

# Instructions for Electronic Forms, pg 1

2015 WSEC Compliance Forms for Commercial Buildings including R2, R3, & R4 over 3 stories and all R1

Revised Jun 2016

<p><b>Intro</b></p>	<p>Commercial Provision Chapters 1 - 5 of the 2015 Washington State Energy Code apply to all commercial occupancies, R-2, R-3 &amp; R4 occupancies greater than 3 stories above grade, and R-1 occupancy (all building heights). This file, ENV15-v1.XLSM, has electronic compliance forms for envelope provisions as defined in Sections C101, C303, C402 and Appendix A for Climate Zones 4c and 5b. There are two companion files: LTG15-v1.XLSM (Section C405 lighting, motor, and transformer requirements), and MECH15-v1.XLSM (Section C403 mechanical systems requirements).</p>
<p><b>Energy Code</b></p>	<p>This form is a compliance aid and is not a substitute for the full energy code text or specific jurisdiction compliance requirements. Users should refer to the code text and contact the local jurisdiction for complete information. The full 2015 WSEC code text is available for download from the NEEC website: <a href="http://www.neec.net/energy-codes">http://www.neec.net/energy-codes</a></p>
<p><b>Training</b></p>	<p>Refer to the NEEC website for instruction on how to complete all of the 2015 WSEC Compliance Forms.</p>
<p><b>Start-up</b></p>	<p>Select this file from the NEEC website to download to your computer. When opening the file be sure to <b>Enable Macros</b>.</p>
<p><b>Overview</b></p>	<p>This file is an Excel workbook that contains multiple compliance forms and resources in Excel worksheets. Each worksheet is indicated by a tab at the bottom of the screen. You may visit each worksheet by selecting it's tab. Most calculations are automated. Cells that display informational text and the results of calculations are write-protected and cannot be edited.</p>
<p><b>Save Files</b></p>	<p>This file is saved in the same manner as any standard Excel file.</p>
<p><b>Getting Around</b></p>	<p>Some forms have two pages. Both pages are available on screen when you select the tab for a form (worksheet). Use the scroll bars to find the second page located below the first page.</p>
<p><b>Input Cells</b></p>	<p>All general project information and the date are entered once on PROJ-SUM. This information is automatically replicated on all other ENV forms. The PROJ-SUM form accompanies all other ENV forms. Only input cells are accessible. If you try to edit a write-protected cell an error message will appear requesting a password. A password IS NOT required to complete these forms. You may use the TAB key to move to the next input cell. If the TAB doesn't take you where you want to go, use your mouse to move around the form. Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will not be visible. In most cases the text will wrap within the cell. This may force part of the form onto a new page. To enter the date, use this format: mm/dd/yyyy. For example, you would enter 7/1/2013 or 12/21/2014. Check boxes can be checked or unchecked by clicking in the box with your mouse. Radio buttons (circles) allow only one in a set to be selected. Drop-down lists have an arrow at the right side of the cell. Click on the arrow with your mouse and select the appropriate option. Use the delete button on your computer to clear a drop-down entry. When a form has a space for notes or explanation, click anywhere in the space to edit.</p>
<p><b>Personalizing</b></p>	<p>You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the header or footer in Excel.</p>
<p><b>Adding Lines and Removing</b></p>	<p>Many tables, such as for listing envelope assembly types, have a certain number of lines available for entering data. You may need more lines to enter all your information. Where this feature is available, you can add additional lines to the table by selecting the "+" button on the right hand side of the table with your mouse. If you can't see the "+" button, scroll to the right or increase the View Zoom setting for the worksheet. To remove lines that you have added, select the "-" button with your mouse. You cannot remove lines that were not added; an error message will appear if you try. If you add additional lines with this method, the pagination may be affected forcing the forms to carry additional lines over to other pages. Be sure to submit all pages to the plans examiner.</p>
<p><b>Compliance Path</b></p>	<p>You must select a <b>Compliance Path</b> on ENV-SUM (line 12) to activate the correct input method for Window-to-Wall and Skylight-to-Roof ratios.</p>
<p><b>Occupancy Group</b></p>	<p>You must select an <b>Occupancy Group</b> on ENV-SUM (line 14). This does not do anything in this version of the forms but the selection must be made.</p>

# Instructions for Electronic Forms, pg 2

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<p><b>Fenestration Area</b></p>	<p>For projects complying via the Prescriptive Path, enter the vertical fenestration area, gross wall area (includes vertical fenestration, doors, etc), skylight area and gross roof area (includes skylights, mechanical equipment curbs, etc) directly into the <b>Vertical Fenestration and Skylight Area Calculation</b> input cells on the ENV-SUM form. The form will calculate the Window-to-Wall and Skylight-to-Roof ratios.</p> <p>For projects complying via the Component Performance Path, the Vertical Fenestration and Skylight Area inputs in the ENV-SUM form are write protected. Enter all applicable envelope information in the ENV-UA form. The resulting Window-to-Wall and Skylight-to-Roof ratios will auto fill into the ENV-SUM form from the ENV-UA form.</p>
<p><b>Vertical Fenestration Alternates</b></p>	<p>The prescriptive vertical fenestration target area is 30%. This target increases to 40% if the project complies with the requirements of C402.3.1.1 ≤ 3 story building with 50% floor area in the daylight zone, C402.3.1.1 &lt; 3 story building with 25% of net floor area in the daylight zone, C402.3.1.3 high performance vertical fenestration, or C402.3.1.4 Dedicated outdoor air system (DOAS).</p> <p>If the project is eligible for one of these alternates, select the corresponding button on Line 30 of the ENV-SUM form. This will re-calculate the prescriptive target area in the ENV-SUM and ENV-UA forms based on 40%.</p>
<p><b>Target Area Adjustment</b></p>	<p>Target Area Adjustment is required if the project exceeds the prescriptive target area for vertical fenestration or skylights. Adjusted target areas are automatically calculated in the ENV-UA form using envelope assembly areas you enter for your project. Adjusted target areas will appear in the Target UA column in the ENV-UA form. Refer to Target Area Adjustment worksheet for the supporting calculations.</p>
<p><b>Printing</b></p>	<p>The forms should print on any printer supported by your operating system. You will need to have the following TrueType fonts installed under Windows: Arial, Times New Roman, Courier New and Wingdings. These are all standard Windows fonts.</p> <p>If you are losing form details when printing, you may have a shortage of printer memory. Try printing problem pages individually.</p> <p>By default, only the active worksheet is printed. To print more than one worksheet at a time, open your print set-up menu and select either the page range you wish to print or Entire Workbook.</p> <p>Forms (worksheets) in a workbook may not be deleted because the file is locked.</p>
<p><b>Blank Forms</b></p>	<p>To print blank forms to fill out by hand, delete all of the heading information at the beginning of ENV-SUM and select the desired <b>Occupancy Group</b>.</p> <p>For each radio button group there is a button labeled "Clear." Clicking this button will clear the other buttons so that they will print as empty circles. The "Clear" button will not print.</p>

