 16 September 2021
Chicago, USA

**Adipec**
8 - 11 November 2021
Abu Dhabi, UAE

**Win Eurasia**
10 - 13 November 2021
Istanbul, Turkey

**TechniShow**
March 2022
Netherlands
Introduction

Weld Purge Monitors® can ensure that you get the best possible environment to carry out high quality welding of those metals mentioned above. It is essential to measure and monitor oxygen content when welding, so that the welds are safe, clean and meet industry standards. To avoid costly errors and bad welds, only monitors specifically made for weld purging purposes should be used.

Weld Purge Monitors® vs oxygen meters

Beware: Many monitors used for weld purging are actually oxygen meters and are not suited for weld purging. They are slow to react and are calibrated at atmospheric oxygen levels, not at low oxygen levels that are necessary for welding.

Advantages of using Weld Purge Monitors®

- Operators quickly alerted to faults and performance variations.
- Much faster reaction time compared with oxygen "safety" monitors.
- Production of scrap is reduced or eliminated, loss of corrosion resistance is avoided.
- Accuracy better than 0.1% of reading can be achieved.
- Sensors are accurately calibrated for weld purging levels - not atmospheric oxygen levels.
- Can be used with any inert gas.

Consequences of poor weld purge conditions

- Oxidised welds, traces of porosity and pitting can occur.
- Welds can be rejected and result in scrap.
- Incorrect welds can lead to expensive re-welding.
- The need to re-weld can result in a loss of time.
- Wasted materials and gas may prove very costly.

Tips for consistent weld purging and good weld quality

- Purge gas should be set at a consistent flow rate avoiding turbulence within the purge volume.
- Argon is denser than air, so should be introduced at the lowest point possible in a purge environment.
- Monitor the oxygen levels throughout the welding process to ensure conditions remain constant.
- Use the Weld Purge Monitor® to isolate the weld process in the event of oxygen levels rising above presets.

Monitor maintenance - Argweld® PurgeEye® Weld Purge Monitors®

- Family Range of Argweld® Weld Purge Monitors® for accurate measurement of oxygen at levels down to 1 ppm.
- Your Weld Purge Monitors® should show oxygen level in a normal air environment prior to measuring the purge gas.
- Sensor performance improves and the life expectancy is maintained in a low oxygen environment.
- Sensors should be treated as a consumable item and be ordered as and when needed.
- They are available for immediate delivery.
- Sensors must not be pressurised or exposed to water / moisture.

INVENTORS, INNOVATORS, DEVELOPERS and MANUFACTURERS of WELD PURGE MONITORS®

www.huntingdonfusion.com
Care is necessary when welding large diameter pipework in stainless, duplex, chrome steels, nickel alloys and zirconium. When welding such reactive materials, they need to be purged of oxygen before, during and after welding, which can cause a huge expense when they are of a large diameter.

Weld Purging Experts Huntingdon Fusion Techniques HFT®’s innovative QuickPurge® Systems, which are manufactured up to 88” (2,235mm), dramatically reduces the space that needs to be purged, thereby reducing purging time dramatically, making huge savings in both time and gas costs.

Ron Sewell, Chairman for HFT® said: “Using QuickPurge® means there is no longer a need to fill complete pipes with an inert gas. The systems are so efficient they pay for themselves in the first couple of welds in gas savings alone, whatever the pipe size. QuickPurge® is simply inserted into a tube or pipe, inflated within the pipe, restricting the area that is to be welded, reducing the oxygen level down to 100 ppm (parts per million) within minutes.”

QuickPurge® has an additional gas input line, which means extra purge gas can be introduced for applications such as this, thereby achieving a much faster purge, down to the lowest oxygen levels, which is perfect for larger diameter pipes where quality welds are required.

High speed pipe purging system QuickPurge® is leading the way in the field of purging tube, pipe and pipeline joints over 6” diameter, where oxygen levels are required to be as low as 100 parts per million (ppm) or less.

Huntingdon Fusion Techniques HFT®’s innovative design of the QuickPurge® System means that zero colour welds will be achieved and there will be no loss of corrosion resistance or loss of mechanical strength caused due to the presence of oxygen, nitrogen or hydrogen gas.

Using IntaCal® combined with the integrated PurgeGate® device makes it possible to safely inflate the dams with argon gas, for purging the space between the dams where the weld joint is located. With PurgeGate®, burst dams are prevented in the event of undue pressure increase or accidental flow increase of the purging gas.
For many years, oxygen monitors and gas analysers have been used for weld purging. They are specifically designed and calibrated for accuracy at atmospheric oxygen level but not for weld purging where accuracy is required when reading much lower oxygen levels.

