2022 ISSUE 03: MARCH

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THE LATEST NEWS FROM OUR UK HQ

TECHNICAL ARTICLE: LIQUID NITROGEN SOLVES PIPE CUTTING PROBLEMS

WELD PURGING PRODUCTS INNOVATORS, MANUFACTURERS AND INTERNATIONALLY RENOWNED SPECIALISTS
Dear Reader,

Welcome to issue three of Weld Purging World for 2022.

This month we ask the Questions: What is Weld Purging, How do you Purge and Why? See page 6 for the answers!

On page 7 you will find our Technical Article Liquid Nitrogen Solves Pipe Cutting Problems where our USA Partner helped solve a major environmental problem in a remote area of Oregon using Accu-Freeze™.

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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The HFT® Pipestoppers® Range of Aluminium Plugs can be used to leak testing, isolation, sealing, stopping and weld purging of pipes.

Here are some of our Frequently Asked Questions.

1.0 Can the plugs be used as a permanent stopper in pipes?

HFT Pipestoppers® Aluminium Test Plugs can be used effectively as a permanent stopper. The wings can be cropped to prevent tampering.

2.0 Will HFT Pipestoppers® Aluminium Drain Test Plugs withstand attacks from various acids, alkalis and chemicals?

Technical data sheets about the chemical resistance of different materials is available on request.

3.0 What if HFT Pipestoppers® natural rubber rings deteriorate in the presence of my special chemicals, gases or fluids?

Synthetic sealing rings are available, made from nitrile, neoprene, silicone and viton rubbers which will resist attack by many harmful products.

4.0 What is the maximum working temperature for the HFT Pipestoppers® Aluminium Test Plugs and Stoppers?

The natural rubber rings can be used up to 70°C (158°F) in continuous use.

For higher temperatures, we manufacture rings made from silicone that can be used up to 300°C (572°F) and viton, which can be used up to 350°C (662°F).

Technical data sheets about the resistance of various rubbers to all temperatures and materials are available on request.
5.0 I have a hole to seal, where your plug won’t quite seal well enough, but the next size up is too big. Do you have any in between sizes?

The user can extend the range of each plug by a few millimetres by using an exterior rubber seal on top of the ring provided.

6.0 Can I have the plugs made as a branded product?

Yes, we can supply the screw caps in your own house colours as well as black or white. Caps can be provided with your name, initials or logo printed on them.

7.0 What pressures can the plugs withstand?

A pressure chart for HFT Pipestoppers® Aluminium Testing Plugs is available. Plugs can be braced to assist in greater stability.

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**CALENDAR: EVENTS IN THE INDUSTRY**

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<td>Tube 2022</td>
<td>20 - 24 Jun 2022</td>
<td>Düsseldorf, Germany</td>
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<td>Adipec</td>
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<td>Fabtech</td>
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Prior to welding of titanium, widely practiced in the aerospace Industry, the oxygen content of the purge gas must be reduced to a level below 50 ppm.

Engine components such as discs, blades, shafts and casings, from the front fan to the rear of the engine, and fasteners, airframe components and landing gear are all examples where titanium is used. Further examples are fuel tanks for satellites and military jets. Components such as wing spars have also been made recently out of titanium using the Wire Arc Additive Manufacturing (WAAM) process.

The innovative PurgEye® Desk, a new monitor designed and manufactured by weld purging experts Huntingdon Fusion Techniques HFT®, is leading the way in inert gas weld purging technology by reading oxygen levels from 1,000 ppm, right down to levels as low as 1ppm (highly accurate to 10 ppm), ensuring welders achieve perfect oxide free, zero colour welds time and time again.

Ron Sewell, Chairman for HFT® said: “The PurgEye® Desk is for use with Welding Chambers and Enclosures, as well as with Orbital Welding Machines and other Automatic Welding Systems. One huge addition to the PurgEye® Desk is the revolutionary PurgeNet™, for the in-line connection of additional accessories that allows the Weld Purge Monitor® to control welding systems based upon oxygen level as well as to provide indications of high and low oxygen levels and even give dew point measurements.”

The rugged, high frequency proof PurgEye® Desk has automatic fault finding diagnostics that can detect and report a number of possible faults. It also features an OLED (organic light-emitting diode) display giving brighter, sharper readings at longer distances.

With a unique, fast-response, long-life sensor having little maintenance requirement, the PurgEye® Desk Weld Purge Monitor® comes complete with an integral pump to deliver the exhausting purge gas to the measuring sensor on a consistent basis to allow precision control of the welding systems.

The PurgEye® Desk® is also a highly recommended monitor when welding in the Additive Manufacturing, automotive and titanium bicycle industry.
Preventing oxidation and thus avoiding ugly looking weld underbeads in tubes and pipes is easy when using inert gas purging. This simple procedure saves time and cost.

Don’t just take our word for it.

Consider the thoughts of expert fabricators:

Chicago Iron and Bridge Company, Chicago Illinois
“What an enormous saving in waiting time for our welders. Normally we wait several hours for our 30” stainless steel pipe joints to be purged but now, with HFT®’s specialist equipment, we can start welding in under 10 minutes”.

