2021 Issue
08: August

In this issue:
The latest news from our UK HQ

Technical Article: Welding with Preheat

Weld Purging Products
Innovators, Manufacturers and Internationally Renowned Specialists
Welcome to the August issue of Weld Purging World 2021.

Another busy month here at HQ. On page 3 you can read about all the exciting orders coming in, including a huge 136” Weld Purging Dam and 76” QuickPurge®.

On page 10 you will find our Technical Article about welding with pre-heat, which details ways in which you can meet the requirements of inert gas purging when temperatures in the welding zone exceed 200°C for several hours.

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
michaelahess@huntingdonfusion.com
Technical Sales Manager Luke Keane gives us a round up of what has been happening at our UK HQ this month.

It’s been another great month, with some exciting orders coming in! We manufactured a 136” diameter Weld Purging Dam for one of our European customers, which are perfect for closure welds, tight bends, T piece joints and dome end connections.

Another record for HFT®, as this is the largest we have ever produced and to our knowledge the largest purging system supplied into industry to date!

The next images show a 76” QuickPurge on site. These Inflatable Tube and Pipe Purging Systems save huge amounts in argon and time.

It was also a great few weeks with our Rubber Plugs. These lightweight, simple to inflate, high pressure Plugs are ideal for blocking pipes containing oils, hydrocarbons and petrochemicals. The Pipestoppers® range of Rubber Plugs are manufactured from high quality materials, ensuring a long life span of each Plug. They have a temperature resistance from -40°C (-40°F) to 70°C (158°F) and are available in sizes from 2 to 78” (51 to 1,981 mm).
FAQ’S ON OUR WELD BACKING TAPE

Weld Backing Tape is a low cost way of supporting the backside of weld joints, helping to achieve oxide free welds and reducing re-welding post-weld cleaning.

What is Weld Backing Tape manufactured from?

Comprising of a 3” (75mm) wide aluminium adhesive tape backing strip, Weld Backing Tape has a 1” (25mm) wide band of woven glass fibre matting running down the centre.

Unlike ceramic fibre, Weld Backing Tape® has no true melting point so it works satisfactorily with TIG or MIG welding (GTAW or GMAW) where temperatures can reach up to 6,000°C. This overcomes the concerns associated with ceramic fibre versions that have a melting point of 1,800°C.

How does Weld Backing Tape work?

Weld Backing Tape® is a glass fibre weld backing system that supports and protects the weld root from oxidation. It will trap the inert gas from the weld torch to hold the gas surrounding the weld pool, effectively providing a back purge facility.

What grades are available?

Weld Backing Tape® is available in four grades and all consist of a high temperature resistant aluminium backing foil with a heat resistant band of woven glass fibre cloth. With the thickest cloth Backing Tape® will support single pass welding at weld currents up to 600 amps, without change to the chemistry or metallurgy of the weld.

Why use Weld Backing Tape?

Where manual welding cannot control the weld root profile sufficiently, or when an automatic weld process is unable to reach satisfactory speeds while still obtaining satisfactory underbeads, it is common to use a method of backing below the weld. A cost-effective way to provide support for molten metal below a weld joint is to use Weld Backing Tape®.

CALENDAR: EVENTS IN THE INDUSTRY

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<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tr>
<td>Fabtech</td>
<td>13 - 16 September 2021</td>
<td>Chicago, USA</td>
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<tr>
<td>Win Eurasia</td>
<td>10 - 13 November 2021</td>
<td>Istanbul, Turkey</td>
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<tr>
<td>Adipec</td>
<td>8 - 11 November 2021</td>
<td>Abu Dhabi, UAE</td>
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<tr>
<td>TechniShow</td>
<td>March 2022</td>
<td>Netherlands</td>
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PURGELITE® WELD PURGE SYSTEMS

Innovators, Manufacturers and Internationally Renowned Specialists

www.huntingdonfusion.com
With the ever increasing list of challenges posed by welding on-site, Weld Purging Experts Huntingdon Fusion Techniques HFT®’s innovative PurgEye® Site means quality doesn’t have to be affected when welding in difficult conditions.

CEO for HFT® Georgia Gascoyne said: “Welding on-site does not eliminate the need to measure oxygen levels when welding metals such as stainless steel, zirconium and titanium. Often, welders are left to guess at purge levels, due to some Weld Purge Monitors® not being able to handle various on site conditions.”

