

City of Bainbridge Island
Building Division
Tenant Improvement Checklist - 2009



PLANNING AND COMMUNITY DEVELOPMENT
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The following Building Codes are now in effect:

- ⇒ 2009 Residential Code (IRC)
- ⇒ 2009 International Mechanical Code (IMC)
- ⇒ 2009 International Fire Code (IFC)
- ⇒ 2009 Uniform Plumbing Code (UPC)
- ⇒ 2009 Edition Washington State Energy Code (WSEC), WAC 5 15 - 20.
(Effective January 1, 2009.)
- ⇒ The Washington State Ventilation and Indoor Air Quality Code has been repealed. Provisions formerly found in the VIAQ are now located in the IRC, the IMC and the IBC as appropriate.

What is a Tenant Improvement Permit?

A tenant improvement permit is a permit that is required for completing, remodeling, or altering a space within an existing building. This may also include a change of use. A change of use from one occupancy group (*see below*) to another may require the entire building or portion of the building under permit to comply with all current code requirements.

Address & Suite Number

To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the department of building safety for that purpose. Such application shall include street address or similar description such as suite number.

Scope of Work

A scope of work is a written description identifying and describing all work to be covered by the permit for which application is received.

Business Description

A detailed description of what the business is, what are the plans for the space of the Tenant Improvement.

Valuation

The valuation is the total value of all work for which the permit is issued, including electrical, plumbing, mechanical, fire-protection systems, finish work, elevators and any other permanent equipment. This value will be used for computing permit fees.

Contractor

A copy of the contractor's current registration is required, in addition to a city business license.

Vicinity Map

Provide directions from City Hall by use of map or written instruction how to locate the job site.

Site Plan/Parking Plan

A site plan must clearly depict the building in relationship to all property lines. All parking should be shown on the site plan. Any existing wheelchair accessible parking must be identified.

Occupancy Classification & Change of Use

Every building must have its use classified into the occupancy group it most closely resembles in the 2006 IBC. Any change of use or character of a building must comply with the type of construction. EXAMPLE: *A dwelling unit (Group R Division 3 Occupancy) converted to an office (Group B Occupancy) would be required to comply with current applicable codes for a Group B Occupancy.*

Type of Construction

The five various types of construction outlined in the 2006 IBC represent varying degrees of public safety and resistance to fire. Certain occupancies will not be allowed in the less restrictive types of construction.

Square Footage/Occupant Load

The square footage of all areas must be shown to determine the occupant load, which will determine the exiting requirements for the building or space.

Fire Sprinklers

May be required if not already in place, or existing sprinklers may need to be modified for new use. A permit

will be required for new or modified systems, with a review from the Fire Marshal's office.

Food Service

Depending on menu, a Type I range hood with fire-suppression will be required (*for grease laden vapors*). Indirect wastes and grease traps/interceptors will be required for food and beverage equipment, etc. A floor plan and plumbing plan will be required. The plans will be reviewed by the building, fire and local health department for compliance.

Architect/Engineer

State law requires plans for commercial projects larger than 4,000 square feet in floor area be signed and sealed by a licensed architect or engineer. Depending on the scope and complexity of the work, the building official has the authority to request stamped plans on smaller projects as deemed necessary.

Plans legible, dimensioned and to scale

Plans shall be of sufficient clarity to indicate the location, nature and the extent of the work proposed and show in detail that it will conform to all applicable codes and regulations.

Non-Residential Energy Code (NREC) Compliance Worksheets

Alterations subject to the *NREC* shall comply with *Chapters 11-20* for changes to the building envelope, mechanical systems and lighting. The appropriate forms are attached. In some cases, additions and alterations may not require full compliance with the *NREC* when full compliance is physically impossible and/or economically impractical in the opinion of the building official. In no case shall the energy efficiency be decreased by any alteration to an existing building.

Floor Plan

The floor plan shall show existing conditions as well as the changes you intend to make. Show existing walls that are to remain, existing walls to be removed, and new walls. Label all spaces by their intended use. Give stair rise and run & ramp slopes. Show rated corridors, exit signs and emergency lighting. Include window, door and hardware schedules. Show barrier-free accessibility (*see below*).

Barrier-Free Compliance

A change of use will be subject to the requirements of *WAC 51-40-1100*, Accessibility. No alteration shall reduce accessibility of the facility. When the alteration is to an area of primary function, the area shall be made accessible to the maximum extent feasible. When

required, additional toilet facilities must conform to current requirements.

Framing Plan

Provide a cross sectional drawing showing new walls, floors and ceilings and connections between new and existing building elements.

Ceiling Plan

Provide ceiling construction details on a scaled drawing. If a suspended ceiling is proposed, provide details showing compliance with *UBC Standard 25-2*. Show seismic bracing of the grid and light fixtures.

Electrical Plan

Exit illumination and signage must be shown on an electrical plan or the floor plan. The exit paths are required to be illuminated the entire time the building is occupied. Additionally, illuminated exit signs are required when more than one exit is necessary due to occupant load.

Electrical Permits are handled thru the State Department of L & I at 360.415.4000

Plumbing Plan

For larger projects and for projects including food services, plumbing plans will be required. Typically this means schematics for DWV and potable water systems, including pipe sizing. When required, provide a fixture schedule and show all fixtures on the floor plan.

CROSS-CONNECTION: *Means of cross-connection control to be determined by city.*

GREASE TRAP/INTERCEPTOR: *Sized in accordance with usage (commercial kitchens).*

Mechanical Plan

Plans are not typically required for minor alterations to heating duct systems. Plans and specifications will be required for kitchen hoods and equipment and most larger projects. *NREC* compliance may be required.

Water/Sewer Availability Request

Provide proof that a COBI Public Works Department (206.842.2016) Water/Sewer Availability Request form has been filled out and turned in.

Sewer Connection Analysis

Provide proof that a COBI Public Works Department (206.842.2016) Sewer Connection Analysis form has been filled out and turned in.

Kitsap County Health District

Approval from or proof that application has been submitted to Kitsap County Health District.(360.337.5285).



Tenant Improvement Submittal Checklist

2006 International Building Code (IBC), WAC 51-50
 2006 International Mechanical Code (IMC), WAC 51-52
 2006 Uniform Plumbing Code (UPC), WAC 51-56/57
 2006 Accessible & Usable Buildings & Facilities, ICC/ANSI A117.1-2003

2006 WA ST Energy Code (WSEC), WAC 51-11
 2006 WA ST Ventilation & Indoor Air Quality Code (WSVIAQ), WAC 51-13

Applicant: _____ Permit # _____ Date: _____

BUILDING DIVISION

TWO COMPLETE PLAN SETS		YES	NO	N/A
1.	PRE-APPLICATION CONFERENCE INFO			
2.	COVER SHEET (Sheet size, pick one, 18" X 24" or 24" X 36" ONLY)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Address & Suite Number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Scope of Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Business Description	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Valuation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Contractor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Vicinity Map: <i>(directions to site)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Site Plan/Parking Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Occupancy Classification <i>(change of use?)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type of Construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square Footage/Occupant Load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fire Sprinklers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Food Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Architect/Engineer stamped & signed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Plans legible, dimensioned and to scale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	NON-RESIDENTIAL ENERGY CODE COMPLIANCE WORKSHEETS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	FLOOR PLAN (identify all areas, Permanent Fixtures i.e. things attached to floor or walls; exiting plan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	BARRIER-FREE COMPLIANCE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	FRAMING PLAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	CEILING PLAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	ELECTRICAL PLAN (exit signage & illumination)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	PLUMBING PLAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Cross-Connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Grease Trap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	MECHANICAL PLAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HVAC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Exhaust Hood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.	PLANNING REVIEW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	ENGINEERING DEPARTMENT REVIEW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Water/Sewer Availability Request	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sewer Connection Analysis (2 copies – 1 for Existing, 1 for Proposed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.	FIRE DEPARTMENT REVIEW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	HEALTH DEPARTMENT REVIEW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Approval from Kitsap County Health District or	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Proof that application has been submitted to Kitsap County Health District	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cover Sheet Information (Example)

CODE INFORMATION		DIRECTORY	
Scope of Work/Area:	1,167 SF retail tenant improvement/build out	Owner:	City of Bainbridge Island
Automatic Fire Protection System:	(E) Building per NFPA 12 (Prior design-build)	Address	280 Madison Ave. N.
Smoke Detection System:	(E) Building per IBC & NFPA 72 (Prior Design-Build)	Tax Lot Number:	262502-3-143-2007
Occupancy Class/Load:	Retail: M/30 SF per Occupant = 39 Occupants		
Occupancy Separation:	1HR Typical (2HR Between Garage S-3)	Applicant:	Joe Smith and Associates Inc
Construction Type:	V-HR	(Owners Rep.)	206.842.2552
Handicap Accessibility:	2006 IBC-Chapter 11 – Building Access & Public Facilities. 2006 ICC/ANSI A117.1–2006 – Accessible and Usable Building and Facilities.		
Valuation:	\$15/SF = \$17,500	Tenant:	Planning & Community Development
NREC Energy Code:	Building Envelope (Prior Application & Approval)	Architect:	Jane Doe Arch.
	Lighting Budget (Avg. 1fc per SF)		206.842.2552
		Contractor:	Public Works Construction, Inc.
			206.842.2552



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● Fax: (206)780-0955 ● Email: pcd@bainbridgewa.gov



TENANT IMPROVEMENT PERMITS

The 2009 International Building Code says:

105.1 Required. *Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.*

Common myths about Tenant Improvements:

Myth: “I’m just replacing sheetrock!”

Fact: Even replacing sheetrock needs a permit. The Building Division needs to check the Fire Separation between you and the other tenants.

Myth: “All we’re doing is putting in new sinks and a toilet!”

Fact: Any new fixtures require inspection for correct installation, traps and venting. The City of Bainbridge Island is also tasked with making sure that a person with a physical disability can independently go to, enter, and use a facility or building according to the Americans with Disabilities Act. The City also needs to make sure that we’re not overloading the capacity of our water system.

Myth: “We’re only adding a non-bearing/non-structural wall.”

Fact: Even non-bearing walls must be checked for correct framing; making sure that they don’t cause a “Fire Trap”; that any fire sprinkler heads aren’t covered or end up too close to a wall.

Myth: “It’s not a Bar, it’s a counter top with storage cabinets below.”

Fact: If it’s on **wheels** i.e. portable, it’s exempt from a permit, but furnishings attached to the floor require a permit.

Myth: “I don’t need a permit to replace my old windows with new, better ones!”

Fact: Yes you DO! According to the International Code Council & Washington State Building Code Council the Moisture Barrier/Flashing needs to be inspected for correct installation to prevent moisture from entering the wall.

Myth: *Cabinets & Short Walls don’t need a permit.*

Fact: Cabinets that are **NOT affixed** to the floor and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height as long as they don’t block the accessible means of egress don’t need a permit. If affixed to the floor, it **NEEDS** a permit.

Myth: “I’m only changing the Floor!”

Fact: Painting, papering, tiling, carpeting, and similar finish work does NOT require a permit, but if you’re changing the subflooring it needs a permit.

Myth: “I asked the City and they said”

Fact: A Tenant Improvement building permit is required unless waived in writing from the Building Official.

Fact: Both the Contractor and owner are liable and will be fined if work is performed without a permit when one was required.

See below for excerpts from the IBC:

SECTION 105; PERMITS

105.1 Required. Any owner or authorized agent who intends to construct, **enlarge, alter, repair, move, demolish, or change the occupancy of a building** or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.

105.2 Work exempt from permit. Exemptions from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. Permits shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11 m²).
2. Fences not over 6 feet (1829 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity does not exceed 5,000 gallons (18 925 L) and the ratio of height to diameter or width does not exceed 2:1.
6. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any basement or story below and are not part of an accessible route.
7. **Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.**



Main Entry: cabi-net

1 a: a case or cupboard usually having doors and shelves .

