THE ORDERING FORCE
ENGINEERING | MANAGEMENT | GENERAL CONTRACTING

Local Law 97 Initial Findings Report

[redacted]

BRONX, NY 10467

March 23rd 2024

Contents

Building Information

Street:	[redacted]
Number:	[redacted]
City:	Bronx
State:	NY
Zip Code:	10467
BIN:	[redacted]
Block:	[redacted]
Lot:	[redacted]
Portfolio Manager Property ID:	TBD
Date of Initial Inspection	March 20, 2024

Property Type:	Multi-Family Housing
Year Built:	1930
Gross Floor Area:	[redacted]
Occupancy:	100%
Floors:	6
Residential Units:	[redacted]
Laundry Hookups:	TBD
Irrigation:	No
Heated Space:	90%
Cooled Space:	80%
Electricity:	Con Edison
Gas:	National Grid
Fuel Oil No. 2:	Marathon
Water:	DEP

Heating System	One-Pipe
Cooling System	Window Units
Domestic Hot Water System	Heat Exchanger
Domestic Hot Water Storage	None

Type of heating system	*Article 321 Prescriptive Energy Conservation Measures ("PECMs")*												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Temp. set points	*Repair leaks*	*Heating system function*	*Radiator temperature controls**	*Piping insulation*	*Water tank insulation*	*Indoor / outdoor temp. sensors**	*Steam traps**	*Master steam system venting**	*Lighting*	*Building envelope*	*Exhaust fan timers*	*Radiant barriers*
One-pipe steam	●	●	●		●	●	●		●	●	●	●	●
Two-pipe steam	●	●	●	●	●	○	●	●	○	●	●	●	●
Hydronic	●	●	●	●	●	●	●			●	●	●	●
Forced air	●		●				●			●	●	●	
Heat pump	●	●	●		●					●	●	●	
Electric resistance	●		●	●						●	●	●	●

PECM 1 – Temperature Set Points

1.1 Background Information

A building should ensure its occupants have ample heating and hot water for domestic use. Nonetheless, supplying excessively heated air and water may lead to discomfort and represents an inefficient energy utilization.

It is necessary to confirm set points for all central heating and hot water equipment. In cases where buildings lack central heating or hot water systems, set points must be verified for:

- 100% of heating and hot water systems serving common areas
- at least 20% of such equipment serving non-common owner areas
- at least 10% of such equipment serving non-common tenant areas Scope does not apply to unitized systems with individual thermostats.

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following: Minimum set points:

- Hot water must generally be delivered at a minimum of 110 °F and a maximum of 140 °F, per the 2022 NYC Plumbing Code.
- Interior temperature minimums for various occupancies generally fall within a range of 50 °F to 75 °F, as listed in BC Section 1204.
- During off-hours, interior temperature minimums may be relaxed per Section C403.4.2 of the 2020 NYC Energy Conservation Code ("NYC ECC").
- Multifamily residential buildings have more detailed mandatory temperature minimums, as listed in Article 8 of the NYC Housing Maintenance Code:
- Between 6 AM and midnight, residential sinks must deliver hot water at a minimum of 120 °F.
- During heating season (October 1 to May 31), minimum interior temperature is 68 °F during the day (6 AM to 10 PM) and 62 °F overnight.
- For steam distribution systems, this requirement may be satisfied by the use of wireless temperature sensors that provide feedback to the boiler or heating system control, provided that such sensors have been installed in a minimum of 25% of dwelling units and are in good working order

1.2 Observed Conditions

The heating at [redacted] is controlled by an existing Heat-Timer System Model EPU-CH Serial Number L03EPUCH607100 AS indicated in Figure 1.2.1. This system controls the flow of heat from the boiler. Refer to Section 7.2 of PECM 7.

The Heat Timer set point for the Indoor Temperature of the building is traditionally set to 70°F as indicated in the Heat Timer Manual for Model EPU-CH.

The Domestic Hot Water set point is indicated by a thermometer after the mixing valve and set by the mixing valve knob. Figure 1.2.2 shows the set point of the Domestic Hot Water. It is currently at 145°F which is above the recommended set temperature for water from a tankless water heater at a maximum limit of 140°F**.**

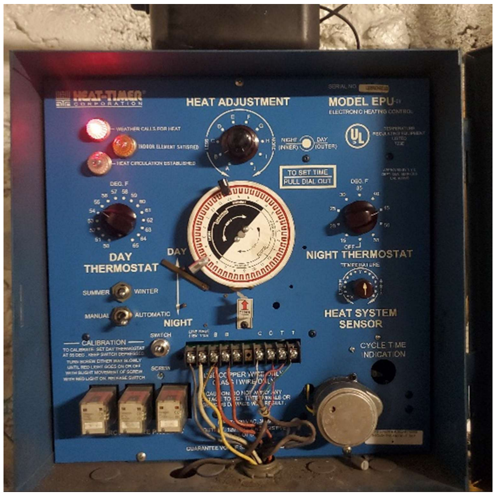


Figure 1.2.1 Heat Timer controls

Figure 1.2.2 Domestic Hot Water Set Point

1.3 Required Implementation

Hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range best to have a set temperature of 140 °F.

An upgrade of the Heat Timer system is best implemented but not required for accessibility to view the set point temperature of the building.

1.4 Verification of Implementation

PECM 2 – Repair Leaks

2.1 Background Information

Incorporating leak detection and repair into routine system maintenance is crucial due to the adverse effects of leaks (water, steam, oil, and/or refrigerant), which can lead to a domino effect of issues. These include decreased efficiency in heating systems, damage to surrounding interior surfaces, and heightened strain on heating system components. In closed-loop steam or hydronic heating systems, leaks necessitate the addition of feedwater, which contains more dissolved solids and gases than preheated water, exacerbating scale buildup and metal corrosion.

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:

Identifying readily accessible leaks should involve visual inspections and scrutiny of maintenance records or tenant complaints, with all leaks rectified by the conclusion of 2024. Inspection coverage should encompass:

- 100% of common areas
- A minimum of 20% of non-common owner areas
- At least 10% of non-common tenant areas

For compliance with this PECM (Prescribed Energy and Conservation Measures), an LL87 Energy Efficiency Report, endorsed by the Department, includes the necessary tasks provided the audit and retro-commissioning activities were finalized within four years preceding the submission of the LL97 PECM report.

2.2 Observed Conditions

There were no visible leaks present during the walkthrough of the site.

