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Laboratory for Ballistic
Research (LBO)
Visiting address:
Suburb Ypenburg
Ypenburgse Boslaan 2
2496 ZA The Hague

Dear mr. Sung Min Kim,

Hereby we send you the result(s) of the ballistic test(s), we have carried out
in order from Haebichim Company.

Subject

Ballistic experiments

Date

11-12-2012

Reference

12 LBR/1354

Contact

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The Standard Conditions for Research
Instructions given to TNO, as filed at
the Registry of the District Court and
the Chamber of Commerce in The
Hague shall apply to all instructions
given to TNO.

Yours faithfully,


Dr. ir. M.W. Verheijden

Research manager Laboratory for Ballistic Research



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Test report *

The test has been carried out according to **Multihit**

Assignor Haebichim Company
 202 B East Giant Plaza 1 | 120-3 Buogok-dong Gung-si
 435-020 Gyeonggi-do
 Korea

Experiment date 19-09-2012

Project Glass

Sample identification H.B.C. - 2012 - 01 & H.B.C. - 2012 - 02

Subject

Ballistic experiments

Date

05-12-2012

Reference

12MB03373 / 12MB03374

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For details see page 2 upto page 4.

The ballistic impact experiments were conducted in a triangular hit pattern of 120 mm using a 5.45x39 AP (7N10) projectile with an impact velocity of 883m/s \pm 10m/s. All three shots were stopped by the sample.

K. breeman

Project leader

* This report is based on data obtained from having tested only the samples submitted and should not be interpreted as an endorsement by TNO of the continuing quality or performance of any other items of the same or similar design.

Test report number 12MB03373 / 12MB03374
Assignor Haebichim Company

page 2 of 4
Experiment date 19-09-2012

Test results

Description of testmethod

In order to determine the ballistic performance of a test panel several experiments are performed at velocities specified by the assignor. In this way the amount of protection afforded by the test panel is measured for the threat considered.

Results

H.B.C. - 2012 - 01 (12MB03373) : Multihit - 5.45x39 AP (7N10)			
Shot number	Impact velocity [m/s]	Stop / Perforation	Valid (Yes/No)
KKW2 12SN05537	883	Stopped	Yes
KKW2 12SN05538	877	Stopped	Yes
KKW2 12SN05539	892	Stopped	Yes

H.B.C. - 2012 - 02 (12MB03374) : Multihit - 5.45x39 AP (7N10)			
Shot number	Impact velocity [m/s]	Stop / Perforation	Valid (Yes/No)
KKW2 12SN05540	873	Stopped	Yes
KKW2 12SN05541	880	Stopped	Yes
KKW2 12SN05542	877	Stopped	Yes

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Test report number 12MB03373 / 12MB03374
 Assignor Haebichim Company

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 Experiment date 19-09-2012

Sample specifications

Assignor identification	:	H.B.C. - 2012 - 01	H.B.C. - 2012 - 02
TNO identification	:	12MB03373	12MB03374
Date of arrival	:	07-09-2012	07-09-2012
Size	:	400 x 400 mm ²	400 x 400 mm ²
Thickness	:	40 mm	47 mm
Weight	:	14132 gram	16499 gram
Areal mass	:	88.3 kg/m ²	103.1 kg/m ²
Composition of sample in direction as encountered by projectile (Specification assignor)	:	Assignee known to	Assignee known to

Test specifications

Experimental facility	:	Small Calibre Firing Range no. 2 Ypenburg	Small Calibre Firing Range no. 2 Ypenburg
- temperature	:	18 °C	18 °C
- relative humidity	:	50 %	49 %

Conditioning of sample material

- duration at least	:	12 - hours	12 - hours
- temperature	:	18 - 25 °C	18 - 25 °C
- relative humidity	:	30 - 70 %	30 - 70 %