8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated swimming pools accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, do not exceed 5,000 gallons (18 925 L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family dwellings.
12. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support of Group R-3 and U occupancies.
13. **Non-fixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.**



Main Entry: fixed

1 a: securely placed or fastened : STATIONARY

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part that does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (5 kg) or less of refrigerant and actuated by motors of 1 horsepower (746 W) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

SECTION 202; DEFINITIONS

ADDITION. An extension or increase in floor area or height of a building or structure.

ALTERATION. Any construction or renovation to an existing structure other than repair or addition.

Any of the following work NEEDS a permit:

<p>Add Foundation, Altering existing Foundation, Moving Foundation, Remove Foundation, Repair Foundation</p> <p>Add Framing, Altering existing Framing, Moving Framing, Remove Framing, Repair Framing</p> <p>Add walls, Altering existing walls, Moving walls, Remove walls, Repair walls</p> <p>Add Roof, Altering existing Roof, Moving Roof, Remove Roof, Repair Roof</p> <p>Add Stairs, Altering existing Stairs, Moving Stairs, Remove Stairs, Repair Stairs</p> <p>Add Windows, Altering existing Windows, Moving Windows, Remove Windows, Repair Windows</p> <p>Add Plumbing Drains, Altering existing Plumbing Drains, Moving Plumbing Drains, Remove Plumbing Drains, Repair Plumbing Drains</p> <p>Add Plumbing Traps, Altering existing Plumbing Traps, Moving Plumbing Traps, Remove Plumbing Traps, Repair Plumbing Traps</p>	<p>Add Plumbing Vents, Altering existing Plumbing Vents, Moving Plumbing Vents, Remove Plumbing Vents, Repair Plumbing Vents</p> <p>Add Plumbing Fixtures, Altering existing Plumbing Fixtures, Moving Plumbing Fixtures, Remove Plumbing Fixtures, Repair Plumbing Fixtures</p> <p>Add Plumbing lines, Altering existing Plumbing lines, Moving Plumbing lines, Remove Plumbing lines, Repair Plumbing lines</p> <p>Add Water Heaters, Altering existing Water Heaters, Moving Water Heaters, Remove Water Heaters, Repair Water Heaters</p> <p>Add HVAC Systems, Altering existing HVAC Systems, Moving HVAC Systems, Remove HVAC Systems, Repair HVAC Systems</p> <p>Add HVAC Ducts, Altering existing HVAC Ducts, Moving HVAC Ducts, Remove HVAC Ducts, Repair HVAC Ducts</p> <p>Add Square Footage, Altering existing Square Footage, Moving Square Footage, Remove Square Footage, Repair Square Footage</p> <p>Add Fire Sprinklers, Altering existing Fire Sprinklers, Moving Fire Sprinklers, Remove Fire Sprinklers,</p>	<p>Repair Fire Sprinklers</p> <p>Add Fire Alarms, Altering existing Fire Alarms, Moving Fire Alarms, Remove Fire Alarms, Repair Fire Alarms</p> <p>Add Counters (attached to floor), Altering existing Counters (attached to floor), Moving Counters (attached to floor), Remove Counters (attached to floor), Repair Counters (attached to floor)</p> <p>Add Tables (attached to floor), Altering existing Tables (attached to floor), Moving Tables (attached to floor), Remove Tables (attached to floor), Repair Tables (attached to floor)</p>
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Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Intro	<p>Chapters 11-15 of the 2009 Washington State Energy Code apply to all nonresidential occupancies and to all multifamily residential occupancies except those within the scope of the IRC (single family residential, duplexes, attached townhouses).</p> <p>This file, ENV09.XLS, has electronic compliance forms for Chapter 13 envelop provisions for Climate Zones 1 and 2. There are three companion files: MTR09.XLS (Chapter 12 metering requirements); MECH09.XLS (Chapter 14 mechanical systems requirements); and LTG09.XLS (Chapter 15 lighting, motor, and transformer requirements).</p> <p>This form is a compliance aid and is not a substitute for the full energy code text or specific jurisdiction compliance requirements. In particular, this form is not to be used for cold storage areas. Users should refer to the code text and contact the local jurisdiction for complete information. The full 2009 WSEC code text is available for download from: Download 2009 WSEC from http://www.ga.wa.gov/sbcc</p>
Start-up	<p>Open a working copy of this file and be sure to use Save As to save it to a new file name. Alternatively, you can save the file as a template in the XLSTART subdirectory in the EXCEL directory, and open new copies with the "File New" menu command. Look for "ENV09".</p>
Overview	<p>This workbook file contains multiple worksheets. Each worksheet is indicated by a tab at the bottom of the screen. (If you don't see the tabs, visit menu option "Tools-Options-View-Sheet Tabs".) You may visit each form by clicking on its tab.</p> <p>Most calculations are automated. The spaces which display the results of calculations are not editable. Some adjustments to formatting have been made to facilitate electronic filling and calculation of the forms.</p>
Save Files	<p>Each time you open this file and start filling forms, you must save it under a new filename of your choosing using File Save As. The original template file cannot be altered. You may also save your own versions of the forms this way.</p>
Getting Around	<p>Each form has two pages (front and back). Both pages are available on screen when you click the tab for a form. Use the scroll bars to find the second page. It is either to the right, below, or sometimes to the right and below the first page.</p>
Filling Fields	<p>All project info and the date for all forms is entered once on "ENV-SUM" and automatically reproduced on the other forms. Always fill in the heading of ENV-SUM, even if you will not be using that form. The other forms have a reminder to do this.</p> <p>Only fillable fields are accessible. If you try to edit any other field, you'll get an error message. You may use the TAB key to move to the next fillable field. If the TAB doesn't take you where you want to go, use the mouse.</p> <p>Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will simply not be seen. In most cases, the text will wrap within the cell. This may force part of the form onto a new page.</p> <p>To enter the date, use this format: mm/dd/yyyy. For example, you would enter 6/8/2006 or 12/21/2012.</p> <p>Check boxes can be either blank, or checked-off with an "x" shown in the box. To toggle between cases, click the box with your mouse. Radio buttons (circles) are either filled or unfilled. Only one in a set may be filled.</p> <p>Drop-down lists have an arrow at the right side of the space. Click the arrow with your mouse and select the appropriate option. One of the options is a blank.</p> <p>When a form has a space for notes or explanation, click anywhere in the space to edit. Your cursor will become a text editing insertion bar and you can edit as with a word processor.</p>
Personalizing	<p>You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the footer using File Page Setup Header/Footer. You can then save the file under a new template name and re-use it again.</p>
Adding Lines and Removing	<p>Many tables, such as for listing equipment types, have a certain number of lines for entering data. There may not always be enough lines for all the entries you need to make. With this electronic version, you can add additional lines to the table.</p> <p>To add additional lines where this feature is available, click on the "+" button with your mouse. This button is located to the right of the sheet. If you can't see it, scroll right (or change the View Zoom setting to 83%).</p> <p>To remove lines that you have added, click on the "-" button with your mouse. You cannot remove lines that were not added: an error appears if you try.</p> <p>If you add additional lines with this method, the pagination will usually be affected. The forms will be forced to carry additional lines over to other pages. Be sure to submit all pages to the plans examiner.</p>
Occupancy Group	<p>You must select a value for Occupancy Group on ENV-SUM (line 14) for this workbook to display the correct code requirements and automatically calculate component performance target UA.</p>
Climate Zone	<p>You must select a value for Climate Zone on ENV-SUM (line 15) for this workbook to display the correct code requirements and automatically calculate component performance target UA.</p>
Fenestration vs Glazing	<p>The 2009 WSEC uses the terms "fenestration" and "glazing" and the terms "overhead glazing" and "skylight" somewhat interchangeably. These forms use fenestration and skylight exclusively. In general, "vertical fenestration" is equivalent to "vertical glazing" and "skylight" is equivalent to "overhead glazing".</p>
Fenestration Area	<p>The Fenestration % shown on the ENV-SUM form is automatically calculated in the electronic version from the Proposed areas on the corresponding ENV-UA form. These calculations follow those in equations 13-1 and 13-2.</p> <p>If you use the Envelope Prescriptive Option, you still must enter the actual areas. As a shortcut in this case, you can enter the vertical fenestration, the skylight and the opaque wall areas (including doors) as single numbers and leave the rest of the ENV-UA form blank.</p>
Fenestration Adjustments	<p>Under the Envelope Component Performance option, the Target Area Adjustment Calculations are fully automatic, using information you enter for on your project type and your Proposed Areas on the ENV-UA form. Target areas are calculated automatically.</p>

Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Printing	<p>The forms should print on any printer supported by Windows. 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 or flowchart details when printing, you may have a shortage of printer memory. Try printing problem pages individually.</p> <p>By default, only selected forms are printed. To select one or more forms, hold down the Ctrl key and click the tabs of the worksheets you need. Issue the File Print Selected Sheets command. To print the entire set, use File Print Entire Workbook.</p>
Clean Forms	<p>It is possible to print clean, blank versions of these forms for hand filling. To do so, delete all of the heading information at the beginning of ENV-SUM, select the desired Climate Zone and Occupancy Group, and make sure that all fillable cells in the forms are empty. Then print the clean forms.</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>
Partial Form Sets	<p>Forms in a set may not be deleted, because the file is locked, but you need not print all the forms, as explained in "Printing" above.</p>
Re-Calculation	<p>As this is a large file, it may respond slowly to changes if it is set to automatically re-calculate after every action. To set calculation to manual, visit the "Tools-Options-Calculation" menu item. Then manually recalculate using the F9 key.</p>

Envelope Summary (back)

ENV-SUM

Minimum Requirements for Prescriptive Option

Use table to determine if project qualifies for the optional Prescriptive Option. All components must meet the stated

Roofs				
Insulation Entirely above Deck	R-30 c.i.	R-38 c.i.	R-30 c.i.	R-38 c.i.
Metal Building	R-25 + R-11 Ls	R-25 + R-11 Ls	R-25 + R-11 Ls	R-25 + R-11 Ls
Single-Rafter	R-38	R-38	R-38	R-38
Attic and Other	R-38 adv or R-49	R-38 adv or R-49	R-38 adv or R-49	R-38 adv or R-49
Walls, Above-grade				
Mass	R-5.7 c.i. ¹	R-11.4 c.i.	R-7.6 c.i.	R-13.3 c.i.
Metal Building	R-13 + R-7.5 c.i.	R-19 + R-8.5 c.i.	R-13 + R-7.5 c.i.	R-19 + R-16 c.i.
Steel Framed	R-13 + R-7.5 c.i.	R-19 + R-8.5 c.i.	R-13 + R-7.5 c.i.	R-19 + R-14 c.i.
Wood Framed and Other	R-21	R-13 + R-6 c.i.	R-13 + R-7.5 c.i., or R-21 + R-2.5 c.i.	R-21 + R-5 c.i.
Below Grade Wall	Same as above grade		Same as above grade	
Floors				
Mass	R-30 c.i.	R-30 c.i.	R-30 c.i.	R-30 c.i.
Steel Joist	R-38 + R-4 c.i.	R-38 + R-4 c.i.	R-38 + R-4 c.i.	R-38.0 + R-4 c.i.
Wood Framed and Other	R-30	R-30	R-30	R-30
Slab-On-Grade Floors				
Unheated	R-10 for 24 in. (with thermal break)	R-10 for 24 in. (with thermal break)	R-10 for 24 in. (with thermal break)	R-10 for 24 in. (with thermal break)
Heated	R-10 c.i. (with thermal break)	R-10 c.i. (with thermal break)	R-10 c.i. (with thermal break)	R-10 c.i. (with thermal break)
Opaque Doors				
	Maximum U-Factor			
Swinging	U-0.600	U-0.400	U-0.600	U-0.400
Non-Swinging	U-0.600	U-0.400	U-0.600	U-0.400
Vertical Fenestration				
Nonmetal framing	U-0.32	U-0.32	U-0.32	U-0.32
Metal framing	U-0.40	U-0.40	U-0.40	U-0.40
Entrance doors	U-0.60	U-0.60	U-0.60	U-0.60
Skylights				
Without curb (i.e. sloped)	U-0.50	U-0.50	U-0.50	U-0.50
With curb (i.e. individual unit)	U-0.60	U-0.60	U-0.60	U-0.60
Vertical Fenestration	SHGC-0.40 all, OR SHGC-0.45 all PLUS permanent PF > 0.50 on west, south, east	No Requirement	SHGC-0.40 all, OR SHGC-0.45 all PLUS permanent PF > 0.50 on west, south, east	No Requirement
Skylights	SHGC-0.35	SHGC-0.35	SHGC-0.35	SHGC-0.35

The following definitions apply: c.i. = continuous insulation, Ls = liner system (see

Section 504.2.1.1) Zone 1, nonresidential walls may be ASTM C90 concrete block walls, ungrouted or partially grouted at 32 inches vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum conductivity of 0.44 ft²·h/F.

