SIRAPID 3343 Steel

Designation by Standards

Brand Name	Ravne	Mat. No.	DIN	EN	AISI/SAE
SIRAPID 3343	BRM2	1.3343	S6-5-2 †	HS6-5-2	M2

Chemical Composition (in weight %)

C	Si	Mn	Cr	Mo	Ni	V	W	Others
0.90	max. 0.45	max. 0.40	4.15	4.95	-	1.90	6.60	-

Description
M2 is a higher carbon version of the M1 tool steel (Molybdenum High Speed Tool Steel). The M2 alloy has somewhat better wear resistance than M1. Very high resistance to softening at elevated temperatures. Very high resistance to wear. Good toughness and cutting capability. Deep hardening response.

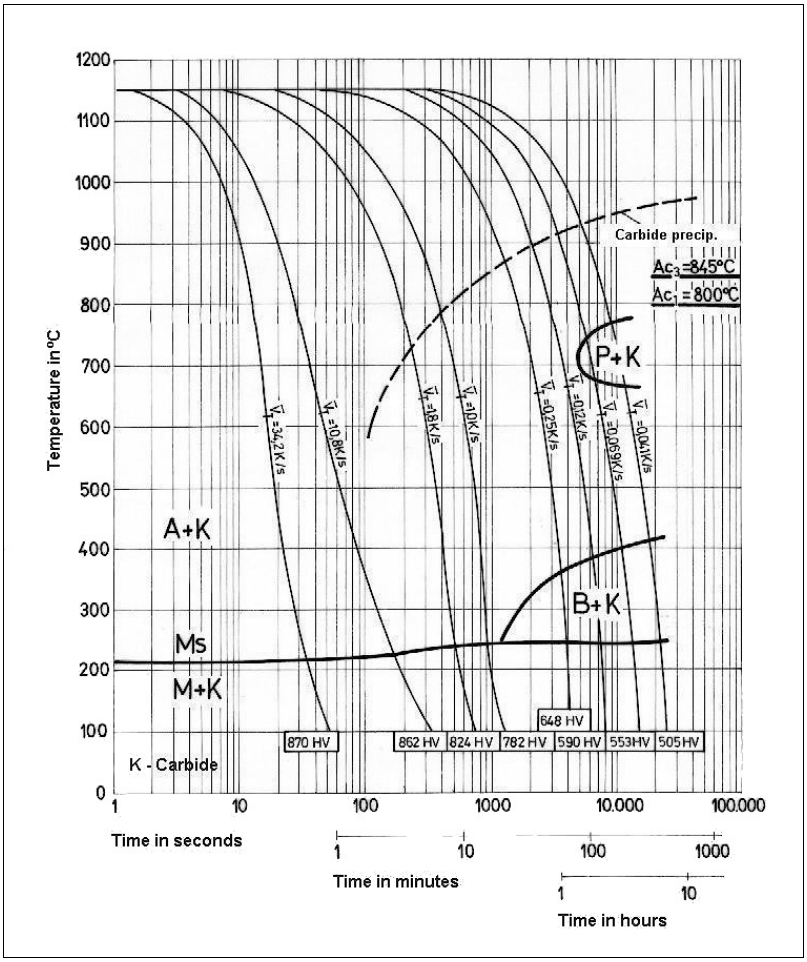
Applications
Primarily used for cutting tools, knives, tap and spiral drills, broaching tools, milling cutters, woodworking tools, cold work tools.

Physical properties (average values) at ambient temperature
Modulus of elasticity [10^3 x N/mm^2]: 217
Density [g/cm^3]: 8.12
Thermal conductivity [W/m.K]: 19.0
Electric resistivity [Ohm mm^2/m]: 0.54
Specific heat capacity[J/g.K]: 0.46