**End of Instructions for Electronic Forms**

# Project Summary

# PROJ-SUM

2015 WSEC Compliance Forms for Commercial Buildings including R2, R3, & R4 over 3 stories and all R1

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<b>General Info</b>  <i>This PROJ-SUM form shall be provided as a cover sheet for all compliance form submittals. Project Title matches project plans title block.</i>	<b>Project Title:</b> <b>1 - This title will copy onto other forms</b>	<b>Date:</b> <b>7/1/2016</b>
	Project Street Address:	For Building Department Use
	Project City, County, Zip:	
	Project Owner or Rep:	
	Jurisdiction:	

<b>Project Description</b>  <i>Select all that apply to the scope of project.</i>  <i>Select Addition + Existing or Alteration + Existing if the existing building will be combined with the addition or alteration to demonstrate compliance per Section C502.1 or C503.1.</i>	<b>New Construction and Additions</b> <input type="checkbox"/> New Building <input type="checkbox"/> Building Addition <input type="checkbox"/> Addition + Existing
	<b>Existing Building Retrofit</b> <input type="checkbox"/> Alteration <input type="checkbox"/> Alteration + Existing <input type="checkbox"/> Change in Space Conditioning <input type="checkbox"/> Change of Occupancy <input type="checkbox"/> Historic Building
<b>Building Elements Scope - Select all that apply</b> <input type="checkbox"/> All <input type="checkbox"/> Building Envelope <input type="checkbox"/> Mechanical Systems <input type="checkbox"/> Service Hot Water Systems <input type="checkbox"/> Lighting Systems <input type="checkbox"/> Electrical Systems	

<b>Occupancy Type</b>	<input type="radio"/> All Commercial <input type="radio"/> Group R - R2, R3, & R4 over 3 stories and all R1 <input type="radio"/>
	<b>Mixed Use</b> - Building is greater than three stories above grade and it has both Commercial and Group R occupancies. <b>Mixed Occupancy</b> - Building is three stories or less above grade and it has both Commercial and Group R2, R3 or R4 occupancies. Select All Commercial to document compliance for the commercial areas of the building. The residential spaces shall comply with the WSEC Residential Provisions.

<b>Space Conditioning Categories</b>	<i>Select all that apply to the scope of project</i> <input type="checkbox"/> Fully Conditioned <input type="checkbox"/> Semi-heated <sup>2</sup> <input type="checkbox"/> Refrigerated Warehouse, Walk-in Cooler/Freezer, Refrigerated Display Case <sup>1</sup> <input type="checkbox"/> Low Energy Space Category <sup>3</sup>
	<b>Eligible Low Energy Spaces</b> <input type="checkbox"/> Unconditioned <input type="checkbox"/> Low energy heating/cooling capacity <input type="checkbox"/> Wireless service equipment shelter <input type="checkbox"/> Greenhouse <sup>4</sup> <input type="checkbox"/> Equipment building

<b>Floor Area and Stories</b>	Floors Above Grade      Building Gross Conditioned Floor Area      Project Gross Conditioned Floor Area
	(Empty fields for data entry)

<b>General Compliance Path</b>	<input type="radio"/> Prescriptive <input type="radio"/> Total Building Performance
	<b>Prescriptive</b> - Projects complying prescriptively shall demonstrate compliance with all applicable mandatory and prescriptive requirements of this code. Refer to C401.2, Item 1 for more information. Compliance forms to include with a Prescriptive submittal: All applicable ENV, LTG, MECH and C406.  <b>Total Building Performance</b> - Projects complying via total building performance (TBP) shall include a summary of results from a whole building energy model per Section C407 and shall demonstrate compliance with all applicable mandatory provisions in this Code. Refer to Section C401.2, Item 2 for more information. Compliance forms to include with a TPB submittal: PROJ-SUM, C406-SUM & C406-DETAIL, ENV-CHK, LTG-EXT, LTG-CHK, and all MECH forms (except MECH-ECONO).

Note 1 - Requirements For Refrigerated Spaces - Refrigerated walk-in and warehouse coolers and freezers shall comply with the envelope and refrigeration equipment requirements in Section C410 and all applicable mandatory provisions in the WSEC.  
 Note 2 - Semi-heated Spaces - Wall Insulation Exemption - Semi-heated spaces heated with equipment other than electric resistance may take an exemption for wall insulation. All other envelope assemblies shall comply with the thermal envelope provisions.  
 Note 3 - Exemptions For Low Energy Spaces - Low Energy spaces are exempt from all provisions in WSEC Section C402 Building Envelope, however all other applicable provisions in the Code do apply including lighting, mechanical, service water heating, etc.  
 Note 4 - Eligible Space Conditioning For Low Energy Greenhouses - Greenhouses are defined as spaces that maintain a specialized sunlit environment that is used exclusively for cultivation, protection and maintenance of plants. Cooling with outside air and/or evaporative cooling, and any form of heating equipment, are allowed under the Low Energy Greenhouse category. Greenhouses with cooling equipment that requires a condensing unit are NOT eligible.



# Envelope Requirements Summary, pg 1

# ENV-REQ

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**Minimum Requirements for Prescriptive Compliance** *This table summarizes prescriptive compliance requirements for opaque elements and fenestration. Refer to Tables C402.1.3, C402.1.4 and C402.4 in the 2015 WSEC for important footnotes that apply to these tables. Refer to Section C402 for all applicable requirements that apply for each envelope element type and applicable exceptions. Refer to Section C410 for all applicable information for refrigerated spaces.*

