

AR500F

Abrasion Resistant Steel Plate

General Product Description

AR500F is a through-hardened, abrasion-resistant product with a nominal hardness level of 500 HBW. This product is ideal for applications where a good combination of abrasion resistance, formability, and weldability is desired. AR500F is produced by austenitizing, water quenching, and tempering.

Applications

AR500F abrasion-resistant plate is used in equipment subjected to abrasive wear. Common applications for AR500F abrasion-resistant plate include mining and raw material handling, recycling, and construction equipment where AR500F may be employed in hoppers, chutes, crushers, conveyors, screens, shovels and buckets, cutting edges, truck dump bodies, and other components exposed to abrasive wear.

Mechanical Properties

AR500F has a nominal hardness of 500 HBW.

Hardness, HBW Minimum	Hardness, HBW Maximum
457	543

AR500F typical transverse tensile properties (standard plate-type tensile specimen per ASTM A370) and typical Charpy V-notch impact toughness for ¾" [19 mm] thick plate:

0.2% Yield Strength, ksi [MPa], Typical	Tensile Strength, ksi [MPa], Typical	Elongation, %, in 2" [50mm], Typical	Typical Longitudinal CVN Energy at -40 °F [-40 °C], ft-lbf [J]	Typical Transverse CVN Energy at -40 °F [-40 °C], ft-lbf [J]
175 [1,200]	225 [1,550]	20%	20 [27]	15 [20]

Chemical Composition (ladle analysis, wt. %, max. except where noted)

Plate Thickness, t, (in)	C	Mn	P	S	Si	Ni	Cr	Mo	B Min.	CEV Typical	CET Typical
t ≤ 0.787"	0.27	1.60	0.025	0.010	0.70	0.30	1.00	0.25	0.0005	0.52	0.37
0.787" < t ≤ 1.25"	0.29	1.60	0.025	0.010	0.70	0.30	1.00	0.25	0.0005	0.63	0.43

Tolerances

Thickness, width, and length tolerances according to ASTM A6. Flatness tolerance ½ ASTM A6.

Fabrication and Other Recommendations

Weldability

AR500F is weldable by conventional electric arc welding processes, using low-hydrogen consumables and appropriate welding practices.

Welding Process	Thickness, in [mm]	Minimum Preheat Temperature	Consumables
Shielded Metal Arc (SMAW)	Up to 0.500" [12.7]	60°F [15°C]	AWS E70XX, AWS ER70S-X AWS F7XX-EXXX-XX AWS E7XT-X
	>0.500" [12.7] – 1.25" [31.8]	350°F [175°C]	
Gas Metal Arc (GMAW)	Up to 0.500" [12.7]	60°F [15°C]	
	>0.500" [12.7] – 1.25" [31.8]	350°F [175°C]	
Submerged Arc (SAW)	Up to 0.500" [12.7]	60°F [15°C]	
	>0.500" [12.7] – 1.25" [31.8]	350°F [175°C]	
Flux Cored Arc (FCAW)	Up to 0.500" [12.7]	60°F [15°C]	
	>0.500" [12.7] – 1.25" [31.8]	350°F [175°C]	

Formability

The minimum recommended punch radius, R, and die-opening width, W, for plate thickness, t, for cold forming AR500F are provided in the following table. Shear burrs and heat-affected zones of thermal cut edges on or near the bend axis as well as sharp corners on edges and on gas cut or punched holes located on or adjacent to the bend axis should be removed by grinding prior cold forming.

Thickness in [mm]	Bend Axis Perpendicular to Rolling Direction		Bend Axis Parallel to Rolling Direction	
	Min. Punch Radius, R	Die width W	Min. Punch Radius, R	Die width W
0.250" – 0.787" [6.4 – 20]	6.0t	14t	7.0t	14t
>0.787" – 1.250" [20 – 31.8]	8.0t	18t	9.0t	18t