

••• T-75 Hot Work Tool Steel

(AISI H-10 A)

WMT-75 is a chromium-molybdenum-cobalt hot work steel that has outstanding resistance to softening when tempering. As a result, it will withstand operating temperatures of approximately 50 to 75°F above those endured successfully by the 5% chromium hot work steels. It has very good thermal fatigue characteristics.

Chemical Composition

Carbon	0.35
Manganese	0.30
Silicon	1.00
Chromium	3.50
Molybdenum	2.50
Vanadium	0.75
Cobalt	3.00

Typical Applications

Aluminum die casting dies and inserts, cores, plungers, sleeves, slides, extrusion dies, die holders, dummy blocks, bolsters, mandrels, forging dies and inserts.



Physical Properties

Critical Temperature – (on heating) 1570°F

Specific Gravity – 7.72

Coefficient of Thermal Expansion

100-800°F 6.66 x 10⁻⁶ in./in./°F

100-1000°F 7.17

100-1200°F 7.47

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Forging

Heating for forging must be done slowly and uniformly. Soak through at 1900°F- 2050°F, and stop work when the temperature drops below 1650°F. After forging, cool slowly in lime, mica, dry ashes, or a furnace. **WMT-75** should always be annealed after forging.

Annealing

Heat slowly to 1550°F- 1650°F, hold until the entire mass is heated through and cool slowly in the furnace (40°F per hour) to about 1000°F, after which the cooling rate may be increased. Suitable precautions must be taken to prevent excessive carburization or decarburization.

Strain Relieving

When desirable to relieve the strains of machining, heat slowly to 1100-1250°F, allow to equalize, and then cool in air.

Preheat for Hardening

Warm slightly before charging into the preheat furnace, which should be operating at 1400-1500°F.

Hardening

WMT-75 is a steel which has medium hardenability and the use of interrupted oil quenching is recommended to obtain optimum properties. The use of a salt bath, controlled atmosphere, or vacuum furnace is desirable to prevent decarburization. If this equipment is not available, pack hardening in spent pitch coke is suggested. The recommended austenitizing temperature range is 1850° to 1950°F. At the lower end of the range, the toughness of the steel will be maximized. At the higher end of the range, the elevated-temperature strength and thermal fatigue resistance will be maximized. For pressurized gas quenching in a vacuum furnace, the quench rate of the work piece to 1000°F must be a minimum of 50°F per minute.

Tempering

Typical tempering temperatures are 1050°F-1150°F, but may be varied depending upon the size of the work piece. Double tempering is mandatory, and triple tempering is recommended. Typical tempered hardnesses are given below for two austenitizing temperatures.

Triple Tempered	Oil Quenched from	
	1850°F	1950°F
900°F	55HRC	59 HRC
950°F	55	59
1000°F	54	58
1050°F	53	57
1100°F	50	53.5
1150°F	42.5	47
1200°F	33	36

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