“Now with our networking device PurgeNet™, the PurgEye® Site is our on-site monitor, that has been specifically designed for extreme conditions. By using the PurgEye® Site, welders can ensure non-oxidised, zero colour welds are achieved regardless of conditions.”

The PurgEye® Site has a fast response, long life sensor and it is equipped with PurgeNet™, allowing the monitor to connect to a variety of accessories. One of the accessories, an automatic welding machine interface, allows controls to be based upon the oxygen level, to prevent welding if that level is too high. Other accessories include a traffic light visual indication system and a temperature gauge.

With the housing case open, the PurgEye® Site is IP65 rated and IP68 rated with the lid closed. The PurgEye® Site measures oxygen from 1,000 ppm, right down to 1 ppm (accurate to 10 ppm) with readings in parts per million (ppm) or percentage, depending on the users preference.

The small, low volume, almost indestructible case, can be carried anywhere and the PurgEye® Site used either with its internal battery, which lasts up to 10 hours or connected to mains electricity from 90 – 250V, single phase A.C.

The large, bright, OLED display allows the data to be easily read and is mainly symbol based, rather than text. The display does not need a backlight and can be viewed from greater angles than LED screens.
World Leading Designers and Manufacturers of Weld Purging Equipment, Huntingdon Fusion Techniques HFT® manufacture their very popular Tungsten Electrode Grinder at their UK HQ.

With over 45 years of successful business and with their UK HQ located in Burry Port, Carmarthenshire, HFT® are proud to continue to contribute to the British Manufacturing Industry.

Ron Sewell, Chairman for HFT® said: “All of our Weld Purge Monitors® and Inflatable Pipe Purging Systems are manufactured right here in the UK and we are proud to have our TEG-1000 Tungsten Electrode Grinder on that list too.”

“Using a Grinder that has been designed and manufactured specifically for tungsten metal is not only a much safer option, they provide more accurate results leading to as many as ten times greater number of arc strikes and giving very directional arcs without flicker or wander.”

The use of the TEG-1000 Grinder will give repeatable Tungsten Electrode points every time, enabling consistent arc performance and welding results. Sizes 1.0 to 3.2 mm can be ground as standard, with other sizes catered for on request.

TIG welding requires Tungsten Electrodes to have perfectly ground and polished tips. HFT®’s TEG-1000 provides these, time after time, to exactly the same size and shape. The design of the TEG-1000 is such, that the diamond wheel grinds the Tungsten Electrodes longitudinally, preventing arc flicker or wander caused by circumferential lines or ridges found on electrodes, which have been ground incorrectly.

The Weld Purging Experts celebrated 45 years of success in 2020 and have retained their position at the forefront of weld purging technology by developing and evolving new products to maintain pace with advancing knowledge and market demands.

“45 years in business is an incredible achievement and a huge landmark for us. Our dedication to product development, long-standing industry experience and loyal Distributor network are key elements of our success,” comments Georgia. “We are a family owned business and are proud of our heritage. We have developed into a truly global business and are looking forward to the next few years of continued business expansion, enabling us to strengthen our position as the number one manufacturer of Weld Purging Systems.”

Now, with a string of major international offices, HFT® and their dedicated distribution branches are able to provide global coverage and an unbeatable technical knowledge base, supported by an innovative research and development team who are constantly striving to update, improve and advance the range of products to remain at the forefront of weld purging and pipe stopping technologies.
Some engineering alloys are prone to cracking during welding. Industry sectors having to overcome this problem are principally in power engineering and nuclear and include low and medium alloy steels that have been specially developed for their high strength.

Metallurgists have learned that heating the joint prior to and after welding (preheating and post-heating) can reduce the sensitivity to cracking quite significantly. It involves temperatures in the region of 200°C although this may be much higher for certain materials.

An example of a commonly used alloy benefiting from this treatment is SA 213 T91 or SA 335 P91. This is a ferritic alloy steel that meets the condition of creep resistance required in high temperature steam generating plant.

The material, often simply referred to as P91, has been in successful use for the last two decades in power plant service.

