



COMcheck Software Version 3.9.2

Mechanical Compliance Certificate

2009 IECC

Section 1: Project Information

Project Type: **New Construction**

Project Title : OPTIMUM PERSONAL CARE ASSISTED LIVING FACILITIES

Construction Site:

1110/12/14 LAKEVIEW DRIVE
SUAGR LAND, TX 77478

Designer

ROBERT LIU
REDDING LINDEN BURR ENGINEERS
801 TRAVIS STREET
SUITE 2000
HOUSTON, TX 77002
(713)237-9800
RLIU@RLBENGINEERS.COM

Section 2: General Information

Building Location (for weather data): **Sugar Land, Texas**
Climate Zone: **2a**

Section 3: Mechanical Systems List

Quantity System Type & Description

- 4 1,8,12,17 (Single Zone) :
Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
Cooling: 1 each - Split System, Capacity = 36 kBtu/h, Air-Cooled Condenser
Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes
Fans:
FAN 1 Supply, Single-Zone VAV, 1370 CFM, 1 motor nameplate hp
- 4 2,9,18,18 (Single Zone) :
Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
Cooling: 1 each - Split System, Capacity = 39 kBtu/h, Air-Cooled Condenser
Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
Fan System: FAN SYSTEM 2 -- Compliance (Motor nameplate HP method) : Passes
Fans:
FAN 2 Supply, Single-Zone VAV, 1225 CFM, 1 motor nameplate hp
- 4 3,10,14,19 (Single Zone) :
Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
Cooling: 1 each - Split System, Capacity = 42 kBtu/h, Air-Cooled Condenser
Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
Fan System: FAN SYSTEM 3 -- Compliance (Motor nameplate HP method) : Passes
Fans:
FAN 6 Supply, Single-Zone VAV, 1400 CFM, 1 motor nameplate hp
- 4 4,11,15,20 (Single Zone) :
Heating: 1 each - Duct Furnace, Gas, Capacity = 51 kBtu/h
Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
Cooling: 1 each - Split System, Capacity = 29 kBtu/h, Air-Cooled Condenser
Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
Fan System: FAN SYSTEM 4 -- Compliance (Motor nameplate HP method) : Passes
Fans:
FAN 7 Supply, Single-Zone VAV, 1050 CFM, 1 motor nameplate hp

- 1 5 (Single Zone) :
 Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
 Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
 Cooling: 1 each - Split System, Capacity = 28 kBtu/h, Air-Cooled Condenser
 Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
 Fan System: FAN SYSTEM 5 -- Compliance (Motor nameplate HP method) : Passes
 Fans:
 FAN 8 Supply, Single-Zone VAV, 875 CFM, 1 motor nameplate hp
- 1 6 (Single Zone) :
 Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
 Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
 Cooling: 1 each - Split System, Capacity = 27 kBtu/h, Air-Cooled Condenser
 Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
 Fan System: FAN SYSTEM 6 -- Compliance (Motor nameplate HP method) : Passes
 Fans:
 FAN 9 Supply, Single-Zone VAV, 935 CFM, 1 motor nameplate hp
- 2 7,16 (Single Zone) :
 Heating: 1 each - Duct Furnace, Gas, Capacity = 69 kBtu/h
 Proposed Efficiency = 80.00% Ec, Required Efficiency = 80.00% Ec
 Cooling: 1 each - Split System, Capacity = 50 kBtu/h, Air-Cooled Condenser
 Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
 Fan System: FAN SYSTEM 7 -- Compliance (Motor nameplate HP method) : Passes
 Fans:
 FAN 10 Supply, Single-Zone VAV, 1835 CFM, 1 motor nameplate hp
- 5 Cyclone HE BTX-80:
 Gas Storage Water Heater, Capacity: 50 gallons, Input Rating: 76 Btu/h w/ Circulation Pump
 Proposed Efficiency: 90.00 % Et, Required Efficiency: 80.00 % Et
- 2 Cyclone HE BTX-120:
 Gas Storage Water Heater, Capacity: 60 gallons, Input Rating: 120 Btu/h
 Proposed Efficiency: 96.00 % Et, Required Efficiency: 80.00 % Et

Section 4: Requirements Checklist

Requirements Specific To: 1,8,12,17 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 2,9,18,18 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 3,10,14,19 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 4,11,15,20 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 5 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 6 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: 7,16 :

- 1. Equipment minimum efficiency: Duct Furnace (Gas): 80.00 % Ec
- 2. Equipment minimum efficiency: Split System: 13.00 SEER

Requirements Specific To: Cyclone HE BTX-80 :

- 1. Water heating equipment meets minimum efficiency requirements: Gas Storage Water Heater efficiency: 80.00 % Et (110 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

Requirements Specific To: Cyclone HE BTX-120 :

- 1. Water heating equipment meets minimum efficiency requirements: Gas Storage Water Heater efficiency: 80.00 % Et (164 SL, kBtu/h)
- 2. First 8 ft of outlet piping is insulated
- 3. Hot water storage temperature controls that allow setpoint of 90°F for non-dwelling units and 110°F for dwelling units.
- 4. Heat traps provided on inlet and outlet of storage tanks

Generic Requirements: Must be met by all systems to which the requirement is applicable:

- 1. Plant equipment and system capacity no greater than needed to meet loads
Exception(s):
 - Standby equipment automatically off when primary system is operating
 - Multiple units controlled to sequence operation as a function of load
- 2. Minimum one temperature control device per system
- 3. Minimum one humidity control device per installed humidification/dehumidification system
- 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. Balancing devices provided in accordance with IMC (2006) 603.17
- 14. Demand control ventilation (DCV) present for high design occupancy areas (>40 person/1000 ft² in spaces >500 ft²) and served by systems with any one of 1) an air-side economizer, 2) automatic modulating control of the outdoor air damper, or 3) a design outdoor airflow greater than 3000 cfm.
Exception(s):
 - Systems with heat recovery.
 - Multiple-zone systems without DDC of individual zones communicating with a central control panel.
 - Systems with a design outdoor airflow less than 1200 cfm.
 - Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.
- 15. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings
Exception(s):
 - Gravity dampers acceptable in buildings <3 stories

- 16. Automatic controls for freeze protection systems present
- 17. Exhaust air heat recovery included for systems 5,000 cfm or greater with more than 70% outside air fraction or specifically exempted
Exception(s):
 - Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems.
 - Systems serving spaces that are heated and not cooled to less than 60°F.
 - Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.
 - Heating systems in climates with less than 3600 HDD.
 - Cooling systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F.
 - Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
 - Laboratory fume hood exhaust systems that have either a variable air volume system capable of reducing exhaust and makeup air volume to 50 percent or less of design values or, a separate make-up air supply meeting the following makeup air requirements:
 - a) at least 75 percent of exhaust flow rate, b) heated to no more than 10°F below room setpoint temperature, c) cooled to no lower than 3°F above room setpoint temperature, d) no humidification added, e) the 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 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

NEAL F. DOMINICK, PE
 Name - Title



Signature

5/6/13
 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