

Preparing Activity: NAVFAC

Superseding
UFGS-08 44 00 (August 2011)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2026

SECTION TABLE OF CONTENTS

DIVISION 08 - OPENINGS

SECTION 08 44 00

CURTAIN WALL AND GLAZED ASSEMBLIES

05/19

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 QUALITY ASSURANCE
 - 1.3.1 Engineer Qualifications for Blast Design
 - 1.3.2 Qualification of Welders
 - 1.3.3 Qualifications for the Curtain-Wall Installer
 - 1.3.4 Testing Requirements
 - 1.3.5 Mockup
 - 1.3.5.1 Construction
 - 1.3.5.2 Performance Test
 - 1.3.5.3 Approved Mock-Up
 - 1.3.6 Factory Tests
 - 1.3.6.1 Deflection and Structural Tests
 - 1.3.6.2 Water Penetration Test
 - 1.3.6.3 Air Infiltration Test
 - 1.3.6.4 Delamination Test
 - 1.3.6.5 Sealant Adhesion and Compatibility Testing
 - 1.3.6.6 Energy Performance Tests
 - 1.3.6.7 Window Tests
 - 1.3.6.8 Fire Resistance Tests
 - 1.3.6.9 Noise Reduction
- 1.4 FIELD TESTS
 - 1.4.1 Field Water Spray Tests
 - 1.4.2 Air Infiltration
 - 1.4.2.1 Water Penetration
- 1.5 GLAZED CURTAIN WALL SYSTEM REQUIREMENTS
 - 1.5.1 Source
 - 1.5.2 Design
 - 1.5.3 Tolerances
 - 1.5.4 Structural Requirements
 - 1.5.5 Seismic Calculations
 - 1.5.6 Thermal Cycling and Vertical Inter-Story Movement Calculations

- 1.6 DELIVERY AND STORAGE
 - 1.6.1 Protective Covering
 - 1.6.2 Identification
- 1.7 WARRANTY
 - 1.7.1 Sample Warranties
- 1.8 INTERPRETATION OF AWS CODE
- 1.9 PERFORMANCE REQUIREMENTS
 - 1.9.1 Antiterrorism Performance Requirements
 - 1.9.1.1 Computational Design Analysis Method
 - 1.9.1.2 Dynamic Design Analysis Method
 - 1.9.1.3 Standard Airblast Test Method
 - 1.9.1.4 Wind-Borne Debris /Hurricane Performance Requirements
 - 1.9.2 Allowable Design Stresses
 - 1.9.3 Design Wind Load
 - 1.9.4 Structural Capacity

PART 2 PRODUCTS

- 2.1 MATERIALS
 - 2.1.1 Aluminum
 - 2.1.1.1 Wrought Aluminum Alloys
 - 2.1.1.2 Cast Aluminum Alloys
 - 2.1.1.3 Welding Rods and Electrodes
 - 2.1.1.4 Strength
 - 2.1.2 Bronze
 - 2.1.3 Copper
 - 2.1.4 Carbon Steel
 - 2.1.5 Stainless Steel
 - 2.1.6 Weathering High-Strength Low-Alloy Steel
 - 2.1.7 High-Strength, Low-Alloy Steel
 - 2.1.8 Metal Fasteners
 - 2.1.9 Porcelain Enamel
 - 2.1.10 Joint Sealants and Accessories
 - 2.1.10.1 Elastomeric, Single or Multiple Component
 - 2.1.10.2 Single Component Silicone Rubber Base
 - 2.1.10.3 Solvents and Primers
 - 2.1.10.4 Structural Sealant
 - 2.1.10.5 Backing Material
 - 2.1.10.6 Bond Preventive Materials
 - 2.1.10.7 Preformed Sealing Compound
 - 2.1.11 Glass and Glazing
 - 2.1.12 Firestopping Material
 - 2.1.13 Screens
 - 2.1.14 Paint and Finishes
 - 2.1.15 Panels
 - 2.1.15.1 Metal Facing Panels, Single Thickness
 - 2.1.15.2 Laminated Panels
 - 2.1.15.2.1 Exterior Metal Facing
 - 2.1.15.2.2 Facing Backing
 - 2.1.15.2.3 Core Insulation
 - 2.1.15.2.4 Interior Metal Facing
 - 2.1.15.2.5 Panel Fabrication
 - 2.1.15.3 Nonmetallic Panels
 - 2.1.16 Metal Windows
 - 2.1.16.1 Frames
 - 2.1.16.2 Operating Windows
 - 2.1.16.3 Window Construction
 - 2.1.17 Insect Screens
 - 2.1.18 Metal Accessories

