



Mars[®] 280: Rolled Homogeneous Armor heat treated for maximum resistance to shock.

Mars[®]280 is a less hardness (typical 280 HBW), high toughness protection steel offering maximum resistance to shock and blast waves for all vehicle structures (main battle tanks, armoured personal carriers ...).

PROPERTIES

STANDARDS

Mars[®] 280 can be ordered according to the following standard:

> MIL-DTL-12560 class 2

CHEMICAL COMPOSITION - LADLE ANALYSIS - MAX WEIGHT%

C	S	P	Si	Mn	Ni	Cr	Mo	V	B	CE 1)
0.27	0.002	0.012	0.4	1.2	1.8	1.5	0.6	0.10	0.003	0.80

1) Carbon equivalence per ASTM A6/A6M, i.e. : $CE = C + [Mn/6] + [(Cr + Mo + V)/5] + [(Ni + Cu)/15]$

MECHANICAL PROPERTIES (IN BOTH DIRECTIONS)

	Hardness	Charpy KV 2) @-40° C standard 10 x 10 specimen 3)	
	HBW	J	ft.lbs
Guarantees	260 - 310	≥ 43	≥ 32

2) Average of 3 tests. Single value min 70% of specified average.

3) For nominal thicknesses under 11mm, sub-size specimens are used. The specified minimum value is then proportional to the specimen cross section.

Brinell hardness test according to relevant standard (EN ISO 6506-1 / ASTM E10/E110), on each plate and in two places, one at each end of a diagonal, on a milled surface 0,5 to 1mm below plate surface.

Charpy Impact test according to relevant standard (EN ISO 148-1 / ASTM E23) on each heat and thickness from 6mm.

Ultrasonic test is performed according to standard requirements or upon special agreement up to testing levels ASTM A578/A578M level C / EN 10160 Class S₃/E₄

IN SERVICE CONDITIONS

BALLISTIC PROPERTIES

Mars® 280 exceeds the ballistic performance requirements of MIL-DTL-12560 for class 2 material.
Ballistic test to be performed upon request.

PLATE PROCESSING

For all information concerning machining, cutting, forming or welding, see our userguide for Mars® protection steels.

DELIVERY CONDITIONS

HEAT TREATMENT

Mars® 280 is **quenched** and tempered at high temperature ($\geq 550^{\circ}\text{C}$).

SURFACE PROPERTIES

According to EN 10163 class B - subclass 3
Shot blasting and weldable primer application can be performed upon request

SIZES AND TOLERANCES

Mars® 280 can be supplied as quarto plates or cut-to-length sheets (from hot strip mill) **in standard sizes or tailor made dimensions.**

	Quarto plates			Cut-to-length sheets
Thicknesses	5.0 – 50.8 mm (.197" – 2")			5.0 – 10.0 mm (.197" – .393")
Thickness	Th	For width $\leq 2000\text{mm}$	For width $\leq 2400\text{mm}$	
	≥ 5 to ≤ 12	0/+0.8	0/+0.8	≥ 5.0 to ≤ 8.5 : -0/+0.4
	> 12 to 20	0/+1.0	0/+1.2	> 8.5 to ≤ 10.0 : -0/+0.5
	> 20 to 35	0/+1.2	0/+1.4	
	> 35 to 50.8	0/+1.6	0/+1.8	
Width	1000 – 3500 mm (39" – 137")			1000 – 2000 mm (39" – 78")
Length	1200 – 8100 mm (63" – 319")			1800 – 8100 mm (71" – 319")
Shape, length, and width tolerances as per EN 10029				

For information purpose only, refer to the requirements of specified standard.

FLATNESS

Maximum flatness deviation is 3mm/m (when measured according to EN 10029).

YOUR CONTACT

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Technical data and information are to the best of our knowledge at the time of printing. However, they may be subject to some slight variations due to our ongoing research programme on protection steels. Therefore, we suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.