

SECTION: 15550

CHIMNEY AUTOMATION SYSTEM (CASI)

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install a packaged Chimney Automation System and related equipment as shown on the drawings and as specified, complete, including the following:

1. Packaged power venter/control combination, listed to UL378, Standard for Draft Equipment as a complete system.
2. Electrical connections.
3. Stack connection.

1.02 CODES AND STANDARDS

A. In addition to Section 15010, GENERAL MECHANICAL CONDITIONS, the following published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this section:

1. UL – Underwriters Laboratories.
2. National Electrical Code.

1.03 QUALITY ASSURANCE

A. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture and shall be of a standard catalog product.

B. Draft system guaranteed to operate satisfactory and efficiently without objectionable smoke or odor.

C. Scheduled equipment performance is minimum capacity required.

D. Scheduled electrical capacity shall be considered as maximum available.

E. Equipment to be manufactured at ISO 9001 certified plant.

1.04 SUBMITTALS

A. System vendor shall coordinate equipment product data submittal sheets and shall provide a comprehensive set of interfaced drawings and stack design calculations, which shall serve as the basis for system evaluation by consulting engineer.

B. Submit the following to the Owner's Representative.

1. Comprehensive set of mechanical venting calculations based on the Chimney Design Equation published in the ASHRAE Handbook. Calculations must show flue gas volumes, pressure losses and estimated temperatures in each section to assure compliance with fan temperature rating and prevent condensation, if appropriate.
2. Power venter descriptive literature, dimensional diagram and electrical diagram.
3. Control descriptive literature, dimensional diagrams and electrical diagrams.
4. Specification review with respect to submitted equipment identifying all areas of compliance and exceptions.
5. Certification of listing by recognized testing laboratory.

C. Manufacturers not named in these specifications, but those that have received prior approval by the consulting engineer as required within 10 days prior to bid date, shall be permitted one opportunity to receive formal submittal approval. If the consulting engineer does not grant this approval, the contractor shall submit on the manufacturer name in these specifications only or the contractor will be charged for the submittal review time for alternate manufacturers.

1.05 OPERATING AND MAINTENANCE MANUALS

A. Provide to Owner's Representative complete Operation and Maintenance manuals with product literature on the power venter and controls, dimensional and wiring diagrams.

PART 2: PRODUCTS

2.01 MANUFACTURERS, CHIMNEY AUTOMATION SYSTEMS

A. Furnish EXHAUSTO Chimney Automation System(s) with design volume and design pressure as scheduled on the drawings and specified.

B. Alternate manufacturers complying with plans and specifications must be submitted and approved by the consulting engineer within 10 days prior to bid date.

2.02 CHIMNEY AUTOMATION SYSTEM DESIGN

A. The power venter construction must be a Type B, Spark Resistant Construction in compliance with AMCA Standard 99-0401. It shall be of a high-temperature design with backward impeller. The housing must be in stainless steel type 316L with a min. thickness of 0.012" and be of a direct drive design. It must have a service door on the front to provide easy access to the impeller and the vents/stacks. Housing must be resistant to corrosion. The power venter must be rated for a continuous operating temperature of 650°F (350°C) measured at the inlet point. The power venter must be measured and certified to ISO 5801 (*Industrial Fans - Performance Testing Using Standardized Airways*) as well as ISO 5136 (*Acoustics -- Determination of sound power radiated into a duct by fans and other air-moving devices -- In-duct method*) and ISO 3744 (*Acoustics -- Determination of sound power levels of noise sources using sound pressure -- Engineering method in an essentially free field over a reflecting plane*)

B. The backward inclined impeller shall be made in cast aluminum or other non-ferrous material to eliminate the possibility of sparks and the potential of igniting unburned fuel and/or explosive gases. The impeller must be balanced statically and dynamically, and balancing weights must be permanently attached. Clip-on weights are not considered permanently attached.

C. The motor(s) must be a variable speed motor with pre-lubricated and sealed ball bearings requiring no further maintenance. The bearings must be of the high temperature type with a minimum rating of 320°F (160°C). The motor must be totally enclosed, and fan-cooled (TEFC) where the cooling vane must be an integral part of the motor. An external cooling fan is not considered an integral part. To assure motor longevity the motor shall not operate at speeds above 1720 RPM. The power venter must be constructed to allow motor replacement in 30 minutes or less without the necessity to cut the wiring harness.

D. The modulating fan control, EBC30, must be a true PID control and must be able to maintain a constant draft, between 0.012"W.C. and 0.568"W.C with a tolerance of 0.004"W.C., by modulating fan speed. It must be designed so it can maintain a draft setting as well as a separate mechanical room pressure setting. It must be able to adjust to the proper setting in less than 20 seconds after an adjustment is made necessary. The control shall include a chimney probe along with tubing and a pressure transducer, XTP, to be located in the chimney or stack as shown on the manufacturer's submittal. The XTP shall be field wired to the EBC30. (When providing combustion air to a mechanical room it shall also include an outdoor pressure probe with tubing along with an XTP-transducer).

