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Preparing Activity: NASA

Superseding  
UFGS-08 41 13 (August 2010)

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in Agreement with UMRL dated July 2012

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02/11

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### SECTION 08 41 13

#### ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS 02/11

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NOTE: This section covers Aluminum Entrances, glass and glazing, door hardware and components.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

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## PART 1 GENERAL

### 1.1 SUMMARY

This Specification includes aluminum entrances, glass and glazing, door hardware, and components.

Type of Aluminum Entrance includes:

Impact Resistance Entrances; medium stile, 88.9 mm 3-1/2 inch vertical face dimension, 44.45 mm 1-3/4 inch depth, interior structural silicone glazed, high traffic/impact resistant applications.

### 1.2 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in

this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

- |           |   |
|-----------|---|
| AAMA 1503 | (2009) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections |
| AAMA 501  | (2005) Methods of Test for Exterior Walls   |
| AAMA 503  | (2008) Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems     |
| AAMA 800  | (2010) Voluntary Specifications and Test Methods for Sealants   |

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- |            |  |
|------------|--|
| ANSI Z97.1 | (2009; Errata 2010) Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test |
|------------|--|

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

- |           |  |
|-----------|--|
| ASCE 7-10 | (2010; Change 2010; Change 2011; Errata 2011; Change 2011) Minimum Design Loads for Buildings and Other Structures |
|-----------|--|

ASTM INTERNATIONAL (ASTM)

- |            |   |
|------------|---|
| ASTM B221  | (2012) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes          |
| ASTM B221M | (2007) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) |
| ASTM E1105 | (2000; R 2008) Standard Test Method for   |

Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference

ASTM E1424 (1991; R 2008) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure and Temperature Differences Across the Specimen

ASTM E1886 (2005) Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

ASTM E283 (2004) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E330 (2002; R 2010) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E331 (2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E783 (2002; R 2010) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

ASTM F1642 (2004; R 2010) Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.10 (2011) Power Operated Pedestrian Doors

ANSI/BHMA A156.4 (2008) Door Controls - Closers

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual (2004) Glazing Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

16 CFR 1201 Safety Standard for Architectural Glazing Materials

UNDERWRITERS LABORATORIES (UL)

UL 325 (2002; Reprint Jan 20121) Door, Drapery, Gate, Louver, and Window Operators and

## Systems

### 1.3 ADMINISTRATIVE REQUIREMENTS

Within [30] [\_\_\_\_\_] days of the Contract Award, submit the following for review and approval by the Contracting Officer:

Listing of product installations

Sample warranty

Finish and color samples

Manufacturer's catalog data

Installation drawings

Fabrication drawings for custom fabrications

Concurrently submit certified test reports showing compliance with specified performance characteristics and UL 325 for the following:

#### 1.3.1 Entrance Performance Requirements

##### 1.3.1.1 Air Infiltration

Submit certified test reports showing compliance with specified performance characteristics as follows:

- a. For single acting offset pivot, butt hung or continuous geared hinge entrances in the closed and locked position, test the specimen in accordance with ANSI/BHMA A156.10, and ASTM E283 at a pressure differential of 7.7.67 kilogram/square meter 1.57 psf for pairs of doors; maximum infiltration for a pair of 2.13 meter by 2.44 meter 7 foot - 0 inch by 8 foot - 0 inch entrance doors and frame is 0.034 cubic meters per minute/square meter 1.2 cfm/ft2.
- b. Maximum allowable infiltration, for a completed storefront system is not to exceed 0.0017 cubic meters/square meter 0.06 cfm/square foot when tested in accordance with ASTM E1424 at differential static pressure of 299 Pa 6.24 psf.

##### 1.3.1.2 Wind Loads

Provide completed storefront system capable of withstanding wind pressure loads, normal to the wall plane indicated, as follows:

- a. Exterior Walls
  - (1) Positive Pressure: [\_\_\_\_\_] kilogram/square meter [\_\_\_\_\_] psf
  - (2) Negative Pressure: [\_\_\_\_\_] kilogram/square meter [\_\_\_\_\_] psf
- b. Interior Walls: (pressure acting in either direction) [\_\_\_\_\_] kilogram/square meter [\_\_\_\_\_] psf

##### 1.3.1.3 Deflection

Submit certified test reports showing compliance with specified performance

characteristics as follows:

The maximum allowable deflection in any member when tested in accordance with **ASTM E330** with allowable stress in accordance with AA Specifications for Aluminum Structures is L/175 or **19.1 mm 3/4 inches** maximum.

