



## SINOXX 4034 Steel

### Designation by Standards

| Brand Name  | Ravne | Mat. No. | DIN | EN      | AISI/SAE |
|-------------|-------|----------|-----|---------|----------|
| SINOXX 4034 | PK4EX | 1.4034   | -   | X46Cr13 | 420      |

### Chemical Composition (in weight %)

| C    | Si       | Mn       | Cr    | Mo | Ni | V | W | Others |
|------|----------|----------|-------|----|----|---|---|--------|
| 0.47 | max. 1.0 | max. 1.0 | 13.50 | -  | -  | - | - | -      |

### Description

Steel 420 displays the best corrosion resistance in hardened condition with a surface polished to give a mirror finish.

### Applications

All kinds of cutting tools - knives, shears, surgical instruments, moulds for plastics production, as well as for surgical instruments and measuring gauges.

### Physical properties (average values) at ambient temperature

Modulus of elasticity [ $10^3 \times \text{N/mm}^2$ ]: 220

Density [ $\text{g/cm}^3$ ]: 7.73

Thermal conductivity [ $\text{W/m.K}$ ]: 30.0

Electric resistivity [ $\text{Ohm mm}^2/\text{m}$ ]: 0.65

Specific heat capacity [ $\text{J/g.K}$ ]: 0.46

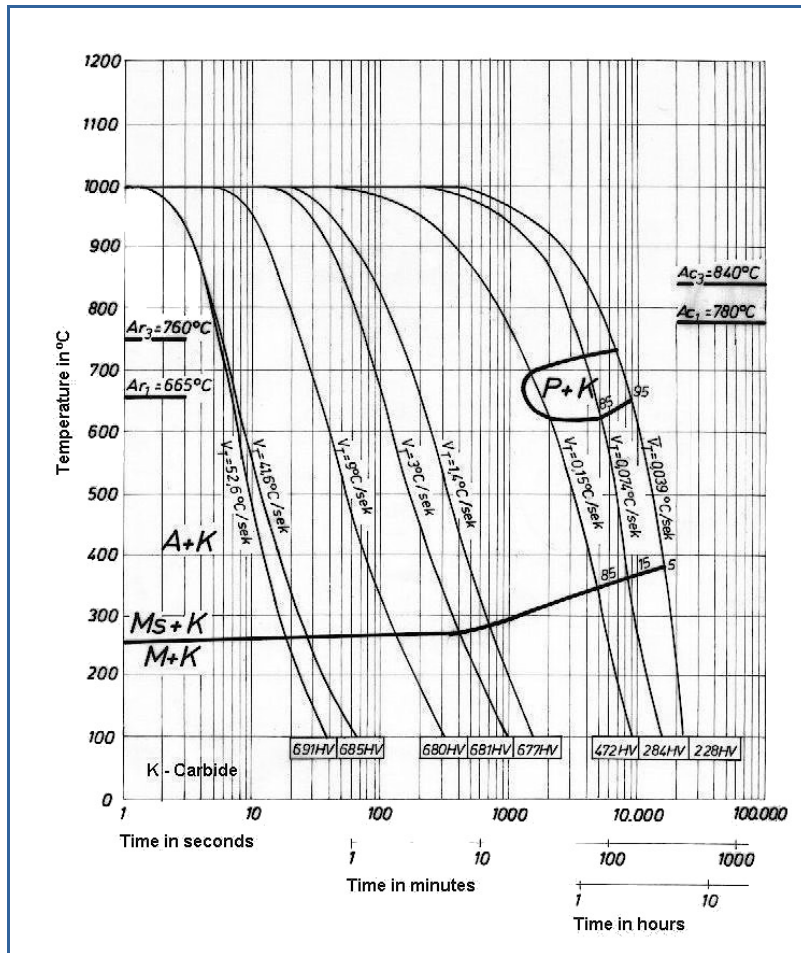
### Coefficient of Linear Thermal Expansion $10^{-6} \text{ } ^\circ\text{C}^{-1}$

| 20-100°C | 20-200°C | 20-300°C | 20-400°C | 20-500°C |
|----------|----------|----------|----------|----------|
| 10.5     | 11.0     | 11.0     | 11.5     | 12.0     |

### Modulus of Elasticity [ $10^3 \text{ N/mm}^2$ ]

| 20°C | 200°C | 400°C |
|------|-------|-------|
| 220  | 205   | 190   |

## Continuous Cooling Transformation (CCT) Diagram



### Soft Annealing

Heat to 730-780°C, cool slowly in furnace or air. Structure is ferrite with spherical carbides.

### Hardening

Harden from a temperature of 980-1030°C followed by oil or air quenching. Hardness after quenching is 56 HRC.

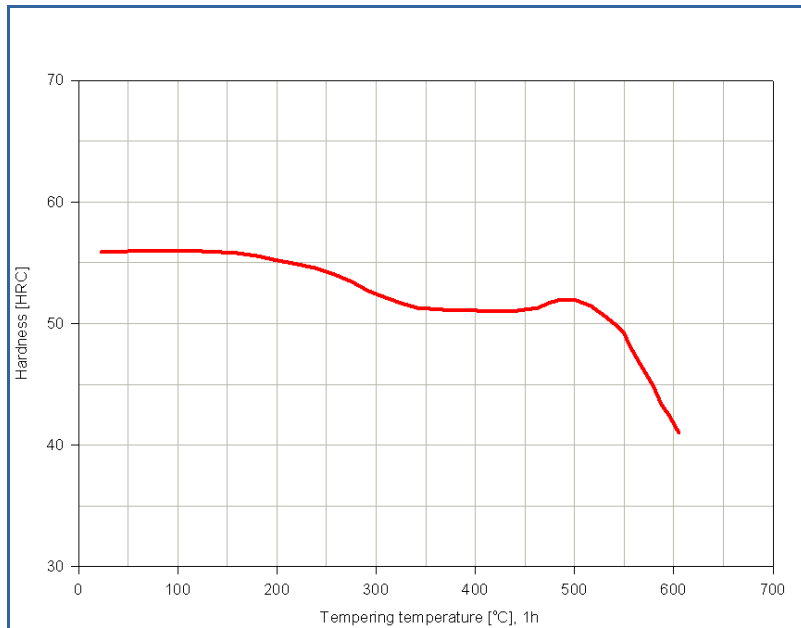
### Tempering

Tempering temperature: 100-200°C.

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

| 20°C | 100°C | 200°C | 300°C | 400°C | 500°C | 600°C |
|------|-------|-------|-------|-------|-------|-------|
| 56   | 56    | 55    | 52    | 51    | 52    | 42    |

## Tempering Diagram



### Forging

Hot forming temperature: 1100-800°C.

### Machinability

Similar to machining some of the high carbon tool steel, this alloy has tough, stringy chip build-up.

### Corrosion Resistance

420 is resistant to the atmosphere, fresh water, dilute acids and alkalis and fruit and vegetable juices.

### Welding

Not commonly welded due to its air hardening characteristics. Welding may be performed after preheating to 149-204°C with post weld tempering at temperature for 2 hours . Filler metal should be AWS E/ER420.

Note: The hot forming temperature stated should not be exceed, as harmful grain coarsening and simultaneous formation of a carbide network along the grain boundaries will otherwise occur. This results in poor development of hardness and a decline in toughness and elasticity in hardened condition.

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

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