**PART 1 GENERAL**

* 1. **SUMMARY**
1. Section Includes Tubelite ForceFront Storm Monumental Entrance Series and all system components and installation accessories.
	1. Tubelite ForceFront Storm Monumental Wide Entrance WZ 4
	2. **RELATED PRODUCTS**
2. Single Manufacture: All products in divisions listed below shall be supplied by a single manufacturer. To ensure consistency in quality, warranty, finish, and product compatibility, products supplied by different manufacturers are not acceptable.
	1. Division 08 43 13 – Aluminum Framed Storefronts: *<insert Tubelite ForceFront Storm storefront products>.*
	2. Division 08 44 13 - Glazed Aluminum Curtainwalls: *<insert Tubelite ForceFront Storm curtainwall products>.*
	3. Division 10 71 13 - Exterior Sun Control Devices: *<insert Tubelite exterior sun control products>.*
	4. Division 12 26 00 - Interior Daylighting Devices: *<insert Tubelite interior daylighting products>.*

*SPECIFIER NOTE: Review the following suggested Pre-installation Meeting and Agenda information and confirm that this Work is extensive enough to justify this meeting and edit for project specific meeting requirements.*

* 1. **ADMINISTRATIVE REQUIREMENTS**
1. Coordinate with installation of other components that comprise the exterior enclosure.
2. Pre-installation Meeting:
	* 1. Attendees: Owner’s Representative, Architect, General Contractor, Structural Engineer, Mechanical Engineer, Consultants, Entrance Installer. Entrance Manufacturer’s Representative, structural support installers, and installers whose work interfaces with entrance and glazing, [\_\_\_\_\_\_\_].
	1. Agenda:
		1. Review and finalize construction schedule.
		2. Review code and project performance compliance documentation and testing requirements including product certification for energy (U-value, SHGC), condensation, ADA, acoustics, etc.
		3. Review product specific mockups and field testing requirements.
		4. Verify availability of materials, installer’s personnel, equipment, and facilities required to maintain schedule.
		5. Review means and methods related to installation, including manufacturer’s written instructions.
		6. Examine support conditions for compliance with requirements including alignment and attachment to structural members.
		7. Review flashings, membrane interface with entrance, wall penetrations, openings, and conditions of other construction affecting this Work.
		8. Review temporary protection requirements for during and after installation of this Work.
	2. **PERFORMANCE REQUIREMENTS**
3. Design Wind Loads
	1. Provide aluminum entrance system with all structural components including but not limited to anchors and mullions based on the following wind load design pressures and the deflection and stress criteria of paragraph 1.04 B. Pressures based on Allowable Stress Design (ASD).
		1. [\_\_\_] psf positive and negative - typical zones
		[\_\_\_] psf negative - corner zones.
		2. Basic Wind Speed of [\_\_\_] mph
			1. Exposure Category [I],[II], [III]
			2. Importance factor [1], [1.15], [\_\_\_]
		3. Design criteria based on [\_\_\_] building code *or* wind pressure diagram.

 *NOTE: Tubelite is not responsible for determining design loads; this is the responsibility of the Engineer of Record for the building.*

1. Air and Structural Performance:
	1. Air Infiltration Performance:
		1. Shall not exceed 1.0 cfm/ft2 at 1.57 psf static air pressure differential, when tested per ASTM 283.
	2. Structural Performance:
		1. Refer to Florida and Texas state submittals in Section 1.04.B.3 for approved applications.
		2. Design Loads: System to withstand up to +/- 100 psf when tested per ASTM E330 and TAS 201
			1. Maximum allowable deflection of L/175 of the clear span or an amount that restricts edge deflection of individual glazing lites of glass to ¾”
		3. 1.5x Design Loads: System to withstand up to +/- 150 psf when tested per ASTM E330 and TAS 201
			1. There shall be no permanent deformation of main frame members in excess of 0.2% of its clear span, glass breakage, or permanent damage to fasteners or anchors.
		4. Forced Entry Resistance when tested per AAMA 1304: 300 lbs
	3. Wind-borne Debris Hurricane Impact and Cyclic Wind Pressure Loading
		1. State Product Approvals :
			* 1. Florida FPA: FL #14563 *(HVHZ approved)*
				2. Texas TDI: DR-730
		2. Shall be tested in accordance with ASTM E 1996 , ASTM E 1886, TAS 201, and TAS 203
			1. Missile type: D *(HVHZ approved)*
2. Thermal Transmittance and Condensation Resistance Performance Requirements
	1. Thermal transmittance (U-factor) for window system shall not exceed [\_\_\_\_] BTU/hr-ft2- OF per NFRC 100.
	 *(Coordinate performance with 08 80 00 Glazing)*
		1. U-Factor performance reference data per NFRC 100 thermal simulations:

|  |  |
| --- | --- |
|  | **MONUMENTAL ENTRANCE SYSTEM U-FACTOR** (BTU/hr-ft²°F**)** |
| ***DOOR TYPE*** | ***SPACER***  | ***CENTER OF GLASS U-FACTOR*** (BTU/hr-ft2-OF) |
| **0.18** | **0.20** | **0.22** | **0.24** | **0.26** | **0.28** | **0.29** | **0.30** |
| **SINGLE – 10” bottom rail** |
| WIDE | aluminum | **0.80** | **0.81** | **0.81** | **0.82** | **0.83** | **0.84** | **0.84** | **0.84** |
| WIDE | warm edge | **0.80** | **0.80** | **0.81** | **0.82** | **0.83** | **0.83** | **0.84** | **0.84** |
| **DOUBLE – 10” bottom rail** |
| WIDE | aluminum | **0.75** | **0.76** | **0.76** | **0.78** | **0.78** | **0.79** | **0.80** | **0.80** |
| WIDE | warm edge | **0.75** | **0.75** | **0.76** | **0.77** | **0.78** | **0.79** | **0.79** | **0.80** |

*NOTE: The above tables for reference only. Please contact a Tubelite representative for system U-Factors using project specific glass and framing. Values based on standard system with 2” x 4-1/2” non-thermal frame and determined in accordance with NFRC 100 for single and double entrance configurations configuration. Glass makeup: 1” IGU: ¼” ext, ½” space, ¼” int.*

* 1. Solar Heat Gain Coefficient (SHGC) for the window area shall not exceed [\_\_\_\_] as determined in accordance with NFRC 200. *(Coordinate performance with 08 80 00 Glazing)*
	2. **SUBMITTALS**
1. Product Data:
	1. Manufacturer’s literature for each specified system.
	2. Components within assembly, including material descriptions, component profiles, finishes, anchorage and fasteners, glazing, and internal drainage.
2. Shop Drawings:
	1. Shop drawings must be prepared by a qualified engineering service under the employ of the [entrance manufacturer] [installer].
	2. Include system dimensions, framed opening requirements and tolerances, affected related Work, anchorage, expansion and contraction joint location and details, and field welding required.
	3. Include scaled shop drawings showing detailed relationships with glazing, flashing, internal drainage, joinery, and provisions for thermal expansion.
3. Design Data: Submit framing member structural and physical characteristics, [engineering calculations], and [dimensional limitations].
4. Samples:
	1. System components: Submit corner samples, anchors, fasteners, trim, and other materials as requested by the architect.
	2. Finish: Submit [two] aluminum sheet stock samples [2” x 3”] for each finish type.
5. Warranty: Submit manufacturer sample warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
6. Entrance Door Hardware Schedule: Coordinate entrance door hardware schedule with doors, frames, and related work for sizes, orientation, thickness, hardware types and finishes.
7. Optional [Sustainable Design Submittals] or [LEED Reports]:
	1. *EA Credit 1 Optimize Energy Performance*: Submit documentation from manufacturer showing energy performance of system(s) beyond the prerequisite standard.
	2. *IEQ Credit 7.1 Thermal Comfort*: Submit documentation from manufacturer reflecting use of natural ventilation products.
	3. *IEQ Credit 8.1 Daylight and Views*: Submit documentation from manufacturer showing the introduction of daylight and views into regularly occupied areas as a function of percentage of these spaces exposed to such daylight and views.
	4. *MR5.1 and MR5.2 Regional Materials*: Submit documentation from manufacturer showing a minimum of 10% up to 20% (based on cost) of building materials or products extracted, harvested, recovered or manufactured within 500 miles of the project site.
	5. *MR3.1 and MR3.2 Resource Reuse*: Submit documentation from manufacturer reflecting use of a minimum of 5% up to 10% [based on weight] salvaged, refurbished or reused materials.
	6. **QUALITY ASSURANCE**
8. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least twenty years of documented experience.
9. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State that the Project is located.
10. Installer: Company approved by manufacturer and specializing in performing work of this section with at least [\_\_\_] years of [documented] installation experience.
11. Source Limitations: Obtain the entrances and all products listed in Section 1.02 from a single manufacturer.
	1. **DELIVERY, STORAGE, AND HANDLING**
12. Materials to be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.
13. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.
	1. **FIELD CONDITIONS**
14. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.
15. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before fabrication of entrance framing and indicate measurements on Shop Drawings.
16. Install sealant according to sealant manufacturer guidelines.
17. Coordinate installation with other applicable trades.
	1. **WARRANTY**
18. Aluminum Monumental Entrance Warranty:
	1. Manufacturer agrees to repair or replace defective entrance components for a period of 2 [3][5][10] years from the date of shipment. *<3, 5, and 10 years optional>.*
	2. The warranty for Tubelite’s tie rod corner construction extends to the useful life of the entrance door.
19. Finish Warranty:
	1. Warranty covers factory-applied organic and anodic finishes on exposed extruded aluminum surfaces without standing water accumulation, against peeling, checking, cracking, chalking and change of color, per applicable AAMA specifications.
		1. Paint Coatings
			1. AAMA 2605 70% PVDF:  10 [20] years *<20 years optional>*
			2. AAMA 2604 50% PVDF: 5 [10] years *<10 years optional>*
			3. AAMA 2603 Baked Enamel: 1 year (adhesion only)
		2. Anodized Coatings
			1. AAMA 611 Class I:   5 [10] years *<10 years optional>*
			2. AAMA 611 Class II:  2 years

