

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	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".
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	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.
Getting Around	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.
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	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.
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	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.
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

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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 checked="" 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
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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.
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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

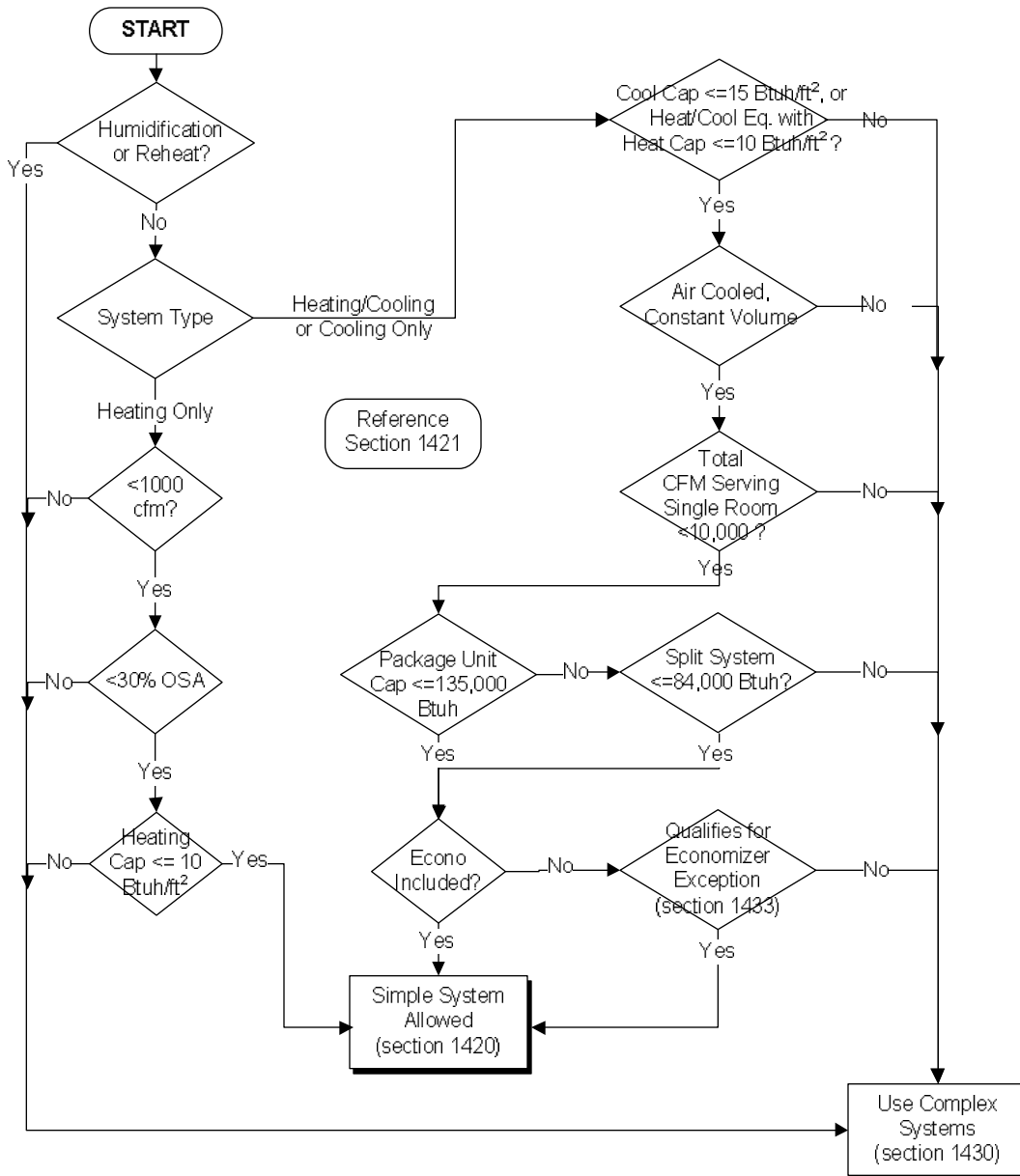
¹If available. ² As tested according to Table 14-1A through 14-1G. ³ If required. ⁴ COP, HSPF, Combustion Efficiency, or AFUE, as applicable. ⁵ Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS). ⁶ Exception number from

