

SECTION 08 51 13

ALUMINUM WINDOWS

1. GENERAL

1.1. THE CONDITIONS OF THE CONTRACT, AND ALL SECTIONS OF DIVISION 1, ARE HEREBY MADE PART OF THIS SECTION.

1.2. RELATED SECTIONS:

1.2.1. SECTION 079200 JOINTS AND SEALANTS

1.2.2. SECTION 088100 GLASS AND GLAZING

1.3. REFERENCES

- |        |                            |  |
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| 1.3.1. | AAMA/ NWWDA 101/ I.S. 2-97 | VOLUNTARY SPECIFICATIONS FOR ALUMINUM, VINYL (PVC) AND WOOD WINDOWS AND GLASS DOORS.   |
| 1.3.2. | AAMA 803.3                 | NARROW JOINT SEAM SEALER   |
| 1.3.3. | AAMA 2603 -02              | VOLUNTARY SPECIFICATION FOR PIGMENTED ORGANIC COATINGS ON ALUMINUM EXTRUSIONS AND PANELS   |
| 1.3.4. | AAMA 2604 - 05             | VOLUNTARY SPECIFICATION FOR HIGH PERFORMANCE ORGANIC COATINGS ON ALUMINUM EXTRUSIONS AND PANELS  |
| 1.3.5. | AAMA 2605 - 05             | VOLUNTARY SPECIFICATION FOR SUPERIOR PERFORMANCE ORGANIC COATINGS ON ALUMINUM EXTRUSIONS AND PANELS  |
| 1.3.6. | AAMA 1302                  | VOLUNTARY SPECIFICATIONS FOR FORCED ENTRY RESISTANT ALUMINUM WINDOWS.  |
| 1.3.7. | AAMA 1503                  | VOLUNTARY TEST METHOD FOR THERMAL TRANSMITTANCE AND CONDENSATION RESISTANCE OF WINDOWS, DOORS AND GLAZED WALLS                                 |
| 1.3.8. | ASTM B 221                 | ALUMINUM-ALLOY EXTRUDED BARS, RODS, WIRE, PROFILES, AND TUBES.   |
| 1.3.9. | ASTM E 283                 | DETERMINING THE RATE OF AIR LEAKAGE THROUGH EXTERIOR WINDOWS, CURTAIN WALL, AND DOORS UNDER SPECIFIED PRESSURE DIFFERENCES ACROSS THE SPECIMEN |

- 1.3.10. ASTM E 330 STRUCTURAL PERFORMANCE OF EXTERIOR WINDOWS, CURTAIN WALLS AND DOORS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE
- 1.3.11. ASTM E 331 WATER PENETRATION OF EXTERIOR WINDOWS, CURTAIN WALLS AND DOORS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE
- [FOR BLAST MITIGATION ONLY]**
- 1.3.12. ASTM E 1300 STANDARD PRACTICE FOR DETERMINING LOAD RESISTANCE OF GLASS IN BUILDINGS
- 1.3.13. ASTM F 2248 STANDARD PRACTICE FOR SPECIFYING AN EQUIVALENT 3-SECOND DURATION DESIGN LOADING FOR BLAST RESISTANT GLAZING FABRICATED WITH LAMINATED GLASS
- 1.3.14. UFC 4-010-01 UNITED FACILITIES CRITERIA (UFC) DoD MINIMUM ANTI TERRORISM STANDARD FOR BUILDINGS

#### 1.4. QUALITY ASSURANCE

##### 1.4.1. TEST UNITS

- 1.4.1.1. AIR, WATER AND STRUCTURAL TEST UNIT SHALL CONFORM TO REQUIREMENTS SET FORTH IN AAMA/ NWWDA 101/ I.S. 2-97. AND SHALL BE CONDUCTED BY AN INDEPENDENT ACCREDITED TESTING AGENCY.

##### 1.4.2. TEST PROCEDURES AND PERFORMANCES

- 1.4.2.1. WINDOWS SHALL CONFORM TO ALL AAMA/ NWWDA 101/ I.S. 2-97 REQUIREMENTS FOR THE WINDOW TYPE REFERENCED IN 2.1.1. IN ADDITION THE FOLLOWING SPECIFIC PERFORMANCE REQUIREMENTS SHALL BE MET.

##### 1.4.3. AIR INFILTRATION TEST

- 1.4.3.1. TEST UNIT IN ACCORDANCE WITH ASTM E 283 AT A PRESSURE OF 6.24 PSF

- 1.4.3.2. AIR INFILTRATION NOT TO EXCEED .02 CUBIC FEET PER MINUTE PER SQUARE FOOT OF WINDOW AREA.

