

## **TYPICAL WELDING PROCEDURE**

The procedures that follow are those that should be used when repairing most all iron based tools and dies. **Pay close attention to the base metal that is called out and the preheating, postheating, and tempering temperatures that are recommended.**

The following procedures should be utilized for the repair of

### **A.I.S.I./S.A.E. 4340 MODIFIED TOOL STEEL.**

- A.** Qualify the base metal composition, if possible.
  - B.** Visually inspect the tool or die to determine the reason for failure and establish the exact area of repair. Record any dimensions that will be altered during the course of repair for reference when remachining to original dimensions.
  - C.** Machine, grind, or **Arc Air Gouge** defective areas, etc. If arc air gouging is the preparation method to be used, **then preheating before preparation must be exercised.** Preparation for welding by remachining or grinding does not require preheating.
  - D.** **Preheat 800°F. - 1000°F.** for one hour per inch of thickness.
  - E.** Select the appropriate welding process for the repair condition encountered.  
Choose one or more of the following welding processes.
    - 1. The **G.T.A.W.** or tig process, using direct current straight polarity (D.C.S.P.) with 100% argon shielding gas; or
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2. The **S.M.A.W.** or stick electrode process; or
  3. The **G.M.A.W.** or wire welding process **using direct current reverse polarity (D.C.R.P.)** for both processes use 75% argon, 25% Co<sub>2</sub> shielding gas with flow rate of 60-90 C.F.H. when using the wire process.
- F. Alloy Selection:** Select an alloy that meets the service requirements of the tool or die while in operation.
- G.** Peen each weld deposit immediately after breaking arc.
- H.** Eliminate all undercuts, square-up rounded corners, etc.
- I.** Immediately after welding, the dies should be **post heated** back to **preheat temperature 900°F. - 1000°F.** to equalize weld deposit and tool or die temperature prior to slow cooling. **If the preheat temperature has been maintained during welding, this step may be skipped; thereby , commencing immediately to the following step.**
- J. Slow cool** welded tool or die to room temperature for a minimum of **150°F.**
- K. Temper** the welded tool or die by immediately placing the section into the furnace at a temperature that is conducive to the required hardness of the welding alloy being used. **\*Refer to the welding alloys temper curve.**
- L.** Slow cool to 150°F. minimum.
- M.** Double temper – **(strongly encouraged) same as above.**
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- N.** Slow cool.
  - O.** Commence with machining.
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