

REVISIONS CONSTRUCTION REVISIONS 11206 ѕмм SDI# 2013-01H

☐ 5. Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup Exception: Continuously operating zones ■ Exception: 2 kW demand or less, submit calculations 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: Ducts located within equipment ☐ Exception: 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: Piping within HVAC equipment. ■ Exception: Fluid temperatures between 55 and 105°F. Exception: Fluid not heated or cooled with renewable energy. ☐ Exception: Piping within room fan-coil (with AHRI440 rating) and unit ventilators (with AHRI840 rating). Exception: Runouts <4 ft in length.</p>

☐ 11.Operation and maintenance manual provided to building owner

12.Piping, insulated to 1/2 in. if nominal diameter of pipe is <1.5 in.; Larger pipe insulated to 1 in. thickness ☐ 13.Lavatory faucet outlet temperatures in public restrooms limited to 110°F (43°C) ☐ 14.Thermostatic controls have 5°F deadband

🔲 17.Total cooling capacity without economizers must be less than 25200 kBtu/h. This project lists 120000 kBtu/h capacity without

 Exception: Thermostats requiring manual changeover between heating and cooling Exception: Special occupancy or special applications where wide temperature ranges are not acceptable and are approved by the authority having jurisdiction. ☐ 15.Balancing devices provided in accordance with IMC (2006) 603.17 ☐ 16.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: Systems with heat recovery. ☐ Exception: Multiple-zone systems without DDC of individual zones communicating with a central control panel. ■ Exception: Systems with a design outdoor airflow less than 1200 cfm. ☐ Exception: Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.

■ 18.Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings Exception: Gravity dampers acceptable in buildings <3 stories</p> ☐ Exception: Gravity dampers acceptable in systems with outside or exhaust air flow rates less than 300 cfm where dampers are interlocked with fan 19.Automatic controls for freeze protection systems present

20. Exhaust air heat recovery included for systems 5,000 cfm or greater with more than 70% outside air fraction or specifically exempted ☐ Exception: Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems. ■ Exception: Systems serving spaces that are heated and not cooled to less than 60°F. ☐ Exception: Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy. Exception: Heating systems in climates with less than 3600 HDD.

Exception: Cooling systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F. Exception: Systems requiring dehumidification that employ energy recovery in series with the cooling coil. ☐ Exception: 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** 

Report date: 04/19/13 Data filename: C:\Users\Dominic\Documents\COMcheck\LifeLine Bronx.cck Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications

requirements in COMcheck Version 3.8.1 and to comply with the mandatory requirements in the Requirements Checklist.

and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2009 IECC

Report date: 04/19/13

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Section 4: Requirements Checklist Requirements Specific To: HVAC System RTU-1: ☐ 1. Equipment minimum efficiency: Central Furnace (Gas): 80.0 % Ec 2. Equipment minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) 3. Discharge dampers prohibited with fan motors > 10 hp Requirements Specific To: HVAC System RTU-2:

1. Equipment minimum efficiency: Central Furnace (Gas): 80.0 % Ec a. Each space required to have a manual control also allows for reducing the connected lighting load by at least 50 percent by either 2. Equipment minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) controlling all luminaires, dual switching of alternate rows of luminaires, alternate luminaires, or alternate lamps, switching the middle 3. Discharge dampers prohibited with fan motors > 10 hp lamp luminaires independently of other lamps, or switching each luminaire or each lamp. Requirements Specific To: HVAC System RTU-3: ☐ 1. Equipment minimum efficiency: Central Furnace (Gas): 80.0 % Ec Only one luminaire in space. 2. Equipment minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) An occupant-sensing device controls the area. 3. Cooling system provides a means to relieve excess outdoor air during economizer operation. 4. Discharge dampers prohibited with fan motors > 10 hp ☐ The area is a corridor, storeroom, restroom, public lobby or sleeping unit. 5. Integrated air economizer required Areas that use less than 0.6 Watts/sq.ft. 9. Automatic lighting shutoff control in buildings larger than 5,000 sq.ft. Requirements Specific To: HVAC System RTU-4: 1. Equipment minimum efficiency: Central Furnace (Gas): 80.0 % Ec 2. Equipment minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) ☐ Sleeping units, patient care areas; and spaces where automatic shutoff would endanger safety or security.

COMcheck Software Version 3.9.2
Interior Lighting Compliance
Certificate

Designer/Contractor:

Richard J. Stern, P.E.