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>MN</th>
<th>P,S, Max</th>
<th>SI</th>
<th>Cr</th>
<th>Mo</th>
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<tbody>
<tr>
<td>P91</td>
<td>0.08 - 0.12</td>
<td>0.30 - 0.60</td>
<td>0.020/0.010</td>
<td>0.20 - 0.50</td>
<td>8.00 - 9.50</td>
<td>0.85 - 1.05</td>
</tr>
<tr>
<td>V</td>
<td>0.18 - 0.25</td>
<td>N 0.03 - 0.07</td>
<td>Ni 0.40 max</td>
<td>Al 0.02 max</td>
<td>Nb 0.06 - 0.10</td>
<td>Ti 0.01 max</td>
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Welding is one process that is widely used during manufacture. This affects the microstructure. Preheating, maintaining inter-pass temperatures, and post-weld heat treatment procedures are very critical for P91 and similar alloys. Failure to follow the procedures can result in catastrophic failures in service.

Other high temperature creep resistant ferrous alloys requiring this type of heat treatment are; ASTM A389 grade C24, A356 grade 9, DIN 21CrMoV 5-11, 15CrMoV 5-10, GS-17CrMoV 511, EN G17CrMoV5-10 and GE B50A224.

The preferred welding procedures in this type of fabrication are GTAW and GMAW and these offer protection of the exposed upper fusion zone. The joint around the underbead however needs to be protected by separate inert gas coverage and this is referred to as weld purging. It involves removal of oxygen from the vicinity of the joint to prevent contamination during the thermal cycle.
Meeting the requirements of inert gas purging when temperatures exceeding 200°C are involved necessitates the use of purge systems capable of withstanding these temperatures throughout the heating and welding cycles. Typical thermal cycles can exceed 2 hours and it may be necessary to maintain the purge system in place throughout.

Specially engineered purge products have been designed over the past five years that are capable of withstanding the temperatures involved whilst at the same time maintaining adequate gas sealing characteristics. They are also rugged enough to survive multiple-use applications.

The only manufacturer that has studied materials and designed products suitable for use in weld purging at the high temperatures prevailing during pre- and post-heating is Huntingdon Fusion Techniques, HFT®. These systems, referred to as Argweld® HotPurge™ meet the requirement for thermal stability and operational reliability.

The inflatable seals at each end of HotPurge® Systems are manufactured from flexible, thermally resistant engineering materials. The connecting collar is fabricated from high temperature resistant material. Gas delivery hoses are manufactured from engineering grade nylon and metal fittings comply with international standards.

As with all HFT® products, HotPurge® is subject to continuous development and the latest innovative change has been to incorporate PurgeGate®. This exploits advanced valve technology to ensure that there is no possibility of over-inflation and hence failure of the seals. These heat resistant pipe purge systems are capable of withstanding temperatures up to 300°C (570°F) for 24 hours.

A wide range of pipe diameters can be accommodated with HotPurge® offering sizes from 150 – 2,235 mm (6 to 88 in). All products have an expansion range of +/- 12 mm on diameter.
The collapsed system is inserted into the pipe to be welded and positioned at the joint: pull loops are integrated with the system to help with this operation. When the selected purge gas is admitted the dams will first inflate to a preset pressure at which point the gas will be diverted into the purge volume. Gas flow will continue until the weld has been completed and cooled.

1. The Argweld® HotPurge™ is positioned using the heat-resistant pull tags. A high visibility strip, called RootGlo®, is incorporated at the centre to facilitate accurate positioning below the joint under low light level conditions. RootGlo® gives up to 20 hours illumination for only 10 minutes of exposure to daylight.

2. The seals are inflated using the inert gas supply.

3. When inflation is complete the purge valve opens automatically. The inert gas then displaces the air between the seals.

4. When the weld is completed and allowed to cool sufficiently to satisfy the metallurgical requirements set by the welding procedure the purge gas can be closed. Disconnection of the hose allows the system to deflate ready for removal.
Measurement of Oxygen Levels in the Purge Volume

It is of course essential to confirm that the oxygen content at the weld area has been reduced to the level set by the welding procedure. Acceptable oxygen levels may well be below those measurable with older instruments and HFT® has developed advanced monitoring instruments specifically for welding operations.

The PurgEye® 100 IP65 Sealed Weld Purge Monitor® has been designed to measure oxygen content as low as 0.01% accurately. For ferritic creep resistant materials an oxygen content below 0.1% is normally considered suitable.

References

BS EN ISO 13916:1997:

BS EN 1011-2: 2001:

Easy
Impenetrable
Weld Purge
Barrier!

WATER SOLUBLE
WELD PURGE FILM®

easy application  low cost  variety of pipe sizes

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