AlgoTuf 450F

Increased wear-resistance and toughness
Abrasion resistant heat-treated steel plate

AlgoTuf 450F is designed specifically for applications which require superior abrasion resistance. Most of the thickness range of AlgoTuf 450F is through-hard, which translates into longer service life for the finished products.

AlgoTuf 450F is the cost-effective material for truck and hopper liners, wear plates, chutes, buckets, crushers and similar heavy equipment.

Dimensions

Thickness range: 0.188" (5mm) – 2.5" (65mm)

Maximum width: 152" (3860mm)
Maximum length: 960" (24400mm)

The stock plate size most commonly available through Algoma's distributor network is 96" x 288" (2440mm x 7315mm).

Notch Toughness

AlgoTuf 450F will typically have CVNL average values of 30 ft-lbs at -40°F (40 Joules at -40°C) for thicknesses up to 0.787" (20mm), and 15 ft-lbs at -40°F (20 Joules at -40°C) for thicknesses greater than 0.787" (20mm).

AlgoTuf 450F is not normally produced with certified notch toughness values. However, impact values may be reported, for information only, if requested at the time the order is placed.

Hardness

AlgoTuf 450F is heat-treated to produce a through-thickness hard product with a range of 410-477 HBW for thicknesses up to 0.787" (20mm), and 420-477 HBW for thicknesses greater than 0.787" (20mm) to less than 2.25" (57mm). For greater thicknesses there may be some softening in the core below the 420 HBW minimum value.

Forming (Up to 90°)

AlgoTuf 450F is designed for improved formability, with low levels of carbon and sulphur, and is treated for inclusion shape control.

Plate up to and including 0.787" (20mm) thick can be cold bent to a minimum inside bend radius of 6t (where t is the plate thickness), with the bend axis transverse to the rolling direction (i.e. across the grain). For thicknesses greater than 0.787" (20mm), a radius of 8t should be used for cold-forming with the bend axis transverse to the rolling direction.

Maximum Temperatures for Hot Forming and Stress-Relief

AlgoTuf 450F over 0.787" (20mm) thick can be heated to approximately 480°F (250°C) for about 10 minutes, for hot forming or stress relief operations. Additional time at this temperature may result in some loss of mechanical properties.

Hot forming or stress relief operations are not recommended for thicknesses of 0.787" (20mm) and less.

Chemical Composition - Heat Analysis (% maximum)

Thickness	C	Mn	P	S	Si	Cr	Mo	B
0.188" (5mm) to 0.394" (10mm)	0.21	1.50	0.025	0.015	0.45	0.20	0.20	0.003
Over 0.394" (10mm) to 0.787" (20mm)	0.23	1.50	0.025	0.015	0.45	0.20	0.35	0.003
Over 0.787" (20mm) to 2.5" (65mm)	0.26	1.50	0.025	0.015	0.45	0.60	0.45	0.003

Notes:

1. *The molybdenum content will vary according to thickness.*
2. *To meet the required mechanical properties, Algoma may use additional alloy elements, which it will report to purchasers.*

Mechanical Properties (transverse) for information only*

Tensile Strength Typical	Yield Strength Typical	Elongation (per cent) Typical 2" (50mm)
200 ksi (1380 MPa)	NA	14

**These values are provided for reference only and no express or implied warranty is made that a specific plate will provide these properties, unless negotiated with Algoma prior to order acceptance*

Welding

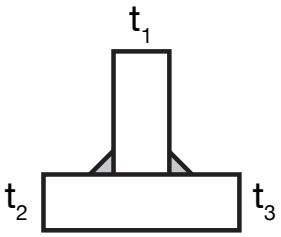
AlgoTuf 450F exhibits excellent weldability. Because of its low alloy content, this grade can be welded using simple procedures and common, readily available consumables.

Algoma recommends H8 designation electrodes.

High heat input welding processes such as electroslag and electrogas are not suitable for AlgoTuf 450F, and will cause a reduction of mechanical properties and hardness along the heat-affected zone.

Preheat and Interpass Temperatures

Algoma recommends the following preheat and interpass temperatures, which should be monitored with temperature crayons, thermocouples, etc. Higher preheat temperatures may be required when the weld metal hydrogen level is greater than 8ml/100g deposited weld metal, or when higher joint restraint is present.



Combined plate thickness (t1+t2+t3)	H8 Designation	
	Low restraint	High restraint
<=0.75" (20mm)	no preheat	no preheat
<=1.50" (38mm)	no preheat	210°F (100°C)
<=2.25" (57mm)	210°F (100°C)	255°F (125°C)
<=3.00" (75mm)	300°F (150°C)	350°F (175°C)
<=4.00" (100mm)	300°F (150°C)	350°F (175°C)
> 4.00" (100mm)	300°F (150°C)	350°F (175°C)

**Ambient temperature is assumed as 68°F (20°C).*

These temperatures are based on the SMAW process, using E7018 electrodes. Once the electrodes are removed from their sealed containers, they should be stored in an oven at 250°F (120°C).

Preheat temperatures can be reduced by 50°F (28°C) for the GMAW process.

The Dearden-O'Neill Carbon Equivalent (C.E.) of AlgoTuf 450F is:

Thickness	Nominal Aim Carbon Equivalent	Maximum Carbon Equivalent
0.188" (5mm) to 0.394" (10mm)	0.44	0.49
Over 0.394" (10mm) to 0.787" (20mm)	0.50	0.55
Over 0.787" (20mm) to 2.5" (65mm)	0.57	0.63

The carbon equivalent calculated from the mill test report should be used for critical applications.