



COMcheck Software Version 3.9.2

Envelope Compliance Certificate



Reviewed for Code Compliance

Inspections Division

Approved with Conditions

Date: 05/16/14

2009 IECC

Section 1: Project Information

Project Type: **New Construction**

Project Title : 118 On Monjoy Hill

Construction Site:
118 Congress Street
Portland, ME 04101

Owner/Agent:

Designer/Contractor:

Section 2: General Information

Building Location (for weather data): **Portland, Maine**
Climate Zone: **6a**
Building Space Conditioning Type(s): **Nonresidential, Residential**
Vertical Glazing / Wall Area Pct.: **39%**

<u>Activity Type(s)</u>	<u>Floor Area</u>
Multifamily	26266
Retail	2528
Parking Garage	6396

Section 3: Requirements Checklist

Envelope PASSES: Design 15% better than code.

Climate-Specific Requirements:

Component Name/Description	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor ^(a)
Roof 1: Insulation Entirely Above Deck, Residential	8820	---	50.7	0.019	0.048
Exterior Wall 1: Steel-Framed, 16" o.c., Residential	18437	19.0	12.5	0.046	0.057
Window 1: Metal Frame with Thermal Break:Double Pane with Low-E, Clear, SHGC 0.32, Residential	7125	---	---	0.350	0.550
Door 1: Glass (> 50% glazing):Metal Frame, Entrance Door, SHGC 0.50, Residential	42	---	---	0.200	0.800
Exterior Wall 2: Steel-Framed, 16" o.c., Nonresidential	1778	19.0	12.5	0.046	0.064
Window 2: Metal Frame with Thermal Break:Double Pane with Low-E, Clear, SHGC 0.32, Nonresidential	734	---	---	0.350	0.550
Door 2: Glass (> 50% glazing):Metal Frame, Entrance Door, SHGC 0.50, Nonresidential	42	---	---	0.200	0.800
Floor 1: Concrete Floor (over unconditioned space), Residential	6396	---	44.4	0.021	0.057
Floor 2: Slab-On-Grade:Unheated, Horizontal with vertical 4 ft., Nonresidential	442	---	7.2	---	---

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.

Air Leakage, Component Certification, and Vapor Retarder Requirements:

- q 1. All joints and penetrations are caulked, gasketed or covered with a moisture vapor-permeable wrapping material installed in accordance with the manufacturer's installation instructions.
- q 2. Windows, doors, and skylights certified as meeting leakage requirements.
- q 3. Component R-values & U-factors labeled as certified.
- q 4. No roof insulation is installed on a suspended ceiling with removable ceiling panels.



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- ☐ 5. 'Other' components have supporting documentation for proposed U-Factors.
- ☐ 6. Insulation installed according to manufacturer's instructions, in substantial contact with the surface being insulated, and in a achieves the rated R-value without compressing the insulation.
- ☐ 7. Stair, elevator shaft vents, and other outdoor air intake and exhaust openings in the building envelope are equipped with moisture dampers.
- ☐ 8. Cargo doors and loading dock doors are weather sealed.
- ☐ 9. Recessed lighting fixtures installed in the building envelope are Type IC rated as meeting ASTM E283, are sealed with gasket or caulk.
- ☐ 10. Building entrance doors have a vestibule equipped with self-closing devices.

Exceptions:

- ☐ Building entrances with revolving doors.
- ☐ Doors not intended to be used as a building entrance.
- ☐ Doors that open directly from a space less than 3000 sq. ft. in area.
- ☐ Doors used primarily to facilitate vehicular movement or materials handling and adjacent personnel doors.
- ☐ Doors opening directly from a sleeping/dwelling unit.

