

Community Development & Neighborhood Services
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**2012 Fort Collins Commercial Energy Code and Green Code
*COMPLIANCE GUIDE***

Revised 11-7-12

Commercial

Commercial Building Code Green Building Amendments (Prescriptive)



Item	GB Practice	Description *	Intent	Ordinance Ref	
				Code	Section
RESOURCE EFFICIENCY					
1	Construction waste recycling	<ul style="list-style-type: none"> Submit recycling plan (who, what, where, how) before project begins Implement recycling (non-landfill) for wood, metal, concrete and cardboard 	Divert construction waste from landfill	New: Yes Addition: No Alteration: No	IBC 3602.1
2	Certified wood	Sustainable forestry certification required for all tropical hardwoods	Support sustainable forestry practices	New: Yes Addition: Yes Alteration: Yes	IBC 3602.2
3	Windows, skylights, doors: installation	Increased detailing regarding integration of fenestration with exterior drainage plane	Reduce potential for exterior moisture damage	New: Yes Addition: Yes Alteration: No	IBC 1405.13.3
ENERGY EFFICIENCY + CONSERVATION					
4	Energy distribution design	Each electrical panel supplies only one of the following electricity use types - HVAC, lighting, plug loads, process loads, & miscellaneous loads. Space required for metering. Buildings less than 15,000 sq. feet are exempt.	Provides means for measurement and verification leading to potential energy savings	New: Yes Addition: Part Alteration: No	IECC 505.8
5	Building envelope: air barrier	Requirement for continuous air barrier system with air tightness testing per City of Fort Collins standard. Leakage must not exceed 0.25 CFM/SF at 75 Pa.	Saves energy, improves occupant comfort, improves building durability, reduces pest problems	New: Yes Addition: Yes Alteration: No	502.4.3.1 502.4.3.2 IECC
6	Building envelope: electrically heated buildings	More rigorous insulation specifications than IECC 2009 for electrically-heated buildings. Applies to buildings with electric heat power density greater than 1.5 W/sq ft.	Save energy and reduce peak electrical demand	New: Yes Addition: Yes Alteration: No	502.1.1 502.1.2 Table 502.2(3) IECC
7	Building envelope: installed insulation standards	All insulation installed to Residential Energy Services Network (RESNET) Grade I standard. Grade II allowed for cavity insulation if exterior continuous insulation installed to Grade I.	Improves performance of insulation - energy savings, better occupant comfort, better building durability	New: Yes Addition: Yes Alteration: Yes	IECC 502.1
8	Sleeping unit controls	Controls required that automatically turn off lighting, switched outlets, permanently-wired luminaires and televisions when guest rooms are unoccupied. HVAC set point will be relaxed by at least 5°F when rooms are unoccupied. Manual-on, auto-off occupancy sensors required for bathroom lighting. Applies to hotels/motels with more than 20 rooms.	Energy savings, operations and maintenance savings through increased equipment life	New: Yes Addition: Yes Alteration: Yes	505.2.3 505.2.3.1 IECC
9	Outdoor lighting controls	Automatic controls to reduce outdoor lighting by at least 50% 2 hours after business closes. Turn off outdoor lighting within 30 minutes of sunrise. Applies to building facades, parking lots, garages, canopies, outdoor sales areas. Some exceptions apply.	Electricity savings, CO2 reduction	New: Yes Addition: Part Alteration: No	IECC 505.2.4

10	Occupant sensor controls	Occupant sensor controls to automatically reduce connected lighting power by at least 50% in corridors, enclosed stairwells, storage stack areas not open to the public, library stack areas, and parking garages when unoccupied.	Electricity savings, CO2 reduction	New: Yes Addition: Part Alteration: No	IECC	505.2.2.1
11	Energy assessments for alterations	Energy assessments required prior to building alterations with valuation of \$30,000 or greater. No-cost assessment provided by Fort Collins Utilities.	Identify energy efficiency opportunities	New: No Addition: No Alteration: Yes	IECC	101.4.3.1
WATER EFFICIENCY + CONSERVATION						
12	Water-efficient fixtures	Specified fixtures must meet standards for maximum flow rates or consumption.	Save water and energy	New: Yes Addition: Yes Alteration: Yes	IPC	Table 604.4
INDOOR ENVIRONMENTAL QUALITY (IEQ)						
13	HVAC IAQ Design	<ul style="list-style-type: none"> Protect ducts from contamination during construction Air handling system access & ability to clean and maintain No friable materials in air plenums 	Avoid introducing contaminants into supply air and provide means for maintaining air quality.	New: Yes Addition: Yes Alteration: Yes	IBC	3603.1
14	Building flush-out	Flush out building contaminants by ventilating at prescribed outside air setting continuously for 14 days.	Remove pollutants generated from outgassing of new materials	New: Yes Addition: Part Alteration: Part	IBC	3603.1.2
15	Low-Volatile Organic Compound (VOC) materials	<p>Interior materials meet maximum VOC emissions standards:</p> <ul style="list-style-type: none"> Sealants + adhesives Resilient flooring Carpeting and pad Site-applied paints, stains and varnishes Structural wood panels, hardwood veneer plywood, particle board and fiber board Insulation 	Improve indoor air quality for construction workers and occupants	New: Yes Addition: Yes Alteration: Part	IBC	3603.2
16	Acoustical control	Requirements for exterior-to-interior sound transmission in specific location categories, interior sound transmission and background sound levels.	Reduce noise disturbances for occupants	New: Yes Addition: Part Alteration: No	IBC	3603.3
COMMISSIONING / OPERATIONS + MAINTENANCE + EDUCATION						
17	Commissioning	Provide commissioning of HVAC, controls, building envelope, lighting controls, service water heating, renewable energy systems and background sound levels. Verify systems performance, training and O&M manual. (Applies to new buildings + additions >15,000 sq ft)	Ensure that building systems are installed and operate per owner's intent and that it can be operated and maintained	New: Yes Addition: Part Alteration: No	IBC	3604.1

* Amended code language is posted at www.fcgov.com/building/codes.php

** Indication of how amendment applies to new buildings, additions and alterations to existing buildings. In general, amendments apply in same manner as any code provision, when a building permit is required.

