durostat 400/450/500/B2

Wear-resistant steels with best workability

The steel grades durostat 400, durostat 450 and durostat 500 are wear-resistant special steels with hardness of approx. 400 HB, 450 HB resp. 500 HB. These steels provide high levels of resistance to mechanical wear and are specially suitable for components exposed to heavy abrasion, e.g. loading devices, shovels of wheel loaders, bodies of trough tipping wagons, conveyors, excavator components, road machines, screens and crushers. The high hardness is reached by accelerated cooling directly after hot rolling (direct quenching) or by conventional quenching in a water quench. Direct quenching is mainly applied due to improved toughness and reduced scale. State-of-the-art alloying concepts with low carbon content provide good weldability.

durostat B2 steels are delivered in as-rolled condition (non-quenched). The highest achievable hardness is approximately 500 HB. These steel grades are used in components of agricultural machinery, cutting edges for front-end loaders and brick-molding boxes.

Convincing advantages

- Longer service life with much higher resistance to wear
- Weight savings due to reduced plate thickness as a result of high hardness
- Good surface quality due to thinner, more easily removable rolling scale
- Good weldability with elimination of preheating for small plate thicknesses
- Guaranteed toughness for low temperature applications

greentec steel

Premium quality
with reduced carbon footprint

durostat®
greentec steel

voestalpine Grobblech GmbH
www.voestalpine.com/grobblech

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Chemical composition

Heat analysis in mass %

durostat®	C max.	Si max.	Mn max.	P max.	S max.	Al min.	Cr max.	Mo max.	B max.	Ti max.
400	0.18	0.60	2.10	0.025	0.010	0.020	1.00	0.50	0.005	0.050
450	0.23	0.60	2.10	0.025	0.010	0.020	1.00	0.50	0.005	0.050
500	0.30	0.60	2.10	0.025	0.010	0.020	1.00	0.50	0.005	0.050
B2	0.30	0.60	2.10	0.025	0.010	0.020	1.00	0.50	0.005	0.050

The steel is fine grain melted and may contain microalloying elements such as Nb and V.

Carbon equivalent

durostat®	Plate thickness [mm]	Mass percentages [%] CEV [1] max.	CET [2] max.
400	5 ≤ 35	0.52	0.35
	> 35 - 120	0.57	0.37
450	5 ≤ 15	0.57	0.37
	>15 - 70	0.59	0.39
500	8 ≤ 30	0.59	0.44
	> 30 - 50	0.67	0.47

[1] CEV = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15, according to IIW
[2] CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40, according to SEW 088

Mechanical properties: Hardness/Tensile strength

durostat®	Hardness [HB]	Standard values [1] Hardness [HB]	Yield strength R_{eH} [MPa]	Tensile strength R_m [MPa]	Fracture elongation A_5 [%]
400	360 - 440	400	1,000	1,250	10
450	410 - 490	450	1,100	1,400	9
500	460 - 540	500	1,200	1,550	8
B2	ca. 500 [2]	200	400	650	20

[1] Typical values for plate thickness of 20 mm
[2] As-delivered condition is non-quenched; achievable hardness after water quenching

Mechanical properties: Notch impact energy/Edging radii

durostat®	Plate thickness [mm]	Notch impact energy [1] Av [Joule] min. –40 °C	Edging radii Ri min. at 90° edging (s = plate thickness) Position of the bending edge to the rolling direction Longitudinal	Transverse
Guaranteed values				
400	5 - 50	27	-	-
	> 50 ≤ 120	upon request	-	-
450	5 - 50	20	-	-
500	8 - 50	upon request	-	-
Standard values [2]				
400	-	50	4 s	3 s
450	-	30	5 s	4 s
500	-	20	5 s	4 s

[1] Notch impact bending test in accordance with EN ISO 148-1 on Charpy-V longitudinal samples at –40 °C.
The mean value from 3 individual samples must reach the specified requirements. No individual value may be below 70% of the guaranteed mean value.
For thicknesses < 12 mm, subsize-specimen with dimensions of 10 x 7.5 mm or 10 x 5 mm are tested.
The guaranteed value is reduced in proportion to the sample cross-section.
[2] Typical values of notch impact energy for plate thickness of 20 mm

Available dimensions

Maximum width per thickness; minimum width 1,500 mm; for thickness of 5 mm the minimum width is 2,000 mm

durostat®	Plate thickness [mm]	Max. width [mm]	Max. length [mm]	As-delivered condition [5]
400	5 ≤ 12	2,500	12,000 (8,000 for thickness 5 mm and a width ≥ 2,000 mm)	direct quenched
	> 12 ≤ 120	3,000		
450	5 ≤ 12	2,500		
	> 12 ≤ 70	3,000		
500	8 ≤ 50	2,500		quenched or direct quenched
B2	8 ≤ 50	2,500	18,700	non-quenched

Weight per plate is max. 16 t.
Additional dimensions upon request.

OUR PATH TO A GREENER FUTURE

Premium products in the greentec steel Edition

With greentec steel, voestalpine is pursuing an ambitious step-by-step plan in the long-term decarbonization of steel production. The declared objective is to achieve carbon-neutral production by 2050, and the initial steps have already been taken. Process-optimized production operations already prevent up to 10% of the direct CO_2 emissions at the Linz site. The material and processing properties of the steel are not affected in any way in this production route. Each voestalpine heavy plate product is available in premium quality in the greentec steel Edition with a reduced carbon footprint and unique benefits.

greentec steel

Premium quality with reduced carbon footprint

durostat®

greentec steel

Heavy plates (excl. heads and clad plates) – greentec steel Edition
Max. carbon footprint 2.21 kg CO_2e per kg of steel [1]

[1] per EN 15804+A2 (EPD methodology) cradle to gate

Please find further information and downloadable files at
www.voestalpine.com/durostat/en

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