Using the latest scientific knowledge and innovation, Huntingdon Fusion Techniques HFT® have designed and manufactured the PurgEye® Nano, the World’s first and only low cost, no frills, Weld Purge Monitor® that measures accurately down to 10 parts per million (ppm).

Ron Sewell, Chairman for HFT® said: “A Weld Purge Monitor® is essential to monitor oxygen levels when welding metals such as stainless steels, titanium and nickel alloys where a high quality, non-oxidised, zero colour weld is required. The PurgEye® Nano has been developed for weld purging where data logging, alarms and welder control are not necessarily required. It is small, lightweight and inexpensive. There are no knobs, no switches, no controls, making this a really simple, ‘plug and play’ monitor.”

With its leak tight connectors for weld purge hoses, the PurgEye® Nano can be used with optional accessory hand pump and gas sampling probe. The monitor can be used to check purge gas quality from the main source and at the exhaust end of a purging system as well as to find air leaks in purging hose connections anywhere in a system.

HFT® has a Family Range of PurgEye® Weld Purge Monitors® for every application. The range includes hand held, battery operated monitors and mains powered monitors, which can read oxygen levels from atmospheric concentrate, right down to 1 ppm.
Effective weld purging is only achieved by making sure that oxygen is displaced from the purge zone prior to and during welding. Any residual oxygen can cause significant loss of corrosion resistance and a reduction in joint strength. It is therefore essential to seal the pipe either side of the joint and maintain this seal throughout the process. The residual level of oxygen in the purge zone needs to be consistent with the welding procedure so continuously monitoring to ensure compliance is crucial.

1. **Choose a dependable sealing material**

The cheapest is seldom the best so examine the options available.

Don’t be tempted to use sealing discs made from polystyrene foam, wood and cardboard - at best they leak or emit contaminants and at worst they catch fire during the hot weld cycle.

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Fig 1. These examples from the QuickPurge® range are representative of proven purge systems. They employ components made from materials that are stable, thermally resistant, durable and non-toxic. They cover the entire pipe size range between 150 and 2400 mm diameter giving an effective seal in each case and a low purge volume.
2 Use a complete purging system

Don’t try to economise by making use of whatever happens to be around at the time. Separate seals for the pipe and rubber tubing for the inert gas, all held together with bits of tape seldom succeeds. Invariably this is time consuming and can only be used once.

Find systems using inflatable dams. Commercial equipment is now available in which gas flow and pressure and purge gas quality are all pre-set. Complete monitoring instrumentation can be incorporated to ensure a high level of quality control. These systems have been designed for multiple use and are rugged enough to cope with site conditions whilst still reducing overall purging and welding time very significantly.

Fig 2. These PurgElite® systems employ the latest advances in technology and are fully integrated to keep purge times and cost to a minimum. Sizes between 25 and 600 mm diameter are available. The hoses are completely flexible and allow the systems to transverse 90° bends.
3. Establish what level of oxygen in the purge gas is acceptable

There is plenty of published information available that establishes what the maximum oxygen content needs to be to prevent loss of mechanical and physical properties in the weld. This depends on the material being welded but generally, some stainless steel welding requires a low level whereas most carbon steels are much less sensitive.

4. Take care with gas flow

Whatever system is selected ensure that the inert gas enters gas slowly. Argon is heavier than air so introduce it slowly at the bottom of the weld purge space and discharge from the highest point. Helium is lighter than air and needs to be inserted at the top of a cavity and removed at the base.

![Fig 3. Inflated system in place showing gas flow.](image)

5. Don’t rush into the welding sequence

Wait until all the air has been displaced before welding. For many metals this means ensuring a residual oxygen level below 100 ppm.

Traditionally, and a practice still followed even by major fabricators, this is based a pure guesswork. If the oxygen content is too high, or varies during welding, oxidation occurs and this often means rejection with the expense of re-machining, and therefore production delays. It can also lead to loss of corrosion resistance in stainless steels.

6. Use a purge gas oxygen monitor

Don’t assume that allowing ‘plenty of time’ for purging to remove all the oxygen. If there are leaks in the system, turbulence or simply poor quality purge gas then oxygen levels could be way above those necessary to prevent contamination. The best solution is to use a device capable of accurate and reliable measurement of oxygen level.
7. Read published information about purging

There’s plenty of it and examples are shown below. Learn from the experience of others rather than using trial and error methods that could cost time and necessitate re-welding.

References

1. Argweld products from www.huntingdonfusion.com


6. Major Advances in Weld Purge Technology World Pipelines 2014

7. Latest developments in weld purging www.energyglobal.com
Weld

Backing Tape®

Resistant to very high temperatures
so fully compliant with
GTAW, GMAW and PAW processes

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