10/04/2011

Planning, Development & Transportation Services



Community Development & Neighborhood Services

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Commercial

Green Code Amendments IBC, IMC, IFGC, IECC

Plan Submittal Requirements

(Items to be provided on plans or with application)

IBC	
3602.1	<i>Construction Waste Management Plan.</i> Plan identifying the collection of wood, concrete, cardboard, and steel. Plan submitted with application. Plan to be posted onsite.
3603.3.1.1	<i>Exterior Sound.</i> Wall components identified on plans. Groups A1, A3, E, I, B (education), R. If within 500' of multi-lane highway, 250' of truck route, 1000' of railway
3603.3.1.2	<i>Interior Sound.</i> Wall and ceiling components identified on plans with STC rating of 50+; 53+; and 60+ depending on spaces to be separated.
3604.1	<i>Building Commissioning Authority.</i> All new commercial and additions over 15,000 sq ft. Submittal to identify the Commissioning Authority used
IECC	
101.4.3.1	<i>Energy Assessment.</i> Required for alterations to commercial, exceptions: 1 st time tenant space, assessment performed within 3 yrs, construction value less than \$30,000.
502.4.3	<i>Air Barrier.</i> Details on plans showing location and materials used
505.2.2.1	<i>Lighting Controls.</i> Automatic controls to reduce lighting by 50% when un-occupied in corridors and enclosed stairways, non-public storage areas, library stack areas, parking garages.
505.2.3	<i>Sleeping Unit Controls.</i> (New hotels and motels with >20 rooms). Switch to override lighting, controls to increase or decrease heating/cooling set points when un-occupied.
505.2.3.1	<i>Sleeping Unit Bathroom Controls.</i> (New hotels and motels with >20 rooms). Bathrooms to have occupant sensor lighting with manual override switch.
505.2.4	<i>Exterior Lighting Controls.</i> Automatic controls that reduce wattage by 50%, 2 hours after closing, reducing: façade, parking lots and garages, canopies and outdoor sales areas. Exceptions: lighting required by health & safety ordinances, temporary lighting, signs.
505.8	<i>Electric Distribution.</i> New buildings over 15,000 sq. ft. provide separate panels for loads: HVAC, lighting, plugs, process, and misc loads.

Commercial Requirements Green Codes

IPC	
604.4	<i>Maximum Flow Rates.</i> Plans to indicate flow rates for fixtures per table 604.4

Inspection Requirements
(Items to be inspected by City or Approved Agency)

IBC	
1405.13.3	<i>Fenestration Installation.</i> (New windows, not replacements) Verify that installation conforms to AAMA Standard A or A1 in regards to water plane. Spot check by City, final document by Approved Agency
3602.1	<i>Construction Waste Management Plan.</i> Plan document and site control of the collection of wood, concrete, cardboard, and steel. On site plan inspected by City
3602.2	<i>Certified Hardwoods.</i> Documentation of any hardwood products used. Inspected by City
3603.1.1	<i>HVAC access to equipment to be kept clean during construction;</i> such as covers over ends of open ducts, both supply and return and equipment. Inspected by City
3603.1.1.1	<i>Air handling access,</i> to be provided for cleaning and not interfered with by pipes, conduits or building components. Inspected by City
3603.1.1.2	<i>Durability of air handling surfaces</i> shall be resistant to deterioration and flaking. Inspected by City
3603.1.1.3	<i>Materials within air stream</i> to be tested to UL 181. Inspected by City
3603.2	<i>Low VOC materials</i> used in paints, stains, sealers etc. Inspected by City
3603.3	<i>Acoustical control,</i> when required complying with various sound ratings STC 40-60 Inspected by City
IECC	
502.1	<i>Insulation Installation</i> to RESNET I standards, RESNET II at rims. Inspected by City and as required per Commissioning Authority.
502.4.3	<i>Air Barrier.</i> Verify air sealing details on plans for new construction. New construction spot check by City, blower door by Approved Agency or through commissioning. Air sealing of additions and alterations to existing buildings inspected by City and as required per Commissioning Authority.
505.2.2.1	<i>Lighting Controls.</i> Verify automatic controls to reduce lighting by 50% when un-occupied in corridors and enclosed stairways, non-public storage areas, library stack areas, parking garages. Inspected by City & test at finals and as required per Commissioning Authority.
505.2.3	<i>Sleeping Unit Controls.</i> (New hotels and motels with >20 rooms). Switch to override lighting, controls to increase or decrease heating/cooling set points when un-occupied. Inspected by City & test at finals and as required per Commissioning Authority.

Commercial Requirements Green Codes

505.2.3.1	<i>Sleeping Unit Bathroom Controls. (New hotels and motels with >20 rooms). Verify bathrooms have occupant sensor lighting with manual override switch. Inspected by City & test at finals.</i>
505.2.4	<i>Exterior Lighting Controls. (All Commercial) Automatic controls that reduce wattage by 50%, 2 hours after closing, reducing: façade, parking lots and garages, canopies and outdoor sales areas. Exceptions: lighting required by health & safety ordinances, temporary lighting, signs. Inspected by City & test at finals and as required per Commissioning Authority.</i>
505.8	<i>Electric Distribution. New buildings over 15,000 sq. ft. separate panels for loads: HVAC, lighting, plugs, process, and misc loads. Inspected by City.</i>
IPC	
604.4	<i>Maximum Flow Rates. Verify maximum flow rates for fixtures per table 604.4. Inspected by City.</i>

Certificate of Occupancy Requirements
(Items to be provided by Approved Agency)

IBC	
1405.13.3	<i>Fenestration installation certificate. Report submitted to the City</i>
.603.1.2	<i>Building flush-out. New buildings, non-residential, certificate required within 30 days of CO. Report submitted to the City</i>
3604.1	<i>Commissioning report. New buildings or additions over 15,000 sq ft. Report to cover: HVAC/Refrigeration, building thermal envelope, lighting controls, service water heating, renewable energy systems, background sound. Report submitted to the City. System manual delivered to owners.</i>
IMC	
107.3	<i>Mechanical system performance tested certificate (new buildings). (except buildings under commissioning) Report submitted to the City.</i>
IECC	
502.4.3.2	<i>Air Barrier (Commercial) testing (blower door) test results (new buildings) air leakage not to exceed 0.25 cfm/ft2 under 75pa. pressure. Report submitted to the City</i>



Planning, Development & Transportation Services
Community Development & Neighborhood Services

2012 FORT COLLINS COMMERCIAL ENERGY CODE COMPLIANCE FORM
FORM 2 - NON-ELECTRIC HEAT (If using elec heat form 3 must be used), use
this form for all commercial buildings including residential buildings 4 stories or
more.