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Envelope UA Calculations

ENV-UA

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Address 1 - Always fill out this line on ENV-SUM1	Date
Occupancy Group <input type="radio"/> Nonresidential <input type="radio"/> Multifamily residential <input type="text" value="Clear"/>	For Building Department Use
Climate Zone <input type="radio"/> Zone 1 <input type="radio"/> Zone 2	
Fenestration Area as % gross exterior wall area Max. Target:	
Notes: 1: If fenestration area exceeds maximum allowed, then calculate adjusted areas on Target Area Adjustment sheet on the backside of the ENV-SHGC form. 2: U-factors shall come from chapter 10 or calculated per 1332. See the ENV-CHK worksheet for example of how to complete the rows on this form.	

Building Component		Proposed UA			Target UA			
Provide assembly ID & page/plan # for each bldg. element		U-factor	x Area (A)	= UA (U x A)	U-factor	x Area (A)	= UA (U x A)	
Roofs	Deck	R= ID:						
		R= ID:						
		R= ID:						
	Mtl Bld	R= ID:				Above Deck Insulation	set occ.	
		R= ID:						
		R= ID:				Metal Building	set occ.	
	Other	R= ID:						
		R= ID:				Single raft, attic, other	set occ.	
		R= ID:						
Opaque Walls - Above	Metal Frm	R= ID:						
		R= ID:						
		R= ID:				Steel frame/metal bldg	set occ.	
		R= ID:						
	Wood/Oth	R= ID:						
		R= ID:						
		R= ID:				Wood Frame, other	set occ.	
		R= ID:						
	Mass*	R= ID:						
		R= ID:						
		R= ID:				Mass Wall	set occ.	
		R= ID:						
Proposed assembly U-factor from Tables 10-5 thru 10-5B								
Below Grade Walls	R= ID:							
	R= ID:							
	R= ID:				Assumed to be Mass Wall	set occ.		
Proposed assembly U-factor from Tables 10-5 thru 10-5B. Do NOT use Table 10-1.								
Opaque Doors	U= ID:							
	U= ID:							
	U= ID:				All Doors	set occ.		
Floors	R= ID:							
	R= ID:							
	R= ID:				Floors	set occ.		
		F-factor	x Perimeter	= UA(U x A)	F-factor	x Perimeter	= UA (U x A)	
Slab-on-grade	Unheated	R= ID:						
		R= ID:						
		R= ID:				Slab-On-Grade	set occ.	
	Heated	R= ID:						
		R= ID:				Heated Slab-On-Grade	set occ.	
Proposed assembly F-factors can use the unheated values in Table 10-2								

*Zone 1 CMU walls meeting Table 13-1 Footnote 1 can be entered with U-value of 0.15 rather than Table 10-5b values. Plans must clearly state footnote requirements.

	Area	UA		Area	UA
Page 1					
Subtotal					

Envelope UA, continued.

ENV-UA

Project Address 1 - Always fill out this line on ENV-SUM1				Date						
Fenestration Area as % gross exterior wall area				Max. Target:		For Building Department Use				
Notes: 1: If fenestration area exceeds maximum allowed, then calculate adjusted areas on Target Area Adjustment sheet on the backside of the ENV-SHGC form. 2: Provide NFRC or Table 10-6 U-factor (See Section 1312.1) for fenestration assembly (combined) See the ENV-CHK worksheet for example of how to complete the rows on this form.										
Building Component				Proposed UA			Target UA			
Provide assembly ID & page/plan # for each bldg. element				U-factor	x Area (A)	= UA (U x A)	U-factor	x Area (A)	= UA (U x A)	
Vertical Fenestration	Metal Frame	U=	ID:							
		U=	ID:							
		U=	ID:							
		U=	ID:							
	Non-Metal Frame	U=	ID:							
		U=	ID:							
		U=	ID:							
		U=	ID:							
Mtl entrance	U=	ID:								
	U=	ID:								
	U=	ID:								
	U=	ID:								
Skylights	No Curb	U=	ID:							
		U=	ID:							
		U=	ID:							
		U=	ID:							
	With Curb	U=	ID:							
		U=	ID:							
		U=	ID:							
		U=	ID:							

	Area	UA		Area	UA
Page 2 Subtotal					
Page 1 Subtotal					
Total					

To comply:

- 1) Proposed Total UA shall not exceed Target Total UA.
- 2) Proposed Total Area shall equal Target Total Area.

SHGC Calculation

ENV-SHGC

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Address 1 - Always fill out this line on ENV-SUM1		Date
Fenestration Area as % gross exterior wall area	Prop	Max. Target
Prescriptive PF Credit	<input type="radio"/> Yes <input type="radio"/> No	
Vertical North Facing Credit (1323.3 Exp. 2)	<input type="radio"/> Yes <input type="radio"/> No	
Notes: To comply the Proposed total SHGC x A for all fenestration (vertical & skylights) shall not exceed Target total SHGC x A. If the north facing credit is used then the north and non-north must comply separately with skylights being included with the non-north vertical fenestration.		

Skylights List ID & page #, NFRC or glass only	Proposed SHGC		Target SHGC	
	SHGC*	x Area (A) = SHGC x A	SHGC	x Area (A) = SHGC x A
ID:				
ID:				
ID:				
ID:				
ID:				
		Totals		
		Totals		

* Note: Manufacturer's SC may be used in lieu of SHGC.
 Nonresidential compliance is based upon combined skylight and vertical fenestration performance. Residential compliance is based upon skylight only.

All Non-North Vertical Fenestration++ List ID & page #, NFRC or glass only	SHGC+	PF	PF Mult*	Adjusted SHGC	Proposed SHGC		Target SHGC	
					x Area (A) = SHGC x A	x Area (A) = SHGC x A		
ID:								
ID:								
ID:								
ID:								
ID:								
ID:								
ID:								
ID:								
					Totals			
					Non-North Total			

++Note: If projection factors or north vertical glazing credit are used then vertical fenestration must be entered according to orientation. If neither are used then vertical fenestration can be entered in either section.
 + Note: Manufacturer's SC may be used in lieu of SHGC. Fenestration that separates conditioned space from a non-conditioned or semi-conditioned space shall be listed here with a proposed SHGC equal to the target value.

North Vertical Fenestration++ List ID & page #, NFRC or glass only	SHGC+	PF	PF Mult*	Adjusted SHGC	Proposed SHGC		Target SHGC		
					x Area (A) = SHGC x A	SHGC	x Area (A) = SHGC x A	SHGC	x Area (A) = SHGC x A
ID:									
ID:									
ID:									
ID:									
ID:									
					North Total				

For compliance: Proposed total SHGC x A shall not exceed Target total SHGC x A. If north glazing credit is used then north facing vertical fenestration must comply separately from non-north vertical fenestration and skylights.

	Area	SHGC x A		Area	SHGC x A
Grand Total			Grand Total		

Target Area Adjustment Calculations

Project Address 1 - Always fill out this line on ENV-SUM1	Date
--	------

If the total fenestration area as a % of gross exterior wall area (calculated on ENV-SUM) exceeds the maximum allowed in Table 13-1, then this calculation must be submitted. Use the resulting areas in the Target UA and SHGC calculations above.

SKY= Skylight. Referred to as overhead glazing in WSEC 1333 & 1334 and equations 13-1 & 13-2.
VF = vertical fenestration. Referred to as vertical glazing in WSEC 1333 & 1334 and equations 13-1 & 13-2.
NW = net wall (excludes fenestration, BG, and doors.) **DBG** = Doors and below grade wall.
Total Fenestration = SKY + VF. **Gross Exterior Wall Area**= VF + NW + DBG

Proposed Areas

	Above Grade Walls	Doors & BG Walls
Fenestration ->	SKY=	VF=
Opaque ->	NW=	DBG=

Gross Exterior Wall Area	X	Max Fenestration % (Table 13-1)	÷	100	=	Maximum Target Fenestration Area
--------------------------	---	---------------------------------	---	-----	---	----------------------------------

Total Fenestration	-	Maximum Target	=	Excess Fenestration	-	0 ⇕ lesser	=	Excess Fenestration
--------------------	---	----------------	---	---------------------	---	---------------	---	---------------------

Total Fenestration	-	Excess Fenestration	=	Target Fenestration	÷	Total Fenestration	=	Target VF Multiplier
--------------------	---	---------------------	---	---------------------	---	--------------------	---	----------------------

Apply to all Proposed Fenestration Areas to get Target Fenestration Area

Net AG Wall Area	+	Excess Fenestration	=	Target Net Wall Area	÷	Net Wall	=	Target Net Wall Mult.
------------------	---	---------------------	---	----------------------	---	----------	---	-----------------------

Apply to all Proposed Opaque AG Wall Areas to get Target Area

	Proposed Area	X	Target VF Mult.	=	Target Area
Vertical Fenestration					
metal frame		X		=	
non-metal frame		X		=	
metal entrance		X		=	
Skylight					
without curb		X		=	
with curb		X		=	
AG Wall					
Steel Frame/metal		X		=	
Wood/Other frame		X		=	
Mass		X		=	
Sum of Proposed			Sum of Target		

Target areas in shaded boxes shall be used as target areas on ENV-UA.

Sum of Proposed must equal Sum of Target.

	Proposed Area	X	Target VF Mult.	=	Target Area
SHGC Calculation					
Skylights (all)		X		=	
Non-North Vertical Fenestration		X		=	
North Vertical Fenestration		X		=	

SHGC target areas in shaded boxes shall be entered as target areas on ENV-SHGC

Building Permit Plans Checklist

ENV-CHK

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Address 1 - Always fill out this line on ENV-SUM1	Date
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The following information is necessary to check a building permit application for compliance with the building envelope requirements in the Washington State Nonresidential Energy Code.

