Spec 630-8
12/1/06

Eclipse BoostPak

Packaged Gas Booster Systems

Recommended Specification
Medium Flow Duplex Gas Booster System
With Heat Exchanger

Series MX
Version 3

PART 1 - GENERAL

1.1. DESCRIPTION

1.1.1. SCOPE

This section specifies the unit packaged gas booster system. The contractor shall assign unit responsibility to the booster system manufacturer for the equipment specified in this section.

1.1.2. GENERAL REQUIREMENTS

The Eclipse BoostPak is to be installed when the gas pressure is inadequate to operate the appliances in a building. The BoostPak is typically installed just downstream of the gas meter either inside or outside of the building. The Eclipse BoostPak is a completely integrated skid mounted package designed to boost natural gas pressure with a factory built control system for safe, automatic operation.

1.1.3. TYPE

The packaged gas booster system shall be a complete assembled unit designed to deliver the specified gas at ambient temperatures and humidity levels. All components shall conform to the specifications of Part 2 of this document. The system shall include but not be limited to two appropriately sized gas booster blowers of the hermetically sealed centrifugal type, check valves, gas pressure switch, isolating valves, inlet and outlet piping and flange connectors, pressure gauges, and control system all mounted to a single structural mounting base, assembled, wired, and tested.

1.1.4. SUBMITTALS

Documentation shall be submitted to show conformance to the specifications and shall include but not be limited to pressure and flow performance, dimensions, weight, electrical ratings, and environmental conditions.

1.2. QUALITY ASSURANCE

1.2.1. PERFORMANCE AND DESIGN RESPONSIBILITY

The packaged gas booster system shall be designed and supplied by a single manufacturer who shall assume responsibility for the adequacy of all components. The manufacturer shall perform leak and functional testing at their factory before shipment. The booster manufacturer shall be able to provide factory authorized field service assistance to the contractor for installation supervision and equipment startup. After successful system startup, the manufacturer shall provide (1) one year warranty for all system components.

1.2.2. PERFORMANCE REQUIREMENTS

The booster blower system shall be designed to allow continuous operation with the specified gas over the specified flow, ambient temperature, and humidity ranges. The manufacturer shall review all aspects of the installation in advance including gas piping layout, gas pressure requirements and total load requirements for the project in order to provide a properly operating gas booster system.

1.2.3. QUALITY SYSTEM

The manufacturer shall have an active and documented quality assurance program and the employees shall be qualified to perform their assigned manufacturing tasks.

1.3. ENVIRONMENTAL CONDITIONS

1.3.1. LOCATION

The equipment specified in this section will be located in an
{select one:} enclosed ventilated outdoor exposed
area that is considered
{select one:} non-hazardous hazardous NEMA Class 1, Division 2, Group D.

1.3.2. TEMPERATURE AND HUMIDITY

The equipment ambient temperature will range between _____ and _____ degrees F. Relative humidity will range between _____ and _____ percent.

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PART 2 - PRODUCTS

2.1. TYPE

The booster system shall be standard catalog item BoostPak model series MX… as manufactured by Eclipse Combustion and indicated on the table below. The required maximum and minimum flow rates shall be within the range of the below selected model. The minimum flow rate shall be greater than that which creates an excessive temperature rise on the booster motor.

Parameter	MX3314	MX3412	MX4414	MX4617	MX4619	MX4623	MX4628
Booster	HB3314-½	HB3412-½	HB4414-1	HB4617-1	HB4619-2	HB4623-5	HB4628-5
Minimum Flow[a]	50	150	150	150	150	300	150
Maximum Flow[a]	5,300	11,600	20,400	23,000	17,800	33,000	14,600
Pressure Boost[b]	9	7	7	13	18	26	34

[a] cfh Natural Gas
[b] "w.c. Natural Gas

2.2. EQUIPMENT

2.2.1. BOOSTER BLOWER

The booster blower shall be of the hermetically sealed centrifugal type, designed to deliver the gas at any volume within the capacity range of the booster with a relatively constant added pressure, without encountering any surge characteristics. The rotor shall be constructed of materials designed to prevent friction sparks and shall be accessed through a fully gasketed cover plate assembly which shall allow for easy replacement of the motor without disassembly of field piping or wiring or removal of gas booster. The booster blower shall be UL listed as a unit assembly including the blower motor. The design of the booster shall completely enclose the impeller and explosion proof motor in an air tight housing without the requirement for external shaft seals. The booster shall include a Class I Group D 3450 RPM explosion proof motor which shall be specifically designed and labeled for {select one:} □115 □208 □230 □460 Volt, {select one:} □1 □3 phase, 60 hz power.

2.2.2. CHECK VALVES

Check valves shall be of the swing disk type constructed of heavy-duty cast iron with a lightweight aluminum disk and removable top with gasket for ease of inspection and service. Valves shall be designed to withstand a back-pressure differential of a minimum of 7 psig across the valve seat and all sizes shall require no more than 1.5 inches w.c. forward-pressure differential to open. Valves sized up to and including 2 ½ inches shall be screwed connection. Sizes 3 inches and larger shall be flanged. Check valves shall be FM approved and shall be Eclipse series 1000.