*NOTE: Refer to Tubelite Limited Warranty and Finish Warranty for detailed exclusions, qualifications and limitations. When warranties are required, verify with Owner's counsel that warranties stated under this article are not less than remedies available to Owner under prevailing local laws. Verify the length of available warranties on the actual finish being specified.*

**PART 2 PRODUCTS**

* 1. **MANUFACTURER**
1. Basis of Design: Aluminum Framed Entrances
	1. Tubelite Inc. ForceFront Storm Monumental Wide Entrance WZ 4
	2. Substitutions
		1. Manufacturer’s products that meet specified design requirements may be considered as a substitution. Substitution requests / submittals must include the following, and be submitted at least ten working days prior to the bid date.
			1. Submittal information must include test reports as specified in performance sections.
			2. Copy of manufactures warranty
			3. Any additional information as requested
			4. System details / samples
	3. **ALUMINUM FRAMED ENTRANCES**
2. Aluminum Framed Entrances: Factory fabricated, field glazed, factory finished aluminum, with tie rod construction.
	1. System description: Wide, [Single Door] [ Double Door] *<select>*

|  |  |  |  |
| --- | --- | --- | --- |
| **TYPE** | **VERTICAL STILES** | **TOP RAIL** | **BOTTOM RAIL** |
| WIDE | 6” | 6” | 10” |

* + 1. Depth: 2”
		2. Threshold: Extruded aluminum threshold machined to fit door type and size with bulb weather stripping. Height to be ½” and beveled to the floor on both sides for easy accessibility.
	1. Glass and Glazing: *(coordinate with Section 08 80 00)*
		1. Refer to Florida and Texas state submittals in Section 1.04.B.3 for approved glass and glazing.

 **2.03 FINISHES**

1. Finish all exposed areas of aluminum entrance components in accordance with applicable AAMA Voluntary Finish Guide Specification: *<select from list below>.*

|  |  |  |  |
| --- | --- | --- | --- |
| **SPECIFICATION** | **DESCRIPTION** | **DESIGNATION** | **COLOR** |
| AAMA 2605 | 70% PVDF [2][3][4] coat *<select>* | Exterior Paint | [ ] *<specify color name/number>* |
| AAMA 2604 | 50% PVDF [2][3][4] coat *<select>* | Exterior Paint | [ ] *<specify color name/number>* |
| AAMA 2603 | Baked enamel | Interior Paint | [ ] *<specify color name/number>* |
| AAMA 611 | Class I - Color anodize coating,Eco-friendly etch (0.7 mils thick min) | AA-M10C21A44 | [Light Bronze],[Medium Bronze],[Dark Bronze] [Extra Dark Bronze] [Black],[Champagne], [Light Champagne], [Copper], [other] *<select >* |
| AAMA 611 | Class I - Clear anodize coating,Eco-friendly etch (0.7 mils thick min) | AA-M10C21A41 | Clear |
| AAMA 611 | Class II - Clear anodize coatingEco-friendly etch (0.4 mils thick min)  | AA-M10C21A31 | Clear |