- 2.2 METALS FOR FABRICATION
 - 2.2.1 Aluminum-Alloy Extrusions
 - 2.2.2 Aluminum-Alloy Sheets and Plates
 - 2.2.3 Structural Steel
 - 2.2.4 Metals for Fasteners
- 2.3 NONSKINNING SEALING COMPOUND
- 2.4 FABRICATION
 - 2.4.1 Workmanship
 - 2.4.2 Shop-Painting Aluminum
 - 2.4.3 Shop-Painting Steel
 - 2.4.4 Depth of Glazing Rabbets
 - 2.4.5 Anodic Finish
 - 2.4.6 Pigmented Organic Coating
- 2.5 CURTAIN-WALL FRAMING MEMBERS
 - 2.5.1 General
 - 2.5.2 Construction
- 2.6 ALUMINUM DOORS AND FRAMES
- 2.7 METAL ACCESSORIES
 - 2.7.1 Sills
 - 2.7.2 Coping
 - 2.7.3 Exterior Architectural Louvers
- 2.8 SUN CONTROL
 - 2.8.1 Sunshades
 - 2.8.2 Light Shelves
- 2.9 THERMAL INSULATION MATERIALS
- 2.10 SEALANTS AND CAULKINGS
- 2.11 CURTAIN-WALL INSTALLATION MATERIALS
 - 2.11.1 Threaded Concrete Inserts
 - 2.11.2 Wedge Concrete Inserts
 - 2.11.3 Slotted Concrete Inserts
 - 2.11.4 Masonry Anchorage Devices
 - 2.11.5 Toggle Bolts
 - 2.11.6 Steel Bolts, Nuts, and Washers
 - 2.11.7 Machine Screws
 - 2.11.8 Electrodes for Welding Steel

PART 3 EXECUTION

- 3.1 GENERAL
- 3.2 FABRICATION
 - 3.2.1 Joints
 - 3.2.2 Welding
 - 3.2.3 Soldering and Brazing
 - 3.2.4 Ventilation and Drainage
 - 3.2.5 Protection and Treatment of Metals
 - 3.2.5.1 General
 - 3.2.5.2 Galvanic Action
 - 3.2.5.3 Protection for Aluminum
- 3.3 INSTALLATION
 - 3.3.1 Bench Marks and Reference Points
 - 3.3.2 Verifying Conditions and Adjacent Surfaces
 - 3.3.3 Materials Embedded In Other Construction
 - 3.3.4 Fastening To Construction-In-Place
 - 3.3.5 Setting Masonry Anchorage Devices
 - 3.3.6 Field-Welding Steel And Touchup Painting
 - 3.3.7 Installation Tolerances
 - 3.3.8 Placing Curtain-Wall Framing Members
 - 3.3.9 Panel Installation
 - 3.3.10 Panels

3.3.11	Windows
3.3.11.1	Sealing
3.3.11.2	Ventilators and Hardware
3.3.11.3	Weatherstripping
3.3.12	Joint Sealants
3.3.12.1	Surface Preparation
3.3.12.2	Applications
3.3.12.3	Primer
3.3.12.4	Backing
3.3.12.5	Bond Prevention
3.3.12.6	Protection and Cleaning
3.3.13	Glass
3.3.13.1	Inspection of Sash and Frames
3.3.13.2	Preparation of Glass and Rabbets
3.3.13.3	Positioning Glass
3.3.13.4	Setting Methods
3.3.13.5	Void Space
3.3.13.6	Insulating Glass
3.3.13.7	Insulating Glass With Edge Bands
3.3.14	Firestopping
3.3.15	Field Applied Insulation
3.4	FINISHES
3.4.1	Galvanizing
3.4.1.1	Repair of Zinc-Coated Surfaces
3.4.2	Shop Cleaning and Painting
3.4.2.1	Cleaning
3.4.2.2	Painting Steel or Iron Surfaces
3.4.2.3	Painting Weathering Steel
3.5	FIELD TESTS
3.6	CLEANING AND PROTECTION
3.6.1	General
3.6.2	Manufacturer's Information
3.6.3	Glass
3.6.4	Aluminum Surfaces
3.6.5	Other Metal Surfaces
3.6.6	Porcelain-Enamel Surfaces
3.7	SCHEDULE
3.8	INSPECTION AND ACCEPTANCE PROVISIONS
3.8.1	Finished Curtain-Wall System Requirements
3.8.2	Repair of Defective Work

