

ARGWELD® Weld Backing Tape® and Weld Purge Tape®



Extending the **Argweld®** range of purging products, Huntingdon Fusion Techniques HFT® are providing an economical non metallic weld backing system for the backing of welds, where purging is required but not easily achieved, for quality and for supporting weld roots to improve weld bead profiles.

The latest addition to the Weld Backing Tape® range is the 600 Amps tape to support very high welding currents.

Typically for the welding of thin wall stainless steel sheet and vessels from one side only, the backing tape can be attached to the backside of the weld, to support the weld pool, keep the argon from the weld torch surrounding the weld pool and eliminate the need to back purge, while giving a consistent high quality underbead profile.

For purging large vessels the tremendous savings of purge gas and waiting time, pays for the use of the backing tape many times over.

The high temperature heat resistant adhesive aluminium backing foil is 75 mm (3 inch) wide and in the centre is a heat resistant band of woven glass fibre cloth 25 mm (1") wide.

The glass fibre cloth has a weight of 1000 grams per square metre.

The 80 Ampere tape comes in rolls of 25 m (80") length and the 160, 240 and 600 Amps tape rolls are 12.5 m (40") long.

With the thickest cloth Argweld® **Backing Tape®** will support single pass welding at weld currents up to 600 Amps, without change to the chemistry or metallurgy of the weld.

FEATURES:

- Speeds up production.
- Provides back purge facility.
- Ideal for stainless steel and alloyed metals.
- Saves cleaning costs.
- Massive purge gas savings.
- Eliminates weld defects.
- Suitable for sheet, plate, pipes, vessels.
- For horizontal or vertical welding.
- No gouging or grinding.
- No re-welding or rework.

Glass fibre tape materials – the cost-effective solution to weld backing

For the majority of applications for fusion welded joints it is unnecessary to go to the trouble and expense of ensuring fully continuous transition of metal between parent materials. The fillet weld and the partial penetrating butt weld are thus adequate in many circumstances: employed intelligently they are capable of meeting many structural requirements and as a consequence are in widespread use throughout manufacturing engineering.

There remain nonetheless some demanding requirements where maximum joint strength is mandatory. Products subjected to mechanical fatigue, corrosion resistance or thermal cycling in end-user industries such as nuclear engineering, aerospace and power generation need joints of optimum quality in order to provide an acceptable level of insurance against service failure. For these critical applications the fully penetrating butt weld is essential.

The penetrating capability of the arc process determines whether or not a square edge preparation is adequate. With the MMA and TIG techniques the maximum material thickness which can be welded from one side is usually taken as about 3 mm. Using a high current MIG technique allows this thickness to be raised to around 6 mm. For thicker materials it becomes necessary to cut back the edges to provide access for the torch. The simplest preparation of this type is the single-V and the joint is filled using a multiple run with each pass fusing into the previous one and into the adjacent side walls. The first pass is referred to as the root run and it is the quality of this deposit which ultimately determines the overall quality of the finished joint. The fundamental requirement of the root run is to provide continuous fusion between the two materials along their length and this can be achieved in a number of different ways.

The most direct technique is for the welder to exercise total control over the deposit, producing an acceptably smooth underbead of constant width with no significant surface oxidation products. The root gap plays an important part here in ensuring consistency of penetration; too wide and there will be over-penetration,

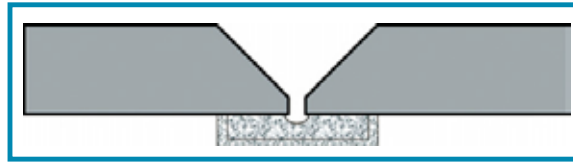


Fig. 1. Ceramic tile backing.

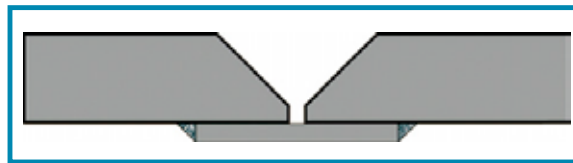


Fig. 2. Permanent backing.

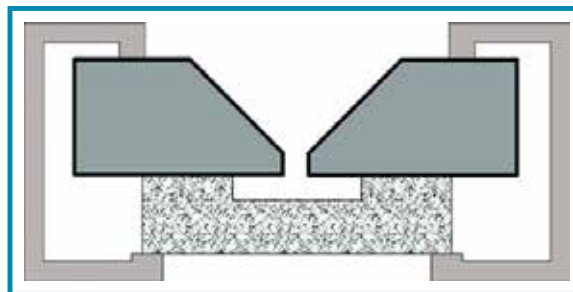


Fig. 3. Temporary backing.

