

## Mars® steels for military applications

Threat		Mars® 380	Mars® 500	Mars® 550	Mars® 600	Mars® 650	Multi-layer system examples (from strike face to back face)													
Recommended minimum thickness for protection (mm)																				
Stanag Level*	i	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Multi-layer system					AD** (kg/sqm)			
												Grade / thickness	AG*** (mm)	Grade / thickness	AG*** (mm)	Grade / thickness				
1	0°	7,62 x 51 Nato ball	10,5	82	6,3	49	8,7	68	5,0	39	5,5	43	Mars®650 - 5,2mm	0	Glass fibers - 6mm	-	-	54		
		5,56 x 45 Nato SS109			9,3				73										6,8	49
		5,56 x 45 M193																		
2	0°	7,62 x 39 API BZ	13,5	106	12,5	98	10	78	8,5	67	7,5	59	Mars®600 - 4,5mm	30	Mars®500 - 6,5mm	-	-	86		
	30°		7	55	6	47	-	-	6	47	-	-	Mars®650 - 5,4mm	0	Aramid fibers - 9mm	-	-	57		
3	0°	7,62 x 54R API B32	18	141	16	126	-	-	14	110	13	102	Mars®600 - 5mm	15	Mars®600 - 6,5mm	-	-	90		
		Mars®600 - 5mm											10	Mars®380 - 8mm	-	-	102			
	7,62 x 51 AP WC	0°	23	181	20,5	161	-	-	-	-	-	-	-	Mars®600 - 9mm	15	Mars®380 - 13,5mm	-	-	177	
														Mars®650P - 6mm R6T10	30	Mars®650P - 8mm R8T12	15	Mars®500 - 12,5mm	167	
														Mars®600 - 7mm	10	Mars®650P - 6mm R6T10	10	Mars®600 - 8,5mm	153	
														Mars®650P - 6mm R6T10	30	Mars®650P - 8mm R8T12	35	Mars®600 - 8,5mm	136	
60°	8,5	67	8	63	-	-	-	-	-	-	-	-	-	-	-	-				
4	0°	14,5 x 114 API B32	37	290	-	-	-	-	-	-	-	-	Mars®600 - 14mm	0	Mars®380 - 13,5mm	-	-	216		
													Mars®600 - 8,5mm	20	Mars®600 - 8,5mm	20	Mars®500 - 8mm	196		
	Mars®600 - 8,5mm												30	Mars®380 - 15mm	-	-	184			
	30°												23	181	-	-	-	-	-	-
5	60°	25 x 137 APDS-T	34	267	-	-	-	-	-	-	-	-	Mars®650P - 12mm R12T18	100	Mars®650P - 6mm R6T10	100	Mars®380 - 15mm	206		
	-	25 x 137 APFSDS-T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

\*Stanag 4569/ AEP 55 vol1 Ed C.

\*\*AD : Areal Density

\*\*\*AG : Air Gapw

Mars® 650P = Perforated Mars® 650

All tests are carried out at Stanag recommendations speeds.

All information in this document is for information purpose only. Final configuration must be tested on vehicle.

Looking for a specific multi-layer configuration of for protection against a threat that is not included in this table?

Please contact us for recommendation

Industeel reserves the right to change its product range at any time without prior notice.

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## Steels for civil applications

Threat				Safe 500		Mars® 550		Mars® 600		Mars® 650	
				Recommended minimum thickness for protection (mm)							
Standard & protection level		Munition	V proof* (m/s)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)	Th	AD** (kg/sqm)
EN 1522	FB4	.44 Magnum FJ/FN/SC	440 ± 10	3,2*	25	-	-	-	-	-	-
	FB4+	7,62 x 39 FJ/PB/SC M43	720 ± 10	4,2	33	-	-	-	-	-	-
	FB5	5,56 x 45 SS109	950 ± 10	-	-	-	-	5	39	-	-
	FB6	7,62 x 51 Ball	830 ± 10	6,5	51	5,9	46	5	39	-	-
		5,56 x 45 SS109	950 ± 10								
	FB6 with Skin Effect <sup>1)</sup>	5,56 x 45 SS109	950 ± 10	8	63	8,5	67	-	-	-	-
FB7	7,62 x 51 AP (P80)	820 ± 10	-	-	14,5	114	10,5	82	9,5	75	
NIJ J0108.01	Level II	.357 Magnum JSP	426 ± 15	-	-	-	-	-	-	-	-
	Level IIIA	.44 Magnum SWC	426 ± 15	-	-	-	-	-	-	-	-
	Level III	7,62 x 51 M80	838 ± 15	6,5	-	-	-	5	39	-	-
	Level IV	.30-06 (7,62 x 63) AP M2	868 ± 15	-	-	-	-	11,5	90	11	86
	PM6	7,62 x 39 FJ/PB/SC M43	720 ± 10	-	-	-	-	3,9	31	-	-
	PM6 + multi hit <sup>2)</sup>	7,62 x 39 FJ/PB/SC M43	720 ± 10	4,2	33	3,9	31	-	-	-	-
	PM7	5,56 x 45 SS109	950 ± 10	-	-	-	-	5,0	39	-	-
		7,62 x 51 Ball	830 ± 10								
VPAM	PM7 + multi hit <sup>2)</sup>	7,62 x 51 FMJ Nato Ball	830 ± 10	6,5	51	-	-	-	-	-	-
	PM7 + multi hit <sup>2)</sup> with Skin Effect <sup>1)</sup>	7,62 x 51 FMJ Nato Ball	830 ± 10	8	63	-	-	-	-	-	-
	PM8	7,62 x 39 API BZ	740 ± 10	-	-	-	-	8,5	67	7,5	59
	PM9	7,62 x 51 AP (P80)	820 ± 10	-	-	-	-	10,5	82	9,5	75
	PM10	7,62 x 54R API B32	860 ± 10	-	-	-	-	14	110	13	102

\*For EN 1522 and VPAM PM 2006, velocity is recorded at maximum 2,5m from target strike face. For NIJ 0108.01, velocity is recorded at 2,5m from target strike face for levels II and IIIA and 12,5m for levels III and IV.

\*\* AD : Areal Density

<sup>1)</sup> Skin Effect : the armor steel is tested with a 1mm mild-steel plate placed, in front of it, at a stand-off distance of 10mm

<sup>2)</sup> Multi hit test condition : equilateral triangle with sides 4 ± 1 time projectile caliber

All angles of incidence are 0°.

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\* Mars 500

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