2741 Furnace Road

Watts / ft2

Allowed Watts

18 128 2304

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2 96 192

2 6 52 312

1 2 250 500

Total Proposed Watts = 768

(B x C)

Felton, PA 17322

Richard Stern

2010 New York Energy Conservation Construction Code

Owner/Agent:

Section 2: Interior Lighting and Power Calculation

Section 3: Interior Lighting Fixture Schedule

Linear Fluorescent 1: A: 2x4 Flour.: 48" T8 32W: Electronic

Linear Fluorescent 2: A1: 2x4 Flour.: 48" T8 32W: Electronic:

Linear Fluorescent 3: B: 2x4 Flour.: 48" T8 32W: Electronic:

Incandescent 1: G: Operating Light: Incandescent 250W:

Section 4: Requirements Checklist

7962

separate switch for general area lighting.

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

5. Master switch at entry to hotel/motel guest room.

10. Photocell/astronomical time switch on exterior lights.

Lighting intended for 24 hour use.

Section 5: Compliance Statement

Exceptions:

Requirements Checklist.

Project Title: Lifeline Access Center

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6. Individual dwelling units separately metered.

Controls, Switching, and Wiring:

Project Title: Lifeline Access Center

Compact Fluorescent 1: D: Flour Down Light: Triple 4-pin 26W: Electronic:

Compact Fluorescent 2: H: Flour Down Light: Triple 4-pin 26W: Electronic:

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

Fixture ID: Description / Lamp / Wattage Per Lamp / Ballast

Interior Lighting PASSES: Design 3% better than code

3. Daylight zones have individual lighting controls independent from that of the general area lighting.

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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.

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

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

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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 2010 New York

Energy Conservation Construction Code requirements in COMcheck Version 3.9.2 and to comply with the mandatory requirements in the

Daylight zones under skylights more than 15 feet from the perimeter have lighting controls separate from daylight zones adjacent to

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

. Medical task lighting or art/history display lighting claimed to be exempt from compliance has a control device independent of the control

Allowed Watts Proposed Watts Complies

Lifeline Access Center

**Section 1: Project Information** 

Project Title: Lifeline Access Center

Project Type: Addition

1733 Eastcheaster Road

Exam/Treatment (Hospital)

Lighting Wattage:

Exam/Treatment ( Hospital 6635 sq.ft.)

Construction Site:

Bronx, NY 10461

3. Cooling system provides a means to relieve excess outdoor air during economizer operation. 4. Discharge dampers prohibited with fan motors > 10 hp 5. Integrated air economizer required Requirements Specific To: HVAC System EDH-1:

**2009 IECC** 

Project Type: Addition

Construction Site:

Bronx, NY 10461

LifeLine Access Center

1733 Eastchester Road

Project Title: LifeLine Access Center

Building Location (for weather data):

Quantity System Type & Description

1 HVAC System RTU-1 (Single Zone)

1 HVAC System RTU-2 (Single Zone) :

1 HVAC System RTU-3 (Single Zone) :

HVAC System RTU-4 (Single Zone)

1 HVAC System EDH-1 (Single Zone) :

1 HVAC System EDH-2 (Single Zone) :

1 HVAC System EDH-4 (Single Zone) :

1 HVAC System EDH-5 (Single Zone) :

1 HVAC System EDH-6 (Single Zone):

1 HVAC System HUH-1 (Single Zone)

Project Title: LifeLine Access Center

HVAC System EWH-1 (Single Zone) :

HVAC System EDH-3 (Single Zone)

Section 1: Project Information

Section 2: General Information

Section 3: Mechanical Systems List

Owner/Agent:

Heating: 1 each - Central Furnace, Gas, Capacity = 60000 kBtu/h, Efficiency = 80.00% Ec

Heating: 1 each - Central Furnace, Gas, Capacity = 60000 kBtu/h, Efficiency = 80.00% Ec

Heating: 1 each - Central Furnace, Gas, Capacity = 125000 kBtu/h, Efficiency = 80.00% Ec

Heating: 1 each - Central Furnace, Gas, Capacity = 72000 kBtu/h, Efficiency = 80.00% Ec