##### 1.4.4. WATER RESISTANCE TEST

- 1.4.4.1. TEST UNIT IN ACCORDANCE WITH ASTM E 331 AT A STATIC AIR PRESSURE DIFFERENCE OF 15.0 PSF.

- 1.4.4.2. NO WATER SHALL PASS THRU TO THE INTERIOR FACE OF THE WINDOW FRAME AND NO LEAKAGE AS DEFINED BY ASTM E 331
- 1.4.5. UNIFORM DEFLECTION LOAD TEST
  - 1.4.5.1. TEST UNIT IN ACCORDANCE WITH ASTM E 330 AT A STATIC AIR PRESSURE DIFFERENCE OF 80 PSF, POSITIVE AND NEGATIVE PRESSURE.
  - 1.4.5.2. NO MEMBER SHALL DEFLECT OF L/175 OF ITS SPAN
- 1.4.6. UNIFORM LOAD STRUCTURAL TEST
  - 1.4.6.1. TEST UNIT IN ACCORDANCE WITH ASTM E 330 AT A STATIC PRESSURE OF 120 PSF, BOTH POSITIVE AND NEGATIVE PRESSURE.
  - 1.4.6.2. AT CONCLUSION OF TEST THERE SHALL BE NO GLASS BREAKAGE, PERMANENT DAMAGE TO FASTENERS, HARDWARE PARTS, SUPPORT ARMS, OR ACTUATING MECHANISMS, NOR ANY OTHER DAMAGE THAT WOULD CAUSE THE WINDOW TO BE INOPERABLE.
- 1.4.7. FORCED RESISTANCE ENTRY
  - 1.4.7.1. TEST WINDOWS IN ACCORDANCE WITH AAMA 1302.5 AND MEET THE REQUIREMENTS OF "NO FORCED ENTRY"
- 1.5. SUBMITTALS
  - 1.5.1. PRODUCT DATA - SUBMIT MANUFACTURER'S DATA SHEETS ON EACH PRODUCT TO BE USED.
    - 1.5.1.1. PREPARATION INSTRUCTIONS AND RECOMMENDATIONS
    - 1.5.1.2. STORAGE AND HANDLING REQUIREMENTS
    - 1.5.1.3. INSTALLATION METHODS
    - 1.5.1.4. MAINTENANCE INSTRUCTIONS
  - 1.5.2. SHOP DRAWINGS
    - 1.5.2.1. INCLUDE PLANS, ELEVATIONS, SECTIONS AND DETAILS INDICATING DIMENSIONS, TOLERANCES, PROFILES, ANCHORAGE, CONNECTIONS, FASTENERS, FLASHING, FINISH, GLAZING AND ATTACHMENTS TO OTHER WORK.
  - 1.5.3. TEST REPORTS - SUBMIT CERTIFIED TEST REPORTS FROM A QUALIFIED INDEPENDENT TESTING AGENCY FOR THE FOLLOWING REQUIREMENTS
    - 1.5.3.1. AAMA/ NWWDA 101/ I.S. 2-97
    - 1.5.3.2. AAMA 1302

- 1.5.3.3. AAMA 1503
- 1.5.3.4. ASTM E 221
- 1.5.3.5. ASTM E 330
- 1.5.3.6. ASTM E 331
- 1.5.4. DESIGN DATA [TO BE USED FOR UFC 4-010-01 ATFP REQUIREMENTS ONLY]
  - 1.5.4.1. SUBMIT STRUCTURAL CALCULATIONS PERFORMED BY A PROFESSIONAL ENGINEER WITH AT LEAST 5 YEARS EXPERIENCE AND FAMILIAR WITH DOD REQUIREMENTS AND ALUMINUM WINDOWS, FOLLOWING APPROVAL OF DESIGN AND LAYOUT AND CONFIRMATION OF ROUGH OPENING DIMENSIONS.
- 1.5.5. SAMPLES
  - 1.5.5.1. SUBMIT TWO 3" X 3" FINISH SAMPLES FOR COLOR APPROVAL
  - 1.5.5.2. SUBMIT TWO 12" X 12" GLAZING SAMPLES FOR EACH TYPE OF GLAZING BEING USED
- 1.5.6. OPERATION AND MAINTENANCE
  - 1.5.6.1. SUBMIT TWO COPIES OF MANUFACTURER'S STANDARD WARRANTY
  - 1.5.6.2. MANUFACTURER'S INSTRUCTIONS FOR REGLAZING OF WINDOW
  - 1.5.6.3. MANUFACTURER'S INSTRUCTIONS FOR MAINTAINING WINDOW IN GOOD ORDER
  - 1.5.6.4. MANUFACTURER'S INSTRUCTIONS FOR CLEANING GLASS
  - 1.5.6.5. MANUFACTURER'S INSTRUCTIONS FOR MAINTAINING FINISH
- 1.6. DELIVERY STORAGE AND HANDLING
  - 1.6.1. DELIVER MATERIALS TO SITE IN MANUFACTURER'S ORIGINAL PACKAGING MATERIALS.
  - 1.6.2. STORE MATERIALS ABOVE THE FLOOR AND UNDER COVER IN A CLEAN, DRY AREA UNTIL READY FOR INSTALLATION.
  - 1.6.3. PROTECT MATERIALS AND FINISH FROM DAMAGE DURING HANDLING AND INSTALLATION
- 1.7. WARRANTIES
  - 1.7.1. THE RESPONSIBLE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND WARRANT FOR ONE YEAR THE SATISFACTORY PERFORMANCE OF THE TOTAL

