

••• SCK Cold Work Die Steel



WM SCK represents a chemical balance which provides an optimum combination of toughness, wear resistance, and minimum distortion during heat treatment. It is recognized that the addition of nickel, with this carbon content, greatly enhances the impact strength, while air hardening characteristics are readily achieved with this composition. While lacking some of the extreme abrasion resistance of the high carbon-high chromium die steels, **WM SCK** provides equivalent freedom from distortion, and vastly increased toughness.

Chemical Composition

Carbon	0.70
Manganese	0.35
Silicon	1.00
Chromium	8.50
Vanadium	1.00
Molybdenum	1.40
Nickel	1.50

Typical Applications

Shear blades, slitter knives, chipper knives, trimming dies, cold forming dies, forming rolls.



Physical Properties

Critical temperature – (on heating) 1525°F

Specific Gravity – 7.89

Coefficient of Thermal Expansion

100 - 500°F 5.32×10^{-6} in/in/°F

100 - 800°F 6.21

100 - 1000°F 6.72

100 - 1200°F 6.98



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Forging

Heating for forging must be done slowly and uniformly. Soak through at 1900-2000°F, and reheat as often as necessary, stopping work when the temperature drops below 1700°F. After forging cool slowly in lime, mica, dry ashes, or furnace. **SCK** should always be annealed after forging.

Annealing

Heat slowly to 1600-1650°F, hold until the entire mass is heated through, and cool slowly in the furnace (25°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 1050-1250°F, allow to equalize, and then cool in still air.

Preheat for Hardening

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

Hardening

After through preheating, transfer to the hardening furnace, operating at 1900-2050°F, depending upon the degree of hardening required for the applications, and the size of the tool.

Quenching

SCK is an air hardening steel, and will develop full hardness on cooling in still air. If the scaled surface resulting from air cooling is objectionable, the part may be quenched in oil until it has lost its color (1000-1200°F), and then allowed to cool in still air. Parts should be allowed to cool to 150°F, or to where they can be held in the bare hand, and then tempered immediately.

Tempering

For the optimum combination of hardness and mechanical properties, it is recommended that **SCK** be tempered at or beyond its maximum secondary hardness, or in the range of 900-1000°F. Double tempering is recommended. The following chart may be used as a guide to the hardness which may be expected after air cooling and tempering at the indicated temperatures.

Hardening Temperature	Air Cooled From		
	1900°F	2000°F	2050°F
As Quenched	59.3 RC	60.3 RC	61.0 RC
Double Tempered			
500 °F	56.0	56.7	55.2
600 °F	56.0	56.6	54.7
700 °F	57.0	56.9	54.5
800 °F	57.7	58.3	56.9
900 °F	59.8	59.8	59.0
1000 °F	57.8	59.4	61.0
1100 °F	43.9	46.0	47.7
1200 °F	36.0	37.7	37.7

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 changes in practices which may render some information outdated or obsolete. Walter Metals should be consulted for current information & capabilities.

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