Section 4: Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed envelope system has been designed to meet the 2009 IECC requirements in COMcheck Version 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

KURT MAGNUSSON, P.E.
Name - Title

[Signature]
Signature

5/7/14
Date



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Climate Zone:

Portland, Maine
6a

Section 3: Mechanical Systems List

Quantity System Type & Description

- 30 HVAC System 1 (Single Zone) : Split System Heat Pump
Heating Mode: Capacity = 28 kBtu/h,
Proposed Efficiency = 9.20 HSPF, Required Efficiency = 7.70 HSPF
Cooling Mode: Capacity = 26 kBtu/h,
Proposed Efficiency = 17.80 SEER, Required Efficiency = 13.00 SEER
Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes
Fans:
FAN 1 Supply, Constant Volume, 746 CFM, 0 motor nameplate hp
- 12 Plant 1:
Heating: Hot Water Boiler, Capacity 50 kBtu/h, Gas
No minimum efficiency requirement applies
- 12 Water Heater 1:
Gas Storage Water Heater, Capacity: 60 gallons, Input Rating: 100 Btu/h
Proposed Efficiency: 93.50 % Et, Required Efficiency: 80.00 % Et

Section 4: Requirements Checklist

Requirements Specific To: HVAC System 1 :

- q 1. Equipment minimum efficiency: Heat Pump: 7.70 HSPF 13.00 SEER

Requirements Specific To: Plant 1 :

- q 1. Newly purchased heating equipment meets the heating efficiency requirements
- q 2. Two-pipe changeover heating/cooling controls must have:
 - a) 15 degrees F deadband where boiler and chiller can not operate,
 - b) allow operation in either heating or cooling for at least 4 hrs. and
 - c) prevent difference between heating and cooling set points greater than 30 degrees F*Exception(s):*
 - q Air/evap condenser and extensive outside-air filtration
- q 3. Systems with multiple boilers have automatic controls capable of sequencing boiler operation

Requirements Specific To: Water Heater 1 :

- q 1. Water heating equipment meets minimum efficiency requirements: Gas Storage Water Heater efficiency: 80.00 % Et (139 SL, kBtu/h)
- q 2. First 8 ft of outlet piping is insulated



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- q 3. Hot water storage temperature controls that allow setpoint of 90°F for non-dwelling units and 110°F for dwelling units.
- q 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:

- q 1. Plant equipment and system capacity no greater than needed to meet loads
 - Exception(s):
 - q Standby equipment automatically off when primary system is operating
 - q Multiple units controlled to sequence operation as a function of load
- q 2. Minimum one temperature control device per system
- q 3. Minimum one humidity control device per installed humidification/dehumidification system
- q 4. Load calculations per ASHRAE/ACCA Standard 183.
- q 5. Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup
 - Exception(s):
 - q Continuously operating zones
- q 6. Outside-air source for ventilation; system capable of reducing OSA to required minimum
- q 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):
 - q Ducts located within equipment
 - q Ducts with interior and exterior temperature difference not exceeding 15°F.
- q 8. Mechanical fasteners and sealants used to connect ducts and air distribution equipment
- q 9. Ducts sealed - longitudinal seams on rigid ducts; transverse seams on all ducts; UL 181A or 181B tapes and mastics
- q 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):
 - q Piping within HVAC equipment.
 - q Fluid temperatures between 55 and 105°F.
 - q Fluid not heated or cooled with renewable energy.
 - q Piping within room fan-coil (with AHRI440 rating) and unit ventilators (with AHRI840 rating).
 - q Runouts <4 ft in length.
- q 11. Operation and maintenance manual provided to building owner
- q 12. Balancing devices provided in accordance with IMC (2006) 603.17
- q 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):
 - q Systems with heat recovery.
 - q Multiple-zone systems without DDC of individual zones communicating with a central control panel.
 - q Systems with a design outdoor airflow less than 1200 cfm.
 - q Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.
- q 14. Total cooling capacity without economizers must be less than 480 kBtu/h. This project lists 780 kBtu/h capacity without economizers.
- q 15. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings
 - Exception(s):
 - q Gravity dampers acceptable in buildings <3 stories
- q 16. Automatic controls for freeze protection systems present
- q 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):
 - q Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems.
 - q Systems serving spaces that are heated and not cooled to less than 60°F.
 - q Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.
 - q Heating systems in climates with less than 3600 HDD.
 - q Cooling systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F.
 - q Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
 - q 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 than 3°F above room setpoint temperature, d) no humidification added, e) no simultaneous heating and cooling.



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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 Version 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

KURT MAGNUSSON, P.E.
Name - Title

[Signature]
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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