Permit Number:

Address:

DIRECTIONS: Place a check next to Prescriptive or Total Building Performance indicating the path chosen. Applicant must also choose between an Air sealing checklist or Blower Door Test.

(A) PRESCRIPTIVE compliance for house, 2009 IECC, section 502, climate zone 5.

BUILDING ENVELOPE	INSULATION R-VALUE
Wood frame wall insul r-value	R-13+R-3.8 CI
Metal frame wall insul r-value	R-13+R-7.5 CI
Mass wall (concrete, cmu)	R-11.4 CI
Crawl space wall	R-10 FULL DEPTH
Roof insulation in attic	R-38
Roof insulation cont. above deck	R-20
Walls below grade	R-10 FULL DEPTH
Wood floor over un-cond	R-30
Slab on grade floor, unheat	R-10, 24" DEEP
Windows	U-.55

(B) TOTAL BUILDING PERFORMANCE (ComCheck), 2009 IECC, SECTION 506

An energy rating system must be utilized using approved computer software tool such ComCheck from the Dept. of Energy. A calculation passing to the 2009 IECC must be submitted at time of application. Calculation must include Address, Name of individual completing the rating, & Name & version of software tool.

Circle one: **Air Sealing Checklist** **Blower Door Test**

SIGN: _____ DATE: _____

CONTRACTOR: _____ PHONE: _____



Planning, Development & Transportation Services
Community Development & Neighborhood Services

FORM

FORM 3- ELECTRIC HEAT, for buildings whose primary heat source is electric.

Permit Number:

Address:

DIRECTIONS: Place a check next to method A or B indicating the path chosen. Also choose between an Air sealing checklist or Blower Door Test.

(A) PRESCRIPTIVE, 2009 IRC & IECC local amendment, climate zone 5.

	RESIDENTIAL	COMMERCIAL
BUILDING ENVELOPE	INSULATION R-VALUE	INSULATION R-VALUE
Wood frame wall insul r-value	R-20+5ci	R-13+7.5ci
Metal frame wall insul r-value		R-13+R-10ci
Mass wall (concrete, cmu)	R-15 ci or R-19	R-13.3 ci
Roof insulation in attic	R-49	R-49
Roof insulation cont. above deck		R-25ci
Walls below grade (bsmt or crawl)	R-15 ci or R-19	R-10ci
Wood floor over un-cond	R-30	R-30+7.5ci
Slab on grade floor, unheat	R-10, 48" DEEP	R-10, 24" DEEP
Windows	U-.30	U-.35

(B) TOTAL UA ALTERNATIVE / TOTAL BLDG PERFORMANCE (ResCheck/ComCheck) 2009 IECC chap 4 and 5.

This path is only allowed when 2 calculations (ResCheck or ComCheck) are submitted. One form showing all prescriptive values above inserted into the calculation thus establishing specific passing score. The second form can then be submitted using trade-offs but must pass to the same score as the first calculation. Passing forms must be submitted at time of application showing address of residence; name of individual completing the rating form; name & version of software tool. Air Sealing Checklist or Blower Door Test is required.

Circle one for either method above: Air Sealing Checklist Blower Door Test

(C) SIMULATED PERFORMANCE ALTERNATIVE, 2009 IECC, SECTION 405

An energy rating system must be utilized using approved computer software tool but must show that modifiers can be inputted into such programs to allow for upgraded requirements in the prescriptive method above. A preliminary rating must be submitted at time of application and include Address, Name, & software tool & version. Final passing rating must be submitted for certificate of occupancy.

SIGN:

DATE:

CONTRACTOR:

PHONE:



Construction Waste Management Plan

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirements apply to all new residential and non-residential construction.

Code reference

International Building Code—(IBC) 3602.1 Commercial and all multifamily housing

International Residential Code—(IRC)R 324.1 Single-family detached housing, duplexes, townhomes

“For new residential and non-residential buildings, a construction waste management plan acceptable to the Building Official that includes recycling of concrete, wood, metals and cardboard, is required at time of application for a building permit. The plan shall be implemented and conspicuously posted on the construction site. Substantive changes to the plan shall be subject to prior approval by the Building Official”.

What is construction waste management and why is it important?

Construction waste management is applying management practices that result in less waste going to the landfill. At least 16% of the waste buried in the Larimer County landfill is directly attributed to construction and demolition (C & D) activities. Diverting construction and demolition waste extends the life of landfills, while contributing to the community’s waste diversion and carbon emissions reduction goals. Waste management techniques also save natural resources and can reduce a project’s overall disposal costs.

Techniques fall into “reduce, reuse, recycle” categories:

- **Waste prevention:** generating less waste to begin with. Plan efficient use of materials during the design and specification process, use scrap materials from one process for another process on the same job site.
- **Reuse:** set aside surplus or off-spec materials for use on other projects, or donate them to architectural materials retailers such as the non-profit organizations (ReSource Fort Collins or Habitat for Humanity).
- **Deconstruction:** disassemble a structure instead of demolishing it, to salvage materials such as cabinetry and porcelain appliances, lumber, landscaping elements, windows, doors.
- **On-site recycling:** use waste materials from the project by reprocessing them for other applications on the same site. One example for large projects is to grind waste materials to use as a soil amendment.
- **Off-site recycling:** collect materials on site for recycling at other facilities.

How do I comply with the code requirement?

The code outlines a three-step process:

1. **Develop a construction waste management plan.** This helps you get organized on the front end. The plan must address, at minimum, recycling of four materials: concrete, wood, metals and cardboard. The plan must address how these materials will be collected and recycled. For example, for each material, will a recycling service provider pick it up? Or, will the contractor haul the material to a designated location? A template for a simple plan is provided below. The plan is submitted with the building permit application and it is reviewed.
2. **Post the plan on the job site.** Be sure everyone on the project understands the CWM plan and commits to following through with it.
3. **Implement the plan.** To help ensure the designated materials are separated from other construction waste, post signage. Monitor receptacles to ensure materials aren’t ending up in the wrong place. Building inspectors will be spot checking during site visits for other inspections.

