

Sector: Residential

Category/Practice: Energy Efficiency / Fenestration Installation

Proposed GB Practice

Description

Require increased attention to detail regarding integration of windows, skylights and door flashings with the exterior drainage plane, by requiring installation in accordance with the American Architectural Manufacturers Association (AAMA) Installation Master Standards. All fenestration installations shall be supervised and inspected by an individual certified by AAMA Installation Master or other approved agency.

Applicability

New Construction: Applies

Existing Buildings/Additions: Applies only to addition portion

Existing Buildings/Alterations: Does not apply (address with education)

Intent

Reduce potential for exterior moisture damage.

Benefits and Costs

Triple Bottom Line Benefits

People: None

Economic:

- No annual operational cost savings are anticipated.
- Increase building durability and avoid large maintenance/repair costs by reducing the potential for water leakage into building cavities

Environment: Environmental benefits of enhanced durability

Costs Passed to Owner

“Medium” cost

Incremental cost is estimated at no more than \$25 per window (additional flashings that may be required plus increased time for installation). 10 windows @\$25 = \$250.

Lost Opportunity

Meeting these requirements is much less expensive than repairing water damage later.

Implementation

Availability of Products and/or Services

Materials to implement this requirement are readily available. There are a reasonably large number of AAMA Installation Masters-certified installers in the Fort Collins replacement window market. In the new construction market, a significant number of framing contractors will need to be trained and certified.

Practicality

No obstacles have been identified. Certification requirements could potentially be phased in as framers renew their licenses.

Certification Issues

Inspections must be performed by individuals certified by AAMA Installation Masters (or other credential approved by the Building Official). Inspection may be performed by the same company that installed the windows; i.e. third-party inspection is allowed but not required.

Cost of certification is estimated at \$300 to \$600. The lead framer is the logical candidate to become certified.

Certification requirements could potentially be phased in as framers renew their licenses.

Enforcement Procedures

Permit application/plan review: N/A

Field inspection: N/A

Certificate of Occupancy: Applicant must turn in signed affidavit documenting compliance. The document will include the certified inspector's certification number and expiration date.

The Building Department is contemplating adding a pre-siding inspection to be able to check compliance with other drainage plane requirements. If this occurs, inspection responsibility for this proposed amendment would be transferred to building inspectors and no documentation would be required before the Certificate of Occupancy is issued.

Support Materials Needs

Compliance form

Training Needs – Industry

Additional training opportunities should be made available to those wishing to become certified.

Window installation training is periodically being offered by Fort Collins Utilities as a requirement to be listed as a participating window installation contractor in the Home Efficiency Program (for existing homes). Installation Masters certification could be offered as an extension of this training or separately for framers, focusing on new construction installations.

Training Needs - Staff

If the Building Department adds a pre-siding inspection, inspectors will need training in fenestration installation inspection.

Background

Current Practice

Many different methods are being used to install windows, doors and skylights. New construction and retrofit installations can be very different and each contractor thinks the method they use is correct. Comparing the contractors' methods with window manufacturers' installation instructions or other nationally recognized installation standards, in many cases there is a significant difference. Unless these installation standards are followed closely, there can be no guarantee that the windows, doors, or skylights will not leak.

In new construction, windows are typically installed by framers. Replacement windows in existing buildings are typically installed by window installers working for, or contracted by, the window vendor.

Staff is aware of expensive moisture-related problems caused by leakage around windows and skylights in relatively new Fort Collins buildings. No data has been collected regarding the frequency of such problems.

Context

The root cause of many building failures is water. Wood and other cellulose-based building materials that get wet and can't dry quickly enough decay. Part of the challenge of building a durable building is to keep the water out of the structure. This is accomplished through a systems approach, addressing both exterior and interior moisture sources (see "Related Green Building Practices" below).

Some key exterior moisture control measures have been missed in Fort Collins in the past, likely due to perceptions around the semi-arid climate. Since the 1997 Uniform Building Code, a "weather-resistive barrier" (WRB) been required in the model codes. The WRB is a membrane layer, exterior to the wall and roof sheathing, that provides secondary protection for the building structure against exterior moisture intrusion (primary protection is provided by exterior finish materials like siding and stucco). Since 2005, with the adoption of the 2003 IRC, this requirement been enforced in Fort Collins.

Windows, skylights and doors are installed in openings in the building structure. The edges of these components are prime locations for moisture intrusion. To complete an effective exterior "drainage plane," these components must be carefully integrated with the surrounding WRB; installation details for these elements are critical.

The 2009 IRC provides general requirements for the flashing of window, door and skylight penetrations in the building exterior. These flashings must extend out to the finish or to the WRB on the exterior. However, specific guidance regarding the proper installation of these flashings is not provided. The proposed amendment would reference installation details developed by AAMA, a trade association of window manufacturers. It would eliminate contention about which contractor's installation method is correct.

Related Green Building Practices

Exterior moisture protection requires a systems approach. Elements that work together to keep exterior moisture out of the building include:

- Roofing

- Roof overhangs
- Gutters and downspouts, with downspout terminations a minimum distance from the building
- Exterior siding
- Flashings
- WRB and fenestration installation details
- Finish grading adequately sloped from the building
- Permeable backfill adjacent to the building
- Foundation drains

Known Objections

- Another certification required, with the associated cost to obtain and maintain it