**STORMDEFEND™ SD-TH600 FEMA-361 ALUMINUM WIND/IMPACT RESISTANT FRAMING**

(**Specifier Note**: The purpose of this guide specification is to assist the Specifier in correctly specifying FEMA compliant impact and wind resistant aluminum framing and glass assemblies and their installation as windows and storefront components of storm shelters that comply with ICC 500. These assemblies may also be able to meet Level 4 Bullet Resistance criteria.

The Specifier needs to edit this guide specification to fit the needs of each specific project. References have been made within the text of the specification to MasterFormat section numbers and titles. The Specifier needs to coordinate these numbers and titles with sections included for the specific project.

*Throughout the guide specification, there are Specifier Notes to assist in the editing of the file. Brackets have been used to indicate when a selection is required. Contact a Protective Structures representative for further assistance with appropriate product selections.)*

SECTION 08 43 33.13 –SECURITY STOREFRONTS / ARCHITECTURAL WIND AND IMPACT RESISTANT ALUMINUM FRAMING SYSTEMS (FOR USE IN FEMA 361-2008 / ICC-500-08 STORM SHELTERS)

PART 1 – GENERAL

1.1 SECTION INCLUDES

* + - * 1. Impact and Wind **[and Bullet]** ResistantAluminum Storefront Framing

1.2 ACTION SUBMITTALS

* + - * 1. Refer to Section **[01 33 00 Submittal Procedures] [Insert section number and title].**
				2. Product Data: For each type of framing and glazing including manufacturer recommended installation instructions.
				3. Shop Drawings: Include plans, elevations, sections, details, attachment to other work [**and glazing details for field-glazed units**].
				4. Samples: For each exposed finish.

1.3 INFORMATIONAL SUBMITTALS

* + - * 1. Product Test Reports: Indicating compliance with requirements
				2. Warranty: Sample of finish warranty
				3. Delegated Design: For assembly indicated to comply with performance requirements and design criteria, including structural calculations signed and sealed by the qualified professional engineer responsible for their preparation.
				4. Special Inspection Report: As indicated in **[Section 01 45 33 - Code-Required Special Inspections and Procedures] [Insert section number and title].**

1.4 CLOSEOUT SUBMITTALS

* + - * 1. Refer to Section **[01 78 00 Closeout Submittals] [Insert section number and title].**
				2. Maintenance data.

1.5 QUALITY ASSURANCE

(**Specifier Note**: Depending upon the scope of the work it may be appropriate to require the installation of a mock-up at the project site, which can either be part of the work or separate. Indicate the size of mock‑up to be constructed.)

* + - * 1. Mock-up: Install framing assembly at project site. Obtain Architect’s approval prior to proceeding with installation of remaining storefront. Accepted mock-up [**may**] [**may not**] remain as portion of final work.

1.6 DELIVERY, STORAGE AND HANDLING

* + - * 1. Refer to Section **[01 60 00 Product Requirements] [Insert section number and title]**.

1.7 WARRANTY

(**Specifier Note**: The 5 year finish warranty applies to the Class I anodic finishes and the 10 year applies to the 70% PVDF coating finish.

* + - * 1. Framing: Manufacturer’s warranty against defects in material and workmanship under normal use for a period of 1 year from the date of invoice.
				2. Finish Warranty: Manufacturer’s warranty against deterioration of factory finishes for the period of **[5] [10]** years from the date of invoice.
				3. Glass Warranty: Manufacturer’s warranty against defects in material and workmanship resulting in edge separation or delamination for a period of 5 years from the date of invoice.

PART 2 – PRODUCTS

2.1 FRAMING

1. Basis of Design: StormDefend™ SD-TH600 Aluminum FEMA Tornado Window Framing System by Protective Structures, Jasper, GA. Phone: (888) 521-8666; Email: info@protectivestructures.com; Website: [www.protectivestructures.com](http://www.protectivestructures.com).
2. Description:
	1. Factory fabricated framing constructed from either 6005-T5 or 6105-T5 extruded aluminum with integral weep design to allow water to vent to the exterior along horizontal members.
	2. Dimensions:
3. Head, Jamb, Sill, Mullion and Intermediate Horizontal Members: 2-1/2 inches by 6 inches

2.2. GLAZING

* + - * 1. Glazing Material: [**Insulating**] Glass Clad Polycarbonate

(**Specifier Note**: TOR-GARD Products conform to FEMA 361 requirements.)