Prescriptive Path	Table C402.1.3 <sup>Notes 1,7</sup> Insulation Minimum R-Value		Table C402.1.4 <sup>Notes 1,2</sup> Assembly Maximum U-factor	
	Occupancy Group	All Other	Group R	All Other
<b>Opaque Elements</b>				
<b>Roofs</b>				
Insulation Entirely above Deck	R-38 c.i.	R-38 c.i.	U-0.027	U-0.027
Metal Building (with thermal spacer block) <sup>Note 3</sup>	R-25 + R-11 Ls	R-25 + R-11 Ls	U-0.031	U-0.031
Attic and Other	R-49	R-49	U-0.021	U-0.021
Joist or single rafter	R-49	R-49	U-0.027	U-0.027
<b>Walls, Above-grade</b>				
Mass	R-9.5 c.i. <sup>Note 6</sup>	R-13.3 c.i.	U-0.104 <sup>Note 6</sup>	U-0.078
Mass transfer deck slab edge	No R-Value for prescriptive compliance		U-0.200	U-0.200
Metal Building	R-19 c.i.	R-19 c.i.	U-0.052	U-0.052
Steel Framed	R-13 + R-10c.i.	R-19 + R-8.5 c.i.	U-0.055	U-0.055
Wood Framed and Other	R-21 w/ int. frame	R-21 w/ int. frame	U-0.054	U-0.054
<b>Below Grade Wall</b> <sup>Note 4</sup>	Same as above grade		Same as above grade	
<b>Floors</b>				
Mass	R-30 c.i.	R-30 c.i.	U-0.031	U-0.031
Steel Joist	R-38 + R-10 c.i.	R-38 + R-10 c.i.	U-0.029	U-0.029
Wood Framed and Other	R-30	R-30	U-0.029	U-0.029
<b>Slab-On-Grade Floors</b>				
Unheated	R-10 for 24 in. (from top of slab)		F-0.54	F-0.54
Heated <sup>Note 5</sup>	R-10 perimeter & under entire slab		F-0.55	F-0.55
<b>Opaque Doors</b>				
Swinging	No R-Value for prescriptive compliance		U-0.37	U-0.37
Nonswinging (Roll-up or sliding)	R-4.75	R-4.75	U-0.34	U-0.34
	<i>Table C402.4 - 0-30% of wall area, or 30%-40% per Section C402.3.1.1 DLZ or Section C402.3.1.4 DOAS</i>		<i>Section C402.3.1.3 High Performance Fenestration Option - 0-40% of wall area</i>	
<b>Fenestration</b>				
<b>Assembly Maximum U-factor</b> <sup>Notes 1,2</sup>				
<b>Vertical Fenestration</b>				
Nonmetal framing	U-0.30	U-0.30	U-0.28	U-0.28
Metal framing (fixed)	U-0.38	U-0.38	U-0.34	U-0.34
Metal framing (operable)	U-0.40	U-0.40	U-0.36	U-0.36
Entrance doors	U-0.60	U-0.60	U-0.60	U-0.60
<b>Skylights</b>				
Skylights	U-0.50	U-0.50	U-0.50	U-0.50
<b>Fenestration</b>				
<b>Assembly Maximum SHGC Factor</b>				
<b>Vertical Fenestration</b>	PF<0.2: north - SHGC=0.53; all other SHGC=0.4 0.2 ≤ PF < 0.5: north - SHGC=0.58; all other - SHGC=0.48 PF ≥ 0.5: all orientations - SHGC=0.64		PF<0.2: north - SHGC=0.46; all other SHGC=0.35 0.2 ≤ PF < 0.5: north - SHGC=0.51; all other - SHGC=0.42 PF ≥ 0.5: all orientations - SHGC=0.56	
<b>Skylights</b>	SHGC=0.35		SHGC=0.35	
<b>C410.2 Refrigerated Spaces Insulation</b>				
<b>Insulation Minimum R-Value</b>				
<b>Assembly Maximum U-factor</b>				
<b>Freezers - Walk-in and Warehouse</b>				
Roof / Ceiling	R-32		U-0.030	
Wall	R-32		U-0.030	
Door	R-32		U-0.030	
Door - transparent reach-in	triple-pane, heat-reflective treated or gas			
Floor	R-28		U-0.035	
<b>Coolers - Walk-in and Warehouse</b>				
Roof / Ceiling	R-25		U-0.039	
Wall	R-25		U-0.039	
Door	R-25		U-0.039	
Door - transparent reach-in	double-pane, heat-reflective treated & gas fill, or comply with freezer door req.			
Floor	No Requirement			

**Definitions:**

Ls = Liner system -- A continuous membrane installed below the purlins and uninterrupted by framing members. Uncompressed, unfaced insulation rests on top of the membrane between the purlins. Refer to Section A102.2.5.4.

c.i. = Continuous insulation -- Insulation that is continuous across all structural members without thermal bridges other than service openings and penetrations by metal fasteners with a x-sectional area of less than 0.04% of the opaque surface area of the assembly. Components with more than 0.04% metal penetrations may be eligible to follow the alternate CI values below.

int = Intermediate framing -- Includes insulated headers, corners and interior partition wall to exterior wall intersections. Refer to Section A103.2 for framing definitions.

**Footnote Summary:**

Each table in the 2015 WSEC has footnotes applicable to specific information provided in the table. This footnote summary provides only abbreviated details from these footnotes. **Refer to 2015 WSEC for complete footnote information.**

Note 1 - Assembly descriptions can be found in Chapter 2 and Appendix A.

Note 2 - Use of assembly U-factors, C-fanominal ctors and F-factors from Appendix A and Chapter 3 are required unless otherwise allowed by the provisions of this Code.

Note 3 - For metal building roofs where using R-value compliance method, a thermal spacer block is required. Otherwise use the U-factor compliance method.

Note 4 - Where heated slabs are below-grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.

Note 5 - Heated slab F-factors shall be determined specifically for heated slabs. Unheated slab F-factors shall not be used.

Note 6 - CMU walls in all occupancies other than Group R may be eligible for reduced insulation if all provisions stated in applicable footnote are met. Refer to Footnote D in Table C402.1.4 or Footnote C in Table C402.1.3 for eligibility requirements.

Note 7 - Components with continuous insulation but with metal penetrations / connections may be eligible for alternate continuous insulation R-values if all provisions in applicable footnote are met. Refer to alternate prescriptive R-values in table below and Footnote F in Table C402.1.3 for eligibility requirements.

**Alternate continuous insulation nominal R-values**

This alternate nominal R-value compliance option is allowed for projects complying with all of the following:

1. The ratio of the cross-sectional area, as measured in the plane of the surface, of metal penetrations of otherwise continuous insulation to the opaque surface area of the assembly is greater than 0.0004 (0.04%), but less than 0.0012 (0.12%).
2. The metal penetrations of otherwise continuous insulation are isolated or discontinuous (e.g., brick ties or other discontinuous metal attachments, offset brackets supporting shelf angles that allow insulation to go between the shelf angle and the primary portions of the wall structure). No continuous metal elements (e.g., metal studs, z-girts, z-channels, shelf angles) penetrate the otherwise continuous portion of the insulation.
3. Building permit drawings shall contain details showing the locations and dimensions of all the metal penetrations (e.g., brick ties or other discontinuous metal attachments, offset brackets, etc.) of otherwise continuous insulation. In addition, calculations shall be provided showing the ratio of the cross-sectional area of metal penetrations of otherwise continuous insulation to the overall opaque wall area.

