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Test & Evaluation Department

Ballistic Testing Facility

Test Report

Bullet Attack Resistance Test

6.5 mm Ballistic Steel "Mars 500"

6.5 mm Ballistic Steel "Safe 500"

VPAM PM-2007 Test Standard (Class 7)

(7.62x51mm DM111 "308 Win FMJ, PB, SC")

(5.56x45mm SS 109 ".223 Rem FMJ, PB, SCP")

"Triangle Shooting"

KANAS TRADING FZE/UAE

JODDB/TEST/BTF/TR/925



4515

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Approval

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"Triangle Shooting"

KANAS TRADING FZE/UAE

Compiled by
Head of Weapons, Ammunition & Armor Testing
Dr. Eng. Riyadh Ali Ratrouf

Approved by
Acting Head of Test & Evaluation Department.
Dr. Eng. Riyadh Ali Ratrouf

Signature

23 May 2021
Date

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1. Test Data

Requester	JODDB/ Sales
Contractor	KANAS TRADING FZE/UAE Office # 1325, C1 Tower, P.O. Box 40348, Ajman Free Zone Authority, Ajman, UAE
References	<ul style="list-style-type: none"> • Test and Evaluation Request No. 925 dated 14/04/2021 • Test Proposal No. JODDB/TEST/BTF/TP/925 Dated 14/04/2021 <p>(See Appendix A)</p>
Test Samples	<p>Test Sample No. (1): 6.5 mm Ballistic Steel Mars 500</p> <ul style="list-style-type: none"> • Test Piece No.1: 6.87 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm • Test Piece No.2: 6.91 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm • Test Piece No.3: 6.93 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm <p>Test Sample No. (2): 6.5 mm Ballistic Steel Safe 500</p> <ul style="list-style-type: none"> • Test Piece No.1: 6.93 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm • Test Piece No.2: 6.85 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm • Test Piece No.3: 6.89 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm
Manufacturer	Industeel/ France
Test Type	Bullet Attack Resistance Test
Test Standard	VPAM PM-2007 (Class 7) "Triangle Shooting"
Test Site	Ballistic Testing Facility (JODDB)
Sample Received	06 May 2021
Test Temperature	21 °C
Test Weapon	<ul style="list-style-type: none"> • NATO Universal Ballistic Breech with standard barrel:7.62x51mm SN:4561 • NATO Universal Ballistic Breech with standard barrel:5.56x45mm SN:3715
Type of Bullets	<ul style="list-style-type: none"> • 308 Win "DM 111" Full Steel Jacket (Plated), Pointed Bullet, Soft Core (Lead), Bullet Mass (9,55 ± 0,1) • .223 Rem "SS 109" Full Steel Jacket , Pointed Bullet lead-soft core steel penetrator, Bullet Mass (4.0 ± 0,1)
Test Equipment	<ul style="list-style-type: none"> • Doppler Radar SN.3503-13-270-011 (± 0.4 m/s) • Digital calliper SN.A18229682 (± 0.05 mm) • Temp .Hum. Meter SN.95941255 (± 0.5 °C) • Distance laser Measuring Device (Lacia) SN.1030967912 (± 2 mm)
Test Conducted By	<ul style="list-style-type: none"> • Eng. Issa Rawashdeh • Eng. Ali Al Sardyah • Eng. Sameer Obeidat • Senior Technician Jalal Gulilat • Technician Muath anaqerh
Test Date	19 May 2021

Note: The results contained in this report are only valid for detailed above and the report shall not be reproduced except in full without approval of the laboratory.

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2. Test Results

Test Sample No.1 6.5 mm Ballistic Steel Mars 500	Number of Shots @10 m	Striking Velocity (m/s)		
		1 st	2 nd	3 rd
Test Piece no.1 6.87 mm Ballistic Steel Mars 500.P (148396)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	830.3	829.1	835.2
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	945.1	941.7	943.2
		KP	KP	KP
	Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through			
	No Penetration (See Photo No.2)			
Test Piece no.2 6.91 mm Ballistic Steel Mars 500.P (148396)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	831.3	835.3	835.1
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	943.4	942.5	955.2
		KP	KP	KP
	Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through			
	No Penetration (See Photo No.2)			
Test Piece no.3 6.93 mm Ballistic Steel Mars 500.P(148396)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	825.2	834.1	835.4
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	945.4	948.1	951.2
		KP	KP	KP
	Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through			
	No Penetration (See Photo No.2)			

Test Criteria:

Each of the three test specimens shall conform to at least one of the following criteria:

oM = Without marks, BmRmL = Bulge with crack letting the light through (Penetration, if splinter in the plasticine),
BmRoL = Bulge with crack not letting the light through (no penetration), BoR = Bulge without crack (no penetration), Ds = Penetration, Ss = Bullet stopped inside specimen, Apr = Ricochet, GaO = Bullet left specimen on the impact side, GaS = Bullet left specimen at the side, NS = No-Splinters, S = Splinter, KP = No Penetration

Status: Comply (See Applied Statement of Conformity and Decision Rule - Page 6)

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Test Results

Test Sample No.2	Number of Shots @10 m	Striking Velocity (m/s)		
		1 st	2 nd	3 rd
6.5 mm Ballistic Steel Safe 500				
Test Piece No.1 6.93 mm Ballistic Steel Safe 500.P (213589)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	832.2	828.3	833.1
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	949.2	946.3	953.5
		KP	KP	KP
Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through		No Penetration (See Photo No.3)		
Test Piece No.2 6.85 mm Ballistic Steel Safe 500.P (213589)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	833.1	824.4	827.2
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	942.4	942.6	944.3
		KP	KP	KP
Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through		No Penetration (See Photo No.3)		
Test Piece No.3 6.89 mm Ballistic Steel Safe 500 P (213589)	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (7.62x51mm "DM111") Shot Distance: 10 + 0.5 m / Bullet Velocity = 830 ±10 m/s Shot Spacing: 120±10 Triangle	829.2	829.3	835.1
		KP	KP	KP
	Three Strikes (Triangle Shooting) VPAM-PM 2007/ Class 7 (5.56x45mm "SS109") Shot Distance: 10 + 0.5 m / Bullet Velocity = 950 ±10 m/s Shot Spacing: 120±10 Triangle	949.8	945.1	947.5
		KP	KP	KP
Test Results: Ds : Penetration, KP: No Penetration, NS: No-Splinters, S: Splinter, BoR: Bulge without crack, BmRoL: Bulge with crack not letting the light through		No Penetration (See Photo No.3)		

Test Criteria:

Each of the three test specimens shall conform to at least one of the following criteria:

oM = Without marks, BmRmL = Bulge with crack letting the light through (Penetration, if splinter in the plasticine), BmRoL = Bulge with crack not letting the light through (no penetration), BoR = Bulge without crack (no penetration), Ds = Penetration, Ss = Bullet stopped inside specimen, Apr = Ricochet, GaO = Bullet left specimen on the impact side, GaS = Bullet left specimen at the side, NS = No-Splinters, S = Splinter, KP = No Penetration

Status: Comply (See Applied Statement of Conformity and Decision Rule - Page 6)

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RANGE EQUIPMENT & CONFIGURATION

THE GUN

The test pieces were shot from the NATO Universal Ballistic Breech with the appropriate standard barrel and bullet type to give projectile stability.

VELOCITY MEASUREMENT

The projectile velocity was measured using Doppler Radar System at 7.5m from the muzzle with uncertainty 0.4 m/s

Applied Statement of Conformity and Decision Rule

Test Level	Test Result	Applied Decision Rule	Statement of Conformity
VPAM PM 2007- Class 7 "Triangle Shooting" 308 Win "DM 111" & .223 Rem "SS 109"	No Penetration	No Projectile or Projectile fragment completely penetrates the test specimen AND No Penetrated by the stuck projectile fragment on the rear surface AND No opening on backside of specimen with a light passage AND No penetration in specified penetration indicator (witness sheet) When DM 111 Bullet velocity ≥ 821.4 m/s And SS109 Bullet velocity ≥ 941.4 m/s	Comply

DISTANCE MESURMENTS

Test range distance was measured by laser measuring device with uncertainty ± 2 mm, striking distances were marked by a digital calibre with uncertainty ± 0.05 mm.

SUPPORT FIXTURE

The test pieces were supported by a fixture that permits its position and attitude to be readily adjusted so that it is perpendicular to the line of flight of the bullet at the point of impact.

AIMING

The aiming process has been achieved by using standard laser bullets.

SHOT PLACEMENT

All shots hit the test pieces in the required pattern.

SPLINTER COLLECTING BOX & WITNESS SHEET

An aluminium sheet with a thickness of 0.5 mm (AlCuMg1, F 40) has to be used as the penetration indicator. It has to be fixed in a distance of 150 mm \pm 5 mm behind the test Specimen.

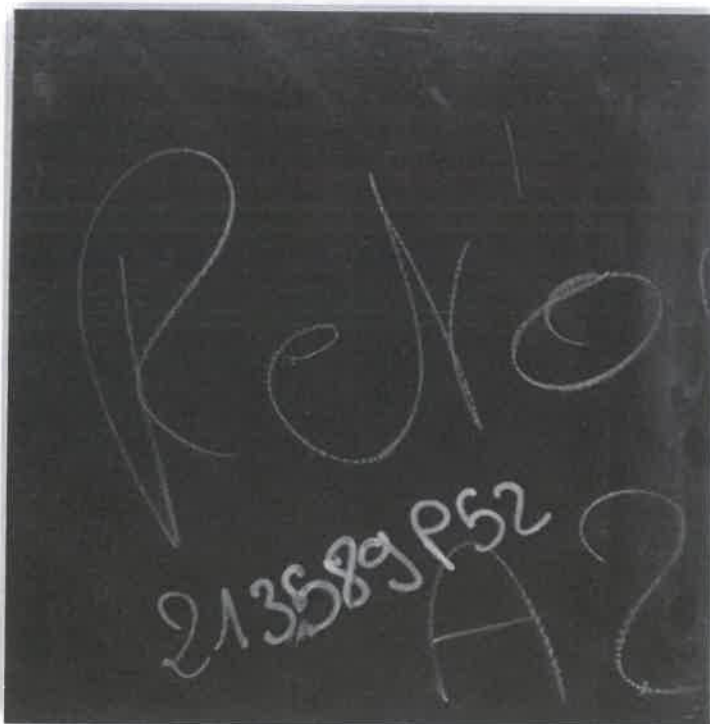
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Photo No. 1: Test Samples

Test Sample No. (1) (6.5 mm Ballistic Steel Mars 500)
Impact Side



Test Sample No. (2) (6.5 mm Ballistic Steel Safe 500)
Impact Side



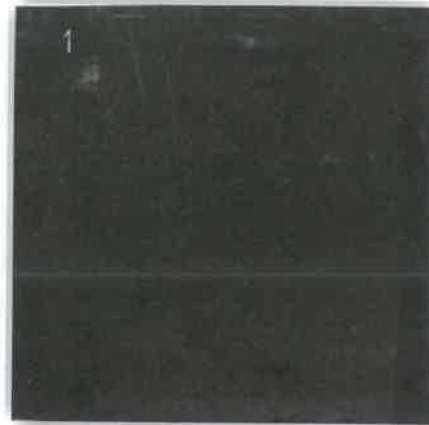
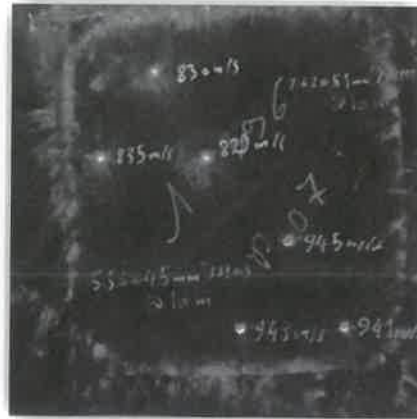
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Photo No. 2: Status of Test Sample No.1 after firing 308 Win "DM 111" & .223 Rem "SS109" Rounds from 10m.

