



SIRAPID 3351 Steel

Designation by Standards

Brand Name	Ravne	Mat. No.	DIN	EN	AISI/SAE
SIRAPID 3351	BRM4	1.3351	-	HS6-5-4	M4

Chemical Composition (in weight %)

C	Si	Mn	Cr	Mo	Ni	V	W	Others
1.33	max. 0.45	max. 0.40	4.15	4.60	-	3.95	5.60	-

Description

M4 Molybdenum High Speed Tool Steels. It has a relatively high 1.3% carbon content for high hardness and excellent wear resistance.

Applications

Used for cutting tools of all types for machining operations. Heavy duty milling cutters, broaches, broaches.

Physical properties (average values) at ambient temperature

Density [g/cm³]: 7.97

Transformation temperatures (°C): Ac₁=803, Ac₃=895

Coefficient of Linear Thermal Expansion 10⁻⁶ °C⁻¹

20-100°C	20-200°C	20-300°C	20-400°C	20-500°C	20-600°C	20-700°C	20-800°C
9.4	10.4	10.9	11.3	11.5	11.8	12.0	12.1

Soft Annealing

Heat to 820-848°C, cool slowly in furnace. This will produce a maximum Brinell hardness of 255.

Hardening

Heat up to 450-600°C, 1st pre-heating: 850°C, 2nd pre-heating: 1050°C. Harden from a temperature of 1190-1230°C followed by oil, air quenching or warm bath quenching at 400°C.

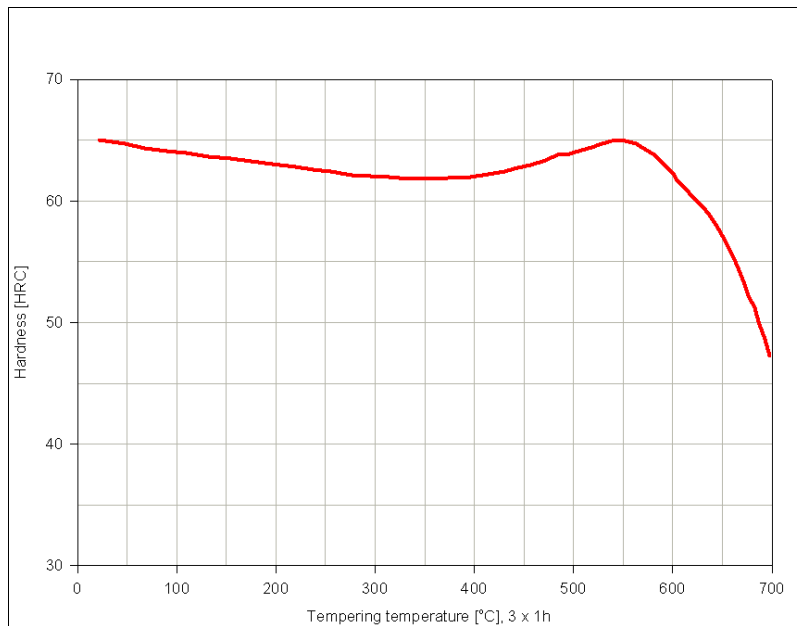
Tempering

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

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	62	62	64	64.5	65	64	62	57	47

Tempering Diagram



Forging

Hot forming temperature: 1100-900°C.

Cold Working

Cold working may be accomplished by conventional methods with the alloy in the annealed condition.

Machinability

Machinability is relatively low, rating 40% that of the water hardening (W group) tool steels which are relatively easy to machine.

Corrosion Resistance

Not normally employed in applications requiring corrosion resistance.

Welding

This is an alloy steel and may be welded. Consult the supplier for details.

Forms manufactured: Please see the [Dimensional Sales Program](#).

Disclaimer

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically suggested for material described herein are made solely for the purpose of illustration to enable the reader to make his own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. There is no representation that the recipient of this literature will receive updated editions as the become available.

Unless otherwise specified, registered trademarks are property of SIJ Metal Ravne company. Copyright 2016 by SIJ Metal Ravne d.o.o. All rights reserved. Contact our [Sales Office](#) for more information.