#### 1.3.1.4 Condensation Resistance and Thermal Transmittance Performance Requirements

Submit certified test reports showing compliance with specified performance characteristics as follows:

##### a. U-Value Requirements:

- (1) Perform test in accordance with **AAMA 1503** procedure and on the configuration specified therein.
- (2) Thermal Transmittance ("U" Value) maximum [\_\_\_\_\_] [**3.69 W/sqm/deg C**] at [\_\_\_\_\_] [**24.14 kmph**] [\_\_\_\_\_] [**0.65 (6250) BTU/hr/sf/deg F**] at [**15 mph**] exterior wind.

##### b. CRF Class Requirements:

- (1) Perform test in accordance with **AAMA 1503**.
- (2) Condensation Resistance Factor Requirements (CRF) minimum [\_\_\_\_\_].

#### 1.3.1.5 Water Infiltration

Submit certified test reports showing compliance with specified performance characteristics as follows:

System is designed to provide no uncontrolled water when tested in accordance with **ASTM E331** at a static pressure of **956 Pa 8 psf**.

#### 1.3.2 Structural

Submit certified test reports showing compliance with specified performance characteristics as follows:

- a. Corner strength per dual moment load test procedure and obtain certification by an independent testing laboratory to ensure weld compliance and corner integrity.
- b. Test and certify test results per **AAMA 503**, **ASTM E1105**, **ASTM E783**, **ASTM E331**, and make available upon request.

##### 1.3.2.1 Uniform Load

Submit certified test reports showing compliance with specified performance characteristics as follows:

- a. Apply a static air design load of **4.07 kilopascal (3.11 kilopascal for 1.43 cm) 85 psf (65 psf for 9/16 inch laminated infill)** in the positive and negative direction in accordance with **AAMA 501**, and **ASTM E330**.
- b. No deflections are allowed to exceed 1/180 of the span of any framing member. At a structural test load equal to 1.5 times the specified

design load, no glass breakage is allowed.

#### 1.3.2.2 Impact Resistance

Submit certified test reports showing compliance with specified performance characteristics as follows:

Large Missile, tested in accordance with ASTM E1886 at a door opening of 2.13 meter by 2.44 meter 7 foot - 0 inch by 8 foot - 0 inch.

#### 1.3.2.3 Forced Entry

Submit certified test reports showing compliance with specified performance characteristics as follows:

Test in accordance with ASTM F1642

#### 1.4 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:



#### SD-01 Preconstruction Submittals

Sample Warranty[; G][; G, [\_\_\_\_]]

Listing of Product Installations[; G][; G, [\_\_\_\_]]

#### SD-02 Shop Drawings

Installation Drawings[; G][; G, [\_\_\_\_]]

[ Fabrication Drawings[; G][; G, [\_\_\_\_]] ]

#### SD-03 Product Data

Manufacturer's Catalog Data

#### SD-04 Samples

Finish and Color Samples[; G][; G, [\_\_\_\_]]

#### SD-06 Test Reports

Certified Test Reports[; G][; G, [\_\_\_\_]]

#### SD-07 Certificates

Manufacturer's Product Warranty[; G][; G, [\_\_\_\_]]

### 1.5 QUALITY ASSURANCE

#### 1.5.1 Qualifications

##### 1.5.1.1 Installer Qualifications

Provide documentation of Installer experience [as determined by Contractor] to perform work of this section, who has specialized in the installation of work similar to that required for this project, and who is acceptable to product manufacturer.

##### 1.5.1.2 Manufacturer Qualifications

Ensure manufacturer is capable of providing field service representation during construction, approving acceptable installer and approving application method.

#### 1.5.2 Pre-Installation Meetings

Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

#### 1.5.3 Single Source Responsibility

Provide design, structural engineering, and custom fabrication for door portal system and supply of all components, materials, and products based on a single manufacturer of sole responsibility. Provision of products from numerous sources for site assembly without complete single source design and supply responsibility is not acceptable. Work items and components to be fabricated or supplied by single source are:

\*\*\*\*\*  
NOTE: Edit the following list to reflect components  
required for glass wall and door portal assembly.  
Verify that sole source responsibility requirement  
is included in other sections.  
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- a. Door assemblies to be installed in door portal as specified in [Section 08 11 16 ALUMINUM DOORS AND FRAMES] [\_\_\_\_].
- b. Glazed wall to be constructed around door portal as specified in [this Section] [\_\_\_\_].
- c. Door operating hardware to be installed on or within door portal as specified in Section 08 71 00 DOOR HARDWARE.
- d. Glass as specified in [Section 08 81 00 GLAZING] [\_\_\_\_].

