October 2, 2018

NOTICE AMENDMENT # 2
Amendment to Specifications of the ITB 01-2018 Modular Buildings

ATTACHMENT 2 SPECIFICATIONS of the ITB document has been revised (changes in red, removed text noted by strikethrough):

ATTACHMENT 2 SPECIFICATIONS

GENERAL:

The buildings shall be Modular buildings constructed in a plant or factory that is normally engaged in the manufacture of modular structures. The plant shall have a full-time quality control program during the construction operation.

All work shall comply with the Idaho Division of Building Safety's standards for Modular Buildings; including obtaining permit, obtaining approvals of plans, inspections, and insignia as required for Modular Buildings.
https://dbs.idaho.gov/programs/modular/index.html

The Contractor will provide the completed buildings placed on CWI property on Contractor designed and permitted foundations. The Contractor will provide the water, sewer and electrical hookup. CWI shall provide water, sewer and electrical stubs at the locations, as identified by the Contractor. Data, and telephone hookups will be provided by CWI. A separate CWI employed contractor will provide accessible concrete ramps, or stairs to all entrances that meet code requirements required by the Idaho Division of Building Safety.

Bid price shall include the completed units including all items identified in this specification including additional appurtenances to provide a complete and "ready to move in to" units. Bid price shall also include transportation, placing on foundations, installing per manufacturer's requirements, leveling the buildings, utility hookups, all drywall finish work, completing any unfinished work such as flooring (carpet, vinyl), and cleaning the buildings prior to final walk through.

The Modular buildings must meet or exceed all applicable State of Idaho Building Codes. The contractor will submit plans to the Idaho Department of Building Safety for approval and pay the applicable fees. A public works license is required to install the modular buildings."

TECHNICAL:

Modular Building # 1 – 3,600 s.f. – Refer to Conceptual Floor Plan#1 (FPM)

The Building shall be one of the manufacturer's standard designs with minimum modifications as follows:

- (2) Accessible restrooms (to comply with current plumbing code)
- (1) Utility room / Janitorial closet with floor sink and eye wash
- (1) Break room
- (1) 18ft x 12ft conference room
- (7) Hard wall offices
- Open office space shown with cubicles (cubicles to be purchased by CWI)

Modular Building # 2 – 3,600 s.f. – Refer to Conceptual Floor Plan #2 (FAC)

The Building shall be one of the manufacturer's standard designs with minimum modifications as follows:

- (2) Accessible restrooms (to comply with current plumbing code)
- (1) Utility room / Janitorial closet with floor sink and eye wash
- (1) Break room
- (1) 14ft 5in x 11ft conference room
- (9) Hard wall offices
- Open office space shown with cubicles (cubicles to be purchased by CWI)
- 3ft x 6ft 6in Data Closet

Modular Building # 3 – 3,600 s.f. – Refer to Conceptual Floor Plan #3 (ESS)

The Building shall be one of the manufacturer's standard designs with minimum modifications as follows:

- (2) Accessible restrooms (to comply with current plumbing code)
- (1) Utility room / Janitorial closet with floor sink and eye wash
- (1) Break room
- (1) 20ft x 13ft conference room
- (10) Offices and (3) break out room
- Central Open office space

The floor plans shall substantially conform to the attached conceptual plans, attached as a pdf document entitled "Conceptual Floor Plans #1,2 & 3." Some alterations may be allowed to fit a specific manufacturer's standards. Sample Elevations are attached to convey desired exterior look.

Design parameters are as follows:

- Live load (snow) – applicable to unit locations
- Wind – applicable to unit locations
- Seismic – applicable to unit locations

Alternate floor plans or elevations which substantially conform to, or are "equivalent to," the attached conceptual plan may be approved, at the CWI's discretion. Any exceptions to or deviations from the

requirements listed below must be documented by the vendor, and must include a detailed explanation as to how the deviation meets the requirements of the specification. Manufacturer's data on specific models proposed shall accompany bid.

FLOOR SYSTEM:

~~Manufacturer's standard design for unit proposed. Floor joists and decking designed to live load of 40 lbs. per sq. ft. Decking joints to be sanded in all areas so as to not have any ridges. The bottom of the floor system is to receive a heavy-duty one-piece bottom board to create a sealed floor system. The longitudinal floor system to enclose the drain, water lines, and heating and cooling duct. All floor insulation to be rated R-30. The floor system is to be designed to hang off the concrete footing wall allowing the finish floor level of the modular to be near grade level.~~

Standard joist framing to work with concrete footings/foundation plan. Manufacturer's standard design for unit proposed. Floor joists and decking designed to live load of 40 lbs. per sq. ft. Decking joints to be sanded in all areas so as to not have any ridges. 7/8" floor sheathing to be installed of floor joists.

EXTERIOR WALLS:

Exterior walls to be constructed of 2"x 6" No. 2 or better with 2"x 6" top and bottom plates. Walls to be screwed, nailed, or stapled and secured by using steel wall straps. Provide a minimum of a double header above wall openings. Walls to be insulated with R-21. Walls to have OSB exterior sheathing with a building wrap under "Hardi Panel" and "Hardi Plank" siding, or approved equal. Paint the exterior siding (Flat, Matte, or Satin Finish). Exterior walls Vendor must provide samples of paint upon award. Color to be selected by CWI. Updated Elevations can be found in Notice Amendment 2. These are updated to reflect appropriate materials and height requirements. Also included is extruded aluminum trim profiles and ideal details.

ROOF SYSTEM:

Engineered trusses designed for roof live loads applicable to the unit location. Roof to be 20 year TPO membrane mechanically fastened with a 1/4" per foot slope. Provide an underlayment over wood sheathing under per Manufacturer roof installation requirements, roof system and details to be preapproved by CWI. All openings through roof to be sealed, flashed, and water/weather tight. Vapor barrier to be used. ~~Primary roof drains to be gutter and down spouted with overflow duct bills scuppered above.~~ Primary roof drains to be concealed within walls with overflow scuppers above.

See Modular Building Elevations in **Attachment 2 Specifications**.

INTERIOR WALLS:

All interior walls will be 2"x 4" construction and will extend from floor to roof deck. All walls to have full 5/8" sheetrock throughout filled with sound batt insulation throughout. Sheetrock to be taped, textured, primed and then painted with a minimum of two (2) coats of paint. Interior shall have multiple colors selected by CWI. All corners throughout the building to have squared corners. Exposed corners to have 2"x2"x6' stainless steel corner guards. At restrooms additional insulation will be placed overhead to minimize noise transmission. A 8'-6" ceiling height is acceptable. Clear span beams are required.

