2009 IECC + 2011 GEORGIA AMENDMENTS

RESIDENTIAL ENERGY CODE FIELD GUIDE

Southface

Published in 2011

Cover Design: Landon Reed Font Credit: jooki.de (http://www.dafont.com/imagine-font.font)

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Introduction

Georgia's new energy code became effective on January 1, 2011. For residential buildings, the 2009 International Energy Conservation Code, along with the Georgia State Supplements and Amendments, make up the current energy code. For links and other resources about the Georgia energy code including a video on using this residential field guide, visit: www.southface.org/energy-codes

Importance of the Energy Code

Building energy codes are important for a number of reasons:

- **Building energy codes save consumers money.** A home that does not meet code standards results in wasted energy and high operating costs. Efficient buildings use less energy, putting that money back into a building owner's pocket.

- **Building energy codes result in healthier, more comfortable buildings.** Energy codes reduce the amount of outside air that enters the home, so that occupants breathe healthier air with appropriate levels of humidity. This keeps them comfortable year-round, resulting in high rates of satisfaction. In addition, because code-built homes are more comfortable, builders typically receive fewer callbacks, which increases the home's value.

- **Energy codes boost the local economy.** The money that consumers save on their homes' operating costs can be spent on other goods and services in the local economy. Similarly, workplaces can reinvest this money to support other areas of need.

- **Energy codes reduce our dependence on foreign energy.** Buildings consume 40 percent of the energy used in the United States. Because energy codes improve the efficiency of our building stock, they reduce the amount of energy that must be imported to meet domestic demand.

Overview of the Energy Code

The Georgia residential energy code ensures that all aspects of a building's thermal envelope (walls, windows, ceilings, floors and foundation separating conditioned space from unconditioned spaces) are both well-insulated and air-sealed effectively. To ensure air-sealing is executed appropriately with correct materials (fiberglass and cellulose insulation do not serve as air-barriers), the energy code requires that builders pass a blower door test to verify that the home is not "leaky."

The residential energy code also ensures that the HVAC system is sized properly, and that its ductwork is efficient and properly installed. For example, the energy code requires that builders seal their ductwork with mastic, and that the ductwork passes a leakage test.

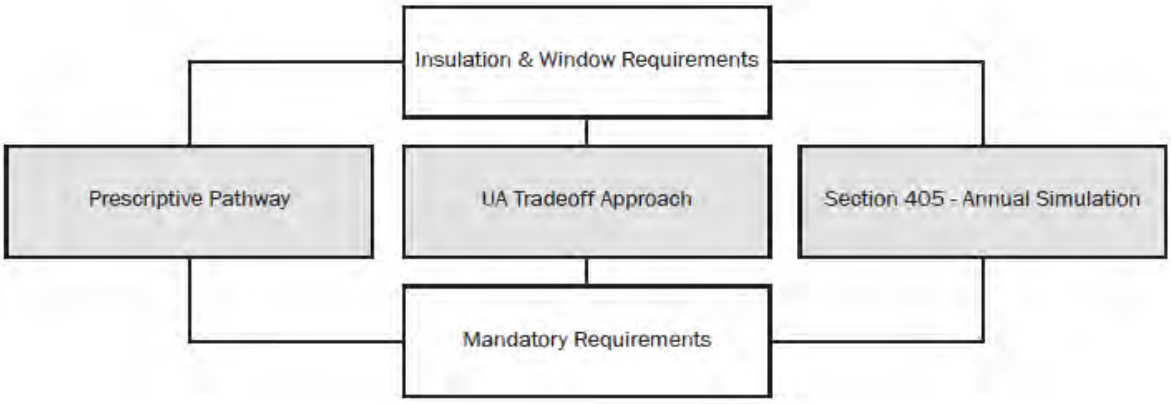
Finally, the energy code requires that a home's lighting is efficient. It requires that 50 percent of the light bulbs in permanent fixtures are either efficient (e.g., CFL or fluorescent) or controlled by occupancy or vacancy sensors.

Instructions

The Residential Energy Code Field Guide is intended for use by code officials when inspecting residential construction projects. Based upon a modified version of the Department of Energy's Building Energy Code Program residential field compliance checklist[1], this field guide illustrates key requirements of the energy code. For every requirement, the code section number, the residential field compliance checklist item number, detailed instructions, graphical elements, and photo images to demonstrate code compliance in the field are given. Each element in the field guide is in the order in which you would inspect it in a home starting with a foundation inspection, a framing inspection, an insulation inspection and a final inspection. It is important to note that some items may not apply in a particular home depending on home construction. For example, if a builder chooses to insulate the underfloor of a basement, basement wall insulation requirements do not apply.

Compliance Approach

Compliance with the insulation and window requirements in the energy code can be demonstrated by the prescriptive, trade-off (e.g., REScheck), or simulated performance approach. In evaluating building compliance, the prescriptive approach should be assumed unless documentation is provided by the builder with either the trade-off or simulated performance approach. The *Code Value* column on the checklist contains the prescriptive requirement which must be met under the prescriptive approach. Whichever trade off approach is used mandatory requirements must be met.



If a trade-off or performance approach is used to demonstrate compliance, the building may NOT comply with the prescriptive code values listed in this field guide and yet may still be deemed to comply with the code on the basis that some other aspect of the building exceeds the code requirement. For example, assume a trade-off approach was used and a valid REScheck software report was submitted showing a compliant building in Climate Zone 3 with R-19 ceiling insulation. In Climate Zone 3, the code's prescriptive insulation R-value requirement for a ceiling is listed as R-30. If the trade-off submission is valid, there will be some other building component that exceeds code requirements and offsets the non-compliant ceiling. There are minimum values you cannot "trade below" using the trade-off approach. If applicable, these minimum values are listed at the end of the description under each application.

[1] Department of Energy. State Compliance Evaluation Checklists. Retrieved from: http://www.energycodes.gov/arra/compliance_checklists.stm

Climate Zone

Many of the insulation and window requirements in the energy code depend on the climate zone of the home. This field guide lists the requirement by Climate Zone when applicable. The majority of Georgia is based in Climate Zone 3. North Georgia is in Climate Zone 4 and South Georgia is in Climate Zone 2. To look up your climate zone by county, see the table below:

Climate Zone 4				
Banks	Fannin	Habersham	Rabun	White
Catoosa	Floyd	Hall	Stephens	Whitfield
Chattooga	Franklin	Lumpkin	Towns	
Dade	Gilmer	Murray	Union	
Dawson	Gordon	Pickens	Walker	
Climate Zone 3				
Baldwin	Crawford	Henry	Muscogee	Taylor
Barrow	Crisp	Houston	Newton	Telfair
Bartow	DeKalb	Irwin	Oconee	Terrell
Ben Hill	Dodge	Jackson	Oglethorpe	Tift
Bibb	Dooly	Jasper	Paulding	Treutlen
Bleckley	Dougherty	Jefferson	Peach	Troup
Bulloch	Douglas	Jenkins	Pike	Turner
Burke	Early	Johnson	Polk	Twiggs
Butts	Elbert	Jones	Pulaski	Upson
Calhoun	Emanuel	Lamar	Putnam	Walton
Candler	Fayette	Laurens	Quitman	Warren
Carroll	Forsyth	Lee	Randolph	Washington
Chattahoochee	Fulton	Lincoln	Richmond	Webster
Cherokee	Glascock	Macon	Rockdale	Wheeler
Clarke	Greene	Madison	Schley	Wilcox
Clay	Gwinnett	Marion	Screven	Wilkes
Clayton	Hancock	McDuffie	Spalding	Wilkinson
Cobb	Haralson	Meriwether	Stewart	Worth
Coffee	Harris	Monroe	Sumter	
Columbia	Hart	Montgomery	Talbot	
Coweta	Heard	Morgan	Taliaferro	
Climate Zone 2				
Appling	Bryan	Decatur	Lanier	Pierce
Atkinson	Camden	Echols	Liberty	Seminole
Bacon	Charlton	Effingham	Long	Tattnall
Baker	Chatham	Evans	Lowndes	Thomas
Berrien	Clinch	Glynn	McIntosh	Toombs
Brantley	Colquitt	Grady	Miller	Ware
Brooks	Cook	Jeff Davis	Mitchell	Wayne

Slab Edge Insulation

Code Section	*402.1.1, 303.2, 402.2.8*
Checklist Item #	[FO1][FO2][FO3]
Code Value	**Unheated: R-0; Heated: R-5**
Description	Insulation for an unheated slab is not required. Heated slabs are required to be insulated where the floor surface is less than 12 in. below grade. Insulation must start at the top surface the slab and extend downward to completely cover the slab edge. It can also be located outside the foundation wall. Insulation depth must be the depth of the footing or 2 feet, whichever is less.

Slab Edge Insulation Diagram*

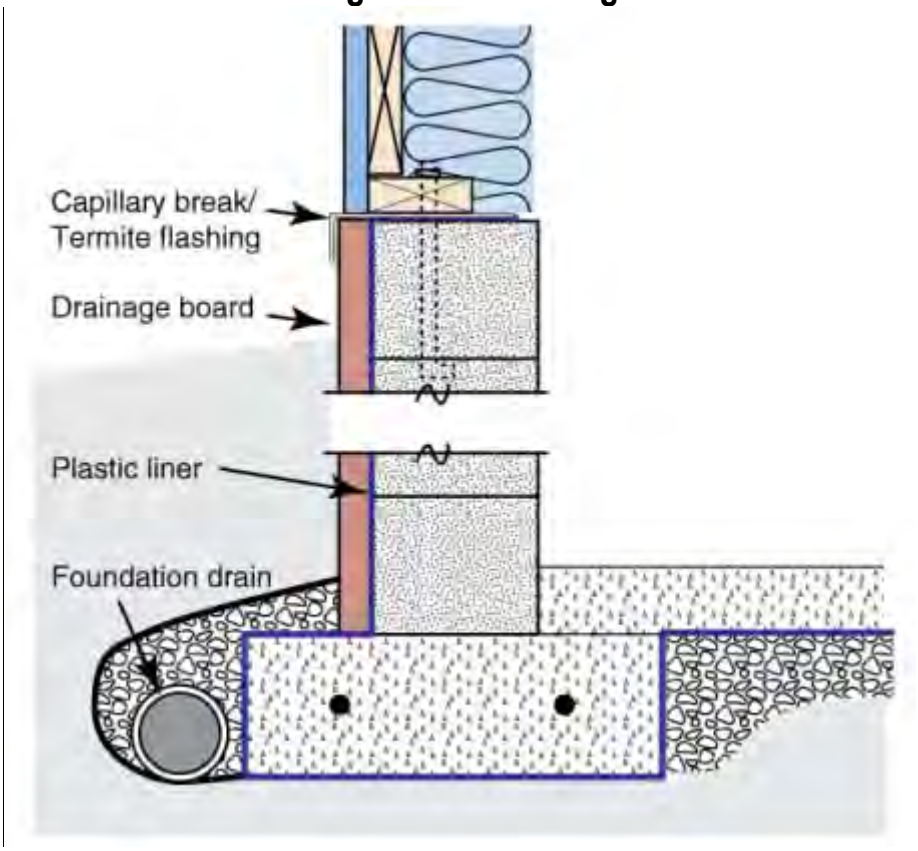


*Diagram also illustrates best practice moisture management techniques.