- No leaks in any common area
- No leaks at the minimum of 20% of non-common owner areas
- No leaks at the minimum of 10% of non-common tenant areas

2.3 Required Implementation

No implementation is required for this Prescriptive Energy Saving Measure

2.4 Verification of Implementation

No verification is required for this Prescriptive Energy Saving Measure

PECM 3 – Heating System Function

3.1 Background Information

Dirty or clogged components, as well as inaccurate or malfunctioning parts, can significantly decrease the operating efficiency of heating systems. This can result in increased stress on the entire system, leading to higher energy consumption and a shortened overall lifespan. In addition to cleaning or replacing components, maintenance also involves calibrating various processes such as damper, valve, and burner modulation, as well as controlling boiler, heat exchanger, and fan coil sequences to prevent short cycling.

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following: Verification of proper function can be achieved through field observation coupled with a review of historical data. Investigation methods may include interviews with facility staff, managers, and tenants, trend analysis, dedicated data loggers, or a review of available operations, maintenance, and complaint records, including Department of Building (DOB) inspections and internal maintenance as per manufacturer requirements. Compliance with this Prescribed Energy and Conservation Measure (PECM) is achieved through an LL87 Energy Efficiency Report (EER) accepted by the Department, provided that the audit and retro-commissioning work were completed within four years prior to the submission of the LL97 PECM report.

Sample maintenance procedures (including, but not limited to):

- Inspect filters and vents, and clean or replace them as necessary.
- Check condensate drains and clean as required.
- Remove sediment and limescale from tanks, skim oily residue, flush dirty boiler water, optimize waterlines, and replace anode rods. (in non-cast-iron boilers).
- Clean heat pump evaporator coils and condenser coils. Verify accuracy of sensors and gauges.
- Check that equipment sequences of operation are functioning properly.

3.2 Observed Conditions

3.2.1. Existing Control System for Heating

The heating system using a Heat Timer System as shown in PECM 1 & 7. IT consists of a indoor, outdoor, and system temperature sensors. The system is calibrated by the manufacturer during installation. From interviewing the facilities personnel, the following were concluded:

- Heat Timer Calibration was not done within the past year
- Boiler Controls Calibration was not done within the past year
- Burner Calibration was done within the past year, October 2023
- Barometric Damper Calibration was not done within the past year.
- Chemical Treatment is done monthly, March 2024
- Boiler Blowdowns are not done daily

Refer to Figure 3.2.1 through Figure 3.2.6

3.2.2. Existing Control System for Domestic Hot Water

The Domestic Hot Water system regulated by a mixing valve with a knob for adjustment. The boiler is regulated by the Aquastat on the Boiler and is entirely independent of the Heat Timer Control System. The system is calibrated by a technician during installation. From interviewing the facilities personnel, the following were concluded:

- Aquastat Calibration was not done within the past year
- Mixing Valve was not adjusted within the past year
- The Hot Water Return Pump was not present. Therefore not Hot Water Recirculation system

Refer to Figure 3.2.7 and Figure 5.2.4

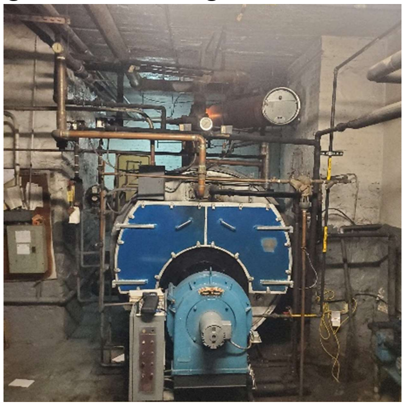


Figure 3.2.1 Boiler System

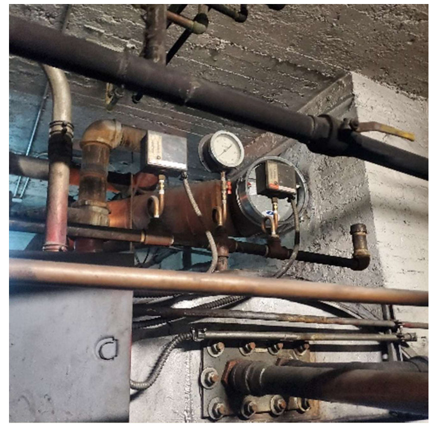


Figure 3.2.1 Boiler Controls

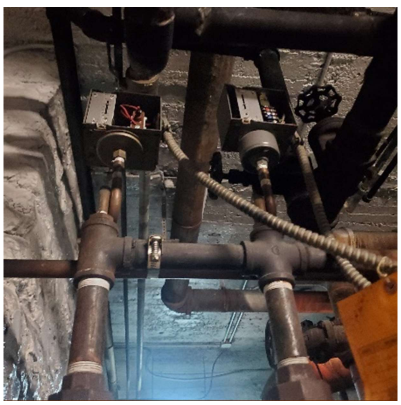


Figure 3.2.3 Boiler Controls

Figure 3.2.4 Burner Inspection Tag

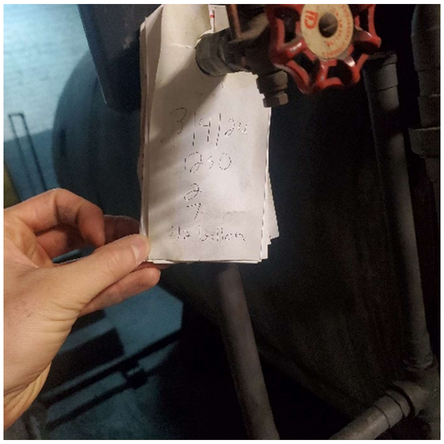


Figure 3.2.5 Boiler Chemical Treatment Tag

Figure 3.2.6 Process System Sensor

Figure 3.2.7 Boiler Aquastat

3.3 Required Implementation

3.3.1 Control System for Heating Implementation

The following implementations need to be carried out:

- Heat Timer Calibration
- Boiler Controls Calibration
- Burner Calibration
- Barometric Damper Calibration
- Boiler Blowdowns to be done daily with a logbook documentation
- Boiler System Flush annually

3.3.2 Control System for Domestic Hot Water Implementation

The following implementations need to be carried out:

- Aquastat Calibration
- Mixing Valve Adjustment

3.4 Verification of Implementation

PECM 4 – Radiator Temperature Controls

4.1 Background Information

Utilizing a window as a means to address an overheated radiator is the least energy-efficient option but may be the only recourse for many individuals at times. Implementing proper controls presents a superior alternative. While steam and hydronic radiators typically feature at least one valve with a knob, this knob often functions more as an on/off switch than a temperature regulator, failing to prevent radiators from overheating a room.

