



# Mechanical Compliance Certificate

## Section 1: Project Information

Energy Code: **2014 Oregon Energy Efficiency Specialty Code**

Project Title:

Project Type: New Construction

Construction Site:

Owner/Agent:

Designer/Contractor:

## Section 2: General Information

Building Location (for weather data):

Warm Springs, Oregon

Climate Zone:

5b

## Section 3: Mechanical Systems List

### Quantity System Type & Description

- 1 RTU-1 (Single Zone) :  
Heating: 1 each - Duct Furnace, Gas, Capacity = 336 kBtu/h  
Proposed Efficiency = 81.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 169 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 13.50 EER, Required Efficiency = 10.80 EER  
Fan System: RTU-1 -- Compliance (Brake HP method) : Passes  
  
Fans:  
FAN 1 Supply, Constant Volume, 5520 CFM, 5.0 motor nameplate hp, 3.5 brake hp
- 1 RTU-2 (Single Zone) :  
Heating: 1 each - Duct Furnace, Gas, Capacity = 188 kBtu/h  
Proposed Efficiency = 81.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 86 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 13.00 EER, Required Efficiency = 11.00 EER  
Fan System: RTU-2 -- Compliance (Brake HP method) : Passes  
  
Fans:  
FAN 2 Supply, Constant Volume, 2995 CFM, 2.0 motor nameplate hp, 1.6 brake hp
- 1 RTU-3 (Single Zone) :  
Heating: 1 each - Duct Furnace, Gas, Capacity = 150 kBtu/h  
Proposed Efficiency = 81.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 83 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 13.00 EER, Required Efficiency = 11.00 EER  
Fan System: RTU-3 -- Compliance (Brake HP method) : Passes  
  
Fans:  
FAN 3 Supply, Constant Volume, 2400 CFM, 2.0 motor nameplate hp, 1.8 brake hp
- 1 RTU-1 copy 3 (Single Zone) :  
Heating: 1 each - Duct Furnace, Gas, Capacity = 150 kBtu/h  
Proposed Efficiency = 81.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 57 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 15.20 SEER, Required Efficiency = 13.00 SEER  
Fan System: RTU-4 -- Compliance (Brake HP method) : Passes  
  
Fans:  
FAN 4 Supply, Constant Volume, 2000 CFM, 2.0 motor nameplate hp, 1.6 brake hp
- 5 IAC/OAC-1, 2, 3, 4, 5 (Single Zone) :  
Cooling: 1 each - Split System, Capacity = 24 kBtu/h, Air-Cooled Condenser, No Economizer, Economizer  
exception: Low Capacity Residential

Proposed Efficiency = 15.00 SEER, Required Efficiency = 13.00 SEER  
Fan System: None

- 2 IHP/PHP-2 (Single Zone) : Split System Heat Pump  
Heating Mode: Capacity = 20 kBtu/h,  
Proposed Efficiency = 10.60 HSPF, Required Efficiency = 7.70 HSPF  
Cooling Mode: Capacity = 18 kBtu/h, , No Economizer , Economizer exception: Low Capacity Residential  
Proposed Efficiency = 17.50 SEER, Required Efficiency = 13.00 SEER  
Fan System: None
- 3 Water Heater 1:  
Gas Storage Water Heater, Capacity: 100 gallons, Input Rating: 199 Btu/h w/ Circulation Pump  
Proposed Efficiency: 94.00 % Et, Required Efficiency: 80.00 % Et

## Section 4: Requirements Checklist

*In the following requirements, blank checkboxes identify requirements that the applicant has not acknowledged as being met. Checkmarks identify requirements that the applicant acknowledges are met or excepted from compliance. 'Plans reference page/section' identifies where in the plans/specs the requirement can be verified as being satisfied.*

### Requirements Specific To: RTU-1 :

- ✓ 1. Equipment meets minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- ✓ 2. Equipment meets minimum efficiency: Single Package Unit: 10.80 EER (11.0 IEER)
- ✓ 3. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: \_\_\_\_\_

- ✓ 4. Hot Gas Bypass Limitation. Cooling systems does not use hot gas bypass or other evaporator pressure control unless the equipment is designed with multiple steps (or continuous) capacity modulation.