Basement Wall Exterior Insulation

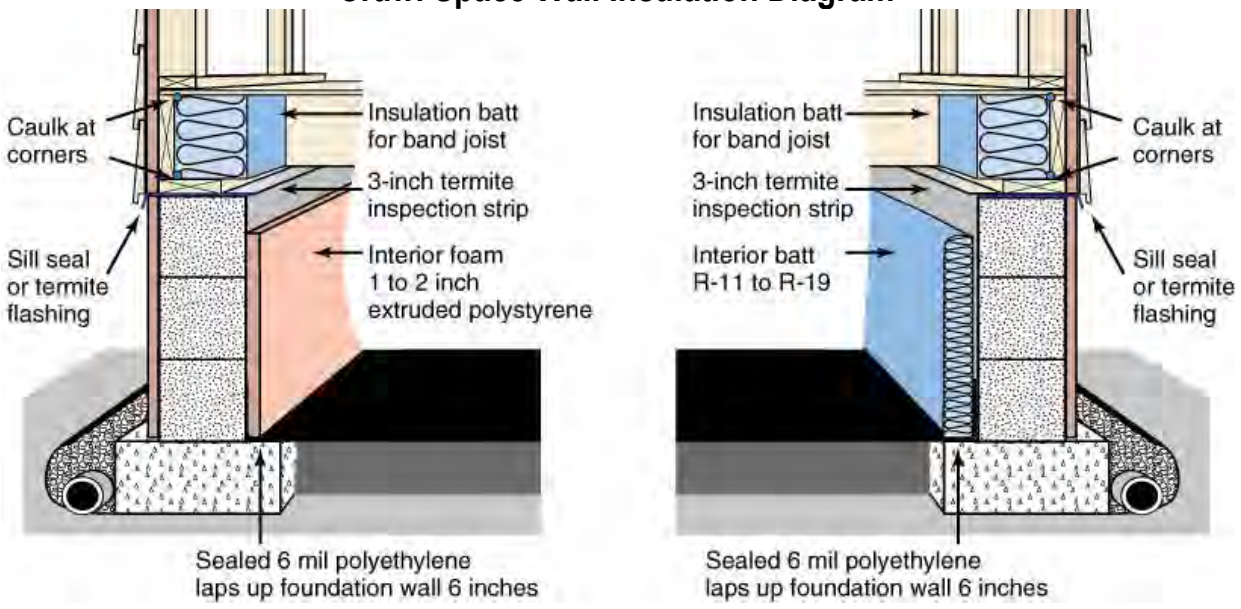
Code Section	*402.1.1, 303.2, 402.2.7, 402.1.4*
Checklist Item #	[FO4] [FO5] [FO6]
Code Value	**CZ2:R-0** **CZ3:Continuous: R-5** **CZ4:Continuous: R-10**
Description	If insulation is installed on the exterior of the basement wall, code values listed above apply. Insulation may also be applied on the interior of the wall, on a basement wall or on the underfloor of the subfloor decking. If this is the case, see "Basement Wall Interior Insulation," "Wall Insulation" or "Floor Insulation" for the appropriate application. A basement wall is one that is at least 50% below grade. Insulation must be installed according to manufacturer's instructions. For the prescriptive approach, the insulation length (from the top of the basement wall to the basement floor) must be the lesser of 10 feet or to the top of the basement floor. Note: If REScheck is used, minimum insulation for basement walls is R-5 in CZ3 and CZ4.

Basement Wall Exterior Insulation

Crawl Space Wall Insulation

Code Section	*402.2.9, 303.2*
Checklist Item #	[FO7] [FO8]
Code Value	**CZ2:R-0** **CZ3:Continuous: R-5; Cavity: R-13** **CZ4:Continuous: R-10; Cavity: R-13**
Description	Insulation must be installed according to manufacturer's instructions for crawl spaces that are not v entilated to the o utside. Crawlspace wall insulation must be permanently fastened to the wall and extend downward from the floor to within 9 inches of the finished interior grade. A 3-inch inspection/view strip immediately below the floor joists must be provided to permit inspections for termites. If the crawl space is ventilated, the floor above the crawl space must be insulated instead of insulating the crawl space walls.

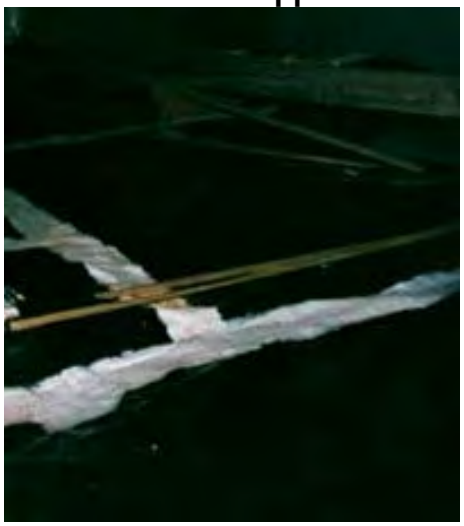
Crawl Space Wall Insulation Diagram



Crawl Space Vapor Retarder

Code Section	*402.2.9*
Checklist Item #	[FO9]
Description	A Class I vapor retarder must be applied to the entire floor and run at least 6 in. up the walls of the crawl space and sealed to the walls. A Class I vapor retarder has a perm rating of less than 0.1 perm (such as polyethylene). Any seams in the vapor retarder must have an overlap of at least 6 in. and be sealed or taped. Note: The energy code only requires a vapor retarder for vented crawlspaces but the 2009 IRC requires a vapor retarder for both vented and unvented crawlspaces. See above code item, "Crawl Space Wall Insulation," for diagram of vapor retarder sealing.

Sealed and Overlapped Seams



Sealed and Applied 6 in. up Wall

Insulation Protection

Code Section	*303.2.1*
Checklist Item #	[FO10]
Description	All slab, basement wall, or crawl space insulation exposed to the outside must be protected from damage by an opaque covering.

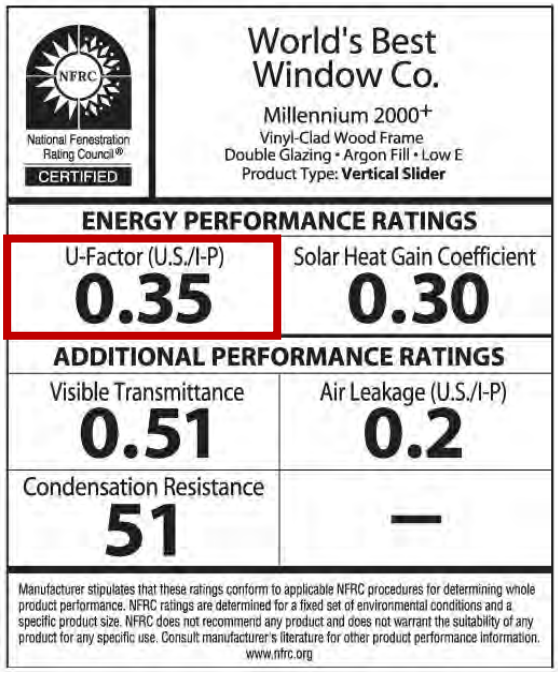
Snow Melt

Code Section	*403.8*
Checklist Item #	[FO11]
Description	If the building is provided with a snow or ice melting system (uncommon in the Southeast), the system must have controls to automatically shut the system off when the pavement temperature is above 50 ºF and precipitation is falling, and controls to automatically or manually shut the system off when the outdoor temperature is above 40 ºF.

Fenestration (e.g., windows and doors) U-Factor

Code Section	*402.1.1, 402.3.1, 402.3.3, 402.3.4, 402.5, 303.1.3, 402.3.5, 402.1.4*
Checklist Item #	[FR1] [FR2] [FR4] [FR8]
Code Value	**CZ2:U-0.50; Impact Rated: U-0.75** **CZ3:U-0.50; Impact Rated: U-0.65** **CZ4:U-0.35**
Description	An area-weighted average can be used to satisfy the U-factor requirement. For the prescriptive approach only, up to 15 ft^2 of the total glazed fenestration, including skylights, do not have to meet the specified U-factor in the code. Glazing must be labeled and certified as meeting NFRC standards. If glazing is not NFRC certified, default values in Table 303 must be used and these default values do not meet the prescriptive requirements in the energy code.[2] Under the prescriptive approach only, up to 24 ft^2 of side-hinged door do not have to meet the specified U-factor in the code. This exemption does not apply to attic access doors. Note: If REScheck is used, maximum U-factor is 0.50 for windows in CZ2 and CZ3, or 0.48 in CZ4.

NFRC Glazing Label (Highlighting U-Factor)

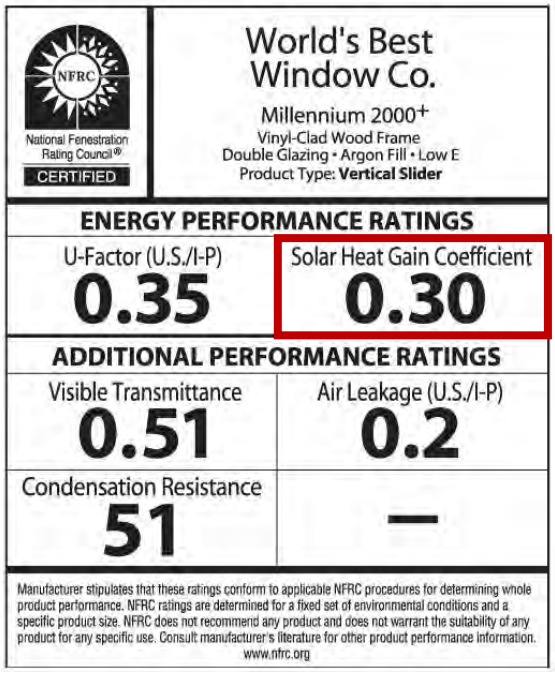


[2]If fenestration without an NFRC label is used, a builder can show compliance by demonstrating that an area-weighted average of all windows meet code. To meet the code in this way, the majority of installed fenestration must be "better than code." A builder could also demonstrate compliance by making trade-offs using REScheck or the simulated performance alternative.

Glazed Fenestration (e.g., windows and doors) and Skylight SHGC Values

Code Section	*402.1.1, 402.3.2, 402.3.3, 303.1.3, 402.3.5, 402.1.4*
Checklist Item #	[FR3] [FR4] [FR7]
Code Value	**SHGC: 0.30**
Description	An area-weighted average can be used to satisfy the SHGC requirement. For the prescriptive approach only, up to 15 ft^2 of glazed fenestration do not have to meet the specified SHGC requirement. Glazing must be labeled and certified as meeting NFRC standards. If glazing is not NFRC certified, default values in Table 303 must be used and these default values do not meet the prescriptive requirements in the energy code.[2] Note: If REScheck is used, maximum SHGC is 0.30 for windows.

NFRC Glazing Label (Highlighting SHGC)



Skylight U-Factor

Code Section	*402.1.1, 402.3.3, 402.5, 303.1.3*
Checklist Item #	[FR5] [FR7][FR9]
Code Value	**CZ2:U-0.75** **CZ3:U-0.65** **CZ4:U-0.60**
Description	Glazing that is at least 15 degrees from vertical installed in the building envelope is subject to this requirement. For the prescriptive approach only, up to 15 ft^2 of the total glazed fenestration, including skylights, do not have to meet the specified U-factor in the code. Glazing must be labeled and certified as meeting NFRC standards. If glazing is not NFRC certified, default values in Table 303 must be used and these default values do not meet the prescriptive requirements in the energy code. Note: If REScheck is used, maximum SHGC is 0.75 for windows in CZ4.

