COMcheck Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code: 90.1 (2019) Standard
Project Title: Thurman Townhomes
Location: Portland, Oregon

Climate Zone: 4c

Project Type: New Construction

Construction Site: 2771 NW Thurman. St Portland, Oregon 97210 Owner/Agent: Sky Lab Architecture 503 525 9315 Designer/Contractor:
Mark Denyer
MFIA Consulting Engineers
(503) 234-0548

Mechanical Systems List

Quantity System Type & Description

6 HP-1 (Single Zone):

Split System Heat Pump

Heating Mode: Capacity = 12 kBtu/h,

Proposed Efficiency = 12.10 HSPF, Required Efficiency = 8.20 HSPF

Cooling Mode: Capacity = 12 kBtu/h,

Proposed Efficiency = 19.80 SEER, Required Efficiency: 14.00 SEER

Fan System: FAN SYSTEM 2 | FC-1 -- Compliance (Motor nameplate HP and fan efficiency method): Passes

Fans:

FAN 2 Supply, Constant Volume, 383 CFM, 0.3 motor nameplate hp, 1.00 fan energy index

5 HP-2 (Single Zone):

Split System Heat Pump

Heating Mode: Capacity = 36 kBtu/h,

Proposed Efficiency = 9.00 HSPF, Required Efficiency = 8.20 HSPF

Cooling Mode: Capacity = 36 kBtu/h,

Proposed Efficiency = 16.00 SEER, Required Efficiency: 14.00 SEER

Fan System: FAN SYSTEM 1 | Townhouse -- Compliance (Motor nameplate HP and fan efficiency method): Passes

Fans

FAN 1 Supply, Constant Volume, 1200 CFM, 1.0 motor nameplate hp, 1.00 fan energy index

5 Water Heater:

Electric Storage Water Heater, Capacity: 50 gallons No minimum efficiency requirement applies

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2019) Standard requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Mark Denyer	it starged	1-11-22
Name - Title	Signature	Date

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Inspection Checklist

Energy Code: 90.1 (2019) Standard

Requirements: 98.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section #	Plan Review	Complies?	Comments/Assumptions
& Req.ID			
4.2.2, 6.4.4.2.1, 6.7.2 [PR2] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2, 7.7.1, 10.4.2 [PR3] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2, 8.4.1.1, 8.4.1.2, 8.7 [PR6] ²	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and document where exceptions are claimed. Feeder connectors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.5.2 [PR5] ¹	Commissioning shall be performed as stated in Sections 5.9.2, 6.9.2, 7.9.2, 8.9.2, 9.9.2, 10.9.2, 11.2(d), and G1.2.1(c). Commissioning must utilize ASHRAE/IES Standard 202 or other generally accepted engineering standards acceptable to the building official. FPT and verification requirements for commissioning are as stated in Section 4.2.5.1. Commissioning shall document compliance of the building systems, controls, and building envelope with required provisions of this standard. Commissioning requirements shall be incorporated into the construction documents.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
6.4.3.7 [FO9] ³	Freeze protection and snow/ice melting system sensors for future connection to controls.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.

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Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
7.4.4.1 [PL2] ³	Temperature controls installed on service water heating systems	\square Complies \square Does Not	Requirement will be met.
	(<=120°F to maximum temperature for intended use).	□Not Observable □Not Applicable	
7.4.6 [PL4] ³	Heat traps installed on non-circulating storage water tanks.	\square Complies \square Does Not	Requirement will be met.
		□Not Observable □Not Applicable	