#### 1.6 DELIVERY, STORAGE, AND HANDLING

##### 1.6.1 Ordering

Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

##### 1.6.2 Packing, Shipping, Handling and Unloading

Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

##### 1.6.3 Storage and Protection

Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

#### 1.7 PROJECT CONDITIONS/ SITE CONDITIONS

##### 1.7.1 Field Measurements

Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication scheduled with construction progress to avoid construction delays.

#### 1.8 DESIGN AND PERFORMANCE CRITERIA

Design, size components, and install door portal system to withstand these loads without breakage, loss, failure of seals, product deterioration, and other defects.

- a. Dead and Live Loads: Determined by ASCE 7-10 and calculated in accordance with applicable codes.
- b. Seismic loads: Design and install system to comply with applicable seismic requirements for project location as defined by Section 1613 of the International Building Code (IBC).

- c. Effects of applicable wind load acting inward and outward normal to plane of wall in accordance with **ASTM E330**.
- d. Thermal loads and movement:
  - (1) Ambient temperature range: **[[67] [ ] degrees C.] [[120] [ ] degrees F.]**
  - (2) Material surfaces range: **[[100] [ ] degrees C.] [[180] [ ] degrees F.]**
- e. Provide and install weatherstripping, exterior gaskets, sealants, and other accessories to resist water and air penetration.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Aluminum (Entrances and Components)

##### 2.1.1.1 Material Standard

**ASTM B221 ASTM B221M**; 6063-T5 alloy and tempered

Provide door stile and rail face dimensions of the entrance doors as follows:

Vertical Stile	Top Rail	Bottom Rail
8.89 cm	8.89 cm	16.51
Vertical Stile	Top Rail	Bottom Rail
3-1/2 inches	3-1/2 inches	6-1/2 inches

Provide major portions of the door members at **0.3175 cm.125 inches** nominal in thickness and glazing molding to be **0.127 cm .050 inches** thick.

##### 2.1.1.2 Tolerances

Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.

Provide either EPDM elastomeric extrusions or thermoplastic elastomer glazing gaskets. Structural silicone sealant is required.

### 2.2 MANUFACTURERS

Manufacturers are acceptable providing they meet the requirements specified in this section and project drawings.

### 2.3 ACCESSORIES

#### 2.3.1 Fasteners

Provide stainless steel where exposed.

### 2.3.2 Perimeter Anchors

When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

### 2.3.3 Standard Entrance Hardware

#### 2.3.3.1 Weatherstripping

Equip meeting stiles on pairs of doors with an adjustable astragal utilizing wool pile with polymeric fin.

Provide door weatherstripping on a single acting offset pivot or butt hung door and frame (single or pairs) comprised of a thermoplastic elastomer weatherstripping on a tubular shape with a semi-rigid polymeric backing.

Provide Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners. (Provide as necessary to meet specified performance tests.)

#### 2.3.3.2 Threshold

Provide extruded aluminum threshold, one piece per door opening, with ribbed surface.

#### 2.3.3.3 Offset Pivots

Provide manufacturer's standard top and bottom pivots with one intermediate offset pivot.

#### 2.3.3.4 Panic Device

Provide manufacturer's recommended standard panic hardware.

#### 2.3.3.5 Closer

Provide surface closer only per ANSI/BHMA A156.4.

#### 2.3.3.6 Security Lock/Dead Lock

Provide A/R MS 1850A lock with (2) A/R 1871 cylinder operated flush bolts.

#### 2.3.3.7 Cylinder(s)/Thumb-turn

Provide manufacturer's recommended standard.

#### 2.3.3.8 Cylinder Guard

Manufacturer standard.

### 2.4 RELATED MATERIALS

#### 2.4.1 Sealants

Refer to Section 07 92 00 JOINT SEALANTS. Ensure all sealants conform to AAMA 800.

#### 2.4.2 Glass

Refer to Section 08 81 00 GLAZING.

### 2.5 FABRICATION

#### 2.5.1 Entrance System Fabrication

Provide door corner construction consisting of mechanical clip fastening, SIGMA deep penetration plug welds and 2.8575 cm 1-1/8 inch long fillet welds inside and outside of all four corners. Provide hook-in type exterior glazing stop with EPDM glazing gaskets reinforced with non-stretchable cord. Provide interior glazing stop mechanically fastened to the door member incorporating a silicone compatible spacer used with silicone sealant.

