

ENERVEX DEMAND-CONTROLLED EXHAUST SYSTEMS FOR BOILERS AND WATER HEATERS

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This section contains product and technical information only.

For additional information and product pricing please contact your local ECCO Supply Sales Branch.

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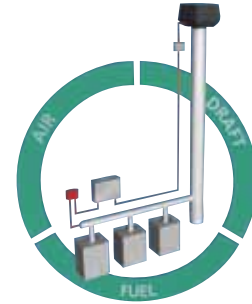
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INTRODUCTION

ENERVEX MAKES IT EASY AND ECONOMICAL TO BE GREEN

If the exhaust system for a heating appliance (boiler or water heaters) does not provide a precise draft for the combustion, it causes the appliance to run inefficiently. An inefficient boiler is not only more expensive to run, but it emits a higher level of emissions.

ENERVEX's demand-controlled exhaust system is designed to optimize the operation of a heating system by maintaining a precise ration of fuel to air, which relies on proper air supply and chimney draft.



A DESIGN THAT FITS EVERY TYPE OF BUILDING

With their air louvers and vent terminations, traditional heating appliance exhaust systems can take up a considerable amount of space, which impacts a building's aesthetics. Also, some buildings are constructed in such a way that an optimal venting system seems impossible to install.

ENERVEX's demand-controlled exhaust system offers a flexibility that other systems can't. Not only does it take up much less space, but because it's not a gravity-based system, it allows the engineers to place the boilers where they are best suited.