-- End of Section Table of Contents --

USACE / NAVFAC / AFCEC UFGS-08 44 00 (May 2019)

Preparing Activity: NAVFAC

Superseding
UFGS-08 44 00 (August 2011)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2026

SECTION 08 44 00

CURTAIN WALL AND GLAZED ASSEMBLIES 05/19

NOTE: This guide specification covers the requirements for complete glazed curtain wall system exclusive of doors, entrances, and store fronts, commercial aluminum curtain walls designed to accommodate fixed-glass lights, window sashes, panels, louvers, and other curtain-wall accessories.

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 item(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 \(CCR\)](#).

Curtain-wall systems may be classified by visual characteristics as follows:

1. Mullion type has dominant vertical lines. Vertical mullions are usually **45 millimeter 1-3/4 inches** or more wide and usually extend **100 millimeter 4 inches** or more beyond the exterior face of the curtain wall. Mullions are usually not more than **1525 millimeter 5 feet** on center.
2. Grid type has equally dominant vertical and horizontal lines. Vertical and horizontal mullions are usually **45 millimeter 1-3/4 inches** or more wide and usually extend **100 millimeter 4 inches** or more

beyond the exterior face of the curtain wall. The area enclosed by the mullions is usually not more than 3 square meter 32 square feet.

3. Spandrel type has dominant horizontal lines, and the supports are not a primary element of expression. The sheathed type has a nonlinear pattern, and the supports are not a primary element of expression.

Related work specified in this section as required by the project includes:

1. Field-applied thermal insulation, glass and glazing, and field-applied joint sealing and expansion joints.
2. Methods of securing framing to structure and details of fastenings, anchors, and auxiliary shapes,
3. Openings to be glazed with double-glazing units.

Include a complete schedule of system types and sizes and all window units for the work to be performed and indicate the following::

1. Arrangement of curtain-wall framing showing all dimensions, shapes, and sizes of the members, floor elevations, connections, and the relation of the curtain-wall framing to other building components
2. Windows showing types, sizes, ventilators, dimensions, shapes, and sizes of members, and the relationship of each window sash to the curtain-wall system
3. Insect screens showing locations, dimensions, shapes, and sizes of members; shade screens and baffles showing locations, dimensions, shapes, and sizes of members; location of window cleaners' bolts
4. Panels showing all dimensions, edge detail, and the relationship of panels to the curtain-wall system, openings to be glazed with double-glazing units
5. Doors and frames showing the door size, thickness, and hand. Arrangement of frames including dimensions, shapes, and sizes of members and connections; and the relationship of doors and frames to the curtain-wall system
6. Metal accessories, such as aluminum sills at the bottom of curtain walls, aluminum coping at the top of curtain walls, and exterior architectural louvers showing all dimensions, shapes, and sizes of members, connections, and the relationship of each metal accessory item to the curtain-wall system

7. Field-applied thermal-insulation systems showing the location, method of attachment, nominal thickness, and name of insulation

8 Joints to be sealed with field-applied sealing compound showing the kind of materials that will be in contact with the sealing compound; locations, dimensions of joints, name of backup material, and name of sealing compound, for each type of sealing compound

PART 1 GENERAL

1.1 REFERENCES

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 Reference Identifier (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.

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.