Condenser, No Economizer , Economizer exception: Humidity Requirements

Condenser, No Economizer, Economizer exception: Humidity Requirements

Condenser, Air Economizer , Economizer exception: High Efficiency Equipment

Condenser, Air Economizer , Economizer exception: Filtration Requirements

Heating: 1 each - Duct Furnace, Electric, Capacity = 3413 kBtu/h

Heating: 1 each - Duct Furnace, Electric, Capacity = 6826 kBtu/h

Heating: 1 each - Duct Furnace, Electric, Capacity = 6826 kBtu/h

Heating: 1 each - Duct Furnace, Electric, Capacity = 6836 kBtu/h

Heating: 1 each - Duct Furnace, Electric, Capacity = 3413 kBtu/h

Heating: 1 each - Duct Furnace, Electric, Capacity = 5120 kBtu/h

Heating: 1 each - Unit Heater, Electric, Capacity = 6836 kBtu/h

Heating: 1 each - Unit Heater, Electric, Capacity = 10239 kBtu/h

Cooling: 1 each - Rooftop Package Unit, Capacity = 60000 kBtu/h, Efficiency = 13.00 EER, Air-Cooled

Cooling: 1 each - Rooftop Package Unit, Capacity = 60000 kBtu/h, Efficiency = 13.00 EER, Air-Cooled

Cooling: 1 each - Rooftop Package Unit, Capacity = 90000 kBtu/h, Efficiency = 11.00 EER, Air-Cooled

Cooling: 1 each - Rooftop Package Unit, Capacity = 36000 kBtu/h, Efficiency = 13.00 EER, Air-Cooled

Water Heater WH-1: Electric Storage Water Heater, Capacity: 100 gallons w/ Circulation Pump, Efficiency: 98.00

LifeLine Acceaa Center

Designer/Contractor

Ricahrd J. Stern, P.E.

2741 Furnace Road

Felton, PA 17322

Ricahrd Stern

Requirements Specific To: HVAC System EDH-2: Requirements Specific To: HVAC System EDH-3: Requirements Specific To: HVAC System EDH-4:

> Requirements Specific To: HVAC System EDH-5: Requirements Specific To: HVAC System EDH-6: Requirements Specific To: HVAC System EWH-1

Requirements Specific To: Water Heater WH-1: 1. Electric Water Heater efficiency: 0.8 EF (370 SL, Btu/h (if > 12 kW)) 2. All piping in circulating system insulated

Requirements Specific To: HVAC System HUH-1:

 3. Hot water storage temperature adjustable down to 120°F or lower 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

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: Standby equipment automatically off when primary system is operating ■ Exception: 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

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fuels or electric power.

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The following list provides more detailed descriptions of the requirements in Section 4 of the Mechanical Compliance

Requirements Specific To: HVAC System RTU-1: 1. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Central Furnace (Gas): 80.0 % Ec 2. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) Rooftop Package Unit: 9.5 EER (9.2 IPLV) 3. Fans with motors > 10 hp may not be equipped with discharge dampers.

Requirements Specific To: HVAC System RTU-2: 1. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Central Furnace (Gas): 80.0 % Ec 2. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) Rooftop Package Unit: 9.5 EER (9.2 IPLV) Fans with motors > 10 hp may not be equipped with discharge dampers.

Requirements Specific To: HVAC System RTU-3: 1. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Central Furnace (Gas): 80.0 % Ec 2. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) Rooftop Package Unit: 9.5 EER (9.2 IPLV) 3. Cooling system provides a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building. 4. Fans with motors > 10 hp may not be equipped with discharge dampers.

5. An integrated air economizer is required for individual cooling systems over 54 kBtu/h in the selected project location and allows simultaneous operation of outdoor-air and mechanical cooling. Requirements Specific To: HVAC System RTU-4: 1. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Central Furnace (Gas): 80.0 % Ec

2. The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Rooftop Package Unit: 9.5 EER (9.2 IPLV) Rooftop Package Unit: 9.5 EER (9.2 IPLV) 3. Cooling system provides a means to relieve excess outdoor air during economizer operation to prevent overpressurizing the building. Fans with motors > 10 hp may not be equipped with discharge dampers. 5. An integrated air economizer is required for individual cooling systems over 54 kBtu/h in the selected project location and allows simultaneous operation of outdoor-air and mechanical cooling.