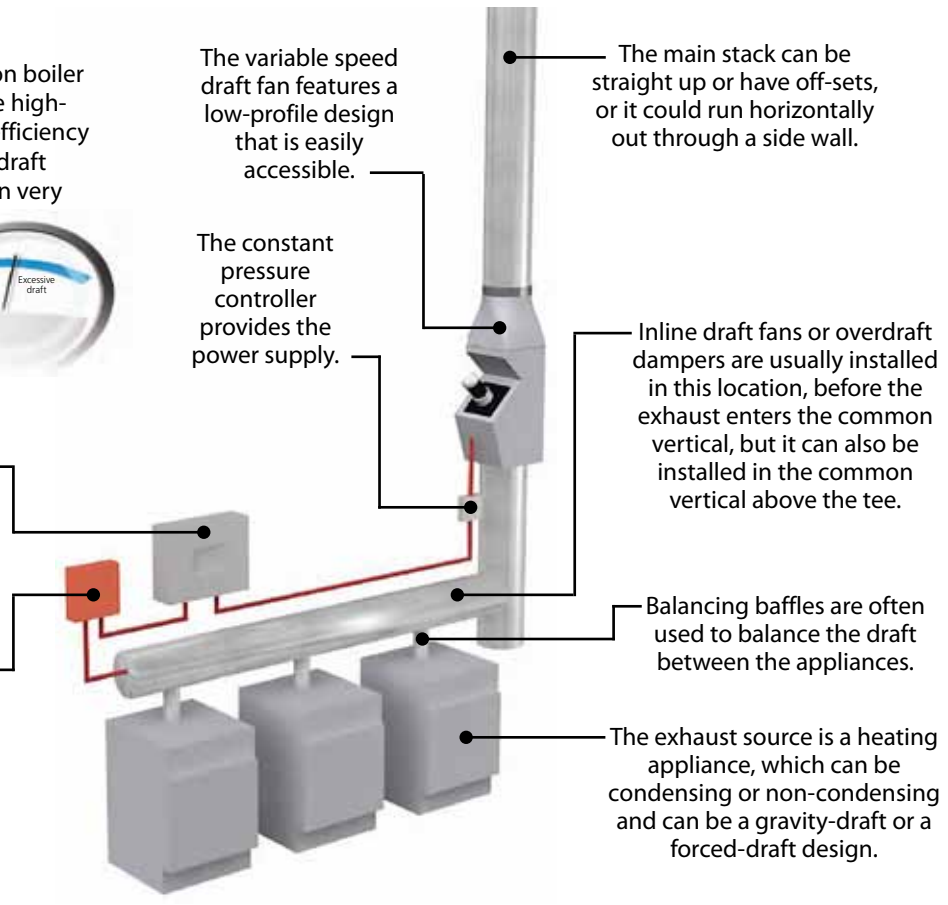
HOW DEMAND-CONTROLLED EXHAUST WORKS

In order to operate efficiently, a boiler must maximize heat transfer by maintaining the precise ratio of fuel to air, which relies on proper air supply and draft. Because many factors affect the draft, including the boiler operation and outdoor temperatures and elements, maintaining the appropriate level can be difficult. Too much or too little draft can cause flame roll-outs or pilot light failures, as well as freezing pipes or drains in cold climates.

A demand-controlled exhaust system maintains a precise draft by constantly adjusting the exhaust rate to meet current demands. The following illustration describes the components and operation of a demand-controlled exhaust system.

Proper Draft is Crucial

Improper draft has a major impact on boiler operation. It's not uncommon to see high-efficiency boilers operating at low-efficiency levels. This is a result of inadequate draft control. A boiler's draft range is often very narrow and draft control can be made difficult when multiple boilers are exhausted through a common chimney.



The variable speed draft fan features a low-profile design that is easily accessible.

The main stack can be straight up or have off-sets, or it could run horizontally out through a side wall.

The constant pressure controller provides the power supply.

Inline draft fans or overdraft dampers are usually installed in this location, before the exhaust enters the common vertical, but it can also be installed in the common vertical above the tee.

The constant pressure controller modulates the speed of the single-phase or three-phase draft fan. It is for indoor installation only.

Balancing baffles are often used to balance the draft between the appliances.

The pressure-differential sensor monitors pressure inside the main stack through a duct probe. It is powered by the controller and provides the control signal to the controller. It can be installed in other locations depending on the application.

The exhaust source is a heating appliance, which can be condensing or non-condensing and can be a gravity-draft or a forced-draft design.

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INTRODUCTION (cont'd)

SUSTAINABLE ADVANTAGES

Economical

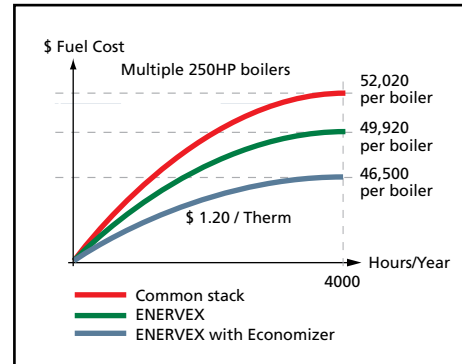
ENERVEX Demand-Controlled			
Fan Cost	Venting Material	Space Cost	Fan Operating Cost
17,000	47,000	23,000	4,000

Combined chimney w/o fan		
Venting Material	Space Cost	Cost of efficiency loss
68,000	40,000	75,000

Life Cycle Cost (LLC) - 15 years, \$1.20/Therm

Over a 15-year period a typical demand-controlled exhaust system serving 4 high-efficiency boilers in a 20-storey building costs 50% less to operate than a combined system without demand-control. Most of these savings are energy savings due to boiler efficiency improvements. And savings can be further enhanced by adding an Economizer.

Energy Savings



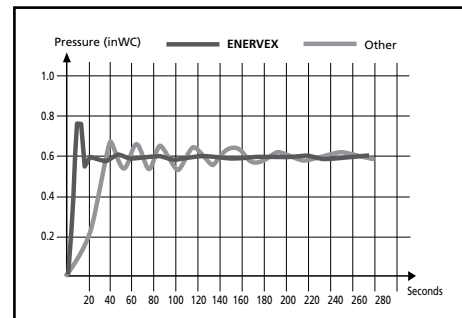
Multiple boilers using a common chimney operate at higher O₂ levels than when exhausted by individual chimneys. A mechanical draft system provides more precise draft control so the O₂ levels can be lowered. Annual savings can amount to 2-4% and thousands of Dollars. Adding an economizer will improve energy savings by up to 5%.