Mass Wall Exterior Insulation

Code Section	*402.1.1, 303.2, 402.1.4*
Checklist Item #	[FR10], [FR11]
Code Value	**CZ2:R-4** **CZ3:R-5** **CZ4:R-5**
Description	An above-grade mass wall is one that is less than 50% below grade. If the wall is at least 50% above grade, see "Basement Wall Exterior Insulation" requirements. Mass wall insulation must be installed in accordance with the manufacturer's installation instructions. If more than half the insulation is on the interior, the mass wall interior insulation requirement applies (see "Wall Insulation" requirements). Note: If REScheck is used, minimum insulation for mass walls is R-4 in CZ2 or R-5 in CZ3 and CZ4.

Duct Insulation

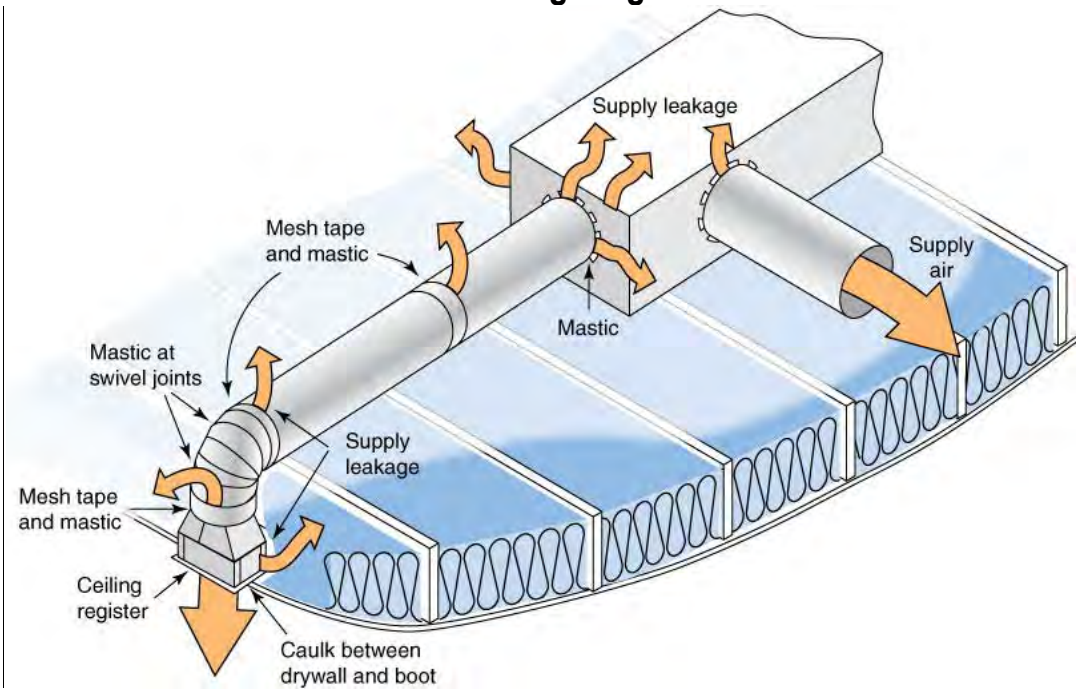
Code Section	*403.2.1*
Checklist Item #	[FR12]
Code Value	**Attic Supply: R-8; Other: R-6**
Description	R-value(s) of insulation apply to heating and/or cooling ducts that are not completely inside the building thermal envelope (e.g., are located outside the conditioned space). Attic supply ducts must be R-8. Other insulation requirements apply to supply and return ducts in unconditioned spaces that are not attic spaces, like an unconditioned basement or crawlspace and return ducts in an unconditioned attic.

R-8 Insulation of Attic Supply Duct

Duct Sealing

Code Section	*403.2.4*
Checklist Item #	[FR13]
Description	The joints and seams of all ducts, air handlers, filter boxes, and building cavities used as return air ducts must be sealed with mastic or mastic tape that is at least as thick as a nickel (0.08 inches (2 mm) in thickness).

Duct Sealing Diagram



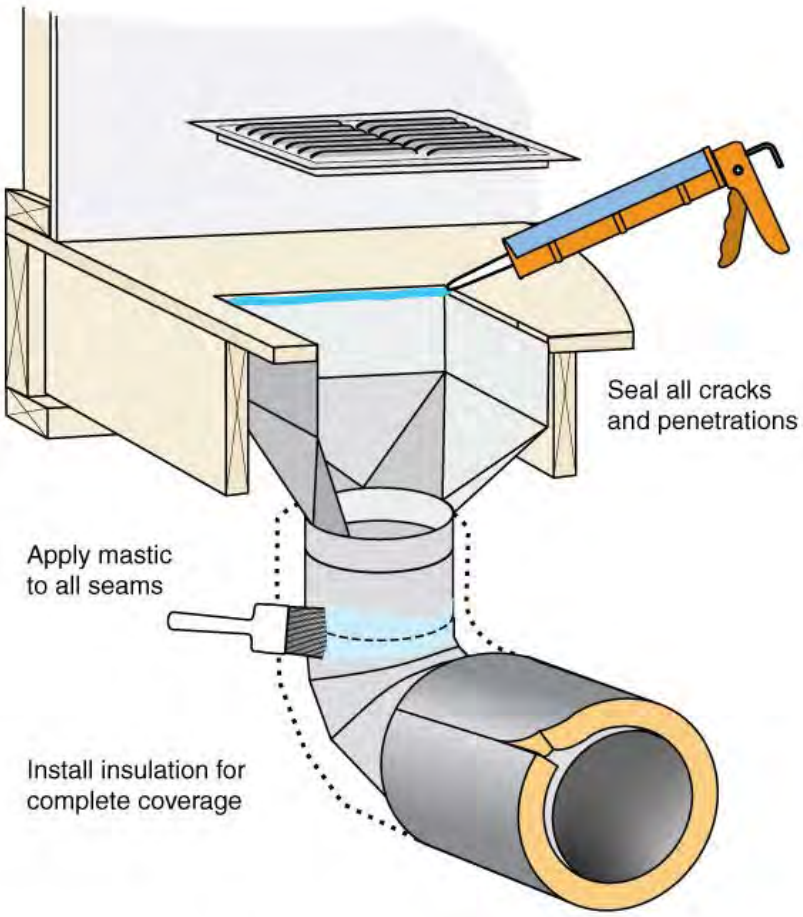
INCORRECT: UL-181 Tape *without* Mastic

Duct Sealing (cont.)

INCORRECT: No Mastic

CORRECT: Mastic-sealed Joints

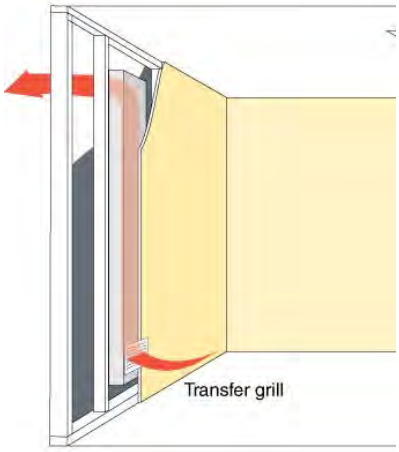
Duct Sealing Diagram



No Building Cavities as Supply or Return Ducts

Code Section	*403.2.3*
Checklist Item #	[FR15]
Description	Building cavities may not be used as supply or return ducts (e.g., function to actually form the duct). All supply and return ducts must be lined with metal, flex duct, ductboard or other material approved in section M1601 of the IRC.

CORRECT: Metal-lined Cavity

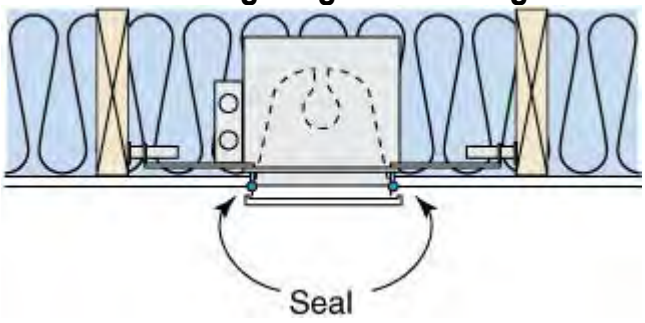


INCORRECT: Unlined Cavity as Plenum

IC-Rated Recessed Lighting Fixtures

Code Section	*402.4.5*
Checklist Item #	[FR16]
Description	Recessed lighting fixtures must be air-tight and IC-rated in areas with insulation.and have a gasket or caulk applied between the fixture housing and the interior finish of the space.

Recessed Lighting Fixture Diagram



INCORRECT: Standard Fixture

CORRECT: IC-Rated and Air-Tight

HVAC Piping Insulation

Code Section	*403.3*
Checklist Item #	[FR17]
Code Value	**R-3**
Description	HVAC system piping capable of carrying fluides above 105°F or below 55°F must be insulated. Usually 3/8 of an inch of insulation is not a cceptable. ½ an inch of insulation is equivalent to R-3 insulation.

HVAC Piping Insulation

Source: DOE

Z

Circulating Hot-Water Piping Insulation and Controls

Code Section	*403.4*
Checklist Item #	[FR18] [FI11]
Code Value	**R-2**
Description	Circulating hot water piping must be insulated. All pumps must also have either automatic controls or a manual control that is readily accessible to turn off the system when not in use.

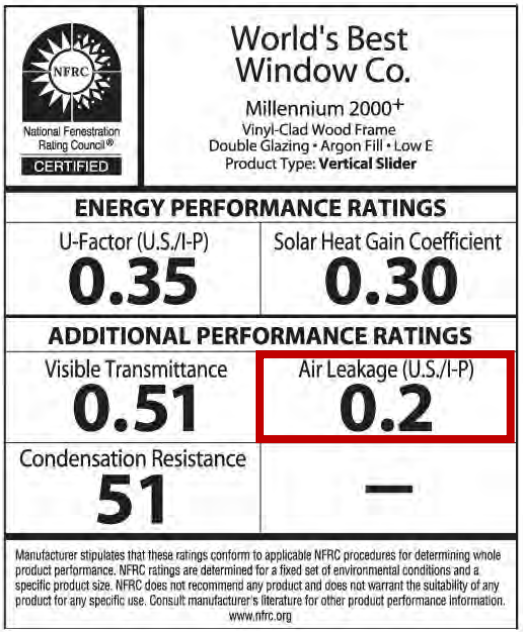
Outdoor Intake/Exhaust Openings

Code Section	*403.5*
Checklist Item #	[FR19]
Description	All outdoor intake and ex haust openings must have either gravity (self-closing) or automatic dampers that will close when the system associated with the air intake or exhaust is not functioning. To ensure that dampers close correctly, direction of airflow must be taken into account when installed.

Fenestration Air Leakage

Code Section	*402.4.4*
Checklist Item #	[FR20] [FR22]
Code Value	**0.3 cfm/ft²**
Description	Each window, skylight, and sliding glass door must be tested to the referenced NFRC 400 or AAMA/WDMA/CSA standards and meet the required air infiltration rate. If the tested rate is not shown on the assembly, one could determine the make and model number and consult the manufacturer's web site or other source of data to determine the air leakage of the assembly as tested by an independent laboratory. Each window, skylight and sliding glass door must also have a label, seal, symbol or other identifying mark indicating the test results or compliance with the code. Site-built windows, skylights, and sliding glass doors are not required to meet this requirement.