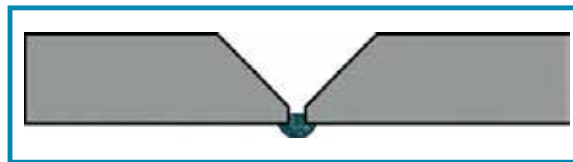


Fig. 4. Consumable insert.

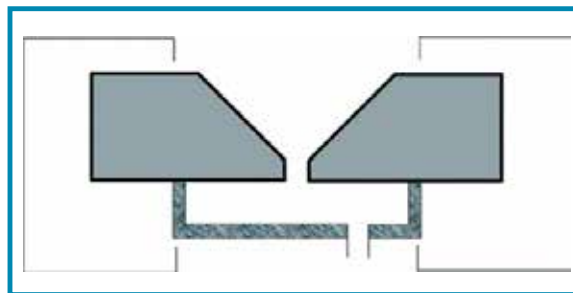


Fig. 5. Gas purge backing.

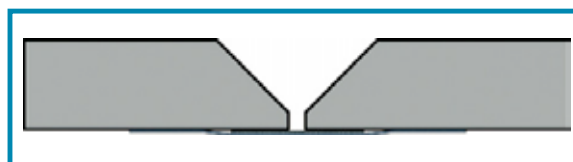


Fig. 6. Tape backing.

too small and there will be inadequate penetration. Achieving consistency requires a level of skill on the part of the welder which is not always available.

To counter this need for high levels of welder skill, mechanical methods of weld-bead control have been developed. In circumstances where access to the rear of the

joint is possible, the external bead profile can be machined or ground to an acceptable form – perhaps even to produce a smooth, flat continuous surface. Alternatively the bead can be deposited from the rear of the joint and the internal profile treated. Where access to the rear of the joint is not possible, recourse to physical weld bead or backing support is the only alternative. The following represents the range of backing solutions available:

- 1 Ceramic tile backing strip
- 2 Permanent backing bar
- 3 Temporary backing bar
- 4 Consumable inserts
- 5 Inert gas
- 6 Glass reinforced fibre tape.

Ceramic tile backing strip

This technique has been designed to meet the requirements of the slag processes, submerged arc, flux cored MIG and MMA welding. The slag is contained within the tile recess below the weld and protects and shapes the external bead. The ceramic tile method is relatively expensive and not widely used.

Permanent backing bar

Protecting and shaping the weldbead by providing a permanently attached strip of similar material to that being welded is popular. It is cheap, easily applied and needs little specialist skill. It does, however, present the potential drawback of becoming a permanent feature of the joint which may be undesirable from an aesthetic point of view: it also presents an undesirable fatigue notch at the weld root.

Temporary backing bar

To overcome the disadvantages of the integrated backing bar a support can be clamped in place and removed after the joint has been completed. To avoid the possibility of welding the bar to the joint these temporary supports are often water cooled and manufactured from copper. The supports are expensive to produce and the application is time-consuming, particularly for low volume manufacture.

Consumable inserts

Shaped inserts are available in a range of materials designed to be metallurgically compatible with the weld metal. During deposition of the root bead, the insert is melted into the weld pool. This solution is capable of producing a consistent root profile but is expensive and is available only in a limited range of materials.

Inert gas

Although originally intended to be used in the butt welding of tube using the TIG process, inert gas backing has been extended to linear butt welds. By providing nominal gas sealing at the ends of the joint seam it is possible to create a gas pressure under the bead sufficient to provide protection from contamination and support for the molten metal. Inert gas backing is expensive but, well applied, capable of producing good root profiles.

Glass reinforced tape

Self-adhesive, thermally stable and inert tape is simply applied to the underside

of the joint. The tape provides good mechanical support to the weld and prevents contamination. It is easy to use, requiring no special skills. This tape solution remains surprisingly underused and relatively unknown.

One example of the fibre tape is provided by the “Argweld” product manufactured by Huntingdon Fusion Techniques. “Argweld” is suitable for most common materials such as carbon, alloy and stainless steels, cast iron and for copper, nickel and titanium alloys and it can be used in conjunction with the MMA, TIG and MIG processes. The standard product can be used up to 80 A and heavier tapes are available for application up to 160 A and beyond. “Argweld” is essentially a 75 mm wide strip of adhesively-backed aluminium foil centrally overlaid with a 25mm band of woven continuous filament glass fibre cloth and is supplied in 12.5 m lengths. The tape is simply cut to length and stuck to the underside of the joint to be welded. The thermally stable woven fibre prevents overpenetration of the fusion zone but shapes the underbead to produce a positive reinforcement which is continuous and uniform and which blends smoothly to the parent material on each side. The tape can be removed by peeling it away from the weld zone.