Material and Labour Savings

Venting of 4 high-efficiency boilers in 20-storey building	
Combined sidewall venting with ENERVEX	\$27,500
Combined Venting with ENERVEX	\$68,000
Combined Venting	\$72,000
Individual Venting	\$87,000

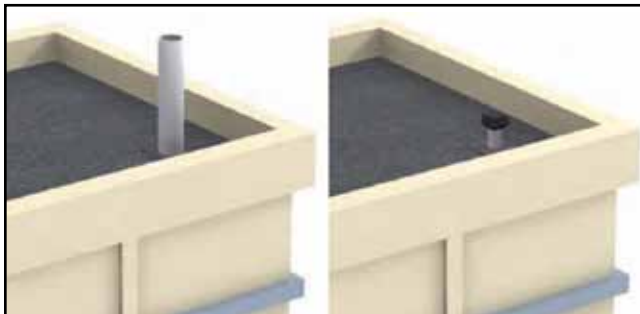
Combining chimneys and reducing diameters can save material and labour when using a mechanical draft system. Smaller chimneys are less expensive to install. Side wall exhaust can save even more material and labour.

Unmatched Performance



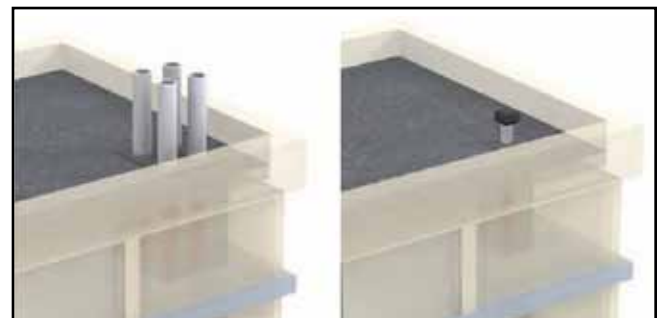
Not only is the ENERVEX system fast in response to demand changes, it's also able to maintain a +/-2% accuracy from set-point. Alternative solutions using a VFD and a pressure sensor only achieve a +/- 20% accuracy, so their savings are over 20% less than that of an ENERVEX system.

Aesthetics



Today's buildings are designed to be both functional and attractive. While the ENERVEX system provides great space savings, it can also keep chimney terminations out of sight. The same applies for combustion air supply where large outside gravity louvers or intakes can be replaced with small louvers when the combustion air supply is provided by an ENERVEX demand-controlled air supply system.

Space Saving



Combining chimneys and reducing diameters can save building space. A smaller footprint could save as much as \$15,000 USD worth of space in a 20-storey building. It also reduces clutter on the roof. Even more space can be saved if redirecting the chimney out through a sidewall.