Applicability (yes,no,na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
GENERAL REQUIREMENTS (Sections 1301-1314)					
	1301	Scope	Unconditioned spaces identified on plans if allowed		
	1310.2	Semi-heated spaces	Semi-heated spaces identified on plans if allowed		
	1310.3	Cold Storage / refrigerator	All refrigerated spaces identified on plans. ENV-RFG completed.		
	1311 Insulation				
	1311.1	General installation	Indicate installation method, densities and clearances to achieve intended R-value of all insulation materials		
	1311.2	Roof/ceiling insul.	Indicate R-value on roof sections for attics and other roofs; Indicate clearances for attic insulation; Indicate baffles if eave vents installed; Indicate face stapling of faced batts		
	1311.3	Wall insulation	Indicate R-value and framing material on wall sections; Indicate face stapling of faced batts; Indicate above grade exterior insulation is protected; Indicate mass of masonry walls if mass wall claimed Indicate loose-fill core insulation for masonry walls as necessary Indicate frequency of grouted cores and bond beams as necessary		
	1311.4	Floor insulation	Indicate R-value on floor sections; Indicate substantial contact with surface; Indicate supports not more than 24" o.c.; Indicate that insulation does not block airflow through foundation vents.		
	1311.5	Slab-on-grade floor	Indicate R-value on wall section or foundation detail; Indicate slab insulation extends down vertically 24" from top; Indicate above grade exterior insulation is protected		
	1311.6	Radiant floor	Indicate R-value on wall section or foundation detail; Indicate slab insulation extends down vertically 36" from the top; Indicate above grade exterior insulation is protected; Indicate insulation also under entire slab where req'd. by Official		
	1312	Glazing and doors	Provide calculation of vertical and overhead glazing area as percent of gross wall area		
	1312.1	U-factors	Indicate glazing and door U-factors on glazing and door schedule (provide area-weighted calculations as necessary); Indicate if values are NFRC or default, if default then specify frame type, glazing layers, gapwidth, low-e coatings, gas filling		
	1312.2	SHGC & SC	Indicate glazing solar heat gain coefficient or shading coefficient on glazing schedule (provide area-weighted calculations by orientation as necessary)		
	1313 Moisture control				
	1313.1	Vapor retarders	Indicate vapor retarders applied to warm side of insulation		
	1313.2	Roof/ceiling vap.ret.	Indicate vapor retarder on roof section; or list exception Indicate vap. retard. with sealed seams for non-wood structure		
	1313.3	Wall vapor retarder	Indicate vapor retarder on wall section		
	1313.4	Floor vapor retarder	Indicate vapor retarder on floor section		
	1313.5	Crawl space vap. ret.	Indicate required grade ground cover with required overlapping.		
	1314 Air leakage				
	1314.1	Bldg. envel. sealing	Indicate sealing, caulking, gasketing, and weatherstripping		
	1314.2	Glazing/door sealing	Specify maximum air leakage rates for fenestration and door products		
	1314.3	Assemb. as ducts	Indicate sealing, caulking and gasketing		
	1314.4	Recessed Lighting Fixture	Indicate IC rating, ASTM E283 cert., and gasketing or caulking to ceiling		
	1314.5	Loading Dock Seal	Indicate weatherseal at cargo and loading dock doors		
	1314.6	Continuous Air Barrier	Indicate air barrier sealing on all roof, wall & floor details Indicate leakage testing method. Provide testing results to building official. Max. leakage of 0.40 cfm/ft2 at 0.3 inch w.g.		
PRESCRIPTIVE PERFORMANCE (Sections 1320-1323)					
		ENV-SUM Form	Completed and attached.		
	1323	Glazing	Indicate number of glazing panes and location of emissivity coating or exception taken		
COMPONENT PERFORMANCE (Sections 1330-1338)					
		ENV-SUM, ENV-UA, & ENV-SHGC Forms	Completed and attached.		

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

ENV-UA INSTRUCTIONS & EXAMPLES

ENV-CHK

FENESTRATION, SKYLIGHTS, & DOORS: Per Energy Code Section 1312.1,

- U-factors shall be “determined, certified, and labeled in accordance with RS-31 by a certified independent agency licensed by the National Fenestration Rating Council (NFRC).” If using this approach, provide manufacturer, model number and NFRC rating on the drawings.
- “Unlabeled glazing and doors shall be assigned the default U-factor in Table 10-6.” If using this approach, provide all glazing characteristics on the drawings: list number of glazing layers, gap width, low-e coating, gas fill, frame material, thermal break details per footnote 2 to Table 10-6B.

OPAQUE ASSEMBLIES: Per Energy Code Section 1332,

- “The U-factors for typical construction assemblies are included in Chapter 10. These values shall be used for all calculations.” For example: see Table 10-5A for metal stud walls and metal building walls/roofs, see Table 10-7A to E for steel truss ceilings, etc.

FURTHER INFORMATION: Refer to the Northwest Energy Efficiency Council website at: www.neec.net

Below are examples of how the Component Information on ENV-UA-1 are to be completed

		List ID & page #, code table # or calculation page #	U-factor	x Area (A)	
Roofs					
Other	R= 38	ID: R1/A1.5, T.10-7 default	0.031	532	R-38 blown-in attic insulation per default
Deck	R= 40	ID: R2/A1.5, T.10-7G default	0.025	9885	R-40 uniform thickness rigid insulation per default
Walls					
Opaque	R=13+7.5	ID: W1/A1.6, T.10-5A(1) default	0.064	7587	R-13 cavity + R-7.5 rigid ins. over metal studs per default
	R= 5	ID: W2/A1.6, T.10-5B(2) default	0.157	923	R-5 rigid ins. at edge of intermediate concrete floors per def
	R=	ID:			
BG	R= 11	ID: W4/A1.6, T.10-5(1) default	0.094	512	R-11 cavity ins. between wood studs on conc. wall per def.
	R=	ID:			
Doors					
	U= 0.6	ID: D1/A1.3, T.10-6 default	0.60	120	Non-NFRC fire-rated exit door per default
	U= 1.2	ID: D2/A1.3, T.10-6 default	1.20	40	Non-NFRC warehouse door per default
Floors and Slabs					
Floor	R= 30	ID: F1/A1.7, T.10-4A default	0.031	10417	R-30 continuous ins. under concrete floor slab per default
	R=	ID:			
Slab	R= 10	ID: F2/A1.7, T.10-2 default	0.700	612	R-10 slab edge ins. for 2 feet without thermal break per def.
Fenestration and Skylights					
Vertical	ID: W1/A1.3, NFRC certified		0.36	12307	Curtainwall rated, certified, and labeled per NFRC
	ID: W2/A1.3, T.10-6 default		0.50	5240	Non-NFRC curtainwall, 2 layer, 0.05emis, argon, TB, fixed
	ID: W3/A1.3, T.10-6 default		0.65	282	Non-NFRC curtainwall, 2 layer, 0.05emis fixed
	ID: W3/A1.3, T.10-6 default		0.78	282	Non-NFRC curtainwall, 2 layer, 0.05emis operable
Sky Light	ID: S1/A1.3, NFRC certified		0.50	453	Sloped glazing rated, certified, and labeled per NFRC
	ID: S2/A1.3, T.10-6 default		0.78	118	Non-NFRC atrium sloped glazing, 2 layer, 0.05 emis., fixed

Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Intro	<p>Chapters 11-15 of the 2009 Washington State Energy Code apply to all nonresidential occupancies and to all multifamily residential occupancies except those within the scope of the IRC (single family residential, duplexes, attached townhouses).</p> <p>This file, LTG09.XLS, has electronic compliance forms for Chapter 15 (lighting system, motors, and transformers). There are three companion templates to this file: MTR09.XLS (Chapter 12 metering requirements); ENV09.XLS (envelope requirements); MECH09.XLS (Chapter 14 mechanical systems requirements).</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 2009 WSEC code text is available for download from:</p> <p>Download 2009 WSEC from http://www.neec.net/sites/default/files/neec_codes/WA-EnergyCodes2009.pdf</p>
Start-up	<p>Open a working copy of this file and be sure to use Save As to save it to a new file name. Alternatively, you can save the file as a template in the XLSTART subdirectory in the EXCEL directory, and open new copies with the "File New" menu command. Look for "LTG09".</p>
Overview	<p>This workbook file contains multiple worksheets. Each worksheet is indicated by a tab at the bottom of the screen. (If you don't see the tabs, visit menu option "Tools-Options-View-Sheet Tabs".) You may visit each form by clicking on its tab.</p> <p>Most calculations are automated. The spaces which display the results of calculations are not editable. <u>Some adjustments to formatting have been made to facilitate electronic filling and calculation of the forms.</u></p>
Save Files	<p>Each time you open this file and start filling forms, you must save it under a new filename of your choosing using File Save As. <u>The original template file cannot be altered. You may also save your own versions of the forms this way.</u></p>
Getting Around	<p>Each form has two pages (front and back). Both pages are available on screen when you click the tab for a form. Use the scroll bars to find the second page. It is either to the right, below, or sometimes to the right and below the first page.</p>
Filling Fields	<p>All project info and the date for all forms is entered once on "PRJ-SUM" and automatically reproduced on the other forms. Always fill in the heading of PRJ-SUM, even if you will not be using that form. The other forms have a reminder to do this.</p> <p>Only fillable fields are accessible. If you try to edit any other field, you'll get an error message. You may use the TAB key to move to the next fillable field. If the TAB doesn't take you where you want to go, use the mouse.</p> <p>Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will simply not be seen. In most cases, the text will wrap within the cell. This may force part of the form onto a new page.</p> <p>To enter the date, use this format: mm/dd/yyyy. For example, you would enter 7/1/2006 or 12/15/2007.</p> <p>Check boxes can be either blank, or checked-off with an "x" shown in the box. To toggle between cases, click the box with your mouse. Radio buttons (circles) are either filled or unfilled. Only one in a set may be filled.</p> <p>Drop-down lists have an arrow at the right side of the space. Click the arrow with your mouse and select the appropriate option. One of the options is a blank.</p> <p>When a form has a space for notes or explanation, click anywhere in the space to edit. Your cursor will become a <u>text editing insertion bar and you can edit as with a word processor.</u></p>
Personalizing	<p>You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the footer using File Page Setup Header/Footer. You can then save the file under a new template name and reuse it again.</p>
Adding Lines and Removing	<p>Many tables, such as for listing equipment types, have a certain number of lines for entering data. There may not always be enough lines for all the entries you need to make. With this electronic version, you can add additional lines to the table.</p> <p>To add additional lines where this feature is available, click on the "+" button with your mouse. This button is located to the right of the sheet. If you can't see it, scroll right (or change the View Zoom setting to 83%).</p> <p>To remove lines that you have added, click on the "-" button with your mouse. You cannot remove lines that were not added: an error appears if you try.</p> <p>If you add additional lines with this method, the pagination will usually be affected. The forms will be forced to carry <u>additional lines over to other pages. Be sure to submit all pages to the plans examiner.</u></p>
Printing	<p>The forms should print on any printer supported by Windows. 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 or flowchart details when printing, you may have a shortage of printer memory. Try printing problem pages individually.</p> <p>By default, only selected forms are printed. To select one or more forms, hold down the Ctrl key and click the tabs of the worksheets you need. Issue the File Print Selected Sheets command. To print the entire set, use File Print Entire Workbook.</p>
Clean Forms	<p>It is possible to print clean, blank versions of these forms for hand filling. To do so, delete all of the heading information at the beginning of PRJ-SUM, and make sure that all fillable cells in the forms are empty. Then print the clean forms.</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. <u>The "Clear" button will not print.</u></p>
Partial Form Sets	<p>Forms in a workbook may not be deleted, because the file is locked, but you need not print all the forms, as explained in "Printing" above.</p>
Re-Calculation	<p>As this is a large file, it may respond slowly to changes if it is set to automatically re-calculate after every action. To set calculation to manual, visit the "Tools-Options-Calculation" menu item. Then manually recalculate using the F9 key.</p>

Project Summary

PRJ-SUM

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Info	Project Address	1 - Always fill out this line on PRJ-SUM	Date
		2 - Fill out this line on PRJ-SUM	For Building Department Use
		3 - Fill out this line on PRJ-SUM	
	Applicant Name:	4 - Fill out this line on PRJ-SUM	
	Applicant Address:	5 - Fill out this line on PRJ-SUM	
	Applicant Phone:	6 - Fill out this line on PRJ-SUM	

Interior Lighting Summary

LTG-INT

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Info	Project Address 1 - Always fill out this line on PRJ-SUM	Date
	2 - Fill out this line on PRJ-SUM	For Building Department Use
	3 - Fill out this line on PRJ-SUM	
	Applicant Name: 4 - Fill out this line on PRJ-SUM	
	Applicant Address: 5 - Fill out this line on PRJ-SUM	
	Applicant Phone: 6 - Fill out this line on PRJ-SUM	

Project Description	<input type="checkbox"/> New Building <input type="checkbox"/> Addition <input type="checkbox"/> Alteration <input type="checkbox"/> Plans Included Refer to WSEC Section 1513 for controls and commissioning requirements.
----------------------------	--

Compliance Option	<input type="radio"/> Prescriptive <input type="radio"/> Lighting Power Allowance <input type="radio"/> Systems Analysis (See Qualification Checklist (over). Indicate Prescriptive & LPA spaces clearly on plans.)
--------------------------	--

Alteration Exceptions (check appropriate box - sec. 1132.3)	<input type="checkbox"/> No changes are being made to the lighting and space use not changed <input type="checkbox"/> Less than 60% of the fixtures new, installed wattage not increased, & space use not changed.
---	---

Maximum Allowed Lighting Wattage

Location (floor plan/room #)	Occupancy Description	Allowed Watts per ft ² **	Gross Interior Area in ft ²	Allowed x Area
** From Table 15-1 (over) - document all exceptions on form LTG-LPA			Total Allowed Watts	

Proposed Lighting Wattage

Location (floor plan/room #)	Fixture Description	Number of Fixtures	Watts/ Fixture	Watts Proposed
Total Proposed Watts may not exceed Total Allowed Watts for Interior			Total Proposed Watts	

Notes:

- For proposed Fixture Description, indicate fixture type, lamp type (e.g. T-8), number of lamps in the fixture, and ballast type (if included). For track lighting, list the length of the track (in feet) in addition to the fixture, lamp, and ballast information.
- For proposed Watts/Fixture, use manufacturer's listed maximum input wattage of the fixture (not simply the lamp wattage) and other criteria as specified in Section 1530. For line voltage track lighting, list the greater of actual luminaire wattage or length of track multiplied by 50, or as applicable, the wattage of current limiting devices or of the transformer. For low voltage track lighting list the transformer rated wattage.
- List all fixtures. For exempt lighting, note section and exception number, and leave Watts/Fixture blank.