Requirements Specific To: HVAC System EDH-1 Requirements Specific To: HVAC System EDH-2: Requirements Specific To: HVAC System EDH-3 Requirements Specific To: HVAC System EDH-4

Requirements Specific To: HVAC System EDH-5 Requirements Specific To: HVAC System EDH-6

Requirements Specific To: HVAC System EWH-1

Requirements Specific To: HVAC System HUH-1: Requirements Specific To: Water Heater WH-1:

1. Service water heating equipment used solely for heating potable water, pool heaters, and hot water storage tanks must meet the following miniumum efficiency: Electric Water Heater efficiency: 0.8 EF (370 SL, Btu/h (if > 12 kW)) 2. Insulation must be provided for recirculating system piping, including the supply and return piping of a circulating tank type water heater.

Project Title: LifeLine Access Center Report date: 04/19/13 Data filename: C:\Users\Dominic\Documents\COMcheck\LifeLine Bronx.cck Page 5 of 7 3. Temperature controls must be provided that allow for storage temperature adjustment from 120°F or lower to a maximum temperature ompatible with the intended use except when the manufacturer's installation instructions specify a higher minimum thermostat settin

4. Systems designed to maintain usage temperatures in hot water pipes, such as recirculating hot water systems or heat trace, must be equipped with automatic time switches or other controls that can be set to switch off the temperature maintenance system during extended periods when hot water is not required. 5. When used to maintain storage tank water temperature, recirculating pumps must be equipped with controls limiting operation to the start of the heating cycle to a maximum of 5 minutes after the end of the heating cycle.

to minimize condensation and resulting corrosion. Documentation of the installation instructions must be provided to be exempted from

Generic Requirements: Must be met by all systems to which the requirement is applicable: 1. All equipment and systems must be sized to be no greater than needed to meet calculated loads. A single piece of equipment providing both heating and cooling must satisfy this provision for one function with the capacity for the other function as small as possible, within

available equipment options. Exception: The equipment and/or system capacity may be greater than calculated loads for standby purposes. Standby equipment must be automatically controlled to be off when the primary equipment and/or system is operating. Exception: Multiple units of the same equipment type whose combined capacities exceed the calculated load are allowed if they are provided with controls to sequence operation of the units as the load increases or decreases.

Each heating or cooling system serving a single zone must have its own temperature control device. Each humidification system must have its own humidity control device. 4. Design heating and cooling loads for the building must be determined using procedures in the ASHRAE Handbook of Fundamentals or an approved equivalent calculation procedure. 5. The system or zone control must be a programmable thermostat or other automatic control meeting the following criteria: a) capable of setting back temperature to 55°F during heating and setting up to 85°F during cooling.

b) capable of automatically setting back or shutting down systems during unoccupied hours using 7 different day schedules, c) have an accessible 2-hour occupant override, d) have a battery back-up capable of maintaining programmed settings for at least 10 hours without power. - Exception: A setback or shutoff control is not required on thermostats that control systems serving areas that operate continuously. Exception: A setback or shutoff control is not required on systems with total energy demand of 2 kW (6,826 Btu/h) or less. designed to supply outdoor-air quantities exceeding minimum required levels, the system must be capable of reducing outdoor-air flow

6. The system must supply outside ventilation air as required by Chapter 4 of the International Mechanical Code. If the ventilation system is to the minimum required levels. 7. Air ducts must be insulated to the following levels: a) Supply and return air ducts for conditioned air located in unconditioned spaces (spaces neither heated nor cooled) must be insulated with a minimum of R-5. Unconditioned spaces include attics, crawl spaces, unheated basements, and unheated garages.

b) Supply and return air ducts and plenums must be insulated to a minimum of R-8 when located outside the building. c) When ducts are located within exterior components (e.g., floors or roofs), minimum R-8 insulation is required only between the duct and the building exterior. Exception: Duct insulation is not required on ducts located within equipment. Exception: Duct insulation is not required when the design temperature difference between the interior and exterior of the duct or

plenum does not exceed 15°F. 8. Mechanical fasteners and seals, mastics, or gaskets must be used when connecting ducts to fans and other air distribution equipment, including multiple-zone terminal units. 9. All joints, longitudinal and transverse seams, and connections in ductwork must be securely sealed using weldments; mechanical fasteners with seals, gaskets, or mastics; mesh and mastic sealing systems; or tapes. Tapes and mastics must be listed and labeled in accordance with UL 181A and shall be marked '181A-P' for pressure sensitive tape, '181A-M' for mastic or '181A-H' for heat-sensitive tape. Tapes and mastics used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked '181B-FX' for pressure-sensitive tape or '181B-M' for mastic. Unlisted duct tape is not permitted as a sealant on any metal ducts.