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:

A survey of at least 80% of all radiators is necessary to ascertain the presence and functionality of temperature controls. Specific reporting guidelines based on the type of heating system are outlined in 1 RCNY §103-17(c)(4). In the case of wireless ("smart") systems, real-time and historical data may be incorporated into the survey.

Retrofit options for existing radiators:

Thermostatic radiator valves (“TRVs”)

- For two-pipe steam systems, TRVs should be installed. To maximize efficiency, radiators should also have either new steam traps or orifice plates properly sized to prevent steam from entering the return piping (see PECM #8).
- TRVs or insulated radiator enclosures are not mandatory for one-pipe systems where the distribution piping has proper system-wide venting and where wireless sensors have been installed in at least 25% of the dwelling units (such sensors must provide operational feedback to the boiler).

4.2 Observed Conditions

The existing radiators showed air vents for a One-Pipe Steam System. There were no TRVs installed and no sensors visible within the 25% of dwelling units. Refer to Figures 4.2.1 and 4.2.2.

Figure 4.2.1 Existing Radiator

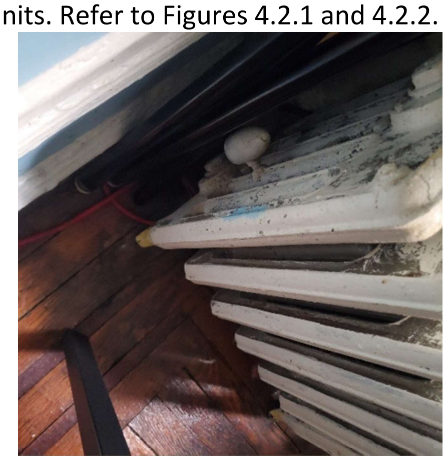


Figure 4.2.2 Air vent on Existing Radiator

4.3 Required Implementation

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:
Retrofit options for existing radiators is as follows:

Due to this one-pipe steam system not having a minimum of 25% of the dwelling units equipped with wireless sensors to provide operational feedback to the boiler, Thermostatic radiator valves ("TRVs") are required to be implemented.

Or

Upgrade Heat Timer Systems with sensors within 25% of dwelling units

4.4 Verification of Implementation

PECM 5 – Piping Insulation

5.1 Background Information

While certain steam or hot water pipes are intentionally left uninsulated to provide warmth to the surrounding space, most other distribution piping within heating and domestic hot water systems should be insulated. The primary advantage of piping insulation lies in its ability to minimize heat loss, thereby enhancing the efficiency of boilers and/or water heaters while reducing energy consumption. Additionally, secondary benefits include:

- Decreased risk of burns and fires resulting from hot pipe surfaces
- Improved steam quality with reduced condensation
- Shortened wait times for domestic hot water
- Mitigated risk of freezing in ambient temperatures below the freezing point

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following: Pipes, fittings, and valves that are part of steam or hot water distribution systems should be visually inspected in:

- 100% of common areas
- At least 20% of non-common owner areas
- At least 10% of non-common tenant areas

5.2 Observed Conditions

5.2.1. Steam Piping Insulation

The Steam distribution piping is not insulated in this basement area in order to condition the space as freeze protection for the other water distribution systems.

Depicted in Figure 5.2.1 through Figure 5.2.4

5.2.2. Domestic Hot Water Piping Insulation

The Domestic Hot Water piping is not insulated in this basement area. This cause energy leakage.

Depicted in Figure 5.2.1 through Figure 5.2.4

5.3.1. Condensation Return Piping Insulation

The Condensate Return piping is insulated in this basement. This is bad practice and show be removed. If the Condensate Return piping is in an area that may cause harm to an individual, piping insulation may be necessary and recommended.

Depicted in Figure 5.2.5,

Figure 5.2.1 Steam Boiler & Piping Configuration

Figure 5.2.2 Steam Boiler & Heat Exchanger inside boiler

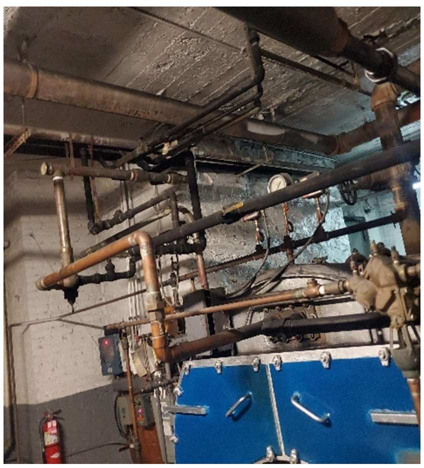


Figure 5.2.3 Hot Water Generation

Figure 5.2.4 Mixing Valve for Domestic Hot Water Generation and piping

Figure 5.2.5 Condensate Return piping

5.3 Required Implementation

The Domestic Hot Water piping distribution systems needs to implement this current PECM.. This includes any missing or degraded piping insulation to be installed, replaced, or repaired by the end of 2024.

The Condensate Return piping needs to implement this current PECM. This includes removal of any piping insulation.

5.4 Verification of Implementation

PECM 6 – Water Tank Insulation

6.1 Background information

Newer boilers and hot water heaters often feature integrated rigid insulation within the tank shell, while older models may require field insulation using flexible blankets. Insulation serves to minimize standby heat loss, consequently reducing energy consumption by minimizing the need for continuous reheating.

Insulating condensate tanks can enhance system efficiency as condensate typically retains a substantial amount of heat energy that can be recycled. However, in pumped-return systems, where condensate water can become excessively hot and potentially damage pumps (as noted in PECM #5), insulating condensate tanks is not recommended.

6.2 Observed Conditions

6.2.1. Existing Domestic Hot Water System

The Domestic Hot Water is generated by a Heat Exchanger Coil in the Steam Boiler refer to Photo 7.2.1. The leaving hot water is mixed Domestic Cold Water through a mixing valve, Figure 7.2.2 to a set point, see PECM 1, . A Domestic Hot Water Storage System was not present in this building.

Figure 7.2.1 Domestic Hot Water generation

Figure 7.2.2 Mixing valves

6.3 Required Implementation

No implementation is required for this Prescriptive Energy Saving Measure

6.4 Verification of Implementation

No verification is required for this Prescriptive Energy Saving Measure

PECM 7 – Indoor/Outdoor Temperature Sensors

7.1 Background information

Steam and hydronic boilers are typically sized to meet the highest heating demands during the coldest days of the year. However, running them at maximum capacity during warmer days can lead to discomfort and unnecessary energy usage. Unfortunately, many systems rely on manual settings or basic outdoor sensors, resulting in frequent short cycling.

