



Report of Materials and Equipment Acceptance Division

NYC Department of Buildings
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Pursuant to Administrative Code Section 27-131, the following equipment or material has been found acceptable for use subject to the terms and conditions contained herein.

MEA 193-05-E

Manufacturer: Capstone Turbine Corporation

Trade Name(s): Microturbine Generator System

Product: C30, C60 and C60-ICHP

Pertinent Code Section(s): Reference Standards RS14, RS15 and RS16

Prescribed Test(s): UL 1741, UL 220, UL 984, UL 508A, UL 508C, NFPA 496

Laboratory: Underwriters Laboratories

Test Report(s): UL File Au2687 issued April 21, 1999 revised April 8, 2004, UL File E240758 issued July 30, 2005, UL File E55632 issued April 5, 1974 revised April 25, 2003, UL File E90186 issued June 5, 1984 revised February 3, 2003. UL File SA12384, Project 00NK41516 issued March 12, 2001 revised October 21, 2004. UL letters dated October 5, 2005, August 18, 2005 and August 25, 2005.

Description –

The Capstone C30, C60 and C60ICHP are Microturbine Generator Systems. The units are designed to operate using a variety of gaseous and liquid fuels, such as natural gas, low Btu and high Btu gases, LPG, landfill or digester biogases or diesel fuel. All units have electric generator, which may operate in parallel with the utility electric grid, other electric generators or in stand-alone mode. The Capstone microturbine generator system comprises of an ultra-low-emission turbine coupled with recuperator, combustor and an electric generator. The required fuel gas pressure at the combustor is relatively high (55-60 psig), therefore, a booster fuel gas compressor is required to increase the utility supply gas pressure, which typically ranges from 0.5 psig (Con Edison) to 3 psig (Keyspan) for New York City applications. The C60 ICHP is an Integrated Combined

Heat and Power unit that contains an integral Heat Recovery Module (HRM) to recover waste heat from the microturbine exhaust to produce hot water, hot fluids or steam.

During utility grid voltage interruptions, the microturbine senses the loss of utility voltage and disconnects from the grid and may operate in a standalone mode. When the grid voltage returns to within its specified limits, the microturbine may be programmed to restart and supply power to the connected loads.

The horizontal fuel gas booster as manufactured by Copeland is integrated with the Capstone microturbine units. This fuel gas booster is a variable speed drive device, which serves to boost the inlet supply pressure of low-pressure natural gas to approximately 80-85 psig range, which is the required pressure for fuel injection into the combustor.

Pursuant to "Promulgation of the Rules relating to the Materials and Equipment Application Procedures" dated November 5, 1992, the Bureau of Fire Prevention has no objections letter dated May 15, 2006, F.P Index #:0510039A.

Terms and Conditions: The above units are accepted on conditions that:

1. The microturbine systems shall be installed in accordance with the requirements of the 2002 Edition of NFPA 37, entitled "Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines", NFPA 54 "Fuel Gas Code" and the 2004 Edition of the New York City Electrical Code.
2. The microturbine systems shall be located in a physical location such that they are readily accessible for maintenance, repair and fire fighting. They could be located in detached structures, within enclosed rooms inside buildings, or on the roofs of buildings in weatherproof housings as specified in NFPA 37. NFPA 37 describes the fire resistance rating requirements of the walls, floors and ceilings and the physical separation requirements surrounding the microturbine system and fuel oil storage tanks for various locations of the units.
3. The heat recovery module shall be designed to meet the requirements of ASME Boiler and Pressure Vessel Code Section IV for the low-pressure hot water boilers.
4. Openings from the engine or fuel oil tank rooms to the other sections of the building structure shall be provided with automatic or self-closing fire doors or dampers corresponding to the rating of the room wall.
5. The combustion air, cooling and ventilation air systems shall be designed to prevent hazardous accumulation of flammable vapors or gases in the room.

