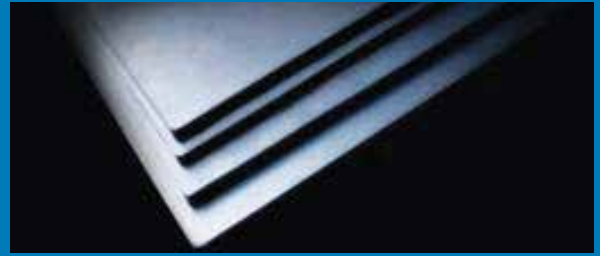


AlgoTuf 400F

More formable, with less preheat
Abrasion-resistant heat-treated steel plate



AlgoTuf 400F is designed to provide a good level of abrasion resistance plus improved formability and weldability. Most of the thickness range of AlgoTuf 400F is through-hard, which translates into longer service life for the finished products. AlgoTuf 400F requires less preheat than the old Algoma 360, which it replaces.

AlgoTuf 400F is the cost-effective abrasion resistant material for mining, forestry and construction applications.

Dimensions

Thickness range: 0.188" (5mm) - 2.75" (70mm)
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 400F will typically have CVNL average values of 35 ft-lbs at -40°F (47 Joules at -40°C) for thicknesses up to 1.0" (25.4mm), and 15 ft-lbs at -40°F (20 Joules at -40°C) for thicknesses greater than 1.0" (25.4mm).

AlgoTuf 400F 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 400F is heat-treated to produce a through-thickness hard product with a range of 360-440 HBW for thicknesses less than 2.25" (57mm). For thicknesses equal to or greater than 2.25" (57mm) there may be some softening in the core, below the 360 HBW minimum value.

Forming (Up to 90°)

AlgoTuf 400F 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) can be cold bent to a minimum inside bend radius of 3t (where t is the plate thickness), with

the bend axis transverse to the rolling direction (i.e. across the grain), and a radius of 4t when bending parallel to the rolling direction. For plate over 0.787" (20mm), a radius of 6t should be used for cold-forming with the bend axis transverse to the rolling direction.

Maximum Temperatures for Hot Forming and Stress-Relief

AlgoTuf 400F over 1" (25.4mm) 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 1" (25.4mm) and less.

Chemical Composition - Heat Analysis (% maximum)

Thickness	C	Mn	P	S	Si	Cr	Mo	B
0.188" (5mm) to less than 0.472" (12mm)	0.17	1.50	0.025	0.015	0.45	0.25	0.20	0.003
0.472" (12mm) to 0.787" (20mm)	0.17	1.50	0.025	0.015	0.45	0.20	0.20	0.003
Over 0.787" (20mm) to 1.00" (25.4mm)	0.20	1.50	0.025	0.015	0.45	0.60	0.35	0.003
Over 1.00" (25.4mm) to 2.75" (70mm)	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)
175 ksi (1206 MPa)	145 ksi (1000MPa)	15

*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 400F exhibits excellent weldability. Because of its low alloy content, this grade can be welded using simple procedures and common, readily available consumables.

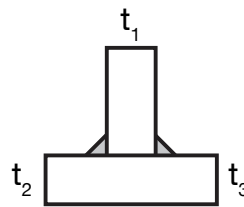
Algoma recommends H8 designation electrodes.

High heat input welding processes such as electroslog and electrogas are not suitable for AlgoTuf 400F, 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
<=2.25" (57mm)	no preheat	120°F (50°C)
<=3.00" (75mm)	255°F (125°C)	300°F (150°C)
<=4.00" (100mm)	255°F (125°C)	300°F (150°C)
>4.00" (100mm)	255°F (125°C)	300°F (150°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 400F is:

Thickness	Nominal Aim Carbon Equivalent	Maximum Carbon Equivalent
0.188" (5mm) to less than 0.472" (12mm)	0.38	0.43
0.472" (12mm) to 0.787" (20mm)	0.41	0.46
Over 0.787" (20mm) to 1.00" (25.4mm)	0.49	0.55
Over 1.00" (25.4mm) to 2.75" (70mm)	0.57	0.63

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