SINOXX 4006 Steel

Designation by Standards

Brand Name	Ravne	Mat. No.	DIN	EN	AISI/SAE
SINOXX 4006	PK330	1.4006	X12Cr13	X10Cr13	410

Chemical Composition (in weight %)

C	Si	Mn	Cr	Mo	Ni	V	W	Others
0.12	max. 1.0	max. 1.50	12.50	-	-	-	-	-

Description
SINOXX 4006 is the basic martensitic stainless which will attain high mechanical properties after heat treatment. It has good impact strength, corrosion and scaling resistance up to 649^{o}C.

Applications
Cutlery, steam and gas turbine blades and buckets, bushings, valve components, fasteners, screens and kitchen utensils. Structural parts to be used in water or steam, components for paper, textile and food industry.

Physical properties (average values) at ambient temperature
Modulus of elasticity [10^3 x N/mm^2]: 216
Density [g/cm^3]: 7.70
Thermal conductivity [W/m.K]: 30.0
Electric resistivity [Ohm mm^2/m]: 0.60
Specific heat capacity[J/g.K]: 0.46

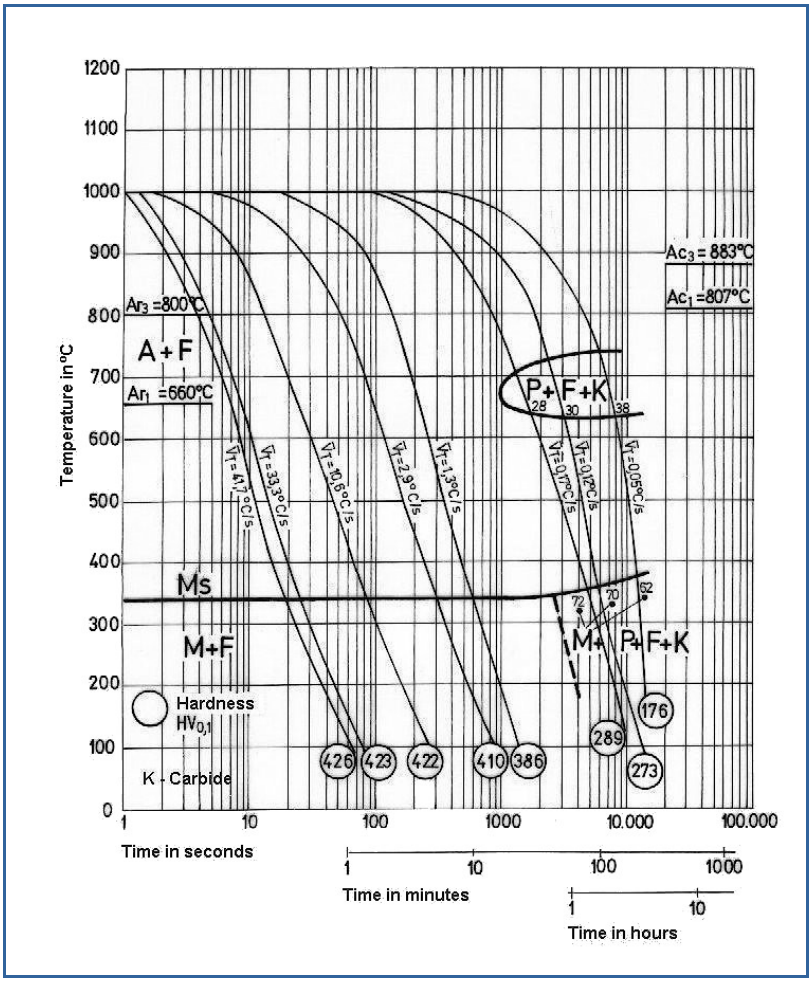
Coefficient of Linear Thermal Expansion 10^{-6} ^{o}C^{-1}

20-100^{o}C	20-200^{o}C	20-300^{o}C	20-400^{o}C	20-500^{o}C
10.5	11.0	11.5	12.0	12.0

Modulus of Elasticity [10^3 N/mm^2]

20^{o}C	200^{o}C	400^{o}C
216	205	190

Continuous Cooling Transformation (CCT) Diagram



Soft Annealing

Heat to 730-810^{O}C, air cooling. Structure is ferrite with spherical carbides.

Hardening

Harden from a temperature of 950-1000^{O}C followed by oil, air quenching.

Tempering

Tempering temperature: 650-750^{O}C. Transformation structure with ferrite.

Mechanical Properties at Room Temperature

Size range mm	Heat treatment condition	0.2 % proof stress (N/mm^2)	Tensile strength (N/mm^2)	Elongation (%)	Notch impact energy (ISO-V) (J)	Hardness HB max.
d<=160	Q+T 650	450	650-850	15	25	220

0.2 % Proof Stress (N/mm^2) at Elevated Temperatures

Condition	100^{O}C	150^{O}C	200^{O}C	250^{O}C	300^{O}C	350^{O}C	400^{O}C
Q+T 650	420	410	400	385	365	335	305

Forging
Hot forming temperature: 1100-850^{O}C.

Machinability
Tough, draggy chips with heavy build-up. While this alloy can be machined in the annealed condition, it tends to perform better in the cold drawn or heat treated condition.

Embittlemnt: It must be in mind that the temperature range between 425 and 525^{O}C must be avoided owing to embritllement at 475^{O}C.

Corrosion Resistance
Not known for its exceptional corrosion resistance, this alloy will stand up well to mild atmospheric conditions and fresh waters.

Welding
Most common methods of welding can be successfully employed with this alloy. To reduce the chance of cracking, it is advisable to preheat the workpiece to 177-204^{O}C. Post-weld annealing is recommended to reattain maximum ductility. Filler meta.

Forms manufactured: Please see the Dimensional Sales Program.

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