NFRC Glazing Label (Highlighting SHGC)



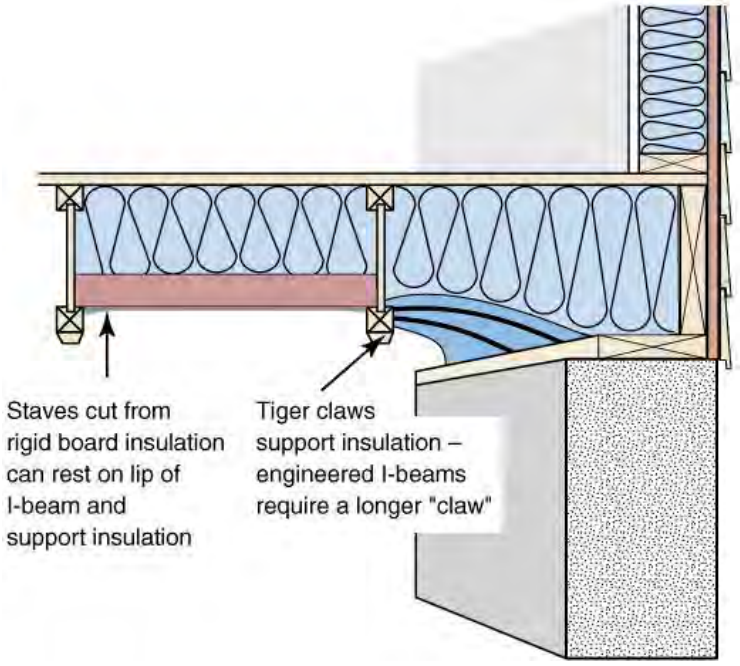
Swinging Door Air Leakage

Code Section	*402.4.4*
Checklist Item #	[FR21] [FR22]
Code Value	**0.5 cfm/ft²**
Description	Each swinging door must be tested to the referenced NFRC 400 or AAMA/WDMA/CSA standards and meet the required air infiltration rate. If the tested rate is not shown on the assembly, one could determine the make and model number and consult the manufacturer's web site or other source of data to determine the air leakage of the assembly as tested by an independent laboratory. Each swinging door must also have a label, seal, symbol, or other identifying mark indicating the test results or compliance with the code. Site built swinging doors are not required to meet this requirement.

Floor Insulation

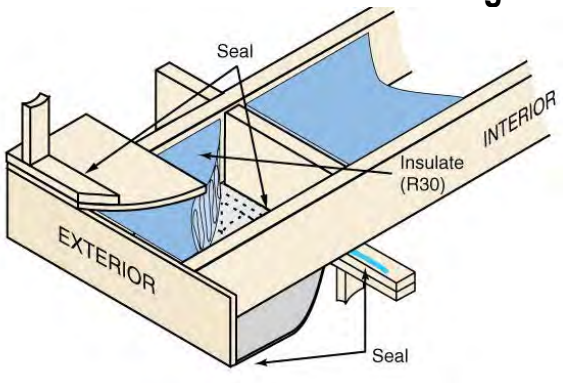
Code Section	*402.1.1, 402.2.5, 402.2.6, 303.2, 402.1.4*
Checklist Item #	[IN1] [IN2]
Code Value	**CZ2: Wood: R-13;** **Steel[3]: R-19 in 2x6; R-19+R-6 in 2x8 or 2x10** **CZ3&: Wood: R-19;** **CZ4 Steel[3]: R-19+R-6 in 2x6; R-19+R-12 in 2x8 or 2x10**
Description	Floor insulation must be i nstalled on any wood-framed, steel-framed, or raised concrete floor associated with the building thermal envelope. Floor insulation must be installed in accordance with the manufacturer's installation instructions and in permanent continuous contact with the underside of the subfloor decking. Cantilevered floors over the outdoors must be R-30 and the band area above the exterior wall must be blocked. Note: If REScheck is used, minimum insulation value for floors over unheated spaces is R-13.

Proper Floor Insulation Diagram



INCORRECT:Poor Insulation Coverage

Cantilevered Floor Insulation Diagram



[3] Cavity insulation R-value is listed first, followed by continuous insulation R-value.

Wall Insulation

Code Section	*402.1.1, 402.2.4, 402.2.5, 303.2, 402.2.11, 402.1.4*
Checklist Item #	[IN3] [IN4] [IN8] [IN9]
Code Value	**CZ2: Wood: R-13** **Mass: Interior: R-6; Exterior or Integral: R-4** **Steel[4]: R-13+R-5; R-15+R-4; R-21+R-3; R-0+R-10** **CZ3: Wood: R-13** **Mass: Interior: R-8; Exterior or Integral: R-5** **Steel[4]: R-13+R-5; R-15+R-4; R-21+R-3; R-0+R-10** **CZ4: Wood: R-13** **Mass: Interior: R-10; Exterior or Integral: R-5** **Steel[4]: R-13+R-5; R-15+R-4; R-21+R-3; R-0+R-10**
Description	Insulation must be applied to wood-framed, steel-framed, and mass walls that are above grade and associated with the building thermal envelope. An above-grade wall is one that is more than 50% above grade. Mass walls are those of concrete block, concrete, ICFs, masonry cavity, brick (non-veneer), earth/adobe, and solid timber/logs. Wall insulation must be installed in accordance with the manufacturer's installation instructions and all places in the wall that will accommodate insulation must be insulated. Insulation in sunroom walls (rooms thermally isolated from conditioned space) must meet this criteria. Note: If REScheck is used, minimum insulation value for cavity (stud) walls is R-13 and minimum insulation for mass walls is R-4 in CZ2 or R-5 in CZ3 and CZ4.

CORRECT: Batt in Wood-framed Cavity

INCORRECT: Unfilled Cavity

CORRECT: Full Coverage and No Compression

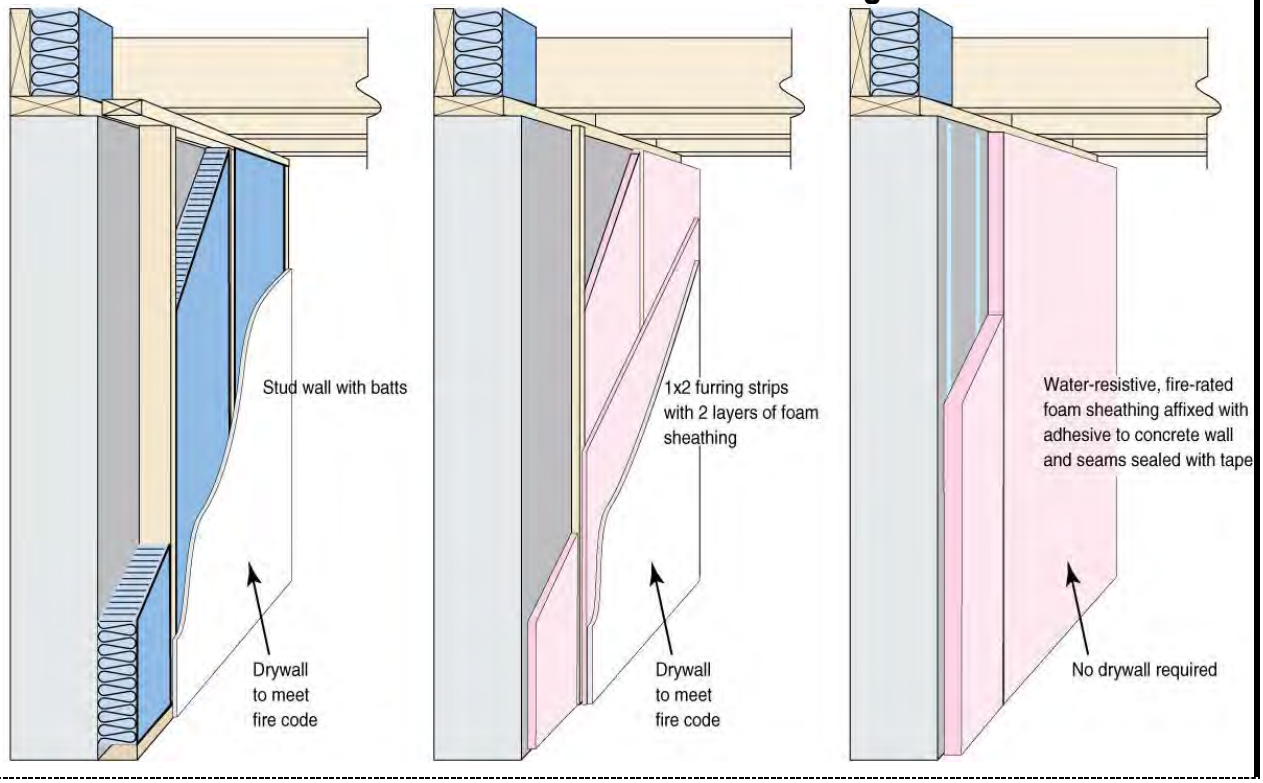
INCORRECT: Compression and Poor Coverage

[4] Cavity insulation R-value is listed first, followed by continuous insulation R-value.

Basement Wall Interior Insulation

Code Section	*402.1.1, 302.2, 402.2.7, 402.1.4*
Checklist Item #	[IN5] [IN6] [IN7]
Code Value	**CZ2:R-0** **CZ3:Continuous: R-5; Cavity: R-13** **CZ4:Continuous: R-10; Cavity: R-13**
Description	A basement wall is one that is at least 50% below grade. If the floor above the basement and other components separating the basement from the rest of the building are not insulated, insulation must be applied to the interior or exterior walls. For exterior wall insulation requirements, see "Basement Wall Exterior Insulation." Basement wall insulation must extend to the basement floor or to 10 ft, whichever is less. Basement wall insulation must be installed in accordance with the manufacturer's installation instructions and all places in the wall that will accommodate insulation must be insulated. Note: If REScheck is used, minimum insulation value for basement walls is R-0 in Climate Zone 2 and R-5 in Climate Zone 3 and 4.

Basement Wall Interior Insulation Diagram



Basement Wall Interior Insulation (cont.)

Insulation Installed in Full Contact with Wall

INCORRECT (CZ3&4): Insulation not on Concrete Portion of Basement Wall

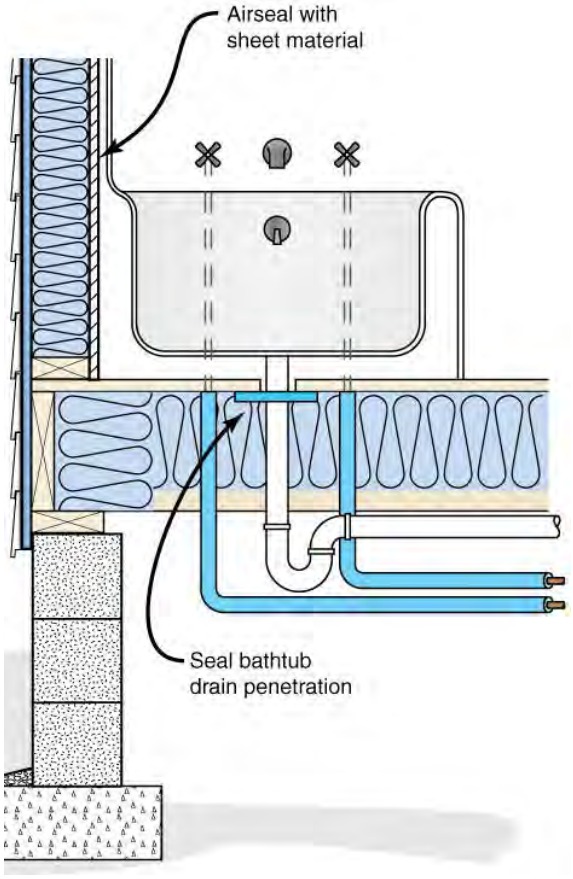
Insulation R-values

Code Section	*303.1*
Checklist Item #	[IN13]
Description	All insulation installed in the building thermal envelope must have a label on the insulation indicating the R-value of the insulation or a certificate verifying the type of insulation, the installed thickness and installed R-value. In addition, a certificate for blown in insulation must provide the installed density, coverage and number of bags of insulation.

