



Viscount 44[®] Prehardened Tool Steel

- **Ready to use** - Bypass costly and time-consuming heat treatment
- **Hardness of 42 - 46 HRC** - Strength level over 150,000 psi
- **Eliminates size change** - No movement in heat treatment
- **Ideal for Prototypes** - Short lead time, easier engineering changes
- **Cuts Downtime** - Replace broken or worn tooling quickly
- **Machinable and Weldable** - Use for jaws, hold-downs, and fixtures

Typical Composition

C	S	Si	Cr	Mo	V
0.40	0.10	1.00	5.25	1.35	1.00

Viscount 44 is a free-machining, prehardened, H13-type hot work tool steel. It is produced using special melting, forging, and heat treating processes, which provide the optimum in control and reproducibility of the performance characteristics of the steel. The sulfur makes the steel readily machinable at the supplied hardness range of 42 to 46 Rockwell C, and the composition provides the strength and wear resistance expected of an H13-type steel. At the supplied hardness, the steel exhibits a yield strength of approximately 156 to 175 ksi (1076 to 1207 MPa), and an ultimate tensile strength of approximately 195 to 219 ksi (1345 to 1510 MPa).

Use of Viscount 44 eliminates time-consuming and costly heat treating, and eliminates the need for post heat-treating finish machining and grinding. In addition, there are no concerns about how the tool might distort during a hardening heat treatment. Tools manufactured from Viscount 44 can be machined directly to finish dimensions.

In hot work tooling applications, Viscount 44 can be used where H13 is commonly used. It excels as short-lead-time prototype dies, short-run die casting cavities, cores, and inserts, and perishable details such as ejector pins. Other hot work applications include shear blades, upsetting dies, piercing punches, and plastic injection tooling.

As a "Ready-To-Use" tool steel, Viscount 44 is a popular choice for a wide variety of cold work tooling applications. Tooling can be manufactured with minimal lead time, and can be easily redressed after wear or damage. Popular applications include tool holders, gripper dies, vise jaws, shear blades, shafts, bending and forming dies, and machine hold-downs and fixtures.

Viscount 44 also excels as a maintenance steel. Worn or broken tooling can be quickly replaced from an in-house maintenance shop inventory to keep manufacturing processes up and running until new standard tooling can be manufactured. Machine downtimes can thus be reduced from weeks to days or from days to a few hours.

Viscount 44[®]

PHYSICAL PROPERTIES

Density: 0.280 lb/in³ (7750 kg/m³)
 Specific Gravity: 7.75

Modulus of Elasticity

Temperature °F	Modulus psi x 10 ⁶	Temperature °C	Modulus GPa
70	30.0	21	206.8
200	29.0	93	199.9
400	27.0	204	186.2
600	28.5	316	196.5
800	27.5	427	189.6
1000	23.0	538	158.6

Machinability: 35-40% of a 1% carbon steel

Thermal Conductivity

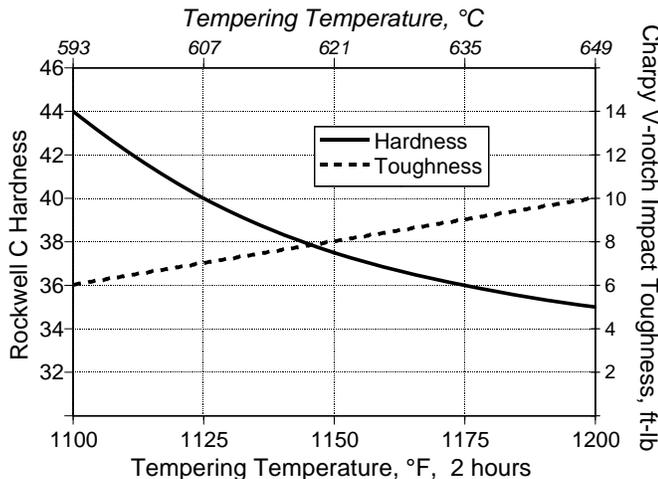
Temperature °F	Btu/hr-ft-°F	Temperature °C	W/m-°C
80	10.17	27	17.6
400	13.52	204	23.4
800	14.50	427	25.1

Coefficient of Thermal Expansion (at 42 to 46 HRC)

Temperature °F	in/in/°F x 10 ⁻⁶	Temperature °C	mm/mm/°C x 10 ⁻⁶
80 - 400	6.3	21 - 204	11.3
80 - 800	6.9	21 - 316	12.4
80 - 1200	7.3	21 - 427	13.1

HEAT TREATING INSTRUCTIONS

Viscount 44 may be tempered to a lower hardness using the tempering curve given below.



Hold at the tempering temperature for 1 hour per inch (25.4 mm) of thickness, but for 2 hours minimum, then air cool to ambient temperature.

NITRIDING: Viscount 44 can be readily nitrided using any of the commercially available nitriding processes. The nitriding parameters should be the same as those used for H13, and the resultant case depth will be similar.

WELDING: Viscount 44 can be readily welded using H13 filler material and standard tool steel welding techniques of preheating, welding at 600 to 1000°F (316 to 538°C), and post-weld tempering.

ANNEALING and REHARDENING: Annealing must be performed before rehardening.

Heat at a rate not exceeding 400°F per hour (222°C per hour) to 1575-1625°F (857-885°C), and hold at temperature for 1 hour per inch of maximum thickness; 2 hours minimum. Then cool slowly with the furnace at a rate not exceeding 50°F per hour (28°C per hour) to 1000°F (538°C). Continue cooling to ambient temperature in the furnace or in air. The resultant hardness should be a maximum of 235 HBW. **Reharden** using the heat treatment parameters for H13 hot work tool steel.

MACHINING

The hardness range of Viscount 44 makes the steel somewhat more difficult to machine than annealed tool steels. In most cases, it is necessary to decrease metal removal rates by approximately 30% compared to machining annealed H13. Usually this is done by decreasing cutting speeds while maintaining similar feed rates and depths of cut. As with all heavy-duty machining, machine tool rigidity and uniform positive feed rates are essential.

For drilling and tapping with high speed steel tools, the use of high-alloy or powder metal steels, such as M42, DuraTech™ M4, or DuraTech™ T15, is recommended. Constant positive feed must be maintained during drilling. Tapping can be improved by drilling oversize holes, reducing the percent thread to 50 to 60%, and liberal use of a good-quality tapping fluid.



The data presented herein are typical values, and do not warrant suitability for any specific application or use of this material. Normal variations in the chemical composition, the size of the product, and heat treatment parameters may result in different values for the various physical and mechanical properties.