Improving the responsiveness of heating system sensors to weather conditions offers an effective solution for adjusting boiler output. This upgrade involves enhancements to both indoor and outdoor components:

- Wireless sensors installed at radiators provide precise heat demand information to the boiler.
- Outdoor reset ("ODR") control, especially beneficial for steam systems and hydronic systems with non-condensing boilers, optimizes cycling duration based on outdoor temperature fluctuations.

For forced-air systems, employing sensors to monitor outdoor air temperature, supply and return air temperature, air flow rate, and zone temperature enables better control of heat output. Additionally, wireless duct dampers can be utilized for enhanced temperature regulation.

7.2 Observed Conditions

7.2.1. Existing Control System for Heating & Hot Water

The heating at [redacted] is controlled by an existing Heat-Timer System Model EPU-CH Serial Number L03EPUCH607100 AS indicated in Figure 7.5.1. This system controls the flow of heat from the boiler.

This model operates using two solid-state sensors: a weather head and an indoor element.

The Weather Head communicates the outdoor air temperature to the control panel. It should be mounted outside the building, at the end of conduit piping, at least 8 feet above ground level, and offset by at least 4 inches from the building.

The indoor element communicates to the control panel when steam has completely filled the heating system and cools at a rate similar to the entire system. Suitable locations include the farthest radiator from the boiler or the farthest return riser. The indoor element signals to the panel when heat has circulated to the farthest point of the heating system, initiating the timing of the heat cycle. Until this signal is received by the control panel, the timing will not commence. Additionally, the indoor element signals a lockout function to the panel at the end of the off portion of the heat cycle if the indoor element setting is still satisfied. The boiler will not restart until the return pipe cools 28°F below the Indoor Element Adjustment setting.

Based upon the signals received from these two elements and the heat adjustment setting selected, the system cycles on and off for set durations as per Figure 7.5.2

As indicated in Figure 7.5.1, the heat-timer system at this property is set to setting B.

7.2.2. Outdoor temperature sensor

It was noted the system was functional and sending heat out to the radiators. However, The outdoor temperature sensor (AKA Weather Head) was not located despite comprehensive surveying efforts.

7.2.3. Indoor temperature sensor

It was noted the system was functional and sending heat out to the radiators. An indoor element was located on a return riser (as per the manufacturer's recommendation)

7.3 Required Implementation

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:

- The indoor/outdoor temperature sensors must be in accordance with section C403.4.1.5 of the NYC Energy Conservation Code NYCECC
  - For steam distribution systems, this requirement may be satisfied by the use of wireless temperature sensors that provide feedback to the boiler or heating system control, provided that such sensors have been installed in a minimum of 25% of dwelling units and are in good working order

7.3.1. Outdoor Temperature Sensor Implementation

The location of the outdoor temperature sensors must be identified by management/ownership as it could not be located during the survey.

7.3.2. Indoor Temperature Sensor Implementation

Currently, there are no indoor air temperature sensors on the property. The only indoor sensor is the system return temp sensors (AKA the indoor element). As such indoor air temperature sensors must be installed in 25% of dwelling units.

