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Buderus Hot Work Tool Steel 2344 ISO-B

	C	Si	Mn	P	S	Cr	Mo	V
Typical analysis	0.40	1.05	0.40	0.025	0.003	5.20	1.40	1.00
Chemical composition as per SEL	0.35–0.42	0.80–1.20	0.25–0.50	≤ 0.030	≤ 0.020	4.80–5.50	1.20–1.50	0.85–1.15

Figures in % by mass

Register of European Steels (SEL)	X 40 CrMoV 5-1
DIN EN ISO 4957	X 40 CrMoV 5-1
AFNOR	Z 40 CDV 5
AISI	H 13
BS	BH 13

Characteristics

CrMoV alloyed hot work tool steel with double V content compared to grade 2343 ISO-B. Very good tempering properties, good toughness, good hardness at high temperatures, very good compressive strength, insensitive to thermal shock. Better wear resistance than grade 2343. Good machinability in the annealed state. Can be cooled in water with limitations.

Applications

Extrusion tools including pipe extruders: highly stressed mould inserts, dummy blocks, extrusion stems, die holders, stem heads; especially for profile dies, insert and bridge type tools for compacting light alloys, liners and line holders.
Highly stressed plastic moulds, mould inserts with abrasive stress, as occurs when processing thermo-setting plastics, thermoplastics and composite materials.
Die-casting moulds and mould inserts, sliders, cores, ejectors and filling sleeves.

Delivered condition

Annealed to max. 229 HB
Hardened and tempered to customer specification on request

Physical properties (reference values)

Thermal expansion coefficient (10^{-6}/K)	20–100 °C 10.5	20–250 °C 11.3	20–500 °C 12.1
Thermal conductivity (W/mK)	20 °C 23.0	250 °C 25.0	500 °C 27.0
Young's modulus (GPa)	20 °C 210	250 °C 195	500 °C 172

High-temperature yield strength

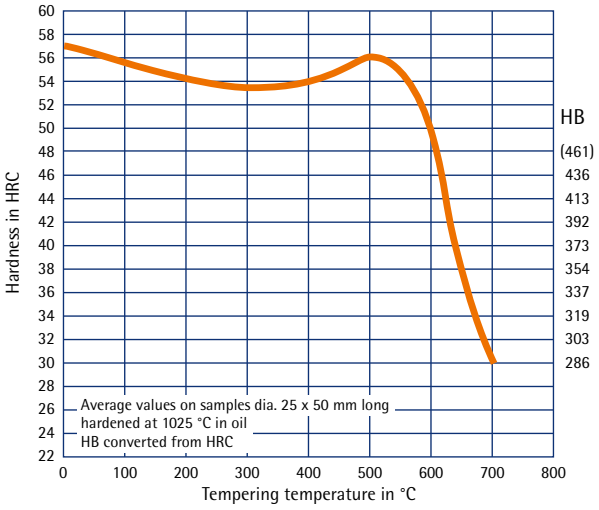
Hardened and tempered state	0.2 % yield strength in MPa at temperature			
	450 °C	500 °C	550 °C	600 °C
~ 1750 MPa	1040	920	740	540
~ 1370 MPa	960	820	640	440
~ 1230 MPa	810	680	520	370

Buderus Edelstahl GmbH | Steel Bar Sales | Buderusstraße 25 | D-35576 Wetzlar
Telephone +49 (0) 64 41-374 2468 | Fax +49 (0) 64 41-374 2784 | info@buderus-steel.com | www.buderus-steel.com

2344 ISO-B

Heat treatment		
Stress relieving	Temperature: Duration: Cooling:	Approx. 650 °C in the annealed state Approx. 550 °C in the hardened and tempered state 1 hour per 50 mm wall thickness Furnace
Soft annealing	Temperature: Duration: Cooling:	820 °C 1 hour per 25 mm wall thickness Furnace
Hardening	Temperature: Duration:	1025 °C 30 seconds per mm wall thickness
Quenching hardness	Max. 56 HRC	in oil, hot bath or vacuum
Tempering	Temperature: Duration: Cooling:	See tempering curve 1 hour per 25 mm wall thickness Air
Working hardness	30–50 HRC	

Tempering curve



TTT curve (continuous)