

## **Energy**

### **2012 IECC, 2012 IRC & 2012 USBC**

- IECC C303.1.3(3) Dynamic Glazing
- IECC C401.2 Application
- IECC C401.2.1 Existing Buildings
- IECC C402.2 R-Values
- IECC C402.3 U-Factor
- IECC C402.3.1 Fenestration Max Area
- IECC C402.3.3.1 SHGC Adjustment
- IECC C402.4.1 Air Barriers
- IECC C402.1.2.3 Building Test
- IECC C402.4.4 Doors and Access Openings
- IECC C402.4.7 Vestibules
- IECC C403.2.3 HVAC Equipment Performance (Efficiency Tables)
- IECC C403.2.4.3.3 Automatic Start Capabilities
- IECC C403.2.5.1 Demand Control Ventilation
- IECC C403.2.6 Energy Recovery Ventilation
- IECC C403.2.87, 403.2.8.1 Piping Insulation
- IECC C403.3.1 Economizers
- IECC C404.7 Pools and In-Ground Permanently Installed Spas
- IECC C405.1 Lighting in Commercial Dwelling Units
- IECC C405.2.2 Additional Lighting Controls
- IECC C405.2.2.1 & C405.2.2.2 Automatic Lighting Controls, Timed Switched Devices or Occupancy Sensors
- C405.2.2.3 Daylight Zone Controls
- IECC C405.2.3 Specific Application Controls

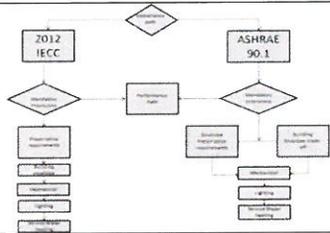
## 2012 Code Change Training Companion Guide

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- IECC C405.5.2(2) Interior Lighting
- IECC C406.1 Additional Efficiency Package Options
- IECC C406.2 Efficient HVAC Performance (Option #1)
- IECC C406.3 Efficient Lighting System (Option #2)
- IECC C406.4 On-Site Renewable Energy (Option #3)
- IECC C407.3 Performance Based Compliance
- 2012 IECC and 2012 IRC Chapter 11
- IECC R402.1.1/IRC Table N1102.1.1 and IECC R402.1.3/IRC Table N1102.1.3 R-Value Changes in Climate Zone 4
- IECC R402.1.1/IRC Table N1102.1.1
- IECC R402.2.1/IRC N1102.2.1 Ceilings With Attic Spaces
- IECC R402.2.3/IRC 1102.2.3 Eave Baffle
- IECC R402.2.4/IRC N1102.2.4 Access Hatches and Doors
- IECC R402.2.6/IRC Table N1102.2.6
- IECC R402.2.12/IRC N1102.2.12 Sunrooms
- IECC R402.3.5/IRC N1102.3.5 Sunroom U-Factor
- IECC R402.4/IRC N1102.4 Air Leakage
- IECC R402.4.1.2.2/IRC N1102.4.1.2.2 Testing
- IECC R402.4.1.3/IRC N1102.4.1.3 Leakage Rate
- IRC R403.1.1/IRC N1103.1.1 Programmable Thermostat
- IECC R403.2.2/IRC 1103.2.2 Sealing
- IECC R403.2.2.1/IRC N1103.2.2.1 Testing Option
- IECC R403.2.2.1/IRC N1103.2.2.1
- IECC R403.3.1/IRC N1103.3.1
- IECC R403.4.2/IRC N1103.4.2
- IECC R403.6/IRC N1103.6
- IECC R404.1/IRC N1104.1
- IECC R404.1.1/IRC N1104.1.1
- IECC R405.5.2(1)/IRC Table N1105.5.2(1)

## ENERGY

### 2012 IECC, 2012 IRC & 2012 USBC

<input type="checkbox"/>	<p><b>2012 IECC and 2012 IRC Chapter 11</b></p> <p>New for 2012:</p> <ul style="list-style-type: none"> <li>Residential Energy provisions are located in IRC Chapter 11 and IECC Chapter 4 [RE]</li> <li>Sections in IRC Chapter 11 are subsequently numbered with the corresponding IECC section</li> <li>Commercial Energy provisions are only located in IECC Chapter 4 [CE]</li> </ul>	
<input type="checkbox"/>	<p><b>IECC C303</b></p> <ul style="list-style-type: none"> <li>C303.1.3(3) Dynamic Glazing</li> </ul>	
<input type="checkbox"/>	<p><b>IECC C401</b></p> <ul style="list-style-type: none"> <li>C401.2 Application</li> </ul>	