7.4 Verification of Implementation

7.5 Survey Photographs

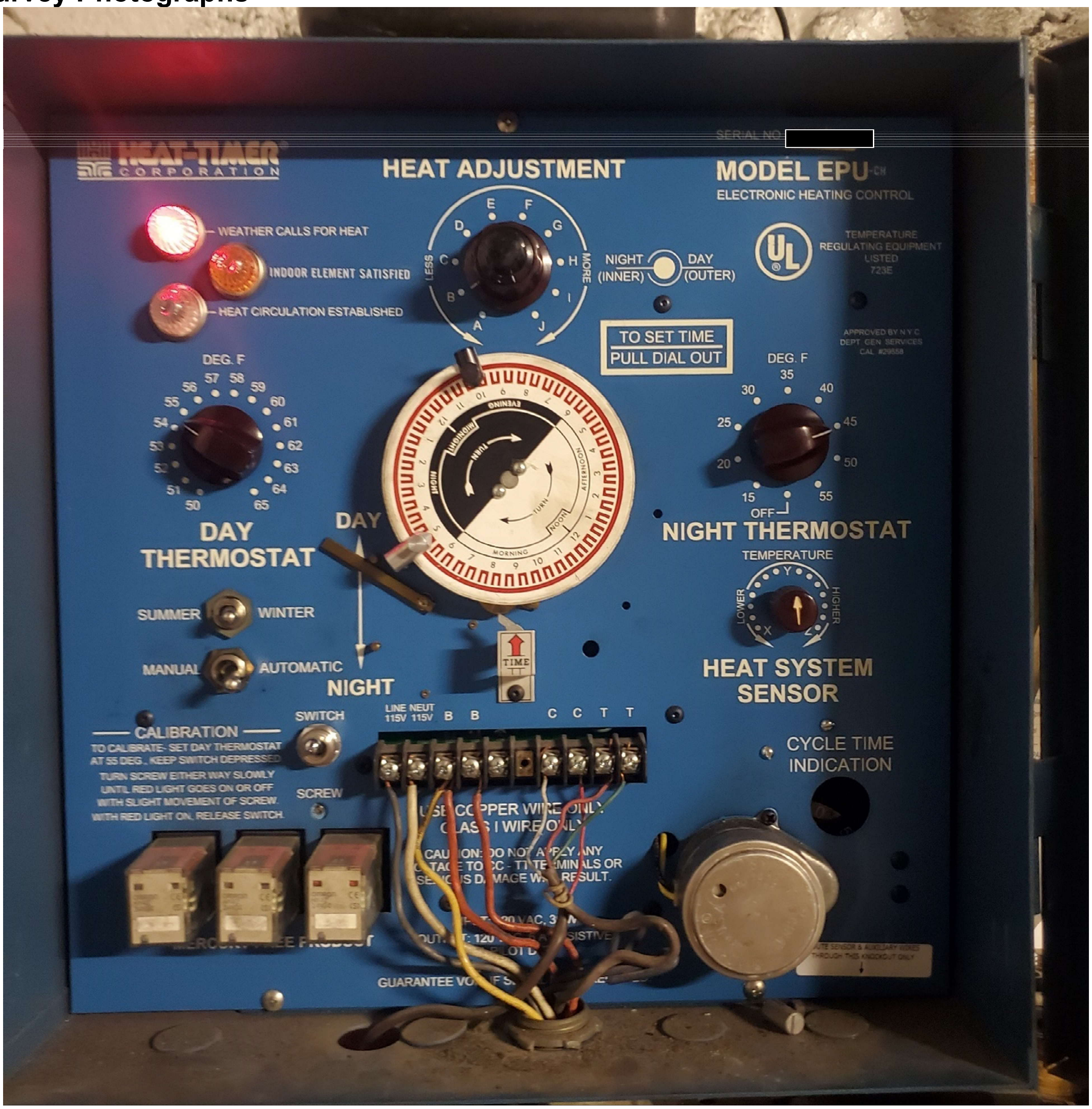


Fig. 7.5.1 - Heat-Timer System Model EPU-CH Serial Number L03EPUCH607100

OUTDOOR TEMPERATURE

HEAT ADJUSTMENT	-20°	-15°	-10°	-5°	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
A–	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
B–	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
C–	22	20	19	18	17	16	15	14	13	12	11	10	9	8	7
D–	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
E–	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
F–	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13
G–	C	C	C	26	25	24	23	22	21	20	19	18	17	16	15
H–	C	C	C	C	C	26	25	24	23	22	21	20	19	18	17
I–	C	C	C	C	C	C	C	26	25	24	23	22	21	20	19
J–	C	C	C	C	C	C	C	C	C	26	25	24	23	22	21

The above chart shows the approximate number of minutes of heat per 1/2 hr after Heat Circulation has been established (Red “ON” and Amber “ON”). **“C” means Continuous Operation.**

Fig. 7.5.2 - Heat-Timer System Model EPU-CH Heat Cycle Chart

PECM 8 – Steam Traps

8.1 Background information

Steam traps are crucial components located at the return pipe of each radiator in a two-pipe steam system. They retain steam while allowing condensate, air, and non-condensable gases to escape. Failure of a steam trap can lead to various issues:

I. If a steam trap fails in the open position, it releases steam into the condensate return, resulting in increased steam production, energy consumption, and potential damage to pumps.

II. A steam trap failing in the closed position (a "cold trap") allows air and condensate to accumulate within the radiator, reducing heat output and accelerating corrosion.

III. Both types of steam trap failure can cause water hammer and other disruptive effects that can damage the system.

8.2 Observed Conditions

As the heating system in this property operates as a one-pipe steam system, steam traps are not present. See Figures 8.5.1

8.3 Required Implementation

No implementation is required for this Prescriptive Energy Saving Measure

8.4 Verification of Implementation

No verification is required for this Prescriptive Energy Saving Measure

8.5 Survey Photos

Fig. 8.5.1 Example of One pipe radiator @[redacted]

PECM 9 – Master Steam System Venting

9.1 Background information

In steam distribution systems, air accumulates when the system is turned off, necessitating its removal when steam is reintroduced. While individual radiators are vented by steam traps in two-pipe systems and air vents in one-pipe systems, these vents are ideally designed to release air slowly and emit a hissing sound if overburdened with system venting tasks. To expedite air removal and ensure uniform steam distribution to all radiators, master venting should be installed at the ends of the supply piping. In two-pipe systems, additional master vents are recommended near the ends of the return piping.

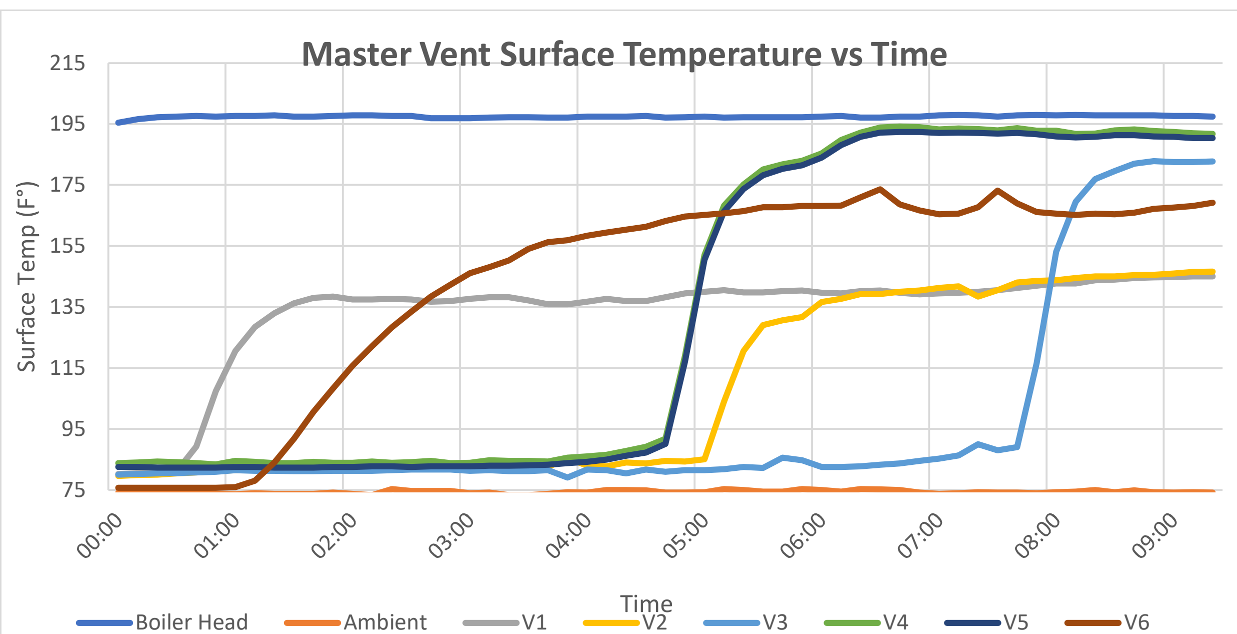
The absence of master venting can result in prolonged heating times for radiators situated farthest from the steam source, leading to perceptions of underheated spaces.

In some cases, master vents may have been removed from the system or may be malfunctioning. In such instances, reinstallation or repair/replacement of the vents is advisable to optimize system performance.9.2

9.2 Observed Conditions

Master vents at [redacted] are represented as per the attached schematic diagram.

In order to test the efficacy of the master vents testing the following Local Law 87 procedures were utilized. One-pipe steam distribution systems serving major equipment are required to ensure that steam travel duration times from the steam header to the end of each main loop vent average less than five minutes. Steam travel time tests were carried out using temperature data loggers (temperature sensors/thermocouples) that provide timestamps and surface temperature readings. During the test, the temperature at the end of each main loop vent must be 140 degrees F or less at the start. By the end of the test, the temperature at the end of each main loop vent must be 195 degrees F or higher.