10. All pipes serving space-conditioning systems must be insulated as follows: Hot water piping for heating systems: 1 1/2 in. for pipes <=1 1/2-in, nominal diameter 2 in. for pipes >1 1/2-in. nominal diameter Chilled water, refrigerant, and brine piping systems: 1 1/2 in. insulation for pipes <=1 1/2-in. nominal diameter 1 1/2 in. insulation for pipes >1 1/2-in. nominal diameter.

1 1/2 in. insulation for pipes <=1 1/2-in. nominal diameter, 3 in. insulation for pipes >1 1/2-in. nominal diameter. Exception: Pipe insulation is not required for factory-installed piping within HVAC equipment. Exception: Pipe insulation is not required for piping that conveys fluids having a design operating temperature range between 55°F Exception: Pipe insulation is not required for piping that conveys fluids that have not been heated or cooled through the use of fossil

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13. Temperature controlling means must be provided to limit the maximum temperature of water delivered from lavatory faucets in public 14. Thermostats controlling both heating and cooling must be capable of maintaining a 5°F deadband (a range of temperature where no Exception: Deadband capability is not required if the thermostat does not have automatic changeover capability between heating and Exception: Special occupancy or special applications where wide temperature ranges are not acceptable and are approved by the authority having jurisdiction. 15. Balancing devices provided in accordance with IMC (2006) 603.17. 16. Demand control ventilation (DCV) required 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: Systems with heat recovery. Exception: Multiple-zone systems without DDC of individual zones communicating with a central control panel. Exception: Systems with a design outdoor airflow less than 1200 cfm. Exception: Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm. 17. Total cooling capacity without economizers must be less than 25200 kBtu/h. This project lists 120000 kBtu/h capacity without 18. Outdoor air supply and exhaust systems must have motorized dampers that automatically shut when the systems or spaces served are not in use. Dampers must be capable of automatically shutting off during preoccupancy building warm-up, cool-down, and setback, except when ventilation reduces energy costs (e.g., night purge) or when ventilation must be supplied to meet code requirements. Both outdoor air supply and exhaust air dampers must have a maximum leakage rate of 3 cfm/ft2 at 1.0 in w.g. when tested in accordance with AMCA Standard 500. Exception: Gravity (non-motorized) dampers are acceptable in buildings less than three stories in height. Exception: Systems with a design outside air intake or exhaust capacity of 300 cfm (140 L/s) or less that are equipped with motor operated dampers that open and close when the unit is energized and de-energized, respectively. 19. All freeze protection systems, including self-regulating heat tracing, must include automatic controls capable of shutting off the systems when outside air temperatures are above 40°F or when the conditions of the protected fluid will prevent freezing. Snow- and ice-melting systems must include automatic controls capable of shutting off the systems when the pavement temperature is above 50°F and no precipitation is falling, and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F. 20. Individual fan systems with a design supply air capacity of 5000 cfm or greater and minimum outside air supply of 70 percent or greater of the supply air capacity must have an energy recovery system with at least a 50 percent effectiveness. Where cooling with outdoor air is required there is a means to bypass or control the energy recovery system to permit cooling with outdoor air. Exception: Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems. Exception: Systems serving spaces that are heated and not cooled to less than 60°F. Exception: Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy. Exception: Heating systems in climates with less than 3600 HDD. Exception: Cooling systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F. Exception: Systems requiring dehumidification that employ energy recovery in series with the cooling coil. Exception: 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.

Exception: Piping within room fan-coil (with AHRI440 rating) and unit ventilators (with AHRI840 rating).

a) equipment capacity (input and output) and required maintenance actions

insulated to 1 in.. Pipe insulation will have a conductivity of less than 0.28 Btu.in/(h-ft2-°F).

d) complete narrative of how each system is intended to operate.

b) equipment operation and maintenance manuals

control systems, in programming comments

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11. Operation and maintenance documentation must be provided to the owner that includes at least the following information:

c) HVAC system control maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions; desired or field-determined set points must be permanently recorded on control drawings, at control devices, or, for digital

12. Service hot water piping, where required, must be insulated to 1/2 in. if pipe less than 1.5 in. nominal diameter. Larger pipe must be

Exception: Pipe insulation is not required for runout piping not exceeding 4 ft in length and 1 in. in diameter between the control valve

SDI