<input type="checkbox"/>	<b>IECC C402</b>	
	<ul style="list-style-type: none"> <li>C402.4.1 Air Barriers</li> </ul>	

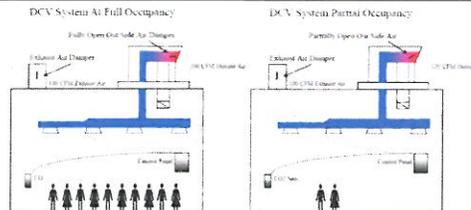
<input type="checkbox"/>	<b>IECC C402</b>	
	<ul style="list-style-type: none"> <li>C402.4.1.2.3 Building Test</li> </ul>	

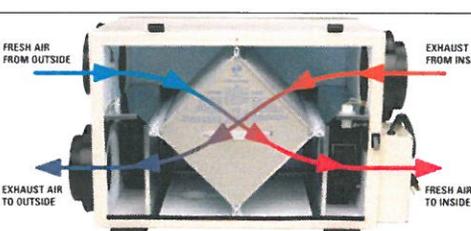
<input type="checkbox"/>	<b>IECC C402</b>	
	<ul style="list-style-type: none"> <li>C402.4.4 Doors and Access Openings</li> </ul>	

<input type="checkbox"/>	<b>IECC C402</b>	
	<ul style="list-style-type: none"> <li>C402.4.7 Vestibules</li> </ul>	

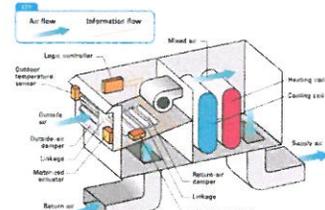
<input type="checkbox"/>	<b>IECC C403</b>																			
	<ul style="list-style-type: none"> <li>C403.2.3 HVAC Equipment Performance (Efficiency Tables)</li> </ul>	<table border="1"> <caption>TABLE C403.2.3(1) MINIMUM EFFICIENCY REQUIREMENTS: ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS</caption> <thead> <tr> <th>EQUIPMENT TYPE</th> <th>SIZE CATEGORY</th> <th>HEATING SECTION TYPE</th> <th>SUBCATEGORY CO.</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Air conditioners, air cooled</td> <td rowspan="2">&lt; 65,000 Btu/h<sup>1</sup></td> <td rowspan="2">All</td> <td>Split System</td> </tr> <tr> <td>Single Package</td> </tr> <tr> <td rowspan="2">Through-the-wall (air cooled)</td> <td rowspan="2">&lt; 30,000 Btu/h<sup>1</sup></td> <td rowspan="2">All</td> <td>Split system</td> </tr> <tr> <td>Single Package</td> </tr> <tr> <td rowspan="2">Small duct high velocity (air cooled)</td> <td rowspan="2">&lt; 65,000 Btu/h<sup>1</sup></td> <td rowspan="2">All</td> <td>Split System</td> </tr> <tr> <td>Electric Resistance (for homes)</td> </tr> </tbody> </table>	EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY CO.	Air conditioners, air cooled	< 65,000 Btu/h <sup>1</sup>	All	Split System	Single Package	Through-the-wall (air cooled)	< 30,000 Btu/h <sup>1</sup>	All	Split system	Single Package	Small duct high velocity (air cooled)	< 65,000 Btu/h <sup>1</sup>	All	Split System
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<input type="checkbox"/>	<p><b>IECC C403</b></p> <ul style="list-style-type: none"> <li>C403.2.4.3.3 Automatic Start Capabilities</li> </ul>	
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<input type="checkbox"/>	<p><b>IECC C403</b></p> <ul style="list-style-type: none"> <li>C403.2.5.1 Demand Control Ventilation</li> </ul>	
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<input type="checkbox"/>	<p><b>IECC C403</b></p> <ul style="list-style-type: none"> <li>C403.2.6 Energy Recovery Ventilation</li> </ul>	
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<input type="checkbox"/>	<p><b>IECC C403</b></p> <ul style="list-style-type: none"> <li>C 403.2.8, 403.2.8.1 Piping Insulation</li> </ul>	
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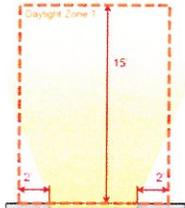
<input type="checkbox"/>	<p><b>IECC C403</b></p> <ul style="list-style-type: none"> <li>Content/slide text</li> </ul>	
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<input type="checkbox"/>	<b>IECC C404</b>	
	<ul style="list-style-type: none"> <li>• C 404.7 Pools and In-Ground Permanently Installed Spas</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>	
	<ul style="list-style-type: none"> <li>• C405.1 Lighting in Commercial Dwelling Units 75% of all Fixtures fitted with High Efficacy Lamps</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>	
	<ul style="list-style-type: none"> <li>• C405.2.2 Additional Lighting Controls</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>	
	<ul style="list-style-type: none"> <li>• C405.2.2.1 &amp; .2 Automatic Lighting Controls, Timed Switched Devices or Occupancy Sensors</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>	
	<ul style="list-style-type: none"> <li>• C405.2.2.3 Daylight Zone Controls</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>	
	<ul style="list-style-type: none"> <li>C405.2.3 Specific Application Controls</li> </ul>	