2.2.3. CONTROL SYSTEM

The control system shall be a complete unit factory built to provide safe, proper automatic operation of the gas booster blower system. The control system shall be a standard cataloged item that has been particularly designed for the booster system. The control panel shall be mounted on the base of the gas booster system and completely integrated. Primary voltage shall be the same as specified for the booster blower in section 2.2.1. Control voltage shall be 115/1/60. The circuitry shall also include a programmable controller the stop and start sequencing, alarm functions and off delay timing.

The enclosure shall be rated for the environmental conditions and have UL and CSA listing. Internal panel components shall include but not be limited to a door interlocked disconnect with provision for padlocking, motor starter sized according to NEMA standards or at least one size larger than IEC standards, properly sized motor overload and short-circuit protection, booster on/off/automatic selector switch, alarm, alarm silence pushbutton, adjustable time delays to eliminate booster short cycling, indicating lights with a rated life of at least 20,000 hours, DIN-rail mounted terminals, and numbered wiring.

2.2.4. LOW GAS PRESSURE SWITCH

Wired to the gas booster control system shall be a UL wired and FM approved low inlet gas pressure switch, which shall be set to open when the gas service inlet pressure falls below 3" w.c. When the switch opens it shall de-energize the booster motor control circuit disabling the gas booster and activating both an audible and visual alarm on the face of the booster control panel. The switch shall be of the manual reset type.

Also wired to the gas booster control system shall be a low discharge gas pressure switch. The low discharge pressure switch shall be set to close at a pressure at least 3-4" w.c. below that of the gas booster system rated discharge pressure. When the switch closes it shall activate both an audible and visual alarm on the gas booster control panel. The switch shall be of the automatic reset type.

2.2.5. HEAT EXCHANGER LOOP

A piping loop with heat exchanger shall be installed from the outlet of the booster back to the inlet. The nominal pipe size diameter of the loop shall be sized at one-half of the booster outlet nominal diameter, but not less than 2". The loop shall have provision to prevent flow bypassing the booster in the direction of inlet to outlet. The loop shall have provision to adjust the amount of flow through it from outlet of the booster back to its inlet based on the outlet gas temperature. It shall have a forced air to gas heat exchanger. The heat exchanger shall be of the single pass modular type and shall be constructed of corrosion resistant aluminum. The heat exchanger shall operate when the temperature of the discharge gas is above the set point recommended by the manufacturer. It shall have a temperature regulating system consisting of a sensor measuring the gas temperature in the outlet, a temperature controller, and an automatic butterfly valve. The loop shall include an Eclipse series 1000 check valve, an Eclipse series BV-A automatic butterfly valve, an Eclipse Rotary Actuator, and Eclipse series ETC temperature controller.

2.2.6. AUTOMATIC BUTTERFLY VALVE

Automatic butterfly valves shall be of the rotary disc type with iron body. It shall have an extended shaft with a slot on the end corresponding to the disc position. The make of the actuator and control system shall be the same as the valve and shall be designed to work together as an assembly by the manufacturer. The butterfly valves shall be UL listed for use with natural gas. Valves sized up to and including 4 inches shall be screwed connection. Sizes 6 inches and larger shall be wafer type suitable for flange connections. Butterfly valves shall be Eclipse series BV-A with Eclipse programmable rotary actuator.

2.2.7 DUPLEX ARRANGEMENT

Both boosters shall have motor access on the same side and will have the same outlet orientation and rotation direction. Check valves shall be provided on the outlet of each booster to prevent backflow through the non-operating booster. Each booster shall have a flexible connection and isolating shutoff valve on both inlet and outlet. The BoostPak inlet shall have a single check valve, low pressure switch and pressure gauge. The BoostPak outlet shall have a single pressure switch and pressure gauge.

2.3. CONTROL MODES

The control mode shall incorporate the method of paragraph _____ below.

2.3.1. CONTINUOUS OPERATION

The Eclipse BoostPak is turned on and off manually via a selector switch on the local control panel.

2.3.2. APPLIANCE ON DEMAND

The Eclipse BoostPak is wired through an interlock of one or more devices that require the elevated gas pressure. Typically this type of installation will have dedicated gas piping from the Eclipse BoostPak to the gas appliance(s). The BoostPak is equipped with a Manual/Off/Auto selector switch. Manual turns the booster on (typically used for servicing). Auto will turn the booster on and off as dictated by the appliance interlocks.

2.3.3. FLOW SENSOR DEMAND

The Eclipse BoostPak is supplied with a flow sensor. The flow sensor shall be explosion proof, stainless steel, CE approved calorimetric type which is wired to the gas booster system with an intrinsically safe cable set with quick disconnect fittings. Flow devices with mechanical moving parts shall not be acceptable. When demand is sensed from the sensor, the booster is turned on until demand is over which turns the booster off. This mode is typically used when there are too many appliances that make the Appliance Dedicated mode of operation costly to wire. The BoostPak is equipped with a Manual/Off/Auto selector switch. Manual turns the booster on (typically used for servicing). Auto will turn the booster on and off as dictated by the flow sensor output.