ALUMINUM ASSOCIATION (AA)

AA ADM	(2020) Aluminum Design Manual
AA ASD1	(2024) Aluminum Standards and Data
AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 501.1	(2017) Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
AAMA 501.2	(2015) Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

AAMA 501.4	(2018) Recommended Static Test Method for Evaluating Window Wall, Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift
AAMA 501.5	(2007) Test Method for Thermal Cycling of Exterior Walls
AAMA 501.6	(2018) Recommended Dynamic Test Method for Determining the Seismic Drift Causing Glass Fallout from Window Wall, Curtain Wall and Storefront Systems
AAMA 501.7	(2017) Recommended Static Test Method for Evaluating Windows, Window Wall, Curtain Wall and Storefront Systems Subjected to Vertical Inter-Story Movements
AAMA 609 & 610	(2015) Cleaning and Maintenance Guide for Architecturally Finished Aluminum
AAMA 800	(2016) Voluntary Specifications and Test Methods for Sealants
AAMA 2603	(2020) Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
AAMA 2604	(2017a) Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 2605	(2022) Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
AAMA CW-10	(2015) Care and Handling of Architectural Aluminum from Shop to Site
AAMA MCWM-1	(1989) Metal Curtain Wall Manual
AAMA/WDMA/CSA 101/I.S.2/A440	(2017) North American Fenestration Standard/Specification for Windows, Doors, and Skylights

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISC/AISI 121	(2007) Standard Definitions for Use in the Design of Steel Structures
AISI SG03-3	(2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)

AWS A5.1/A5.1M (2025) Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

AWS A5.10/A5.10M (2023) Welding Consumables - Wire Electrodes, Wires and Rods for Welding of Aluminum and Aluminum-Alloys - Classification

AWS D1.1/D1.1M (2025) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A27/A27M (2020) Standard Specification for Steel Castings, Carbon, for General Application

ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel

ASTM A47/A47M (1999; R 2022; E 2022) Standard Specification for Ferritic Malleable Iron Castings

ASTM A123/A123M (2024) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2023) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A240/A240M (2025a) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ASTM A242/A242M (2024a; E 2025) Standard Specification for High-Strength Low-Alloy Structural Steel

ASTM A283/A283M (2024) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates

ASTM A424/A424M (2025) Standard Specification for Steel Sheet for Porcelain Enameling

ASTM A501/A501M (2021) Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

ASTM A572/A572M (2025) Standard Specification for High-Strength Low-Alloy Columbium-Vanadium

Structural Steel

ASTM A588/A588M	(2024) Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi, 345 MPa Minimum Yield Point, with Atmospheric Corrosion Resistance
ASTM A606/A606M	(2025) Standard Specification for Steel Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A653/A653M	(2025a) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A1008/A1008M	(2025) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable
ASTM A1011/A1011M	(2025) Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High-Strength
ASTM B26/B26M	(2025) Standard Specification for Aluminum-Alloy Sand Castings
ASTM B85/B85M	(2025) Standard Specification for Aluminum-Alloy Die Castings
ASTM B108/B108M	(2025) Standard Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B136	(2023) Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum
ASTM B137	(1995; R 2021) Standard Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum
ASTM B152/B152M	(2019) Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B211/B211M	(2023) Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire

ASTM B221	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B244	(2009; R 2021) Standard Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments
ASTM B308/B308M	(2010; R 2020) Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM B316/B316M	(2025) Standard Specification for Aluminum and Aluminum-Alloy Rivet and Cold-Heading Wire and Rods
ASTM B429/B429M	(2010; E 2012) Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM C220	(1991; R 2015) Standard Specification for Flat Asbestos-Cement Sheets
ASTM C481	(1999; R 2025) Standard Test Method Laboratory Aging of Sandwich Constructions
ASTM C542	(2005; R 2024) Standard Specification for Lock-Strip Gaskets
ASTM C547	(2025) Standard Specification for Mineral Fiber Pipe Insulation
ASTM C552	(2022) Standard Specification for Cellular Glass Thermal Insulation
ASTM C553	(2024) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C578	(2023) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C591	(2022) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C592	(2024) Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type)
ASTM C610	(2017; R 2023) Standard Specification for

	Molded Expanded Perlite Block and Pipe Thermal Insulation
ASTM C612	(2025) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM C665	(2024) Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C864	(2005; R 2015) Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
ASTM C920	(2018; R 2024) Standard Specification for Elastomeric Joint Sealants
ASTM C1048	(2018) Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
ASTM C1087	(2016) Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
ASTM C1135	(2015) Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants
ASTM C1184	(2023) Standard Specification for Structural Silicone Sealants
ASTM C1363	(2024) Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
ASTM C1401	(2014) Standard Guide for Structural Sealant Glazing
ASTM D1037	(2012; R 2020) Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
ASTM D1730	(2009; R 2020) Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting
ASTM D2244	(2025) Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D3656/D3656M	(2013) Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns

ASTM D4214	(2023) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM E84	(2026) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E90	(2023) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E119	(2026) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E136	(2026) Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C
ASTM E283	(2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E330/E330M	(2014; R 2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E331	(2000; R 2023) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E546	(2014; R 2020) Standard Test Method for Frost Point of Sealed Insulating Glass Units
ASTM E576	(2014; R 2020) Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position
ASTM E783	(2002; R 2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
ASTM E1105	(2015; R 2023) 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 E1300	(2024) Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM E1332	(2016) Standard Classification for Rating

Outdoor-Indoor Sound Attenuation

ASTM E1886	(2019) 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 E1996	(2017) Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
ASTM E3061	(2017) Standard Test Method for Analysis of Aluminum and Aluminum Alloys by Inductively Coupled Plasma Atomic Emission Spectrometry (Performance-Based Method)
ASTM F1642/F1642M	(2025) Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings
ASTM F2248	(2012) Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass
ASTM F2912	(2017) Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings

COMPOSITE PANEL ASSOCIATION (CPA)

ANSI/CPA A135.4	(2012; R2020) Basic Hardboard
-----------------	-------------------------------

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 500	(2006) Metal Finishes Manual
---------------	------------------------------

NATIONAL FENESTRATION RATING COUNCIL (NFRC)

NFRC 100	(2020) Procedure for Determining Fenestration Product U-Factors
NFRC 200	(2020) Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
NFRC 500	(2010) Procedure for Determining Fenestration Product Condensation Resistance Valves

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 285	(2023) Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall
----------	--

Assemblies Containing Combustible
Components

PORCELAIN ENAMEL INSTITUTE (PEI)

PEI 1001 (ALS-100) Specifications for Architectural
Porcelain Enamel

PEI CG-3 (2005) Color Guide for Architectural
Porcelain Enamel

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4 (2007) Brush-Off Blast Cleaning

SSPC SP 1 (2015) Solvent Cleaning

SSPC SP 3 (2024) Power Tool Cleaning

SSPC SP 12/NACE No.5 (2002) Surface Preparation and Cleaning of
Metals by Waterjetting Prior to Recoating

STEEL WINDOW INSTITUTE (SWI)

SWI AGSW (2002) Architect's Guide to Steel Windows

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 4-010-01 (2018; with Change 3, 2024) DoD Minimum
Antiterrorism Standards for Buildings

1.2 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified 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 Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters 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 and Air Force projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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

SD-02 Shop Drawings

Glazed Curtain Wall System; G, [_____]

Installation Drawings

Shop-Painting Aluminum; G, [_____]

Shop-Painting Steel; G, [_____]

SD-03 Product Data

Glazed Curtain Wall System; G, [_____]

Metals For Fabrication; G, [_____]

Nonskinning Sealing Compound; G, [_____]

Metal Accessories; G, [_____]

Curtain-Wall Framing Members; G, [_____]

Aluminum Doors and Frames; G, [_____]

Laminated Panels; G, [_____]

Thermal Insulation Materials; G, [_____]

Masonry Anchorage Devices; G, [_____]

[Recycled Content of Aluminum Doors and Frames; S

][Recycled Content of Aluminum Curtain-Wall Framing Members; S

][Recycled Content of Aluminum Windows; S

] Sample Warranties; G, [_____]

SD-05 Design Data

[Anodic Finish; G, [_____]

][Pigmented Organic Coating; G, [_____]

] Exposed-to-View Aluminum Finish; G, [____]
Seismic Calculations; G, [____]
Structural Calculations for Deflection; G, [____]

NOTE: Provide Design Analysis when blast design is required by UFC 4-010-01, DoD Minimum Antiterrorism Requirements for Building

[Design Analysis; G, [____]

] SD-06 Test Reports

NOTE: Provide Standard Airblast Test Reports when required by UFC 4-010-01, DoD Minimum Antiterrorism Requirements for Building.