**[Wind and Impact Laminated: TOR-GARD NBR2 (clear or tinted)]**

**[Wind and Impact Laminated Insulating Units: TOR-GARD NBR-IG (clear or tinted)]**

**[Wind, Impact and Level 4 Ballistic Resistant: TOR-GARD 40 (clear or tinted)]**

* 1. PERFORMANCE CRITERIA
		+ - 1. Indicated areas of this project have been designed for occupancy as a storm shelter. The Work identified in this Section is a component of that security occupancy as follows:

Type of Shelter:  **[Tornado] [Hurricane] [Both Tornado and Hurricane]**

*(****Specifier Note****: SELECT shelter design wind speeds based on ICC 500-2008 Figure 304.2(1) for Tornadoes and Figure 304.2(2) for Hurricanes.)*

* + - * 1. Shelter Design Wind Speeds: **[As indicated on Drawings]**

Tornado **[130] [160 ] [200] [250]** MPH

Hurricane **[160] [170] [180] [190] [200] [210] [220] [225]** MPH

* + - * 1. Debris Hazard

*(****Specifier Note****: Caution should be used in only requiring comparable products to be FEMA 361 compliant. Some products may only meet requirements of the lower wind speeds, and may not be appropriate for the specific project location.)*

FEMA 361 Compliant: Pass missile-impact tests according to FEMA 361 / ICC 500-2008 in accordance with:

ASTM E1886 - Standard Test Method For Performance Of Exterior Windows, Curtain Walls, Doors And Impact Protective Systems Impacted By Missiles and Exposed To Cyclic Pressure Differentials

ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

*(****Specifier Note****: For a tornado shelter to be FEMA 361 compliant - the assembly must resist the impact of a 15 pound 2 by 4 at the wind speed indicated in ICC 500 Table 305.1.1 based on the Shelter Design Wind Speed. Protective Structures’ SD-TH600 framing system glazed with TOR-GARD products will meet the tornado resistance requirements for the most stringent conditions at 100 MPH.)*

Tornado: Resists impact of a 15 pound 2 by 4 at **[80] [84] [90] [100]** MPH

*(****Specifier Note****: For a hurricane shelter to be FEMA 361 compliant - the assembly must resist the impact of a 9 pound 2 by 4 at 0.50 times the shelter design wind speed. Protective Structures’ SD-TH600 framing system glazed with TOR-GARD products will meet the hurricane resistance requirements for the most stringent conditions of a 9 pound 2 by 4 at 113 MPH.)*

Hurricane: Resists impact of a 9 pound 2 by 4 at **[Design Wind Speed multiplied by 0.5]**

* + - * 1. Pressure Testing

FEMA 361 Compliant: Pass static pressure tests and cyclic tests according to FEMA 361/ICC 500-2008 in accordance with:

*(****Specifier Note****: ASTM E330 is used for both tornado and hurricane shelters)*

ASTM E330 - Standard Test Method For Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

*(****Specifier Note****: ASTM E1886 is used for hurricane shelters, DELETE if application is tornado shelter.)*

ASTM E1886 - Standard Test Method For Performance Of Exterior Windows, Curtain Walls, Doors And Impact Protective Systems Impacted By Missiles and Exposed To Cyclic Pressure Differentials

 *(****Specifier Note****: DELETE ballistic resistance requirements when they are not required for the project)*

* + - * 1. **[Ballistic Resistant: Level 4 in accordance with UL 752 – Standard for Bullet-Resisting Equipment.]**
	1. FABRICATION
1. Tolerances: All joints and connections shall be tight, providing hairline joints and true alignment of adjacent members
	1. FRAMING FINISH
2. Factory-applied finish:

(**Specifier Note**: SELECT the project specific finish from the following. Baked Enamel may also be available but may require minimum quantities.)

[**Clear Anodic Finish**]: Architectural Class I, clear coating AA-M10C22A41 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum"

[**Color Anodic Finish**]: Architectural Class I, color coating AA-M10C22A42/A44 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum".

Color: Dark Bronze.

[**PVDF-Based Coating**]: Fluoropolymer finish containing minimum 70 percent PVDF resins, in accordance with AAMA 2605 “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels”

Coats: [**two**] [**three**] [**four**] coat system,

Color: [**Insert color**] [**custom**] [**to be selected from manufacturer's full color range**].

* 1. ACCESSORIES
1. Anchors: Fully concealed in accordance with requirements of delegated design requirements.
	1. Steel extension anchor plates as required by delegated design.

PART 3 – EXECUTION

3.1 PREPARATION

1. Verify field dimensions of opening prior to fabrication of windows.
2. Prepare openings to be in tolerance, plumb, level, provide for secure anchoring, and in accordance with approved shop drawings.
3. Coordinate structural requirements to ensure proper attachment and support.

3.2 INSTALLATION

1. Install windows in accordance with manufacturer's recommendations and approved shop drawings.
2. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow.
3. Apply sealant per window and sealant manufacturer's recommendations at all specified areas as shown on shop drawings and detailed in installation instructions. Wipe off excess, and leave exposed sealant surfaces clean and smooth.

3.3 ADJUSTING AND CLEANING

1. Leave windows clean and free of construction debris. Strictly adhere to the manufacturer’s recommended cleaning and maintenance instructions.

3.4 PROTECTION

1. Protect window glazing and frames from damage during subsequent construction activities. If damage occurs, remove and replace as required at no additional cost to the Owner to provide windows in their original, undamaged condition.

END OF SECTION