



COMcheck Software Version 4.0.2.2

# Interior Lighting Compliance Certificate

## Section 1: Project Information

Energy Code: **2009 IECC**  
 Project Title: Park Danforth  
 Project Type: New Construction

Construction Site:  
 777 Stevens Ave  
 Portland, ME 04103

Owner/Agent:  
 Park Danforth

Designer/Contractor:  
 Lavallee Brensinger

## Section 2: Interior Lighting and Power Calculation

A Area Category	B Floor Area (ft <sup>2</sup> )	C Allowed Watts / ft <sup>2</sup>	D Allowed Watts (B x C)
Multifamily	77875	0.7	54513
Connector (Office)	5544	1	5544
Parking Garage	17550	0.3	5265
Total Allowed Watts =			65322

## Section 3: Interior Lighting Fixture Schedule

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
<b>Multifamily (77875 sq.ft.)</b>				
VL2A: LED Linear 17W:	4	8	68	544
R5C: Other:	1	4	25	100
CM1: Other:	1	11	46.5	511.5
CM1A: Other:	1	17	23	391
R4: Other:	1	38	7.7	292.6
R2A: Other:	1	27	34.6	934.2
R2: Other:	1	30	39.4	1182
CM4: Other:	1	110	50	5500
R1A: Other:	1	52	13.4	696.8
WS6A: LED PAR 17W:	1	10	17	170
R11: Other:	1	3	3	9
WS8: LED Linear 33W:	1	30	32	960
CM2: Other:	1	2	24	48
R1: Other:	1	49	13.4	656.6
CM3: Other:	1	6	83.5	501
R4A: Other:	1	15	14.4	216
CM11: Other:	1	61	22	1342
CM12: Other:	1	55	22	1210
CM13: Other:	1	60	14	840
CM14: Other:	1	56	24	1344
R13: Other:	1	60	12	720
R3: Other:	1	244	17	4148
UC1 - LINEAR FOOT: Other:	1	379	6	2274
VL1: Incandescent 100W:	4	60	400	24000
WS9: Quad 4-pin 18W: Electronic:	1	56	18	1008
<b>Connector ( Office 5544 sq.ft.)</b>				
CL1: Other:	1	309	9	2781

CM1A: Other:	1	4	23	92
R1A: Other:	1	54	13.4	723.6
WS6A: LED PAR 17W:	1	5	17	85
R3: Other:	1	4	16.4	65.6
VL2A: LED Linear 17W:	4	1	68	68
P6: Other:	1	2	120	240
R4: Other:	1	8	7.7	61.6
R2A: Other:	1	7	34.6	242.2
R2: Other:	1	6	39.4	236.4
WS8: LED Linear 33W:	1	2	32	64
M2: Other:	1	1	238	238
R8 - 12': Other:	1	2	28	56
CM2: Other:	1	1	24	24
CM1: Other:	1	3	46.5	139.5
R4A: Other:	1	16	14.4	230.4
CM5A: Other:	1	4	75	300
<b>Parking Garage (17550 sq.ft.)</b>				
PG: Other:	1	24	107.8	2587.2
F1: 48" T8 32W: Electronic:	2	10	60	600
F1A: 48" T8 32W (Super T8): Electronic:	4	20	118	2360
WS8: LED Linear 33W:	1	4	32	128
W1: Other:	1	8	14	112
CM3: Other:	1	2	83.5	167
Total Proposed Watts = 61200				

## Section 4: Requirements Checklist

**Interior Lighting PASSES:** Design 6% better than code.

### Lighting Wattage:

1. Total proposed watts must be less than or equal to total allowed watts.

Allowed Watts	Proposed Watts	Complies
65322	61200	YES

### Controls, Switching, and Wiring:

2. Daylight zones under skylights more than 15 feet from the perimeter have lighting controls separate from daylight zones adjacent to vertical fenestration.
3. Daylight zones have individual lighting controls independent from that of the general area lighting.

#### Exceptions:

- Contiguous daylight zones spanning no more than two orientations are allowed to be controlled by a single controlling device.
- Daylight spaces enclosed by walls or ceiling height partitions and containing two or fewer light fixtures are not required to have a separate switch for general area lighting.

4. Independent controls for each space (switch/occupancy sensor).

#### Exceptions:

- Areas designated as security or emergency areas that must be continuously illuminated.
- Lighting in stairways or corridors that are elements of the means of egress.

5. Master switch at entry to hotel/motel guest room.
6. Individual dwelling units separately metered.
7. Medical task lighting or art/history display lighting claimed to be exempt from compliance has a control device independent of the control of the nonexempt lighting.
8. Each space required to have a manual control also allows for reducing the connected lighting load by at least 50 percent by either controlling all luminaires, dual switching of alternate rows of luminaires, alternate luminaires, or alternate lamps, switching the middle lamp luminaires independently of other lamps, or switching each luminaire or each lamp.

#### Exceptions:

- Only one luminaire in space.
- An occupant-sensing device controls the area.
- The area is a corridor, storeroom, restroom, public lobby or sleeping unit.

