



Specially Coated Electrode Designed to
Repair H-Class Hot Work Tool & Die Steels

ToolTectic® 6NHW



- Ideal solution for welding H Series Tool Steels
- Weld deposits show minimum heat crazing
- Deposits maintain excellent hot-hardness properties
- Formulated for surface modification of low alloy steels

ToolTectic® 6NHW

ToolTectic 6NHW is a coated electrode modified to weld H-series tool steels such as H11, H12, & H13 and to surface enhance lower alloy Tool & Die steels during composite fabrication. Weld deposits show minimum heat crazing and are tolerant of high and inservice quenching operations. Deposits maintain excellent hot-hardness properties.

TECHNICAL DATA

Typical Values	
Hardness:	50 - 53 HRC as-deposited
Hot Hardness:	45 - 50 HRC up to 1200°F (648°C)
Annealing Temperature:	1600°F (871°C)
Hardening Temperature:	Typically 1850°F (1010°C) followed by air quenching
Tempering Temperature:	900 - 1200°F (482 - 649°C), also known as the "draw" temperature
Preheat Temperature:	950 - 1000°F (510 - 537°C) when welding H11, H12, and H13 grades. For general applications a preheat of 400°F (204°C) is suitable.
Inter-pass Temperature:	900 - 1150°F (482 - 621°C) when welding H13-grade steel. For general applications use a $\pm 50^\circ\text{F}$ inter-pass range.
Current & Polarity:	DCEP (+) and AC

PROCEDURE FOR USE

PREPARATION: Clean weld area of scale and/or oxide and degrease using VOC-free cleaners. Dye penetrant test to locate cracks. Prepare cracks by grinding so as to generate a "U" profile. For enclosed cracks without an end point continue the preparation some 1" (25mm) ahead of the crack. Preheat slowly according to the grade and heat treated condition of the tool or die.

TECHNIQUE: Maintain a short arc length and do not use a contact technique. Use stringer beads & back whip craters to reduce crater-cracking tendencies. Check the inter-pass temperature frequently.

POST-WELDING: Parts should be covered with a heat-retardant blanket or placed in a pre-heated furnace for controlled cool-down.

SUGGESTED WELDING PARAMETERS:

Diameter	Amperage
3/32" (2.4mm)	55 - 70
1/8" (3.2mm)	85 - 125
5/32" (4.0mm)	115 - 155

TYPICAL APPLICATIONS

For H-series tool steels, particularly grade H13. This grade, and other grades, are typically used for repairing forging dies, hot piercing punches, die casting dies and gripper and header dies. Weld deposits maintain impression profiles over many forging cycles and resist time-in-service tempering while maintaining superior toughness.

Observe normal welding practices, respiratory protection and proper air flow pattern advised. For general welding practices, see AWS publications Z49.1 "Safety in Welding and Cutting and Allied Process". Welding is a completely safe process when performed in accordance with proper safety measures. Become familiar with local safety regulations before beginning welding operations. DO NOT operate welding equipment or use welding materials before you have thoroughly read the proper instruction manual(s). Please refer to the Eutectic internet site for Material Safety Data Sheet (MSDS) information. DISREGARDING THESE INSTRUCTIONS, AND/OR THE INSTRUCTIONS OF WELDING EQUIPMENT OR MATERIAL MANUALS, MAY BE HAZARDOUS TO YOUR HEALTH.