Ballistic specifications

Weapon	:	SVB	SVB
- barrel length	:	650 mm	650 mm
- rifling twist	:	1 : 196 mm	1 : 196 mm
Projectile	:	5.45x39 AP (7N10)	5.45x39 AP (7N10)
- weight	:	3.6 gram	3.6 gram
- calibre	:	5.45 mm	5.45 mm
- manufacturer	:	Luganskij Patronnyj Zavod	Luganskij Patronnyj Zavod
Distance muzzle to target	:	7.8 m	7.8 m
Target obliquity	:	0 °NATO	0 °NATO

Other specifications

Contract number	:	053.02841	053.02841
Backing	:	Aluminium 0,5mm AL-2024	Aluminium 0,5mm AL-2024

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Test report number 12MB03373 / 12MB03374
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Experiment date 19-09-2012



Figure 1 : Strike face of 12MB03373 after experiment

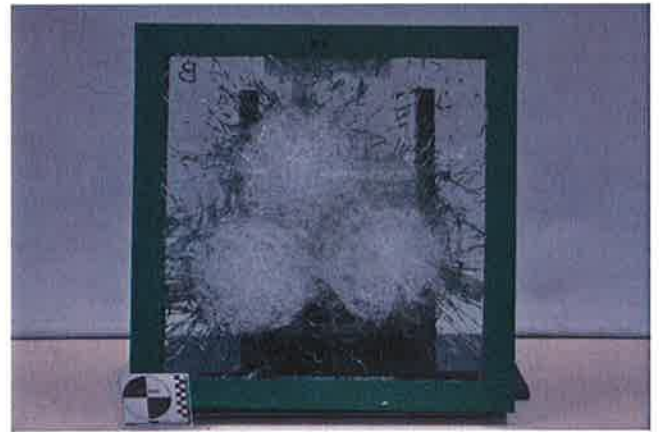


Figure 2 : Back face of 12MB03373 after experiment

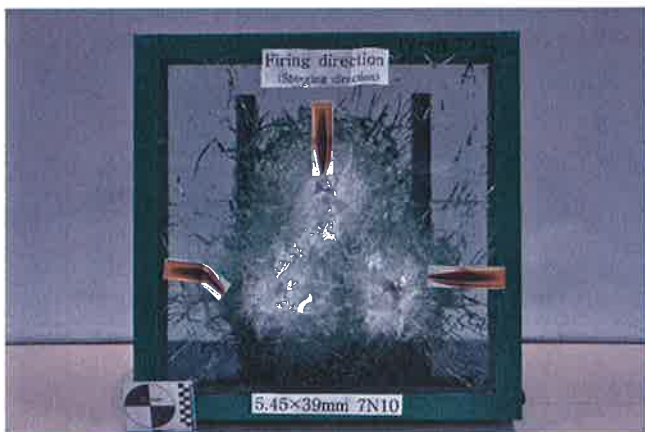


Figure 3 : Strike face of 12MB03374 after experiment

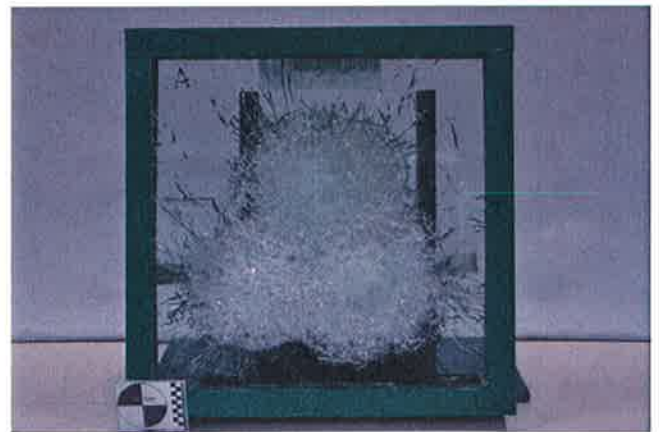


Figure 4 : Back face of 12MB03374 after experiment