Interior Lighting Summary (back)**LTG-INT**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Prescriptive Spaces	Occupancy: <input type="radio"/> Warehouse or Parking Garage <input checked="" type="radio"/> Other
Qualification Checklist Note: If occupancy type is "Other" and fixture answer is checked, the number of fixtures in the space is not limited by Code. Clearly indicate these spaces on plans. If not qualified, do LPA Calculations.	Lighting Fixtures: (Section 1521) <ul style="list-style-type: none"> <input type="checkbox"/> Check if 95% or more of fixtures comply with 1,2 or 3 and rest are ballasted. 1. Fluorescent fixtures with a) 1 or 2 two lamps, b) reflector or louvers, c) 5-60 watt T-1, T-2, T-4, T-5, T-8, or CFL lamps, and d) hard-wired electronic dimming ballasts. Screw-in CFL fixtures and tracking lighting do not qualify. 2. Metal Halide with a) reflector b) ceramic MH lamps <=150w c) electronic ballasts 3. LED lights.

TABLE 15-1 Unit Lighting Power Allowance (LPA)

Use ¹	LPA ² (W/ft ²)	Use ¹	LPA ² (W/ft ²)
Automotive facility	0.85	Office buildings, office/administrative areas in facilities of other use types (including but not limited to schools, hospitals, institutions, museums, banks, churches) ⁵	0.91
Convention center	1.10	Parking garages	0.20
Courthouse	1.10	Penitentiary and other Group I-3 Occupancies	0.90
Cafeterias, fast food establishments ⁵ , restaurants/bars ⁵	1.20	Police and fire stations	0.90
Dormitory	0.85	Post office	1.00
Dwelling Units	1.00	Retail ¹⁰ , retail banking, mall concourses, wholesale stores (pallet rack shelving)	1.33
Exercise center	0.95	School buildings (Group E Occupancy only), school classrooms, day care centers	1.00
Gymnasias, assembly spaces	0.95	Theater, motion picture	0.97
Health care clinic	1.00	Theater, performing arts	1.25
Hospital, nursing homes, and other Group I-1 and I-2 Occupancies	1.20	Transportation	0.80
Hotel/motel	1.00	Warehouses	0.50
Laboratory spaces (all spaces not classified "laboratory" shall meet office and other appropriate categories)	1.62	Workshops	1.20
Laundries	1.20		
Libraries ⁵	1.20	Plans Submitted for Common Areas Only⁷	
Manufacturing facility	1.20	Main floor building lobbies ³ (except mall concourses)	1.10
Museum	1.00	Common areas, corridors, toilet facilities and washrooms, elevator lobbies	0.80

Footnotes for Table 15-1

- 1) In cases in which a general use and a specific use are listed, the specific use shall apply. In cases in which a use is not mentioned specifically, the Unit Power Allowance shall be determined by the building official. This determination shall be based upon the most comparable use specified in the table. See Section 1512 for exempt areas.
- 2) The watts per square foot may be increased, by 2% per foot of ceiling height above 20 feet, unless specifically directed otherwise by subsequent footnotes.
- 3) Watts per square foot of room may be increased by 2% per foot of ceiling height above 12 feet.
- 4) For all other spaces, such as seating and common areas, use the Unit Light Power Allowance for assembly.
- 5) Watts per square foot of room may be increased by 2% per foot of ceiling height above 9 feet.
- 6) Reserved.
- 7) For conference rooms and offices less than 150ft² with full height partitions, a Unit Lighting Power Allowance of 1.1 w/ft² may be used.
- 8) Reserved.
- 9) For indoor sport tournament courts with adjacent spectator seating over 5,000, the *Unit Lighting Power Allowance* for the court area is 2.60 W/ft².

- 10) Display window illumination installed within 2 feet of the window, provided that the display window is separated from the retail space by walls or at least three-quarter-height partitions (transparent or opaque) and lighting for free-standing display where the lighting moves with the display are exempt.

An additional lighting power allowance is allowed for merchandise display luminaires installed in retail sales areas that are specifically designed and directed to highlight merchandise. The following additional wattages apply:

- i. 0.6 watts per square foot of sales floor area not listed in items ii and iii below;
- ii. 1.4 watts per square foot of furniture, clothing, cosmetics or artwork floor area; or
- iii. 2.5 watts per square foot of jewelry, crystal or china floor area.

The specified floor area for items i, ii, or iii above, and the adjoining circulation paths shall be identified and specified on building plans. Calculate the additional power allowance by multiplying the above LPDs by the sales floor area for each department excluding major circulation paths. The total additional lighting power allowance is the sum of allowances for sales categories i, ii, or iii plus an additional 1,000 watts for each separate tenant larger than 250 square feet in area.

The additional wattage is allowed only if the merchandise display luminaires comply with all of the following:

- (a) Located on ceiling-mounted track or directly on or recessed into the ceiling itself (not on the wall).
- (b) Adjustable in both the horizontal and vertical axes (vertical axis only is acceptable for fluorescent and other fixtures with two points of track attachment).

This additional lighting power is allowed only if the lighting is actually installed and automatically controlled, separately from the general lighting, to be turned off during nonbusiness hours. This additional power shall be used only for the specified luminaires and shall not be used for any other purpose.

This additional lighting power is allowed only if the lighting is actually installed.

- 11) Provided that a floor plan, indicating rack location and height, is submitted, the square footage for a warehouse may be defined, for computing the interior Unit Lighting Power Allowance, as the floor area not covered by racks plus the vertical face area (access side only) of the racks. The height allowance defined in footnote 2 applies only to the floor area not covered by racks.

Exterior Lighting Summary

LTG-EXT

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Info	Proj Address: 1 - Always fill out this line on PRJ-SUM	Date
	2 - Fill out this line on PRJ-SUM	For Building Department Use
	3 - Fill out this line on PRJ-SUM	
	Name: 4 - Fill out this line on PRJ-SUM	
	Appl. Name 5 - Fill out this line on PRJ-SUM	
	Appl. Phone 6 - Fill out this line on PRJ-SUM	

Project Description	<input type="checkbox"/> New <input type="checkbox"/> Addition <input type="checkbox"/> Alteration <input type="checkbox"/> Plans Included Refer to WSEC Section 1513 for controls and commissioning requirements.
----------------------------	---

Lighting Zone (as specified by Jurisdiction)	<input type="radio"/> Zone 1 Zone 2 <input type="radio"/> Zone 3 <input type="radio"/> Zone 4
--	--

Compliance Option	<input type="radio"/> Lighting Power Allowance <input type="radio"/> Systems Analysis
--------------------------	---

Building Grounds (luminaires > 100 Watts)	<input type="checkbox"/> Efficacy > 60 lumens/W <input type="checkbox"/> Controlled by motion sensor
	<input type="checkbox"/> Exemption (list) _____

Alteration Exceptions (check appropriate box - sec. 1132.3)	<input type="checkbox"/> No changes are being made to the lighting and space use not changed.
	<input type="checkbox"/> Less than 60% of fixtures are new, installed wattage not increased, & space use not changed.

Tradable Maximum Allowed Lighting Wattage				Base Site Allowance:	
Tradable Surfaces	Description	Allowed Watts per ft ² or per lf	Area (ft ²), perimeter (lf) or # of items	Allowed Watts x ft ² (or x lf)	
Total Allowed Tradable Watts:					

Tradable Proposed Lighting Wattage (use mfg listed maximum input wattage for luminaire.)				
Surface	Fixture Description	Number of Fixtures	Watts/Fixture	Watts Proposed
Total Proposed Tradable Watts:				

Total proposed tradable watts may not exceed the sum of total allowed tradable watts plus the base site allowance. Any base site allowance not needed to make tradable watts comply can be applied to individual non-tradable categories.

Non-Tradable Maximum Allowed Lighting Wattage				Base Site Allowance Remaining:	
Non-Tradable Surfaces	Description	Allowed Watts per ft ² or per lf	Area (ft ²), perimeter (lf) or # of items	Allowed Watts x ft ² (or x lf)	

Non-Tradable Proposed Lighting Wattage				
Surface	Fixture Description	Number of Fixtures	Watts/Fixture	Watts Proposed

Non-tradable proposed watts may not exceed allowed watts for any individual surface unless the total excess watts for all non-tradable surfaces are less than the remaining site allowance.

Total excess Non-Tradable watts: _____
 Site Allowance Balance: _____

Exterior Lighting Summary (back)

LTG-EXT

**TABLE 15-2B
LIGHTING POWER DENSITIES FOR BUILDING EXTERIORS**

Specific area description		Zone 1	Zone 2	Zone 3	Zone 4
Base site allowance¹		500 W	600 W	750 W	1300 W
Tradable Surfaces					
Uncovered Parking Areas	Parking lots and drives	0.04 W/ft ²	0.06 W/ft ²	0.10 W/ft ²	0.13 W/ft ²
Building Grounds	Walkways less than 10 ft wide	0.7 W/linear foot	0.7 W/linear foot	0.8 W/linear foot	1.0 W/linear foot
	Walkways 10 ft wide or greater Plaza areas Special feature areas	0.14 W/ft ²	0.14 W/ft ²	0.16 W/ft ²	0.2 W/ft ²
	Exterior Stairways	0.75 W/ft ²	1.0 W/ft ²	1.0 W/ft ²	1.0 W/ft ²
	Pedestrian tunnel	0.15 W/ft ²	0.15 W/ft ²	0.2 W/ft ²	0.3 W/ft ²
	Landscaping	0.04 W/ft ²	0.05 W/ft ²	0.05 W/ft ²	0.05 W/ft ²
Building Entrances and Exits	Main entries	20 W/linear foot of door width	20 W/linear foot of door width	30 W/linear foot of door width	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width	20 W/linear foot of door width	20 W/linear foot of door width	20 W/linear foot of door width
	Entry canopies	0.25 W/ft ²	0.25 W/ft ²	0.4 W/ft ²	0.4 W/ft ²
Sales Canopies	Free standing and attached	0.6 W/ft ²	0.6 W/ft ²	0.8 W/ft ²	1.0 W/ft ²
Outdoor Sales	Open areas ³	0.25 W/ft ²	0.25 W/ft ²	0.5 W/ft ²	0.7 W/ft ²
	Street frontage for vehicle sales lots in addition to "open area" allowance	No Allowance	10 W/linear foot	10 W/linear foot	30 W/linear foot
Nontradable Surfaces					
Building Facades		No Allowance	0.1 W/ft ² for each illuminated wall or surface ⁵	0.15 W/ft ² for each illuminated wall or surface ⁶	0.2 W/ft ² for each illuminated wall or surface ⁷
Automated teller machines and night depositories		270 W per location ⁸	270 W per location ⁸	270 W per location ⁸	270 W per location ⁸
Entrances and gatehouse inspection stations at guarded facilities		0.75 W/ft ² of covered & uncovered area			
Loading areas for law enforcement, fire, ambulance and other emergency service vehicles		0.5 W/ft ² of covered & uncovered area			
Material handling and associated storage		No Allowance	No Allowance	No Allowance	0.5 W/ft ²
Drive-up Windows & Doors		400W per drive-through			
Parking near 24-hour retail entrances		800 W per main entry			

FOOTNOTES FOR TABLE 15-2B:

1. Base site allowance may be used in tradable or nontradable surfaces.
2. Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas may be traded.
3. Including vehicle sales lots.
4. Lighting power density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.
5. May alternately use 2.5 watts per linear foot for each wall or surface length.
6. May alternately use 3.75 watts per linear foot for each wall or surface length.
7. May alternately use 5 watts per linear foot for each wall or surface length.
8. An additional 90 watts is allowed per additional ATM location.