Plans reference page/section: M600, SPECS

- ✓ 5. Supply air economizers shall be provided on each cooling system and are capable of providing 100-percent outdoor air, even if additional mechanical cooling is required to meet the cooling load of the building. Systems provide a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building.

Plans reference page/section: M600, SPECS

### Requirements Specific To: RTU-2 :

- ✓ 1. Equipment meets minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- ✓ 2. Equipment meets minimum efficiency: Single Package Unit: 11.00 EER (11.2 IEER)
- ✓ 3. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: \_\_\_\_\_

- ✓ 4. Supply air economizers shall be provided on each cooling system and are capable of providing 100-percent outdoor air, even if additional mechanical cooling is required to meet the cooling load of the building. Systems provide a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building.

Plans reference page/section: M600, SPECS

### Requirements Specific To: RTU-3 :

- ✓ 1. Equipment meets minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- ✓ 2. Equipment meets minimum efficiency: Single Package Unit: 11.00 EER (11.2 IEER)
- ✓ 3. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: \_\_\_\_\_

- ✓ 4. Supply air economizers shall be provided on each cooling system and are capable of providing 100-percent outdoor air, even if additional mechanical cooling is required to meet the cooling load of the building. Systems provide a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building.

Plans reference page/section: M600, SPECS

### Requirements Specific To: RTU-1 copy 3 :

- ✓ 1. Equipment meets minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- ✓ 2. Equipment meets minimum efficiency: Single Package Unit: 13.00 SEER

- ✓ 3. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: \_\_\_\_\_

- ✓ 4. Supply air economizers shall be provided on each cooling system and are capable of providing 100-percent outdoor air, even if additional mechanical cooling is required to meet the cooling load of the building. Systems provide a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building.

Plans reference page/section: M600, SPECS

#### **Requirements Specific To: IAC/OAC-1, 2, 3, 4, 5 :**

- ✓ 1. Equipment meets minimum efficiency: Split System: 13.00 SEER
- ✓ 2. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: M600, SPECS

#### **Requirements Specific To: IHP/PHP-2 :**

- ✓ 1. Equipment meets minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- ✓ 2. Energy recovery ventilation systems. Individual fan systems that have both a design supply air capacity of 5,000 cfm or greater and a minimum outside air supply of 70 percent or greater of the design supply air quantity have an energy recovery system.

Plans reference page/section: M600, SPECS

#### **Requirements Specific To: Water Heater 1 :**

- ✓ 1. Newly purchased equipment meets the efficiency requirements. Gas Storage Water Heater efficiency: 80.00 % Et (259 SL, kBtu/h)
- ✓ 2. Service water-heating equipment performance efficiency. Water heating equipment efficiency has been verified through data furnished by the manufacturer or through certification under an approved certification program.
- ✓ 3. Temperature controls. Service water-heating equipment have controls to allow a setpoint of 110°F for equipment serving dwelling units and 90°F for equipment serving other occupancies. The outlet temperature of lavatories in public facility rest rooms is limited to 110°F.

Plans reference page/section: p600, SPECS

- ✓ 4. Heat traps. Water-heating equipment not supplied with integral heat traps and serving noncirculating systems have heat traps on the supply and discharge piping associated with the equipment.

Plans reference page/section: P600

- ✓ 5. Pipe Insulation. For automatic-circulating hot water and externally heated (such as heat trace or impedance heating) systems, piping is insulated in accordance with the specifications of this section.
- ✓ 6. Hot Water System Controls. Systems designed to maintain usage temperatures in hot water pipes is turned off automatically when the hot water system is not in operation and has demand sensing controls that turn off the system when there is no demand when the system is operational. A check valve or similar device is installed per requirement details.

Plans reference page/section: P600

#### **Generic Requirements: Must be met by all systems to which the requirement is applicable:**

- ✓ 1. Calculation of heating and cooling loads. Design loads are determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183. Alternatively, design loads have been determined by an approved equivalent computation procedure.