Mechanical Summary (back)

MECH-SUM

System Description See Section 1421 for full description of Simple System qualifications.	All Systems: <input type="checkbox"/> No humidification? <input type="checkbox"/> No Reheat?
	If Heating/Cooling or Cooling Only: <input type="checkbox"/> Constant vol? <input type="checkbox"/> Split system? <input type="checkbox"/> <=84,000 Btuh? <input type="checkbox"/> Economizer included? <input type="checkbox"/> Air cooled? <input type="checkbox"/> Packaged sys? <input type="checkbox"/> <=135,000 Btuh? <input type="checkbox"/> Cooling Cap <=15 Btuh/ft ² ? <input type="checkbox"/> Heating Cap. > 0 & <=10 Btuh/ft ²
	If Heating Only: <input type="checkbox"/> <1000 cfm? <input type="checkbox"/> <30% outside air? <input type="checkbox"/> Heating Cap. <=10 Btuh/ft ² ?

Decision Flowchart Use this flowchart to determine if project qualifies for Simple System Option. If not, either the Complex System or Systems Analysis Options must be used.



Complex Systems Refer to MECH-COMP Mechanical Complex Systems for assistance in determining which Complex Systems requirements are applicable to this project.

Mechanical - Complex Systems Checklist

MECH-COMP

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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

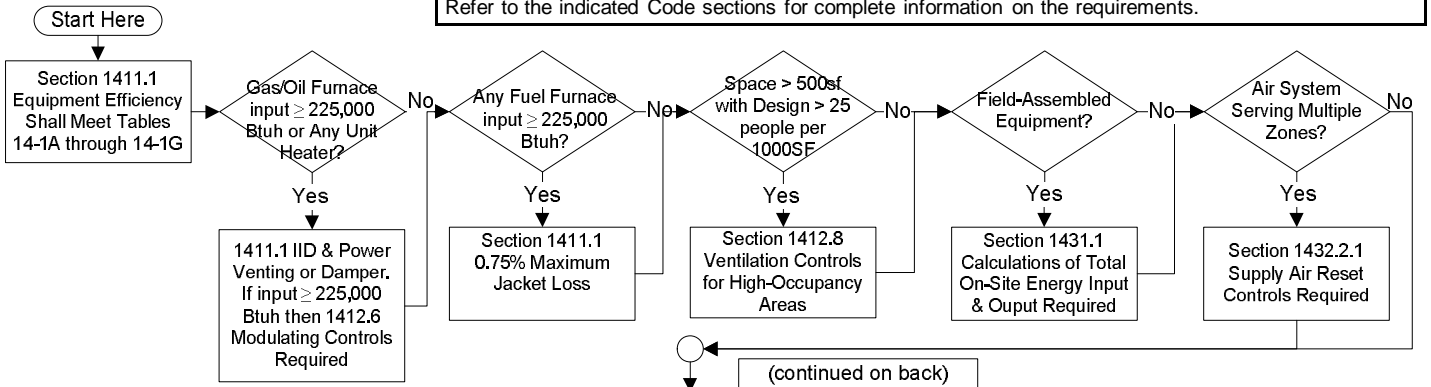
ADDITIONAL CHECKLIST ITEMS FOR COMPLEX SYSTEMS ONLY

Code Section	Component	Information Required	Location on Plans	Building Department Notes
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 effic.	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:

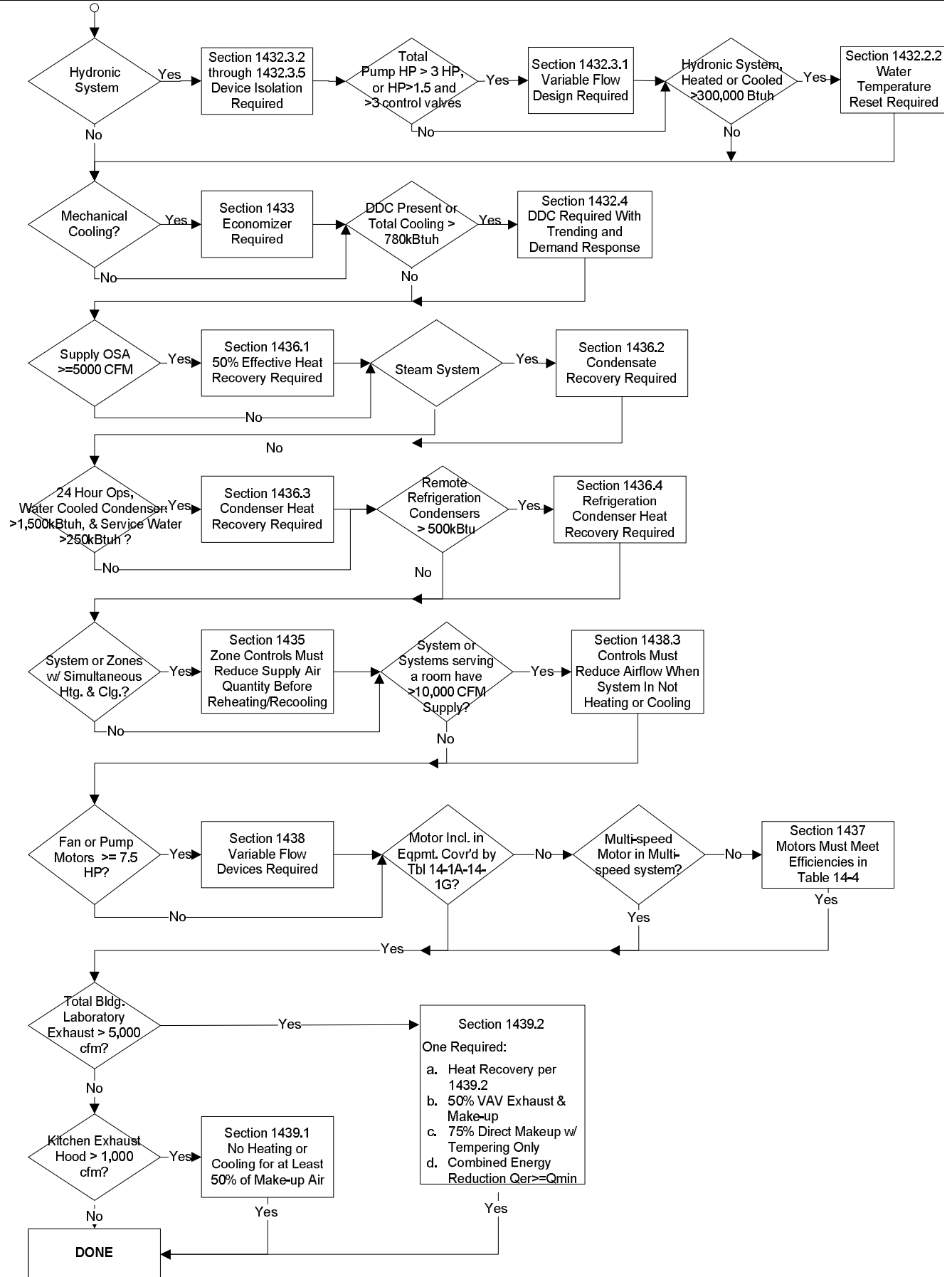
Decision Flowchart

Use flowchart to determine how the requirements of the Complex Systems Option apply to the project. Refer to the indicated Code sections for complete information on the requirements.