Lighting, Motor, and Transformer Permit Plans Checklist LTG-CHK

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Address	1 - Always fill out this line on PRJ-SUM	Date
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The following information is necessary to check a permit application for compliance with the lighting, motor, and transformer requirements in the 2009 Washington State Nonresidential Energy Code.

Applicability (yes, no, n.a.)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
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LIGHTING CONTROLS (Section 1513)

	1513.1	Local control/access	Schedule with type, indicate locations		
	1513.2	Area controls	Maximum limit per switch		
	1513.3	Daylight zone control	Schedule with type and features, indicate locations		
		vertical glazing	Indicate vertical glazing on plans		
		overhead glazing	Indicate overhead glazing on plans		
	1513.4	Display/exhib/special	Indicate separate controls		
	1513.5	Exterior shut-off	Schedule with type and features, indicate location		
		(a) timer w/backup	Indicate location		
		(b) photocell.	Indicate location		
	1513.6	Inter. auto shut-off	Indicate location		
	1513.6.1	(a) occup. sensors	Schedule with type and locations		
	1513.6.2	(b) auto. switches	Schedule with type and features (back-up, override capability); Indicate size of zone on plans		
	1513.7	Hotel/motel controls	Indicate location of room master controls		
	1513.8	Commissioning	Indicate requirements for lighting controls commissioning		

EXIT SIGNS (Section 1514)

	1514	Max. watts	Indicate watts for each exit sign		
--	------	------------	-----------------------------------	--	--

LIGHTING POWER ALLOWANCE (Section 1530-1532)

	1531	Interior Lighting Summary Form	Completed and attached. Schedule with fixture types, lamps, ballasts, watts per fixture		
	1532	Exterior Lighting Summary Form	Completed and attached. Schedule with fixture types, lamps, ballasts, watts per fixture		

MOTORS (Section 1511)

	1511	Elec motor efficiency	MECH-MOT or Equipment Schedule with hp, rpm, efficiency		
--	------	-----------------------	---	--	--

TRANSFORMERS (Section 1540)

	1540	Transformers	Indicate size and efficiency		
--	------	--------------	------------------------------	--	--

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

Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Intro	<p>Chapters 11-15 of the 2009 Washington State Energy Code apply to all nonresidential occupancies and to all multifamily residential occupancies except those within the scope of the IRC (single family residential, duplexes, attached townhouses).</p> <p>This file, MECH09.XLS, has electronic compliance forms for Chapter 14 mechanical provisions. There are three companion files: MTR09.XLS (Chapter 12 metering requirements); ENV09.XLS (Chapter 13 envelope requirements); and LTG09.XLS (Chapter 15 lighting, motor, and transformer requirements).</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 2009 WSEC code text is available for download from: Download 2009 WSEC from http://www.ga.wa.gov/sbcc</p>
Start-up	<p>Open a working copy of this file and be sure to use Save As to save it to a new file name. Alternatively, you can save the file as a template in the XLSTART subdirectory in the EXCEL directory, and open new copies with the "File New" menu command. Look for "MECH09".</p>
Overview	<p>This workbook file contains multiple worksheets. Each worksheet is indicated by a tab at the bottom of the screen. (If you don't see the tabs, visit menu option "Tools-Options-View-Sheet Tabs".) You may visit each form by clicking on its tab.</p> <p>Most calculations are automated. The spaces which display the results of calculations are not editable. Some adjustments to formatting have been made to facilitate electronic filling and calculation of the forms.</p>
Save Files	<p>Each time you open this file and start filling forms, you must save it under a new filename of your choosing using File Save As. The original template file cannot be altered. You may also save your own versions of the forms this way.</p>
Getting Around	<p>Each form has two pages (front and back). Both pages are available on screen when you click the tab for a form. Use the scroll bars to find the second page. It is either to the right, below, or sometimes to the right and below the first page.</p>
Filling Fields	<p>All project info and the date for all forms are entered once on "MECH-SUM1" and automatically reproduced on the other forms. Always fill in the heading of MECH-SUM1, even if you will not be using that form. The other forms have a reminder to do this. To print forms with blank address fields enter blanks on "MECH-SUM1".</p> <p>Only fillable fields are accessible. If you try to edit any other field, you'll get an error message. You may use the TAB key to move to the next fillable field. If the TAB doesn't take you where you want to go, use the mouse.</p> <p>Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will simply not be seen. In most cases, the text will wrap within the cell. This may force part of the form onto a new page.</p> <p>To enter the date, use this format: mm/dd/yyyy. For example, you would enter 7/2/2010 or 12/21/2012. On MECH-MOT, horsepower (HP) is displayed in fractions, but may be entered any way. For example, 1-1/2 may be entered as "1.5" or as "1 1/2".</p> <p>Check boxes can be either blank, or checked-off with an "x" shown in the box. To toggle between cases, click the box with your mouse. Radio buttons (circles) are either filled or unfilled. Only one in a set may be filled.</p> <p>Drop-down lists have an arrow at the right side of the space. Click the arrow with your mouse and select the appropriate option. One of the options is a blank.</p> <p>When a form has a space for notes or explanation, click anywhere in the space to edit. Your cursor will become a text editing insertion bar and you can edit as with a word processor.</p>
Personalizing	<p>You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the footer using File Page Setup Header/Footer. You can then save the file under a new template name and re-use it again.</p>
Adding Lines and Removing	<p>Many tables, such as for listing equipment types, have a certain number of lines for entering data. There may not always be enough lines for all the entries you need to make. With this electronic version, you can add additional lines to the table.</p> <p>To add additional lines where this feature is available, click on the "+" button with your mouse. This button is located to the right of the sheet. If you can't see it, scroll right (or change the View Zoom setting to 83%).</p> <p>To remove lines that you have added, click on the "-" button with your mouse. You cannot remove lines that were not added: an error appears if you try.</p> <p>If you add additional lines with this method, the pagination will usually be affected. The forms will be forced to carry additional lines over to other pages. Be sure to submit all pages to the plans examiner.</p>
Printing	<p>The forms should print on any printer supported by Windows. 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 or flowchart details when printing, you may have a shortage of printer memory. Try printing problem pages individually.</p> <p>By default, only selected forms are printed. To select one or more forms, hold down the Ctrl key and click the tabs of the worksheets you need. Issue the File Print Selected Sheets command. To print the entire set, use File Print Entire Workbook.</p>
Clean Forms	<p>It is possible to print clean, blank versions of these forms for hand filling. To do so, delete all of the heading information at the beginning of PRJ-SUM, and make sure that all fillable cells in the forms are empty. Then print the clean forms.</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>
Partial Form Sets	<p>Forms in a set may not be deleted, because the file is locked, but you need not print all the forms, as explained in "Printing" above.</p>

Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

MECH-SUM	If your building has both Simple Systems and Complex Systems, you must use separate copies of MECH-SUM for each type. Two copies of the form are provided for this purpose.
Re-Calculation	As this is a large file, it may respond slowly to changes if it is set to automatically re-calculate after every action. To set calculation to manual, visit the "Tools-Options-Calculation" menu item. Then manually recalculate using the F9 key.

Mechanical Summary

MECH-SUM

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Info	Project Address	Date
		For Building Dept. Use
	Applicant Name:	
	Applicant Address:	
	Applicant Phone:	

Project Description Briefly describe mechanical system type and features.	
<input type="checkbox"/> Includes Plans	Include documentation requiring compliance with commissioning requirements, Section 1416.

Compliance Option	<input type="radio"/> Simple System <input type="radio"/> Complex System <input type="radio"/> Systems Analysis (See Decision Flowchart (over) for qualifications. Use separate MECH-SUM for simple & complex)
--------------------------	---

Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.
----------------------------	--

Cooling Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA CFM or Econo?	SEER or EER	IPLV ³	Econmizer Option or Exception ⁶	Heat Recovery Y/N

Heating Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency ⁴	Heat Recovery Y/N

Fan Equipment Schedule								
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	CFM	SP ¹	HP/BHP	Flow Control ⁵	Location of Service

¹If available. ² As tested according to Table 14-1A through 14-1G. ³ If required. ⁴ COP, HSPF, Combustion Efficiency, or AFUE, as applicable. ⁵ Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS). ⁶ Exception number from Section 1433.

Mechanical Summary

MECH-SUM

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Info	Project Address	Date
		For Building Dept. Use
	Applicant Name:	
	Applicant Address:	
	Applicant Phone:	

Project Description Briefly describe mechanical system type and features. Includes Plans	Include documentation requiring compliance with commissioning requirements, Section 1416.
---	---

Compliance Option	<input type="radio"/> Simple System <input type="radio"/> Complex System <input type="radio"/> Systems Analysis (See Decision Flowchart (over) for qualifications. Use separate MECH-SUM for simple & complex
--------------------------	--

Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.
----------------------------	--

Cooling Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA CFM or Econo?	SEER or EER	IPLV ³	Econmizer Option or Exception ⁶	Heat Recovery Y/N

Heating Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency ⁴	Heat Recovery Y/N

Fan Equipment Schedule								
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	CFM	SP ¹	HP/BHP	Flow Control ⁵	Location of Service

¹If available. ² As tested according to Table 14-1A through 14-1G. ³ If required. ⁴ COP, HSPF, Combustion Efficiency, or AFUE, as applicable.
⁵ Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS). ⁶ Exception number from Section 1433.

Mechanical - Complex Systems Checklist

MECH-COMP

Project Address				Date	
The following additional information is necessary to check a mechanical permit application for a complex mechanical system for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code. Use the checklist as a reference for notes added to the mechanical drawings (see the MECH-CHK checklist for additional requirements). This information must be on the plans since this is the official record of the permit. Having this information in separate specifications alone is NOT an acceptable alternative.				For Building Department Use	

Applicability (yes, no, na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
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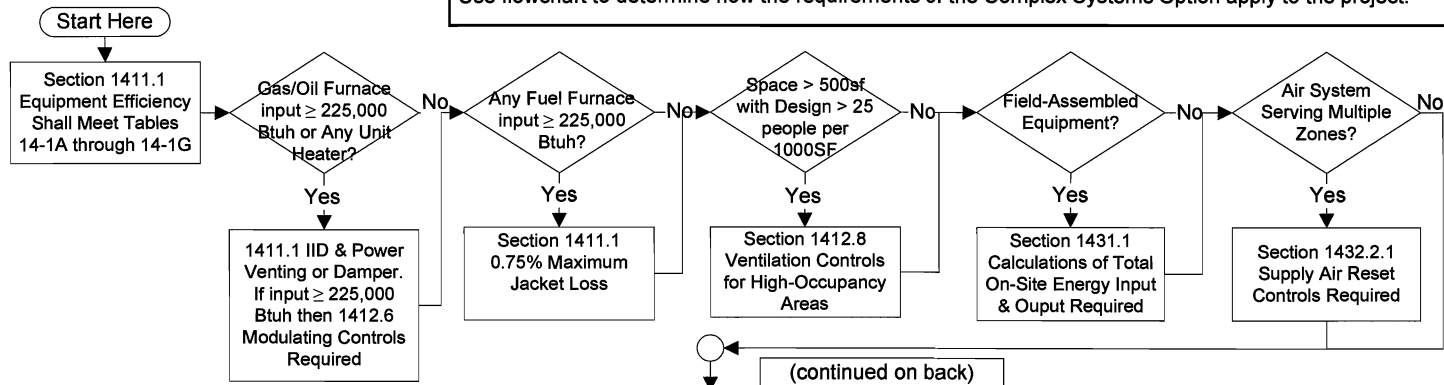
ADDITIONAL CHECKLIST ITEMS FOR COMPLEX SYSTEMS ONLY