- ✓ 2. Packaged Electric Equipment. Specified packaged electrical equipment has a heat pump as the primary heating source.

Plans reference page/section: SPECS

- ✓ 3. Equipment and system sizing. Heating and cooling equipment and systems capacity do not exceed the loads calculated in accordance with Section 503.2.1.

Plans reference page/section: M600

- ☐ 4. HVAC Equipment Performance Requirements. Reported efficiencies have been tested and rated in accordance with the applicable test procedure. The efficiency has been verified through certification under an approved certification program or, if no certification program exists, the equipment efficiency ratings are supported by data furnished by the manufacturer.

- ✓ 5. Thermostatic Controls. The supply of heating and cooling energy to each zone is controlled by individual thermostatic controls that respond to temperature within the zone.

Plans reference page/section: M200, SPECS

- ✓ 6. Heat pump supplementary heat. Heat pumps having supplementary electric resistance heat have controls that, except during defrost, prevent supplementary heat operation when the heat pump can meet the heating load.

Plans reference page/section: SPECS

- ✓ 7. Set point overlap restriction. Where used to control both heating and cooling, zone thermostatic controls provide a temperature range or deadband of at least 5°F (2.8°C) within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.

Plans reference page/section: SPECS

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- ✓ 8. Optimum Start Controls. Each HVAC system has controls that vary the start-up time of the system to just meet the temperature set point at time of occupancy.

Plans reference page/section: SPECS

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- ✓ 9. Off-hour controls. Each zone is provided with thermostatic setback controls that are controlled by either an automatic time clock or programmable control system.

✓ **Exception applies:** Zones that will be operated continuously.

Plans reference page/section: NA

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- ✓ 10. Shutoff damper controls. Both outdoor air supply and exhaust are equipped with not less than Class I motorized dampers.

Plans reference page/section: SPECS

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- ✓ 11. Freeze Protection and Snow melt system controls. Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, include automatic controls capable of shutting off the systems when outdoor air temperatures meet code criteria.

Plans reference page/section: NA

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- ✓ 12. Zone Isolation Controls. A system serving multiple occupancies or floors in the same building is independently zoned and equipped with isolation devices.

Plans reference page/section: NA

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- ✓ 13. Separate air distribution systems. Zones with special process temperature requirements and/or humidity requirements are served by separate air distribution systems from those serving zones requiring only comfort conditions; or shall include supplementary control provisions so that the primary systems may be specifically controlled for comfort purposes only.

Plans reference page/section: NA

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- ✓ 14. Humidity control. If a system is equipped with a means to add or remove moisture to maintain specific humidity levels in a zone or zones, a humidity control device is provided.

Plans reference page/section: NA

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- ✓ 15. Humidity control. Where a humidity control device exists it is set to prevent the use of fossil fuel or electricity to produce relative humidity in excess of 30 percent. Where a humidity control device is used for dehumidification, it is set to prevent the use of fossil fuel or electricity to reduce relative humidity below 60 percent.

Plans reference page/section: NA

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- ✓ 16. Humidity control. Where a humidity control device exists it is set to maintain a deadband of at least 10% relative humidity where no active humidification or dehumidification takes place.

Plans reference page/section: NA

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- ✓ 17. Ventilation. Ventilation, either natural or mechanical, is provided in accordance with Chapter 4 of the International Mechanical Code. Where mechanical ventilation is provided, the system has the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the International Mechanical Code.

Plans reference page/section: M600M, M601

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- ✓ 18. Demand controlled ventilation (DCV). DCV is required for spaces larger than 500 ft<sup>2</sup> for simple systems and spaces larger than 150 ft<sup>2</sup> for multiple zone systems.

Plans reference page/section: M601

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- ✓ 19. Kitchen hoods. Kitchen makeup is provided as required by the Oregon Mechanical Specialty Code.

Plans reference page/section: SEE KITCHEN PLANS

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- ✓ 20. Enclosed parking garage ventilation controls. In Group S-2, enclosed parking garages used for storing or handling automobiles employ automatic carbon monoxide sensing devices.