Surface Temp (F°)

Time	Boiler Head	Ambient	V1	V2	V3	V4	V5	V6
00:00	195.44	74.12	80.24	79.7	80.06	83.81	82.58	75.74
00:10	196.52	74.3	80.42	79.88	80.24	84.00	82.58	75.74
00:20	197.24	74.3	80.6	80.06	80.42	84.32	82.4	75.74
00:30	197.42	74.12	81.14	80.42	80.6	84.16	82.4	75.74
00:40	197.6	74.12	89.24	80.78	80.78	83.79	82.4	75.74
00:50	197.42	73.76	107.42	81.14	80.96	83.42	82.4	75.74
01:00	197.6	73.58	120.56	81.5	81.5	84.56	82.58	75.92
01:10	197.6	73.94	128.48	81.68	81.32	84.25	82.58	78.08
01:20	197.78	73.76	132.98	81.68	81.32	83.82	82.4	84.02
01:30	197.42	73.76	136.22	81.86	81.14	83.78	82.4	91.76
01:40	197.42	73.76	138.02	81.86	81.14	84.18	82.4	100.58
01:50	197.6	74.12	138.38	81.5	81.32	83.89	82.58	108.32
02:00	197.78	73.76	137.48	81.5	81.32	83.89	82.58	115.7
02:10	197.78	73.4	137.48	82.04	81.32	84.32	82.76	122.18
02:20	197.6	75.38	137.66	82.04	81.5	83.93	82.76	128.3
02:30	197.6	74.66	137.48	82.04	81.68	84.11	82.58	133.52
02:40	196.88	74.66	136.76	81.86	81.68	84.58	82.76	138.38
02:50	196.88	74.66	136.94	82.4	81.68	83.81	82.76	142.34
03:00	196.88	73.94	137.66	82.4	81.32	83.92	82.76	146.12
03:10	197.06	74.12	138.2	82.58	81.5	84.76	82.94	148.1
03:20	197.24	73.4	138.2	82.58	81.14	84.58	82.94	150.26
03:30	197.24	73.4	137.12	82.58	81.14	84.56	83.12	154.04
03:40	197.06	73.76	135.86	82.58	81.5	84.34	83.3	156.2
03:50	197.06	74.3	135.86	85.46	79.16	85.58	83.84	156.92
04:00	197.42	74.12	136.76	82.94	81.68	86.05	84.2	158.36
04:10	197.42	75.02	137.66	82.76	81.5	86.56	84.92	159.44
04:20	197.42	75.02	136.94	84.02	80.42	87.76	86.18	160.34
04:30	197.6	74.84	136.94	83.66	81.68	89.19	87.26	161.24
04:40	197.06	74.12	138.2	84.56	80.96	91.74	90.14	163.22
04:50	197.24	74.12	139.46	84.38	81.5	118.98	117.14	164.66
05:00	197.42	74.3	140	85.1	81.5	152.06	150.44	165.2
05:10	197.06	75.38	140.54	104	81.86	168.23	166.28	165.74

	Surface Temp (F°)							
Time	Boiler Head	Ambient	V1	V2	V3	V4	V5	V6
05:20	197.24	75.02	139.82	120.56	82.58	175.12	173.66	166.46
05:30	197.24	74.48	139.82	129.02	82.22	180.13	178.16	167.72
05:40	197.24	74.48	140.18	130.64	85.64	181.80	180.32	167.72
05:50	197.24	75.38	140.36	131.72	84.74	182.91	181.4	168.08
06:00	197.42	75.02	139.64	136.58	82.58	185.30	183.92	168.08
06:10	197.6	74.48	139.46	137.66	82.58	189.73	188.06	168.26
06:20	197.06	75.38	140.18	139.28	82.76	192.14	190.76	170.96
06:30	197.06	75.2	140.36	139.28	83.3	193.83	192.2	173.66
06:40	197.42	75.02	139.64	140	83.66	194.24	192.38	168.62
06:50	197.42	74.12	139.1	140.36	84.56	193.98	192.38	166.64
07:00	197.78	73.76	139.46	141.26	85.28	193.25	192.02	165.38
07:10	197.96	73.94	139.64	141.8	86.36	193.54	192.2	165.56
07:20	197.78	74.3	140	138.38	89.96	193.36	192.02	167.72
07:30	197.42	74.12	140.54	140.54	87.98	192.84	191.84	173.12
07:40	197.78	74.12	141.26	143.06	89.06	193.62	192.02	168.98
07:50	197.96	73.94	141.98	143.6	116.6	192.77	191.66	166.1
08:00	197.78	74.3	142.7	143.78	153.14	192.74	190.94	165.56
08:10	197.96	74.48	142.7	144.5	169.52	191.79	190.58	165.2
08:20	197.78	75.02	143.78	145.04	176.9	191.89	190.76	165.56
08:30	197.78	74.3	143.96	145.04	179.6	192.88	191.3	165.38
08:40	197.78	74.84	144.5	145.4	181.94	193.26	191.3	165.92
08:50	197.78	74.3	144.68	145.58	182.84	192.66	190.94	167.18
09:00	197.6	74.12	144.86	145.94	182.48	192.41	190.76	167.54
09:10	197.6	74.3	145.04	146.48	182.48	191.93	190.4	168.08
09:20	197.42	74.12	145.04	146.66	182.66	191.75	190.4	169.16
09:30	197.24	75.02	144.5	147.02	183.56	191.61	190.58	167.54

9.3 Required Implementation

The layout of the steam piping is shown in the appendix. The existing vents are labeled numerically in their current locations and the alphabetic labels represent either resizing of the existing vent or installing a new vents at those locations.

Vent Label	Comment
1	Optimal position is at position A
2	Optimal position is at position D
3	Optimal position is at position C
4	Installed incorrectly, and should resize
5	Resize
6	Can remain
F	Install new due to transition of steam
G	Install new for efficient venting

The vents collectively didn't meet the 5:00 minute mark to reach the temperature of 195 and therefore all vents should be replaced.

9.4 Verification of Implementation

9.5 Survey Photos

Fig. 9.5.1 Master Steam Vents in Boiler Room @[redacted]

Fig. 9.5.2 Master Steam Vent in Office @[redacted]

PECM 10 – Lighting

10.1 Background information

Upgrading a building's lighting to meet current energy conservation standards is often the most cost-effective method for reducing energy usage.