WINDOWS AND DOORS:

Windows to be a Low E vinyl sliders (horizontal or vertical), dual glazed, and energy efficient. Window numbers, size, and location similar to enclosed plan view. The number of windows and their locations to meet or exceed what is shown on the attached Floor Plan. Provide 2" blinds on each of the windows.

Exterior doors to be 1-3/4" hollow metal doors and frames thermally broken. Each exterior doors to have half glass. Interior door frames to be "knock down" or "timely" frames. Interior doors 1-3/4" solid core, stain grade 36"X6'-8" wide doors with a half lite with Marks levers grade 1 626 with (3) 4.5" hinges /bb 626. Exterior door access control to be provide via card reader and door controller. Exterior double doors to be out-swinging with a keyed removable mullion, lcn closer, Von Dupren 99QEL Panic Hardware prepared for card access with Marks levers grade 1 626.

INTERIOR FINISHES:

Interior and Exterior paint to be Sherwin Williams or equal with a satin finish. Colors to be selected by CWI after award. Interior wall texture to be a light orange peel finish. Suspended acoustical ceiling system to be 2' X 4' grid similar or equal to Armstrong Calla.
https://www.armstrongceilings.com/commercial/en-us/commercial-ceilings-walls/calla-ceiling-tiles.html
Carpet to be Mohawk/Bigelow Carpet Tile Mixology Collection – Bold Strokes 968 – Smoky Martini. LVT in break rooms, restrooms, custodial and communication rooms to be Mohawk Mass Appeal Collection – Metal 859 One the line. Counter tops to be plastic laminate, style and color to be selected by CWI. Cabinets to contain adjustable shelving: Plastic laminate uppers and lowers with edge banding and matching back splash. Breakroom to have an "under the counter" dishwasher. Kitchen sink is to be a single basin stainless steel model. Sink to have a single lever faucet with spray attachment and garbage disposal. Plumbing under sink to have shut-off valves.

Light & Plumbing Fixtures:

Interior lighting to be similar or equal to Lithonia _RTLED with exterior Lithonia Security Flood Light (2) per side. Lavatories and Toilets to be American Standard or equal. Toilets to be pressure assisted. Plumbing fixtures at lavatories to be proximity activated. ~~Toilet partitions where required to be floor-mounted, ceiling supported and similar or equal to Bobrick CL phenolic.~~

THERMAL AND HEAT SYSTEM:

Insulation shall be:

- Ceiling - R-40
- Walls – R-21
- Floor – R-30

Heating / A/C to be RTU's

Appliances: provide the following (or approved equivalent)

Dishwasher: to be provided by CWI.

Electric Water Heater: 20 gallon minimum.

PLUMBING AND ELECTRICAL:

Provide high-grade water pipe in flooring system. Pipeline system to be rated at a 100-psi minimum. Contractor to provide recommendations on size and minimum pressure of water supply line going to buildings. Pex piping is an acceptable supply line. Piping can be run in the crawl space and walls as required. Provide Eye wash stations in the custodial closet just above the floor sinks. Use model Haws – 7260B-7270B. Each modular building will be equipped with a water cooler located in the Breakroom in lieu of a drinking fountain. Provide supply water line for water cooler. A typical data and power layout for buildings can be found in Notice Amendment 2. Provide floor boxes at conference rooms and where required to feed cubicles. For data ports provide boxes and conduit rough-in for future work. Provide rough-in boxes for future card readers at each exterior entrance. Provide push button door operators at main entry, both inside and out for each modular building. Recommendation is a two panels per building, 200amp & 250amp, rather than per building section as wall space is limited for an interior mounted electrical panel, three may be permitted. Final electrical connections from the MDP to the interior panels will be the contractor's responsibility in this contract. A pathway will be provided, but terminations and conductors will be required.

For the Modular buildings recommendations shall be based on adequate water flow for simultaneous water for all fixtures in building. Provide shut-off valves at all fixtures. Provide main shut-off valve (ball valve) where it enters the building. Water line to be tested prior to acceptance.

Building to be plumbed and wired for RTU's, hot water heater, freezer/ refrigerator (Ice & Water), dishwasher, and microwave.

Provide and install two (2) frost proof exterior faucets for each building (one in front and one in rear).

The water heater to be electric provide manufacturer's specifications including warranty.

The primary heat/cooling source to be roof mounted RTU's with BACnet card on isolation springs. To be similar or equal to York, Trane or Daikian. Provide screen around RTU's with a perforated corrugated 24 gauge aluminum material mounted to the roof, with required tpo boots and flashing. Provide a split system (Mitsubishi, Daikian or Fijitsu) for the Communications room located in the Faculty Modular building.

All piping to be tested prior to acceptance.

Provide two (2) exterior weatherproof G.F.I. receptacles (one at entry door and one at rear door).

Provide exhaust fans in both bathrooms, CFM rating should be sufficient for size of bathroom (i.e. 1 CFM per square foot of room).

Provide electrical service as required by code for new modular buildings. 208 3phase power will be provided. An exterior MDP will also be provide.

Provide smoke and carbon monoxide detectors at appropriate locations.

Use electrical wire protectors throughout the building. Electrical system to be tested and approved prior to acceptance.

All drain lines to be ABS pipe with appropriate clean-outs located for easy access. Drain lines to be tested for leakage prior to acceptance.

FOUNDATION PLANS:

The Contractor will provide and install CWI with foundation plans, designed by an Idaho licensed engineer and approved by the Manufacturer, within two weeks after award of contract. Foundation plan submittal shall be reviewed by CWI to verify details including dimensions, steel reinforcement, vents, utility locations, and all details necessary to depict a permanent concrete foundation for these new buildings. The contractor will permit and install foundations as approved by the Division of Building Safety and CWI.