WINDOW INSTALLATION INCLUDING THAT OF THE WINDOWS, HARDWARE, GLASS, GLAZING, ANCHORAGE, AND SETTING SYSTEM, SEALING, FLASHING, ETC. AS IT RELATES TO AIR, WATER, AND STRUCTURAL ADEQUACY AS CALLED FOR IN THE SPECIFICATIONS AND APPROVED SHOP DRAWINGS.

- 1.7.2. ANY DEFICIENCIES DUE TO SUCH ELEMENTS NOT MEETING THE SPECIFICATIONS SHALL BE CORRECTED BY THE RESPONSIBLE CONTRACTOR DURING THE WARRANTY PERIOD.

## 2. PRODUCTS

### 2.1. MATERIALS

- 2.1.1. ALUMINUM SHALL BE OF COMMERCIAL QUALITY AND PROPER ALLOY FOR WINDOW CONSTRUCTION, FREE FROM DEFECTS IMPAIRING STRENGTH AND DURABILITY. ALL EXTRUDED SECTIONS SHALL BE OF 6063-T5 ALLOY AND TEMPER AND SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 22,000 PSI AND A YIELD OF 16,000 PSI.

### 2.1.2. WINDOW MEMBERS

- 2.1.2.1. MAIN FRAME MEMBERS SHALL HAVE A .125" NOMINAL WALL THICKNESS.

- 2.1.2.2. MAIN FRAME SHALL BE NO LESS THAN 2" DEEP.

### 2.1.3. GLASS

- 2.1.3.1. INSULATED GLASS SHALL BE NOMINAL 1" THICK CONSISTING OF

2.1.3.1.1. ( ) AT EXTERIOR LITE

2.1.3.1.2. ( ) AT INTERIOR LITE

(OR)

- 2.1.3.2. SINGLE GLAZED CONSISTING OF:

2.1.3.2.1. ( )

## 2.2. FABRICATION

### 2.2.1. GENERAL

- 2.2.1.1. WINDOWS SHALL BE MANUFACTURED IN A SECURE AND PROFESSIONAL MANNER TO ASSURE A NEAT WEATHER TIGHT CONSTRUCTION.

### 2.2.2. MAIN FRAME

- 2.2.2.1. SHALL BE 45° MITERED CORNERS, AND SECURED BY MEANS OF A STAINLESS STEEL MECHANICAL FASTENER. ALL JAMB AND STILL JOINTS

SHALL BE SEALED WITH HIGH QUALITY JOINT SEALER IN ACCORDANCE WITH AAMA 803.3.

**[OPTIONAL]**

2.2.2.2. THERMAL BARRIER

2.2.2.2.1. PROVIDE A CONTINUOUS UNINTERRUPTED THERMAL BARRIER AROUND THE ENTIRE PERIMETER OF THE FRAME AND SHALL NOT BE BRIDGED BY ANY METAL CONDUCTORS.

**[FOR BLAST MITIGATION ONLY]**

2.2.2.3. BLAST MITIGATION

2.2.2.3.1. PROVIDE UNITS CAPABLE OF PROVIDING BLAST MITIGATION PROTECTION AS DEFINED BY THE UFC 4-010-01.

2.2.2.3.1.1. CALCULATIONS MUST BE SIGNED BY A LICENSED PROFESSIONAL ENGINEER.

2.2.2.3.1.2. CALCULATIONS MUST COMPLY WITH ALL REQUIREMENTS PER ASTM E 1300 AND ASTM F 2248 AND OTHER MINIMUM REQUIREMENTS OF THE UFC STANDARD LATEST ISSUE.