Compliance with this Prescriptive Energy Conservation Measure (PECM) is attained by adhering to the lighting upgrade requirements outlined in Local Law 88 (LL88). LL88 specifies that lighting within the property must align with the New York City Energy Conservation Code. This includes ensuring that lighting wattages per square foot adhere to prescribed limits and implementing appropriate lighting controls where necessary.

It's important to note that in multifamily buildings or lots, LL88 only pertains to common or base building spaces, excluding individual dwelling units from consideration for this PECM.

10.2 Observed Conditions

- See Attachment 1. Lighting Plan – LTG-3040.001 for Existing Lighting Conditions
- No lighting controls for office & laundry room

10.3 Required Implementation

- Philips C70S62/M lights on the building exterior must be replaced with lights that have a lamp efficacy of at least 65 lumens/watt or fixtures with a luminaire efficacy of at least 45 lumens/watt
- Philips F20T12 lights in the basement must be replaced with lights that have a lamp efficacy of at least 65 lumens/watt or fixtures with a luminaire efficacy of at least 45 lumens/watt
- Occupant Sensor Control to be installed in the basement office.
  - Automatic-Off: Drawings must specify that occupant sensor controlled luminaires are automatically turned off within 15 minutes of all occupants leaving the space.
  - Manual-On or Maximum 50% Automatic-On: Lights turned off by occupant sensor controls must be either manually on, or controlled to be automatically on maximum 50% of the lighting power in the space.
  - Manual Control to Turn Off: Occupant-sensor-controlled luminaires must also be equipped with manual controls that allow occupants to turn lights off.
- Time Switch Controls & Light-Reduction Controls to be installed in the Laundry Room
  - Time Switch Control must be designed to
    - Have a minimum 7-day clock,
    - Allow to program 7-different day types/week,
    - Have an automatic holiday 'shutoff' feature,
    - Have program backup capabilities in case of power interruption, and
    - Include a manually-controlled override switch that, when initiated, permits the controlled lighting to remain on for a maximum of 2 hours, and that individually controls a maximum area of 5,000 sf.
  - Light Reduction Controls
    - Spaces with time-switch controls must also be provided with manual light-reduction controls that allow the occupant to reduce the connected lighting load by minimum 50%.
    - Light fixture layout plans must clearly indicate the light-reduction control method, the options of which are as follows:

    - 1) Control of all lamps/luminaires
    - 2) Dual switching of alternate rows of luminaries
    - 3) Switching middle lamp luminaires independently
    - 4) Switching each lamp/luminaire
  - Ensure no internal exist signs exceed 5Watts per side

10.4 Verification of Implementation

PECM 11 – Building Envelope

11.1 Background information

Weatherizing a building involves improving its resistance to changes in outdoor temperature and humidity, which in turn enhances the efficiency of heating and cooling systems. By minimizing heat loss and gain, these systems can operate at lower intensities and consume less energy to maintain a comfortable indoor environment.
This process includes sealing cracks and holes in the building's thermal envelope, which reduces convective heat transfer—the movement of air and moisture. Additionally, insulating walls, floors, and ceilings slows conductive heat transfer, which occurs when temperature changes pass through solid materials.

11.2 Observed Conditions

A visual survey of the following was carried out

- Building façade
- Interior visual inspection
  - 100% common areas
  - At least 20% of non-common owner areas
  - 5 Apartments

A visual inspection for air leakage at envelope openings and penetrations between conditioned and unconditioned spaces includes examining various areas such as:

- Doors
- Windows
- Packaged Terminal Air Conditioners (PTACs)
- Skylights
- Roof curbs
- Vents
- Elevator and stair bulkheads
- Loading docks
- Penetrations for piping
- Ducting
- Conduits and other wiring
- Chimneys
- Flues
- Dropped soffits

The visual inspection of the facade determined that it was in good condition. No visible cracks in the brick, mortar, or parging were observed, indicating the absence of any breaks in the building insulation that could lead to heat or air conditioning leakage. Instances of re-pointing were noted on the facade. Records indicate that the property underwent compliance with Local Law 11 between 2020 and 2022, and the absence of any violations suggests compliance, with facade servicing likely occurring within the past two years. See figures 11.5.1 & 11.5.2

The sealing for the doors and windows in both the common spaces and apartments was found to be in satisfactory condition during the inspection, indicating that repairs were not deemed necessary. Please refer to figure 11.5.3 further details.

11.3 Required Implementation

No implementation is required for this Prescriptive Energy Saving Measure as the existing conditions were found to be satisfactory.

11.4 Verification of Implementation

11.5 Survey Photos

Fig. 11.5.1 Façade at @[redacted]

[redacted]

[redacted]

Fig. 11.5.3 Window at @[redacted]

[redacted]

Fig. 11.5.4 Window at @[redacted]

Fig. 11.5.3 Window at @[redacted]

PECM 12 – Exhaust Fan Timers

12.1 Background information

Exhaust fans play a critical role in eliminating moisture, pollutants, and stagnant or overheated air from spaces such as bathrooms, kitchens, and laundry rooms. Some fans are engineered to operate continuously and quietly at low speeds, and these should not be equipped with timers, occupancy sensors, or humidistats (humidity sensors).
Conversely, fans designed for intermittent operation at higher speeds are occasionally left running unnecessarily, leading to excessive energy consumption. This includes both the energy required to power the fan motor and the need to replace conditioned air needlessly exhausted from the space.

12.2 Observed Conditions

A visual survey of the following was carried out.

- Interior visual inspection
  - 100% common areas
  - At least 20% of non-common owner areas
  - 5 Apartments

No exhaust fans were located on the premises.

12.3 Required Implementation

No implementation is required for this Prescriptive Energy Saving Measure

12.4 Verification of Implementation

No Verification is required for this Prescriptive Energy Saving Measure

PECM 13 – Radiant Barriers

13.1 Background information

Placing reflective, insulated surfaces on the wall behind a radiator—whether it's a steam, hydronic, or electric radiator—can effectively prevent heat loss through the wall, resulting in improved radiator efficiency and reduced energy consumption.

Radiators primarily transfer heat through two mechanisms:

Convection: By heating the surrounding air, which then rises to displace cooler air and distribute warmth throughout the room.

Radiant heat: By emitting infrared radiation that heats up objects within its line of sight without significantly affecting the air in between.

Moreover, when heated air comes into contact with a wall, it conducts heat into the wall itself.

A radiant barrier with a reflective surface can redirect radiant heat away from the wall and back into the room, while its insulation properties can impede conductive heat transfer, thereby preserving the heat energy within the indoor air.

