SIHARD 2080 Steel

Designation by Standards

Brand Name	Ravne	Mat. No.	DIN	EN	AISI/SAE
SIHARD 2080	OCR12	1.2080	X210Cr12	X210Cr12	D3

Chemical Composition (in weight %)

C	Si	Mn	Cr	Mo	Ni	V	W	Others
2.05	0.25	0.30	11.50	-	-	-	-	-

Description
D3 is an oil hardening, high carbon/chromium type tool steel with very high wear resistance. It hardens with a very slight change in size. The alloy possesses very high compressive strength and is deep hardening.

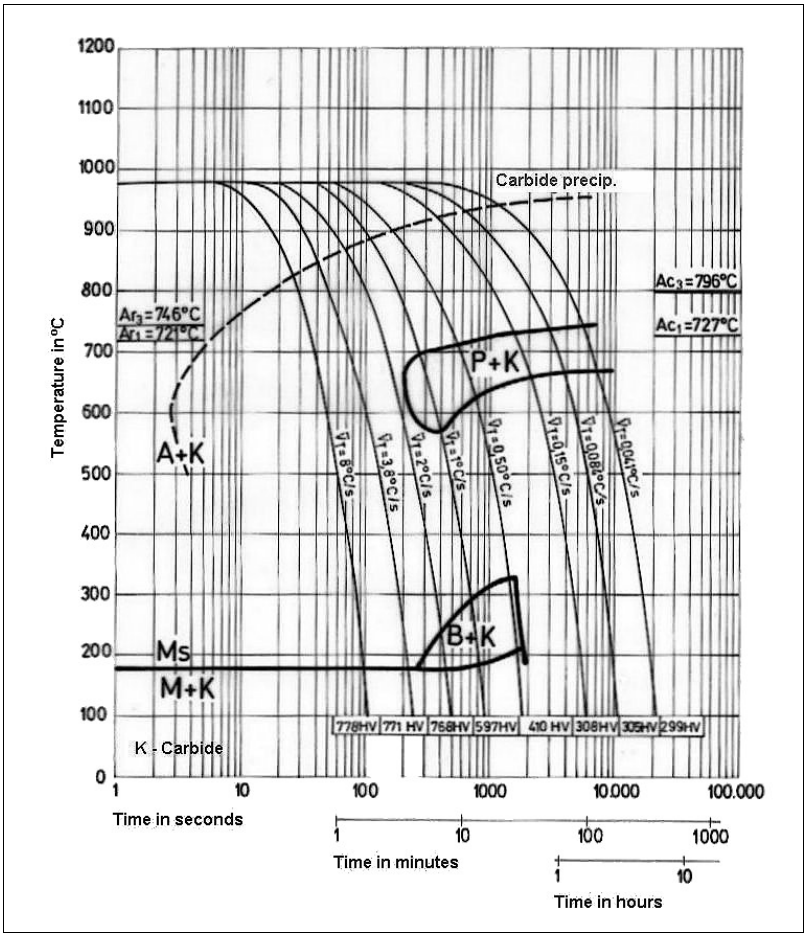
Applications
Cutting tools, stamping, woodworking, drawing, deep drawing and pressing tools, cold working rolls, measuring tools.

Physical properties (average values) at ambient temperature
Modulus of elasticity [10^3 x N/mm^2]: 210
Density [g/cm^3]: 7.67
Thermal conductivity [W/m.K]: 20.0
Electric resistivity [Ohm mm^2/m]: 0.65
Specific heat capacity[J/g.K]: 0.46