2.2.3. GLASS

2.2.3.1. GLASS OR PANELS SHALL BE DROP IN TYPE, HELD IN PLACE BY A REMOVABLE EXTRUDED ALUMINUM GLAZING BEAD. THE GLAZING BEAD MUST BE ISOLATED FROM THE GLAZING BY A GASKET, AND SHALL BE PREGLAZED AT THE FACTORY.

2.2.4. FINISH

2.2.4.1. ANODIC

2.2.4.1.1. FINISH ALL EXPOSED AREAS OF ALUMINUM AND COMPONENTS WITH ELECTROLYTICALLY DEPOSITED COLOR IN ACCORDANCE WITH ALUMINUM ASSOCIATION DESIGNATION AA-M10-C22-A41, CLEAR ANODIZED, IN ACCORDANCE WITH AAMA 611-98.

(OR)

2.2.4.1.2. FINISH ALL EXPOSED AREAS OF ALUMINUM AND COMPONENTS WITH ELECTROLYTICALLY DEPOSITED COLOR IN ACCORDANCE WITH ALUMINUM ASSOCIATION DESIGNATION AA-M10-C22-A44, DARK BRONZE ANODIZED, IN ACCORDANCE WITH AAMA 611-98.

2.2.4.2. ORGANIC

2.2.4.2.1. FINISH ALL EXPOSED AREAS OF ALUMINUM WINDOWS AND COMPONENTS WITH MANUFACTURER'S STANDARD 2 COAT 50% FLUOROPOLYMER, BAKED ON ELECTROSTATICALLY COATING IN ACCORDANCE WITH AAMA 2604-05

2.2.4.2.1.1. COLOR TO BE: \_\_\_\_\_

(OR)

2.2.4.2.2. FINISH ALL EXPOSED AREAS OF ALUMINUM WINDOWS AND COMPONENTS WITH MANUFACTURER'S STANDARD 3 COAT 70% FLUOROPOLYMER, BAKED ON ELECTROSTATICALLY COATING IN ACCORDANCE WITH AAMA 2605-05

2.2.4.2.2.1. COLOR TO BE: \_\_\_\_\_

### 3. EXECUTION

#### 3.1. JOB CONDITIONS

3.1.1. VERIFY THAT OPENINGS ARE WITHIN ALLOWABLE TOLERANCES, PLUMB, LEVEL, CLEAN, PROVIDE A SOLID ANCHORING SURFACE AND ARE IN ACCORDANCE WITH APPROVED SHOP DRAWINGS.

#### 3.2. INSTALLATION

3.2.1. USE ONLY SKILLED TRADESMAN WITH WORK DONE IN ACCORDANCE WITH THE APPROVED SHOP DRAWINGS AND SPECIFICATIONS.

3.2.2. SET UNITS PLUMB, LEVEL AND TRUE TO LINE, WITHOUT WARP OR RACK OF FRAMES. ADEQUATELY ANCHOR TO MAINTAIN POSITIONS PERMANENTLY WHEN SUBJECTED TO NORMAL THERMAL MOVEMENT.

#### **[FOR USE WITH BLAST MITIGATION]**

3.2.3. SET WINDOWS IN ACCORDANCE WITH CALCULATIONS PERFORMED BY STRUCTURAL ENGINEER USING SPECIFIED ANCHOR SIZE AND TYPE OR APPROVED EQUAL.

3.2.4. SET WINDOWS IN A CONTINUOUS BED OF SEALANT TO PROVIDE A WEATHERTIGHT CONSTRUCTION. APPLY SEALANTS AT OPENING PERIMETER TO PROVIDE A COMPLETE WEATHER TIGHT SYSTEM.

3.2.5. CLEAN ALUMINUM SURFACES PROMPTLY FOLLOWING INSTALLATION OF WINDOWS. REMOVE ANY EXCESS MATERIAL AND LEAVE EXPOSED SURFACES AND JOINTS CLEAN AND SMOOTH.

#### 3.3. PROTECTION AND CLEANING

3.3.1. AFTER COMPLETION OF THE WINDOW INSTALLATION, WINDOWS SHALL BE INSPECTED ADJUSTED AND PUT INTO WORKING ORDER AND LEFT CLEAN AND FREE OF ANY LABELS. PROTECTION FROM THIS POINT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

**END OF SECTION**