

Buderus Hot Work Tool Steel 2343 ISO-B MOD

	C	Si	Mn	P	S	Cr	Mo	V
Typical analysis	0.35	0.30	0.40	≤ 0.010	≤ 0.003	5.00	1.35	0.50
Chemical composition as per SEL	0.33–0.41	0.80–1.20	0.25–0.50	≤ 0.030	≤ 0.020	4.80–5.50	1.10–1.50	0.30–0.50

Figures in % by mass

Register of European Steels (SEL)	X 36 CrMoV 5-1 (1.2340)
DIN EN ISO 4957	~ X 37 CrMoV 5-1
AFNOR	Z 38 CDV 5
AISI	~ H 11 mod.
BS	~ BH 11

Characteristics

This hot work tool steel specially developed for the aluminium and magnesium die casting industry is distinguished by outstanding toughness characteristics. This steel is designed on the basis of a composition modification to suppress temper embrittlement and secondary metallurgical measures required for ISO-B quality. This provides the basic requirements for long tool life in die-casting and extrusion processes. The judicious application of appropriate heat treatment after the forging process, such as microstructure treatment, brings to bear the steel's key properties, such as:

- ▮ Fine grained structure
- ▮ Non-directional toughness in all test positions
- ▮ Temperature fatigue resistance.

Practical experience shows that it is possible to achieve significantly better tool life with this material than with the traditional standard grades 2343 ISO-B and 2344 ISO-B.

Applications

Highly stressed die-casting moulds and inserts with high tool life expectancy. Extruder tools including pipe extruders such as die holders, insert and bridge type tools, liners and liner holders. Plastic moulds subject to abrasive stress with tool hardnesses up to 50 HRC, combined with surface coating if required.

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	20–200 °C	20–300 °C	20–500 °C
	9.9	11.5	12.1	12.8
Thermal conductivity (W/mK)	20 °C	350 °C	700 °C	
	23.0	26.0	29.5	
Young's modulus (GPa)	20 °C	250 °C	500 °C	
	210	195	172	

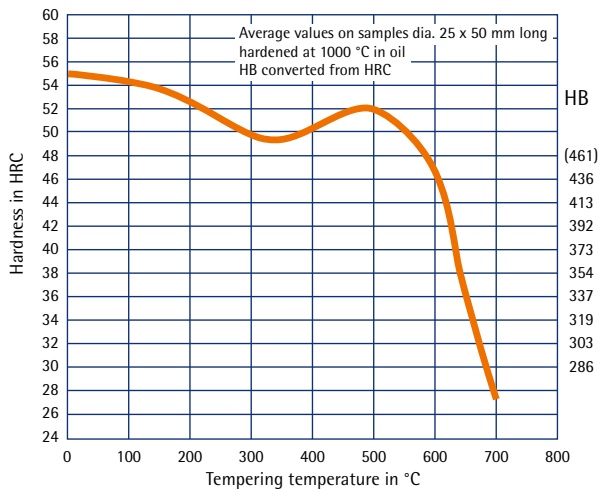
High-temperature yield strength

Hardened and tempered state	0.2 % yield strength in MPa at temperature			
	450 °C	500 °C	550 °C	600 °C
~ 1570 MPa	1050	960	690	430
~ 1370 MPa	900	830	650	390
~ 1230 MPa	800	720	500	310

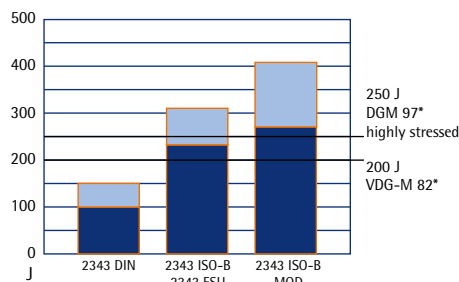
2343 ISO-B MOD

Heat treatment	
Stress relieving	Temperature: Approx. 650 °C in the annealed state Approx. 30–50 °C below the tempering temperature in the hardened and tempered state Duration: 1 hour per 50 mm wall thickness Cooling: Furnace
Soft annealing	Temperature: 820 °C Duration: 1 hour per 25 mm wall thickness Cooling: Furnace
Hardening	Temperature: 1000 °C Duration: 30 seconds per mm wall thickness
Quenching	in oil, hot bath, protective atmosphere, vacuum or air, depending on geometry and dimensions
Tempering	Temperature: See tempering curve Duration: 1 hour per 25 mm wall thickness Cooling: Air
Working hardness	30–50 HRC depending on application

Tempering curve

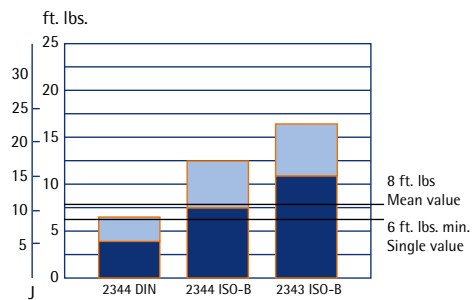
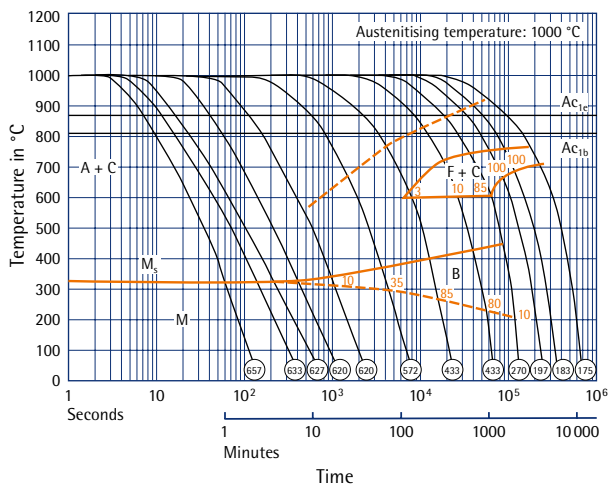


Mechanical properties



Comparison of impact energy
Quenched and tempered to 43–47 HRC
Samples transverse, 20 °C

TTT curve (continuous)



Comparison of notch impact energy to NADCA #207-03* (Charpy V)
Quenched and tempered to 44–46 HRC
samples transverse, 20 °C

* Indicate when ordering

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