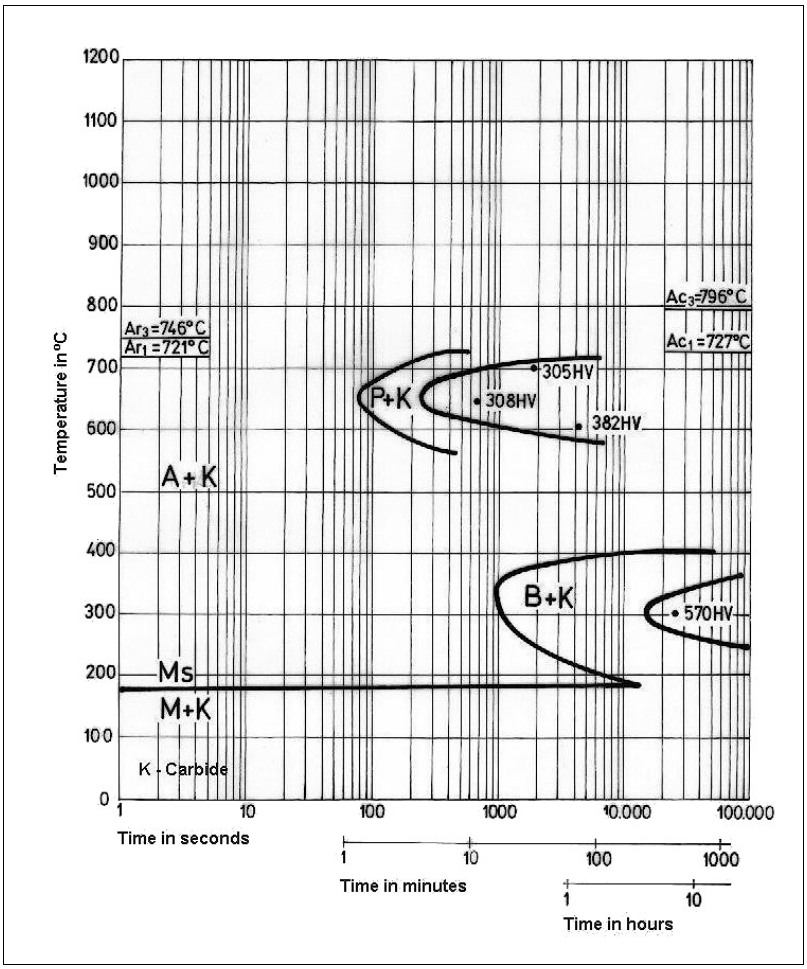
Coefficient of Linear Thermal Expansion 10^{-6} $^oC^{-1}$

20-100^{o}C	20-200^{o}C	20-300^{o}C	20-400^{o}C	20-500^{o}C	20-600^{o}C	20-700^{o}C
11.7	12.0	12.4	12.9	13.3	13.6	14.0

Continuous Cooling Transformation (CCT) Diagram



Time-Temperature Transformation (TTT) Diagram



Soft Annealing

Heat to 800-840°C, cool slowly. This will produce a maximum Brinell hardness of 250. To secure uniform softness.

Stress Relieving

Stress relieving to remove machining stresses should be carried out by heating to 650°C, holding for one hour at heat, followed by air cooling. This operation is performed to reduce distortion during heat treatment.

Hardening

Harden from a temperature of 940-980°C followed by oil quenching or warm bath approx. 400°C. Hardness after quenching is 64-66 HRC.

For small parts up to thickness 30 mm. Harden from a temperature of 960-100°C followed by air, comompressed air quenching. Hardness after quenching is 63-65 HRC.

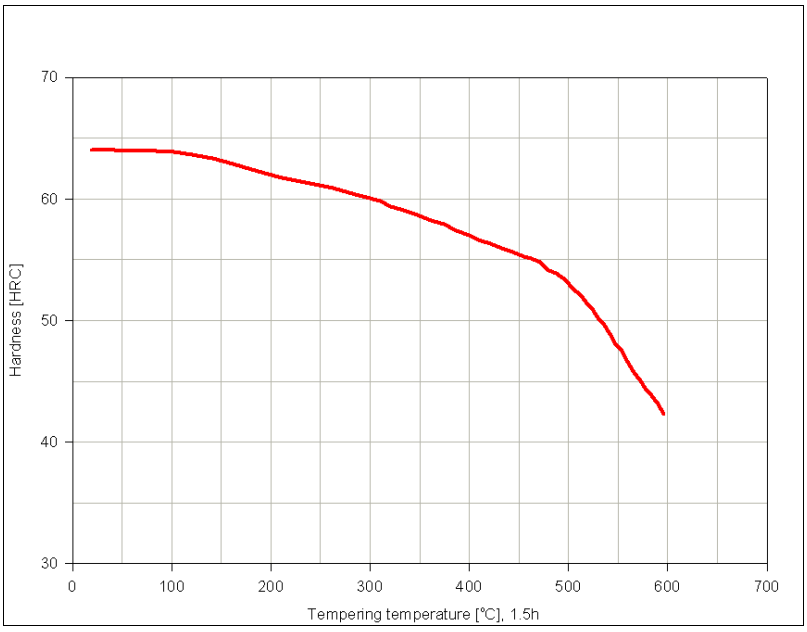
Tempering

Tempering temperature: 150-400°C.

Tempering Temperature (°C) vs. Hardness (HRC)

100°C	200°C	300°C	400°C	500°C	600°C
64	62	60	57	53	42

Tempering Diagram



Forging

Hot forming temperature: 1050-850°C.

Machinability

The machinability rating of D3 is roughly 25 % that of free machining carbon steel 1018. Due to its abrasion resistant nature, machining in the hardened condition should be limited to finish grinding.

Forms manufactured: Please see the Dimensional Sales Program.

Disclaimer

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