

Dated: October 21, 1987

Revised: August 23, 2000

INTRODUCTION

Eureka No. 650 Electrode was developed for the forging industry's need for a companion to **Eurekamatic No. 650 Alloy Cored Wire**. They are utilized for partial repair and for finishing die surfaces to eliminate low spots and undercuts where flood welding has been performed. They are also used where the Eurekamatic process is not practical.

METALLURGICAL CHARACTERISTICS

Eureka No. 650 Electrodes are a high Molybdenum tool steel, modified with Tungsten for increased red hardness and resistance to heat checking. Weld deposits of this alloy are extremely dense and hard but still impart good impact resistance. Typical as welded hardness is 49 – 54 HRC.

RECOMMENDED APPLICATIONS

Eureka No. 650 Electrodes are recommended for the partial repair of press and hammer hot forging dies. They are very useful for repairing forging dies, flash lands and other areas that are worn out where the balance of the impression is in good shape. E.D.M. machining process is recommended. They are also good for the repair of dies that are used to forge non-ferrous alloys; **EXAMPLE** (Aluminum, titanium, magnesium, etc.)

PREPARATION AND WELDING PROCEDURE

1. Impressions or surfaces to be welded must be free of scale, dirt, or any other foreign matter.

PREPARATION AND WELDING PROCEDURE

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2. All cracks and heat checks must be removed entirely. This can be accomplished by grinding or machining and or air carbon arc gouging.
Note: If air carbon arc gouging is to be utilized. Then preheating prior to gouging will be necessary. In stock removal, allow at least three layers (3/8") of weld metal to guard against dilution or admixture with the base metal.
3. Select a preheat temperature according to the base metal (heat for one hour per inch maximum cross sectional thickness at temperature.)
4. Select D.C. reverse polarity.
5. Select the proper diameter electrode according to job size or repair area.
6. Select the lowest amperage needed to effectively weld so as not to overheat or disturb the base.
7. Utilize short 3" – 4" stringer beads – peening thoroughly after each pass to offset shrinkage and welding stress in the crater of the weld.
8. Control interpass temperature as close as possible to preheat temperature.
9. After welding, **post heat** at the same temperature used to preheat to equalize thermal gradients.
10. After post heating, slow cool the die by covering it with heat resistant blankets (Kaowool, Cerawool) to 150°F. minimum.
11. Return the die or component to the furnace for tempering. Temper the die or component according to the temper chart of the welding alloy for desired hardness.
12. Remove from furnace and slow cool (**same as Step 10**).
13. Double temper (**highly recommended**).

WELDING PARAMETERS

Type	Size	Amp Range
650	3/32"	@ 90 – 95
	1/8"	@ 110 – 125
	5/32"	@ 140 – 155
	3/16"	@ 170 – 185
	1/4"	@ 220 – 240

MECHANICAL PROPERTIES

Single Tempered at 1000°F.

50 – 51 HRC

Tested at 700°F.

Tensile Strength P.S.I.	Yield Strength P.S.I.	Elongation %	Reduction in Area %
213,000	176,000	1.5	3.0

Charpy "V" Notch Impact

Double tempered at 1050°F.

Energy Foot Pounds: 12.3

TEMPERING DATA

The hardness values and tempering temperatures assigned to Eureka's products are only approximations and should only be referred to as a guide.

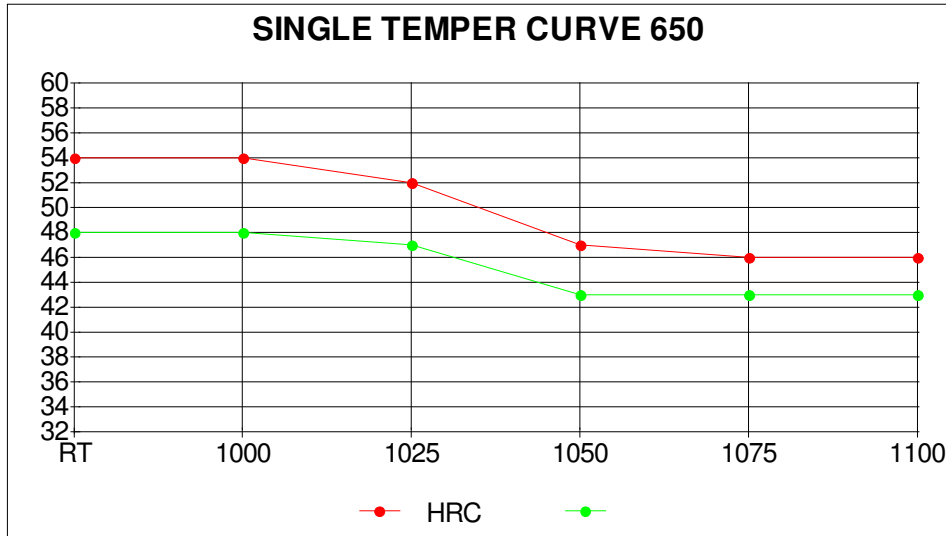
The hardness value and tempering temperatures displayed in the charts on page 4 were obtained under optimum conditions. The values your staff obtains will vary according to the procedures and use of equipment that may be utilized; therefore, a hardness range is given rather than a specific value.

To read the tempering charts on page 4, follow temperature line up to lower and upper intersecting points and read approximate hardness range.

TEMPERING DATA

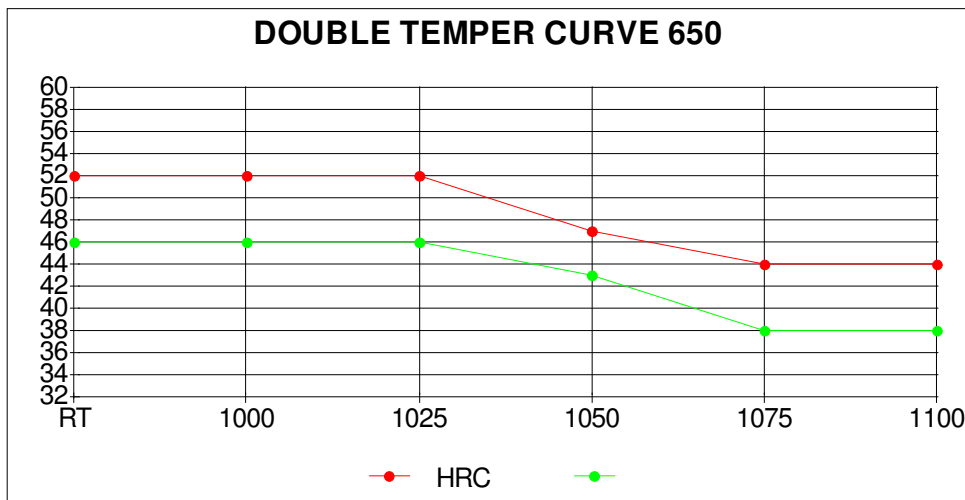
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Tempering Temperature °F.

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Tempering Temperature °F.