Test Piece No.1: 6.87 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm (No Penetration)

Impact Side

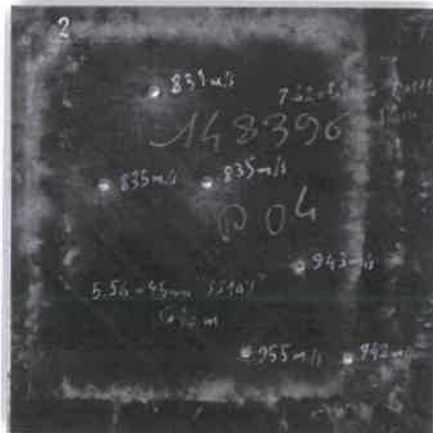
Rear Side



Test Piece No.2: 6.91 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm (No Penetration)

Impact Side

Rear Side



Test Piece No.3: 6.93 mm Ballistic Steel Mars 500 (148396) / Size 500x500 mm (No Penetration)

Impact Side

Rear Side



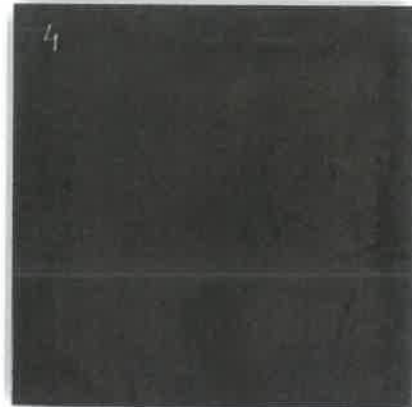
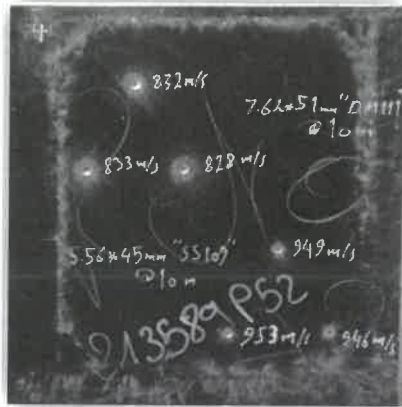
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Photo No. 3: Status of Sample No.2 after firing 308 Win "DM 111"&.223 Rem"SS109" Rounds from 10m.

Test Piece No.1: 6.93 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm (No Penetration)

Impact Side

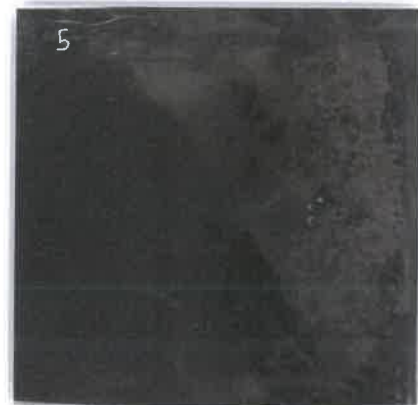
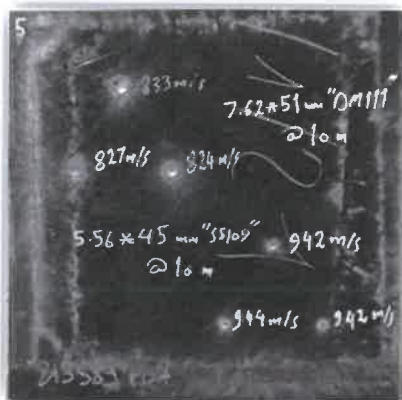
Rear Side



Test Piece No.2: 6.85 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm (No Penetration)

