	Title: YALE OFFICE OF FACILITIES PROCEDURE MANUAL Chapter: 01 - Yale Design Standard Division: 08 00 00 Openings	Section: 08 50 00 Requirements for Metal Windows
		Date: December 2023
		Author: Office of Facilities

PART 1 - INTRODUCTION


1.1 PURPOSE

This section contains general design criteria for metal windows. Yale University has developed a specification for steel windows, which must be used by the architect.

PART 2 - GENERAL DESIGN REQUIREMENTS

2.1 SYSTEM DESIGN AND PERFORMANCE REQUIREMENTS

- A. Provide security screen design and application as approved by the Yale University Security Committee.
- B. Metal windows must be commercial grade, high-performance windows of types required by the design or required to match existing window units.
- C. Provide hardware for all operable windows.
- D. Performance criteria:
 - 1. Water infiltration
 - none at 20% of the design wind pressure
 - 2. Air infiltration
 - none at 20% of the design wind pressure
 - Fixed windows: 0.06 cfm per linear foot
 - Operable windows: 0.10 cfm per linear foot of crack
 - 3. Thermal performance
 - the same as specified for insulating glass units Acoustical performance—sound transmission class rating of 30–32
 - 4. Deflection
 - not to exceed 1/175 of the unsupported spans

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2.2 SUBMITTALS

Submit the following documentation and samples to Yale University.

A. Shop Drawings

Provide shop drawings showing materials in place on the building, including coordination of related and adjoining work. Insert drawings and erection diagrams. Show the relative layout for all adjacent walls, beams, columns slabs, ceilings, and similar elements. Drawings must include elevations, floor plans, sections, and details. Details must be full-size and fully drawn, not outlined. Provide isometric details of any conditions, as requested by the architect.

B. Calculations


Provide structural calculations, sealed by a professional engineer licensed in the applicable state, and prepared in compliance with referenced documents and these standards. Where specifications and code differ, the more stringent requirements take precedence. Test reports are not an acceptable substitute for calculations.

C. Samples

Submit samples of all materials to be encompassed in the work in the size and quantity required by the project documents, including extrusions, glass samples, and technical data.

D. Product Data

Submit manufacturers' product data and specifications for any materials or fabrication techniques used in the curtain wall work. Include instructions or recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where test methods are indicated.

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2.3 MANUFACTURERS

Subject to compliance with the design requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following. Equivalent products from other manufacturers must be approved by Yale University.

A. Steel Windows

- Hopes Windows
- Crittall Windows

B. Aluminum Windows

- Kawneer
- Tubelite
- Wausau
- As approved by Yale University

2.4 MATERIALS


Provide aluminum shapes and thicknesses as shown and as required to meet performance requirements. Use an alloy, with adequate structural characteristics, that is suitable for extruding and for finishing as specified. Comply with ASTM B221 requirements for extrusions and ASTM B209 requirements for sheet and plate. Formed sheet members must be at least .090" thick. Form curved shapes accurately to the radius shown.

2.5 ACCESSORIES OR SPECIAL FEATURES

- A. For each double hung operable window, provide unit aluminum framed screens, with plastic mesh insect screening.
- B. For historic steel casement windows, the screens must be pull-down, interior mounted, retractable insect screens by Phantom Screens, or an equivalent product approved by Yale University.

2.6 SPECIAL REQUIREMENTS

Provide a mock-up representative of the proposed window units. Test the mock-up unit to the standards indicated elsewhere in this section.

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2.7 INSTALLATION GUIDELINES


Install windows in accordance with the manufacturer's instructions and approved shop drawings, or with more stringent requirements indicated.

2.8 QUALITY CONTROL

- A. Perform the work in accordance with the AAMA – Metal Curtain Wall, Window, Store Front Entrance – Guide Specifications Manual. Maintain one copy of the manual on site. Engage a single firm to assume undivided responsibility for fabrication and installation and for the coordination of all metal window work components. This firm must demonstrate not less than five years successful experience in the fabrication and installation of similar work.
- B. Window manufacturers must have windows tested by a qualified independent laboratory.

2.9 CLEANING AND ADJUSTING

The contractor must remove all mastic smears or other unsightly marks caused by their workers. The contractor is responsible for any damage to, or disfigurement of, the work caused at any time by other trades, as well as for final cleaning and washing of glass and aluminum. The wall contractor must advise the contractor of proper and adequate protection and cleaning procedures during the remainder of construction period, so that the system is without damage or deterioration at the time of acceptance.

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2.10 WARRANTY

- A. Provide a five-year manufacturer's warranty to cover the complete system for failure to meet specified requirements.
- B. The warranty must state that glass is guaranteed against breakage due to defects in glass material, fabrication of insulating units, and/or installation for a period of five years after substantial completion.
- C. Insulating glass units (vision or spandrel) must carry a 10-year manufacturer's warranty against delaminating; obstruction of vision due to fogging; collection of dust or dirt in the enclosed space; and cracking, peeling, or flaking of coatings.
- D. Spandrel glass must carry a five-year manufacturer's warranty against peeling or flaking of opacifying film.
- E. The silicone sealants must carry a 20-year manufacturer's warranty against adhesive or cohesive failure and discoloration or change in appearance due to fluid migration of porous substrate. The warranty must state that the silicone sealants will perform as a watertight weatherseal.
- F. Painted finish systems must carry a 10-year warranty from the manufacturer and applicator against peeling, fading, chalking, crazing, cracking, flaking, or other damage, as well as changes in appearance or performance beyond normal weathering.

Date	Description of Change	Pages / Sections Modified	ID
12/12/23	Template update	-	Office of Facilities