

Project Information

Energy Code:
Project Title:
Location:
Climate Zone:
Project Type:

90.1 (2019) Standard 20 Quimby Portland, Oregon 4c New Construction

Construction Site: 1520 NW 20th Avenue Portland, Oregon 97209 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

- AC-1 (Single Zone):
 Cooling: 5 each Split System, Capacity = 30 kBtu/h, Air-Cooled Condenser Proposed Efficiency = 17.00 SEER, Required Efficiency = 13.00 SEER Proposed Part Load Efficiency = 0.00, Required Part Load Efficiency = 0.00
 - F-1 (Single Zone): Heating: 5 each - Central Furnace, Gas, Capacity = 80 kBtu/h Proposed Efficiency = 97.00% Et, Required Efficiency: 80.00 % Et (or 80% AFUE) Fan System: FAN SYSTEM 1 | Townhouse -- Compliance (Motor nameplate HP and fan efficiency method): Passes

Fans:

5

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

1 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 Proposed Part Load Efficiency = 0.00, Required Part Load Efficiency = 0.00 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

Signature

5 WH-1:

Mark Denyer Name - Title

Gas Instantaneous Water Heater, Capacity: 8 gallons, Input Rating: 150 kBtu/h 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 COM*check* Version COM*check*Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

mark Dorgon

8-12-22

Date

COMcheck Software Version COMcheckWeb Inspection Checklist

Energy Code: 90.1 (2019) Standard

Requirements: 100.0% 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:

1 High Impact (Tier 1)

2 Medium Impact (Tier 2)

Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
6.4.3.7 [FO9] ³	connection to controle	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. Location on plans/spec: NA

 1
 High Impact (Tier 1)
 2
 Medium Impact (Tier 2)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.1.4, 6.4.1.5 [ME1] ²	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting 90.1.	Efficiency:	Efficiency:	□Complies □Does Not □Not Observable □Not Applicable	<i>See the Mechanical Systems list for values.</i>
6.4.3.4.1 [ME3] ³	Stair and elevator shaft vents have motorized dampers that automatically close.			Complies Does Not Not Observable Not Applicable	Exception: Requirement does not apply. Location on plans/spec: NA
6.4.3.4.2, 6.4.3.4.3 [ME4] ³	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.4.3.4.5 [ME39] ³	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. Location on plans/spec: NA
6.4.3.4.4 [ME5] ³	Ventilation fans >0.75 hp have automatic controls to shut off fan when not required.			□Complies □Does Not □Not Observable □Not Applicable	Exception: HVAC systems intended to operate continuously. Location on plans/spec: See sheet M06.01
6.4.3.8 [ME6] ¹	Demand control ventilation provided for spaces >500 ft2 and >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.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Systems with heat recovery. Location on plans/spec: NA
6.5.3.2.1 [ME40] ²	DX cooling systems >= 75 kBtu/h (>= 65 kBtu/h effective 1/2016) and chilled-water and evaporative cooling fan motor hp >= $\frac{1}{4}$ designed to vary supply fan airflow as a function of load and comply with operational requirements.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. Location on plans/spec: NA See the Mechanical Systems list for values.
6.4.4.1.1 [ME7] ³	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.4.4.1.2 [ME8] ²	HVAC ducts and plenums insulated per Table 6.8.2. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	R	R	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.4.4.1.3 [ME9] ²	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	in.	in.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply. Location on plans/spec: See sheet M06.01

1 High Impact (Tier 1)

2 Medium Impact (Tier 2)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.1.4 [ME41] ³	Thermally ineffective panel surfaces of sensible heating panels have insulation $>= R-3.5$.			Complies	Exception: Requirement does not apply.
				□Not Observable □Not Applicable	Location on plans/spec: NA
6.4.4.2.1 [ME10] ²	Ducts and plenums having pressure class ratings are Seal			□Complies □Does Not	Exception: Requirement does not apply.
	Class A construction.			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.8.1-15, 6.8.1-16	Electrically operated DX-DOAS units meet requirements per			□Complies □Does Not	Requirement will be met.
[ME110] ²	Tables 6.8.1-15 or 6.8.1-16.			□Not Observable □Not Applicable	Location on plans/spec: NA
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage			□Complies □Does Not	Exception: Requirement does not apply.
	testing.			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage			□Complies □Does Not	Exception: Requirement does not apply.
	testing.			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage			□Complies □Does Not	Exception: Requirement does not apply.
	testing.			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
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	Location on plans/spec: NA
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	Location on plans/spec: NA
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	Location on plans/spec: NA
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 heat recovery to warm supply air above 60°F when representative building loads or outdoor air temperature indicate that most zones demand cooling.			□Not Observable □Not Applicable	Location on plans/spec: NA

 1
 High Impact (Tier 1)
 2
 Medium Impact (Tier 2)
 3

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.6 [ME72] ²	Motors for fans >= 1/12 hp and < 1 hp are electronically- commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.5.3.6 [ME72] ²	Motors for fans >= 1/12 hp and < 1 hp are electronically- commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
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.