Accurately fit and secure joints and corners. Make joints hairline in appearance. Prepare components with internal reinforcement for door hardware. Arrange fasteners and attachments to conceal from view.

#### 2.5.2 Shop Assembly

Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

##### 2.5.2.1 Welding

Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

#### 2.5.3 Fabrication Tolerance

Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

##### 2.5.3.1 Material Cuts

Square to 0.8 mm 1/32 inch off square, over largest dimension; proportionate amount of 0.8 mm 1/32 inch on the two dimensions.

##### [2.5.3.2 Maximum Offset

0.4 mm 1/64 inch in alignment between two consecutive members in line, end to end.

##### ] 2.5.3.3 Maximum Offset

0.4 mm 1/64 inch between framing members at glazing pocket corners.

##### ] 2.5.3.4 Joints

(Between adjacent members in same assembly: Hairline and square to adjacent member.

#### 2.5.3.5 Variation

In squaring diagonals for doors and fabricated assemblies: 1.6 mm 1/16 inch.

#### 2.5.3.6 Flatness

For doors and fabricated assemblies: 1.6 mm plus/minus 1/16 inch of neutral plane.

### 2.6 SOURCE QUALITY CONTROL

#### 2.6.1 Source Quality

Provide aluminum entrances specified herein from a single source.

##### 2.6.1.1 Building Enclosure System

When aluminum entrances are part of a building enclosure system, including storefront framing, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

#### 2.6.2 Fabrication Tolerances

Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

## PART 3 EXECUTION

### 3.1 EXAMINATION

#### 3.1.1 Site Verification of Conditions

Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.

#### 3.1.2 Field Measurements

Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

### 3.2 INSTALLATION

Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities. Provide alignment attachments and shims to permanently fasten system to building structure. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

Set thresholds in bed of mastic and secure. Protect aluminum members in

contact with masonry, steel, concrete, or dissimilar materials using nylatron pads or bituminous coating. Shim and brace aluminum system before anchoring to structure. Verify weep holes are open, and metal joints are sealed in accordance with manufacturer's installation instructions. Seal metal to metal joints using sealant recommended by system manufacturer.

### 3.2.1 Preparation

Field verify dimensions prior to fabricating door portal assembly components.

Coordinate requirements for locations of blockouts for anchorage of door portal columns and other embedded components with Section 03 30 00 CAST-IN-PLACE CONCRETE.

Coordinate erection of door portal with installation of surrounding glass wall and door assemblies. Ensure adequate provision is made for support and anchorage of assembly components.

\*\*\*\*\*  
**NOTE: Edit the following list to reflect components required for glass wall and door portal assembly. Verify that sole source responsibility requirement is included in other sections.**  
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Coordinate electrical requirements for [automatic door assemblies] [electrified door hardware] to ensure proper power source, conduit, wiring, and boxes.

#### 3.2.1.1 Adjacent Surfaces Protection

Protect adjacent work areas and finish surfaces from damage during product installation.

#### 3.2.1.2 Aluminum Surface Protection

Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

### 3.2.2 Adjusting

Adjust operating hardware for smooth operation, and as recommended by the manufacturer.

### 3.2.3 Related Products Installation Requirements

#### 3.2.3.1 Sealants (Perimeter)

Refer to Section 07 92 00 JOINT SEALANTS.

#### 3.2.3.2 Glass

Refer to Section 08 81 00 GLAZING.

#### 3.2.3.3 Reference

ANSI Z97.1, 16 CFR 1201 and GANA Glazing Manual.

### 3.3 PROTECTION AND CLEANING

#### 3.3.1 Protection

Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

#### 3.3.2 Cleaning

Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

### 3.4 WARRANTY

Submit [three] [\_\_\_\_\_] signed copies of [manufacturer's product warranty](#) for entrance system as follows:

Warranty Period: [Two] [\_\_\_\_\_] years from Date of Substantial Completion of the project, provided that the Limited Warranty begins in no event later than [six] [\_\_\_\_\_] months from date of shipment by manufacturer. In addition, support welded door corner construction with a limited lifetime warranty for the life of the door under normal use.

Ensure Warranty language is identical to "As Approved" version of the sample warranty submitted and returned from the Contracting Officer.

-- End of Section --