

**Redstar HWD** is a 5% Chrome, High Vanadium Hot Work Tool Steel that is commonly regarded as “The most forgiving hot work die steel”. You cannot find a more universally accepted tool steel to provide resistance to thermal shock (readily stands up to tool temperatures to 1000°F).

**Redstar HWD** is easier to machine than most Hot Work Tool Steels. It will provide uniform hardness throughout even massive sections, and withstands the stress of drastic cooling from high temperatures, such as with extrusion press tooling.

Primary use is for dies used with Aluminum and Non-Ferrous metals.

Machinability at full anneal is 75%, where a 1 percent carbon steel is equal to 100%.

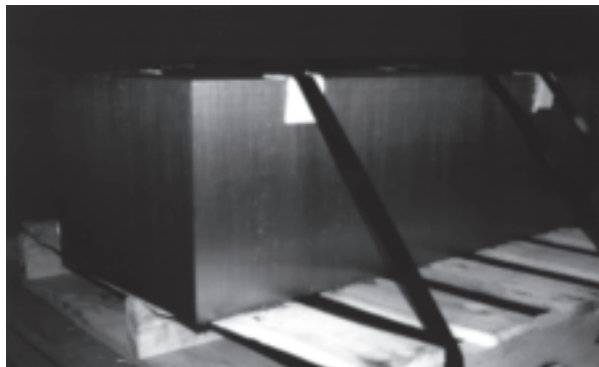
**Redstar HWD** is an air hardening grade of tool steel that provides all of the advantages of an air hardening grade; most notably non-deforming characteristics.

Less decarburization in thermal treatment than other tool steel grades. Heat treat in a near neutral atmosphere. Surface grind, if possible, following heat treatment.

**Redstar HWD** is found in almost every tool room, where it is used to replace many other grades of tool steel.

If you need a brute, tough, resilient tool steel that is easy to work with, and is very forgiving, consider **Redstar HWD**.

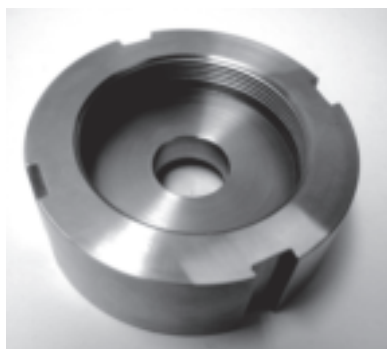
*Consider **Redstar HWD** as an upgrade for H-13 type tool steel.*



**INQUIRE ON LARGE ROUNDS**

## Advantages

- RESISTS THERMAL FATIGUE CRACKING
- HIGH HARDNESS FOR RESISTANCE TO WEAR
- NON-DEFORMING PROPERTIES
- EXCELLENT TOUGHNESS
- EXCELLENT SHOCK RESISTANCE
- GOOD MACHINABILITY
- GOOD RED HARDNESS
- GOOD SIZE STABILITY
- SAFETY IN DRAMATIC TEMPERATURE CHANGES



## Typical Applications

Hot Forging Dies	Bolsters
Hot Shear Blades	Die Casting
Shot Sleeves	Gripper Dies
Trimmer Dies	Plastic Mold Cavities
Extrusion Dies	Mandrels
Dummy Blocks	Hot Upset Dies
Ejector Pins	Core Pins

## Availability

Please contact our offices for the latest in-stock items. We offer Rounds, Squares, and Flats.

## Surface Condition\* Pre-Machined (As Supplied)

Ground Top and Bottom (+.015"/+.035" oversize)  
Sides Saw Cut (+.125" oversize)  
Length Saw Cut (+.250" oversize)

## Heat Treatment

**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 1 hour per inch of max thickness; 2 hours minimum. Cool slowly, not exceeding 30°F per hour to 1150°F. Continue to cool in ambient temp. Proper annealing includes packing in a sealed container, using inert neutral material.

**Forging** – Do not forge.

**Hardening / Preheating** – Preheat thoroughly at 1350°F. Then raise heat temperature to 1850°F and hold for one hour per inch of greatest cross section or actual thickness. **NOTE:** Heat slowly to temperature.

**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 to 125°F.

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