

UFC / ATFP Windows

DOD Anti-Terrorism/Force Protection Windows
for Military and Civilian Structures of All Types



THERMAL WINDOWS, INC.

Series 4100 Single Hung and 4150 Fixed Windows Meet Level 2 ATFP Performance in ASTM 1642-04 Shock-Tube Testing



York, PA Shock Tube testing lab
Photos courtesy of Architectural Testing, Inc.



Series 4100 interior



Series 4100 exterior

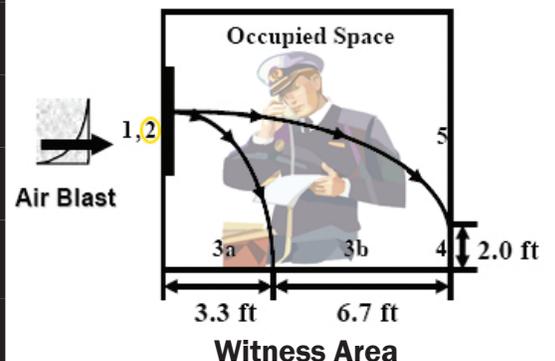
Summary of Results (Series 4100 Single Hung)			
Title	Test Specimen #1	Test Specimen #2	Test Specimen #3
ASTM Hazard Rating	No Hazard	No Hazard	No Hazard
GSA Performance Condition	2	2	2
Average Peak Blast Pressure	5.9 psi	5.9 psi	6.5 psi
Average Positive Phase Impulse	41 psi-msec	49 psi-msec	50 psi-msec
Average Positive Phase Duration	15 msec	16 msec	13 msec

Test Specifications: Glazing: UFC rated 1/4" annealed over 1/4" Lami w/ .030 pvb
Specs: ASTM 1642-04 & GSA-TS01 Test Size: 48"x 66"

Performance Condition	Protection Level	Hazard Level	Description of Window Glazing Response
1	Safe	None	Glazing does not break. No visible damage to glazing or frame.
2	Very High	None	Glazing cracks but is retained by the frame. Dusting or very small fragments near sill or on floor acceptable.
3a	High	Very Low	Glazing cracks. Fragments enter space and land on floor no further than 3.3 ft. from the window.
3b	High	Low	Glazing cracks. Fragments enter space and land on floor no further than 10 ft. from the window.
4	Medium	Medium	Glazing cracks. Fragments enter space and land on floor and impact a vertical witness panel at a distance of no more than 10 ft. from the window at a height no greater than 2 ft. above the floor.
5	Low	High	Glazing cracks and window system fails catastrophically. Fragments enter space impacting a vertical witness panel at a distance of no more than 10 ft. from the window at a height greater than 2 ft. above the floor.

Dynamic Analysis

Protection against Hazard Levels



Other Anti-Terrorism / Force Protection Windows

The products listed below comply with UFC 4-010-01 and ASTM F2248-03 Minimum Antiterrorism Standards for Buildings in accordance with 3-Second Design Loading Engineering Calculations.

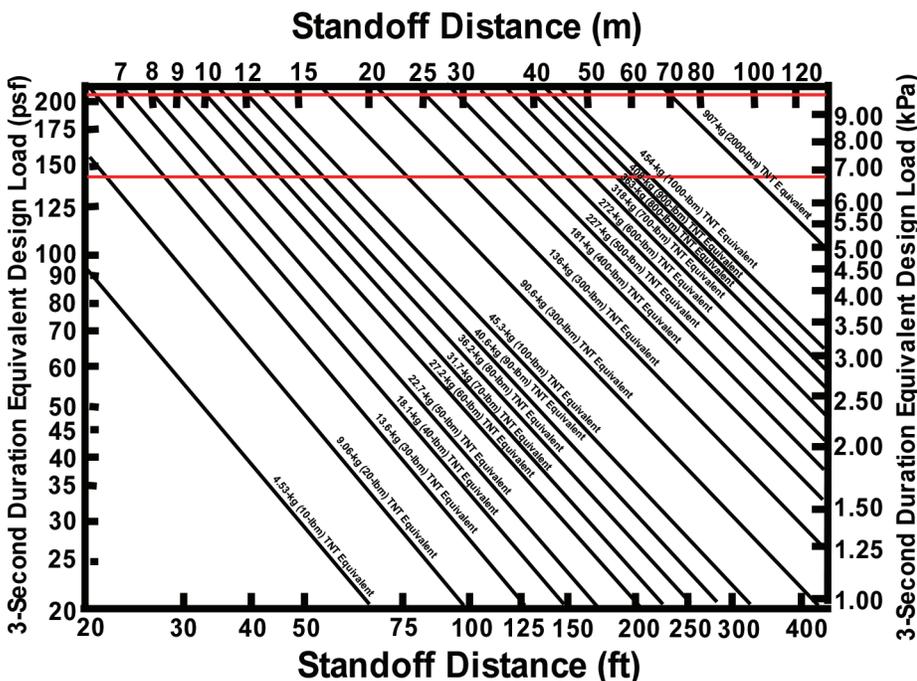


Window Series	Style	AAMA Rating	Calculated Pressures	Meets UFC 4-010-01 and ASTM F2248-03	UFC 4-010-01 / ASTM 1642-04 Protection Level
4100 4"	Single Hung	AW 75	144 psf / 1 psi	Yes	2 (Very High)
4150 4"	Fixed	AW 80	144 & 210 psf (max) / 1 psi+	Yes	2 (Very High)
4125 4"	Double Slider	AW 60	144 psf / 1 psi	Yes	Tests pending
750 3 1/4"	Fixed	HC 80	210 psf (max) / 1.45 psi	Yes	Tests pending
800 2 5/8"	Casement	HC 70	210 psf (max) / 1.45 psi	Yes	Tests pending
850 2 5/8"	Fixed	AW 75	144 psf / 1 psi	Yes	Tests pending
825 2 5/8"	POB	AW 75	144 psf / 1 psi	Yes	Tests pending

Glazing – 1/4" tempered exterior lite* with 1/4" annealed Lami (.030 PVB) interior lite. 1/2" air space.
 * Per ASTM 1300 as required.

Anchor Calculations – TWI provides assistance in obtaining Engineering Calculations for your installation according to the standards and in accordance with the specific project requirements.

Trim – A full compliment of Receptor, Subsills and Mulls are also in compliance.
 Other anchoring options are snap-trim, continuous strap anchors or through the main frame.



Design Loading

(Left) As a graphic representation of the pressures involved, a chart from ASTM 2248 indicates the levels at which our products perform. Note that the 144 psf and 210 psf design loads exceed the standoff and TNT amounts found in typical specifications.



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