Design Guideline 084113
Aluminum-Framed Entrances and Storefronts

Scope

This section includes aluminum entrances and storefront. Aluminum windows installed in the storefront are covered in another section.

Use curtain wall framing instead of storefront for extensive exterior applications, particularly in areas where dimensions and configuration would require reinforcement. Typically, specify curtain walls for framing exceeding 12 feet in height.

Related Sections

U-M Design Guideline Section:

3.2 – Energy and Water Conservation
1.0 – Codes and Regulatory Agencies
6.1 - 084413 – Glazed Aluminum Curtain Walls
6.1 - 085113 – Aluminum Windows
6.1 - 087100 – Door Hardware
6.1 - 088000 – Glazing
8.2 - Architectural Preferred Manufacturer List

U-M Master Specification Sections: (A digitally accessible version is pending; please email AEC-Digital Accessibility Support if assistance is needed)

084113 – Aluminum-Framed Entrances and Storefronts

Reference Documents:

ASHRAE 90.1-2007, "Energy Standard for Buildings Except Low-Rise Residential Buildings"
AAMA/WDMA/CSA 101/I.S.2/A440-2008: NAFS – North American Fenestration Standard/Specification for Windows, Doors and Skylights
National Fenestration Rating Council (NFRC) Technical Documents

Design and Installation Requirements

Design Requirements for Aluminum Entrances

Single source responsibility - Specify that all of the storefront components, including the glazing, windows and doors, be assigned to a single contractor. In addition, the storefront, windows and doors should be provided by the same manufacturer.

Construction - In general, manufacturer's standard products (with the exception of hardware) are acceptable, provided they comply with the following requirements:

- Storefront System Construction: Thermally broken.
- Door Opening Frames: Applied stops only; blade stops are not acceptable.
- Doors: Medium stile (3-1/2 inch nominal) or wide stile (5 inches or more) doors. Medium style is preferred. Do not specify thin or narrow stile doors. Comply with current barrier-free code for bottom rail height.

Glazing - Specify glazing per Design Guideline 08 8000 and as follows:

- Exterior storefront and doors exposed to weather: Insulating glass to match window or curtain wall systems.
- Interior storefront and doors: Single pane glazing, unless insulating glass required for acoustic properties.
- Minimum glass thickness for single panes or individual components of insulating glass used in door and storefront systems should be 1/4 inch.
- Specify factory-glazed doors where feasible.
- Carefully coordinate the selection of glazing to achieve appropriate U-value and Solar Heat Gain Coefficient (SHGC) of the assembly. Specify total assembly U-values, not center-of-glass. Design Guideline 3.2 requires designers to investigate the payback for improved U-values and SHGC.

Finish - Typically match window or curtain wall system finish.

- For most new and replacement work, specify2-coat 70% polyvinylidene fluoride coating. Require 3-coat systems for organic coatings applied to doors.
- For anodized finishes, specify AAMA 611 Class 1 finish, clear or color anodized, as suited to the project.

Hardware - Do not use door manufacturer's "standard" hardware for aluminum entrance doors. Comply with requirements of Guideline 087100 "Door Hardware" and Preferred Manufacturer's List.

Other Considerations

Pay careful attention to specifying and detailing connections to adjacent construction, moisture control and the potential for incorporating enhanced thermal performance. Regardless of Delegated Design requirements (see below) for the storefront, the A/E is responsible for the interface between the storefront and the surrounding building (adjacent jamb, head and sill conditions). Perimeter flashing, sealants and insulation, continuity of the air barrier, anchoring and clearances must be thoroughly detailed at head, sill and jamb conditions.

In buildings with higher than typical humidity, perform a thermal analysis of the storefront assembly to ensure that condensation will be avoided on both the frame and the glazing. For buildings with typical humidity criteria it should be adequate to specify a minimum Condensation Resistance Factor (CRF) that takes into account the anticipated interior conditions. Refer to Master Specification Section 22

0500 for typical mechanical design requirements.

Delegated Design

UM recognizes that it is common practice to specify structural performance criteria for curtain walls and to delegate the actual design needed to meet these criteria to the curtain wall manufacturer. Indicate the design loads and the displacement on the drawings. The A/E should utilize the Delegated Design language contained in AEC Masterspec Section 084113.

Testing

UM requires the storefront manufacturer to submit documentation of preconstruction testing showing that the designated system meets the performance criteria. If standard systems are being used the manufacturer is allowed to submit standard test reports for that system.

In-place field testing is also usually required for storefront installations. In special circumstances where the storefront is very limited in extent (especially if it is limited to entrance doors and framing), the requirement for in-place field testing may be waived by the Design Manager (DM). Obtain DM's approval in writing if field testing is to be waived. In most circumstances U-M will contract with a testing service for witnessing and validating testing, as well as for performing enhanced field inspections. The actual testing will normally be performed by the Contractor. In order to achieve testing of representative workmanship, samples for testing will be selected on a random basis by the A/E and the testing company (not the Contractor). At a minimum, field testing should be done twice; once fairly early in the installation process and again at the completion of the process.

Refer to language in AEC Masterspec Section 084113 ("Manufacturer Testing" in Part 1 and "Field Quality Control" in Part 3) for appropriate language regarding testing.