Air-seal and Insulate Tubs and Showers

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	Insulation and a sealed air barrier must be installed behind all tubs and showers located on exterior walls. In addition, all plumbing penetrations must be appropriately air-sealed.

Tub Air-sealing and Insulation Diagram



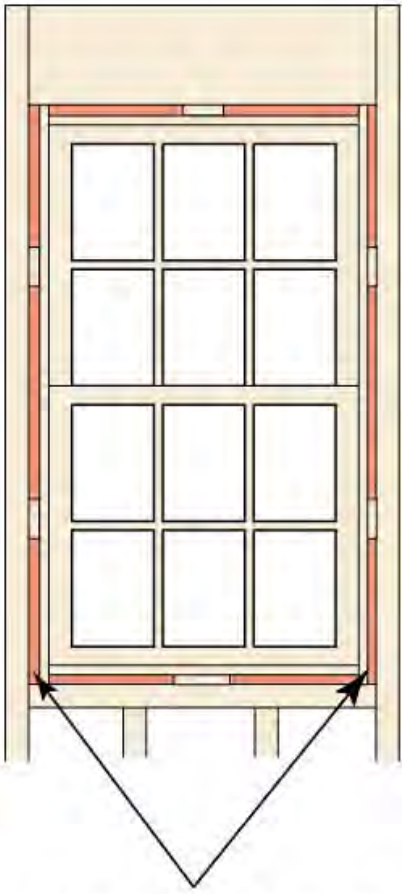
CORRECT: Air Barrier and Insulation Behind Tub

INCORRECT: Drain Penetration Open

Air-seal Window/Door Openings

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	Gaps between window and door and rough opening must be air-sealed (e.g., with low expanding foam or backer rod).

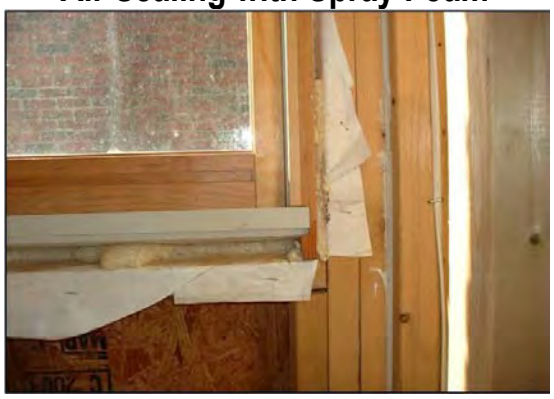
Window Air-sealing Diagram



Use backer rod or low expanding spray foam (appropriate for windows) to fill gaps between window/door and rough opening

Air Sealing with Backer Rod

Air Sealing with Spray Foam

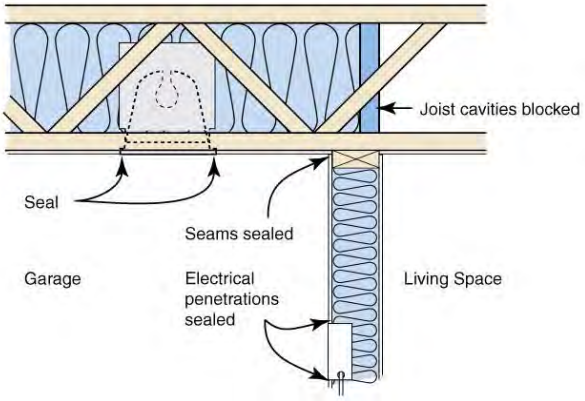


Air-seal Assemblies Separating Garage

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	Walls and ceilings seperating garage from conditioned space must be air-sealed. For example, all floor joists above attached garages must be blocked and sealed.

INCORRECT: Air Bypass Behind Stairs

Air-sealing Assembly for Garage

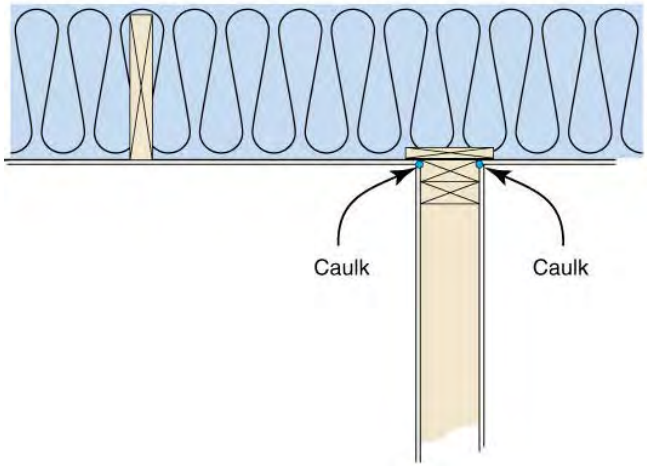


CORRECT: Joist Cavities Blocked

Air-seal Bottom Plate and Top Plate

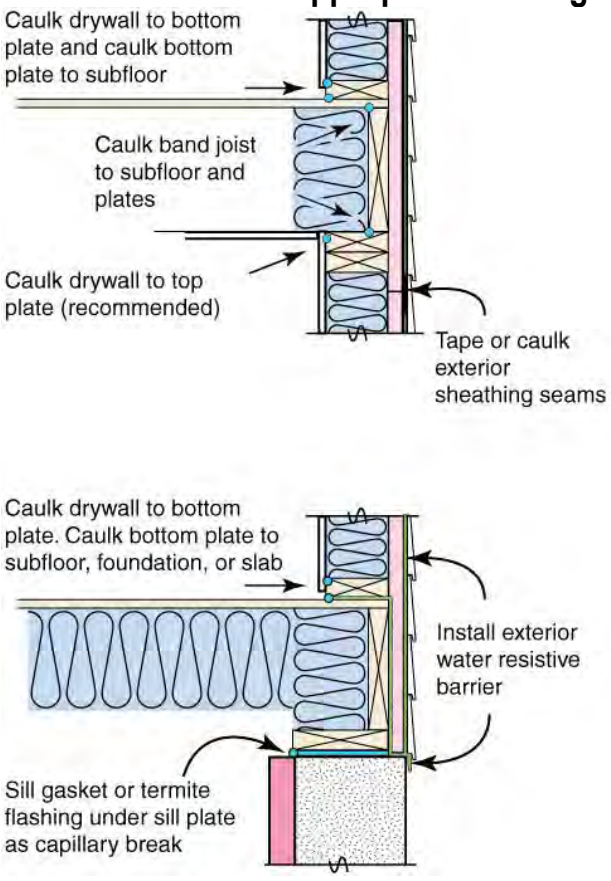
Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	All joints, seams, and penetrations must be sealed. For example, bottom plates of walls separating conditioned and unconditioned spaces must be sealed to subfloor or foundation. Top plate must also be sealed to drywall at all interfaces between unconditioned attic and wall. Sealant may be applied from attic side to joints between drywall and top plate.

Top Plate Air-sealing Diagram



Caulking Around Bottom Plate

Wall Section with Appropriate Sealing



Air-seal Seams in Exterior Sheathing

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	All joints, seams and penetrations must be sealed. For example, gaps in exterior sheathing must be sealed using appropriate sealant.

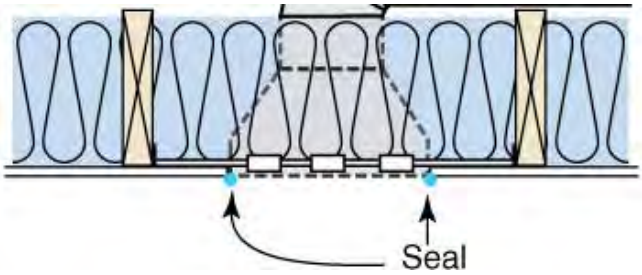
INCORRECT: Gaps in Sheathing

CORRECT: Sealing Exterior Sheathing

Air-seal Utility Penetrations

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	All utility penetrations through areas seperating conditioned space from unconditioned spaces must be air sealed. For example, penetrations from plumbing, wiring, ductwork, exhaust fans, light fixtures, and electrical boxes through top and bottom plates, exterior sheathing, band and rim joists, insulated walls, insulated ceilings, and insulated subfloors must be sealed.

