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Böhler K302 Isodisc is a chromium-molybdenum-vanadium alloy hot-work tool steel. It is characterized by good toughness, high hot hardness, and high wear resistance.

Chemical Composition

Element	Composition, wt%(a)
Carbon	0.39
Silicon	1.10
Manganese	0.40
Phosphorus	(b)
Sulfur	(b)
Chromium	5.20
Molybdenum	1.30
Vanadium	0.95
Iron	bal

(a) Typical values. (b) Not disclosed in *Böhler K302 Isodisc*, voestalpine Böhler Edelstahl GmbH, 2023

Physical Properties

Property	Unit	At	Value
Density	kg/m ³ (lb/in. ³)	20 °C (68 °F)	7800 (0.28)
Coefficient of linear thermal expansion	10 ⁻⁶ /K (10 ⁻⁶ /°F)	20–100 °C (68–212 °F)	11.5 (6.4)
		20–200 °C (68–392 °F)	12 (6.7)
		20–300 °C (68–572 °F)	12.2 (6.8)
		20–400 °C (68–752 °F)	12.5 (6.9)
		20–500 °C (68–932 °F)	12.9 (7.2)
Specific heat capacity	J/(kg·K) (cal/(g·°C))	20 °C (68 °F)	460 (0.110)
Electrical resistivity	μΩ·m (Ω·circular-mil/ft)	20 °C (68 °F)	0.52 (313)

Typical values

Mechanical Properties

See Tables 1–2, and Fig. 1.

Heat Treatment

Continuous-Cooling-Transformation Diagram. See Fig. 2.

Annealing. Heat to 750–800 °C (1380–1470 °F). Wait for equalization of the temperature. Furnace cool to 600 °C

(1110 °F) at a rate of 10–20 °C/h (20–35 °F/h). Continue cooling in still air.

Stress Relieving. Heat to 600–650 °C (1110–1200 °F). Wait for equalization of the temperature. Soak in a neutral atmosphere for 1–2 h. Cool slowly in the furnace.

Quench Hardening. Heat to 1020–1080 °C (1870–1975 °F). Wait for equalization of the temperature. Soak for 15–30 minutes. Quench in air, oil or molten salt maintained at 500–550 °C (930–1020 °F).

Tempering. Temper immediately after quench hardening—see Fig. 3.

Comparable Grades

voestalpine Böhler Edelstahl GmbH & Co KG	Böhler K302 Isodisc
ASTM	Type H13 (UNS T20813)
EN	X40CrMoV5-1 (1.2344)
JIS	SKD61

General Characteristics

Good thermal conductivity ; good micro-cleanliness; good toughness and ductility; high hot hardness (red hardness); high wear resistance; very high machinability, good polishability.

Product Forms

Long products; plates; open die forgings.

Table 1 Hardness

Treatment condition	Hardness
Annealed	≤ 205 HBW
Quench hardened and tempered	30–44 HRC, 40–55 HRC

Table 2 Modulus of elasticity

Property	Unit	At	Value
Modulus of elasticity	GPa (10 ⁶ psi)	20 °C (68 °F)	215 (31.18)

