

Basis of Design

This section applies to the design and installation of metal wall systems and their coordination with other wall systems.

Background

Exterior metal walls come in three basic design systems: Curtainwall, Barrier Wall, and Rainscreen Wall.

- Metal curtainwalls have no secondary barrier against water and air infiltration. Manufacture and installation must be close to perfect. Life expectancy is 30 years before refinishing may be required, and 50 years before major upgrade or replacement.
- Barrier Walls may not provide complete protection of the building interior, so a second layer of building protection is generally required behind the initial metal barrier. Barrier Wall systems in metal (without back-up protection) shall only be used in the construction of roof top mechanical penthouses, and in buildings with a life cycle of 30-years or less.
- Rainscreen walls admit the potential for water entry past the initial barrier, and therefore have a second layer of protection built in. A Pressure-equalizing rainscreen further employs open joints to allow the cavity to breath and weep. This is the preferred system for cladding permanent buildings with metal. Life expectancy is 30 years before refinishing is required, and 50 years before major upgrade or replacement.

Programming

- Consider material movement and deferential movements due to forces of temperature, wind, water and earthquake.
- Sub-frames shall be a part of the metal wall system.

Design Criteria

- Bidder design metal wall systems are acceptable. Bidder designed systems shall conform to this section.
- Metal walls acting as a curtainwall shall meet curtainwall requirements.
- Barrier walls that enclose occupied space shall have a second wall behind them. This second wall may be of any construction permitted by code, and shall have a covering on the exterior face that will repel water. Joints in the barrier wall shall be designed to weep water from the back wall surface to the exterior.
- Barrier walls that enclose mechanical penthouses and walls acting as visual screens do not need a second wall behind them; however, great care is needed in the design and construction of the assembly of these walls.
- Rainscreen Walls always have a second wall behind the primary metal cladding. This second wall must be capable of enclosing the building on its own. Construction of this second wall may be of concrete, concrete masonry, or metal frame and sheathing construction (see masonry walls for exceptions).
- Testing for metal wall systems: Panel flatness, no noticeable oilcanning
- Custom metal wall systems and any metal wall systems using copper and zinc shall be designed in concert with industry recognized experts.

- Consider use of metal wall systems with high recycle content where possible.

Design Evaluation

The following information is required to evaluate the design:

- Programming Phase: Statement of intent to use metal wall systems, including type of system, materials, and performance standards.
- Schematic Design: Plans and elevations showing extent of metal wall system. Outline specifications describing basic concept of the metal wall system, including materials and integration with other cladding systems.
- Design Development: Building elevations showing extent of metal wall system, integral windows. Typical details of installation into the building including top, bottom and sides, connections to other cladding systems and special conditions. Draft specification.
 - 1) Bidders wishing to design their own systems must be brought into the process at the beginning of this phase.
- Contract Documents: All information required for installation of the metal wall systems. All details of connection and integration with all other building systems including windows, waterproofing, structure and anchoring. Final specification.

Construction Submittals

The following minimum submittals are required from the Contractor:

- The submittals shall indicate, in addition to industry standard submittals, coordination with adjacent building systems.
- Perimeter flashing conditions

Quality Assurance

The following general quality assurance measures apply:

- See requirements for custom metal wall systems above.
- Mock-up is required for large projects; may not be part of the work; may be used to train installers. Work must be approved prior to working on the building. Use same sequencing and testing as proposed for the building.
- Field-testing of single barrier wall systems as required for curtainwalls

Related Sections

- Facilities Services Design Guide - Curtainwalls and Windows
- Facilities Services Design Guide - Exterior Doors
- Facilities Services Design Guide - Masonry Walls
- Facilities Services Design Guide - Thermal and Moisture Protection

- Facilities Services Design Guide - Access Control - CAAMS

Products, Materials, Equipment

Materials

- Metal panels may be of galvanized steel, galvalume, aluminum, copper, zinc or stainless steel. Use high recycled content material where possible. Gauge depends on performance, i.e., wind loading, appearance, and span.
- Anchoring elements: Stainless Steel for all clips, screws, and bolts. Galvanized metal is unacceptable.
- Second wall may be of concrete or concrete masonry with dampproofing on exterior surface, minimum. May be of light gauge metal (galvanized) framing with "Densglas" sheathing or exterior grade plywood, and breathable watertight barrier over all sheathing surfaces, i.e., "Blueskin" by Henry.

Finishes

- High performance fluoropolymer coating: Comply with AAMA 2605-98.
- Anodized aluminum: Comply with Class I anodizing conforming to AAMA 611-98.
- Exposed metal, i.e., stainless steel, copper, and zinc

Installation, Fabrication and Construction

- Pre-construction conference
 - 1) Set quality of work
 - 2) Establish sequence of work
 - 3) Review requirements
 - 4) Discuss construction means and methods
 - 5) Who will set supporting steel and flashing?
 - 6) Intent to enforce the contract
 - 7) Incentives

END OF DESIGN GUIDE SECTION