Bechtel Corporation, San Francisco, California
“Weld quality has improved enormously since we started to use the professionally made Quick Purge dams. We have also seen dramatic time savings”.

What is Purging?
Inflatable Purging System technology has advanced by leaps and bounds in the last few years with Huntingdon Fusion Techniques HFT® leading the way with highly innovative developments that help the welder produce sound weld joints quickly and free from the defects that arise due to oxidation in unprotected joints.

How to Purge?

QuickPurge®
Inflatable Tube, Pipe and Pipeline Weld Purging System
- From 6” - 96” (150 mm - 2440 mm).
- Designed as fully integrated solutions.

PurgElite®
Inflatable Tube and Pipe Weld Purging System
- Low profile valve.
- No metal fittings.
- Flexible though bends and elbows.
- From 1” - 24” (25 mm - 600 mm).

More information needed?
The following published White Papers indicate the depth of technical knowledge available at Huntingdon Fusion Techniques HFT®.
We will supply these free detailed guidance notes on request.

- No 17 Why use Inert Gas Purging when welding...?
- No 21 Help with pristine weld purging of tubes
- No 25 Weld Purging Best Practice
- No 41 Orbital Weld Purging
- No 43 Principles of Tube and Pipe Weld Purging
- No 49 Weld Purging with Preheat
- No 55 Purge Gas for Duplex Steel Welding

www.huntingdonfusion.com
Huntingdon Fusion Techniques HFT®’s  Construction of a new access to the Willamette River was necessary, as part of a plan to replenish a salmon hatchery but this necessitated removal of part of a 10-inch (254 mm) pipeline that was causing an obstruction.

The pipeline had been isolated and abandoned previously and filled with water that had probably become polluted. Simply cutting the pipeline would release over 1 million 300 thousand gallons (5,000 m³) of contaminated water into surrounding land lying within a sensitive, environmentally protected area. A decision was made to use liquid nitrogen to create ice plugs and isolate the small section of pipe causing the obstruction. The pipe could then be cut, releasing only limited contaminated water and this could be contained and removed from the site.

Pits were excavated on either side of the access exposing the pipe and the anti-corrosion coating was removed. Freezing commenced in the early morning in record high temperatures combined with little to no shade in the area.

The pipe was cut on both sides and the remaining contaminated water drained to disposal containers for removal. Welders quickly capped the open ends. The freeze equipment was shut down and the ice plugs allowed to thaw naturally. The proposed river access refurbishment was allowed to continue the following week bringing life back to a vital natural habitat.

The equipment employed for the freezing operation was an Accu-Freeze™ System. The procedure creates an in-line ice plug capable of withstanding 140 bar in pipes up to 12-inch (305 mm) diameter and can be modified using available options to handle even larger diameters.

A specially designed insulated aluminium jacket is placed around the required section of pipe to be frozen. An advanced temperature-monitoring unit controls the surface wall temperature of the pipe to accurately and safely create a short ice plug that does not extend outside the jacket.
LIQUID NITROGEN FREEZING SOLVES PIPE CUTTING PROBLEMS

Accu-Freeze™ automatic and can be remotely operated making it attractive for use in nuclear applications and other locations where engineer access has to be restricted. Freezing using liquid nitrogen is effective down to -184°F (-120°C) so is suitable for isolating sections of pipe carrying petrochemicals so that valves and other control devices can be removed without the expense and delays involved in draining the system.

The concept of isolation using liquid nitrogen had been used in the past to resolve major problems with a NASA launch vehicle and inside large chemical plant2.

With the space shuttle Atlantis on the launch pad ready to go on mission ST-101 a last-minute system check revealed a fault in the power drive unit. The PDU is an hydraulic power pump which controls the shuttles’ rear rudder or air brake so failure of this unit during flight could be catastrophic.

Repairing this sensitive system conventionally meant suspending the launch, rolling the shuttle back to the vehicle assembly building and draining out the hydraulic lines to undertake repairs. This would delay the launch for several weeks and be extremely costly.

The solution was to use liquid nitrogen to freeze six 16 mm hydraulic fluid lines either side of the faulty PDU and then remove and replace it. There were demanding requirements. The lines were nested in the base of the tail of the shuttle and physical access was restricted and Shuttle engineers needed to be able to monitor and control the temperature of the pipes in order to ensure that the freeze was being safely and consistently controlled.
Conclusions

Pipe freezer technology allows fluids to be frozen below -238°F (-150°C) using liquid nitrogen. Specially designed insulation and feeder hoses are used to deliver coolants and continuous temperature control during the freeze operation can be incorporated.

The use of freeze technology affords the opportunity to isolate sections of pipework for maintenance, repair and replacement of valves, couplings and instrumentation and thus obviates any need to drain the system. There is no need to disrupt production beyond the time needed to freeze and undertake changes.

References

1. www.dfw.state.or.us/fish/HOP/Willamette%20HOP.pdf

Note for editor; The HFT® White Paper, referenced above, has been prepared for internal use and not previously published. It contains an extended version of the NASA project and a separate case study using liquid carbon dioxide as the freeze medium. We could submit this to you for possible future publication.

By Dr. Michael J. Fletcher M.Sc. Metallurgy
Delta Consultants
KEEP A CLOSE ‘EYE’ ON YOUR PURGE

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