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Section #	Mechanical Rough-In	Plans Verified	Field Verified	Complies?	Comments/Assumptions
& Req.ID	Inspection	Value	Value	Compiles:	Comments/Assumptions
6.4.1.4, 6.4.1.5 [ME1] ²	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting	Efficiency:	Efficiency:	\square Complies \square Does Not	See the Mechanical Systems list for values.
[INICI]	90.1.			□Not Observable □Not Applicable	
6.4.3.4.1 [ME3] ³	Stair and elevator shaft vents have motorized dampers that automatically close.			□Complies □Does Not	Exception: Requirement does not apply.
	·			□Not Observable □Not Applicable	
	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in			□Complies □Does Not	Requirement will be met.
[]	use and meet maximum leakage rates. Check gravity dampers where allowed.			□Not Observable □Not Applicable	
6.4.3.4.5 [ME39] ³	Enclosed parking garage ventilation has automatic			☐Complies ☐Does Not	Exception: Requirement does not apply.
	contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.			□Not Observable □Not Applicable	
6.4.3.4.4 [ME5] ³	Ventilation fans >0.75 hp have automatic controls to shut off fan			□Complies □Does Not	Exception: HVAC systems intended to operate
	when not required.			□Not Observable □Not Applicable	continuously.
6.4.3.8 [ME6] ¹	Demand control ventilation provided for spaces >500 ft2 and			☐Complies ☐Does Not	Exception: Systems with heat recovery.
	>25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.			□Not Observable □Not Applicable	
6.5.3.2.1 [ME40] ²	DX cooling systems >= 75 kBtu/h (>= 65 kBtu/h effective 1/2016) and chilled-water and			☐Complies ☐Does Not	Exception: Requirement does not apply.
	evaporative cooling fan motor hp >= ¼ designed to vary supply fan airflow as a function of load and comply with operational requirements.			□Not Observable □Not Applicable	See the Mechanical Systems list for values.
6.4.4.1.1 [ME7] ³	Insulation exposed to weather protected from damage.			☐Complies ☐Does Not	Requirement will be met.
	Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			□Not Observable □Not Applicable	
6.4.4.1.2 [ME8] ²	HVAC ducts and plenums insulated per Table 6.8.2. Where	R	R	\square Complies \square Does Not	Requirement will be met.
	ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.			□Not Observable □Not Applicable	
6.4.4.1.3 [ME9] ²	HVAC piping insulation thickness. Where piping is installed in or	in.	in.	□Complies □Does Not	Exception: Requirement does not apply.
	under a slab, verification may need to occur during Foundation Inspection.			□Not Observable □Not Applicable	
6.4.4.1.4 [ME41] ³	Thermally ineffective panel surfaces of sensible heating			□Complies □Does Not	Exception: Requirement does not apply.
	panels have insulation >= R-3.5.			□Not Observable □Not Applicable	
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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.2.1 [ME10] ²	Ducts and plenums having pressure class ratings are Seal Class A construction.			□Complies □Does Not	Exception: Requirement does not apply.
	Class A Collsti action.			□Not Observable □Not Applicable	
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			□Complies □Does Not	Exception: Requirement does not apply.
	J			□Not Observable □Not Applicable	
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			☐Complies ☐Does Not	Exception: Requirement does not apply.
	testing.			□Not Observable □Not Applicable	
6.5.2.3 [ME19] ³	Dehumidification controls provided to prevent reheating,			□Complies □Does Not	Exception: Cooling capacity 40 kBtu/h.
	recooling, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.			□Not Observable □Not Applicable	
6.5.2.4.1 [ME68] ³	Humidifiers with airstream mounted preheating jackets have			□Complies □Does Not	Exception: Requirement does not apply.
	preheat auto-shutoff value set to activate when humidification is not required.			□Not Observable □Not Applicable	
6.5.2.4.2 [ME69] ³	Humidification system dispersion tube hot surfaces in the			□Complies □Does Not	Exception: Requirement does not apply.
	airstreams of ducts or air- handling units insulated >= R- 0.5.			□Not Observable □Not Applicable	
6.5.2.5 [ME70] ³	Preheat coils controlled to stop heat output whenever			☐Complies ☐Does Not	Requirement will be met.
	mechanical cooling, including economizer operation, is active.			□Not Observable □Not Applicable	Location on plans/spec: NA
6.5.2.6 [ME106] ³	Units that provide ventilation air to multiple zones and operate in			□Complies □Does Not	Exception: Requirement does not apply.
	conjunction with zone heating and cooling systems are prevented from using heating or			□Not Observable □Not Applicable	
	heat recovery to warm supply air above 60°F when representative				
	building loads or outdoor air temperature indicate that most zones demand cooling.				
6.5.3.6 [ME72] ²	Motors for fans >= 1/12 hp and < 1 hp are electronically-			□Complies □Does Not	Requirement will be met.
	commutated motors or have a minimum motor efficiency of 70%. These motors are also			□Not Observable □Not Applicable	
	speed adjustable for either balancing or remote control.				
6.5.3.6 [ME72] ²	Motors for fans >= 1/12 hp and < 1 hp are electronically-			☐Complies ☐Does Not	
	commutated motors or have a minimum motor efficiency of 70%. These motors are also			□Not Observable □Not Applicable	1 1 1 1 1
	speed adjustable for either balancing or remote control.				