Are there local providers who can help with construction waste management?

- Yes. There are a mix of specialty providers and conventional waste haulers who also provide recycling services. City of Fort Collins provides a current list of local hauling, salvage and recycling facilities found on the City’s website at <http://www.fcgov.com/recycling/centers.php>

For more information

- City of Fort Collins Natural Resources Department, 221-6600, www.fcgov.com/naturalresources/recycling.
- Construction Materials Recycling Association: www.cdrecycling.org
- U.S. Environmental Protection Agency: www.epa.gov/osw/conserve/rrr/imr/cdm



Community Development & Neighborhood Services
281 N. College Ave., Fort Collins, CO 80522; Voice: 970-221-6760
FAX: 970-224-6134

CONSTRUCTION WASTE MANAGEMENT PLAN
Required as part of Approved Construction Plans

PROJECT INFORMATION

Address _____ DATE _____

Permit No. _____

General Contractor & Contact Info: _____

CONSTRUCTION WASTE MANAGEMENT PLAN

Complete this table or attach a more detailed plan

Material ⁽¹⁾	Vendor retrieving the material ⁽²⁾	Facility recycling the material ⁽³⁾
Concrete		
Wood/Lumber		
Metals		
Cardboard		

Notes

- (1) At minimum, the four listed materials must be recycled.
- (2) Enter vendor name and phone number. If the applicant will haul the material themselves, state such.
- (3) Where will applicant or vendor take the material for recycling? Enter facility name and address.



Building Air Barrier Fact Sheet

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirements apply to new commercial buildings and new additions to commercial buildings.

Code reference: *2009 International Energy Conservation Code (IECC), Section 502.4.3.1* as amended by the City of Fort Collins. Buildings must be designed and constructed with a continuous air barrier to control air leakage into, or out of, the conditioned space. An air tightness test is required that shows total building leakage of less than 0.25 cfm/ft² (of envelope area) at 75 Pascals pressure.

What is a building air barrier and why is it important?

Air barriers are made up specific *Materials*, which are combined to create air barrier *Assemblies*, which in turn are combined to form a continuous plane of air tightness around the *Building*. Studies have shown that air leakage rates of conventional buildings are high. For buildings with well-designed and implemented air barrier systems, energy use is lower, HVAC systems can be smaller and are easier to control, human comfort is better, and the buildings are more durable.

How do I comply with the code requirement?

- Individual air barrier materials must not exceed ASTM E2178 permeability criteria. A list of qualifying air barrier products can be found at http://www.airbarrier.org/materials/index_e.php and standard building materials meeting ASTM E2178 can be found in ASHRAE 189.1-2010, Appendix B. Other materials showing compliance with ASTM E2178 also qualify.
- All air barrier components of each building thermal envelope assembly shall be clearly identified on construction documents.
- A quality assurance process must be performed before 5% of certain building details are completed. See the Commissioning Checklist for details.
- The agency performing the air tightness testing must be qualified by having demonstrated experience testing at least three buildings, each 10,000 square feet or larger (non-residential), that have been tested using the Fort Collins Building Air Leakage test Protocol or ASTM E779.
- The *City of Fort Collins Certification of Compliance, Building Air Leakage Test Results* must be submitted to the building department prior to receiving a Certificate of Occupancy.

For more information

See code references, above and;

National Institute of Building Science (NIBS) www.nibs.org

Building Enclosure Technology and Environment Council (BETEC) www.nibs.org/index.php/betec

Whole Building Design Guide www.wbdg.org

Journal of Building Enclosure Design www.nibs.org/jbed.html

Building Science Corporation www.buildingscience.com

Air Barrier Association of America www.airbarrier.org

ASHRAE Journal (Building Sciences Column)

City of Fort Collins Certification of Compliance Building Air Leakage Test Results

Pressurization

Metric	Requirement	Actual	Requirement Met/Not Met
n	$0.45 < n < 0.8$		
C	N/A		N/A
r^2	$r^2 > 0.98$		
CFM75/sq ft	Actual < 0.25 CFM75/sq ft		
95% C.I. Upper	N/A		N/A
95% C.I. Lower	N/A		N/A
EqLA75	N/A		N/A

Depressurization

Metric	Requirement	Actual	Requirement Met/Not Met
n	$0.45 < n < 0.8$		
C	N/A		N/A
r^2	$r^2 > 0.98$		
CFM75/sq ft	Actual < 0.25 CFM75/sq ft		
95% C.I. Upper	N/A		N/A
95% C.I. Lower	N/A		N/A
EqLA75	N/A		N/A

Average

Metric	Requirement	Actual	Pass / Fail
CFM75/sq ft	Actual < 0.25 CFM75/sq ft		

Testing Agency Certified Compliance with the Protocol

1	The test boundary area was obtained from the Architect of Record and was checked on-site for reasonableness.	Initial
2	Set up was performed according to section 2 of the test form and all deviations and their impact noted here.	Initial
3	Test equipment used was in compliance with respect to accuracy and calibration date.	Initial
4	The test procedure used was in compliance except as noted here.	Initial
5	The calculations were done in strict accordance with ASTM E779-10 except as noted in this Protocol.	Initial
6	Provide the value calculated in step 5.15 (or, 5.11 or 5.4 if applicable).	CFM75/sq ft
7	Determine pass/fail status based on the average of pressurization and depressurization.	Pass/Fail
8	All accuracies, pressure limits, and data correlations and confidence intervals are within the bounds specified in steps 3, 4 and 5 and all deviations are noted here.	Initial
9	Supporting documentation described in steps 1, 3, 6, and 7 is attached to this test form, including all digital photographs of the building and test procedure.	Initial

I hereby certify that the results above are in conformance with the City of Fort Collins Air Leakage Test Protocol.

Testing agency name: _____

Testing agency authorized representative: _____ Date: _____

Signature



Certified Tropical Hardwood

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirements apply to all new residential and non-residential construction.

Code reference

International Building Code (IBC) Sec. 3602.2 – applies to nonresidential and all multifamily housing.

International Residential Code (IRC) Sec. R324.3 – applies to single-family houses, duplexes, townhomes.

"All tropical hardwoods used in new construction, additions and alterations requiring a building permit, shall be certified by the Forest Stewardship Council or other approved agency.

