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# Mechanical Compliance Certificate

## 2009 IECC

### Section 1: Project Information

Project Type: **New Construction**

Project Title : 89 Anderson Street Apartments

Construction Site:

89 Anderson Street  
Portland, Maine 04101

Owner/Agent:

Jonathan Culley  
Redfern LWS, LLC  
P.O. Box 8816  
Portland, Maine 04104  
207-221-5746  
jonathan@redfernproperties.com

Designer/Contractor:

Ryan Senatore  
Ryan Senatore Architecture, LLC  
67 Gray Road  
Gorham, Maine 04038  
207-650-6141  
ryan@senatorearchitecture.com

### Section 2: General Information

Building Location (for weather data):

**Portland, Maine**

Climate Zone:

**6a**

### Section 3: Mechanical Systems List

#### Quantity System Type & Description

- |    |   |                            |
|----|---|----------------------------|
| 10 | Single Zone Ductless Split (Single Zone) : Split System Heat Pump<br>Heating Mode: Capacity = 18 kBtu/h,<br>Proposed Efficiency = 12.00 HSPF, Required Efficiency = 7.70 HSPF<br>Cooling Mode: Capacity = 15 kBtu/h, , No Economizer , Economizer exception: None<br>Proposed Efficiency = 22.00 SEER, Required Efficiency = 13.00 SEER<br>SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.                | <b>N/A Ductless Splits</b> |
| 35 | 2 Zone Split (Multiple-Zone) : Split System Heat Pump<br>Heating Mode: Capacity = 22 kBtu/h,<br>Proposed Efficiency = 9.80 HSPF, Required Efficiency = 7.70 HSPF<br>Cooling Mode: Capacity = 18 kBtu/h, , No Economizer , Economizer exception: None<br>Proposed Efficiency = 17.00 SEER, Required Efficiency = 13.00 SEER<br>SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.                             | <b>N/A Ductless Splits</b> |
| 10 | 3 Zone Multi Split (Multiple-Zone) : Split System Heat Pump<br>Heating Mode: Capacity = 28 kBtu/h,<br>Proposed Efficiency = 11.00 HSPF, Required Efficiency = 7.70 HSPF<br>Cooling Mode: Capacity = 28 kBtu/h, , No Economizer , Economizer exception: None<br>Proposed Efficiency = 18.00 SEER, Required Efficiency = 13.00 SEER<br>SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.                      | <b>N/A Ductless Splits</b> |
| 1  | Corridor Multi Split (Multiple-Zone) : Split System Heat Pump<br>Heating Mode: Capacity = 45 kBtu/h,<br>Proposed Efficiency = 11.30 HSPF, Required Efficiency = 7.70 HSPF<br>Cooling Mode: Capacity = 36 kBtu/h, , No Economizer , Economizer exception: None<br>Proposed Efficiency = 19.10 SEER, Required Efficiency = 13.00 SEER<br>SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.                    | <b>N/A Ductless Splits</b> |
| 1  | Commercial 2 (Multiple-Zone) : Split System Heat Pump<br>Heating Mode: Capacity = 54 kBtu/h,<br>Proposed Efficiency = 11.00 HSPF, Required Efficiency = 7.70 HSPF<br>Cooling Mode: Capacity = 48 kBtu/h, , No Economizer , Economizer exception: None<br>Proposed Efficiency = 18.90 SEER, Required Efficiency = 13.00 SEER<br>Fan System: Unspecified<br>SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. | <b>N/A Ductless Splits</b> |

- 54 ERV (Unknown) :  
 Heating: 1 each - Other, Unknown, Capacity Unknown  
 No minimum efficiency requirement applies  
 Cooling: 1 each - Other, Capacity Unknown, Air Economizer  
 No minimum efficiency requirement applies  
 Fan System: Unspecified
- 56 Water Heater:  
 Electric Storage Water Heater, Capacity: 40 gallons  
 Proposed Efficiency: 0.95 EF, Required Efficiency: 0.88 EF

## Section 4: Requirements Checklist

### Requirements Specific To: Single Zone Ductless Split :

- 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- 2. Integrated economizer is required for this location and system. *N/A Ductless Split*