<input type="checkbox"/>	<b>IECC C405</b>																										
	<ul style="list-style-type: none"> <li>C405.5.2 (2) Interior Lighting</li> </ul>	<table border="1"> <thead> <tr> <th>Common Space-by-Space Types</th> <th>LPD (w/ft<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>Atrium – First 40 feet in height</td> <td>0.03 per ft. ht.</td> </tr> <tr> <td>Atrium – Above 40 feet in height</td> <td>0.02 per ft. ht.</td> </tr> <tr> <td>Audience/seating area – permanent</td> <td></td> </tr> <tr> <td>    For auditorium</td> <td>0.9</td> </tr> <tr> <td>    For performing arts theater</td> <td>2.6</td> </tr> <tr> <td>    For motion picture theater</td> <td>1.2</td> </tr> <tr> <td>Classroom/lecture/training</td> <td>1.30</td> </tr> <tr> <td>Conference/meeting/multipurpose</td> <td>1.2</td> </tr> <tr> <td>Corridor/transition</td> <td>0.7</td> </tr> <tr> <td>Dining area</td> <td></td> </tr> <tr> <td>    Bar/lounge/leisure dining</td> <td>1.40</td> </tr> <tr> <td>    Family dining area</td> <td>1.40</td> </tr> </tbody> </table>	Common Space-by-Space Types	LPD (w/ft <sup>2</sup> )	Atrium – First 40 feet in height	0.03 per ft. ht.	Atrium – Above 40 feet in height	0.02 per ft. ht.	Audience/seating area – permanent		For auditorium	0.9	For performing arts theater	2.6	For motion picture theater	1.2	Classroom/lecture/training	1.30	Conference/meeting/multipurpose	1.2	Corridor/transition	0.7	Dining area		Bar/lounge/leisure dining	1.40	Family dining area
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<input type="checkbox"/>	<b>IECC C406</b>	
	<ul style="list-style-type: none"> <li>C 406.1 Additional Efficiency Package Options</li> </ul>	<p><b>Pick One:</b></p> <div style="border: 1px solid green; padding: 5px; text-align: center; margin-bottom: 5px;">C406.2 – Eff. HVAC Performance</div> <p style="text-align: center;">OR</p> <div style="border: 1px solid green; padding: 5px; text-align: center; margin-bottom: 5px;">C406.3 – Eff. Lighting Systems</div> <p style="text-align: center;">OR</p> <div style="border: 1px solid green; padding: 5px; text-align: center;">C406.4 – On-site Renewable Energy</div>

<input type="checkbox"/>	<b>IECC C406</b>	
	<p>C406.2 Efficient HVAC Performance (Option #1)</p> <ul style="list-style-type: none"> <li>Tables C406.2(1) through C406.2(7)</li> <li>Greater efficiencies than those in C403.2.3</li> </ul>	

<input type="checkbox"/>	<b>IECC C406</b>	
	<p>C406.3 Efficient Lighting System (Option #2)</p> <ul style="list-style-type: none"> <li>Reduced lighting power density per Table C406.3</li> <li>Applies to the whole building (not space by space)</li> </ul>	

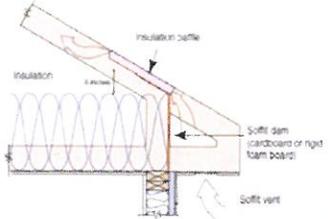
<b>IECC C406</b>		
<input type="checkbox"/>	<p>C406.4 On-Site Renewable Energy (Option #3)</p> <ul style="list-style-type: none"> <li>• Provide <math>\geq 1.75</math> Btu or not less than 0.50 watts per square foot of conditioned floor area OR</li> <li>• Provide <math>\geq 3\%</math> of energy used for mechanical and service water heating equipment and lighting</li> </ul>	

<b>IECC C407</b>		<b>● Building energy cost to be <math>\leq 85\%</math> of standard reference design building</b>
<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• C407.3 Performance Based Compliance</li> </ul>	

<b>2012 IECC and 2012 IRC Chapter 11</b>		
<input type="checkbox"/>	<p>New for 2012:</p> <ul style="list-style-type: none"> <li>• <u>Residential</u> Energy provisions are located in IRC Chapter 11 and IECC Chapter 4 [RE]</li> <li>• Sections in IRC Chapter 11 are subsequently numbered with the corresponding IECC section</li> <li>• <u>Commercial</u> Energy provisions are only located in IECC Chapter 4 [CE]</li> </ul>	

<b>IRC N1102/IECC R402</b>		
<input type="checkbox"/>	<p>Table N1102.1.1 (R402.1.1) and Table N1102.1.3 (402.1.3) R-Value changes Climate Zone 4</p> <ul style="list-style-type: none"> <li>• Wood-framed walls – R 15 or 13 + 1</li> <li>• Ceilings – R 38</li> <li>• Mass Walls – 8/13</li> <li>• Ceiling U-factor – 0.030</li> <li>• Frame Wall U-factor – 0.079</li> </ul>	

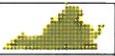
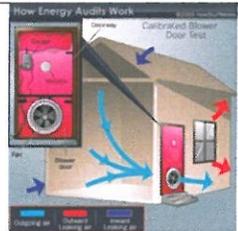
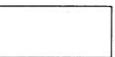
☐	<b>IRC N1102/IECC R402</b>	
	Table N1102.1.1 (R402.1.1) USBC Amendment <ul style="list-style-type: none"> <li>• Climate Zone 4 Skylight U Factor – 0.55</li> <li>• Solar Heat Gain Coefficient (SHGC) – 0.40</li> </ul>	

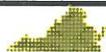
☐	<b>IRC N1102/IECC R402</b>	
	N1102.2.1 (R402.2.1) Ceilings with attic spaces - <ul style="list-style-type: none"> <li>• This section allows for reduced R values of ceiling insulation when a raised-heel (energy) truss is used.</li> <li>• USBC amended ceiling R-values to require R-38 and R-30 with Energy Truss</li> </ul>	Energy Truss with full height insulation (recommended) 

☐	<b>IRC N1102/IECC R402</b>	
	N1102.2.3 (R402.2.3) Eave Baffle – Required in attics when air-permeable insulation is used.	

☐	<b>IRC N1102/IECC R402</b>	
	N1102.2.4 (R402.2.4) Access hatches and doors – Virginia amended entire section <ul style="list-style-type: none"> <li>• In addition to weather-stripping, certain doors and hatches, such as hinged vertical doors, pull down, and hatches and scuttle covers must be insulated per this section</li> </ul>	

☐	<b>IRC N1102/IECC R402</b>	
	Table N1102.2.6 (R402.2.6) Changes to insulation R-Value requirements for steel framed walls	

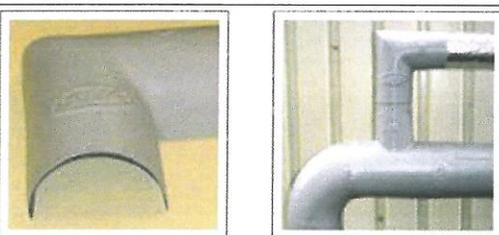
<input type="checkbox"/>	<p><b><u>IRC N1102/IECC R402</u></b></p> <p>N1102.2.12 (R402.2.12) Sunrooms -</p> <ul style="list-style-type: none"> <li>• Energy Code requires all walls separating sunrooms from conditioned space to meet current R – Value requirements for insulation.</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1102/IECC R402</u></b></p> <p>N1102.3.5 (R 402.3.5) Sunroom <i>U</i>-Factor – New <i>U</i>-Factor requirements for sunrooms</p> <ul style="list-style-type: none"> <li>• Maximum fenestration <i>U</i>-Factor of .45 and maximum skylight <i>U</i>-Factor of .70</li> <li>• Exceptions for thermally isolated sunrooms</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1104/IECC R402</u></b></p> <p>N1102.4 (R402.4) Air leakage – Virginia has amended the following criteria in Table N1102.1.1.1 (402.1.1.1)</p> <ul style="list-style-type: none"> <li>• Walls-corners and headers shall be completely filled with R 3</li> <li>• Shower/Tub on exterior wall-air barrier installed on interior side of wall</li> <li>• Fireplace-gasketed doors <u>or</u> tight-fitting flue dampers required</li> </ul> <p>Two notes added to table</p>	
<input type="checkbox"/>	<p><b><u>IRC N1102/IECC R402</u></b></p> <ul style="list-style-type: none"> <li>• N1102.4.1.2.2 /R402.4.1.2.2 Testing – Virginia amended this section to add Visual Option back in.</li> <li>• Envelope tightness acceptable when all items in Table N1102.4.1.1 (R402.4.1.1) are field verified.</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1102/IECC R402</u></b></p> <ul style="list-style-type: none"> <li>• N1102.4.1.3 (R402.4.1.3) Leakage Rate – The building or dwelling shall not have a leakage rate exceeding 5 Air Changes per hour (ACH)</li> <li>• Note: new section in IRC, R303.4 Mechanical Ventilation</li> <li>• Requires whole-house mechanical ventilation when <u>less than</u> 5 ACH is obtained as verified by <u>Blower Door Testing</u></li> </ul>	

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p>	
	<ul style="list-style-type: none"> <li>• N1103.1.1 (R403.1.1) Programmable Thermostat – Amended by Virginia</li> <li>• The thermostat controlling the <u>primary heating and cooling system</u> must meet the requirements of this section</li> </ul>	

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p>
	<ul style="list-style-type: none"> <li>• N1103.2.2 (R403.2.2) Sealing - All ducts, air handlers and filter boxes shall be sealed IAW IMC to minimize leakage.</li> </ul> <p>Three new exceptions:</p> <ul style="list-style-type: none"> <li>• Air impermeable spray foam permitted</li> <li>• Partially inaccessible duct connections shall have 3 screws equally spaced used on exposed portion of joint</li> <li>• Continuously welded or locking-type longitudinal joints and seams for systems of 2 inches of wc or less</li> </ul>

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p>	
	<p>N1103.2.2.1 (R403.2.2.1) Testing option</p> <ul style="list-style-type: none"> <li>• Post Construction testing – Total leakage shall be less than or equal to <u>6</u> cfm/100 sq. ft. of conditioned floor area</li> <li>• Rough-in testing – Total leakage shall be less than or equal to <u>5</u> cfm/100 sq. ft. of conditioned floor area</li> <li>• USBC amendment Visual Option allowed</li> </ul>	

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p>	
	<ul style="list-style-type: none"> <li>• N1103.2.2.1 (R403.2.2.1) Air handlers shall include manufacturer’s designation for an air leakage of no more than 2 percent of the design air flow rate IAW ASHRAE 193.</li> </ul>	

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p>	
	<ul style="list-style-type: none"> <li>• N1103.3.1 (R403.3.1) Piping insulation shall be protected from damage when exposed to weather, including sunlight, moisture, equipment maintenance, wind, and solar radiation.</li> <li>• Tape cannot be used.</li> </ul>	

<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p> <ul style="list-style-type: none"> <li>N1103.4.2 (R403.4.2) Piping for service water heating shall be insulated to R-3. Va. USBC Amendment.</li> </ul> <p>Deleted Table N1103.4.2 (R403.4.2) and added the following criteria:</p> <ol style="list-style-type: none"> <li>1. Larger than ¾" nominal diameter</li> <li>2. Piping serving for than one dwelling unit</li> <li>3. Located outside the conditioned space</li> <li>4. From the water heater to a distribution manifold</li> <li>5. Located under floor slab or Buried piping</li> <li>6. All Piping in recirculating systems</li> </ol>	
<input type="checkbox"/>	<p><b><u>IRC N1103/IECC R403</u></b></p> <ul style="list-style-type: none"> <li>N1103.6 (R403.6) Mechanical equipment shall be sized IAW ACCA Manual S and building loads calculated IAW ACCA Manual J <u>or other approved</u> heating and cooling calculation methods.</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1104/IECC R404</u></b></p> <ul style="list-style-type: none"> <li>N1104.1 (R404.1) A minimum of 50% of the lamps in permanently installed lighting fixtures shall be high-efficacy.</li> <li>Amended by Virginia to remain at 50% vs. 75%.</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1104/IECC R404</u></b></p> <ul style="list-style-type: none"> <li>N1104.1.1 (R404.1.1) Fuel gas lighting systems shall not have continuously burning pilots.</li> </ul>	
<input type="checkbox"/>	<p><b><u>IRC N1105/IECC R405</u></b></p> <ul style="list-style-type: none"> <li>Table N1105.5.2(1) (R405.5.2(1) ) Changes to table for Air Exchange Rate, Heating Systems, Cooling Systems and Thermal Distribution Systems so Standard Reference Design Table is compatible with Virginia changes.</li> <li>Standard Reference Design only to be used as a baseline for comparing Performance-Based Design.</li> </ul>	