Areas that use less than 0.6 Watts/sq.ft.

9. Automatic lighting shutoff control in buildings larger than 5,000 sq.ft.

*Exceptions:*

Sleeping units, patient care areas; and spaces where automatic shutoff would endanger safety or security.

10. Photocell/astronomical time switch on exterior lights.

*Exceptions:*

Lighting intended for 24 hour use.

11. Tandem wired one-lamp and three-lamp ballasted luminaires (No single-lamp ballasts).

*Exceptions:*

Electronic high-frequency ballasts; Luminaires on emergency circuits or with no available pair.

## Section 5: Compliance Statement

*Compliance Statement:* The proposed lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2009 IECC requirements in COMcheck Version 4.0.2.2 and to comply with the mandatory requirements in the Requirements Checklist.

Stephen Markiewicz, Senior Electrical Designer

Name - Title

Signature

Date



# Mechanical Compliance Certificate

## Section 1: Project Information

Energy Code: **2009 IECC**  
Project Title: Park Danforth  
Project Type: New Construction

Construction Site:  
777 Stevens Ave  
Portland, ME 04103

Owner/Agent:  
Park Danforth

Designer/Contractor:  
Lavallee Brensinger

## Section 2: General Information

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

## Section 3: Mechanical Systems List

### Quantity System Type & Description

- 1 ERU-A (Single Zone) :  
Heating: 1 each - Central Furnace, Gas, Capacity = 400 kBtu/h  
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 227 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 14.60 EER, Required Efficiency = 10.80 EER  
Fan System: ERU-A | apartments -- Compliance (Brake HP method) : Passes
- Fans:  
FAN 1 Supply, Constant Volume, 7200 CFM, 7.5 motor nameplate hp, 5.8 brake hp  
FAN 33 Exhaust, Constant Volume, 6700 CFM, 5.0 motor nameplate hp, 2.4 brake hp  
Pressure Drop Credits:  
Fully ducted return and/or exhaust air systems, 0.8109 credit  
Heat recovery device, 0.8715 credit  
Exhaust filters, scrubbers, or other exhaust treatment, 0.1460 credit
- 53 AC-1 - typ 1BR apartment (Single Zone) :  
Cooling: 53 each - Split System, Capacity = 9 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 19.30 SEER, Required Efficiency = 13.00 SEER  
Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes
- Fans:  
FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp
- 1 RTU-1 (Single Zone) :  
Heating: 1 each - Duct Furnace, Gas, Capacity = 128 kBtu/h  
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec  
Cooling: 1 each - Single Package DX Unit, Capacity = 76 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 11.30 EER, Required Efficiency = 11.00 EER  
Fan System: RTU-1 | Auditorium -- Compliance (Motor nameplate HP method) : Passes
- Fans:  
FAN 29 Supply, Single-Zone VAV, 2700 CFM, 4.0 motor nameplate hp
- 4 AC-2 - typ 2BR apartment (Single Zone) :  
Cooling: 4 each - Split System, Capacity = 12 kBtu/h, Air-Cooled Condenser, Air Economizer  
Proposed Efficiency = 19.30 SEER, Required Efficiency = 13.00 SEER  
Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes
- Fans:  
FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp
- 1 AC-2 - typ 2BR apartment copy 1 (Single Zone) :

Cooling: 1 each - Split System, Capacity = 12 kBtu/h, Air-Cooled Condenser, No Economizer, Economizer exception: None

Proposed Efficiency = 19.30 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

1 AC-E - elev mach rooms (Single Zone) :

Cooling: 1 each - Split System, Capacity = 30 kBtu/h, Air-Cooled Condenser, No Economizer, Economizer exception: None

Proposed Efficiency = 19.30 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

1 AC-D equip. 132A (Single Zone) :

Cooling: 1 each - Split System, Capacity = 24 kBtu/h, Air-Cooled Condenser, No Economizer, Economizer exception: None

Proposed Efficiency = 20.00 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

1 ERU-B (Single Zone) :

Heating: 1 each - Central Furnace, Gas, Capacity = 160 kBtu/h

Proposed Efficiency = 80.00% Et, Required Efficiency = 80.00% Et

Cooling: 1 each - Single Package DX Unit, Capacity = 91 kBtu/h, Air-Cooled Condenser, Air Economizer

Proposed Efficiency = 15.10 EER, Required Efficiency = 11.00 EER

Fan System: ERU-B -- Compliance (Brake HP method) : Passes

Fans:

FAN 34 Supply, Constant Volume, 3000 CFM, 5.0 motor nameplate hp, 2.4 brake hp

FAN 35 Exhaust, Constant Volume, 2500 CFM, 2.0 motor nameplate hp, 1.6 brake hp

Pressure Drop Credits:

Fully ducted return and/or exhaust air systems, 0.3026 credit

Exhaust filters, scrubbers, or other exhaust treatment, 0.0303 credit

Heat recovery device, 0.3631 credit

1 1.5 ton multi split (Single Zone) :