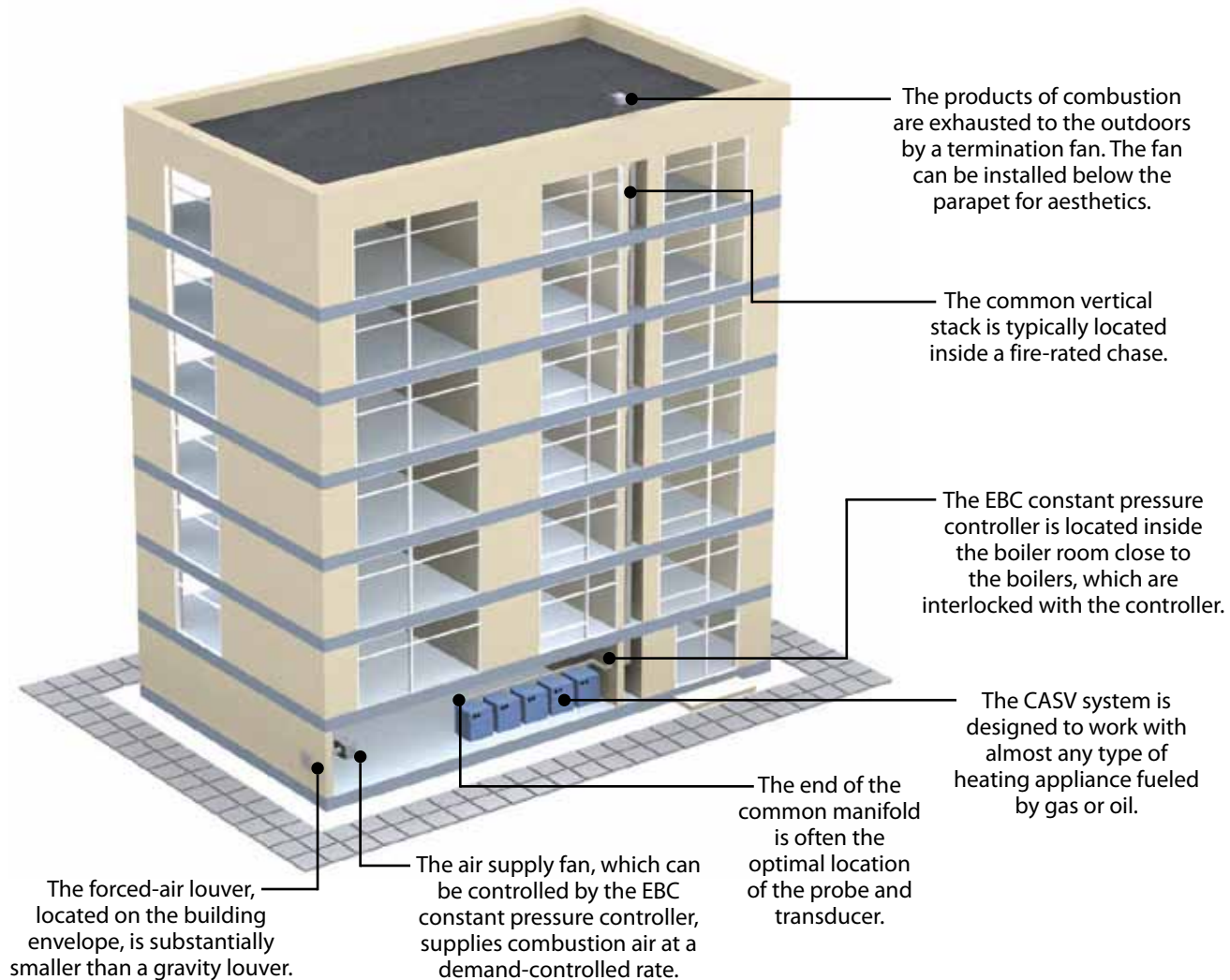
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CHIMNEY AUTOMATION SYSTEM (CASV) — TERMINATION

The Chimney Automation System (CASV) is a demand-controlled exhaust system designed for commercial boilers and water heaters in buildings where the exhaust is powered by a chimney fan on the exterior of the building.

The CASV system can be combined with a Modulating Combustion Air-Supply System that provides combustion air to a mechanical room. A common EBC can control both systems independently.



