



**PENDULUM IMPACT TESTING AND CLASSIFICATION OF FLAT GLASS
DIN EN 12600 Test Report**

Rendered to:
3M WINDOW FILMS
3M Center, Building 235, 3D-02
St. Paul, Minnesota 55144-1000

Report No.: F1093.02-119-37
Test Date: 09/09/15
Through: 09/10/15
Report Date: 10/22/15

Test Sample Details:

Sample ID: Ultra Night Vision S25
Overall Nominal Thickness: 6mm (nominal thickness)
Glazing Make Up: 0.25 mm film applied to 6 mm annealed glass (asymmetric glazing)
Film Manufacturer/Brand: 3M™ Scotchshield™ Ultra Night Vision S25
Test Samples Provided By: 3M Window Films
Test Size: 876 mm wide by 1940 mm high
Note: Representative from 3M Window Films was present during testing

Test Sample Test Date and Conditions:

Samples	Film Type	Date of Test	Test Temperature	Conditioning
18 to 26	Night Vision	09/09/15	26°C	24°C - 26°C for 24 hours
27 to 34	Night Vision	09/10/15	24°C	24°C - 26°C for 24 hours
35 to 45	Night Vision	09/10/15	24°C	24°C - 26°C for 24 hours

Reference Test Standard: Each test specimen was tested in accordance with DIN EN 12600 (2002), *Glass in building, Pendulum test - Impact test method and classification for flat glass.*

Test Procedure: Each test specimen was mounted within the test fixture with the film captured by the mounting clamps and impact tested in accordance with DIN EN 12600:2002. The test samples meet the definition of asymmetrical glazing; therefore impact testing was executed from both sides, identified herein as “glass-side” and “film-side”. Impacting started at the lowest drop height and continued to next drop height as long as the specimen remained unbroken or, when broke, broke in accordance with the test requirements (DIN EN 12600, clause a). Unbroken specimens were used in next higher drop height. Impacting continued until all 3 drop heights were completed 4 times.

Impact Level	3	2	1
Drop Height	190 mm	450 mm	1200 mm

Calibration: The test rig was last calibrated in accordance with Annex B of EN 12600 on 03/27/15, per EN 12600 B.4, the calibration shall be in effect for three years.

Test Results: Ultra Night Vision S25 (Film-Side)

Impact Level	Spec. No.	Overall Thickness (mm)	Acceptance Criteria (g) ^a		Results & Observations After Impact Particle Weight (g)			Observation
			Total ^b	Single ^c	Total ¹	Single ²	>25.4 sq. mm ³	
3	27	5.97	143.28	63.04	--	--	--	DNB ⁴
	29	6.02	144.48	63.57	--	--	--	DNB ⁴
	31	6.01	144.24	63.47	--	--	--	DNB ⁴
	33	5.92	142.08	62.52	--	--	--	DNB ⁴
2	27	5.97	143.28	63.04	18.5	0.5	--	No openings
	29	6.02	144.48	63.57	15.0	0.5	--	No openings
	31	6.01	144.24	63.47	59.5	0.5	--	No openings
	33	5.92	142.08	62.52	18.2	1.1	--	No openings
1	28	5.98	143.52	63.15	51.4	0.9	--	No openings
	30	5.93	143.52	63.15	44.0	0.1	--	No openings
	32	5.96	143.04	62.94	54.3	1.0	--	No openings
	34	6.01	144.24	63.47	34.7	0.4	--	No openings

Test Results: Ultra Night Vision S25 (Glass-Side)

Impact Level	Spec. No.	Overall Thickness (mm)	Acceptance Criteria (g) ^a		Results & Observations After Impact Particle Weight (g)			Observation
			Total ^b	Single ^c	Total ¹	Single ²	>25.4 sq. mm ³	
3	18	6.01	144.24	63.47	7.5	--	--	No openings
	21	5.97	143.28	63.04	11.7	0.7	--	No openings
	24	5.92	142.08	62.52	--	--	--	DNB ⁴
	26	5.96	143.04	62.94	--	--	--	DNB ⁴
2	19	6.01	144.24	63.47	14.6	0.5	--	No openings
	22	6.00	144.00	63.36	--	--	--	DNB ⁴
	24	5.92	142.08	62.52	21.7	0.6	--	No openings
	26	5.96	143.04	62.94	--	--	--	DNB ⁴

Acceptance Criteria	<p>^a No openings develop that permit a 76 mm diameter sphere to pass when a maximum force of 25N is applied.</p> <p>^b All detached particles shall weigh, in total, no more than a mass equivalent to 10,000 mm² of the original test piece.</p> <p>^c No single fragment shall weigh more than 4,400 mm² of the original test piece.</p>
------------------------	---

¹ **Total:** The combined weight of all particles (dust, slivers and fragments) collected after the impact event.

² **Single:** The measured weight of the single largest particle.

³ **Total over 1 sq. in.:** The combined weight of all particles having a mass equivalence of greater than 1 square inch (25.4 square mm) of the original test piece (reference ANSI Z97.1-2015). No criteria - data recorded at client request.

⁴ **DNB:** The specimen did not break at the selected impact height.

Comments: In some instances, the total¹ particle weight amounted to no more than a fine glass dust.

Conclusion: The Film Side of the specimen meets the impact requirements of EN 12600 classification **1(B)1**. The Glass Side of the specimen meets the impact requirements of EN 12600 classification **2(B)2**. These classifications are used to determine specimen orientation during installation, based on possible threat of impact.

1 (First Number) - Denotes the highest drop height at which the product either did not break or broke in accordance with the applicable clauses of DIN EN 12600.

(X) (Letter within Parentheses) - Denotes the mode of breakage.

1 (Second Number) - Denotes the highest height class at which the product either did not break or when broke, broke in accordance with the test requirements (clause A).



Closing Statement: Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, or other pertinent project documentation will be retained by Intertek-ATI for the entire four year test record retention period. All test specimens were destroyed by test or by our personnel and have been disposed of as trash.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

Todd M. Wilt
Senior Technician

Christian E. Lapadat
Program Manager

TMW:cel/kf

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	10/22/15	N/A	Original report issue