

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

DIRECTIVE 8-6

Issue date: October 2012

CURTAIN WALLS / STOREFRONT

1. Introduction

- a. The purpose of this Directive is to outline Fund guidelines and requirements for the Consultants relative to the design and specification of curtain walls systems. The term “curtain wall” is applied to a broad array of products that serve as exterior cladding systems for buildings or areas of buildings but most commonly refers to metal frame systems supporting glass, louvers, and opaque panels of various materials.

2. General Requirements

- a. The selected system should be carefully evaluated with regard to the following:
 - 1) The Fund’s policy of constructing buildings and building systems utilizing materials and methods designed to provide durability and longevity.
 - 2) The aesthetics of design: systems should be selected with sensitivity to the surrounding built, paved and landscaped environment in terms of color, materials, textures and overall design appearance. (See Directive 1C-3, Materials and Color Selections, for additional information.)
 - 3) Energy Efficiency: select the system that comports with the Energy Model provided in Directive 1B-7, Executive Order No. 111. If there is no project-specific model required, select the system that meets the building envelope requirements of the Energy Conservation Code of NYS. Select the system that allows it to align with the adjacent wall insulation and positively link with the air barrier system.
 - 4) Weathertight construction: design the flashing between the curtain wall system and other portions of the building envelope to meet performance requirements similar to the curtain wall system.
 - 5) Maintenance characteristics: minimal maintenance requirements should be a primary objective in terms of system selection and

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design. Consider setting the base framing on a curb to protect the system from damage from salts, snow removal equipment, mowers, etc.

- 6) Cost: select the most cost effective system for the openings being spanned. Consider use of storefront systems and less deep curtain wall systems where their performance requirements are appropriate for the openings. For new construction, consider reducing opening spans to allow use of lower cost systems.
- 7) Code: When selecting a Building Risk Category to determine wind loads, consult with the Campus to confirm that the selected category fits the current and intended use of the building.
- 8) Constructability:
 - i. Consider the availability of qualified installers and field labor when selecting a system that involves significant field erection, embedded anchor points with restrictive tolerances, welds in locations that are difficult to access, etc.
 - ii. Consider the potential sequences for erection of factory assembled units, potential staging areas for delivery and erection and the potential impact to Campus operations during staging and erection.
 - iii. Consider the means of anchoring the system to the slab edge or other structure, the potential range for variation in location of anchor points and the means for addressing the variation during construction.
 - iv. For existing buildings, investigate, evaluate and document the existing structure and substrates prior to bidding and show the existing variance range in the applicable details. Show new supplemental structural work where applicable. Consider performing a mockup (pilot installation of the system) prior to bidding to discover and document hidden conditions that may change the design approach. See Directive 8-4, Windows, for documenting existing conditions and considering construction impact for work in existing building. Unless included in the lump sum fee or the Schedule B of the Consultant's

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Agreement, the services and fees related to existing conditions investigation and the pilot project may be an ECA (See Directive 1C-4 Extra Compensation Authorization).

- v. Consider the extent of field testing required to assure quality of system seals, air vents and drainage. Provide intensive field quality assurance inspection and testing of critical seals that will become inaccessible for simple repair in the completed assembly.
 - vi. When selecting sizes of reveals and joints, consider reasonable tolerances to mitigate esthetic issues associated with in-place work.
- b. Most curtain wall manufacturers have developed systems that differ from each other in their methods of construction and accomplishment of design intent. Name three manufacturers and consult with manufacturers prior to bidding. The manufacturers listed in the specifications should be capable of achieving the specified system characteristics, design requirements and performance criteria. (See Directive 1C-2, Specifications of Materials, for additional information – multiple anchor design criteria may be required.) Prior to advertising, it would be best to obtain the named manufacturers review of the drawings and specifications to confirm that the proposed design and details meet the requirements of each manufacturer listed.
3. Design and Performance Criteria
- a. Design Issues
 - 1) Fire Rating – show details at joints to adjacent rated assemblies and partitions for a clear explanation of how the integrity of the rating is maintained.
 - 2) Framing – Curtain wall framing systems shall be isolated from the building structural frame. They should support only the weight of the curtain wall system and the force generated by wind load. The framing system should be insulated and thermally broken for energy efficiency and control of condensation.
 - 3) Framing systems should be drained to relieve condensation and gasketed to prevent leaks.

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- 4) Concealed vs. Exposed Fasteners – It is generally desirable to specify a system that utilizes concealed rather than exposed fasteners. If a system utilizing exposed fasteners is proposed, the Campus should be made aware of maintenance requirements.

Note: Exposed fasteners should not be considered when a kynar or dark anodized finish is specified as a framing system – exposed fasteners are typically countersunk and will expose bare aluminum should this method be employed.

b. Performance Criteria

- 1) General: performance criteria shall be provided to bidders in appropriate specification section.
- 2) Curtain wall systems and anchoring systems shall be capable of withstanding, without failure, the effects of:
 - i. Structural (dead) loads of the system
 - ii. Thermal movement of the system
 - iii. Movement of supporting structure within specified tolerances caused by live loads during construction and occupancy.
 - iv. Movement of structural frame and adjacent construction caused by thermal conditions during construction and occupancy, shrinkage and settlement within specified tolerances and other factors.
 - v. Deflection within specified tolerances
 - vi. Seismic Loads
 - vii. Wind loads
- 3) Coordinate with the structural engineer, code consultant and interior finish designer to provide consistent definition and use of the deflection limitations and the structural loads throughout the construction documents.

4. Contract Documents

- a. Drawings: Bid drawings shall portray the extent of the curtain wall system, its anchorage, flashing and joints to adjacent construction. Drawings shall include elevations, sections and sufficient details. All components of the curtain wall system are to be labeled, and be clearly identifiable. The scale

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of drawings shall be appropriate to the level of detail shown. All elements should be dimensioned. In large scale details, show all variations in flashing and the treatment of joints and transitions between configurations of flashing. All components of anchoring system should be clearly identified and their means of articulating with the building frame and the curtain wall cladding components are to be portrayed in detail.

b. Specifications: Clearly list the project specific structural loads and deflection limitations applicable to the curtain wall system.

5. Curtain Wall Project Checklist: Shown below is a list of issues to consider when reviewing a curtain wall design submission:

- Asbestos (retrofit projects)
- Code Review
- Testing
- Energy code - R-Value consistent with Project Energy Model
- Glazing Requirements – coatings, tints, etc.
- Code Requirements
 - Local conditions
 - Wind loads
 - Seismic considerations
 - Life safety issues
 - Fire rating
- Appearance Options
 - sight lines
 - Beveled, sloped or radiused exteriors
 - Color, finish
 - Depth of assembly/ framing profile
 - Framing materials (primary structural frame) – colors, coatings
- Structural Issues
- Design criteria for anchors
 - Spacing
 - Design loads
 - Material quality
 - Key anchorage – grid/ panel to structure

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