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Mechanical Compliance Certificate

Section 1: Project Information

Energy Code: **2009 IECC**
Project Title: 667 Congress Street Apartments
Project Type: New Construction

Construction Site:
667 Congress Street
Portland, Maine 04101

Owner/Agent:
Jonathan Culley
Redfern LWS, LLC
PO Box 8816
Portland, Maine 04101
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Designer/Contractor:
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Ryan Senatore Architecture, LLC
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Gorham, Maine 04038
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Section 2: General Information

Building Location (for weather data):	Portland, Maine
Climate Zone:	6a

Section 3: Mechanical Systems List

Quantity	System Type & Description
27	Single Zone Ductless Split (Single Zone) (Single Zone) : Split System Heat Pump Heating Mode: Capacity = 13600 kBtu/h, Proposed Efficiency = 6.88 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 12000 kBtu/h, , No Economizer , Economizer exception: None Proposed Efficiency = 23.49 EER, Required Efficiency = 9.50 EER SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
104	2 Zone Split (Multiple Zone) (Multiple-Zone) : Split System Heat Pump Heating Mode: Capacity = 25000 kBtu/h, Proposed Efficiency = 3.95 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 23600 kBtu/h, , No Economizer , Economizer exception: None Proposed Efficiency = 13.50 EER, Required Efficiency = 9.50 EER SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. N/A Ductless Splits
8	3 Zone Split (Multiple Zone) (Multiple-Zone) : Split System Heat Pump Heating Mode: Capacity = 28600 kBtu/h, Proposed Efficiency = 3.66 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 28400 kBtu/h, , No Economizer , Economizer exception: None Proposed Efficiency = 12.50 EER, Required Efficiency = 9.50 EER SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. N/A Ductless Splits
2	Commerical & Fitness (Multiple Zone) (Multiple-Zone) : Split System Heat Pump Heating Mode: Capacity = 54000 kBtu/h, Proposed Efficiency = 3.51 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 48000 kBtu/h, , No Economizer , Economizer exception: None Proposed Efficiency = 12.00 EER, Required Efficiency = 9.50 EER SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. N/A Ductless Splits
1	Lobby (Muliple Zone) (Multiple-Zone) : Split System Heat Pump Heating Mode: Capacity = 45000 kBtu/h, Proposed Efficiency = 4.10 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 36000 kBtu/h, , No Economizer , Economizer exception: None Proposed Efficiency = 14.00 EER, Required Efficiency = 9.50 EER SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. N/A Ductless Splits
1	Lounge & Mgt Office (Mulitple Zone) (Multiple-Zone) : Split System Heat Pump Heating Mode: Capacity = 48000 kBtu/h, Proposed Efficiency = 3.92 COP, Required Efficiency = 3.20 COP

Cooling Mode: Capacity = 42000 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 13.40 EER, Required Efficiency = 9.50 EER
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met. N/A Ductless Splits

1 MUA-1 (Unknown) :
Heating: 1 each - Other, Gas, Capacity = 200 kBtu/h
No minimum efficiency requirement applies

2 MUA-2 & 3 (Unknown) :
Heating: 2 each - Other, Gas, Capacity = 120 kBtu/h
No minimum efficiency requirement applies

1 ERV-1 (Unknown) :
Heating: 146 each - Other, Electric, Capacity Unknown
No minimum efficiency requirement applies

1 Boiler (Unknown) :
Heating: 1 each - Central Furnace, Electric, Capacity = 160 kBtu/h
No minimum efficiency requirement applies

139 Water Heater:
Electric Storage Water Heater, Capacity: 40 gallons
Proposed Efficiency: 0.95 EF, Required Efficiency: 0.88 EF

6 Water Heater:
Electric Storage Water Heater, Capacity: 20 gallons
No minimum efficiency requirement applies

Section 4: Requirements Checklist

Requirements Specific To: Single Zone Ductless Split (Single Zone) :

- [x] 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
- [x] 2. Discharge dampers prohibited with fan motors > 25 hp
- [x] 3. Integrated economizer is required for this location and system. N/A Ductless Splits

Requirements Specific To: 2 Zone Split (Multiple Zone) :

- [x] 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
- [x] 2. Minimum one temperature control device per zone
- [x] 3. Integrated economizer is required for this location and system. N/A Ductless Splits
- [ ] ~~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 Split (Multiple Zone) :

- [x] 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
- [x] 2. Minimum one temperature control device per zone
- [x] 3. Integrated economizer is required for this location and system. N/A Ductless Splits
- [ ] ~~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: Commerical & Fitness (Multiple Zone) :

☑ 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
☑ 2. Minimum one temperature control device per zone
☑ 3. Integrated economizer is required for this location and system. N/A Ductless Splits
☐ ~~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: Lobby (Muliple Zone) :

☑ 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
☑ 2. Minimum one temperature control device per zone
☑ 3. Integrated economizer is required for this location and system. N/A Ductless Splits
☐ ~~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: Lounge & Mgt Office (Mulitple Zone) :

☑ 1. Equipment minimum efficiency: Heat Pump: 3.20 COP 9.50 EER (9.2 IPLV)
☑ 2. Minimum one temperature control device per zone
☑ 3. Integrated economizer is required for this location and system. N/A Ductless Splits
☐ ~~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: MUA-1 : Make-Up Air

None

Requirements Specific To: MUA-2 & 3 : Make-Up Air

None

Requirements Specific To: ERV-1 : ERV is for bath exhaust & Make-Up Air

None

Requirements Specific To: Boiler :

- ☑ 1. Newly purchased equipment meets the efficiency requirements

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

Requirements Specific To: Water Heater :

- ☑ 1. Water heating equipment meets minimum efficiency requirements: No efficiency requirements for water heater with storage capacity less than 20 gallons.
- ☑ 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 N/A
- ☑ 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 N/A
- ☑ 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.
  Steam pipe insulation: 1.5 in. for pipes <=1.5 in. and 3 in. for pipes >1.5 in.
  Exception(s): N/A
  - ☐ 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. Balancing devices provided in accordance with IMC 603.17
- ☑ 13. Demand control ventilation (DCV) present for high design occupancy areas (>40 person/1000 ft2 in spaces >500 ft2) 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.

■ 14. Total cooling capacity without economizers must be less than 480 kBtu/h. This project lists 3179600 kBtu/h capacity without economizers.

■ 15. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings
Exception(s):

- ❑ Gravity dampers acceptable in buildings <3 stories

■ 16. Automatic controls for freeze protection systems present

■ 17. 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 COM*check-Web* and to comply with the mandatory requirements in the Requirements Checklist.

Aaron St Pierre, President	Aaron St Pierre cn=Aaron St Pierre, o=Ranor Mechanical, ou, email=aaron@ranormech.com, c=US 2016.05.13 08:35:06 -04'00'	
Name - Title	Signature	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