1. Combination anodic oxide and transparent organic coatings as defined in AAMA 612 are not equivalent substitutions for the AAMA 611 anodized finishes shown above due to surface hardness disparities.
2. Applicator Qualifications: Certified by AAMA and listed on AAMA Verified Components List.
3. Verify accuracy of components, quantities, and sizes prior to application of finishes.
4. Applicator – PVDF Based Finishes:
	1. Use regenerative thermal oxidizer to destroy VOC’s.
	2. Utilize chrome-based five –stage pretreatment system applied in accordance with AAMA and ASTM standards. Use of a chrome-based five-stage system ensures long-term adhesion and an option for an extended warranty.
	3. Possess in-house blending capabilities, allow for only specific amount of paint needed for each project.
	4. Utilize automated rotary atomization spray bell application providing uniform coverage with manual spray reinforcement for coverage in areas unreachable by automation.
	5. Employ skilled professional field service division to repair warranty or application issues arising at Project site.
	6. Utilize documented quality control protocol in accordance with AAMA procedures.
5. Applicator – Anodize Finishes
	1. Offer both standard eco-friendly (acid) and optional caustic (traditional) etching technologies.
	2. Utilize fully automated, computer-controlled process lines for consistency through Project.
	3. Utilize documented quality control protocol in accordance with AAMA 611 procedures.
		1. Online quality assurance inspection:
			1. Random sample check for color uniformity, maximum difference of 5AE.
			2. Random coating thickness testing:
				1. Class I clear and color anodize – 0.7 mils (18 microns)
				2. Class II clear anodize – 0.4 mils (10 microns)
	4. **MATERIALS**
6. Aluminum extrusions: 6063-T6 or 6063-T5 alloy and temper in accordance with ASTM B221, and extruded within commercial tolerances and free from defects that impair strength and/or durability.
7. Tie rods: Steel tension tie-rods of 3/8” diameter shall run the full width of the top and bottom rails and shall be fixed with steel plates and lock nuts.
8. Weather strip: Entrance stops and threshold shall have buib weather stripping.
9. Primary extruded rail and stile members will be a minimum 0.125" thick.
10. Entrance frames shall be 0.080” minimum increased to 0.125” at hardware attachment locations.
11. Extruded or formed trim components will be a minimum 0.050" thick.
12. Exposed Flashings: [ “] thick aluminum sheet; finish matching framing members.
13. Concealed Flashings: [ “ ] thick [galvanized steel] [stainless steel] or [aluminum] sheet. *<select>*
14. Structural Steel Reinforcement and anchors necessary to meet the performance requirements of 1.04.
	1. ASTM A36/A36M; [galvanized per ASTM A123/A123M] or [shop primed]. *<select>*
	2. Where galvanizing is not compatible with alloy of component parts, apply heavy coating of epoxy paint where necessary to prevent galvanic action with dissimilar materials.
15. Galvanizing Repair Paint: High zinc content paint for over welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and in compliance with SSPC Paint 20.
16. Bituminous Paint: Cold applied asphalt mastic, containing no asbestos fibers.
17. Glazing and Sealant material:
	1. Refer to Florida state submittals in Section 1.04.B.3 for approved glazing methods and materials
	2. Glazing method shall be in accordance with manufacturer installation instructions and the GANA Glazing Manual for specified glass type or as approved by the glass manufacturer. Refer to section 08 80 00.
	3. Setting blocks and Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual and glass manufacture.
	4. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
	5. **FABRICATION**
18. Ensure joints and corners are flush, hairline and weatherproof, accurately fitted and secured.
19. Prepare framework to receive anchors and hardware.
20. Conceal fasteners from view.
21. Reinforce framework as required for imposed loads.
22. Expansion and Contraction: Fabricate to allow for thermal movement of materials when subjected to project temperature differential requirements.
	1. Allow for movement between entrance and adjacent construction, without damage to components or deterioration of seals.
	2. Provide for membrane interface as indicated on architectural drawings.
	3. Fabricate entrance door corners using steel tie rods connection design allowing for field adjustment.
	4. **HARDWARE**

*IMPORTANT SPECIFIER NOTE: Refer to Florida state approvals in Section 1.04.B.3 for approved applications.*