Cooling: 1 each - Split System, Capacity = 18 kBtu/h, Air-Cooled Condenser, Air Economizer

Proposed Efficiency = 19.50 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

2 2 ton multi split (Single Zone) :

Cooling: 2 each - Split System, Capacity = 24 kBtu/h, Air-Cooled Condenser, Air Economizer

Proposed Efficiency = 16.60 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

11 2.5 ton multi split (Single Zone) :

Cooling: 11 each - Split System, Capacity = 32 kBtu/h, Air-Cooled Condenser, Air Economizer

Proposed Efficiency = 17.20 SEER, Required Efficiency = 13.00 SEER

Fan System: Ductless Split | various -- Compliance (Brake HP method) : Passes

Fans:

FAN 28 Supply, Constant Volume, 790 CFM, 0.1 motor nameplate hp, 0.0 brake hp

1 Boiler Plant:

Heating: Hot Water Boiler, Capacity 3234 kBtu/h, Gas

Proposed Efficiency: 95.00 % Ec, Required Efficiency: 80.00 % Ec

1 Water Heater 2:

Gas Storage Water Heater, Capacity: 238 gallons, Input Rating: 343 Btu/h w/ Circulation Pump

Proposed Efficiency: 80.00 % Et, Required Efficiency: 80.00 % Et

## Section 4: Requirements Checklist

**Requirements Specific To: ERU-A :**

- 1. Equipment minimum efficiency: Central Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Single Package Unit: 10.80 EER
- 3. Integrated economizer is required for this location and system.
- 4. Cooling system provides a means to relieve excess outdoor air during economizer operation.
- 5. Hot gas bypass prohibited unless system has multiple steps of unloading or continuous capacity modulation
- 6. Hot gas bypass limited to 50% of total cooling capacity

**Requirements Specific To: AC-1 - typ 1BR apartment :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: RTU-1 :**

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Single Package Unit: 11.00 EER
- 3. Integrated economizer is required for this location and system.
- 4. Cooling system provides a means to relieve excess outdoor air during economizer operation.

**Requirements Specific To: AC-2 - typ 2BR apartment :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: AC-2 - typ 2BR apartment copy 1 :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: AC-E - elev mach rooms :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: AC-D equip. 132A :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: ERU-B :**

- 1. Equipment minimum efficiency: Central Furnace (Gas): 80.00 % Et (or 78% AFUE)
- 2. Equipment minimum efficiency: Single Package Unit: 11.00 EER
- 3. Integrated economizer is required for this location and system.
- 4. Cooling system provides a means to relieve excess outdoor air during economizer operation.
- 5. Hot gas bypass prohibited unless system has multiple steps of unloading or continuous capacity modulation
- 6. Hot gas bypass limited to 50% of total cooling capacity

**Requirements Specific To: 1.5 ton multi split :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: 2 ton multi split :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: 2.5 ton multi split :**

- 1. Equipment minimum efficiency: Split System: 13.00 SEER

**Requirements Specific To: Boiler Plant :**

- 1. Equipment minimum efficiency: Boiler Combustion Efficiency 80% Ec
  - 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):*
- Air/evap condenser and extensive outside-air filtration
- 3. Newly purchased heating equipment meets the efficiency requirements - used equipment must meet 80% Et @ maximum capacity
  - 4. Systems with multiple boilers have automatic controls capable of sequencing boiler operation
  - 5. Hydronic heating systems comprised of a single boiler and >500 kBtu/h input design capacity include either a multistaged or modulating burner

**Requirements Specific To: Water Heater 2 :**

- 1. Water heating equipment meets minimum efficiency requirements: Gas Storage Water Heater efficiency: 80.00 % Et (435 SL, kBtu/h)

- 2. All piping in circulating system insulated
- 3. Hot water storage temperature controls that allow setpoint of 90°F for non-dwelling units and 110°F for dwelling units.
- 4. Automatic time control of heat tapes and recirculating systems present
- 5. Controls will shut off operation of circulating pump between water heater/boiler and storage tanks within 5 minutes after end of heating cycle

**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
- 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
- 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):*
  - 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. Hot water distribution systems >= 300 kBtu/h must have one of the following:
  - a) controls that reset supply water temperature by 25% of supply/return delta T
  - b) mechanical or electrical adjustable-speed pump drive(s)
  - c) two-way valves at all heating coils
  - d) multiple-stage pumps
  - e) other system controls that reduce pump flow by at least 50% based on load
 - calculations required  
*Exception(s):*
  - Where the supply temperature reset controls cannot be implemented without causing improper operation of heating, cooling, humidification, or dehumidification systems.
  - Hydronic systems that use variable flow to reduce pumping energy.
- 14. Balancing devices provided in accordance with IMC 603.17
- 15. 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.
- 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 Version 4.0.2.2 and to comply with the mandatory requirements in the Requirements Checklist.

**Ian A. MacDonald, P.E.**

**11/23/15**

\_\_\_\_\_  
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