Certification demonstrating compliance shall be required with delivery of such materials and shall be available for inspection".

What is "certified wood?" and why is it important?

Many wood product users have little information about the source of their lumber. Some forest management practices cause environmental damage such as habitat loss, increased erosion and stream sedimentation. Some wood products begin with illegal logging operations.

Programs have been developed to certify wood that comes from forests that are responsibly managed and harvested. For example, the Forest Stewardship Council is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. FSC-certified forest products are verified from the forest of origin through the supply/custody chain. FSC officials maintain theirs is the most rigorous forestry certification system to ensure responsible forest practices are maintained, including environmental protection, social equity & economic viability. The FSC and other certification programs based on recognized responsible forest management practices cover an array of wood products, from construction-grade framing lumber, custom cabinetry and interior finish wall paneling, to applications such as durable interior flooring and weather-resistant outdoor decking.

How do I comply with the code requirement?

The Fort Collins building code requires that all **tropical hardwoods** used in new construction be certified by the FSC or other agency approved by the Building Official. The main uses of tropical hardwood in Colorado are for decks (examples: Garapa, Ipe, Mayan Mahogany, Santa Maria) and hardwood flooring (examples: eucalyptus, tigerwood, bamboo, Brazilian cherrywood). All of these varieties can all be obtained as certified products.

The building permit holder must provide appropriate certification documentation available upon request **by the Building Inspection Division**. FSC-certified products are sometimes clearly identified with the FSC logo. The retailer can ask their supplier to stamp the material with the FSC label. To ensure the product is FSC certified, verify that the invoice from the certified retailer states their FSC CoC code and FSC claim (ie: FSC-Mix)

Where are complying materials available?

Most Fort Collins area building-supply centers and local lumber dealers can provide certified tropical hardwood products from wholesale outlets across the country. Check to see whether products are stocked or special order. Additional sources are located in the Denver metro area.

Search for FSC-certified products and species and certificate holders on-line. Note: the only web site with up-to-date information on the validity of a FSC certificate is <http://info.fsc.org/>.

For more information

- [Forest Stewardship Council – United States: www.fscus.org](http://www.fscus.org)
- [Sustainable Forestry Initiative: www.sfiprogram.org](http://www.sfiprogram.org)
- [American Tree Farm System: www.treefarmssystem.org](http://www.treefarmssystem.org)
- [Program for the Endorsement of Forest Certification Systems: www.pefc.org](http://www.pefc.org)
- [Sustainable Forest Management Program, Canadian Standards Association \(CSA\): www.csa-international.org/product_areas/forest_products_marking/](http://www.csa-international.org/product_areas/forest_products_marking/)



Commercial Acoustical Control Fact Sheet

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirements apply to new commercial buildings and new additions to commercial buildings.

Code reference: *2009 International Building Code, (IBC) Section 3603.3 as amended by the City of Fort Collins. "Acoustical control. Minimum requirements for exterior-to-interior sound transmission, interior sound transmission, and background sound levels in new construction and additions thereto, except as noted hereunder, shall be provided as specified herein."*

What is acoustical control and why is it important?

Acoustical control is reducing unwanted sound transmission through the construction components and interior sound generation. The amendment addresses three areas of acoustical control – *Exterior Sound Transmission* (exterior to interior), *Interior Sound Transmission* (interior space to interior space) and *Background Sound* (generated from HAVC and other interior sources). Improved acoustical control provides a higher quality work and living environment for building occupants.

How do I comply with the code requirement?

Plans submitted for a building permit must specify the construction components used, listing the Sound Transmission Class (STC) rating of each component. Acoustical control measures for exterior and interior sound transmission will be confirmed through plan review and field inspections. Verification of background sound controls will be addressed through the building commissioning process

Exterior Sound Transmission

The wall and roof-ceiling assemblies making up the building thermal envelope shall have a composite Sound Transmission Class (STCc) rating of 40 or greater. Applicable to occupancies Group A1, A3, E, I, R buildings and Group B occupancy buildings used for educational purposes when constructed within close proximity to roadways and railways as defined in the code.

Interior Sound Transmission

Except for residential occupancies in compliance with Section 1207 of the IBC, interior wall and floor/ceiling assemblies, separating interior rooms and spaces shall be designed with STC ratings of 50 to 60 depending upon the uses being separated.

Background Sound

The average background sound levels from heating, ventilating and air conditioning and other building systems within unoccupied rooms shall be below the maximum A-weighted sound level for specific occupancies. These shall be measured during commissioning process and reported in the commissioning report.

Where can I find more information on acoustical control?

Fort Collins amendments Chapter 36 can be found at www.fcgov.com/building/codes click on Codes and Standards. A spreadsheet calculator for determining composite STC ratings for assemblies is available on request from the building department.



Low-Flow Water-supplied Plumbing Fixtures

This fact sheet describes the latest Fort Collins building code amendments effective January 1, 2012-applicable to projects that involve installation of water-supplied plumbing fixtures identified in the table below.

Code Reference

Colorado Plumbing Code/International Plumbing Code (IPC)—Sec. 604.4

"The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4 below and such fixtures shall be Environmental Protection Agency (EPA) WaterSense® labeled fixtures or such fixtures and fittings that provide the equivalent maximum flow rates"

Maximum Flow Rates and Consumption for Plumbing Fixtures	
PLUMBING FIXTURE	MAXIMUM FLOW RATES
Lavatory faucet, private	1.5 gallon per minute at 60 psi
Lavatory, faucet public (metering)	0.25 gallon per metering cycle
Lavatory faucet, public (other than metering)	0.5 gallon per minute at 60 psi
Shower head (includes hand held)	2.0 gallon per minute at 80 psi
Sink faucet	1.8 gallon per minute at 60 psi
Urinal	0.5 gallons per flush
Water closet	1.28 gallons per flushing cycle, with minimum MaP (solid-waste removal performance threshold) of 350 grams
Pre-rinse Spray Valves (food service)	Must meet federal requirements – Department of Energy (DOE) Energy Policy Act
Bar sinks (food service)	2.2 gallon per minute at 60 psi

What are low-flow fixtures and why are they important?

Low flow fixtures and low flow pre-rinse spray valves used in the food service industry use high pressure to produce sufficient flow without using nearly as much water as standard flow fixtures. Less hot water use reduces your energy bill, too. The low-flow standard for toilets includes both water use and minimum performance criteria based on a particular toilet's ability to flush solid waste. Today's low-flush volume toilets often out-perform their conventional counterparts.