The system must have these features:

1. "Plug-and-Play" self-check that detects connections, setting requirements and accessories.
2. Means to set the required draft pressure and a LCD-panel to display the value. The LCD-panel must also be able to show the actual draft pressure.
3. Programmable microprocessor for selective programming of purge times, sensor sensitivity, alarm limits and delays, language, manual overrides, manual functions, low limit and high limit fan speeds and more via the programming panel and via an RS-232 port.
4. Choice of intermittent and continuous fan operation.
5. A standard board that interlocks with up to 6 boilers so a call for heat activates the power venter and release the burner once an adequate, pre-set draft has been established.
6. The proven draft function must be an integral part of the control to avoid external wiring to separate switch(es). It must be able to be set for automatic or manual reset.
7. Operating Priority option, which allows one or more appliances to operate during electrical or mechanical failure of the fan, provided the draft requirement can be met and safe operation assured. Set up of a default Operating Priority must be possible, so most the important appliance(s) have highest priority during calls

for heat. It must automatically check for fan operation every two hours and go back to normal operation if appropriate.

8. Adjustable pre-purge, so the control will allow the fan to prime the chimney prior to appliance startup.

9. Adjustable post-purge, so the control will allow the power venter to operate for up to 3 minutes after the burner has shut down. It shall have a 12-second built-in delay function to avoid nuisance cutouts.

10. Bearing cycle activation every 7 days in case the power venter has not been operating during the past 7 day period.

11. Means to set the required draft pressure and a LCD-panel to display the value. The LCD-panel must also be able to show the actual draft pressure.

12. Self-diagnostics panel with LED-diodes for verification of proper operation.

13. Alarm functions with fault code showing on LED-display as well as a visual alarm.

14. The control must be able to maintain an error log so the last 10 fault codes can be retrieved.

(USED WITH THREE-PHASE POWER VENTER APPLICATIONS)

F. Furnish a variable frequency drive, Danfoss Model VLT2800 programmed for and approved to operate the power venter(s), as shown on plans.

2.03 STACK CONNECTION

A. Stack connections must be of the slip connection type.

2.04 RELAY BOARD FOR EBC30 CONTROL (For 7 boilers or more only)

A. Furnish an internal relay to interlock multiple boilers with the EBC30's safety functions.

2.05 BALANCING BAFFLES (Multiple atmospheric boilers only)

(FOR NEGATIVE PRESSURE VENT)

A. Furnish balancing baffles, type BBM, for type B gas vent for each boiler and water heater where specified by manufacturer.

(FOR POSITIVE PRESSURE STACK)

A. Furnish balancing baffles, type BBF, for positive pressure stack for each boiler and water heater where specified by manufacturer.

2.06 ELECTRICAL REQUIREMENTS

A. Power supply shall be:

1. To the EBC30 control: 1x120V AC, 60 Hz.

(SINGLE-PHASE POWER VENTER)

2. To the power venter: 1x120V AC, 60Hz.

(THREE-PHASE POWER VENTER)

2. To the variable frequency drive: As shown on schedule.

B. All wiring shall be in accordance with the National Electrical Code.

SCHEDULE

Unit Tag	Servicing	Manufacturer	Model No.	Electrical Data			RPM	HP (kW)
				Amps	Volts	Phases		
Example	B-1, B-2	EXHAUSTO	CASI350	3.5	230	1	1720	1.0 (.75)

1. Install balancing baffles at each boiler and water heater.

2. ____ HP Variable Frequency Drive

Footnote to Specifier: Fill in data

EXHAUSTO	Voltage *	Amps	Voltage *	Amps	RPM	HP (kW)
CASI300	120/1/60	5.8	-	-	1600	0.5 (0.35)
CASI350	200-240/3/60	3.6	460-480/3/60	1.75	1720	1.0 (.75)
CASI400	200-240/3/60	6.5	460-480/3/60	2.90	1720	2.0 (1.5)
CASI500	200-240/3/60	9.0	460-480/3/60	4.0	1720	3.0 (2.2)

*Voltage to VFD, if required. Voltage from power venter to VFD may be different.

PART 3: EXECUTION**3.01 INSTALLATION**

A. Complete structural, mechanical, and electrical connections in accordance with manufacturers' printed instructions.

B. Installing contractor shall install all Chimney Automation System components as indicated on drawings, including low voltage wiring from XTP-sensor to EBC30 controller and line voltage wiring from EBC30 to the power venter. He must ensure the following.

1. Allow satisfactory arrangement in the space available.

C. Connecting to stack:

1. Install per plans and in accordance with manufacturer's printed instruction.

3.02 OPERATING TESTS, START-UP, AND ON-SITE SERVICES

A. System vendor's service organization shall employ senior service technicians having

experience in all aspects of trouble shooting, corrective service, and preventive maintenance O&M reporting.

B. After installation is completed:

1. Test the operation of the chimney automation system and:

a. Increase and decrease draft setting.

b. Increase and decrease firing rate.

2. Test safety control by firing boiler and:

a. Shut off the power venter

b. Shut off the control.

(IF FACTORY START-UP)

A. Provide services of factory representative of chimney automation system manufacturer to:

1. Supervise installation of power venter and controls.

2. Start-up and adjust control and balancing baffles.

3. Test individual controls for proper operation.

4. Set draft for specified operation.

5. Test safety system.

B. Submit a written report signed by manufacturer's authorized representative, confirming that safety and operating controls have been properly installed.

3.03 OPERATING INSTRUCTIONS

A. Instruct Owner's Representative and designated personnel in the proper operation and maintenance of the packaged system.

3.04 MANUFACTURERS WARRANTY

A. All equipment is to be guaranteed against defects in materials and/or workmanship for a period of 24 months from the date of installation, or 30 months from date of shipment, whichever occurs first. The warranty shall be provided by the equipment vendor and shall include the parts necessary to repair or replace all defective parts and materials.