Typical value

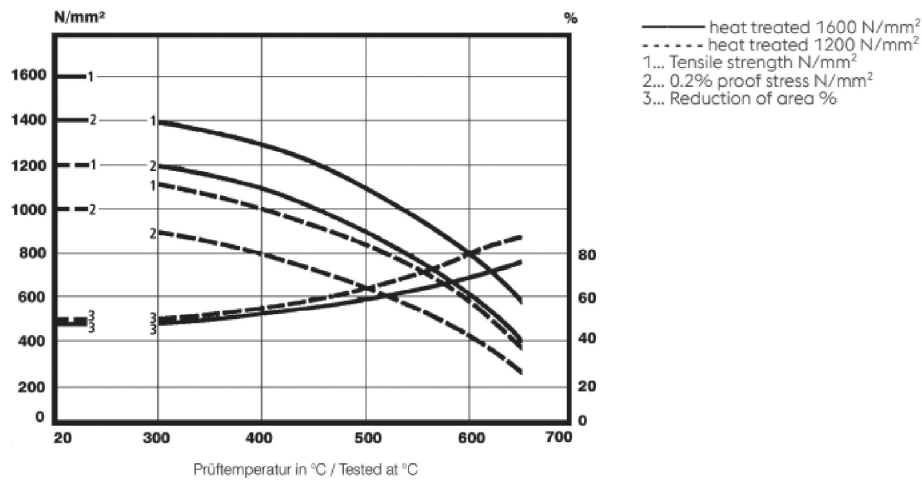


Fig. 1 Hot strength chart

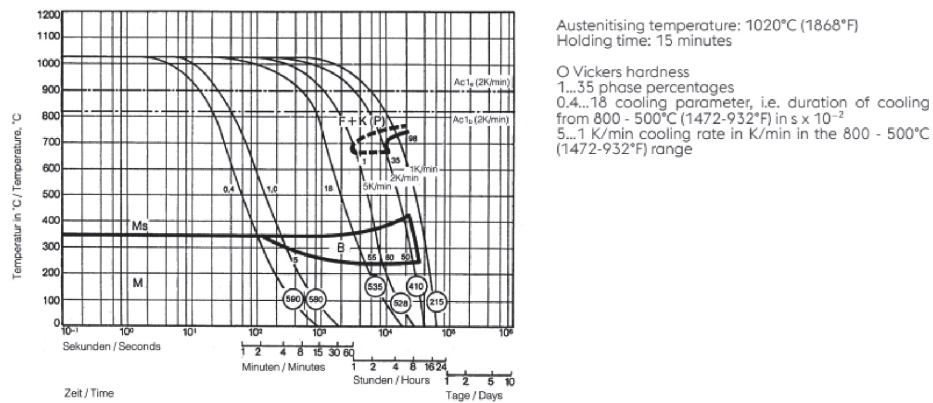


Fig. 2 Continuous-cooling-transformation diagram

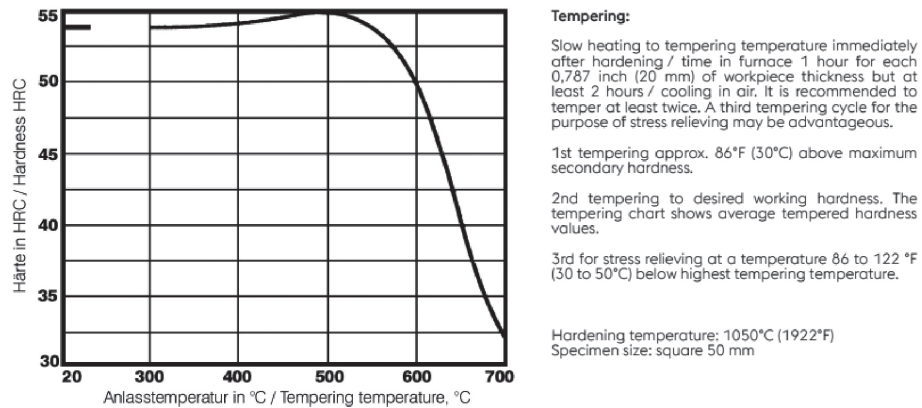


Fig. 3 Tempering chart

Applications

Automotive components (piston rings, sensors, turbochargers, etc.); blow molding; extrusion; forging (hot/semi-hot); general components for mechanical engineering; gravity/low pressure die-casting; high pressure die-casting; injection molding; machine knives; press hardening/hot stamping; progressive forging (Hatebur); tool holders (milling, drilling, turning and chucks).

Supplier

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All data from *Böhler K302 Isodisc*, voestalpine Böhler Edeltahl GmbH, 2023, except where noted.