How do I comply with the code requirement?

The new building codes require that water-supply fixtures meet the maximum flow rates or consumption specified in the table above. One easy way to do this is to specify WaterSense® labeled fixtures. WaterSense® is a U.S. Environmental Protection Agency program supporting water efficiency. It maintains a directory of lavatory (bathroom) faucets, showerheads, toilets and urinals that meet the program standards (www.epa.gov/WaterSense/product_search.html). For sink faucets or other non-WaterSense labeled fixtures, ask suppliers for products with companion documentation meeting the specifications in the table above. Building Services Division staff will inspect for appropriate labels and specifications.

Where are complying products available? A wide selection of compliant plumbing fixtures is available from traditional suppliers. **For more information:** www.epa.gov/WaterSense , or www.map-testing.com



New Electrical Requirements Fact Sheet

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirements apply to new commercial buildings and new additions to commercial buildings.

Code reference: 2009 *International Energy Conservation Code (IECC)* 505.2.2.1, 505.2.3, 505.2.4, and 505.8

IECC 505.2.2.1 Occupant sensor controls. Occupant sensor controls shall be provided to automatically reduce connected lighting power by not less than 50 percent during periods when occupants are not present in corridors and enclosed stairwells; stack areas; and parking garages.

IECC 505.2.3 Sleeping Unit Controls. In hotels and motels with over 20 guest rooms, lighting, televisions, and HVAC shall be controlled when guest rooms are unoccupied.

IECC 505.2.4 Exterior lighting controls. For certain outdoor lighting, automatic controls shall be installed to reduce the sum of all lighting power (in Watts) by a minimum of 50 percent two hours after normal business closing and to turn off outdoor lighting within 30 minutes after sunrise.

IECC 505.2.8 Electricity distribution design requirements and load type isolation. Electric distribution systems for buildings greater than 15,000 square feet shall be designed such that each primary panel supplies only one electricity load type as defined in the code and adequate space shall be provided for installation of metering equipment.

What are these electrical requirements and why are they important?

Three of the requirements relate to automatic control of various electrical loads. A significant portion of electricity use in buildings is due to lighting, appliances, and HVAC being on in unoccupied spaces when it is not needed. Reducing or turning off lighting and relaxing HVAC setpoints in unoccupied spaces saves energy and extends equipment life. The final measure requires the building electrical distribution to be designed such that specific load types (e.g. HVAC, lighting, plug loads, process and miscellaneous loads) could be monitored. This provides the means for measurement and verification of specific electrical loads with the potential to reduce energy use and diagnose under-performing equipment.

How do I comply with the code requirements?

Compliance with these requirements must be on the electrical plans in the construction documents submitted for permit.

Where can I find more information on these requirements?

See code references, listed above, for specifics.

Low Volatile Organic Compound (VOC) Building Products

This fact sheet describes Fort Collins building-code changes effective January 1, 2012, concerning Indoor Environmental Quality (IEQ). The requirements apply to all new residential and non-residential construction projects for which a building permit is required.

Code reference

International Building Code (IBC) Sec. 3603.2: applies to commercial and all multifamily housing.

International Residential Code (IRC) Sec. R325.1: applies to Single-family houses, duplexes, townhomes.

“Construction materials, floor coverings and site-applied finishes, including sealants and adhesives, resilient flooring, carpeting and pad, site-applied paints, stains and varnishes, structural wood panels, hardwood veneer plywood, particle board and fiber board building products, and insulation (does not include cabinets or wall paper) shall meet specified volatile organic compound (VOC) emissions limits in accordance with California Department of Public Health (CDPH) 01350; GREENGUARD Environmental Institute GGPS.001 standard for building materials and finishes; or Green Seal® standards. Documentation demonstrating compliance shall be required with delivery of such materials and shall be available for inspection.

Exception: Alterations to existing buildings.

What are low-VOC materials and why are they important?

Volatile organic compounds (VOCs) refer to chemicals that readily vaporize (become *volatile*) at typical indoor conditions. Common VOCs include formaldehyde, benzene, toluene, flammable alcohols, household cleaning solvents, lacquers, gasoline and other liquid combustion fuels.

VOCs can affect human health or have adverse effects on the environment. Some are known carcinogens. Indoor VOC sources include many building materials – such as carpet, composite wood products, insulation, paints, adhesives – as well as furniture, cleaning products, copy and fax machines, and tobacco smoke. U.S. EPA studies have found that indoor levels of common organic pollutants are several times higher than outdoor levels.

Do low-VOC products perform as well as conventional products?

Many available low-VOC products reduce “off-gassing” of hazardous and potentially flammable vapor emissions. Local suppliers say performance of approved low-VOC building materials has steadily improved, matching or surpassing hazardous VOC products, with little or no price premium.

How do I comply with the code requirement?

The 2012 Fort Collins building codes require products that are certified as “low-VOC or meet recognized standards limiting VOC emissions as verified by an independent testing agency. Acceptable forms of documentation include copies of verified test report(s) from an approved independent testing agency (as determined by the City of Fort Collins Building Services).

Where can I find compliant VOC building products?

Compliant low-VOC building products are widely available locally. The following contact list will help you locate the appropriate certification or standards organization for categories of building products.

Colorado Governor’s Energy Office (GEO)

GEO is a good starting point, with an inclusive, on-line, user-friendly pdf: *Contractor VOC Reference Sheet* listing specific compliant maximum VOC emission limits for most applications. Go to:

[http://rechargecolorado.com/images/uploads/pdfs/GEO HPBP Contractor VOC Reference Sheet.pdf](http://rechargecolorado.com/images/uploads/pdfs/GEO_HPBP_Contractor_VOC_Reference_Sheet.pdf)

International Green Construction Code™

“Public Version 2.0, Section 806” published by the International Code Council® (ICC), is also a detailed resource for compliant maximum VOC emissions. For a free download, go to:

<http://www.iccsafe.org/cs/IGCC/Pages/default.aspx> The “2012 Edition” is scheduled for Spring 2012.

California Department of Public Health (CDPH) – Section 01350

CDPH testing protocol: *“Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.”* This is typically referenced as “CDPH 01350.”