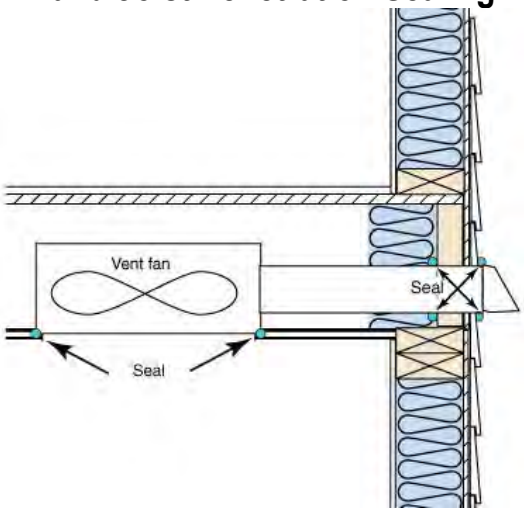
Ductboot Penetration Sealing



INCORRECT: Unsealed Sheathing Penetration

CORRECT: Air-sealed Utility Penetrations

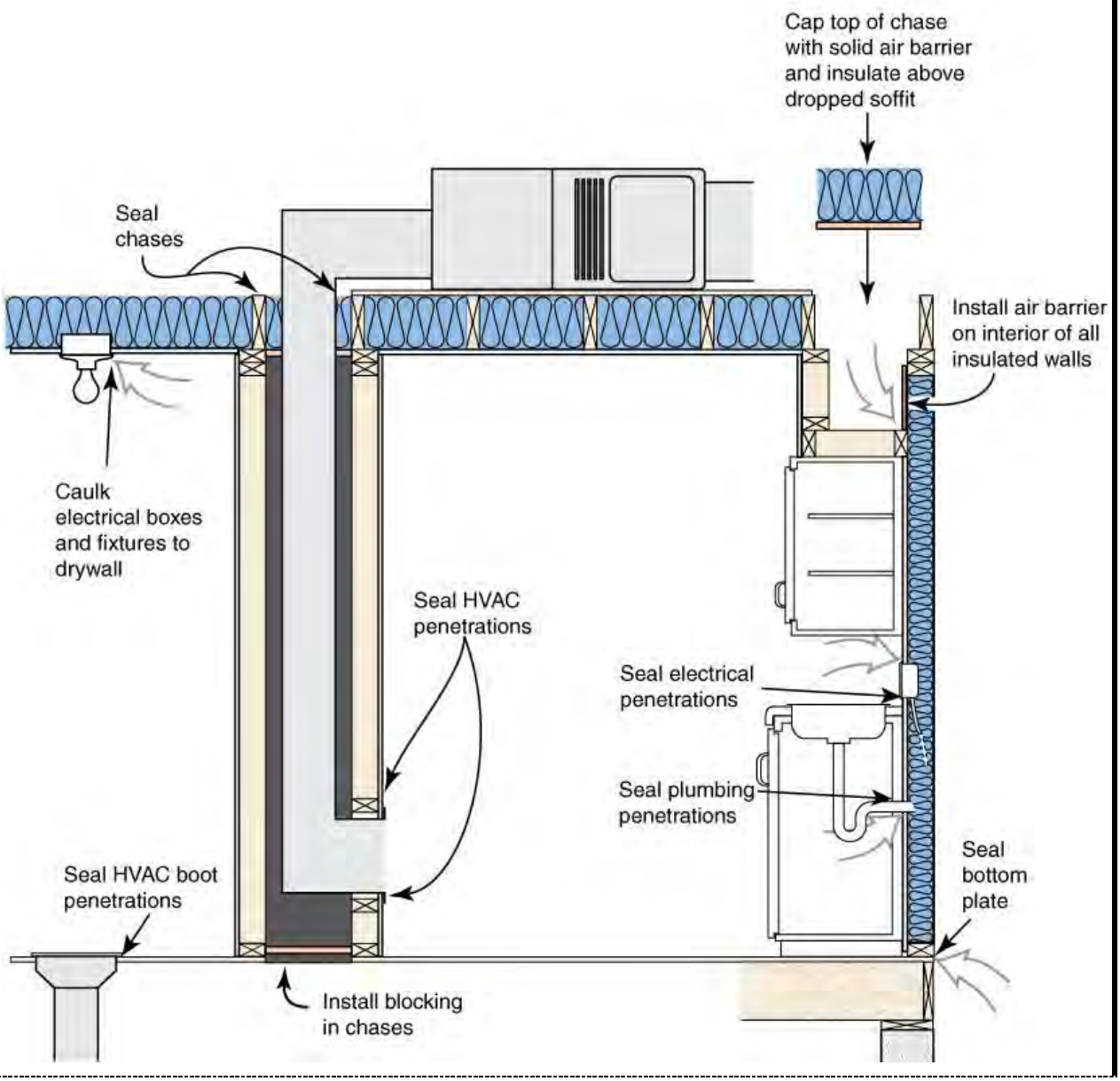
Band Joist Penetration Sealing



Air-seal Dropped Ceilings and Chases

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16]
Description	Framed spaces that connect conditioned areas to unconditioned areas above and below the chase (including attics, unconditioned basements, or vented crawl spaces) must be air-sealed (e.g., using sheet material and appropriate sealant). These areas include chases for plumbing, duct work, chimneys, and flues. Dropped ceilings/soffits between conditioned areas and the attic must also be air-sealed.

Proper Air-sealing for Chases



Air-seal Dropped Ceilings and Chases (cont.)

INCORRECT: Improperly Capped Chase

INCORRECT: Unsealed Chase

CORRECT: Well-capped Chase

CORRECT: Well-sealed Chase (Prior to Duct Installation)

Air-seal Rim Joist Junctions

Code Section	*402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16] [FI2]
Description	All penetrations (e.g., from holes drilled for HVAC lines, plumbing lines, bathroom fans, exhaust fans, and electrical lines) through the band/rim joist located between conditioned and unconditioned spaces must be sealed. Seal all seams in rim joist sheathing separating conditioned and unconditioned spaces between conditioned floors. Rim joist should be sealed to top plate, subfloor and at butt joints, or at exterior sheathing. See above code item, "Air-seal Bottom Plate and Top Plate" and "Air-seal Utility Penetrations" for diagram of air-sealing of rim joist.

Air-sealed Rim Joist Junction

Ceiling Insulation

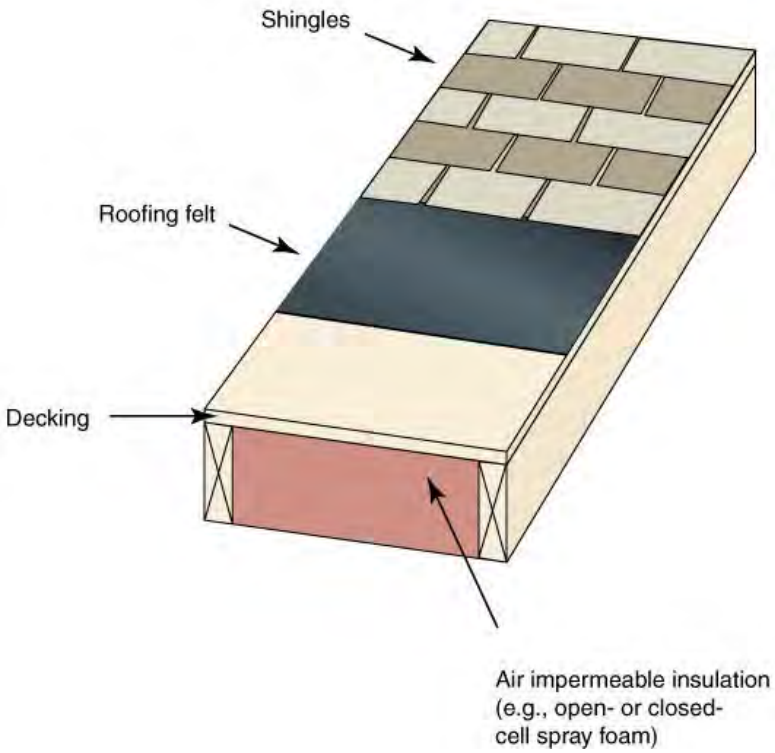
Code Section	*402.1.1, 402.2.1, 402.2.2, 402.2.11, 303.1.1.1, 303.2, 402.1.4*
Checklist Item #	[FI1] [IN10] [IN11]
Code Value	**CZ2 & Wood: R-30** **CZ3 Steel truss equivalent[5]: R-38, R-30+R-3, R-26+R-5** **Steel joist equivalent[5]: R-38 in 2x4, 2x6, or 2x8** **CZ4: Wood: R-38** **Steel truss equivalent[5]: R-49; R-38+R-3** **Steel joist equivalent[5]: R-49 in 2x4, 2x6, 2x8, or 2x10**
Description	For blown-in attic insulation, rulers must be provided for every 300 ft^2 of attic space. For attic HVAC platforms, R-19 is acceptable to meet the requirements of R-30/R38 in the ceiling for up to 32 ft^2 of attic decking per HVAC system. R-19 is also acceptable underneath a maximum 32" wide passage to the HVAC system. Insulation in sunroom ceilings (rooms thermally isolated from conditioned space) must meet this criteria. All insulation must be installed in accordance with the manufacturer's installation instructions. Note: If REScheck is used, minimum insulation value for ceilings with attic spaces is R-30. For attics with air-permeable (fiberglass or cellulose) insulation installed on the roofline, a minimum of R-19 insulation and additional R-5 air-impermeable insulation is required in Climates Zone 2 and 3 if REScheck is used. In Climate Zone 4, R-15 air-impermeable insulation must be installed in addition to the R-19 air-permeable insulation. If air-impermeable insulation is installed on the roofline, R-19 is the minimum when REScheck is used. See Appendix A of the Georgia Amendments for additional technical illustrations of roofline installed insulation requirements.

Ceiling Insulation Ruler

[5] Cavity insulation R-value is listed first, followed by continuous insulation R-value.

Ceiling Insulation (cont.)

Roofline Impermeable Insulation Assembly (e.g. Spray Foam)

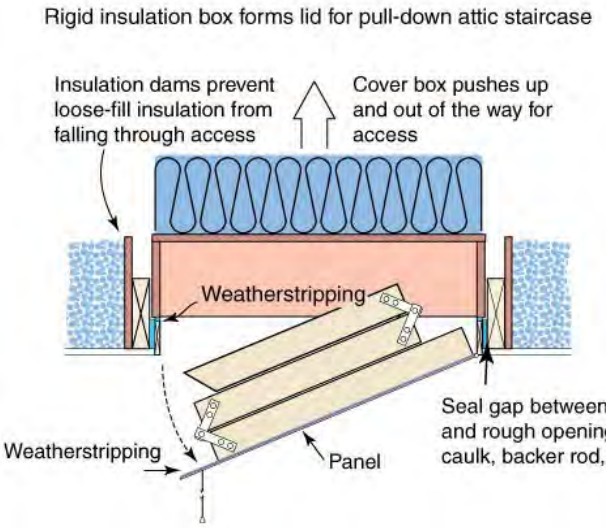


Spray Foam Application

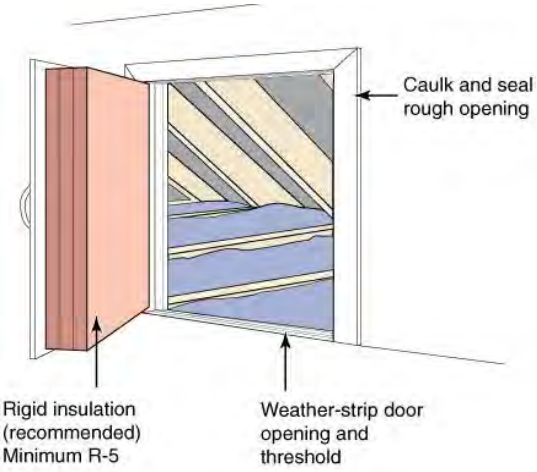
Attic Access

Code Section	*402.2.3, 402.4.1, 402.4.2*
Checklist Item #	[IN14] [IN15] [IN16] [FI3]
Code Value	**Hatches/Scuttle hole covers: R-19; Vertical doors/stairs: R-5**
Description	The attic access must be insulated and air-sealed (weather stripped). A wood framed or equivalent baffle or retainer is required where loose fill insulation is installed.

Attic Pull-Down Stairs

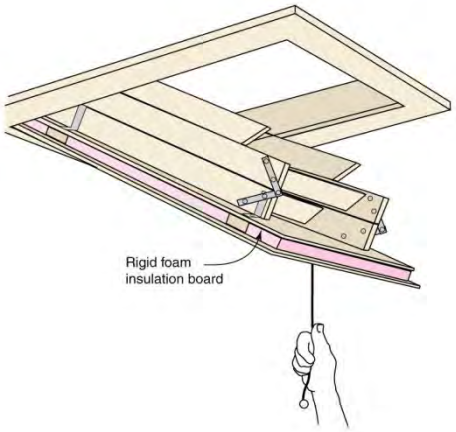


Attic Kneewall Door



Attic Access Hatch with Batt Insulation

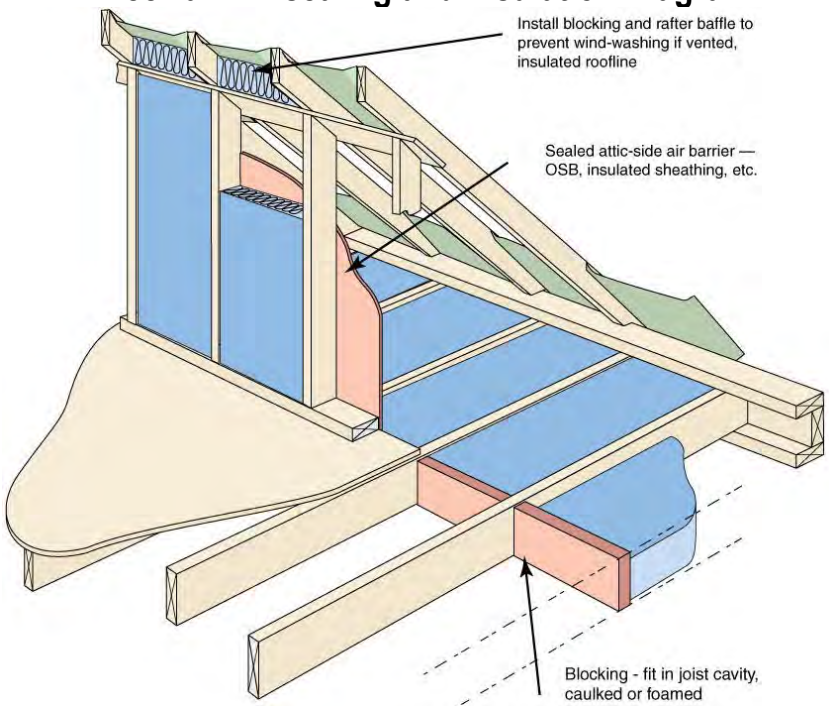
Attic Stairs Insulation



Attic Kneewall

Code Section	*402.1.1, 402.1.4*
Checklist Item #	[FI13ga]
Code Value	**R-18**
Description	An attic kneewall is defined as any vertical or near vertical wall in the building envelope that has conditioned space on one side and attic space on the other side. All attic kneewalls must be insulated and air-sealed. Attic kneewalls may be insulated using R-13+R-5 insulated sheathing, R-15+R-3 insulated sheathing, or R-19 compressed into a 2×6 cavity . The attic-side of the kneewall must have a rigid air barrier (with seams sealed). The top and bottom of the kneewall stud cavity must be blocked and sealed to encapsulate insulation. Note: If REScheck is used, minimum insulation value for attic kneewalls is R-18 with attic-side air barrier.