[NFPA 285 Factory Test Results; G, [____]

] Standard Airblast Test; G, [____]

] Field Water Spray Test Results; G, [____]

Air Infiltration Test Results; G, [____]

Water Penetration Test Results; G, [____]

SD-07 Certificates

Energy Performance Certificates; G, [____]

NOTE: Require Engineer Qualifications when blast design is required by UFC 4-010-01, DoD Minimum Antiterrorism requirements for buildings.

[Engineer Qualifications; G, [____]

] Qualifications for the Curtain-Wall Installer; G, [____]

SD-08 Manufacturer's Instructions

Glazed Curtain Wall System; G, [____]

Insulating Glass; G, [____]

Preventive Maintenance and Inspection; G, [____]

SD-11 Closeout Submittals

Warranty; G, [____]

1.3 QUALITY ASSURANCE

1.3.1 Engineer Qualifications for Blast Design

All blast design calculations must be performed by or under the direct supervision of a registered engineer with a minimum of 5 years experience performing blast design. The [engineer] performing the blast design must be able to demonstrate experience on similar size projects using similar design methods to meet the requirements outlined in this specification.

1.3.2 Qualification of Welders

Welding must be performed by certified welders qualified in accordance with AWS D1.1/D1.1M using procedures, materials, and equipment of the type required for the work.

1.3.3 Qualifications for the Curtain-Wall Installer

Submit a written description of the proposed curtain-wall system installer giving the name of the curtain-wall manufacturer, qualifications of personnel, years of concurrent contracting experience, lists of projects similar in scope to the specified work. Installer must be approved by the Manufacturer as a Certified Installer and have a minimum of 5 years experience installing curtain wall systems, and have completed projects similar in size to this project.

1.3.4 Testing Requirements

NOTE: Revise this paragraph as necessary to cover project requirements.

The components listed below must be tested in accordance with the requirements below, and meet performance requirements specified.

- a. Joint and Glazing Sealants: Perform tests as required by applicable publications referenced.
- b. Preformed Compression Gaskets and Seals: ASTM C864.
- c. Preformed Lock-strip Gaskets: ASTM C542, modified as follows: Heat age specimens seven days at 70 degrees C 158 degrees F, in zipped or locked position under full design compression. Unzip, cool for one hour, re-zip, and test lip seal pressure, which must be minimum 0.045 kilograms per linear millimeter 2.5 pounds per linear inch on any extruded or corner specimen.
- d. Spandrel Glass: Fallout resistance test, ASTM C1048.
- e. Porcelain Enamel: Acid resistance, color retention, and spall resistance tests, PEI 1001.
- f. Anodized Finishes: Stain resistance, coating weight, and coating thickness tests, ASTM B136, ASTM B137, and ASTM B244, respectively.
- g. Insulating Glass: ASTM E546 or ASTM E576 at [minus 29 degrees C 20 degrees F] [____], no frost or dew point.

[1.3.5 Mockup

NOTE: Size of project and system specified will determine whether mock-ups are necessary. Complete information should be given concerning extent, details, and purpose of mock-ups. Where mock-ups have been previously tested for another project or for commercial production, they may serve the purpose. When testing of a mock-up is required, the unit should be erected at a testing laboratory or other location where adequate testing equipment is available.

1.3.5.1 Construction

Construct at [job site] [manufacturer's plant] [approved testing laboratory] full size typical wall unit which incorporates horizontal and vertical joints, framing, window units, panels, glazing, and other accessories as detailed and specified. Mock-up wall unit size and design must be as indicated.

1.3.5.2 Performance Test

Conduct tests after approval of visual aspects has been obtained. Finished work must match approved mock-up.

1.3.5.3 Approved Mock-Up

After completion and approval of test results [[transport mock-up to job site and] install, where directed, for reference during construction.] [Approved mock-up must remain property of the Contractor.]

]1.3.6 Factory Tests

NOTE: The overall performance requirements and tests will vary with the design and geographical location of the building as well as with the type of construction and components specified. Only those tests which are necessary to establish compliance with specifications should be included in the project specification. Refer to AAMA Curtain Wall Manual for detailed testing methods and the recommended minimum performance requirements and safety factors.

Perform the following tests except that where a curtain wall system or component of similar type, size, and design as specified for this project has been previously tested, under the conditions specified herein, the resulting test reports may be submitted in lieu of testing the components listed below:

- a. [NFPA 285 Factory Test Results]
- b. [_____]