*The hardware section below is for reference only to identify standard hardware requirements. Refer to section 08 71 00 for schedule and detailed hardware descriptions including finish, make, model, quantity, etc . Space is provided to fill in product designations. Components not required should be deleted.*

1. Hinge: *<select>*
	1. butt hinge: \_\_\_\_\_\_\_\_\_\_
	2. continuous geared hinge: \_\_\_\_\_\_\_\_\_\_
	3. offset pivot: \_\_\_\_\_\_\_\_\_\_
2. Closure: *<select>*
	1. surface: \_\_\_\_\_\_\_\_\_\_
	2. overhead: \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Locks / Handles: *<select>*
	1. Push / Pull handle: \_\_\_\_\_\_\_\_\_\_
	2. Latch Handle: \_\_\_\_\_\_\_\_\_\_
	3. Panic Device: \_\_\_\_\_\_\_\_\_\_
	4. Cylinder / Thumb-turn: \_\_\_\_\_\_\_\_\_\_
	5. Security Lock / Dead Lock: Active Leaf \_\_\_\_\_\_\_\_\_\_\_ Inactive Leaf \_\_\_\_\_\_\_\_\_\_
	6. Electric Strike / Keeper: \_\_\_\_\_\_\_\_\_\_
	7. Removable Center Mullion: \_\_\_\_\_\_\_\_\_\_
	8. Other: \_\_\_\_\_\_\_\_\_\_

**PART 3 – EXECUTION**

* 1. **VERIFICATION OF CONDITIONS**
1. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of this Work.
2. Notify Contractor in writing, with a copy sent to Owner and Architect, of any conditions detrimental to proper and timely completion of this Work.
3. Proceed with installation only after unsatisfactory conditions have been corrected.
4. Start of this Work shall indicate acceptance of areas and conditions as satisfactory by the Installer.
	1. **INSTALLATION**
5. Preparation: Coordinate and furnish anchors, concrete inserts, sleeves, anchor bolts, and other accessories to be embedded in concrete or masonry construction or welded to structural steel. Coordinate delivery of these items to project site.
6. Install aluminum entrances in accordance with manufacturer's installation instructions, reviewed product data, approved shop drawings, and as indicated on Drawings (per Professional Engineer review when applicable).
7. Do not install damaged components.
8. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
9. Provide alignment attachments and shims to permanently fasten system to building structure.
10. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, [aligning with adjacent work].
11. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
12. Coordinate attachment and seal of membrane materials per architectural drawings. Refer to section 07 25 00.
13. Install accessories with positive anchorage to building, weather tight mounting, provisions for thermal expansion, and coordinate installation with flashings and other components.
14. Install hardware using templates provided. Refer to Section 08 71 00 for hardware installation requirements.
15. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
16. Install perimeter sealant in accordance with Section 07 92 00.
17. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
18. Adjust operating hardware for smooth operation.
19. Tolerances:
	1. Maximum variation from plumb: [1/16”] every 3’ non-cumulative, or [1/16”] per 10’, whichever is least.
	2. Maximum Misalignment of two adjoining members abutting in plane: [1/32”].
	3. **CLEANING**
20. Comply with AAMA 609 and 610 for methods, equipment, and materials to clean finished aluminum after installation and for subsequent periodic maintenance.
21. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Rinse with clear water. Take care to remove dirt from corners, and wipe surfaces clean.
22. Remove excess sealant from glass and aluminum by method acceptable to sealant and finish manufacturer.

	1. **PROTECTION**
23. Protect installed products from damage during subsequent construction.
24. Protect anodized finishes from prolonged exposure to alkaline, such as lime in masonry mortar, or acidic and other corrosive materials.

DISCLAIMER STATEMENT

*This guide specification is intended to be used by a qualified construction specifier. The guide specification is not intended to be verbatim as a project specification without appropriate modifications for the specific use intended. The guide specification must be used and coordinated with the procedures of each design firm, and the particular requirements of a specific construction project.*

*Tubelite reserves the right to change configuration without prior notice when deemed necessary for product improvement.*

*Tubelite takes no responsibility for product selection or application, including but limited to, compliance with laws, codes, merchantability or fitness for a particular purpose; and further disclaims all liability for the use in whole or in part, of these Guide Specifications in preparation of project specifications or other documents.*

**END OF SECTION 08 42 13**

This document supersedes all previous versions.