	1431.1	Field assem. sys.	Provide calculations for total onsite energy input/output to equip.		
	1431.2	System Sizing	Indicate equipment & system sizing complies with 1431.2		
	1432.1	Setback & shut-off	Indicate separate systems or show isolation devices on plans		
	1432.2.1	Air system reset	Indicate automatic temperature reset & operation sequence		
	1432.2.2	Hydr. Sys. reset	Indicate automatic temperature reset & operation sequence		
	1432.3.1	Hydr. Var. Flow	Indicate variable flow method for all applicable systems		
	1432.3.X	Hydronic Isolation	Indicate method of isolation for all applicable systems		
	1432.4	DDC Capabilities	Indicate control capabilities including demand response setpoint adj.		
	1432.4	DDC data mgmt	Indicate metering and trending capabilities.		
	1432.5	Pressure Reset	Indicate static pressure reset for VAV systems		
	1433	Air Economizer	Indicate economizer on equipment schedule or provide calculations to justify exemption. Demonstrate higher efficiency equipment if required.		
	1433	Water Economizer	Indicate water economizer and provide calculations showing compliance with 1413 if 1433 Exception 3 is utilized		
	1434	Separate air sys.	Indicate special requirement zones and indicate systems		
	1435	Simul. htg. & clg.	Indicate method of prohibiting simultaneous heating and cooling, or state exception and show supporting calculations		
	1436	Heat recovery	Indicate heat recovery of all applicable systems on plans; complete and attach heat recovery calculations		
	1437	Elec. motor effc.	MECH-MOT or Equip. Schedule with hp, rpm, efficiency		
	1438	Variable speed drives	Indicate VS control or equivalent on schedules for all applicable equip.		
	1438.1	Heat Rejection	Indicate heat rejection equipment types and fan types		
	1438.2	Hot Gas Bypass	Indicate cooling equipment staging and capacity modulation abilities		
	1438.3	Large Volume sys	Indicate multiple system rooms & indicate ventilation control		
	1439.1	Kitchen Hoods	Indicate source and conditioning of make-up air		
	1439.2	Laboratory Exhaust	Indicate HR, VAV, semi-conditioned makeup, or CERM calc		

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

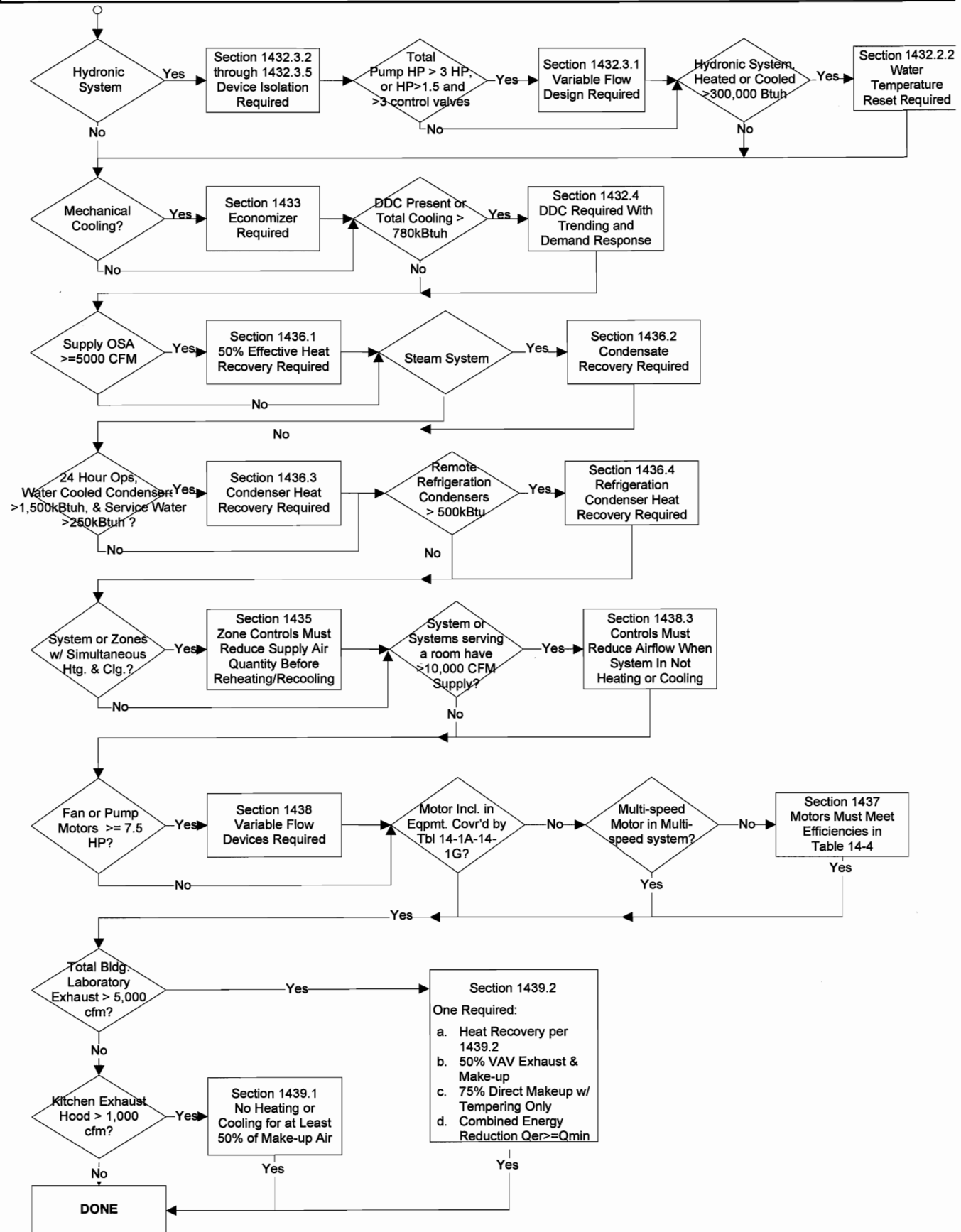
Decision Flowchart

Use flowchart to determine how the requirements of the Complex Systems Option apply to the project.



Mechanical - Complex Systems (back)

MECH-COMP



Economizer

MECH-ECO

Economizer Summary

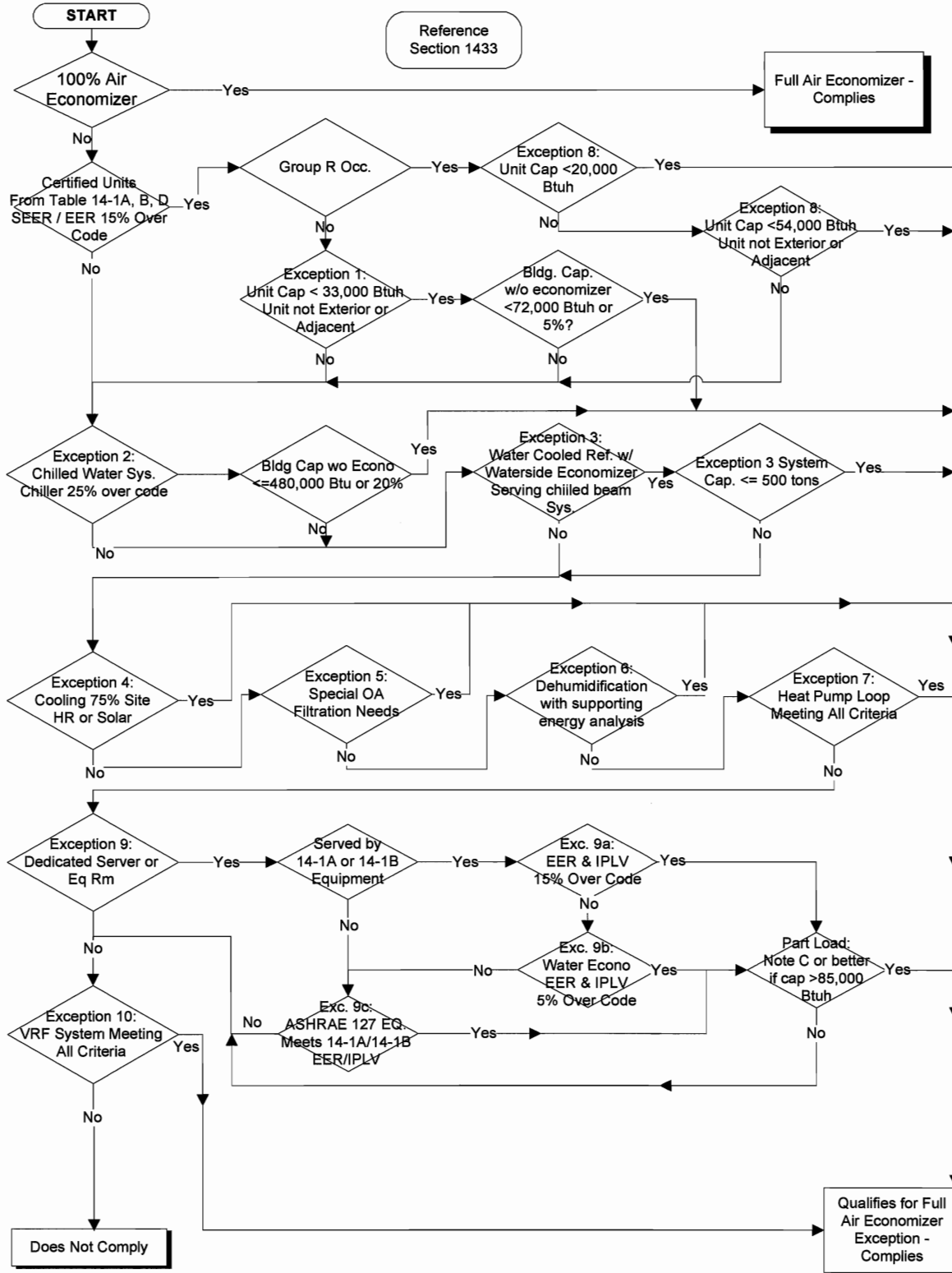
Check box(es) for exceptions being claimed. List the system/equipment that qualifies for each exception. See Section 1433 for full description of Economizer requirements.

Full Air Econo: _____

- | | | |
|--------------------------------------|--------------------------------------|---------------------------------------|
| <input type="checkbox"/> Ex 1: _____ | <input type="checkbox"/> Ex 5: _____ | <input type="checkbox"/> Ex 9a: _____ |
| <input type="checkbox"/> Ex 2: _____ | <input type="checkbox"/> Ex 6: _____ | <input type="checkbox"/> Ex 9b: _____ |
| <input type="checkbox"/> Ex 3: _____ | <input type="checkbox"/> Ex 7: _____ | <input type="checkbox"/> Ex 9c: _____ |
| <input type="checkbox"/> Ex 4: _____ | <input type="checkbox"/> Ex 8: _____ | <input type="checkbox"/> Ex 10: _____ |

Decision Flowchart

Use this flowchart to determine if project complies with Economizer



Mechanical Permit Plans Checklist**MECH-CHK**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Address				Date	
The following information is necessary to check a mechanical permit application for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code.					
Applicability (yes, no, na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
HVAC REQUIREMENTS (Sections 1401-1424)					
1411 Equipment Performance					
	1411.1	Minimum efficiency	Equipment schedule with type, capacity, efficiency		
	1411.1	Combustion htg.	Indicate intermittent ignition, flue/draft damper & jacket loss		
	1411.1	Air-cooled chiller	Provide total air and water chiller capacity		
	1411.2.1	Water-cooled chiller	Full-load and NPLV values adjusted for any non-standard conditions		
	1411.4	Pkg. elec. htg. & clg.	List heat pumps on schedule		
	1411.5	Unenclosed Heat	Indicate radiant heat system and occupancy controls		
1412 HVAC Controls					
	1412.1	Temperature zones	Indicate locations on plans		
	1412.2	Deadband control	Indicate 5 degree deadband minimum		
	1412.3	Humidity control	Indicate humidistat		
	1412.4	Setback and Shutoff	Indicate thermostat with 7 day program capability & required setback		
	1412.4.1	Dampers	Indicate damper location, leakage rate, control type, & max. leakage		
	1412.4.2	Optimum Start	Indicate optimum start controls		
	1412.5	Heat pump control	Indicate heat pump thermostant & outdoor lockout on schedule		
	1412.6	Combustion heating	Indicate modulating or staged control		
	1412.7	Balancing	Indicate balancing features on plans		
	1412.8	Ventilation Control	Indicate demand control ventilation for high-occupancy areas		
	1412.9	Loading Dock & Garage Ventilation	Indicate enclosed loading dock & parking garage ventilation system activation and control method.		
	1422	Thermostat interlock	Indicate thermostat interlock on plans		
	1432.2.1	Temperature Reset	Indicate temperature reset method		
1413 Air / Water Economizers					
	1412.1	Single zone systems	Indicate multiple cooling stage control capability.		
	1413.1	Air Econo Operation	Indicate 100% capability on schedule		
	1413.1	Wtr Econo Operation	Indicate 100% capacity at 45 degF db & 40 deg F wb		
	1413.2	Wtr Econo Document	Indicate max. OSA condition for design clg load & equipment performance data.		
	1413.3	Integrated operation	Indicate capability for partial cooling		
	1413.4	Humidification	Indicate direct evap or fog atomization w/ air economizer		
1414 Ducting Systems					
	1414.1	Duct sealing	Indicate duct design pressures, sealing, and testing requirements		
	1414.1.2	Low press. duct test	Indicate applicable low pressure duct systems shall be leak tested		
	1414.1.3	High press. duct test	Indicate high pressure duct systems shall be leak tested, and identify the location of this ductwork on plans		
	1414.2	Duct insulation	Indicate R-value of insulation on duct		
1415 Piping Systems					
	1415.1	Piping insulation	Indicate R-value of insulation on piping		
1416 Completion Requirements					
	1416.3.2	System Balancing	Indicate air and water system balancing requirements		
	1416.3.3	Functional Testing	Provide sequence of operations and test procedures.		
	1416.3.4	Documentation	Indicate O&M manuals, record drawings, staff training		
	1416.3.5	Comm. Report	Indicate requirements for final commissioning report		
	1416.4	Compliance Chklist	Submit to building official upon substantial completion.		
	Mechanical Summary Form		Completed and attached. Equipment schedule with types, input/output, efficiency, cfm, hp, economizer		

Mechanical Permit Plans Checklist Continued**MECH-CHK**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised February 2011

Project Address _____ Date _____

The following information is necessary to check a mechanical permit application for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code.

Applicability (yes, no, na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
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SERVICE WATER HEATING AND HEATED POOLS (Sections 1440-1454)

1440	Service water htg.				
1441	Elec. water heater	Indicate R-10 insulation under tank			
1442	Shut-off controls	Indicate automatic shut-off of circulators or heat trace			
1443	Pipe Insulation	Indicate R-value of insulation on piping			
1444	Pump Energy	Indicate method of pump energy management (Sec 1438)			
1445	Heat Recovery	Indicate preheat capacity as % of peak service water demand.			
1460	Heated Pools				
1452	Heat Pump COP	Indicate minimum COP of 4.0			
1452	Heater Efficiency	Indicate pool heater efficiency			
1453	Pool heater controls	Indicate switch and 65 degree control			
1454	Pool covers	Indicate vapor retardant cover			
1454	Pools 90+ degrees	Indicate R-12 pool cover			
1455	Heat Recovery	Indicate method and capacity of exhaust air temperature reduction			

COLD STORAGE (Sections 1460-1465)

1460	Cold Storage				
1463	Evaporators	Indicate motor type and speed control			
1464	Condensers	Indicate condenser cooling type, design wb temp and control			
1465	Compressors	Indicate design minimum condensing temp and control.			

If "no" is indicated for any item in Sections 1401-1424 or 1440-1465 , provide explanation:

Instructions for Electronic Forms

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised August 2010

Intro	<p>Chapters 11-15 of the 2009 Washington State Energy Code apply to all nonresidential occupancies and multifamily residential occupancies except those within the scope of the IRC (single family residential, duplexes, attached townhouses).</p> <p>This file, MTR09.XLS, has electronic compliance forms for Chapter 12 metering provisions. There are three companion files: ENV09.XLS (Chapter 13 envelop requirements); MECH09.XLS (Chapter 14 mechanical systems requirements); and LTG09.XLS (Chapter 15 lighting, motor, and transformer requirements).</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 2009 WSEC code text is available for download from: Download 2009 WSEC from http://www.neec.net/sites/default/files/neec_codes/WA-EnergyCodes2009.pdf</p>
Start-up	<p>Open a working copy of this file and be sure to use Save As to save it to a new file name. Alternatively, you can save the file as a template in the XLSTART subdirectory in the EXCEL directory, and open new copies with the "File New" menu command. Look for "MTR09".</p>
Overview	<p>This workbook file contains multiple worksheets. Each worksheet is indicated by a tab at the bottom of the screen. (If you don't see the tabs, visit menu option "Tools-Options-View-Sheet Tabs".) You may visit each form by clicking on its tab.</p> <p>Most calculations are automated. The spaces which display the results of calculations are not editable. Some adjustments to formatting have been made to facilitate electronic filing and calculation of the forms.</p>
Save Files	<p>Each time you open this file and start filling forms, you must save it under a new filename of your choosing using File Save As. The original template file cannot be altered. You may also save your own versions of the forms this way.</p>
Getting Around	<p>Each form has two pages (front and back). Both pages are available on screen when you click the tab for a form. Use the scroll bars to find the second page. It is either to the right, below, or sometimes to the right and below the first page.</p>
Filling Fields	<p>All project info and the date for all forms is entered once on "MTR-SUM" and automatically reproduced on the other forms. Always fill in the heading of ENV-SUM, even if you will not be using that form. The other forms have a reminder to do this.</p> <p>Only fillable fields are accessible. If you try to edit any other field, you'll get an error message. You may use the TAB key to move to the next fillable field. If the TAB doesn't take you where you want to go, use the mouse.</p> <p>Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will simply not be seen. In most cases, the text will wrap within the cell. This may force part of the form onto a new page.</p> <p>To enter the date, use this format: mm/dd/yyyy. For example, you would enter 6/8/2006 or 12/21/2012.</p> <p>Check boxes can be either blank, or checked-off with an "x" shown in the box. To toggle between cases, click the box with your mouse. Radio buttons (circles) are either filled or unfilled. Only one in a set may be filled.</p> <p>Drop-down lists have an arrow at the right side of the space. Click the arrow with your mouse and select the appropriate option. One of the options is a blank.</p> <p>When a form has a space for notes or explanation, click anywhere in the space to edit. Your cursor will become a text editing insertion bar and you can edit as with a word processor.</p>
Personalizing	<p>You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the footer using File Page Setup Header/Footer. You can then save the file under a new template name and re-use it again.</p>
Adding Lines and Removing	<p>Many tables, such as for listing equipment types, have a certain number of lines for entering data. There may not always be enough lines for all the entries you need to make. With this electronic version, you can add additional lines to the table.</p> <p>To add additional lines where this feature is available, click on the "+" button with your mouse. This button is located to the right of the sheet. If you can't see it, scroll right (or change the View Zoom setting to 83%).</p> <p>To remove lines that you have added, click on the "-" button with your mouse. You cannot remove lines that were not added: an error appears if you try.</p> <p>If you add additional lines with this method, the pagination will usually be affected. The forms will be forced to carry additional lines over to other pages. Be sure to submit all pages to the plans examiner.</p>
Printing	<p>The forms should print on any printer supported by the operating system. You will need to have the following TrueType fonts installed: Arial, Times New Roman, Courier New and Wingdings. These are all standard Windows fonts.</p> <p>If you are losing form or flowchart details when printing, you may have a shortage of printer memory. Try printing problem pages individually.</p> <p>By default, only selected forms are printed. To select one or more forms, hold down the Ctrl key and click the tabs of the worksheets you need. Issue the File Print Selected Sheets command. To print the entire set, use File Print Entire Workbook.</p>
Clean Forms	<p>It is possible to print clean, blank versions of these forms for hand filling. To do so, delete all of the heading information at the beginning of MTR-SUM, and make sure that all fillable cells in the forms are empty. Then print the clean forms.</p>
Partial Form Sets	<p>Forms in a set may not be deleted, because the file is locked, but you need not print all the forms, as explained in "Printing" above.</p>
Re-Calculat ion	<p>As this is a large file, it may respond slowly to changes if it is set to automatically re-calculate after every action. To set calculation to manual, visit the "Tools-Options-Calculation" menu item. Then manually recalculate using the F9 key.</p>

Energy Metering Summary**All Zones MTR-SUM**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised August 2010

Project Info	Project Address		Date
			For Building Department Use
	Applicant Name:		
	Applicant Address:		
Applicant Phone:			

Description	<input type="checkbox"/> New Building	<input type="checkbox"/> Addition	<input checked="" type="checkbox"/> Alteration	<input type="checkbox"/> Change of Use
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Table 12-1 Energy Meter Summary (enter values as applicable)					
Energy Service	Service Capacity		Total Meter for Building		Meter Type
Electric Service		kVa	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Renewable Electric		kVa	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Gas Service		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No	No
Steam Supply		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No	No
Geothermal		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Renewable Thermal		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Notes:

Table 12-2 Submeter Summary (required if 12-1 threshold exceeded)				
Energy Use	Total Circuit Capacity		Submeter Provided?	
Chillers/heat pump		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Package AC		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
HVAC fan		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Exhaust fan		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Makeup air fan		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Pump Systems		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Cooling Towers		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Boilers, furnaces, other heating		kW	<input type="checkbox"/> Yes	<input type="checkbox"/> No
General Lighting		kVA	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Misc. Electric Loads		kVA	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Notes:

**CHAPTER 12
ENERGY METERING**

1201 General. All buildings shall comply with Chapter 12. Whole building energy supply sources shall be metered to supply energy consumption data to the building owner to effectively manage energy. The building shall have a totalizing meter for each energy source.

1202 Whole Building Energy Supply Metering. Meters with remote metering capability or automatic meter reading (AMR) capability shall be provided to collect energy use data for each energy supply source to the building including gas, electricity and district steam, that exceeds the thresholds listed in Table 12-1. Utility company service entrance/interval meters are allowed to be used provided that they are configured for automatic meter reading (AMR) capability.

Master submetering with remote metering capability (including current sensors or flow meters) shall be provided for the systems that exceed the thresholds in Table 12-1 to collect overall totalized energy use data for each subsystem in accordance with Table 12-2.

Metering shall be digital-type meters for the main meter. Current sensors or flow meters are allowed for submetering. For subsystems with multiple similar units, such as multicell cooling towers, only one meter is required for the subsystem. Existing buildings are allowed to reuse installed existing analog-type utility company service/interval meters.

1203 Metering: Where new or replacement systems or equipment is installed that exceeds the threshold in Table 12-1 or Table 12-2, metering shall be installed for that system or equipment in accordance with Section 1201.

**TABLE 12-1
ENERGY SOURCE METER THRESHOLDS**

Electrical service	> 500 kVA
On-site renewable electric power	> 10 kVA (peak)
Gas and steam service	> 300 kW (1,000,000 Btu/h)
Geothermal	> 300 kW (1,000,000 Btu/h) heating
On-site renewable thermal energy	> 10 kW (30,000 Btu/h)

**TABLE 12-2
COMPONENT ENERGY MASTER SUBMETERING THRESHOLDS**

Chillers/heat pump systems	> 70 kW (240,000 Btu/h) cooling capacity
Packaged AC unit systems	> 70 kW (240,000 Btu/h) cooling capacity
HVAC fan systems	> 15 kW (20 hp)
Exhaust fan systems	> 15 kW (20 hp)
Make-up air fan systems	> 15 kW (20 hp)
Pump systems	> 15 kW (20 hp)
Cooling towers systems	> 15 kW (20 hp)
Boilers, furnaces and other heating equipment systems	> 300 kW (1,000,000 Btu/h) heating capacity
General lighting circuits	> 15 kVA
Miscellaneous electric loads	> 15 kVA