Results of the testing are commonly used to identify low-VOC-emitting products, typically certified by other independent (“third-party”) testing agencies.

www.eurofins.com/product-testing-services/topics/ecolabels,-quality-labels/section-01350.aspx

GREENGUARD Environmental Institute’s (GEI) Children and Schools Certification Program – Standard GGPS.001

GEI certifies products and materials for low chemical emissions and is a free resource for choosing healthier products and materials for indoor environments. To receive its Indoor Air Quality certification, products must meet GEI’s *GGPS.001. GREENGUARD IAQ Standard for Building Materials, Finishes and Furnishings*. Certified products can be found online at:

www.greenguard.org/en/QuickSearch.aspx.



Green Seal®

Green Seal® develops life cycle-based sustainability standards for products, services and companies and offers third-party certification for those that meet the criteria in the standards. 1993 Standards relevant to the code requirement are GS-11 (Paints and Coatings) and GS- 47 (Stains and Finishes). Certified products can be found online at:

www.greenseal.org/FindGreenSealProductsAndServices.aspx



Carpet and Rug Institute (CRI) – Green Label

CRI is a nonprofit trade association representing carpet manufacturers as well as their suppliers and service providers. CRI initially developed the Green Label program to help commercial specifiers locate carpet, padding and adhesives with low VOC emissions. More recently, the *Green Label Plus* programs sets even higher standards. For more information, visit www.carpet-rug.org.





Energy Assessments for Alterations Fact Sheet

Tenant Finish permit applicants for TF projects in existing buildings of construction value 30k or more, must call and schedule a free Energy Assessment before permit application will be approved.

This fact sheet describes a Fort Collins building code change effective January 1, 2012. The requirement applies to alterations of commercial buildings.

Code reference: *2009 International Energy Conservation Code (IECC), Section 101.4.3.1* as amended by the City of Fort Collins. *"Energy assessment. Prior to any alterations, an energy analysis of the entire building shall be required and submitted to the Building Official."* Energy assessments are NOT required for first-time interior finishes, a building that has undergone an energy assessment within the previous three years, or for alterations with a construction valuation of less than \$30,000.

What is an energy assessment and why is it important?

During an energy assessment, a building's energy consuming systems are evaluated for options to conserve energy and/or upgrade equipment with more efficient retrofits. There may be opportunities during an alteration to economically replace inefficient equipment, make system changes and/or take advantage of financial incentives. Identifying these opportunities will give the building owner or design team information to integrate energy considerations into their alteration plans if they choose.

How do I comply with the code requirement?

Documentation verifying that an energy assessment was performed shall be submitted to Building Services. Fort Collins Utilities provides no-cost energy and water assessments or the assessment can be performed by a private firm with relevant experience. There is no requirement to implement recommended improvements. If identified energy efficiency measures are included in the project, they must be included in the tenant finish permit.

Assessment information and sign up

For information and to sign up for a non-cost assessment from Fort Collins Utilities, go to <http://www.fcgov.com/assessment> . The applicant will need to submit a pre-assessment form at this time.

For clarifying questions about the assessment, contact either Lisa Schroers, lschroers@fcgov.com, 970-416-2032

Typical lead time from submitting a request to the assessment being performed is approximately two weeks. You will receive a report about 2-3 weeks after the assessment. Two hours are typically blocked out for the assessment. A checklist in the preassessment form on the web site gives the typical elements that are checked during an assessment.

(revised 9-12-2012)

Commercial Commissioning Fact Sheet

This fact sheet describes a Fort Collins building code change effective January 1, 2012.

Code reference: 2009 International Building Code (IBC) Section 3604 as amended by the City of Fort Collins. “**Building commissioning.** For new buildings and additions with a gross floor of greater than 15,000 ft² (1,395 m²), commissioning shall be performed in accordance with this section.”

What is building commissioning and why is it important?

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the Owner’s operational needs. It goes beyond typical equipment startup and TAB (Testing, Adjusting, and Balancing) procedures and includes integrated functional performance testing, operating personnel training, and verification of an owner’s building operation manual among other functions. Studies have show that commissioned building have lower operation and maintenance costs, use less energy and are more comfortable.

How do I comply with the code requirement?

Commissioning must be performed by a Commissioning Authority with an approved certification. See the *Commissioning Checklist* for a table of approved certifications. The commissioning authority must:

- Review the Owner’s Project Requirements (OPR) and the Basis of Design (BOD),
- Develop a commissioning plan,
- Complete a pre-functional checklist,
- Complete a functional performance test,
- Complete a commissioning report,
- Verify training, and verify a system manual meeting City requirements has been prepared.
- Commissioning requirements should also be included in the project specifications.

The following systems, if included in the building project, shall be commissioned:

- HVAC, refrigeration and associated controls
- HVAC components and systems related to Indoor Air Quality per IBC 3603.1.1 as amended by City of Fort Collins
- Quality assurance inspections of the building envelope air barrier system (see Commissioning Checklist for details)
- Lighting and shading controls
- Service water heating systems
- Renewable energy systems
- Test and document background sound levels IBC Section 3603.3.1.3 as amended by City of Fort Collins (see Acoustical Control fact sheet)

Submittal requirements:

The City of Fort Collins Commissioning Checklist, signed by the Commissioning Authority, must be submitted to Building Services prior to receiving approval.

For more information

Details of City requirements are provided in the ordinance and the *Commissioning Checklist*.



City of Fort Collins Commissioning Checklist

Project address _____ Permit # _____

Commissioning Authority
 Company Name _____ Project Manager _____

Submit proof of qualifications of Commissioning Authority (CxA) to Building Official. CxA must carry one of the following certifications: CxA by ACG (AABC Commissioning Group), CBCP by AEE (Assoc of Energy Engineers), CPMP by ASHRAE, CCP by BCA (Building Commissioning Assoc), CxAP/CAP/CxM/GcxP or GCP by Univ of Wisconsin Madison.