### Requirements Specific To: 2 Zone Split :

- 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- 2. Minimum one temperature control device per zone
- 3. Integrated economizer is required for this location and system. *N/A Ductless Split*
- 4. Systems serving more than one zone must be VAV systems
- 5. Controls capable of resetting supply air temp (SAT) by 25% of SAT-room temp difference  
*Exception(s):*
  - Systems that prevent reheating, recooling or mixing of heated and cooled supply air
  - Seventy five percent of the energy for reheating is from site-recovered or site solar energy sources.
  - Zones with peak supply air quantities of 300 cfm (142 L/s) or less.
- 6. VAV fans with static pressure sensors are placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure. If placement results in the sensor being located downstream of major duct splits, multiple sensors are installed in each major branch.  
*Exception(s):*
  - Systems with DDC of individual zone boxes reporting to the central control panel and reset of static pressure setpoint based on the zone requiring the most pressure.
- 7. Systems with DDC of individual zone boxes reporting to the central control panel has static pressure setpoint reset based on the zone requiring the most pressure.

### Requirements Specific To: 3 Zone Multi Split :

- 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- 2. Minimum one temperature control device per zone
- 3. Integrated economizer is required for this location and system. *N/A Ductless Split*
- 4. Systems serving more than one zone must be VAV systems
- 5. Controls capable of resetting supply air temp (SAT) by 25% of SAT-room temp difference  
*Exception(s):*
  - Systems that prevent reheating, recooling or mixing of heated and cooled supply air
  - Seventy five percent of the energy for reheating is from site-recovered or site solar energy sources.
  - Zones with peak supply air quantities of 300 cfm (142 L/s) or less.
- 6. VAV fans with static pressure sensors are placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure. If placement results in the sensor being located downstream of major duct splits, multiple sensors are installed in each major branch.  
*Exception(s):*
  - Systems with DDC of individual zone boxes reporting to the central control panel and reset of static pressure setpoint based on the zone requiring the most pressure.
- 7. Systems with DDC of individual zone boxes reporting to the central control panel has static pressure setpoint reset based on the zone requiring the most pressure.

### Requirements Specific To: Corridor Multi Split :

- 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- 2. Minimum one temperature control device per zone
- 3. Integrated economizer is required for this location and system. *N/A Ductless Split*
- 4. Systems serving more than one zone must be VAV systems
- 5. Controls capable of resetting supply air temp (SAT) by 25% of SAT-room temp difference

~~Exception(s):~~

- Systems that prevent reheating, recooling or mixing of heated and cooled supply air
- Seventy five percent of the energy for reheating is from site-recovered or site solar energy sources.
- Zones with peak supply air quantities of 300 cfm (142 L/s) or less.
- 6. VAV fans with static pressure sensors are placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure. If placement results in the sensor being located downstream of major duct splits, multiple sensors are installed in each major branch.  
~~Exception(s):~~
  - Systems with DDC of individual zone boxes reporting to the central control panel and reset of static pressure setpoint based on the zone requiring the most pressure.
- 7. Systems with DDC of individual zone boxes reporting to the central control panel has static pressure setpoint reset based on the zone requiring the most pressure.

**Requirements Specific To: Commercial 2 :**

- 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER
- 2. Minimum one temperature control device per zone
- 3. Integrated economizer is required for this location and system. *N/A Ductless Split*
- 4. Systems serving more than one zone must be VAV systems
- 5. Controls capable of resetting supply air temp (SAT) by 25% of SAT-room temp difference  
~~Exception(s):~~
  - Systems that prevent reheating, recooling or mixing of heated and cooled supply air
  - Seventy five percent of the energy for reheating is from site-recovered or site solar energy sources.
  - Zones with peak supply air quantities of 300 cfm (142 L/s) or less.
- 6. VAV fans with static pressure sensors are placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure. If placement results in the sensor being located downstream of major duct splits, multiple sensors are installed in each major branch.  
~~Exception(s):~~
  - Systems with DDC of individual zone boxes reporting to the central control panel and reset of static pressure setpoint based on the zone requiring the most pressure.
- 7. Systems with DDC of individual zone boxes reporting to the central control panel has static pressure setpoint reset based on the zone requiring the most pressure.

**Requirements Specific To: ERV :**

- 1. Integrated economizer is required for this location and system. *ERV is for Bath exhaust and Makeup.*
- 2. Cooling system provides a means to relieve excess outdoor air during economizer operation.