13.2 Observed Conditions

A visual survey of the following was carried out.

- Interior visual inspection
    - 100% common areas
    - At least 20% of non-common owner areas
    - 5 Apartments

No radiant barriers were located on the premises.

13.3 Required Implementation

Radiant barriers must be installed behind all of the radiators in the [redacted] units at [redacted]

Radiant barriers typically comprise a highly reflective material, commonly aluminum foil, which is affixed to one or both sides of various substrate materials. These substrates can include kraft paper, plastic films, cardboard, oriented strand board, and air infiltration barrier material. Certain products may also incorporate fiber reinforcement to enhance durability and facilitate handling.

In reflective insulation systems, radiant barriers can be integrated with a variety of insulation materials. In such configurations, the radiant barriers serve as the facing material for the thermal insulation.

Common manufacturers of radiant barriers are EcoFoil, Radflek & Reflectix

13.4 Verification of Implementation

Required Implementation Summary

PECM 1 – Temperature Set Points Required Implementation

Hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range best to have a set temperature of 140 °F.

An upgrade of the Heat Timer system is best implemented but not required for accessibility to view the set point temperature of the building.

PECM 2 – Repair Leaks

No implementation is required for this Prescriptive Energy Saving Measure

PECM 3 – Heating System Function

The following implementations need to be carried out:

- Heat Timer Calibration
- Boiler Controls Calibration
- Burner Calibration
- Barometric Damper Calibration
- Boiler Blowdowns to be done daily with a logbook documentation
- Boiler System Flush annually

3.3.3 Control System for Domestic Hot Water Implementation

The following implementations need to be carried out:

- Aquastat Calibration
- Mixing Valve Adjustment

PECM 4 – Radiator Temperature Controls

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:

<u>Retrofit options for existing radiators is as follows:</u>

Due to this one-pipe steam system not having a minimum of 25% of the dwelling units equipped with wireless sensors to provide operational feedback to the boiler, Thermostatic radiator valves (“TRVs”) are required to be implemented.

Or

Upgrade Heat Timer Systems with sensors within 25% of dwelling units

PECM 5 – Piping Insulation

The Domestic Hot Water piping distribution systems needs to implement this current PECM.. This includes any missing or degraded piping insulation to be installed, replaced, or repaired by the end of 2024.
The Condensate Return piping needs to implement this current PECM. This includes removal of any piping insulation.

PECM 6 – Water Tank Insulation

No implementation is required for this Prescriptive Energy Saving Measure

PECM 7 – Indoor/Outdoor Temperature Sensors

As per DOB guidance, compliance with this prescriptive measure is achieved as per the following:

- The indoor/outdoor temperature sensors must be in accordance with section C403.4.1.5 of the NYC Energy Conservation Code NYCECC
    - For steam distribution systems, this requirement may be satisfied by the use of wireless temperature sensors that provide feedback to the boiler or heating system control, provided that such sensors have been installed in a minimum of 25% of dwelling units and are in good working order

7.3.1. Outdoor Temperature Sensor Implementation

The location of the outdoor temperature sensors must be identified by management/ownership as it could not be located during the survey.

7.3.2. Indoor Temperature Sensor Implementation

Currently, there are no indoor air temperature sensors on the property. The only indoor sensor is the system return temp sensors (AKA the indoor element). As such indoor air temperature sensors must be installed in 25% of dwelling units.

PECM 8 – Steam Traps

No implementation is required for this Prescriptive Energy Saving Measure

PECM 9 – Master Steam System Venting

No implementation is required for this Prescriptive Energy Saving Measure

The layout of the steam piping is shown in the appendix. The existing vents are labeled numerically in their current locations and the alphabetic labels represent either resizing of the existing vent or installing a new vents at those locations.

Vent Label	Comment
1	Optimal position is at position A
2	Optimal position is at position D
3	Optimal position is at position C
4	Installed incorrectly, and should resize
5	Resize
6	Can remain
F	Install new due to transition of steam
G	Install new for efficient venting

The vents collectively didn't meet the 5:00 minute mark to reach the temperature of 195 and therefore all vents should be replaced – regardless of if they will be relocated or not.

PECM 10 – Lighting

- Philips C70S62/M lights on the building exterior must be replaced with lights that have a lamp efficacy of at least 65 lumens/watt or fixtures with a luminaire efficacy of at least 45 lumens/watt
- Philips F20T12 lights in the basement must be replaced with lights that have a lamp efficacy of at least 65 lumens/watt or fixtures with a luminaire efficacy of at least 45 lumens/watt
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  - Manual Control to Turn Off: Occupant-sensor-controlled luminaires must also be equipped with manual controls that allow occupants to turn lights off.
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  - Time Switch Control must be designed to
    - Have a minimum 7-day clock,
    - Allow to program 7-different day types/week,
    - Have an automatic holiday 'shutoff' feature,
    - Have program backup capabilities in case of power interruption, and
    - Include a manually-controlled override switch that, when initiated, permits the controlled lighting to remain on for a maximum of 2 hours, and that individually controls a maximum area of 5,000 sf.
  - Light Reduction Controls

    - Spaces with time-switch controls must also be provided with manual light-reduction controls that allow the occupant to reduce the connected lighting load by minimum 50%.
    - Light fixture layout plans must clearly indicate the light-reduction control method, the options of which are as follows:
        - 1) Control of all lamps/luminaires
        - 2) Dual switching of alternate rows of luminaries
        - 3) Switching middle lamp luminaires independently
        - 4) Switching each lamp/luminaire
  - Ensure no internal exist signs exceed 5Watts per side

PECM 11 – Building Envelope

No implementation is required for this Prescriptive Energy Saving Measure as the existing conditions were found to be satisfactory.

PECM 12 – Exhaust Fan Timers

No implementation is required for this Prescriptive Energy Saving Measure

PECM 13 – Radiant Barriers

Radiant barriers must be installed behind all of the radiators in the [redacted] units at [redacted].
Radiant barriers typically comprise a highly reflective material, commonly aluminum foil, which is affixed to one or both sides of various substrate materials. These substrates can include kraft paper, plastic films, cardboard, oriented strand board, and air infiltration barrier material. Certain products may also incorporate fiber reinforcement to enhance durability and facilitate handling.
In reflective insulation systems, radiant barriers can be integrated with a variety of insulation materials. In such configurations, the radiant barriers serve as the facing material for the thermal insulation.
Common manufacturers of radiant barriers are EcoFoil, Radflek & Reflectix