

MOLEX® #13

Hot Work Tool Steel

Molox #13 is a versatile hot work steel that can be widely used in various hot and cold work tooling applications. The combination of good red hardness and abrasion resistance, with the ability to resist heat checking, makes **Molox #13** a popular work horse in many applications. **Molox #13** withstands drastic cooling from high operating temperatures.

The hot hardness (hot strength) of **Molox #13** resists thermal fatigue cracking which occurs as a result of heating and cooling cycles in hot work tool applications. This ability to resist thermal fatigue considerably increases the service life of your die.

Molox #13 should be considered as an upgrade for applications calling out for H-13.

Thermal Treatment Summary*

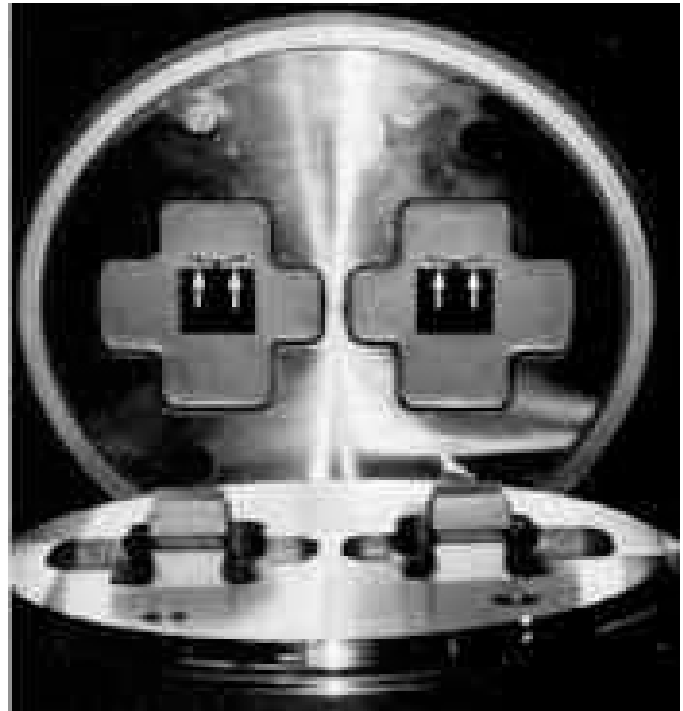
Annealing – Annealing must be performed after hot working and before re-hardening. Heat at a rate not exceeding 400°F per hour to 1575°F/1675°F, and hold at temp. for one hour per inch of max thickness; 2 hours minimum. Cool slowly, not exceeding 50°F per hour to 1000°F. Continue to cool in ambient temp.

Hardening – Preheating: Use a double preheat on complex tools. Heat at a rate not exceeding 400°F per hour to 1150°F/1250°F, equalize, then raise to 1500°F to 1600°F and equalize. For normal tools, use only the second temperature range as a single preheating treatment. **Quenching:** Air, pressurized gas, or warm oil. *For pressurized gas quenching, a minimum rate of 50°F per minute to below 1000°F is required to obtain the optimum properties in the steel.* For oil, quench until black, about 900°F, then cool in still air to 150°F/125°F.

Tempering – Temper immediately after quenching. Typical tempering range is 1000°F/1150°F. Hold at the tempering temp. for 1 hour per inch of thickness, but for 2 hours minimum, then air cool to ambient temp. Double tempering is required. To maximize toughness and tool performance, a third temper is often used as a stress relief after all finish work is completed.

- 400°F typical hardness Rockwell 54 “C”.
- 1100°F typical hardness Rockwell 46 “C”.
- 1200°F typical hardness Rockwell 36 “C”.

*Above values are typical and are not guaranteed.



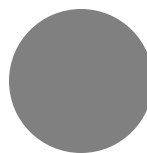
Advantages

- **Excellent Shock Resistance**
- **Good Red Hardness**
- **Good Wear Resistance**
- **Resists Thermal Fatigue Cracking**
- **Excellent Toughness**

Typical Applications

Extrusion Dies	Shot Sleeves
Trimmers Dies	Plastic Mold Cavities
Gripper Dies	Die Casting
Hot Shear Blades	Hot Forging Dies
Casings	

Available Sizes*



Rounds



Squares



Flats

*Call for availability on all sizes.