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भारत सरकार / GOVERNMENT OF INDIA
रक्षा मंत्रालय / MINISTRY OF DEFENCE
रक्षा अनुसंधान तथा विकास संगठन
DEFENCE RESEARCH & DEVELOPMENT ORGANISATION
चरम प्राक्षेपिकी अनुसंधान प्रयोगशाला
TERMINAL BALLISTICS RESEARCH LABORATORY
सेक्टर -30, चण्डीगढ़ - 160030
SECTOR-30, CHANDIGARH-160 030

संदर्भ सं. / Ref. No. : टीबीआरएल/पीसीडी/बेही-आरडीआर/2021

दिनांक / Date : 15-12-2021

सेवा मे/ To

F G Glass Industries Pvt Ltd,
1204 Tower A, Naman Midtown,
Senapati Bapat Marg, Prabhadevi (W),
Lower Parel, Mumbai - 400013

प्रति/Copy No.1


विषय/Sub: Ballistic Evaluation of 02 BR Glass Samples

उपरोक्त उल्लेखित विषय की ट्राइल रिपोर्ट नंबर (TBRL Report No. DRDO-TBRL-BEHI-EVR-01B-39-2021) की कॉपी आपके जानकारी एवं रिकॉर्ड हेतु भेजी जा रही है।

The trial report of above subject (TBRL Report No. DRDO-TBRL-BEHI-EVR-01B-39-2021) is sent herewith for your perusal and record please.

कृपया पावती भेजें/Kindly acknowledge receipt.

संलग्न:- उपरोक्तानुसार


(ललित प्रसाद)
वैज्ञानिक 'डी'
कृते निदेशक



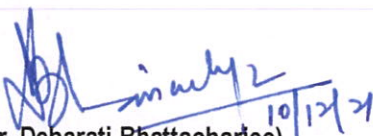
Report No. : DRDO-TBRL-BEHI-EVR-0183-2021
Issue Date : 15/12/2021
User : FG Glass Industries Pvt. Ltd., Mumbai
Trial Plan No. : 1327 dt 01/12/2021
Trial Date : 02/12/2021

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REPORT DOCUMENTATION PAGE

1. Title : Ballistic Evaluation of 02 BR Glass Samples
2. Report No. : DRDO-TBRL-BEHI-EVR- -2021
3. Classification : Restricted
4. Date of issue : /12/2021
5. No. of Pages : 07
6. Issuing Group : BEHI
7. Trial Plan No. : 1327 dt. 01/12/2021
8. Trial date : 02/12/2021
9. Distribution : (a) FG Glass Industries Pvt. Ltd., A1204 Naman Midtown, Lower Parel, Mumbai – 400013, India
(b) Director, TBRL
(c) TD, BEHI
10. Abstract : 02 BR Glass samples were submitted by FG Glass Industries for ballistic evaluation as per user requirements. One sample was tested against 06 shots of 7.62x51mm ammunition and another sample was tested against 03 shot of 7.62x39mm API BZ ammunition. Both samples were able to withstand the ammunitions.

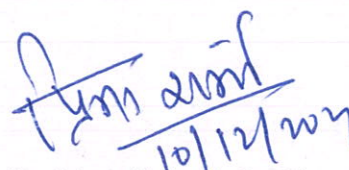
11. Prepared by:


(Dr. Debarati Bhattacharjee),
Sc. 'F' : Trial Officer

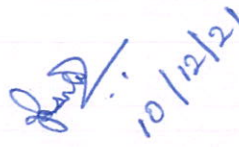
Reviewed by:


(Dr. Debarati Bhattacharjee)
Sc. 'F': BEHI

Recommended by:


(Dr. Prince Sharma), Sc. 'F'
JD: BEHI

Approved by:


(Ipsita Biswas), Sc. 'G'
TD: BEHI

Notes:

1. The test articles were brought to TBRL by the Firm's (user) representative as per their own specifications/fabrication process & were not collected from any production lot.
2. TBRL is not responsible, directly/indirectly, for the quality of production lots being manufactured by the firm (user).
3. The report is valid only for the particular panels evaluated against the specified ammunitions & publication of these results in abridged form is not allowed without written approval from Director, TBRL Chandigarh.
4. The "user" must collect back the tested samples within three months of getting the test report. After the stipulated time (03 months), tested samples will be destroyed.



Ballistic Evaluation of 02 BR Glass Samples

Report No. : DRDO-TBRL-BEHI-EVR-018-39-2021 Dt-15.12.2021
User : FG Glass Industries Pvt. Ltd., Mumbai

**Ballistic Evaluation and Hypervelocity Impact
Terminal Ballistics Research Laboratory
Sector 30, Chandigarh - 160 030**



Report No. : DRDO-TBRL-BEHI-EVR-018-2021
Issue Date : 15/12/2021
User : FG Glass Industries Pvt. Ltd., Mumbai
Trial Plan No. : 1327 dt 01/12/2021
Trial Date : 02/12/2021

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A SUMMARY OF RESULTS

No. of Samples : 02

Type of Test : Perforation/Non-Perforation

Sr. No.	Sample ID	Ammunition	Weapon	No. of fair Shots	Velocity (m/s)			Perforation
					Max.	Min	Ref.	
1	FG/Glass-1	7.62x51mm	SLR	06	832.6	820.1	820±10	No
2	FG/Glass-3	7.62x39mm API BZ	AK-47	03	716.4	713.3	695±20	No
Remarks: Nil								