Impact Side

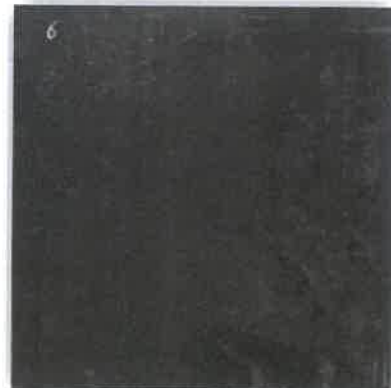
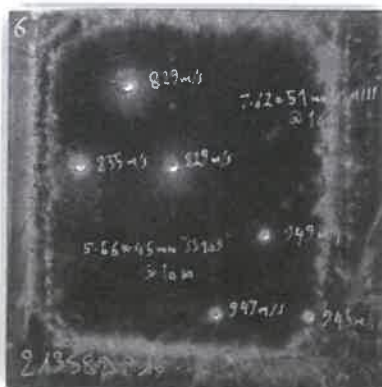
Rear Side



Test Piece No.3: 6.89 mm Ballistic Steel Safe 500 (213589) / Size 500x500 mm (No Penetration)

Impact Side

Rear Side



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APPENDIX A: Approved Technical Testing Proposal

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Test and Evaluation Department
Ballistic Testing Facility
Technical Testing Proposal

Contractor	KANAS TRADING FZE / UAE			
Requester	JODDB/ Sales			
Reference	JODDB/ T&E Request No. 925 dated 14/04/2021			
Test Sample	Test Type	Test Reference	Test Requirements	Test Criteria
6.5 mm Ballistic Steel Mars 500 500x500 mm Qty. 2	Bullet Attack Resistance Test	General Basis for Ballistic Material Construction and Product Testing VPAM PM-2007 (Class 7)	Triangle Shooting (each test piece): Three Strikes: 308 Win "DM 111" Full Steel Jacket (Plated), Pointed Bullet, Soft Core (Lead), Bullet Mass (9.55 ± 0.1) Shot Distance: 10 ± 0.5 m Bullet Velocity: 830 ± 10 m/s (Doppler Radar) Hit Distance :120±10 mm And Three Strikes: 223 Rem "SS 109" Full Steel Jacket, Pointed Bullet lead-soft core steel penetrator, Bullet Mass (4.0 ± 0.1) Shot Distance: 10 ± 0.5 m Bullet Velocity: 950 ± 10 m/s (Doppler Radar) Hit Distance :120±10 mm	Annex A
6.5 mm Ballistic Steel Safe 500 500x500 mm Qty. 3		"Triangle Shooting" "Accredited Test"		

Note: It is necessary to provide JODDB with heat number of test pieces

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Annex A ...		Test Criteria Statement of Conformity and Decision Rule	
Test ...	Comply	Comply with conditions	Not comply
VPAM PM 2007- Class 7 "Triangle Shooting" 308 Win "DM 111" & .223 Rem "SS 109"	No Projectile or Projectile fragment completely penetrates the test specimen AND No Penetrated by the stuck projectile fragment on the rear surface AND No opening on backside of specimen with a light passage AND No penetration in specified penetration indicator (witness sheet) When DM 111 Bullet velocity ≥ 821.4 m/s And SS109 Bullet velocity ≥ 941.4 m/s	No Projectile or Projectile fragment completely penetrates the test specimen AND No Penetrated by the stuck projectile fragment on the rear surface AND No opening on backside of specimen with a light passage AND No penetration in specified penetration indicator (witness sheet) When 820 \leq DM 111 Bullet velocity ≤ 821.4 m/s And 940 \leq SS109 Bullet velocity ≥ 941.4 m/s	Projectile or Projectile fragment completely penetrates the test specimen or Penetrated by the stuck projectile fragment on the rear surface or opening on backside of specimen with a light passage or penetration in specified penetration indicator (witness sheet) When DM 111 Bullet velocity ≤ 838.6 m/s Or SS109 Bullet velocity ≤ 958.6 m/s

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END OF THE REPORT