

# IMPAX WELD / TIG-WELD

## Welding of mould steel

Impax Weld is a basic coated electrode and Impax TIG-Weld is a TIG filler rod special composed as to be compatible with the Uddeholm mould steel Uddeholm Impax Supreme.

Impax Weld and Impax TIG-Weld give a weld metal almost identical in composition to Uddeholm Impax Supreme.

Hardness after welding approx. 330 HB gives a weld metal well matched to the base mould steel, with good polishability and suitable for photoetching.

### IMPAX WELD

Diameter		Length		Current A (DC+)	Voltage V
mm	inch	mm	inch		
2,5	0,10	350	14	90–110	23
3,25	0,12	350	14	120–150	24
4,0	0,16	350	14	170–200	26

Redrying temperature 350°C (660°F) 2 hours.

### IMPAX TIG-WELD

Diameter		Length	
mm	inch	mm	inch
1,0	0,04	1000	40
1,6	0,06	1000	40

## Storage of electrodes

Always keep the electrodes in a thermostatically controlled drying cabinet at 50–150°C (120–300°F) once the package has been opened. The electrodes can be stored unpacked as long as they are kept in the cabinet. Make it a rule that electrodes used for welding are clean and absolutely dry.

## Welding of Uddeholm Impax Supreme General

Good results when welding tool steel can be achieved if proper precautions are taken during welding (elevated working temperature, joint preparation, choice of consumables and welding procedure).

Welding method	Gas Tungsten Arc Welding GTAW/TIG	Shielded Metal Arc Welding SMAW/MMA
Filler metal	IMPAX TIG-WELD	IMPAX WELD
Hardness as welded	300–330 HB	300–330 HB

## Cleaning of tool

Clean the tool carefully with degreasing agent or by grinding before welding. The surfaces in the vicinity of the intended repairs/adjustment should be cleaned to base metal prior to doing anything. Make sure that cavity surfaces are well protected during welding, especially if these are polished.

## Joint preparation

For a satisfactory result, it is imperative that the region to be welded is carefully prepared. Cracks should be ground out so that the joint bottom is well rounded and such that the sides make an angle of at least 30° to the vertical. Any damage occurring during welding should be ground down to “sound steel” before re-welding.

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty for fitness for a particular purpose.

Classified according to EU Directive 1999/45/EC For further information see our “Material Safety Data Sheets”.

Edition: 2, 04.2007

## Preheating temperature

The temperature of the tool during the entire welding process should be maintained at 200–350°C (390–480°F). This is best achieved using electrical heating elements. If the tool is preheated in a furnace prior to welding, then it is important that the furnace temperature is below 175°C (350°F) when the tool is put in.

Small repairs can be made by TIG welding at room temperature. Max. interpass temperature 375°C (705°F).

When welding with MMA preheating is recommended.

## Building up the weld

The root runs should be made with a small-diameter electrode ( $\varnothing$  max 3.25 mm). If TIG welding, the current should be limited to 120 A.

The first two runs should always be welded with the same low heat input, while a greater heat input can be used for the remaining layers.

Ensure that the heat from each run tempers the previous run. Hence even for very minor repairs, the minimum number of runs should be two.

Use a short arc and weld in separate runs. Do not oscillate the gun. Angle the electrode 90° to the joint sides in order to avoid undercut. In addition, the electrode should be held at an angle of 75–85° to the direction of forward movement.

For small repairs and for the final runs along the fusion line, TIG welding is to be preferred. The transition region between weld and base steel should be carefully inspected prior to finishing welding. Arcing sores or undercut should be repaired while the tool is still hot. After welding, the final layer of weld metal is ground away prior to any further treatment.

If the tool is to be polished or photo-etched TIG welding is to be preferred, so that pores, arcing sores or undercut can be avoided.

## Treatment after welding

The tool should cool slowly the first two hours 20–40°C/h (35–70°F/h), then freely in air.

For large weld repairs a stress-relieving is recommended at 550°C (1020°F) during 2 h.

If the tool is to be polished or photo-etched following heat treatment is recommended:

*Polishing:* tempering temperature 550°C x 2 h (1020°F x 2 h).

*Photo-etching:* tempering temperature 610°C x 2 h (1130°F x 2 h).

For more detailed information, ask your Uddeholm representative for the brochure “Welding of Tool Steel”.



Uddeholm Impax Supreme welded with a dissimilar filler rod.



Uddeholm Impax Supreme welded with a filler rod of matching composition.

### FURTHER INFORMATION

Please contact your local Uddeholm office for further information on the selection, heat treatment, application and availability of Uddeholm tool steels. For more information, please visit [www.uddeholm.com](http://www.uddeholm.com) or [www.assab.com](http://www.assab.com)