Kneewall Air-sealing and Insulation Diagram



CORRECT: Blocked Joist Cavity/Sealed Attic-side Air Barrier

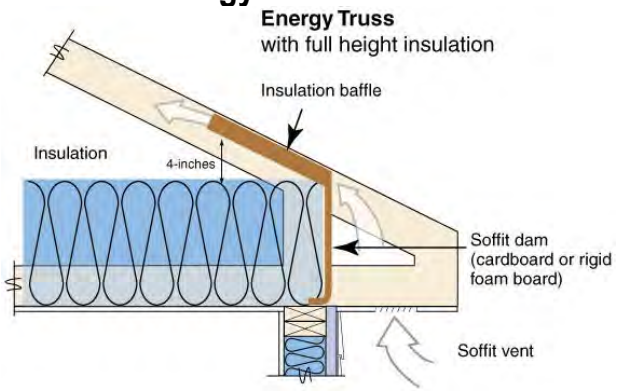
INCORRECT: Unblocked Joist Cavity

Inspector reaching through the unblocked joist cavity revealing a significant pathway for unconditioned attic air into the building envelope.

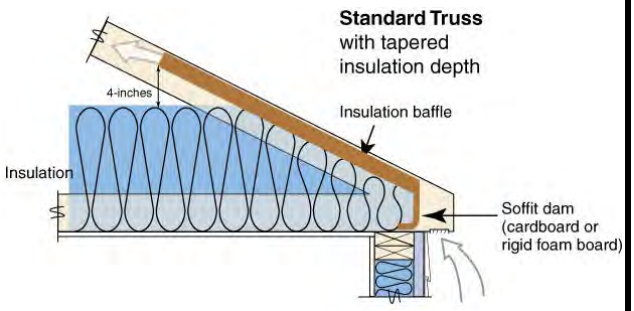
Wind Wash Baffle and Air-permeable Insulation Dam

Code Section	*402.2.1.1*
Checklist Item #	[FI14ga]
Description	For air permeable insulation (fiberglass or cellulose insulation) in vented attics, baffles must be installed adjacent to soffit and eave vents. A minimum of a 1-inch of space must be provided between the insulation and the roof sheathing and at the location of the vent. The baffle must extend over the top of the insulation inward until it is at least 4 inches vertically above the top of the insulation. Any solid material such as cardboard or thin insulating sheathing is permissible as the baffle /insulation dam.

Energy Truss Baffles



Standard Truss Baffles

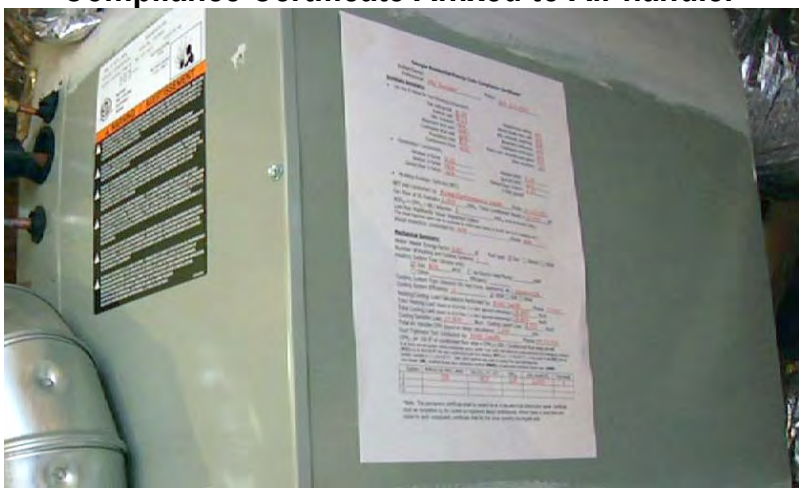


Baffles (Pre-insulation) Extended Over Top-plate

Energy Code Compliance Certificate

Code Section	*401.3*
Checklist Item #	[FI7]
Description	A certificate identifying the energy-related features of the building must be located on or near the electrical distribution panel or air handler. The certificate should include the calculated heating load, sensible cooling load, latent cooling load, and cfm for space conditioning, as well as duct tightness test results for each system and envelope tightness test results (or indicate that v isual inspection was used for envelope tightness for R-2 occupancies). Visit www.southface.org/energy-codes to download a sample compliance certificate.

Compliance Certificate Affixed to Air handler



Sample Certificate

Georgia Residential Energy Code Compliance Certificate*

Builder/Design Professional: ABC Builders Phone: 404-123-4567

Envelope Summary:

- List the R-Value for the following components:

Flat ceiling/roof:	R-30	Sloped/vault ceiling:	n/a
Exterior wall:	R-13	Above grade mass wall:	n/a
Attic kneewall:	n/a	Attic kneewall sheathing:	R13
Basement stud wall:	n/a	Basement continuous:	n/a
Crawlspace stud wall:	n/a	Crawlspace continuous:	n/a
Foundation slab:	R-0	Floors over unconditioned space:	R13
Cantilevered Floor:	n/a	Other insulation:	n/a

- Fenestration Components:

Window U-factor:	0.32	Window SHGC:	0.29
Skylight U-factor:	n/a	Skylight SHGC:	n/a
Glazed Door U-factor:	n/a	Opaque Door U-factor: (<30% glazed)	0.35

- Building Envelope Tightness (BET):

BET test conducted by: Home Performance Smith Phone: 404-123-4567

Fan Flow at 50 Pascals= 2,000 CFM_{50} Total Conditioned Volume = 20,000 ft^3

ACH_{50} = CFM_{50} x 60 / Volume= 6 ACH_{50} (must be less than 7 ACH_{50})

Low Rise Multifamily Visual Inspection Option

(The visual inspection option may be conducted by a third-party instead of the BET test for R-2 buildings only.)

Visual inspection conducted by: n/a Phone: n/a

Mechanical Summary:

Water Heater Energy Factor: 0.61 Ef Fuel type: ☑ Gas ☐ Electric ☐ Other

Number of Heating and Cooling Systems: 1

Heating System Type (choose one):

☑ Gas: 90% AFUE ☐ Air-Source Heat Pump: HSPF

☐ Other: Efficiency:

Cooling System Type (Standard DX, Heat Pump, Geothermal, etc.): Standard DX

Cooling System Efficiency: 13 ☑ SEER ☐ EER ☐ Other

Heating/Cooling Load Calculations Performed by: HVAC Smith Phone:

Total Heating Load (Based on ACCA Man. J or other approved methodology): 39,800 Btu/h

Total Cooling Load (Based on ACCA Man. J or other approved methodology): 28,800 Btu/h

Cooling Sensible Load: 20,800 Btu/h Cooling Latent Load : 8,000 Btu/h

Total Air Handler CFM (based on design calculations): 1600 CFM

Duct Tightness Test Conducted by: HVAC Smith Phone: 404-123-4567

CFM_{50} per 100 ft^2 of conditioned floor area = CFM_{50} x 100 / Conditioned floor area served

If all ducts are not located within conditioned space, builder must verify that either the postconstruction duct leakage to outdoors (**PCD**) is ≤ 8 cfm/100 ft², the post-construction total duct leakage (**PCT**) is ≤ 12 cfm/100 ft², or the rough-in test (**RIT**) will be conducted with air handler installed at a 0.4"w/100 ft² Static which method was used to conduct the duct tightness test:

duct blower (**DB**), modified blower door subtraction method (**MBDS**), or automated multipoint blower door (**AMBD**):

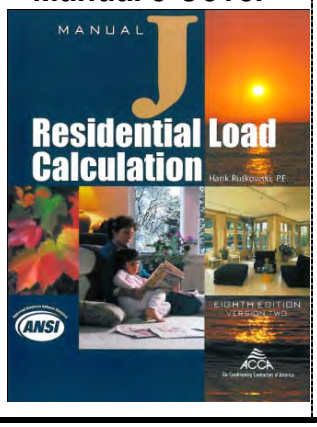
System	Method (DB, MBDS, AMBD)	Test (RIT, PCT, EST)	CFM_{50}	Area served (ft^2)	Test Result
1	DB	PCT	100	2,000	5
2					
3					

*Note: This permanent certificate shall be posted on or in the electrical distribution panel. Certificate shall be completed by the builder or registered design professional. Where there is more than one value for each component, certificate shall list the value covering the largest area

HVAC Load Calculations

Code Section	*403.6*
Checklist Item #	[PR2]
Description	HVAC load calculations must be completed and summarized on the energy code compliance certificate located on or near the e lectrical distribution panel or air handler.

Manual J Cover



Sample Load Calculation on Compliance Certificate

Mechanical Summary:

Water Heater Energy Factor: 0.61 Ef Fuel type: ☑ Gas ☐ Electric ☐ Oth

Number of Heating and Cooling Systems: 1

Heating System Type (choose one):

☑ Gas: 90% AFUE ☐ Air-Source Heat Pump: HSPF

☐ Other: Efficiency:

Cooling System Type (Standard DX, Heat Pump, Geothermal, etc.): Standard DX

Cooling System Efficiency: 13 ☑ SEER ☐ EER ☐ Other

Heating/Cooling Load Calculations Performed by: HVAC Smith Phone: 770-123

Total Heating Load (Based on ACCA Man. J or other approved methodology): 39,800 Btu/h

Total Cooling Load (Based on ACCA Man. J or other approved methodology): 28,800 Btu/h

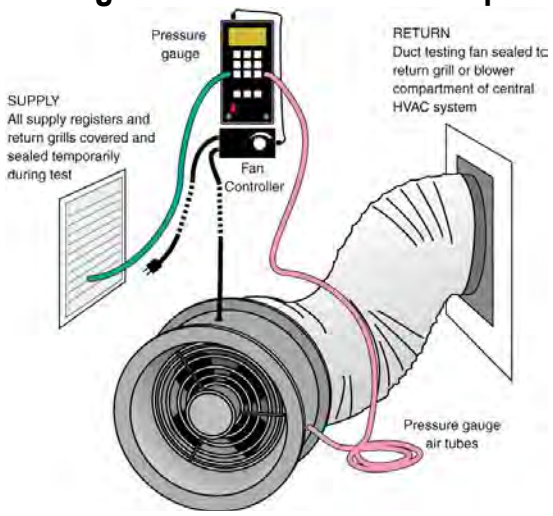
Cooling Sensible Load: 20,800 Btu/h Cooling Latent Load : 8,000 Btu/h

Total Air Handler CFM (based on design calculations): 1600 CFM

Duct Tightness Testing

Code Section	*403.2.2*
Checklist Item #	[FR14] [FI4]
Code Value	**Rough-in Total Leakage (RIT): ≤ 6%;** **Post Construction Leakage to Outside (PCO): ≤ 8%;** **Post Construction Total Leakage (PCT): ≤ 12%**
Description	The ducts and air handler, if not completely located inside the conditioned spaces, must be tes ted for tightness. Information about the test (e.g., the l eakage rate (CFM_{25}) from the test, the zone area served, the percent duct leakage, the type and conditions under which the test was administered, and the test adminstrator) should be available on the ener gy code compliance certificate located on or near the electrical distribution panel or air handler. Testing for duct tightness must be conducted by a certified Duct and Envelope Tightness (DET) verifier. The following tests are allowed: Rough In Total Leakage (RIT), Post Construction (Final) Total Leakage (PCT), or Post Construction Leakage to Outside (PCO). Duct tightness testing is not required if 50% or less of the duct system is modified. If the air handler, furnace or evaporator is replaced, testing is not required but all joints, seams and connections to plenums must be sealed with mastic and verified by visual inspection by the state licensed conditioned air contractor or a DET verifier.