6. The fuel gas piping shall be designed, installed and tested to meet the requirements of NFPA 37 and §27-922 of Subchapter 16 of the New York City Building Code. The fuel gas piping shall be as specified in Reference Standard RS16. The length of the high-pressure gas piping, which runs from the booster compressor to the gas turbine, shall be limited to a maximum of 12 feet, and all the equipment shall be housed in the same room.
7. The fuel gas supply interface connection and the electrical grid interconnection shall be approved and inspected with proper documentation by the respective utility before the microturbine system is placed in service.
8. The minimum installation requirements for the fire detection and alarm systems and automatic fire protection systems are specified in NFPA 37.
9. Manufacturer's terms and conditions are complied with.
10. Welding of high pressure gas piping shall be in accordance with Reference Standard RS16 of the NYC Building Code.
11. The system shall be used only with piped Natural Gas as the fuel.
12. The system (microturbine and gas booster) shall be installed on a roof of non-combustible construction, in the yard or on a setback subject to distance requirements. The system shall not be installed indoors in the following buildings: mercantile (occupancy group C), business (occupancy group E), assembly (occupancy group F), educational (occupancy group G), institutional (occupancy group H) and residential (occupancy group J).
13. The system (microturbine and gas booster) may be installed indoors only
 - (a) in buildings exclusively used for high hazard processes (occupancy group A)
 - (b) in buildings exclusively used for storage (occupancy group B)
 - (c) in buildings exclusively used for industrial use (occupancy group D)
14. The installation shall be used only for distributed generation/cogeneration of power and shall not be used in lieu of emergency power as defined in §27-396.4 Title 27 of the Administrative Code.

15. Only the Copeland Model #SZN22C fuel gas booster shall be used with the microturbine. In a low pressure gas pipeline, one booster shall be used for each microturbine, while in a high pressure gas pipeline, one booster shall be used for two microturbines.
16. The gas riser piping shall run outside the building except in those installation as outlined in item #13 of this terms and conditions, and shall be no greater than 3" in diameter.
17. A manual valve and an automatic shut-off valve that closes if a leak or break is sensed in the riser/pipeline shall be installed at the base of the riser. Such leak or break shall also shut down the complete system simultaneously so that the gas boosters do not cavitate.
18. Riser piping shall be exclusively used for the microturbine installation. Other gas appliances/equipment are not to be connected to the riser or piping.
19. Any high pressure gas equipment used as an accessory to the microturbine and its related gas booster shall be installed in accordance with the New York City Building Code for high hazard occupancies.
20. A flame arrestor shall be installed downstream of the gas booster to prevent flame propagating to the natural gas fuel lines. Proper allowance in the piping system design shall be made.
21. A diagram shall be conspicuously posted indicating the location of the main fuel shut off valve.
22. Plans for the complete installation including electrical, shall be approved by the New York City Department of Buildings and the New York City Fire Department.
23. The installation shall not be located within
 - Five (5) feet of any building opening, including any door, openable window or intake or exhaust vent.
 - Fifty (50) feet of any area occupied as a multiple dwelling.
 - One hundred (100) feet of any area occupied for educational, health care or religious purposes, area used as a place of assembly or other area of public gathering.
 - Five (5) feet of any parked motor vehicle
 - Five (5) feet of any vent or fill line of any flammable or combustible liquid storage tank.
 - Ten (10) feet of any combustible material.

- Twenty (20) feet of any flammable gas storage.
- Twenty (20) feet of any aboveground flammable or combustible liquid storage tank.
- One hundred (100) feet of any subway entrance, exit, vent or other opening.

24. Safety features shall be incorporated, but not limited to the following:

(a) For the Fuel Gas Booster:

- Motor over current protection
- Inlet check valve to prevent reverse flow
- Low pressure switch
- High outlet pressure switch
- High lube oil temperature switch

(b) For the Microturbine

- Pressure transducer to monitor fuel activity
- Turbine exhaust temperature
- Air intake temperature
- Temperature sensor for the electronics
- Ambient air pressure sensor to monitor blocked air intake
- Over speed control
- High exhaust temperature

25. All annunciators shall be provided locally and remotely if required, to indicate any abnormal situations in the system. The panel shall be located in a continuously supervised location on the premises.

26. The microturbine and compressors shall be shut down automatically and the fuel supply cut off automatically in case any of the parameters monitored exceeds the safe limit.

27. A remote shut down feature shall be installed on the premises to shut down the system remotely.

28. Doors leading to the roof where the units are located shall be alarmed.

29. The enclosure for the microturbine shall be kept in good condition over the years. Panels shall not be kept open or loose.

30. A certificate of fitness (C of F) holder shall be required on the premises. The C of F holder shall be trained by the manufacturer or his authorized agent, to shut down the equipment in an emergency.

31. A Fire Department permit is required.

32. According to the manufacturer's' recommendations, the installation shall be inspected every 8,000 running hours and the equipment replaced every 50,000 running hours.

33. The installation shall comply with the requirements, including testing, of all agencies having jurisdiction.

All shipments and deliveries of such equipment shall be provided with a metal tag, suitably placed, certifying that the equipment shipped or delivered is equivalent to that tested and acceptable for use, as provided in Section 27-131 of the Building Code.

Final Acceptance June 14, 2006

Examined by Donald Gottfried

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