**Requirements Specific To: Water Heater :**

- 1. Water heating equipment meets minimum efficiency requirements: Electric Water Heater efficiency: 0.88 EF (241 SL, Btu/h (if > 12 kW))
- 2. First 8 ft of outlet piping is insulated
- 3. Hot water storage temperature controls that allow setpoint of 90°F for non-dwelling units and 110°F for dwelling units.
- 4. Heat traps provided on inlet and outlet of storage tanks

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

- 1. Plant equipment and system capacity no greater than needed to meet loads  
~~Exception(s):~~
  - Standby equipment automatically off when primary system is operating
  - Multiple units controlled to sequence operation as a function of load
- 2. Minimum one temperature control device per system
- 3. Minimum one humidity control device per installed humidification/dehumidification system *NA*
- 4. Load calculations per ASHRAE/ACCA Standard 183.
- 5. Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup  
~~Exception(s):~~
  - Continuously operating zones
- 6. Outside-air source for ventilation; system capable of reducing OSA to required minimum *NA ERV*
- 7. R-5 supply and return air duct insulation in unconditioned spaces  
R-8 supply and return air duct insulation outside the building  
R-8 insulation between ducts and the building exterior when ducts are part of a building assembly  
~~Exception(s):~~
  - Ducts located within equipment
  - Ducts with interior and exterior temperature difference not exceeding 15°F.

- 8. Mechanical fasteners and sealants used to connect ducts and air distribution equipment
- 9. Ducts sealed - longitudinal seams on rigid ducts; transverse seams on all ducts; UL 181A or 181B tapes and mastics
- 10. Hot water pipe insulation: 1.5 in. for pipes <=1.5 in. and 2 in. for pipes >1.5 in.  
 Chilled water/refrigerant/brine pipe insulation: 1.5 in. for pipes <=1.5 in. and 1.5 in. for pipes >1.5 in. *N/A*  
 Steam pipe insulation: 1.5 in. for pipes <=1.5 in. and 3 in. for pipes >1.5 in.  
 Exception(s):
  - Piping within HVAC equipment.
  - Fluid temperatures between 55 and 105°F.
  - Fluid not heated or cooled with renewable energy.
  - Piping within room fan-coil (with AHRI440 rating) and unit ventilators (with AHRI840 rating).
  - Runouts <4 ft in length.
- 11. Operation and maintenance manual provided to building owner
- 12. Thermostatic controls have 5°F deadband  
 Exception(s):
  - Thermostats requiring manual changeover between heating and cooling
  - Special occupancy or special applications where wide temperature ranges are not acceptable and are approved by the authority having jurisdiction.
- 13. Balancing devices provided in accordance with IMC 603.17
- 14. Demand control ventilation (DCV) present for high design occupancy areas (>40 person/1000 ft<sup>2</sup> in spaces >500 ft<sup>2</sup>) and served by systems with any one of 1) an air-side economizer, 2) automatic modulating control of the outdoor air damper, or 3) a design outdoor airflow greater than 3000 cfm.  
 Exception(s):
  - Systems with heat recovery.
  - Multiple-zone systems without DDC of individual zones communicating with a central control panel.
  - Systems with a design outdoor airflow less than 1200 cfm.
  - Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.
- 15. Total cooling capacity without economizers must be less than 480 kBtu/h. This project lists 1144 kBtu/h capacity without economizers.
- 16. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings  
 Exception(s):
  - Gravity dampers acceptable in buildings <3 stories
- 17. Automatic controls for freeze protection systems present
- 18. Exhaust air heat recovery included for systems 5,000 cfm or greater with more than 70% outside air fraction or specifically exempted  
 Exception(s):
  - Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems.
  - Systems serving spaces that are heated and not cooled to less than 60°F.
  - Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.
  - Heating systems in climates with less than 3600 HDD.
  - Cooling systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F.
  - Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
  - Laboratory fume hood exhaust systems that have either a variable air volume system capable of reducing exhaust and makeup air volume to 50 percent or less of design values or, a separate make up air supply meeting the following makeup air requirements:
    - a) at least 75 percent of exhaust flow rate, b) heated to no more than 2°F below room setpoint temperature, c) cooled to no lower than 3°F above room setpoint temperature, d) no humidification added, e) no simultaneous heating and cooling.

## 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 2009 IECC requirements in COMcheck-Web and to comply with the mandatory requirements in the Requirements Checklist.

Wesley P. Sirois, PE  
Name - Title

Wesley P. Sirois  
Signature

10-23-15  
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.

\_\_\_\_\_  
Principal Mechanical Designer-Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date