Diagram of Duct Blaster Setup



Sample Duct Testing Information on Compliance Certificate

Duct Tightness Test Conducted by: *DET Verifier* Phone: *404-123-4567*

CFM_{25} per 100 ft^2 of conditioned floor area = CFM_{25} x 100 / Conditioned floor area served

If all ducts are not located within conditioned space, builder must verify that either the postconstruction duct leakage to outdoors (**PCO**) is ≤ 8%, the post construction total duct leakage (**PCT**) is ≤ 12%, or the rough-in total duct leakage (**RIT**) with air handler installed is ≤ 6%. State which method was used to conduct the duct tightness test: duct blower (**DB**), modified blower door subtraction method (**MBDS**), or automated multipoint blower door (**AMBD**).

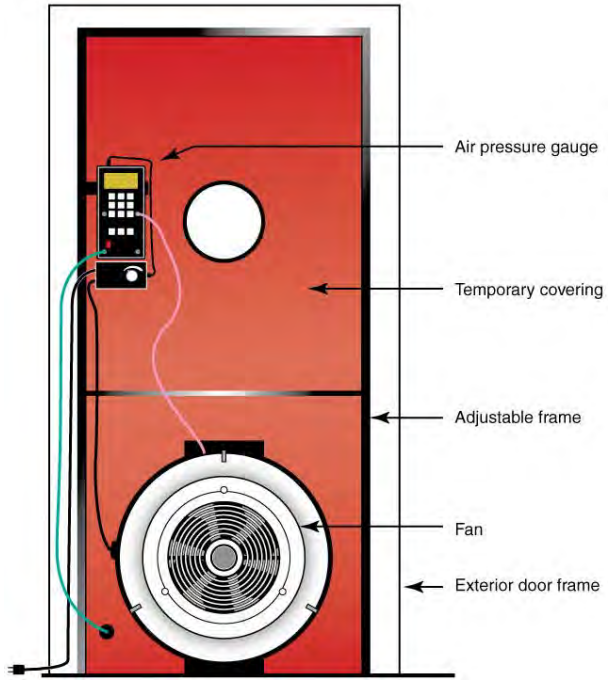
System	Method (DB, MBDS, AMBD)	Test (PCO, PCT, RIT)	CFM_{25}	Area served (ft^2)	Result (%)
1 *Main*	*DB*	*PCT*	*200*	*2000*	*10.0*
2					
3					

*Note: This permanent certificate shall be posted on or in the electrical distribution panel or air handler. Certificate shall be completed by the builder or registered design professional. Where there is more than one value for each component, certificate shall list the value covering the largest area.

Blower Door Testing

Code Section	*402.4.2, 402.4.2.1*
Checklist Item #	[IN12]
Code Value	**ACH_{50} < 7**
Description	All new construction and full renovations (e.g., gut rehabs) that affect all aspects of the building thermal envelope must be tested for tightness with a blower door. The leakage rate from the test, the person administering the test, and the specifications under which the test was administered should be available on the energy code compliance certificate located on or near the electrical distribution panel or air handler. Testing for building envelope tightness must be conducted by a certified duct and envelope tightness (DET) verifier. Where a building is classified as R-2 (low-rise multifamily), envelope testing of less than 100 percent is acceptable. Buildings classified as R-2 (low-rise multifamily), can also undergo a rigorous visual inspection in lieu of a blower door test as detailed in table 402.4.2 of the energy code.

Diagram of Blower Door Setup



Blower Door Setup in Door Frame

Sample Envelope Testing Information on Compliance Certificate

- Building Envelope Tightness (BET):

BET test conducted by: Home Performance Smith Phone: 404-123-6547
Fan Flow at 50 Pascals= 2,000 CFM_{50} Total Conditioned Volume = 20,000 ft^3
ACH_{50} = CFM_{50} x 60 / Volume= 6 ACH_{50} (must be less than 7 ACH_{50})
Low Rise Multifamily Visual Inspection Option
(The visual inspection option may be conducted by a third-party instead of the BET test for R-2 buildings only.)
Visual inspection conducted by: n/a Phone: n/a

Heating, Cooling, and Water Heating Equipment

Code Section	*401.3*
Checklist Item #	[FI5]
Description	The type and efficiencies of the heating, cooling, and water heating equipment must be located on the energy code compliance certificate located either on or near the electrical distribution panel or air handler.

Primary Heat Source

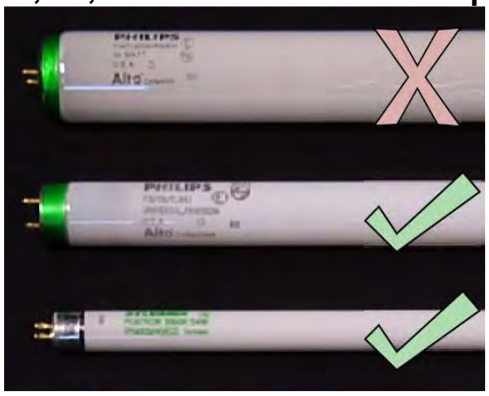
Code Section	*403.6.1*
Checklist Item #	[FI15ga]
Description	For new dwelling unit central HVAC systems, or replacement HVAC systems installed in dwelling units that were originally permitted after January 1, 19 96, electric-resistance heat is not allowed as the primary heat source. Primary heat source is defined as the heat source for the original dwelling unit system. This requirement does not apply to alterations or additions of 50% or less than the original conditioned floor area.

Lighting

Code Section	*404.1*
Checklist Item #	[FI6]
Description	To be deemed compliant under the prescriptive or trade-off approach, half of all bulbs installed in permanent fixtures must either be high-efficacy or be controlled with an occupancy/vacancy sensor or automated lighting control system. High efficacy bulbs include: compact fluorescent lamps (CFLs), T8 or T5 linear fluorescent lamps, or other lamps (such as LEDs) with an efficacy of ≥ 60 lumens per watt when over 40 watts, ≥50 lumens per watt for 15 to 40 watts, and ≥40 lumens per watt for 15 watts or less.

CFL vs. Incandescent

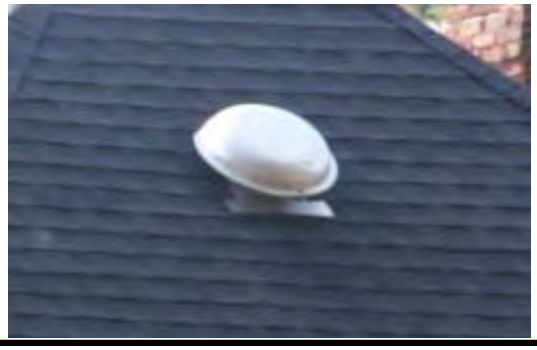
T12, T8, and T5 Fluorescent Lamps



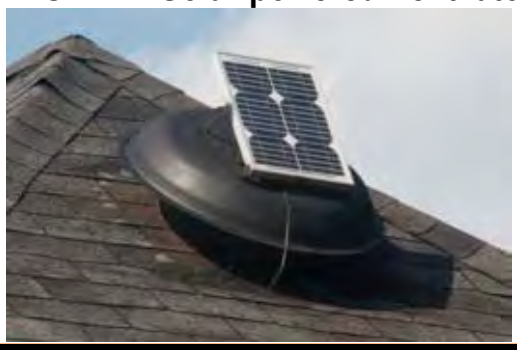
Power Attic Ventilators

Code Section	*403.10*
Checklist Item #	[FI16ga]
Description	Power attic ventilators connected to the electric grid are not allowed. Power attic ventilators powered by a solar panel are allowed.

INCORRECT: Grid-tied Ventilator



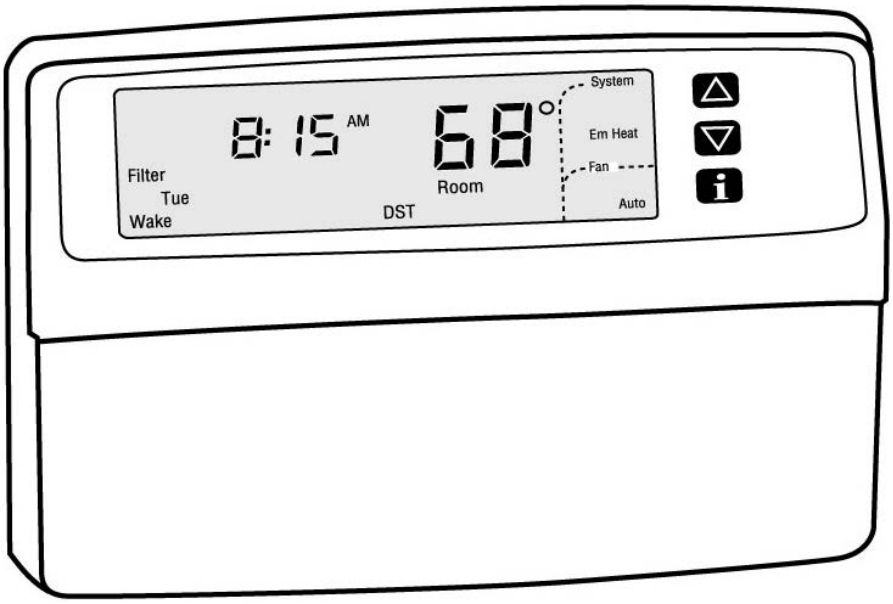
ALLOWED: Solar-powered Ventilator



Programmable Thermostat

Code Section	*403.1.1*
Checklist Item #	[FI9]
Description	Where primary heating is forced-air furnace, each dwelling unit must have at least one programmable thermostat that can control the heating and cooling system to allow heating temperatures down to 55°F and cooling temperatures up to at least 85°F.

Programmable Thermostat



Heat Pump Thermostat

Code Section	*403.1.2*
Checklist Item #	[FI10]
Description	Heat pumps must have a thermostat that will prevent supplemental electric-resistance heat from operating when the heating load can be satisfied by the heat pump.

Masonry Wood Burning Fireplaces

Code Section	*402.4.3*
Checklist Item #	[FI8]
Description	All site-built masonry wood burning fireplaces must have outside combustion air and gasketed doors. For more information, see the clarification on this provision for the Georgia DCA from the International Codes Council.

Heated Swimming Pools

Code Section	*403.9*
Checklist Item #	[FI12]
Code Value	**N/A**
Description	Heated swimming pools where the water is greater than 90°F must be provided with vapor retardant covers, an R-12 blanket, and controls to allow automatic time control of the circulating pumps and to automatically turn off the pool heating equipment.