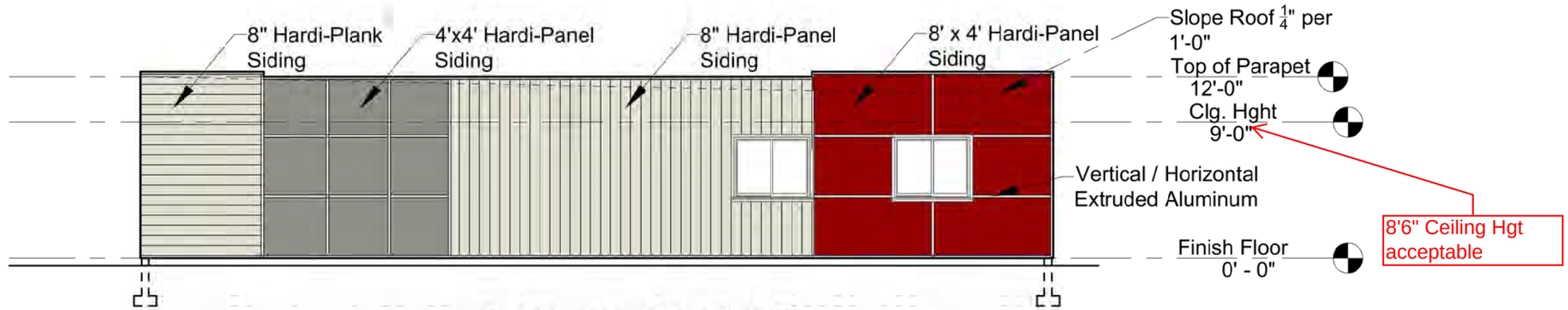
CWI SELECTED ITEMS:

All samples provided by the Contractor that will be selected by CWI are not optional upgrades. The items selected by CWI will have no effect on the awarded amount. Contractors must consider this when offering samples to CWI.

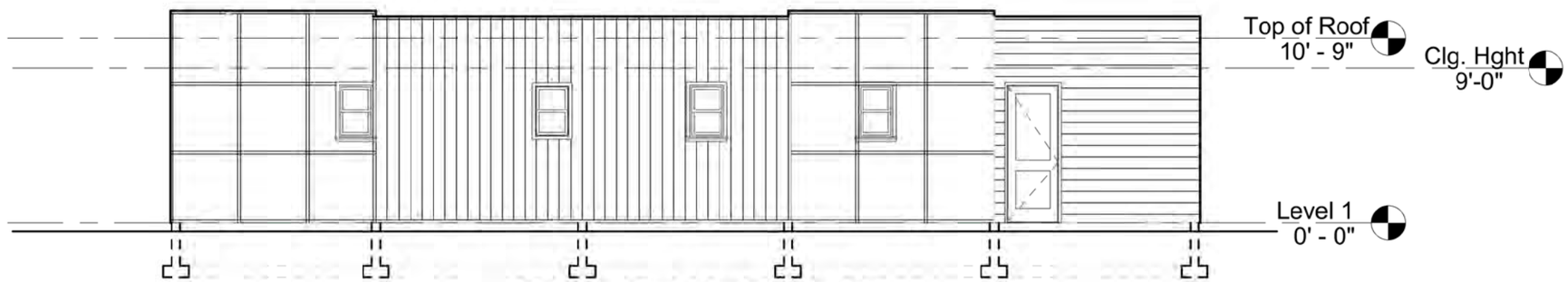
~~**BIDDER MUST SUBMIT SHOP DRAWINGS FOR THE MAKE AND MODEL OF MODULAR HOMES PROPOSED IN THIS ITB. SHOP DRAWING TO INCLUDE BUT NOT LIMITED TO: FLOOR PLAN, ELEVATIONS, AND UTILITY LOCATIONS.**~~

SHOP Drawings will be provided after award, plans will be presented and reviewed with the CWI in a timely fashion.

DOCUMENTS PROVIDING INFORMATION PROVING THE OFFERED MODULAR BUILDING IS AN EQUAL (IF VENDOR IS PROPOSING AN EQUAL).

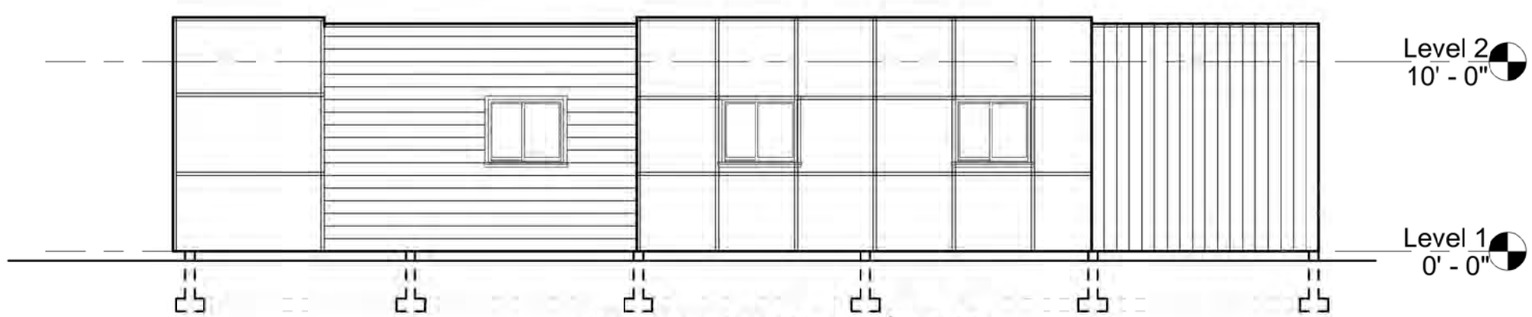


North Elevation - Scale = 1/8" =1'-0"



East Elevation - Scale = 1/8" =1'-0"

