

	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

CONQUEROR™ SUPER CLEAN ISO-B is Cr-Mo-V based hot working steel & is also micro alloyed with Ni, W and Co for better toughness and heat-resistance

## 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 <sup>-5</sup> /K)	20–100 °C 9.9	20–200 °C 11.5	20–300 °C 12.1	20–500 °C 12.8
Thermal conductivity (W/mK)	20 °C 23.0	350 °C 26.0	700 °C 29.5	
Young's modulus (GPa)	20 °C 210	250 °C 195	500 °C 172	

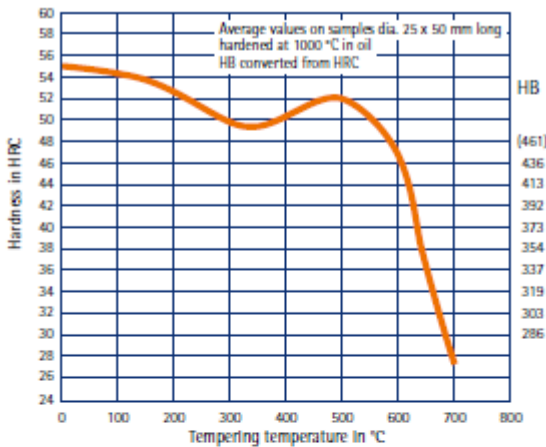
## High-temperature yield strength

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

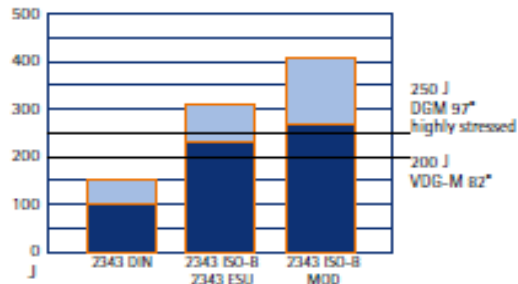
### Heat treatment

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

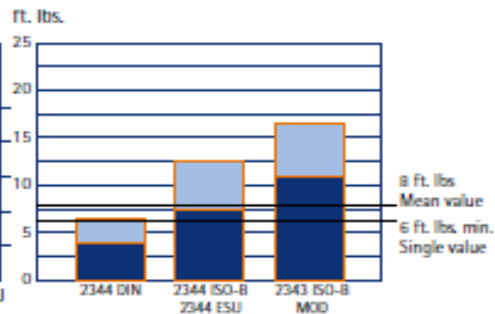
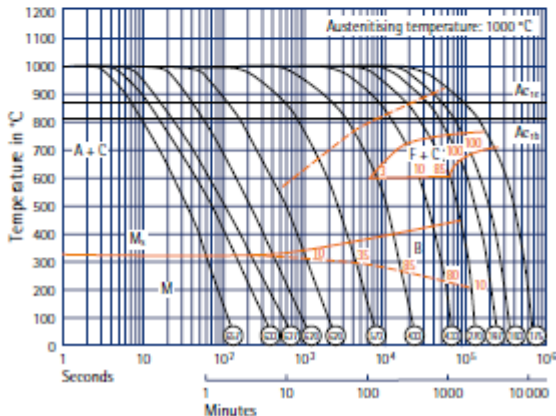


### Mechanical properties



**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