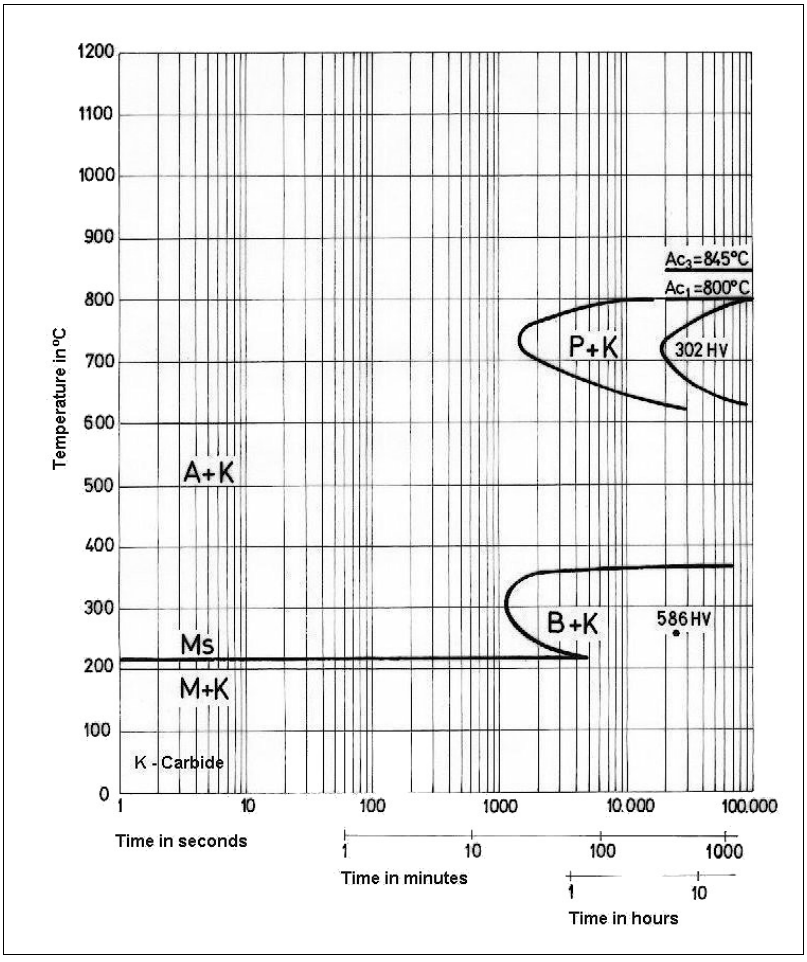
Coefficient of Linear Thermal Expansion 10^{-6} $^oC^{-1}$

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	20-800^{o}C
10.7	11.7	11.9	12.4	12.7	13.1	13.4	13.4

Continuous Cooling Transformation (CCT) Diagram



Time-Temperature Transformation (TTT) Diagram



Soft Annealing
Heat to 820-880°C, cool slowly in furnace. This will produce a maximum Brinell hardness of 225-280.

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.

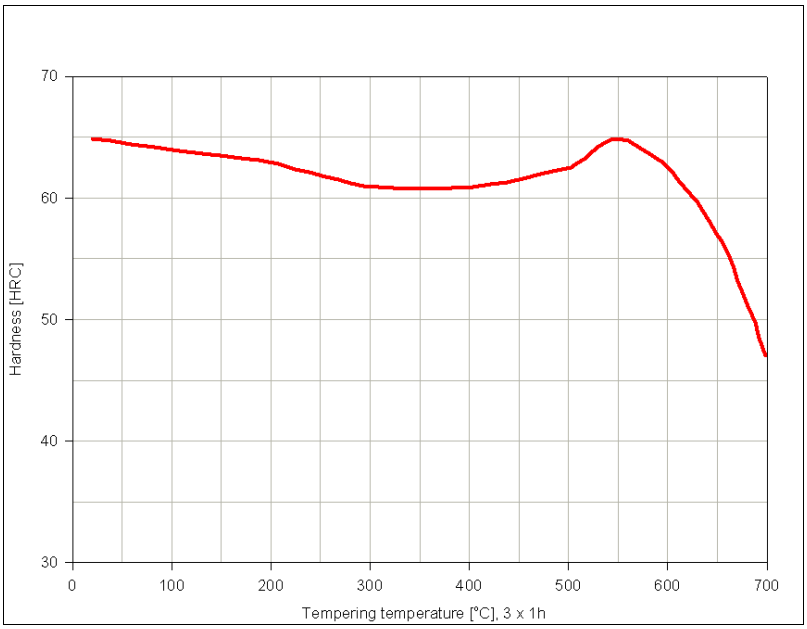
Hardening
Heat up to 450-600°C, then preheat to 850°C, and to 1050°C. Harden from a temperature of 1180-1230°C followed by oil, air quenching or warm bath 550°C. Hardness after quenching is min. 64 HRC.

Tempering
Tempering temperature: 3 x 1 hour at 540-560°C.

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

200°C	300°C	400°C	500°C	525°C	550°C	575°C	600°C	650°C	700°C
63	61	61	62.5	64	65	64	62.5	57	47

Tempering Diagram



Forging
Hot forming temperature: 1120-926°C.

Machinability
M2 is classified as a "medium" machinability tool steel in the annealed condition. It may be shaped by grinding but is relatively poor in regard to capability of being ground. Its machinability rating is 50% as compared to the W group water hardening tool steel.

Corrosion Resistance
Not normally employed in applications requiring corrosion resistance.

Welding
Consult the alloy supplier for information on the advisability of welding.
Forms manufactured: Please see the Dimensional Sales Program.

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