



General Product Description

Armor steel with high hardness and toughness, resistant to ballistic penetration.

Protection 500T; It is supplied in the range of 4.00 - 24.00 mm thickness and 480-560 HBW hardness.

Chemical Composition Content (Ladle Analysis)

Steel Grade	Thickness (mm)	C (max %)	Si (max %)	Mn (max %)	P (max %)	S (max %)	Cr (max %)	Ni (max %)	Mo (max %)	B (max %)
High Hardness Armor Steel (HHA)	4.00 – 24.00	0.32	0.70	1.20	0.015	0.005	0.90	1.20	0.50	0.003

Guaranteed Mechanical Properties

Thickness (mm)	Impact Charpy-V Min. -40°C (Joule)	Hardness Range Min.-Max. (HBW)	CE Max.
4.00 – 24.00	24	480-560	0.72
CE = C + [Mn/6] + [(Cr + Mo + V) / 5] + [(Ni + Cu) / 15]			

Typical Mechanical Properties

Thickness (mm)	Typical Yield Strength (MPa)	Typical Tensile Strength (MPa)	Elongation (%)
4.00 – 24.00	1200	1450-1750	7

Mechanical Tests

→ Brinell hardness test is applied on every armor steel in accordance with the principles of EN ISO 6506-1. If the thickness of the hardness measurement area is thinner than 4.75 mm, the 5/750 HBW measurement method is used. For other thicknesses, the 10/3000 HBW method is used.

→ Hardness tests are applied on the machined surface at a depth of 0.50 - 1.00 mm from the armor steel surface.

→ Charpy V-notched impact test is applied in perpendicular and parallel directions to the rolling direction in every casting and thickness* in accordance with the principles of EN ISO 148-1. For products thinner than 11.00 mm nominal thickness, sub-size samples are used. The determined minimum impact value is in this case proportional to the test specimen cross-sectional area.

(* 6.00 mm order thickness and thicker armor steels)

→ Order-specific test requests should be discussed with Miilux Sales team at order stage.

Typical Ballistic Properties | MILUX® PROTECTION 500T



Ballistic Protection Class	Thickness (mm)	Calibre (mm)	Type of bullet	Weight of the bullet (g)	Shooting Range (m)	Speed of the bullet (m/s)
EN 1522 FB6	6.00	5,56 x 45	SS109 (M855)	4.0	10	950 ± 10
		7,62 x 51	M80 Nato Ball	9.5		830 ± 10
STANAG 4569 Level-1	6.00	7,62 x 51	M80 Nato Ball	9.5	30	833 ± 20
	9.00	5,56 x 45	SS109 (M855)	4.0	30	900 ± 20
STANAG 4569 Level-2	12.00	5,56 x 45	M193	3.5	30	937 ± 20
EN1522 FB7	14.00	7,62 x 39	API BZ	7.7	30	695 ± 20
STANAG 4569 Level-3	16.00	7,62 x 51	P80 Nato AP	9.5	10	820 ± 10
	24.00	7,62 x 54R	B32 API	10.3	30	854 ± 20
	24.00	7,62 x 51	AP (WC core)	8.4	30	930 ± 20

MILUX PROTECTION® 500T DATASHEET

For order-specific test requests, please contact with the Miilux Sales team at the order stage.

Each customer is obliged to verify the requested plate thickness, evaluate the suitability of the information provided to the request and the potential risks according to the area of use.

Miilux High Strength Steel Production Inc. reserves the right to change product groups and tolerances without prior information. You can contact our Customer Technical Services team to get information about different tests.

Manufacturer Recommendations

Machining

Miilux protection products can be machined with rapid steel and hard metal (HSS) drills with a satisfactory service life if the drill advance and cutting speed are correspondingly accommodated.

Welding

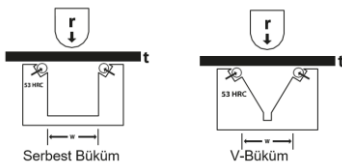
Miilux Protection® 500T can be welded with limited heat input and maximum welding energy. When the combined wall thickness of Miilux Protection® 500T is over 20mm, preheating is required. Austenitic welding consumable products should be used, the preheating temperature should be at least 70% of the working temperature and the welding termination temperature should not exceed the working temperature more than 30%.

Cold Forming

When cold forming Miilux products, sharp transition angles should be avoided as much as possible. In addition, the status of the equipment used in the operations, the process plan and the importance of good workshop practices should not be forgotten. The table of cold forming limits is given below.

Steel Grade	Plate Thickness (mm)	Free Bending < 90° rounding radius of press / plate thickness R/t Bending line to rolling direction		Free Bending--Free hole width/plate thickness W/t	
		Transverse	Longitudinal	Transverse	Longitudinal
Miilux Protection 500T	4.00 – 24.00	6.0	8.0	15.0	19.0

Bending should be done with one press | Slow pressing speed is recommended | Lower tool should be roller-type (see drawings)



Delivery Condition

- Quenched and Tempered
- Protection 500T is not suitable for secondary heat treatments by the user. No guarantee is given in case of secondary heat treatment above 180°C.

Tolerances

- EN 10029 or EN 10051 standards are applied in dimensional tolerances.
- EN 10029 Class C tolerances are guaranteed for thickness.
- Thickness tolerance application is according to narrowed Milux thickness tolerances, which are more restrictive than EN 10029 Class C.
- EN 10029 Class N, Steel Type H tolerances are guaranteed for flatness.

Surface Condition

- EN 10163-2 (Class B, Subclass 3) standard is guaranteed for surface imperfections.
- Steel Plates are sandblasted according to ISO 8501-1 Sa 2½ quality.
- Unless otherwise specified, Milux products are sand blasted and coated with a shop primer paint that is specially developed to provide very high welding and cutting speed which has a very low welding porosity and burning rate in the reverse area.
- Shop primer coating protects the structure against atmospheric corrosion during storage. Applied in thickness of 15-25 microns (these values are specified for a smooth test panel).
- The paint type used has a performance suitable for welding and cutting processes.
- Marking is done with punch and paint.

Product Certificate

- Certification is made according to EN 10204.
- Test results are provided in English and / or Turkish languages in accordance with EN 10204-3.1.
- EN-10204-3.2 test certificates, must be specified at the order stage.

Dimension and Delivery Condition

- Milux products are provided with a maximum width of 2500 mm and a maximum length of 8000 mm. Special size requests should be discussed at the order stage.
- Milux products are negotiated at the order stage and can be supplied as ready-to-install component parts according to customer request.
- Protection 500T requests for other sizes should be discussed at the order stage.

Ultrasonic Test

- It can be made in accordance with EN ISO 10160. For the application class, please contact Milux Sales team at the order stage.

Milux Thickness Tolerances

Plate Thickness (mm)	Tolerances (mm)
4.00 – 8.00	- 0.00 + 0.60*
6.00 – 7.99	- 0.00 + 0.80**
8.00 – 14.99	- 0.00 + 0.90**
15.00 – 24.00	- 0.00 + 1.00**

Other thickness tolerances by special agreement.

* Cut to length sheet from roll (No edge cut)

** Plate (Edge cut)



MILUX PROTECTION® 500T DATASHEET

Sales and Marketing

Sales and Marketing team helps you with your order requests and pre-sales services.

E-mail: satis@milux.com.tr

Customer Technical Services

Customer Technical Services team will assist you if you have a question regarding product features, tests and areas of use.

E-mail: mth@milux.com.tr