Technical data

Composition of fibre: oxides of silicon, aluminium, calcium, boron and magnesium fused in an amorphous vitreous form. Fibre diameter: filament diameters between 6 and 25 microns; boiling point 800°C; non-flammable and non-burning; non-carcinogenic.

Commercial data

Cost savings are well illustrated by comparing tape products with gas purging on a circumferential weld in a 3 m diameter tank 5 m long. The minimum recommended purge would consume double the tank volume in gas at 70 l/min. The purge process would thus take 16 hours and the gas alone would cost in excess of Euro 600. The cost of “Argweld” tape for this requirement would be Euro 30.

Michael J. Fletcher, Milton Keynes/UK

Table 1. Characteristics of backing methods.

Illustration	3	4	5	6	7	8
Additional Machining	none	none	Groove in strip	None	None	Gas containment
Special Requirements	purchase ceramic tiles, clamping	lack welding	Clamping	Purchase inserts, location	Purchase tape	Clamping
Time Utilisation*	4	2	5	3	1	6
Welder skill Level*	4	1	5	3	2	6
Cost of Materials*	5	1	4	3	2	6
Overall cost*	5	2	4	3	1	6

*1 to 5, low to high

OTHER PURGING PRODUCTS

ARGWELD® WELD TRAILING SHIELDS®



The Argweld® **Weld Trailing Shields**® are designed for high quality gas coverage of titanium, duplexes and other reactive metals while welding.

They can be supported to fit any make of TIG or plasma welding torch for manual and automatic welding on pipes, vessels or flat plate.

By using an Argweld® **Weld Trailing Shields**®, welds will be left bright and shiny and eliminate discolouration, oxidation, porosity, etc.

Argweld® **Weld Trailing Shields**® will reduce gas consumption, save re-work and eliminate wasted material costs due to oxidation.

The Argweld® **Weld Trailing Shields**® are manufactured to suit each application, with versions for flat plate or sheet, for any diameter of tube, pipe or vessel and radiused for welding on the outside or the inside of vessels.

ARGWELD® PURGELITE® INFLATABLE TUBE AND PIPE PURGING SYSTEMS



The Argweld® **PurgElite**® **Inflatable Tube and Pipe Purging Systems** are a twin dam system for creating a purge area in all pipe and fitting sizes of 1 - 24" diameter (25 - 610 mm) .

The systems isolate a 10" length either side of the weld and allow quality, fast purging of the interspace and easy withdrawal afterwards.

PurgEye® 100 IP65 Dustproof and Waterproof Weld Purge Monitor®



The **PurgEye**® IP65 which is our most popular instrument Worldwide. This is a portable, battery operated, general purpose instrument for use in workshops as well as on construction sites for all tube and pipework, as well as for chamber purging and basic testing of weld purge gas supplies.

ARGWELD® WATER SOLUBLE WELD PURGE FILM®



The use of water soluble purge film for manufacture of purging dams is well proven and the Argweld® **Purge Film**® gives superior results over all other water soluble products. It can be used for stainless, duplex and chrome-moly steels as well as titanium.

The Argweld® **Water Soluble Weld Purge Film**® makes dams which produce an impenetrable purge barrier but which can easily be washed away when hydrostatically testing the pipe or just by normal wash out.

It dissolves completely without leaving any fibres to clog up filters or other sensitive parts in a system and it is strong in all directions so that it can maintain a good gas barrier throughout the purging process.

The film and adhesive are completely biodegradable and all packaging materials are recyclable.



HUNTINGDON FUSION TECHNIQUES ■ HFT

Other HFT® Weld Purging Products

Argweld® Inflatable Tube Pipe & Pipeline Weld Purging Systems
Argweld® PurgEye® Weld Purge Monitors®
Argweld® Weld Purge Film® & Weld Purge Super Adhesive®
Argweld® Weld Backing Tape™ & Weld Purge Tape™
Argweld® Weld Trailing Shields®
Argweld® Flexible Welding Enclosures®
Argweld® Weld Purge Plugs™ & Orbital Welding Plugs
Techweld® MultiStrike® Tungsten Electrodes

Our HFT Pipestoppers® Division

Nylon, Aluminium, Steel and Rubber Pipe Plugs and Inflatable Stoppers