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.4 [ME108] ²	Parallel-flow fan-powered VAV air terminals have automatic controls to a) turn off the terminal fan except when space heating is required or if required for ventilation; b) turn on the terminal fan as the first stage of heating before the heating coil is activated; and c) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or reverse the terminal damper logic and provide heating from the central air handler through primary air.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.3.4 [ME108] ²	Parallel-flow fan-powered VAV air terminals have automatic controls to a) turn off the terminal fan except when space heating is required or if required for ventilation; b) turn on the terminal fan as the first stage of heating before the heating coil is activated; and c) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or reverse the terminal damper logic and provide heating from the central air handler through primary air.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.3.7 [ME109] ²	Required minimum outdoor air rate is the larger of minimum outdoor air rate or minimum exhaust air rate required by Standard 62.1, Standard 170, or applicable codes or accreditation standards. Outdoor air ventilation systems shall comply with one of the following: a) design minimum system outdoor air provided < 135% of the required minimum outdoor air rate, b) dampers, ductwork, and controls allow the system to supply <= the required minimum outdoor air rate with a single set-point adjustment., or c) system includes exhaust air energy recovery complying with Section 6.5.6.1.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.7 [ME109] ²	Required minimum outdoor air rate is the larger of minimum outdoor air rate or minimum exhaust air rate required by Standard 62.1, Standard 170, or applicable codes or accreditation standards. Outdoor air ventilation systems shall comply with one of the following: a) design minimum system outdoor air provided < 135% of the required minimum outdoor air rate, b) dampers, ductwork, and controls allow the system to supply <= the required minimum outdoor air rate with a single set-point adjustment., or c) system includes exhaust air energy recovery complying with Section 6.5.6.1.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. See the Mechanical Systems list for values.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. See the Mechanical Systems list for values.
6.5.4.2 [ME25] ³	HVAC pumping systems with >= 3 control values designed for variable fluid flow (see section details).			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.6.1.1 [ME56] ¹	Exhaust Air Energy Recovery for Nontransient Dwelling Units			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.5.6.1.2 [ME111] ¹	Exhaust air energy recovery for spaces other than Nontransient dwelling units meeting Tables 6.5.6.1.2-1, and 6.5.6.1.2-2.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Exception: Requirements do not apply.
6.5.7.2.1 [ME32] ²	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.7.1 [ME100] ²	Conditioned supply air to space with mechanical exhaust <= the greater of criteria of supply flow, required ventilation rate, exhaust flow minu the available transffer air (see section details).			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.5.7.1 [ME100] ²	Conditioned supply air to space with mechanical exhaust <= the greater of criteria of supply flow, required ventilation rate, exhaust flow minu the available transffer air (see section details).			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.8 [ME112] ¹	Occupied standy controls for zones serving rooms that are required to have automatic partial OFF or automatic full OFF lighting controls per Section 9.4.1.1 shall meet the following within five minutes of all rooms in that zone entering occupied-standby mode: a)Active heating set point shall be setback at least 1°F, b)Active cooling set point shall be setup at least 1°F and c)All airflow supplied to the zone shall be shut off whenever the space temperature is between the active heating and cooling set points.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.7.2.4 [ME49] ³	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.8.1 [ME34] ²	Unenclosed spaces that are heated use only radiant heat.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Exception: Requirement does not apply.
7.4.2 [ME36] ²	Service water heating equipment meets efficiency requirements.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
6.4.3.9 [ME63] ²	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.10 [ME73] ³	Doors separating conditioned space from the outdoors have controls that disable/reset heating and cooling system when open.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10] ²	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	□Complies □Does Not □Not Observable	Requirement will be met.
8.4.3 [EL11] ²	New buildings have electrical energy use measurement devices installed. Where tenant spaces exist, each tenant is monitored separately. In buildings with a digital control system the energy use is transmitted to to control system and displayed graphically.	□Not Applicable □Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
10.4.1 [EL9] ²	Electric motors meet requirements where applicable.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
6.4.3.1.2 [FI3] ³	Thermostatic controls have a 5 °F deadband.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.2 [FI20] ³	Temperature controls have setpoint overlap restrictions.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.3.1 [FI21] ³	one automatic shutdown control.	□Complies □Does Not	Exception: Systems designed for continuous operation.
		□Not Observable □Not Applicable	
6.4.3.3.2 [FI22] ³	required for maintenance.	□Complies □Does Not	Exception: Systems designed for continuous operation.
		□Not Observable □Not Applicable	
6.4.3.5 [FI5] ³	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.5 [FI5] ³		□Complies □Does Not	Exception: Heat pumps regulated by and meeting NAECA requirements and using internal electric resistance heating.
		□Not Observable □Not Applicable	
6.4.3.6 [FI6] ³	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited. Humidity control prohibits the use of fossil fuel or electricity to produce RH > 30% in the warmest zone humidified and RH < 60% in the coldest zone dehumidified.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.7.2.1 [FI7] ³	submitted within 90 days of system acceptance.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.7.2.2 [FI8] ³	systems within 90 days of system acceptance.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.7.2.3 [FI9] ¹	balancing report is provided for HVAC systems serving zones >5,000 ft2 of conditioned area.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
7.4.4.3 [FI11] ³	Public lavatory faucet water temperature <=110°F.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
10.4.3 [FI24] ²	proper lighting, ventilation power, and standby mode.	□Complies □Does Not	Exception: Requirement does not apply.
		□Not Observable □Not Applicable	

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
7.4.3 [FI45] ²	nonrecirculating storage system, or	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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