••• A-8 Tool Steel (ASTM A8)

WM A-8 is an air-hardening tool steel that is characterized by a combination of very good toughness, intermediate wear resistance, & excellent dimensional stability in heat treatment. WM A-8 is an excellent steel for punches and dies that operate in the 55-60 Rockwell C hardness range. The combination of toughness and wear resistance make WM A-8 an excellent choice for applications that require higher toughness than that of the high-carbon, highchromium steels such as D2 & better wear resistance than that of shock-resisting steels such as S7.

For hot work tooling applications, WM A-8 provides better resistance to erosion, wear and wash-out than the typical chromium-molybdenum hot work steels such as H11 and H13. However, it is not recommended for hot applications where thermal fatigue (heat checking) is the primary failure mode.

Chemical Composition

Carbon	0.55
Manganese	0.30
Silicon	0.95
Chromium	5.00
Molybdenum	1.25
Tungsten	1.25

Typical Applications

Punches, drift pins, pneumatic tools, chuck jaws, hammers, hot rolls, and hot and cold shear knives





Physical Properties

Density – 0.281 lb/in³ Specific gravity – 7.78 Coefficient of Thermal Expansion 70 - 800°F 6.65 x 10⁻⁶ in/in/°F 70 - 1000°F 6.88 70 - 1200°F 7.06

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Preheating

Heat at a rate not exceeding 400°F per hour to 1400-1450°F and equalize.

Austenitizing (high heat)

Heat slowly from the preheat.

Furnace or Salt: 1825-1850°F

Soak for 30 minutes for the first inch of thickness, plus 15 minutes for each additional inch.

Quenching

Air, pressurized gas, or interrupted oil to 150-125°F. Note: Sizes over 5 inches in cross section may not achieve full hardness by cooling in still air. It is usually necessary to increase the quench cooling rate between 1400 to 900°F by using an air blast, pressurized gas, or an interrupted oil quench. For the oil quench, quench until black, about 900°F, then cool in still air to 150-125°F.

Tempering

Temper immediately after quenching.

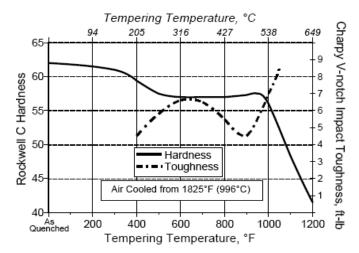
Hold temperature for 1 hour per inch of thickness, 2 hours minimum, then air cool to ambient temperature. The typical tempering range is 300 to 600°F. Double tempering is recommended for tempering temperatures of 900°F and higher.

To minimize internal stresses in cross sections greater than 6 inches and to improve stability in tools that will be EDM'd after heat treatment, a soaking time of 4 to 6 hours at the tempering temperature is strongly recommended.

Cryogenic Treatment: Some prefer to do cryogenic treatment as an extension of the quench from the austenitizing treatment. Others prefer to cryogenically treat after tempering.

HEAT TREATMENT RESPONSE

As Air Cooled from	HRC	
1750°F (954°C), 30 minutes	60	
1800°F (982°C), 30 minutes	61.5	
1825°F (996°C), 30 minutes	62	
1850°F (1010°C), 30 minutes	62	
1900°F (1038°C), 30 minutes	61.5	



Tensile Properties

	Tensile		Yield							
	Strength		Strength		EL	RA				
HRC	ksi	MPa	ksi	MPa	%	%				
18	103	710	65	448	24	41				
40	184	1269	165	1138	12	29				
52	265	1827	225	1551	9	22				
56	297	2048	250	1724	10	7				

Annealing

Annealing must be performed after hot working and before rehardening.

Heat at a rate not exceeding 400°F per hour to 1550°F, 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 to 1000°F. Continue cooling to ambient temperature in the furnace or in air. The resultant hardness should be a maximum of 241 HBW.

This information is intended to provide general data on our products and their uses and is based on our knowledge at the time of publication. No information should be construed as a guarantee of specific properties of the products described or suitability for a particular application. Walter Metals reserves the right to make shanges in practices which may render some information outdated or obsolete. Walter Metals should be consulted for current information & capabilities.

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