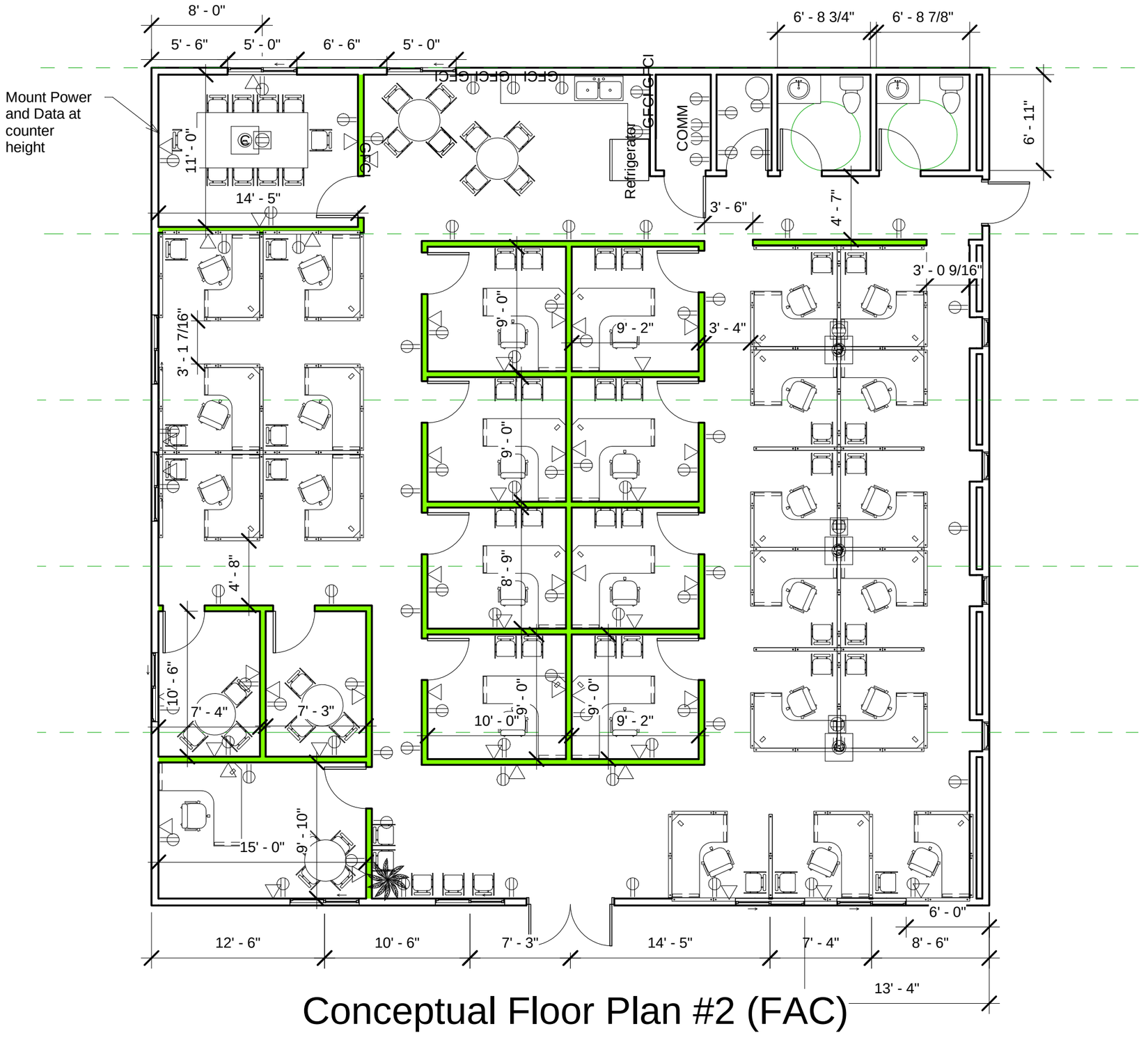
South Elevation - Scale = 1/8" =1'-0"



West Elevation - Scale = 1/8" =1'-0"

Updated Elevations

Typical data and power layout



Conceptual Floor Plan #2 (FAC)

Extruded Aluminum Trim Profiles and Ideal Details

SUSTAINABLE EXTRUDED ALUMINUM TRIM PROFILES

DELIVER AESTHETICS AND DURABILITY

Presented by: TAMLYN

LEARNING OBJECTIVES

At the end of this program, participants will be able to:

1. Identify the sustainability features of extruded aluminum architectural trim.
2. Summarize the aesthetic and environmental benefits of specifying extruded aluminum architectural trim.
3. Explore the profile and finish trim options that are available for use with fiber cement siding.
4. Discuss moisture management and the use of aluminum flashing when designing durable sustainable moisture-free structures.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARjuly2015.5

Use the learning objectives to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR715Course5 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

By Karin Tetlow

"God is in the details," one of several iconic phrases attributed to Mies van der Rohe, continues to haunt architects. Whether the meaning is a disguised plea for creating ornamentation for buildings or adding a few more inches to a roof overhang, details are where architects can and do make a difference. With today's focus on green materials, detailing needs to meet both an architectural design aesthetic and sustainability requirements. Specifying trim for use with fiber cement siding is one instance where a knowledge of detailing can contribute to both.

DESIGN AESTHETIC

Manufactured to work as an integrated/complementary system with the major U.S. manufacturers of fiber cement siding, extruded aluminum profiles are available in a variety of choices. Their design, mostly driven by architects seeking cleaner details, adds a distinctive profile to interiors and exteriors of buildings. In addition, it breaks up the monotony of flat panel walls where the same siding products are used repeatedly. Installing aluminum trim rather than using wood trim or cutting and ripping fiber cement boards or panels is more convenient and saves time. "Using trim over panel joints becomes an architectural element and is a way of expressing the joints and defining their deliberate placement. It adds a level of architectural refinement," says Russell A. Hruska, AIA, principal and co-founder of Intexure Architects in Houston, Texas. In our climate, stucco often requires additional oversight to be correctly executed. Aluminum trim when used with fiber cement panels or lapped siding is more cost effective than stucco and provides long term durability while achieving our design aesthetic."

Constructed from 75 percent to 100 percent post industrial and post consumer scrap, extruded aluminum trim meets requirements for sustainability and can contribute to LEED® points. It may also be specified for interior or exterior use. Applications include an increasingly wide range of building types wherever fiber cement panels or lap siding is specified. In recent years extruded aluminum trim has begun to replace traditional wood 1x2 and 1x4 trim on single-family homes and is increasingly preferred for multi-family structures.

Extruded aluminum trim products are intended for design aesthetics. They do not necessarily include an exterior insulation and finishing system (EIFS), a type of building exterior wall cladding system that provides exterior walls with an insulated finished surface. Manufacturers usually state if their product does or does not include an insulation system. Since some extruded aluminum trim products on the market incorporate an EIFS, design professionals should note the exact description of each manufacturer's product and its performance expectations. As a general rule extruded

aluminum trim products that are not part of an EIFS system are not designed or intended to be used in conjunction with an EIFS or similar system.