1 High Impact (Tier 1) 2 M

2 Medium Impact (Tier 2)

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. Location on plans/spec: See sheet M06.01
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. Location on plans/spec: See sheet M06.01
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	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. Location on plans/spec: NA
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. Location on plans/spec: See sheet M06.00

 1
 High Impact (Tier 1)
 2
 Medium Impact (Tier 2)
 3
 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.6.1.2 [ME111] ¹	Exhaust air energy recovery for spaces other than Nontransient dwelling units meeting Tables			□Complies □Does Not	Exception: Requirements do not apply.
	6.5.6.1.2-1, and 6.5.6.1.2-2.			□Not Observable □Not Applicable	Location on plans/spec: NA
6.5.7.2.1 [ME32] ²	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.			□Complies □Does Not	Exception: Requirement does not apply.
	an volume.			□Not Observable □Not Applicable	Location on plans/spec: NA
6.5.7.1 [ME100] ²	Conditioned supply air to space with mechanical exhaust <= the			□Complies □Does Not	Requirement will be met.
	greater of criteria of supply flow, required ventilation rate, exhaust flow minu the available transffer air (see section details).			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.5.7.1 [ME100] ²	Conditioned supply air to space with mechanical exhaust <= the			□Complies □Does Not	Requirement will be met.
	greater of criteria of supply flow, required ventilation rate, exhaust flow minu the available transffer air (see section details).			□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.5.3.8 [ME112] ¹	Occupied standy controls for zones serving rooms that are			□Complies □Does Not	Exception: Requirement does not apply.
	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.			□Not Observable	Location on plans/spec: See sheet M06.01
6.5.7.2.4 [ME49] ³	Approved field test used to evaluate design air flow rates and demonstrate proper capture			□Complies □Does Not □Not Observable	Exception: Requirement does not apply.
	and containment of kitchen exhaust systems.			Not Applicable	Location on plans/spec: See sheet M06.01
6.5.8.1 [ME34] ²	Unenclosed spaces that are heated use only radiant heat.			□Complies □Does Not	Exception: Requirement does not apply.
				□Not Observable □Not Applicable	Location on plans/spec: NA
6.5.9 [ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 15% >240 kBtu/h - 10%			Complies Does Not	Requirement will be met.
				□Not Observable □Not Applicable	Location on plans/spec: NA
7.4.2 [ME36] ²	Service water heating equipment meets efficiency requirements.			□Complies □Does Not	
				□Not Observable □Not Applicable	

1 High Impact (Tier 1)

2 Medium Impact (Tier 2)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
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. Location on plans/spec: NA
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.

1 High Impact (Tier 1) 2 Medium

2 Medium Impact (Tier 2)

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 Not Applicable	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.	□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.

1 High Impact (Tier 1) 2 Medium

2 Medium Impact (Tier 2)

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	Location on plans/spec: See sheet M06.01
6.4.3.2 [FI20] ³	Temperature controls have setpoint overlap restrictions.	Complies Does Not Not Observable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.4.3.3.1 [Fl21] ³	HVAC systems equipped with at least one automatic shutdown control.	□Not Applicable □Complies □Does Not	Exception: Systems designed for continuous operation.
		□Not Observable □Not Applicable	Location on plans/spec: See sheet M06.01
6.4.3.3.2 [FI22] ³	Setback controls allow automatic restart and temporary operation as required for maintenance.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Systems designed for continuous operation. Location on plans/spec: See sheet M06.01
6.4.3.5 [FI5] ³	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
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 □Not Observable □Not Applicable	Requirement will be met. Location on plans/spec: See sheet M06.01
6.7.2.1 [FI7] ³	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.7.2.2 [FI8] ³	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.7.2.3 [FI9] ¹	An air and/or hydronic system balancing report is provided for HVAC systems serving zones >5,000 ft2 of conditioned area.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
7.4.4.3 [FI11] ³	Public lavatory faucet water temperature <=110°F.	Complies Does Not Not Observable Not Applicable	Requirement will be met.
10.4.3 [FI24] ²	Elevators are designed with the proper lighting, ventilation power, and standby mode.	Complies	Exception: Requirement does not apply.
7.4.3 [FI45] ²	First 8 ft of outlet piping in nonrecirculating storage system, or branch piping connected to recirculated, heat traced, or impredance heated piping is insulated.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

 1
 High Impact (Tier 1)
 2
 Medium Impact (Tier 2)

 1
 High Impact (Tier 1)
 2
 Medium Impact (Tier 2)