Assemblies with continuous insulation (see definition)	Alternate option for assemblies with metal penetrations, greater than 0.04% but less than 0.08%	Alternate option for assemblies with metal penetrations, greater than or equal to 0.08% but less than 0.12%
R-9.5ci	R-11.9ci	R-13ci
R-11.4ci	R-14.3ci	R-15.7ci
R-13.3ci	R-16.6ci	R-18.3ci
R-15.2ci	R-19.0ci	R-21ci
R-30ci	R-38ci	R-42ci
R-38ci	R-48ci	R-53ci
R-13 + R-7.5ci	R-13 + R-9.4ci	R-13 + R-10.3ci
R-13 + R-10ci	R-13 + R-12.5ci	R-13 + R-13.8ci
R-13 + R-12.5ci	R-13 + R-15.6ci	R-13 + R-17.2ci
R-13 + R-13ci	R-13 + R-16.3ci	R-13 + R-17.9ci
R-19 + R-8.5ci	R-19 + R-10.6ci	R-19 + R-11.7ci
R-19 + R-14ci	R-19 + R-17.5ci	R-19 + R-19.2ci
R-19 + R-16ci	R-19 + R-20ci	R-19 + R-22ci
R-20 + R-3.8ci	R-20 + R-4.8ci	R-20 + R-5.3ci
R-21 + R-5ci	R-21 + R-6.3ci	R-21 + R-6.9ci

End of Envelope Requirements Summary

# Prescriptive Path, pg. 1

# ENV-PRESCRIPTIVE

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<b>Project Title:</b> <span style="float: right;"><b>1 - Fill this line out on PROJ-SUM</b></span>	Date: <b>07/01/2016</b>
<b>Fenestration Area</b> as % gross above-grade wall area      Max. Target:	For Building Department Use
<b>Skylight Area</b> as % gross roof area      Max. Target:	
<b>Vertical Fenestration Alternates:</b> None Selected on ENV-SUM	

*Prescriptive compliance of envelope assemblies may be accomplished by providing insulation R-values per Table C402.1.3 or U-factors/F-factors per Tables C-402.1.4 and C-402.4. A single project may comply via R-values for some envelope assemblies and U-factors/F-factors for others. Note compliance method taken for each assembly in spaces provided.*

Building Component		R-Value Method for Prescriptive Compliance			U-Factor/F-Factor Method for Prescriptive Compliance	
		Cavity Ins. R-Value	Continuous Ins. (CI) R-Value <sup>1</sup>	% Area of Metal Penetrations in CI <sup>2</sup>	Assembly U-Factor	U-Factor Source <sup>3</sup>
Provide plan/detail # of assembly and description						
Roofs	Deck					
	Mtl Bid <sup>4</sup>					
	Joist/Rfr					
	Attic/Oth					
Opaque Walls - Above Grade <sup>15</sup>	Steel					
	Mtl Bid.					
	Wood/Oth <sup>5</sup>					
	Mass <sup>6</sup>					
	Transfer <sup>7</sup>					
Group R Walls <sup>15</sup>	Steel					
	Mass					
Below Grade Walls	Comm					
	Group R					
Floors	Mass					
	Framed <sup>8</sup>					

# Prescriptive Path, pg. 2

# ENV-PRESCRIPTIVE

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Project Title: <b>1 - Fill this line out on PROJ-SUM</b>				Date: <b>07/01/2016</b>		
Fenestration Area as % gross above-grade wall area				Max. Target:		
Skylight Area as % gross roof area				Max. Target:		
If vertical fenestration or skylight area exceeds maximum allowed per C402.4.1, then the project must comply via Component Performance and provide ENV-UA and ENV-SHGC forms.						
Building Component		R-Value Method for Prescriptive Compliance			U-Factor/F-Factor Method for Prescriptive Compliance	
		Perim. Ins. R-Value	Full Slab CI R-Value		F-Factor	F-Factor Source <sup>10</sup>
Provide plan/detail # of assembly and description						
Slab-on-grade <sup>9</sup>	Unheated					
	Heated					
Provide ID from door schedule and description		Ins. R-Value			Assembly U-Factor	U-Factor Source <sup>11</sup>
Opaque Doors	Swinging					
	Other					
		Solar Heat Gain Coefficient (SHGC)			U-Factor for Prescriptive Compliance	
Provide ID from window schedule and description		Projection Factor (PF) if applicable <sup>12</sup>	Orientation (N or SEW) <sup>13</sup>	Assembly SHGC <sup>14</sup>	Assembly U-Factor	U-Factor Source <sup>14</sup>
Vertical Fenestration	Non-Metal					
	Metal, fixed					
	Metal, op.					
	Mtl entry					
Skylights	All Types					

- Note 1** - Insulation that is continuous except for fasteners may be entered here if the cross-sectional area of metal penetration through otherwise continuous insulation is less than 0.12%.
- Note 2** - Alternate prescriptive continuous insulation R-values per Table C402.1.4, Footnote F may be used if the cross sectional area of metal penetrations exceeds 0.04% but is less than 0.12%. Calculations are required to use these alternate R-values.
- Note 3** - Opaque assembly U-factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1. Specify the table number or calculation page number.
- Note 4** - Thermal spacer blocking and liner system are required for prescriptive R-Value compliance in metal building roof assemblies.
- Note 5** - Intermediate framing is required for prescriptive R-Value compliance in wood-framed wall assemblies.
- Note 6** - Proposed CMU mass walls in non-Group R that meet Table C402.1.4 Footnote D requirements can enter the target prescriptive U-value of 0.104.
- Note 7** - Mass transfer slab edges must be covered with an assembly having an overall U-factor of 0.2.
- Note 8** - Refer to Table C402.1.3, Footnote E for prescriptive R-Value requirement for steel floor joist assemblies.
- Note 9** - Prescriptive slab-on-grade insulation shall extend from top of slab to minimum length per an approved method as defined in C402.2.6.
- Note 10** - Slab-on-grade F-Factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1.
- Note 11** - Opaque door U-factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1. A door is defined as opaque if less than 50% of the door area has glazing.
- Note 12** - Refer to Equation C4-6 Projection Factor Calculation.
- Note 13** - N = Oriented within 45 degrees of true north, SEW = All other orientations.
- Note 14** - Fenestration assembly U-Factor and SHGC shall be the manufacturer's NFRC product rating, which includes the glazing and frame, or shall be the default value per Section C303.1.3.
- Note 15** - List all above-grade Group R mass walls and steel frame walls in Group R Walls section. List commercial above grade walls and all other Group R above grade walls in Opaque Walls - Above Grade.

# Component Performance Path, pg. 1

ENV-UA

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<b>Project Title:</b> 1 - Fill this line out on PROJ-SUM						<b>Date:</b> 07/01/2016		
<b>Calculation Adjustments</b> None Applied						For Building Department Use		
<b>Fenestration Area</b> as % gross above-grade wall area				Max. Target:				
<b>Skylight Area</b> as % gross roof area				Max. Target:				
<b>Vertical Fenestration Alternates:</b> None Selected on ENV-SUM								
Envelope Component			Proposed UA			Target UA		
Cavity+Cl   Plan/Detail #   U-factor Source & Table # <sup>2</sup>			U-factor	x Area (A)	= UA (U x A)	U-factor	x Area (A) = UA (U x A)	
Roofs	Deck	R=				set occ.		
		R=				Above Deck Insulation	set occ.	
		R=						
	Mtl Bld	R=					set occ.	
		R=					Metal Building	set occ.
		R=						
	Joist/Rtr	R=					set occ.	
		R=					Joist/single rafter	set occ.
		R=						
Attic/Oth	R=					set occ.		
	R=					Single raft, attic, other	set occ.	
	R=							
Opaque Walls - Above Grade <sup>4,6</sup>	Steel	R=				set occ.		
		R=				Steel/metal frame	set occ.	
		R=						
	Mtl Bld.	R=					set occ.	
		R=					Metal Building	set occ.
		R=						
	Wood/Oth	R=					set occ.	
		R=					Wood Frame, other	set occ.
		R=						
Mass <sup>3</sup>	R=					set occ.		
	R=					Mass Wall	set occ.	
	R=							
Transfer <sup>5</sup>	R=					set occ.		
	R=					Mass Transfer Deck	set occ.	
	R=							
Group R	Mass <sup>7</sup>	R=				set occ.		
		R=				Group R Mass Wall	set occ.	
		R=						
Below Grade	Comm <sup>4,7</sup>	R=				set occ.		
		R=				Assumed to be Mass Wall	set occ.	
		R=						
	Group R <sup>4,7</sup>	R=					set occ.	
		R=					Assumed to be Mass Wall	set occ.
		R=						
Floors	Mass	R=				set occ.		
		R=				Mass Floor	set occ.	
		R=						
	Framed	R=					set occ.	
		R=					Joist/Framing	set occ.
		R=						
			Area <sup>1</sup>	UA	Area <sup>1</sup>	UA		
Page 1 Subtotal								

Component Performance Compliance (UA) Occupancy Group not selected

# Component Performance Path, pg. 2

**ENV-UA**

2015 WSEC Compliance Forms for Commercial Buildings including R2, R3, & R4 over 3 stories and all R1

Revised Jun 2016

<b>Project Title:</b>	<b>1 - Fill this line out on PROJ-SUM</b>	Date	07/01/2016
<b>Fenestration Area</b> as % gross above-grade wall area	Max. Target:	For Building Department Use	
<b>Skylight Area</b> as % gross roof area	Max. Target:		

Building Component				Proposed UA			Target UA				
		Ins. R	Plan/Detail #	F-factor Source & Table # <sup>8</sup>	F-factor	x Perimeter	= UA(U x A)	F-factor	x Perimeter =	UA (U x A)	
Slab-on-grade	Unheated	R=						set occ.			
		R=						Slab-On-Grade		set occ.	
		R=									
	Heated	R=							set occ.		
		R=							Heated Slab-On-Grade		set occ.
		R=									
Schedule ID		U-factor Source <sup>9,10</sup>		U-factor	x Area (A)	= UA (U x A)	U-factor	x Area (A) =	UA (U x A)		
Doors <sup>6,9</sup>	Swinging							set occ.			
	Other							Opaque Swing Doors		set occ.	
Vertical Fenestration <sup>6,10</sup>	Non-Metal							set occ.			
	Metal, fixed							Non-Metal Frame		set occ.	
	Metal, op.							set occ.			
	Mtl entrance							Metal Frame, Fixed		set occ.	
	All Types							set occ.			
								Metal Frame, Operable		set occ.	
								set occ.			
								Metal Entrance Door		set occ.	
								set occ.			
								All types		set occ.	

	Area'	UA	Area'	UA
Page 2 Subtotal				
Page 1 Subtotal				
Project Total				

TO COMPLY - The Proposed Total UA shall not exceed the Target Total UA.

## Component Performance Compliance (UA) Occupancy Group not selected

- Note 1** - If vertical fenestration or skylight area exceeds maximum allowed per C402.4.1, then Target Area Adjustment of all applicable envelope elements will be calculated automatically by the compliance form. Refer to Target Area Adjustments worksheet for this calculation.
- Note 2** - Opaque assembly U-factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1.
- Note 3** - Proposed CMU mass wall in non-Group R that meet Table C402.1.4 Footnote D requirements can enter the target U-value of 0.014
- Note 4** - For semi-heated spaces utilizing the wall insulation exception, enter Target Wall U-factors under Proposed Wall U-factors so exterior walls are neutral to the calculation.
- Note 5** - Mass transfer slab edges must be covered with an assembly having an overall U-factor of 0.2.
- Note 6** - Demising walls, doors, and vertical fenestration separating spaces with different degrees of space conditioning (unconditioned, semi-heated, fully conditioned) shall be included only on the ENV-UA form for the space with the greatest degree of space conditioning.
- Note 7** - List Group R above grade mass walls here. List all other mass walls, Commercial and Group R, in the Opaque Walls - Above Grade section.
- Note 8** - Slab-on-grade F-Factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1.
- Note 9** - Opaque door U-factors shall come from Appendix A or calculated per approved method as specified in C402.1.5.1. A door is defined as opaque if less than 50% of the door area has glazing.
- Note 10** - Fenestration assembly U-Factors shall be the manufacturer's NFRC product rating, which includes the glazing and frame, or shall be the default value per Section C303.1.3.

# Vertical Fenestration Target Area Adjustment Calculations

If vertical fenestration area exceeds maximum allowed per Section C402.4.1, then Target Area Adjustment of all applicable envelope elements is required. This worksheet automatically calculates these adjustments and updates target areas in the ENV-UA and ENV-SHGC worksheets. Information shown in this worksheet is for reference only and is write-protected. Submit this Target Area Adjustment form with ENV-UA and ENV-SHGC forms.

**VF** = Vertical fenestration  
**DR** = Opaque doors  
**AG** = Above-grade

**NW** = Net above grade wall (excludes fenestration and doors.)  
**Gross Exterior Above-Grade Wall Area** = VF + NW + DR

## Proposed Areas

Vertical Fenestration ->	VF=	
Opaque ->	NW=	DR=

  

Gross Exterior AG Wall Area	X	Max Vert. Fen. % (C402.3.1)	÷	100	=	Maximum Target Vert. Fen. Area
Total Vertical Fenestration	-	Maximum Target	=	Delta Vertical Fenestration	=	Excess Vertical Fenestration
Total Vertical Fenestration	-	Excess Vertical Fenestration	=	Target Vertical Fenestration	÷	Total Vertical Fenestration
Net AG Wall Area	+	Excess Fenestration	=	Target Net Wall Area	÷	Net Wall
						Target VF Multiplier
						Target Net Wall Mult.

Multiplier applied to all Proposed Vertical Fenestration Areas to calculate Target Vertical Fenestration Area

Multiplier applied to all Proposed Opaque Above-Grade Wall Areas to calculate Target Above-Grade Wall Area

## Target Areas - UA Commercial

Vertical Fenestration	Proposed Area	X	Target VF Mult.	=	Target Area
Non-metal frame		X		=	
Metal frame, fixed		X		=	
Metal frame, operable		X		=	
Metal frame, entrance door		X		=	

  

Above-grade Wall	Proposed Area	X	Target Net Wall Mult.	=	Target Area
Steel Frame		X		=	
Metal Building		X		=	
Wood / Other frame		X		=	
Mass		X		=	
Mass Transfer Deck		X		=	
Group R Mass		X		=	
<b>Sum of Proposed</b>			<b>Sum of Target</b>		

Target areas in shaded boxes are applied to target areas on ENV-UA

Sum of target above-grade wall and vertical fenestration areas are calculated to equal the

## Target Areas - SHGC x A

Non-North Vertical Fenestration	Proposed Area	X	Target VF Mult.	=	Target Area
PF < 0.2		X		=	
0.2 ≤ PF < 0.5		X		=	
PF ≥ 0.5		X		=	

  

North Vertical Fenestration	Proposed Area	X	Target VF Mult.	=	Target Area
PF < 0.2		X		=	
0.2 ≤ PF < 0.5		X		=	
PF ≥ 0.5		X		=	

SHGC target areas in shaded boxes are applied to target areas on ENV-SHGC

# Skylight Target Area Adjustment Calculations

If skylight area exceeds maximum allowed per Section C402.4.1, then Target Area Adjustment of all applicable envelope elements is required. This

SKY= Skylight	NR - Net roof (excludes skylight)	Gross Exterior Roof Area = SKY + NR
---------------	-----------------------------------	-------------------------------------

## Proposed Areas

Skylight (Horizontal Fenestration) -> SKY=   
 Opaque Roof -> NR=

Gross Exterior Roof Area  X Max Skylight % (C402.3.1)  ÷ 100 = Maximum Skylight Fenestration Area

Total Skylight Area  - Maximum Target  = Delta Skylight Area   
 Delta Skylight Area  > 0 = Excess Skylight   
 Delta Skylight Area  < 0 = Excess Skylight

Total Skylight Area  - Excess Skylight  = Target Skylight Area   
 Total Skylight Area  ÷ Target Skylight Area  = Target SKY Multiplier

Net Roof Area  + Excess Skylight  = Target Net Roof Area   
 Net Roof Area  ÷ Target Net Roof Area  = Target Net Roof Mult.

Multiplier applied to all Proposed Skylight Areas to calculate Target Skylight Area

Multiplier applied to all Proposed Opaque Roof Areas to calculate Target Roof Area

## Target Areas - UA and SHGC x A

Category	Element	Proposed Area	Multiplier	Target Area
Skylight	All	<input type="text"/>	Target SKY Mult. <input type="text"/>	<input type="text"/>
	Roof	<input type="text"/>	Target Net Roof Mult. <input type="text"/>	<input type="text"/>
Roof	Insulation Above Deck	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Metal Building	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Joist / Single Rafter	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Attic / All Others	<input type="text"/>	<input type="text"/>	<input type="text"/>
Sum of Proposed		<input type="text"/>		<input type="text"/>
Sum of Target				<input type="text"/>

Target areas in shaded boxes are applied to target areas on ENV-UA

Sum of target roof and skylight areas are calculated to equal the

# SHGC Calculation

# ENV-SHGC

2015 WSEC Compliance Forms for Commercial Buildings including R2, R3, & R4 over 3 stories and all R1

Revised Jun 2016

<b>Project Title:</b> 1 - Fill this line out on PROJ-SUM	<b>Date:</b> 07/01/2016
<b>Fenestration Area</b> as % gross above-grade wall area <span style="float:right">Max. Target:</span>	For Building Department Use
<b>Skylight Area</b> as % gross roof area <span style="float:right">Max. Target:</span>	
<b>Vertical Fenestration Alternates:</b> None Selected on ENV-SUM	
<i>Notes: 1 - Proposed vertical fenestration and skylight areas entered in ENV-SHGC must match proposed fenestration areas in ENV-UA.                  2 - If Target Area Adjustment is required per ENV-UA, then target areas will be automatically adjusted in ENV-SHGC. Refer to Target Area Adjustments worksheet for this calculation.                  3 - Fenestration assembly SHGC shall be the manufacturer's NFRC product rating, or shall be the default value per Section C303.1.3.                  4 - Fenestration that separates conditioned space from a non-conditioned space shall be included in this worksheet. Enter target SHGC values for this fenestration under proposed SHGC, so it is neutral to the calculation.</i>	

Skylights		Proposed SHGC			Target SHGC		
Sch. ID	Provide SHGC source and fenestration schedule ID	SHGC	x Area (A)	= SHGC x A	SHGC	x Area (A)	= SHGC x A
					set occ.		
					SHGC		set occ.
<b>Skylight Totals</b>							

All Non-North Vertical Fenestration+				Proposed SHGC			Target SHGC ++		
Sch. ID	Provide SHGC source and fenestration schedule ID	PF	SHGC	x Area (A)	= SHGC x A	PF Category	SHGC	x Area (A)	= SHGC x A
						PF < 0.2	set occ.		
						0.2 ≤ PF < 0.5	set occ.		
						PF ≥ 0.5	set occ.		
						++ If projection factor (PF) credits are applied to the proposed design, Target SHGC will sum fenestration area by PF category.			
+ If PF credit is applied, then vertical fenestration must be entered in the correct table according to orientation. If credit is not applied then all vertical fenestration can be entered in either table.				<b>Non-North Window Totals</b>					

North Vertical Fenestration+				Proposed SHGC			Target SHGC++		
Sch. ID	Provide SHGC source and fenestration schedule ID	PF	SHGC	x Area (A)	= SHGC x A	PF Category	SHGC	x Area (A)	= SHGC x A
						PF < 0.2	set occ.		
						0.2 ≤ PF < 0.5	set occ.		
						PF ≥ 0.5	set occ.		
						++ If projection factor (PF) credits are applied to the proposed design, Target SHGC will sum fenestration area by PF category.			
				<b>North Window Totals</b>					

TO COMPLY - The Proposed Total SHGC x A shall not exceed the Target Total SHGC x A.

	<b>Area</b>	<b>SHGC x A</b>		<b>Area</b>	<b>SHGC x A</b>
<b>Total (Skylight + Window)</b>					

**Component Performance Compliance (SHGC)**

**Occupancy Group not selected**

# Building Permit Plans Checklist, pg. 1

ENV-CHK

2015 WSEC Compliance Forms for Commercial Buildings including R2, R3, & R4 over 3 stories and all R1

Revised Jun 2016

**Project Title:** 1 - Fill this line out on PROJ-SUM **Date:** 07/01/2016

The following information is necessary to check a building permit application for compliance with the building envelope requirements in the Washington State Energy Code, Commercial Provisions.

Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Location in Documents	Building Department Notes
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## SCOPE

	C402.1.1	Low energy spaces	Low energy spaces are identified on plans; include project information, and calculations if applicable, that demonstrate spaces are eligible for envelope provisions exemption		
	C402.1.1.1	Semi-heated spaces	Semi-heated spaces are identified on plans, include calculations that demonstrate spaces are eligible for wall insulation exemption		
	C402.1.2	Equipment Buildings	Provide building area, average wall and roof U-factor, and installed equipment information that demonstrates equipment building is eligible for envelope provision exemption		
	C410.2	Walk-in and warehouse cooler and freezer spaces	Cooler and freezer spaces are identified on plans; C410 envelope compliance forms provided (pending)		
	C101.4.1	Mixed occupancy	Spaces with different occupancy requirements are identified on plans		
	C503.2	Change of space conditioning	Existing unconditioned spaces changing to semi-heated or conditioned space, and existing semi-heated spaces changing to conditioned space, are identified on plans. Include calculations that demonstrate baseline and final level of conditioning.		
	C505.1	Change of occupancy	Existing F, S and U-occupancy spaces undergoing a change in occupancy are indicated on plans; include calculations that demonstrate upgrade complies with the current WSEC.		
Pre-2002 Group R spaces undergoing a change to a commercial occupancy are indicated on plans; include calculations that demonstrate upgrade complies with the current WSEC.					
Non-Group R occupancy spaces undergoing a change to Group R are indicated on plans; include calculations that demonstrate upgrade complies with the current WSEC.					

## ENVELOPE PROVISIONS

	C103.2 C103.6.3	Compliance documentation	Indicate envelope insulation compliance path and provide applicable forms; ENV-PRESCRIPTIVE or ENV-UA / ENV-SHGC for component performance If complying via total building performance, provide a list of all proposed envelope component types, areas and U-values		
	C303.1.1 C303.1.2	Insulation identification	Indicate identification mark shall be applied to all insulation materials and insulation installed such that the mark is readily observable during inspection		
	C303.1.3 C402.4.3	Fenestration product rating	Fenestration products shall be labeled with rated U-factor, SHGC, VT, and leakage rating		
	C303.1.1 C402.2.1	General insulation installation	Indicate installation methods, thicknesses, densities and clearances to achieve the intended R-value of all insulation materials; Where two or more layers of rigid insulation will be used, indicate that edge joints between layers are staggered		
	C103.2 C402.2.2	Roof assembly insulation	Indicate R-value(s) of cavity/continuous insulation on roof sections;		
Indicate framing materials on roof sections;					
Indicate method of framing for ceilings below vented attics and vaulted ceilings per A102.2 (std, adv);					
Provide area weighted average U-factor calculation for insulation whose thickness varies by 1 inch or less;					
Indicate effective U-factors of tapered insulation entirely above deck per A102.2.6; include roof configuration and slope, maximum R-value at peak and minimum R-value at low point for all roof surfaces					
			Indicate R-values for thermal spacers and each insulation layer, and liner system (LS) method for metal building roofs		
	C402.2.2	Skylight curb insulation	Indicate curb insulation R-value on roof section if not included in skylight NFRC rating		
C103.2 C402.2.3 C402.2.4 C303.2.1	Above/below grade wall insulation	Indicate R-value(s) of cavity/continuous insulation on wall sections;			
		Indicate framing materials on wall sections;			
		Indicate method of framing for wood const per A103.2 (std, int, adv);			
		Indicate material density category, wall weight and heat capacity for qualifying mass walls;			
		For qualifying ASTM C90 masonry walls, indicate loose-fill core insulation material and percentage of cores filled including grouted cores, bond beams, vertical fills, headers and any other grouted cores;			
		Indicate method of protection of exposed exterior basement/crawlspace wall insulation			

# Building Permit Plans Checklist, pg. 2

ENV-CHK

2012 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Project Title: 1 - Fill this line out on PROJ-SUM			Date	07/01/2016	
Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Location in Documents	Building Department Notes
	C103.2 C402.4.4	Opaque doors	Indicate rated U-factor (swinging) or R-value (non-swinging - roll-up/sliding) on wall sections or in door schedules - applies to doors with less than 50% glazed area		
	C402.2.5	Floor over outdoor or unconditioned space insulation	Indicate R-value(s) of cavity/continuous insulation on floor sections; Indicate framing material on floor sections; Indicate material density category and weight of qualifying mass floors		
	C402.2.6 C303.2.1	Slab-on-grade floor insulation	Indicate R-value of continuous insulation on wall section or foundation detail; Indicate insulation extends down vertically and/or horizontally the required distance from top of slab; Indicate method of protection of exposed exterior slab edge insulation		
	C402.2.6 C303.2.1	Radiantly heated slab-on-grade floor insulation	Indicate R-value of continuous insulation on wall section or foundation detail; Indicate insulation extends down vertically from top of slab and then horizontally under the entire slab; Indicate method of protection of exposed exterior slab edge insulation		
	C402.2.8	Radiant heating system insulation	Indicate insulation R-value behind radiant panels, U-bend/headers and bottom surface of radiantly heated floors (other than radiantly heated slab-on-grade)		
	C402.4.1 C502.2.1 C503.3.2	Vertical fenestration maximum area	Provide calculation for total vertical fenestration area as a percentage of gross above grade wall area (WWR) for new construction, additions and alterations in ENV-SUM		
	C402.4.1.1 C405.2.4.1 C502.2.1 C503.3.2	Increased prescriptive maximum vertical fenestration area with daylight zones and controls	Provide calculations showing that the percentage of overall conditioned floor area within daylight zones is equal to or greater than 50% in 1 & 2 story buildings: OR Provide calculations showing that the percentage of overall net floor area within daylight zones is equal to or greater than 25% in buildings 3 stories or more; include the gross floor area and list of spaces omitted for the net floor area; Note in envelope plans that all lighting fixtures located within daylight zones shall be provided with daylight responsive controls per WSEC Section C405.2.4.1; indicate method of control in lighting fixture schedules Indicate that the VT of vertical fenestration is at least 1.1 times the rated SHGC		
	C402.4.1.3 C502.2.1 C503.3.2	Increased prescriptive maximum vertical fenestration area with high-performance glazing	Indicate high performance U-factors and SHGC values in fenestration schedules; If applicable, provide area-weighted U-factor calculation(s) used for multiple fenestration elements within the same fenestration category per Table C402.3		
	C402.4.1.4 C403.6	Increased prescriptive maximum vertical fenestration area with DOAS mechanical systems	Indicate that for eligibility, all occupied, conditioned spaces will be served by a dedicated outside air system (DOAS) that delivers ventilation air without requiring operation of the heating/cooling system per Section C403.6		
	C402.1.5	Wall/vertical fenestration target area adjustment	Indicate if component performance with target area adjustment will be used to account for vertical fenestration area in excess of the prescriptive maximum allowed		
	C402.4.1 C502.2.2 C503.3.3	Skylight maximum area	Provide calculation for total skylight area as a percentage of gross roof area (SRR) for new construction, additions and alterations in ENV-SUM		
	C402.1.5.2	Roof/skylight target area adjustment	Indicate if component performance with target area adjustment will be used to account for skylight area in excess of the prescriptive maximum allowed		
	C402.4.3 C303.1.3	U-factors, SHGC and VT for all fenestration assemblies	Indicate U-factors, SHGC and VT values in fenestration schedules; If applicable, provide area-weighted U-factor calculation(s) used for multiple fenestration elements within the same fenestration category per Table C402.3 Indicate if values are NFRC or default; if default then specify frame type, glazing layers, gap width, low-e coatings, gas-fill		
	C402.4.3	Permanent shading devices	For windows with overhangs or permanent projection shading devices, provide projection factor calculations (Equation C4-6) and associated minimum SHGC for north and non-north orientations		

# Building Permit Plans Checklist, pg. 3

ENV-CHK

2012 Washington State Energy Code Compliance Forms for Commercial Buildings including R2 & R3 over 3 stories and all R1

Project Title: 1 - Fill this line out on PROJ-SUM				Date	
Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Location in Documents	Building Department Notes
	C402.4.2	Spaces in single story buildings requiring skylights	<p>In single story buildings, provide list of enclosed areas that exceed 2,500 sf, have ceiling height greater than 15 ft, and are space types required to comply with this provision. For each area identify space type, floor area, floor to ceiling height, and any exception taken;</p> <p>For each area provide calculations for percentage of conditioned floor area located within a daylight zone including skylight and eligible sidelight daylight zones;</p> <p>For each area provide calculations for percentage of skylight area, OR;</p> <p>Provide calculations for skylight effective aperture (Equation C4-5);</p> <p>Indicate haze factor of skylight glazing material or diffuser</p>		

**AIR LEAKAGE**

	C402.5.1.1	Air barrier construction and sealing	<p>Indicate location of continuous air barrier on plans and sections;</p> <p>Provide details for all joints, transitions in materials, penetrations in air barrier and note method of sealing (caulked, gasketed, or other approved method)</p>		
	C402.5.3	Rooms containing open combustion fuel burning appliances used for space conditioning	<p>Indicate that room(s) containing non-direct vent appliances is isolated from inside the thermal envelope with a sealed air barrier, including doorway gasketing and sealing around ductwork and piping penetrations;</p> <p>Indicate insulation provided in wall, floor and ceiling of the room envelope, and insulation required on combustion air ductwork</p>		
	C402.5.4	Access openings and doors to shafts, chutes, stairways and doors	<p>Indicate locations of all access openings and doors to shafts, chutes, stairways and elevators;</p> <p>Indicate method of gasketing, weatherstripping and sealing of these openings</p>		
	C402.5.5 C403.2.4.3	Outdoor air intakes, exhausts and relief openings	<p>Indicate locations of all stairway enclosure, elevator shaft and building pressurization relief openings, outside air intakes and exhaust openings;</p> <p>Note in envelope plans that all relief, outside air intake and exhaust openings shall be provided with dampers in accordance with Mechanical Section C403.2.4.3</p>		
	C402.5.8	Recessed lighting in building envelope	<p>Indicate method of sealing between light fixture housing and wall or ceiling;</p> <p>Note in envelope plans that all recessed lighting fixtures shall be IC rated and have an air leakage rating not greater than 2 cfm per ASTM E283 test; include these requirements in lighting fixture schedules</p>		
	C402.5.6	Loading dock seals	Indicate weather seal at cargo and loading dock doors		
	C402.5.7	Vestibules	<p>Indicate locations and dimensions of vestibules and air curtains;</p> <p>Indicate exception and criteria utilized for all building entrances and exits that do not have a vestibule or air curtain;</p> <p>Indicate required performance for air curtains installed per exception 7;</p> <p>For unconditioned vestibules, indicate which envelope assembly (interior or exterior) complies with the requirements for a conditioned space</p>		
	C103.2 C402.5.1.2	Building air leakage test	<p>Indicate on plans the air barrier boundaries and area calculations on all six sides of the air barrier;</p> <p>Indicate air barrier test method in accordance with ASTM E779 or approved equivalent;</p> <p>Indicate required maximum leakage rate for compliance.</p> <p>Include the following requirements in project documents: (1) Submit air barrier test report to jurisdiction once test is completed; (2) If test results exceed 0.4 cfm/ft<sup>2</sup> at 0.3 in. wg, then visually inspect air barrier and seal noted sources of leakage; (3) Submit a follow-up report to jurisdiction noting corrective measures taken; (4) Include air barrier test report in compliance documentation provided to owner.</p>		

If "no" is selected for any question, provide explanation: