AM/NS INDIA

AM/NS Rockstar

Heavy Duty Abrasion Resistant Steel

HEAVY DUTY ABRASION RESISTANT STEEL

Product Description

Rockstar is the range of high hardness, low alloyed martensitic steels. This abrasion resistant steel obtains hardness through intense water quenching and tempering process. Rockstar plates are available in three nominal hardness levels: 400, 450 and 500 BHN. Rockstar plates are optimised to provide high hardness, toughness, good formability and weldability for easy and quick fabrication.

Product Application

Rockstar is used for fabrication of crushers, liners for truck beds, buckets, hoppers, chutes, excavators and conveyor troughs, concrete mixer drums, trash truck bottoms, bucket lips, street sweepers, dump trailers and many more.

Grade designation

Rockstar steel grades are designated according to their hardness level. Below table mentions about the grade name with applicable hardness levels:

Grade Name	Rockstar 400	Rockstar 450	Rockstar 500
Hardness level	360 - 430 BHN	425 - 475 BHN	450 - 540 BHN

Capability & Dimensions

Grade Name	Rockstar 400	Rockstar 450	Rockstar 500
Thickness	6 - 80 mm	6 - 50 mm	6 - 50 mm

- Up to 3500mm, higher width can be provided with case to case basis, depending on thickness.
- Individual size (Thick x Width) capability can be assessed based on the actual sizes.

Delivery Condition	
Quenched/Quenched and tempered	The plates are delivered with sheared or thermally cut edges. Untrimmed edges can also be delivered with prior agreement. Plates can be delivered in shot blasted and primer coated surface condition.

Chemical Composition (Ladle Analysis)

Grade	Plate Thickness mm	C Max%	Mn Max%	P Max%	S Max%	Si Max%	Cr Max%	Ni Max%	Mo Max%	B Max%	CE Max	PCM Max
Rockstar 400	6.0 – 20.0	0.18	1.60	0.025	0.010	0.70	0.50	0.50	0.25	0.0040	0.45	0.28
	20.1 – 32.0	0.20	1.60	0.025	0.010	0.70	1.00	0.50	0.50	0.0040	0.48	0.29
	32.1 – 50.0	0.25	1.60	0.025	0.010	0.70	1.40	0.70	0.60	0.0040	0.57	0.33
	50.1 – 80.0	0.25	1.60	0.025	0.010	0.70	1.40	0.70	0.60	0.0040	0.65	0.40
Rockstar 450	6.0 – 20.0	0.30	1.60	0.025	0.010	0.70	1.00	0.80	0.60	0.0040	0.52	0.34
	20.1 – 40.0	0.30	1.60	0.025	0.010	0.70	1.40	0.80	0.60	0.0040	0.60	0.40
	40.1 – 50.0	0.30	1.60	0.025	0.010	0.70	1.40	1.00	0.60	0.0040	0.65	0.50
Rockstar 500	6.0 – 20.0	0.32	1.60	0.025	0.010	0.70	1.50	1.50	0.60	0.0040	0.60	0.41
	20.1 – 40.0	0.32	1.60	0.025	0.010	0.70	1.50	1.50	0.60	0.0040	0.65	0.43
	40.1 – 50.0	0.32	1.60	0.025	0.010	0.70	1.50	1.50	0.60	0.0040	0.74	0.48

- All elements are in Wt%.
- The steel is grained refined. Steel may content grain refining elements as Al, Nb, Ti or V individually or in combination. However, %Al: 0.020 min with Nb+Ti+V as 0.10 max.

$$\mathbf{CE = C} + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Cu+Ni)}{15} \; ; \; \mathbf{PCM = C} + \frac{Si}{30} + \frac{(Mn+Cu+Cr)}{20} + \frac{Ni}{60} + \frac{Mo}{15} + \frac{V}{10} + 5 \times B$$

Mechanical Properties

Hardness	Rockstar 400	Rockstar 450	Rockstar 500
(On a milled surface 0.5 - 2 mm below the plate surface)	360 - 430 BHN	425 - 475 BHN	450 - 540 BHN

- Brinell hardness testing, according to EN ISO 6506-1, on a milled surface 0.5 – 2 mm below surface.
- At least one test specimen per heat per thickness will be tested for hardness.
- The plates are through-hardened to a minimum of 90% of the guaranteed minimum surface hardness.

Tensile Properties

Tensile properties given in below table are typical values normally observed in 20mm thick plate for reference purpose only.

Grade & Thickness	Yield strength (Min-MPa)	Tensile strength (Min-MPa)	%Elongation (GL = 50 mm)	Charpy V-Notch Impact toughness (Min)
Rockstar 400	1000	1250	12	27 Joules min @ -40°C
Rockstar 450	1100	1350	10	27 Joules min @ -20°C
Rockstar 500	1200	1450	8	27 Joules @ 0°C

- Orientation of tensile specimen is Transverse and Impact is longitudinal to rolling direction
- Normally hardness is only guaranteed for abrasion resistance steel unless specified. Other specific testing can be taken on case to case basis

Dimensional Tolerances & Surface Quality

Thickness	As per EN 10029 - Class A/B/C/D as per requirements
Length and Width	As per EN 10029
Flatness	As per EN 10029 Class N steel type H
Surface Properties	As per EN 10163-2, Class A Subclass 1
Plate Ultrasonic Testing	As per EN 10160 S0, E0

- Tighter tolerances can be taken up on case to case basis.

Heat Treatment and Fabrication Guidelines

Heat Treatment

Rockstar plates has obtained its hardness by quenching and when required by subsequent tempering.

The hardness of Rockstar plates may get reduced with exposure of plates above ~200°C. Hence, Rockstar plates are not intended for further heat treatment.

Cold Forming

Rockstar plates with high internal steel cleanliness and uniform properties have good formability. For plates up to 20 mm thick, the recommended minimum bending radius is given in the tables below. For plate thicknesses above 20 mm on case to case basis.

		Minimum inner bend radius	
Bend radius is dependent on the direction of bending to rolling direction (t = Plate thickness)	**Bend angle (In degree)**	**Transverse to rolling direction**	**Parallel to rolling direction**
Rockstar 400	180	3xt	4xt
Rockstar 450	90	4xt	4xt
Rockstar 500	90	5xt	6xt

Welding & Cutting

Welding Method	Lower carbon equivalent of Rockstar plates results in good weldability. All conventional welding methods like manual electric welding, submerged arc welding, inert gas welding can be applied.
Thermal Cutting	Rockstar plates are compatible with all thermal cutting processes including oxy-fuel, plasma, and laser. Preheating at 100 to 150°C is recommended for plates thicker than 40 mm (10 mm for Rockstar 500). Excess preheating above 200°C may reduce the hardness of Rockstar.

ArcelorMittal Nippon Steel India

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ArcelorMittal Nippon Steel India Ltd.
7th Floor, Raheja Tower, Plot C-30, Block G, Opposite SIDBI, Bandra Kurla Complex, Bandra (East) Mumbai – 400051, Maharashtra, India
contact@amns.in | www.amns.in | Follow us on

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