

SIDUR[™] 450

SPECIFICATION SHEET

SIDUR is a highly wear-resistant steel of extreme hardness, strength, and toughness. This makes it durable and suitable for use in the most difficult environments where there is a risk of abrasion caused by contact with hard minerals and other abrasive materials.

SIDUR 450 heavy plates are produced in hardness range 420–470 HB. The unique combination of mechanical properties and chemical composition improves bending, welding, machining properties and deformability. SIDUR 450 is the material well suited for a wide variety of applications in which exposure to heavy wear by hard minerals and other abrasive material is the case.

► Applications

Bulldozers, earth moving crusher jaws, shredder plates, shovel buckets, dump trucks, industrial trucks, lorries, containers for iron ore, machine parts and tools for mineral extraction (mining), metal working tools – cutting edges, gears, bearings, loaders, buckets, slurry pipe systems, guiding and shifting plates, liner of shot blasting unit, shot blasting equipment.

► Chemical composition (Heat analysis in mas. %)

C max	Si max	Mn max	S max	P max	Cr max	Ni max	Mo max	B max
0.27	1.0	1.5	0.002	0.012	0.8	0.5	0.5	0.004

► Carbon equivalent CEV [%]

Thickness range	8–25 [mm]	25–40 [mm]	Above 40 [mm]
Carbon equivalent [%]	max. 0.49	max. 0.59	max. 0.74

► Hardness and delivery conditions [%]

Hardness (HBW)	Delivery conditions
420–470	Quenched (and tempered)

► Dimensional range

Thickness [mm]	Width [mm]	Length [mm]
8–100	1000–2500	2000–12,000

► Tolerances

According to EN 10 029, narrower tolerances upon agreement.

► Bending recommendation*

Thickness [mm]	R/t		W/t		
	Transverse	Longitudinal	Transverse	Longitudinal	Springback
8–20	4.0	5.0	10.0	12.0	
>20	5.0	6.0	12.0	14.0	11–18°

The table shows the minimum recommended punch radius (R) and die opening width (W) for plate thickness (t) when the plate is bent to 90° along the direction of rolling and transversely to the direction of rolling – both with corresponding springback.

* Thermal cut and sheared edges must be properly prepared before bending operation.

► Recommended preheat temperature [°C]

Thickness [mm]	8–20	25–40	45–80
Temperature [°C]	room	125	150

* Data from the table is applicable to single plate thickness when welding with a heat input of 1.7 kJ/mm.
The consumables determine the preheating temperature if their carbon equivalent is higher than that of the plate. | Room temperature is approx. 20 °C.

► Recommended interpass temperature

The maximum recommended interpass temperature is 225 °C.

► Welding recommendation

SIJ Acroni steels have good weldability. Preheating is normally not necessary, but is recommended when welding plates at outside temperature below 5 °C or plates with thickness above 20 mm.

In these cases, the temperature of preheating during infusions should not exceed 200 °C as this can cause reduction of hardness.

Welding should be performed immediately after the welding edges are finished to avoid surface contamination. Consumables must always be stored according to the manufacturer's recommendation. Coated electrodes must be dried before welding. By repair welding and joint welding sharp edges should be avoided. The first layer of weld material should be thinner to assure minimal energy intake. Recommended welding consumables are produced by SIJ Elektrode.

➔ Cutting recommendation

SIDUR 450 can be cut using thermal cutting processes or cold methods of shearing, water-jet etc. When cutting thicker plates, especially by using oxy-fuel, special attention must be given before and after the cutting process to prevent (delayed) cut edge cracking. Preheating the plates is one of most important solutions before cutting. Additional postheating of cut edge is also done where necessary to reduce residual stresses. Cooling, where possible, is done by pilling even if the plates were not preheated.

Method of cutting:	submerged plasma	dry-plasma	oxy-fuel
Method of preheating:	-	blow-pipe system/ furnace / torch / warm pilling / electric heating mats	blow-pipe system / furnace / torch / warm pilling / electric heating mats
Heating temperature:	As per table Recommended preheat temperature	As per table Recommended preheat temperature	As per table Recommended preheat temperature
Soaking time in minutes per mm:	-	Min. 3 min/mm at temperature	Min. 3 min/mm at temperature
Cooling method:	insulating blanket / warm pilling / furnace	insulating blanket / warm pilling / furnace	insulating blanket / warm pilling / furnace

* Does not apply for laser and water-jet cutting methods.

➔ Drilling recommendation

SIDUR 450 has good machinability when using high speed steel - (HSS), solid cemented, brazed cemented carbide drills or with indexable inserts. Recommended high speed steel drills are HSS, HSS-Co (8%), HSS-E. Ordinary HSS drill are more suitable for individual holes than for regular production. In all cases, cutting speed must be adjusted to the hardness of the work piece (400, 450, 500 HBW) and the diameter of the drill. Higher hardness of material requires a lower cutting speed. When drilling, use cooling fluid. When tapping use thread paste HSS-Co TiCN coated taps are normally used.

➔ Disclaimer

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WEAR RESISTANT STEEL