Initials	Date	Item
		Review Owner's project requirements (OPR)
		Review Basis of Design (BOD)
		Include commissioning requirements in project specifications
		Develop Commissioning Plan
		Complete Pre-functional Checklist
		Complete Function Performance Test
		Complete a commissioning report
		Verify owner requirements for training personnel and building occupants is complete.
		Verify that a system manual that includes operations and maintenance documentation and full warranty information, and provides operating staff the information needed to understand and operate the commissioned systems as designed has been completed.
		Commissioning of the following systems has been completed:
		HVAC, Refrigeration, and associated controls
		HVAC components and systems related to Indoor Air Quality per IBC 3603.1.1 as amended by City of Fort Collins have been inspected
		The air barrier assembly has been inspected for continuity and integrity at the following locations in the building within 5% completion of each: <ol style="list-style-type: none"> 1) Roof-wall intersections 2) Fenestration flashing 3) Fenestration installation 4) Bottom of wall (wall-to-foundation connection) 5) Connection of dissimilar wall and roof assemblies 6) Isolation of interior rooms such as mechanical and paint rooms 7) Wall and roof penetrations
		Lighting and shading controls
		Service water heating systems
		Renewable energy systems
		Test and document background sound levels per IBC Section 3603.3.1.3

I hereby attest the above mentioned address has been commissioned per 2009 International Building Code Section 3604 as amended by the City of Fort Collins.

 Commissioning Authority

 Certification Number or Stamp

 Signature Date

 Date of Expiration



Summary Commissioning Report

Code reference: 2009 International Building Code (IBC) Section 3604 as amended by the City of Fort Collins. ***“Building commissioning. For new buildings and additions with a gross floor of greater than 15,000 ft² (1,395 m²), commissioning shall be performed in accordance with this section.”***

Report Requirements:

A final summary report by the Commissioning Authority will be provided to the Owner. The report shall include –

- an executive summary,
- list of participants and roles.
- brief building description.
- the Basis of Design document.
- the Owner’s Project Requirements document,
- overview of commissioning and testing scope, and
- a general description of testing and verification methods

For each piece of commissioned equipment, the report should contain the disposition of the Commissioning Authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:

- Equipment meeting the equipment specifications,
- Equipment installation.
- Functional performance and efficiency,
- Equipment documentation and design intent, and
- Operator training.

All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, EMCS graphics etc.) and include observations and conclusions from the testing.

Appendices shall contain acquired sequence documentation, logs, meeting minutes, progress reports, deficiency lists, site visit reports, findings, unresolved issues, communications, etc. Pre-functional checklists and functional tests (along with blanks for the operators) and monitoring data and analysis will be provided in a separate labeled binder.

The commissioning plan, the pre-functional checklists, functional tests and monitoring reports are not required to be part of the final report. These are typically stored in the Commissioning Record in the O&M manuals.

City of Fort Collins approved agencies for commercial commissioning & air tightness test: (9-10-2012)

Colorado Commissioning Firms

1. Beaudin Ganze, Fort Collins (www.bgce.com , 970-221-5691)
2. Farnsworth Group, Fort Collins (www.f-w.com, 970-266-1066)
3. AEC, Boulder (<http://www.archenergy.com/> , 800-450-4454)
4. E Cube, Inc., Boulder (www.ecube.com , 303-443-2610)
5. Engineering Economics, Inc. (EEI), Golden (<http://www.eeiengineers.com/>,303-239-8700)
6. Eaton, Lakewood (www.eaton.com/energy , 303-974-1200)
7. Group 14, Denver (www.group14eng.com , 303-861-2070)
8. Ambient Energy, Denver (www.ambient-e.com , 303-278-1532)

Commercial Air Tightness testing agencies:

1. Qualified Air Barrier Testing Agencies (9/10/2012)
2. Pie Consulting & Engineering (<http://www.pieglobal.com/> , (866) 552-5246)
3. SBSA (<http://www.callsbsa.com/> , (877) 221-7272)
4. Lightly Treading (www.lightlytreading.com, 303-733-3078)

Fenestration Installation Fact Sheet

This fact sheet describes a Fort Collins building code change effective January 1, 2012.

Code reference: 2009 International Residential Code (IRC) Section R703.8.1 Fenestration Installation, and International Building Code (IBC) Section 1405.13.3, Fenestration Installation, are both amended by the City of Fort Collins as follows:

R703.8.1 Fenestration installation. For all new construction, all fenestration installations shall be in accordance with American Architectural Manufacturers Association (AAMA) Standards/ Specifications for Windows, Doors and Skylights and shall be supervised and inspected by an individual certified as an Installation Master by Architectural Testing, Inc. (ATI), or other approved agency.

What is fenestration installation, and what is the new requirement?

The requirement pertains to the installation of residential and light commercial manufactured windows and doors. The InstallationMasters training and certification program was developed to improve the installation of fenestration products. It was developed by the American Architectural Manufacturers Association (AAMA) and the American Society for Testing and Materials (ASTM), to create consistent installation practices. These installation practices are general guidelines; the manufacturer' installation instructions should always be followed, and in most cases are very similar to these guidelines. This requirement does not apply to built-in-place "store-front" windows. The City of Fort Collins Green Building Code (BGC) Amendment utilizes the InstallationMasters installation techniques, plus incorporates an important sill flashing requirement, based on building science best practice (see the EEBA Water Management guide referenced below).

Fenestration sill and perimeter flashing and how they're integrated into the building drainage plane are critical for a properly functioning building shell. Improper fenestration installation can lead to building component degradation and failure, and is one of the leading causes of potentially costly building repairs and lawsuits. Many installers are already using these best practices, but because of the lack of a standard, there are also many incorrect installations occurring.

The City of Fort Collins Fenestration Installation training class partially illustrates the Installation Master's techniques and sill flashing required to meet the City's GBC amendments. Attending this class qualifies an individual to be an "Approved Agency". This individual will then be able to install, supervise, or inspect a fenestration installation, and fill out and sign the Fenestration Installation Checklist. Any individual who is an InstallationMasters certified installer can also fill out and submit the checklist form.

How do I comply with the code requirement?

Any fenestration installation requiring permit must be performed, supervised, or inspected by an individual who is InstallationMasters certified, or who is a City of Fort Collins Fenestration Installation "Approved Agency". This individual must sign, date and submit the Fenestration Installation Checklist to Building Services prior to receiving approval.

For more information

Reference: InstallationMasters Chapter 16, New Construction Installation Method "A" or "A1".
Best practice sill and perimeter flashing integration into various drainage planes can be found in the Energy and Environmental Building Association (EEBA) Water Management guide, by Joseph W. Lstiburek, PhD, P.Eng.