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Report No. : DRDO-TBRL-BEHI-EVR-0039-2021
 Issue Date : 15/12/2021
 User : FG Glass Industries Pvt. Ltd., Mumbai
 Trial Plan No. : 1327 dt 01/12/2021
 Trial Date : 02/12/2021

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B SAMPLE ID: FG/Glass-1		C SAMPLE CONDITIONING: NA	
D PHYSICAL VERIFICATION			
Type of Sample	: BR Glass	Thickness (mm)	: 50.4
Length (mm)	: 500	Material	: -
Width (mm)	: 500	Layers/Plies	: -
Weight (kg)	: 26.9	Construction	: -
Observations		: NIL	
Ref. Letter		: Email from F G Glass	
Date Recd.		: 20.11.2021	
E TRIAL SET - UP			
Location	: Ballistic Test Facility	Distances from target (m)	Range Conditions
Ref. document	: TBRL SOP: TBRL/BEM/TP-01/12 (Rev No.-03)	Weapon	: 10.0
Backing material	: NA	Velocity Screens	: 2.5
Witness Plate	: 0.5mm Al Alloy	Witness Plate	: 0.15
Temperature (° C)		: 21.6	
Relative Humidity (%)		: 68	
F BACKING MATERIAL CONDITIONING			
DROP No.	1	2	3
Depth of Indentation (mm)	NA		
G BALLISTIC EVALUATION			
Ammunition		Weapon	
Type	: 7.62x51mm	Type	: SLR
Lot No/Year	: OFV-90	Regn. No.	: A-115643
Shot No.	Impact Velocity (m/s)	Impact Angle (°)	Impact Result
1	832.6	0°	Not Perforated
2	826.2	0°	Not Perforated
3	820.1	0°	Not Perforated
4	821.2	0°	Not Perforated
5	832.4	0°	Not Perforated
6	826.9	0°	Not Perforated
Fair/ Unfair			
Fair			
Fair			
Fair			
Fair			
Fair			
Fair			
Remarks: Nil			

Notes :

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Report No. : DRDO-TBRL-BEHI-EVR-010372021
Issue Date : 15/12/2021
User : FG Glass Industries Pvt. Ltd., Mumbai
Trial Plan No. : 1327 dt 01/12/2021
Trial Date : 02/12/2021

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H SAMPLE ID: FG/Glass-1

PHOTOGRAPHS (BEFORE TRIAL)



PHOTOGRAPHS (AFTER TRIAL)



Witness plate

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Report No. : DRDO-TBRL-BEHI-EVR-018-29-2021
Issue Date : 15/12/2021
User : FG Glass Industries Pvt. Ltd., Mumbai
Trial Plan No. : 1327 dt 01/12/2021
Trial Date : 02/12/2021

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B SAMPLE ID: FG/Glass-3		C SAMPLE CONDITIONING: NA					
D PHYSICAL VERIFICATION							
Type of Sample	: BR Glass	Thickness (mm)	: 61.3	Observations	: Thickness measured was higher than the value mentioned on sample		
Length (mm)	: 500	Material	: -				
Width (mm)	: 500	Layers/Plies	: -	Ref. Letter	: Email from F G Glass		
Weight (kg)	: 33.20	Construction	: -	Date Recd.	: 20.11.2021		
E TRIAL SET - UP							
Location	: Ballistic Test Facility	Distances from target (m)		Range Conditions			
Ref. document	: TBRL SOP: TBRL/BEM/TP-01/12 (Rev No.-03)	Weapon	: 10.0	Temperature (° C)	: 21.6		
Backing material	: NA	Velocity Screens	: 2.5	Relative Humidity (%)	: 68		
Witness Plate	: 0.5mm Al Alloy	Witness Plate	: 0.15				
F BACKING MATERIAL CONDITIONING							
DROP No.	1	2	3	4	5	Average	Requirement
Depth of Indentation (mm)	NA						
G BALLISTIC EVALUATION							
Ammunition				Weapon			
Type	: 7.62x39mm API BZ			Type	: AK-47		
Lot No/Year	: E 539			Regn. No.	: TN 1659		
Shot No.	Impact Velocity (m/s)	Impact Angle (°)	Impact Result	Fair/ Unfair			
1	713.3	0°	Not Perforated	Fair			
2	713.3	0°	Not Perforated	Fair			
3	716.4	0°	Not Perforated	Fair			
Remarks: Nil							

Notes:

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Report No. : DRDO-TBRL-BEHI-EVR-⁰¹⁰⁻³⁹2021
Issue Date : 15/12/2021
User : FG Glass Industries Pvt. Ltd., Mumbai
Trial Plan No. : 1327 dt 01/12/2021
Trial Date : 02/12/2021

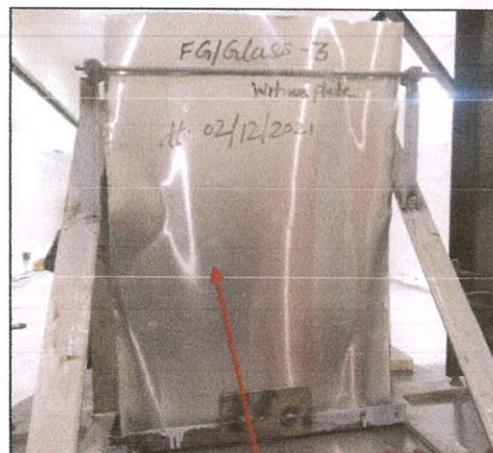
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H SAMPLE ID: FG/Glass-3

PHOTOGRAPHS (BEFORE TRIAL)



PHOTOGRAPHS (AFTER TRIAL)



Witness plate

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