Nor do architectural trim profiles form a complete moisture management system. Always a critical feature of construction, a moisture management system is the province of the architect and builder who are responsible for designing and installing a code compliant building envelope. Again, manufacturers usually point out that extruded aluminum trim alone does not include a complete moisture management system, despite the fact that trim is designed with drain dams for vertical runs and shingle fashion for horizontal profiles. Some manufacturers do, however, supply moisture management products that complement their trim line and additionally help meet code requirements.

Design professionals are also advised to consult with the siding manufacturer for "best practice" applications of extruded aluminum trim product in order to ensure color, dimensional and thickness match.

Extruded aluminum adds durability and longevity to construction that other trim materials such as galvanized steel and polyvinyl chloride (PVC) lack.

PREFABRICATED TRIM MATERIALS

Extruded aluminum adds durability and longevity to construction that other trim materials such as galvanized steel and polyvinyl chloride (PVC) lack (see sidebar Benefits of Extruded Aluminum).

Galvanized steel

While initially less expensive than extruded aluminum, galvanized steel is less durable. The use of bare mill galvanized steel and aluminum flashing in direct contact with most claddings will increase chances of a chemical reaction, causing wear and break down on both products.

Polyvinyl chloride (PVC)

The third most widely produced and least expensive plastic also has limitations compared with extruded aluminum. One manufacturer of extruded aluminum trim profiles developed and manufactured PVC trim profiles to use with fiber cement siding and soffits, and still does. But through learned experiences and public demand, it began converting its profiles into more durable extruded aluminum. One hundred percent vinyl trim is susceptible to swelling and buckling when exposed to direct sunlight. Moreover, PVC trim painted dark colors, which is increasingly the choice of architects and developers, may cause the product to warp. This comes about because excess solar heat may be absorbed, particularly in hot climates, subjecting the PVC to distortion due to extremes of thermal expansion and contraction. Paint adhesion loss, blistering and peeling may also result.

Characteristics of extruded aluminum trim

Characteristics of extruded aluminum trim include:

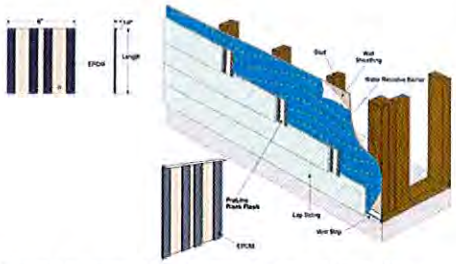
- Adds a design aesthetic to a wide range of building types.
- Offers multiple profile choices.
- Typically fabricated from custom die-extruded heavy duty 6063 T-5 aluminum alloy with a coating that protects against harsh weather conditions and allows for paint adhesion.
- Typically designed to match color, metal thickness and dimensions of the country's major cementitious siding manufacturer.
- Available in anodized, standard color palette, or ready to paint finishes.
- Sustainable material, such as 75 percent to 100 percent post industrial and post consumer scrap, can contribute to LEED® points.
- Replaces time-consuming cutting and ripping of fiber cement panels or boards for trim use.
- Can be used for interior and exterior weather conditions.
- Highly durable and will long outlast caulk.
- Poses no health or physical hazard. (Aluminum trim products are defined as "articles," by the Occupational Safety and Health Administration's (OSHA) and are therefore exempt from the requirement of publishing material safety data sheets.)

CHARACTERISTICS OF EXTRUDED ALUMINUM

The most abundant mineral in the earth's crust, aluminum is derived from bauxite, which is mined from the earth. After processing, the resultant alumina undergoes a smelting and alloying process that produces solid logs of cast metal from which extruded aluminum shapes or profiles are made. Most extruded shapes for architectural use are fabricated from AA 6063, an aluminum alloy with magnesium and silicon as the alloying elements. Type 6063-T5 Aluminum, commonly referred to as the architectural alloy, has a very smooth surface and is the best alloy suited for anodizing applications. The T5 designation indicates it has been artificially aged and moderately heat-treated. Aluminum extrusion is a highly versatile metal-forming process that has a wide array of physical characteristics.

These include:

- Can be recycled and retains a high scrap value. It can be recycled indefinitely without losing any of its superior characteristics, making it especially appealing according to both environmental and economic criteria.
- Lightweight. Weighs about one-third of most other metals which makes it easier to handle and less expensive to ship.
- Strong. Profiles can be made as strong as needed for most applications. Having the strength of a rigid metal prevents swelling and buckling.
- Weather resistant. Cold-weather applications are particularly well served by aluminum because, as temperatures fall, aluminum actually becomes stronger.
- Fire resistant.
- Does not rust because aluminum is protected by its own naturally occurring oxide film.
- Resilient. Can spring back from the shock of impact.
- Not combustible. Even at extremely high temperatures, it does not produce toxic fumes.
- Different finishes available. Can be finished with liquid paint (including acrylics, alkyds, polyesters and others), powder coatings and anodizing.
- Seamless profiles. Complex shapes can be realized in one-piece extruded aluminum sections without having to employ mechanical joining methods. The resultant profile typically is stronger than a comparable assemblage and less likely to leak or loosen over time.
- Can be joined in many ways. Extruded aluminum sections can be joined by all major methods in use today.
- Economical. Relatively inexpensive and may not require long lead times. Even short-run prototypes can often be produced at moderate cost.
- Dimensional tolerance. Can be easily manufactured to accepted standard dimensional tolerances.



Example of aluminum plank flashing with strips of EPDM rubber, which diverts water downward. Drawings provided by Tamlyn.

One example of an aluminum profile newly on the market is plank flashing with strips of non-polluting EPDM (ethylene propylene diene monomer (M-class) rubber.) It reduces moisture penetration behind the joint where two planks butt together and drains water over the top edge of the last full course of siding. The puncture resistant flashing is primed or painted on both sides in order to eliminate any reaction with the fiber cement of the siding. The coating or paint also prevents reflective mirror-like flashback as is found when traditional unfinished metal flashing is used. The stiff aluminum material helps hold a tighter seal against the siding so as not to allow water pressure to enter and wick off to the sides and find its way behind the siding. No nailing is required as the flashing slips beneath the lap siding, so no additional holes are introduced in the wall. Aluminum flashing is preferred to using cut pieces of traditional housewrap to prevent water penetration at lap siding butt joints. The reason is that housewrap is intended to perform as an air barrier, not as flashing. Housewrap also has limited ultra violet exposure life when uncovered during construction or when visible at butt joints. Roofing felt is another material that is less durable than aluminum flashing because it tends to weep (allows water to penetrate) and break down over time.

Manufacturers advise always applying a layer of self-stick material such as asphalt or butyl tape before installing aluminum flashing on treated lumber. This prevents a chemical reaction between the flashing and copper azole in treated lumber. (Copper azole is a wood preservative replacement for chromated copper arsenate (CCA) which has been phased out for most residential applications.)

Housewrap and rainscreens

Exterior walls performance requirements are included in 2009 ICC 1403.2 "Weather protection: Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing, as described in Section 1405.4. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. Protection against condensation in the exterior wall assembly shall be provided in accordance with Section 1405.3. (1405.3 Vapor retarders. Class I or II vapor retarders shall be provided on the interior side of frame walls in Zones 5, 6, 7, 8 and Marine 4.)"

Housewrap

The primary insurance of moisture mitigation for the building envelope is housewrap that is specifically designed to allow water or moisture to drain. There are several advantages to using an integrated wrap/drainage product. These include requiring no additional installation step and no design change to the wall/siding assembly. One type of housewrap on the market eliminates excess moisture from an exterior wall by providing drainage space between the housewrap and exterior sheathing. This is achieved by bonding very small spacers to the wrap.

Example of a moisture management housewrap with 1.5 mm spacers that provide a drainage space between the sheathing and cladding material. Image provided by Tamlyn.

Rainscreen

Another option for meeting code requirements is a rainscreen system. A rainscreen is a moisture management technique for controlling rain entry in an exterior wall. It generally comprises an air space immediately behind exterior cladding plus a water resistive barrier that wraps the building wall assembly. The air space that is created by the rainscreen between the back of the cladding and the face of the water resistive barrier is designed to reduce the forces that draw water into the assembly. Water that does reach the back of the cladding drains from the wall assembly via the space created by the rainscreen. In addition to the drainage capabilities, a rainscreen system also helps accelerate the drying of water vapor that accumulates in the interior wall assembly by moving air throughout the air space. There are several rainscreen options available:

- Installing "weeps" in masonry construction. "Weeps" or "weeper holes" are small openings left in the outer wall as an outlet for water inside a building to move outside the wall and evaporate.
- Constructing a rainscreen wall using furring strips that space the cladding away from the wall. This provides a vent space that helps to dry the back of the siding. Traditionally, layered tarpaper and flashing behind the furring strips created what is called a drainage plane. Now housewrap is more commonly used than tarpaper.
- Rainscreen products. These can be batten strips in the form of plastic slats typically 1–1/2-inch x 1/2-inch placed on top of the housewrap.

TRIM FINISHES

Extruded aluminum trim is typically available in standard color finishes or primed ready-to-paint, and also in anodized finishes.

Pre-colored

Manufacturers recommend one of the standard palette colors because each is made to the exact standards of the largest U.S. cementitious siding manufacturer. The fully engineered paint-coating system is computer matched, fade resistant, uses non-VOC (volatile organic compound), and is expected to last eight years.

Custom color

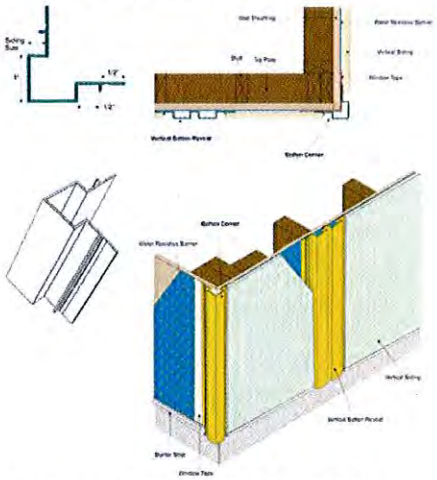
Design professionals requiring custom colors can specify a primed ready-to-paint finish. Manufacturers typically provide a painting guide and recommend following a paint manufacturer's instructions for an eco-friendly, sustainable, recyclable, fire resistant direct to metal (DTM) paint material. Aluminum does not rust. It can, however, corrode if its protective coating is uncovered. Manufacturers recommend recoating trim after making end cuts or if there are surface scratches.

Custom pattern

Design professionals can also order trim in a custom pattern. In one example in an airport interior, the wallpaper pattern was repeated on the aluminum trim covering panel joints in order to provide a continuous unbroken appearance.

Batten corner

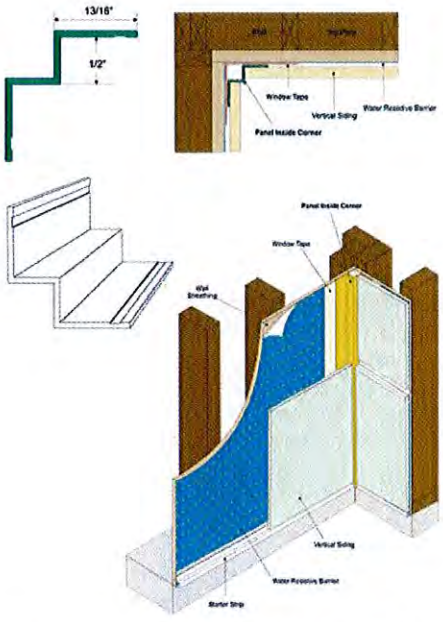
A batten corner trim profile can add a distinctive corner form for structures with vertical siding panels.



Batten corner profile is typically available in lengths of 10 ft. Drawings provided by Tamlyn

Panel inside corner

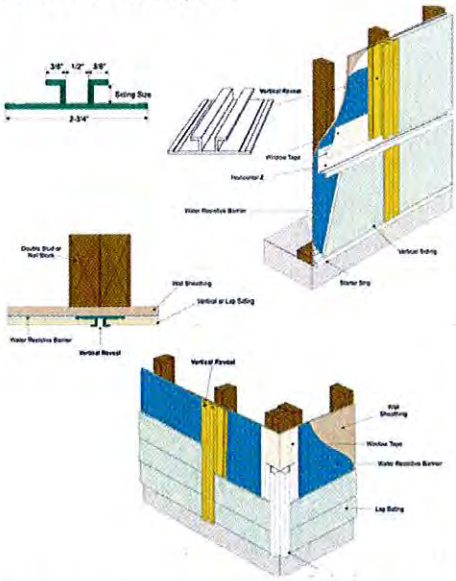
One manufacturer has patented a design that duplicates the look of a wood corner piece. It can be used with panel siding.



Inside corner extruded aluminum batten eliminates the need for a wood corner piece. Drawings provided by Tamlyn.

Panel vertical reveal

Designed for wood and steel stud construction, the aluminum trim provides a reveal for both plank lap and panel siding. The reveal also serves as rustproof flashing between planks and panels. Plank and panel reveals should not be used for horizontal joints.



Typical dimensions for plank vertical reveal. Dimensions for panel vertical reveal are slightly smaller. Drawings provided by Tamlyn

KEEPING MOISTURE OUT

Walls with cladding leak just like masonry walls and must drain and dry moisture since water is the most significant factor in the premature deterioration of buildings. Leakage paths exist at any opening in the wall surface, whether intended or unintended. Joints between materials and around windows and doors, vents, cracks and porous surfaces are all potential entry points for water. As mentioned above, trim manufacturers either recommend or offer moisture management products that help meet code requirements.

Code requirements

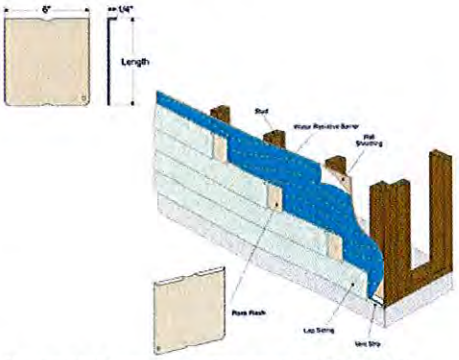
According to the International Code Council (ICC) 2012 Section 1405.4 Flashing, "1405.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim."

The International Residential Code (IRC) 2012 states: Wall Covering—Section R703 Exterior Covering: R703.1 General. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.8. The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer as required by Section R703.2 and a means of draining to the exterior water that enters the assembly. R703.8 Flashing. Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA (American Architectural Manufacturers Association) 711. The flashing shall extend to the surface of the exterior wall finish.

Flashing

Aluminum has long been the flashing of choice because it is widely available, inexpensive, lightweight and fairly easy to handle. A coil of aluminum trim coated on both sides with a paint system that is specifically formulated for residential applications will serve most residential and light commercial applications.

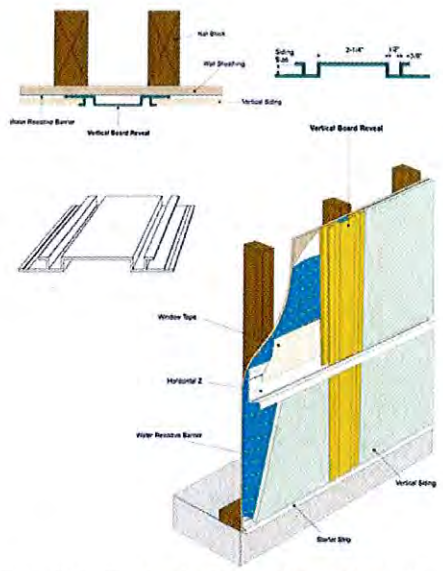
Pre-cut and pre-formed profiles designed for siding, counter, brick ledge, window and other areas, have the advantage of being available in custom sizes and colors that match trim and siding.



Aluminum plank flashing is pre-cut and easily installed. Drawings provided by Tamlyn.

Vertical board reveal

This profile provides a broad vertical accent between siding panels while not protruding beyond the plane of the façade. In addition, it serves as a rustproof flashing between the siding and the building sheathing. Typical standard length is 10 ft.



This profile provides a broad vertical accent between siding panels while not protruding beyond the plane of the façade. Drawings provided by Tamlyn.

This article continues on http://go.hw.net/AR715Course5. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Applications of extruded aluminum trim may be specified
   a. with fiber cement cladding
   b. in a variety of profiles
   c. to give buildings a distinctive design aesthetic
   d. all of the above

2. Installing aluminum trim compared with installing wood trim is
   a. more convenient but time consuming
   b. less convenient but saves time
   c. more convenient and saves time
   d. less costly but time consuming

3. Aluminum trim products always include an EIFS.
   a. True
   b. False

4. Extruded aluminum trim is typically fabricated from:
   a. custom die-extruded 6063 T-5 aluminum alloy
   b. 10%–20% post industrial and post consumer scrap
   c. recycled galvanized steel and aluminum alloy
   d an alloy containing copper and magnesium

5. Architectural aluminum
   a. has a very smooth surface suited for anodizing applications
   b. can be recycled
   c. is strong, lightweight and does not rust
   d. all of the above

6. Code requirements regarding the use of flashing are found in
   a. IRC Section R703.8 and ICC Section 1405.4
   b. ICC Section 703 and IRC 1405.4
   c. ICC Section 1403.2 and 1705.4
   d. IRC Sections 813 and 214

7. Aluminum flashing reduces moisture penetration by
   a. being nailed to the siding
   b. helping to hold a tighter seal against the siding
   c. reacting with the fiber cement of the siding
   d. never being used where two planks butt together

8. Using housewrap that provides drainage space between the housewrap and exterior sheathing
   a. allows water or moisture to drain
   b. needs additional installation steps
   c. requires redesigning the wall/siding assembly
   d. retains water behind the exterior sheathing

9. Typically available aluminum trim finish options include
   a. primed ready-to-paint only
   b. fade resistant standard colors only
   c. primed ready-to-paint, standard colors and anodized finish
   d) clear and bronze anodized finishes that never vary

10. Extruded aluminum trim can help contribute to LEED® credits in the following categories:
    a. Indoor Environmental Quality (IQ) and Materials and Resources (MR)
    b. Water Efficiency (WE) and Indoor Environmental Quality
    c. Materials and Resources: Recycled Content and Regional Materials
    d. Materials and Resources: Building Reuse

SPONSOR INFORMATION

TAMLYN®

XtremeTrim® is a line of extruded aluminum profiles for multiple panelized systems. With multiple options in reveals and profiles ranging in sizes from 5/16" to 1" and the ability to create custom extrusions we are in the business of providing the design community with solutions.

CASE STUDY 1: EXTRUDED ALUMINUM TRIM IN MULTIPLE FINISHES

Peak Preparatory School, Dallas, TX

Extruded aluminum trim painted black accents the reveals in the façade to bring variation to the fiber cement panel.

Peak Preparatory School in Dallas, Texas, developed for Uplift Eduction, and designed by HKS, Inc, is a steel frame construction with a combination of brick and fiber cement panel and lap sidings. Pre-manufactured extruded aluminum trim in multiple finishes was used to accent corners in the lap siding and to create a varied and interesting façade with the fiber cement panel.

CASE STUDY 2: MANY USES OF ALUMINUM TRIM FOR NEW HOPE HOUSING, INC.

Multi-family housing has extruded aluminum trim above windows and doors, between fiber cement siding and brick, and on inside corners.

4415 Perry Street, Houston, TX

The new 4415 Perry Street affordable housing facility in Houston, Texas, developed by New Hope Housing, Inc, and designed by Val Glitsch, FAIA, LEED® AP, Houston, is three-story wood construction on a concrete foundation. The exterior is a mix of brick, fiber cement panels and lap siding. Pre-manufactured aluminum trim was placed above, below and between the different types of fiber cement siding, above windows and doors and below the siding over brick. It also was used for both inside and outside corners and where panels meet the siding boards. "What is the alternative to pre-manufactured trim? Wood trim gives a very different aesthetic. It is bulkier and, for water infiltration concerns, can only be used for vertical joints," says Glitsch. "We could have had a metal shop make up the trim pieces, but that's not always a good way to get a quality, consistent, cost-effective product. And the heavier-weight 'extreme trim' we used makes it easier to install the product properly."

TRIM PROFILES

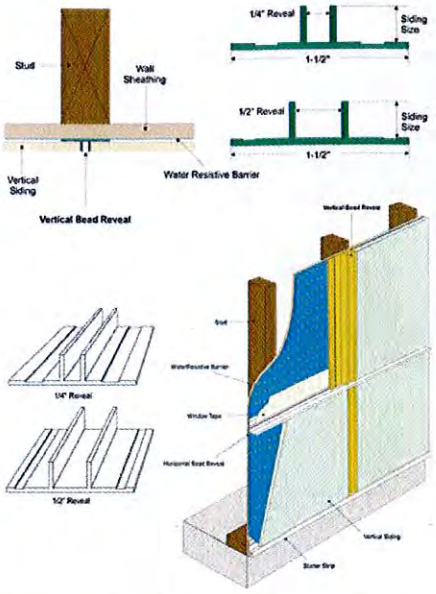
Typically fabricated from custom die-extruded heavy duty 6063 T-5 aluminum alloy, trim profiles have a coating that protects against harsh weather conditions. Since siding panels will expand and contract due to changes in temperature, a 1/8-inch gap should be allowed between panels and trim.

Manufacturers typically warrant defective-free products for a period of 10 years for the original purchaser unless otherwise stated for the specific product ordered. They are further warranted as to adequacy of design, provided products are properly specified and installed.

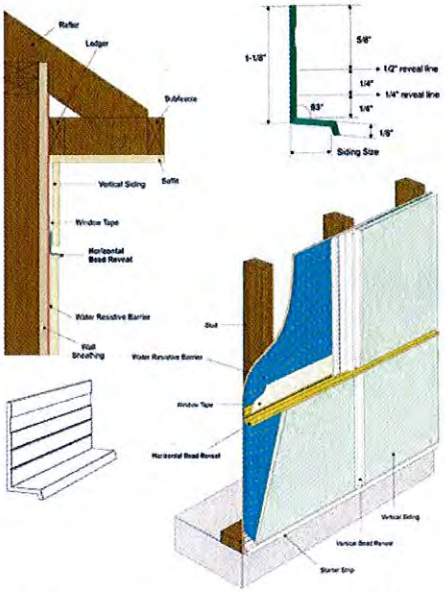
Examples of trim profiles include:

Vertical and horizontal bead trim

Vertical and horizontal bead trim each serve as an expansion joint between panels. Horizontal bead trim is designed to work as a system with vertical bead trim. Both work with all panel profiles and finishes.



Vertical bead trim with typical dimensions serves as an expansion joint between panels. Drawings provided by Tamlyn



Horizontal bead is designed to work with vertical bead trim for use with fiber cement or wood panels and not for use with EIFS systems or similar products. Drawings provided by Tamlyn.

These aluminum trim profiles are not part of an Exterior Insulation Finishing System (EIFS) and are not designed or intended to be used in an EIFS or similar system. They are designed for fiber cement or wood panels only.

Clear anodized finish

A clear anodized finish is an electrochemical conversion process that deposits an oxide film on the aluminum trim. While a natural oxidation process occurs on bare aluminum, producing the controlled oxidation process artificially creates a thicker, harder, and more durable "oxide film." Clear anodized is an extremely durable finish and is resistant to most forms of corrosion. Design professionals should note that clear anodized finishes can vary slightly from one piece of trim to another and should consider this characteristic before ordering.

Special color anodized finishes

Manufacturers also offer special color anodized finishes if required. Typical colors are gold, black and bronze. Again, design professionals should note that finishes can vary from one piece of trim to another. Typically, the color of the anodizing will fall within a certain range, which usually can be determined prior to anodizing. The manufacturer should provide anodized color details upon request. Specifyers should required anodized coating thickness be tested in accordance with ASTM B244-68.

LEED® CREDITS

Extruded aluminum trim products are typically made from 75–100% post industrial and post consumer scrap. They can contribute to credits in categories MR Credit 4 Recycled Content and MR Credit 5: Regional Materials of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) certification, 2009 for New Construction and Major Renovations.

MR Credit 4: Recycled Content

1–2 Points

Intent

To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Requirements

Use materials with recycled content such that the sum of postconsumer recycled content plus 1/2 of the preconsumer content constitutes at least 10 percent or 20 percent, based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is 10 percent recycled content for one point and 20 percent recycled content for two points.

MR Credit 5: Regional Materials

1–2 Points

Intent

To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirements

Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10 percent or 20 percent, based on cost, of the total materials value.

CONCLUSION

Available in a number of configurations, extruded aluminum trim can add architectural distinction to both the interiors and exteriors of a wide range of building types. Typically manufactured to work as a system with cementitious or fiber cement panel or lap siding, it is more convenient and easier to install than trim made from wood or fiber cement panels and saves labor time. Since aluminum is 75 percent to 100 percent post industrial and post consumer scrap, it also sustainable and can contribute to LEED points. While it is critical that design professionals understand how to incorporate water and moisture management systems in building design, they should be aware that trim products by themselves do not necessarily include moisture management or insulation systems. ■