Plans reference page/section: NA

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- ✓ 21. Duct and plenum insulation and sealing. All supply and return air ducts and plenums are insulated with the specified insulation. When located within a building envelope assembly, the duct or plenum is separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation. All ducts, air handlers and filter boxes are sealed. Joints and seams comply with Section 603.9 of the International Mechanical Code.

- ✓ 22.Low-pressure duct systems. All longitudinal and transverse joints, seams and connections of low-pressure supply and return ducts are securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturer's installation instructions.

Plans reference page/section: SPECS

- ✓ 23.Medium-pressure duct systems. All ducts and plenums designed to operate medium-pressure are insulated and sealed in accordance with Section 503.2.7. Pressure classifications specific to the duct system are clearly indicated on the construction documents.

Plans reference page/section: SPECS

- ✓ 24.High-pressure duct systems. Ducts designed to operate at high-pressure are insulated and sealed in accordance with Section 503.2.7. In addition, ducts and plenums are leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

Plans reference page/section: NA

- ✓ 25.Air system balancing. Each supply air outlet and zone terminal device is equipped with means for air balancing in accordance with the requirements of IMC 603.17. Discharge dampers intended to modulate airflow are prohibited on constant volume fans and variable volume fans with motors 10 horsepower.

Plans reference page/section: M200, SPECS

- ✓ 26.Manuals. The construction documents require that an operating and maintenance manual be provided to the building owner by the mechanical contractor. See long description for specifications.

Plans reference page/section: SPECS

- ✓ 27.Air System Design and Control. Each HVAC system having a total fan system motor nameplate hp exceeding 5 hp meets the provisions of Sections 503.2.10.1 through 503.2.10.2.

Plans reference page/section: M600

- ✓ 28.Allowable fan floor horsepower. Each HVAC system at fan system design conditions does not exceed the allowable fan system motor nameplate hp (Option 1) or fan system bhp (Option 2) as shown and calculated in requirement details.

Plans reference page/section: M600

- ✓ 29.Motor nameplate horsepower. For each fan, the selected fan motor is no larger than the first available motor size greater than the brake horsepower (bhp).

Plans reference page/section: M600

- ✓ 30.Large Volume Fan Systems. Fan systems over 8,000 (7 m3/s) cfm without direct expansion cooling coils that serve single zones reduce airflow based on space thermostat heating and cooling demand. A two-speed motor or variable frequency drive reduces airflow to a maximum 60 percent of peak airflow or minimum ventilation air requirement as required by Chapter 4 of the International Mechanical Code, whichever is greater.

Plans reference page/section: NA

- ✓ 31.All air-conditioning equipment and air-handling units with direct expansion cooling and a cooling capacity at ARI conditions greater than or equal to 110,000 Btu/h that serve single zones have their supply fan operation controlled according to code specific requirements.

Plans reference page/section: M600

- ✓ 32.Series fan-powered terminal unit fan motors. Fan motors for series fan-powered terminal units are electronically-commutated motors and have a minimum motor efficiency of 70 percent when rated in accordance with NEMA Standard MG 1-2006 at full load rating conditions.

Plans reference page/section: NA

- ✓ 33.Hot Gas Bypass Limitation. For cooling systems  $\leq 240$  kBtu/h, maximum hot gas bypass capacity is no more than 50% total cooling capacity.

Plans reference page/section: NA

- ✓ 34. All service water heating requirements are listed in requirements section specific to the system.

## Section 5: 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 2014 Oregon Energy Efficiency Specialty Code requirements in COMcheck Version 4.0.3.0 and to comply with the mandatory requirements in the Requirements Checklist.

Takako Baker, Mechanical Engr

Name - Title

  
Signature

8/16/16

Date

## Section 6: Post Construction Compliance Statement

- ☐ HVAC record drawings of the actual installation, system capacities, calibration information, and performance data for each equipment provided to the owner.
- ☐ HVAC O&M documents for all mechanical equipment and system provided to the owner by the mechanical contractor.
- ☐ Written HVAC balancing and operations report provided to the owner.

The above post construction requirements have been completed.

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Principal Mechanical Designer-Name

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Signature

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Date