Mechanical - Complex Systems (back)

MECH-COMP



Economizer

MECH-ECO

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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: _____

Ex 1: _____

Ex 5: _____

Ex 9a: _____

Ex 2: _____

Ex 6: _____

Ex 9b: _____

Ex 3: _____

Ex 7: _____

Ex 9c: _____

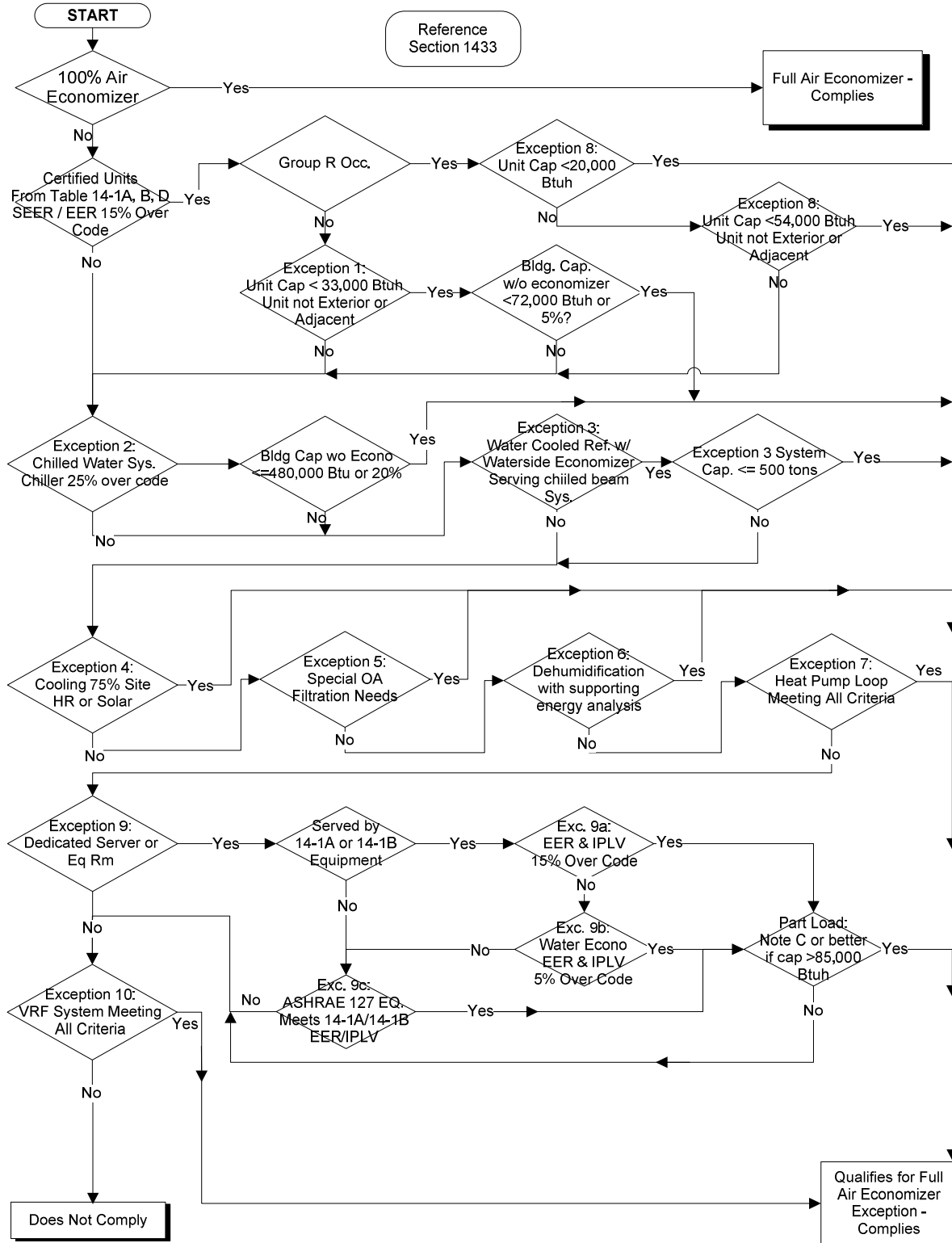
Ex 4: _____

Ex 8: _____

Ex 10: _____

Decision Flowchart

Use this flowchart to determine if project complies with Economizer requirements. If not, the Systems Analysis Option must be used.



Mechanical Permit Plans Checklist**MECH-CHK**

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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 thermostat & 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**

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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: