



## Chemical composition content % maximum (ladle analysis)

Steel grade	Thickness	C	Si	Mn	P	S	Cr	Ni	Mo	B
Miilux Protection 380	6-12 mm	0,13	0,40	1,40	0,020	0,010	1,50	0,40	0,40	0,005
Miilux Protection 400	5-30 mm	0,24	0,70	1,70	0,030	0,015	1,50	0,40	0,50	0,004
Miilux Protection 450	5-40 mm	0,26	0,60	1,50	0,030	0,015	1,50	0,70	0,50	0,005
Miilux Protection 500	2,5-40 mm	0,30	0,70	1,70	0,030	0,015	1,50	0,80	0,50	0,004

## Typical mechanical properties

Steel grade	Thickness	Yield strength Rp 0,2 N/mm <sup>2</sup>	Tensile strength Rm N/mm <sup>2</sup>	Elongation A5 %	Impact Charpy-V -40 °C Kv Joule	Hardness Range HBW	CEV
Miilux Protection 380	6-12 mm	800	1000	12	20	320-370	0,52
Miilux Protection 400	5-30 mm	1000	1250	10	30	360-450	0,50
Miilux Protection 450	5-40 mm	1200	1450	8	30	420-480	0,58
Miilux Protection 500	2,5-40 mm	1250	1600	8	20	480-560	0,64

## Technical specification of Miilux® Protection 500

Class acc. to	Thickness of the test (nominal)	Type of weapon	Calibre	Type of bullet	Weight of the bullet	Shooting distance	Speed of the bullet V2,5 (m/s)
EN1522 FB3	2,5 mm	Revolver	357 Mag.	Fulljacket, coned bulled, soft core	10,2 g	5 m	430 ± 10 m/s
EN1522 FB4	3,0 mm	Revolver	44 Rem. Mag.	Fulljacket, flat nose, soft core	15,6 g	5 m	440 ± 10 m/s
EN1522 FB5	6,0 mm	Rifle	5,56 x 45 mm	SS109 (M855)	4,0 g	10 m	950 ± 10 m/s
EN1522 FB6	6,0 mm	Rifle	7,62 x 51 mm	M80 Nato Ball	9,5 g	10 m	830 ± 10 m/s
EN1522 FB7	14,0 mm	Rifle	7,62 x 51 mm	P80 Nato AP	9,5 g	10 m	820 ± 10 m/s
Stanag 4569 Level 1	6,0 mm 6,0 mm 9,0 mm	Rifle	7,62 x 51 mm 5,56 x 45 mm 5,56 x 45 mm	M80 Nato Ball SS109 (M855) M193	9,5 g	30 m	833 ± 20 m/s
					4,0 g	30 m	900 ± 20 m/s
					3,5 g	30 m	937 ± 20 m/s
Stanag 4569 Level 2	12,0 mm	Rifle	7,62 x 39 mm	API BZ	7,7 g	30 m	695 ± 20 m/s
Stanag 4569 Level 3	24,0 mm 16,0 mm	Rifle	7,62 x 51 mm 7,62 x 54R mm	AP (WC core) B32 API	8,4 g	30 m	930 ± 20 m/s
					10,3 g	30 m	854 ± 20 m/s

Test results mentioned above are according to EN 1522 and Stanag 4569, but we have tested also other classes e.g. MIL-standards. Ask for more information about delivery-specific tests from technical customer service and sales.

## Miilux<sup>®</sup> Protection 380 | 400 | 450 | 500

### Ballistic steel plates and components for human protection

#### Delivery condition

- Quenched

#### Tolerances

- Dimensions according to EN 10029 or EN 10051
- Thickness according to EN 10029 class C and flatness according to EN 10029 class N, steel type H

#### Surface condition

- According to EN 10163-2 class B subclass 3

#### General technical delivery condition

- According to EN 10021. Unless otherwise agreed. Inspection documents EN 10204-2.2. Issued in English.

## Dimensional tolerances according to EN 10029

Plate thickness in mm	Tolerances in mm
3-4	- 0,0 + 0,35
5-6	- 0,0 + 0,70
7-9	- 0,0 + 0,90
10-13	- 0,0 + 1,00
>13	- 0,0 + 1,10

Other thickness tolerances by special agreement.

## Workshop 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 380 and 400 can be welded well. Miilux Protection 450 and 500 are more limited with heat input and maximum welding energy. With Miilux Protection 380 and 400 preheating is needed when combined plate thickness is more than 40 mm and with Miilux Protection 450 and 500 when combined plate thickness is more than 20 mm. More information available in Miilux Protection welding brochure.

### Cold forming

Cold forming directive limits

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		Bottoming 90° -Free hole width/ plate thickness W/t
		Transverse	Longitudinal	Transverse	Longitudinal	
Miilux Protection 380	6-12	2,5	3,0	9,0	9,0	~ 15,0
Miilux Protection 400	5-20	3,0	4,0	9,0	11,0	~ 15,0
Miilux Protection 450	5-20	4,0	5,0	11,0	13,0	~ 15,0
Miilux Protection 500	5-20	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)