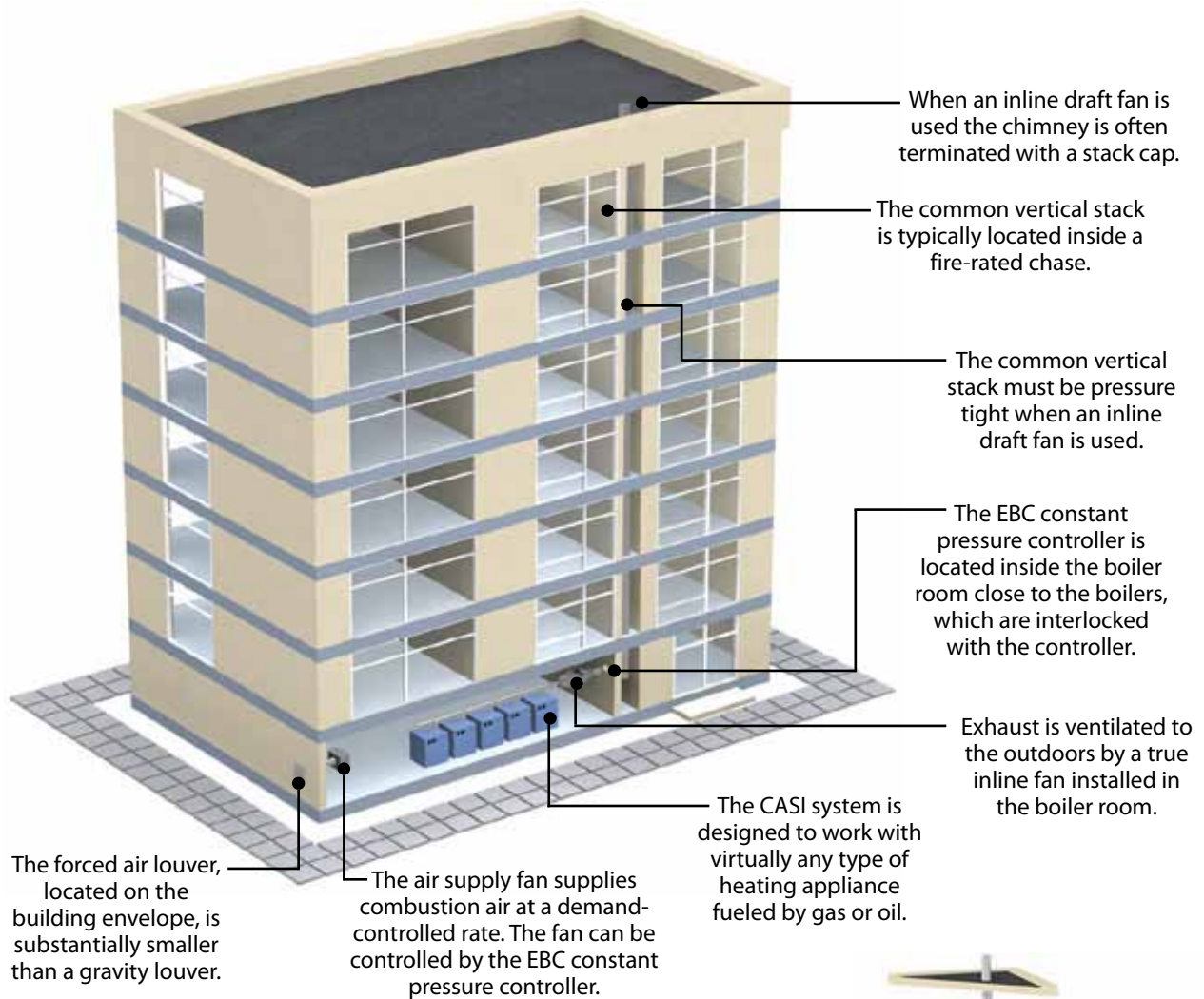
Complete Code Compliance

ENERVEX's demand-controlled exhaust systems comply with all national building codes and standards. In most cases a non-compliant venting installation can be brought into compliance by the addition of a mechanical draft system.

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CHIMNEY AUTOMATION SYSTEM (CASI) — INLINE

The Chimney Automation System (CASI) is a demand-controlled exhaust system designed for commercial boilers and water heaters in buildings where the exhaust is powered by a fan in the boiler room. This system is an option for tall buildings or a building that features sidewall ventilation. The CASI system can be combined with a Modulating Combustion Air-Supply System that provides combustion air to a mechanical room. A common EBC can control both systems independently.



Add Value to the Building

An ENERVEX system can add real value to a building. Through the energy savings generated via the improved boiler operating efficiency value is added by lowering the utility bill. Added value can be as much as six times the annual energy savings. Boiler maintenance cost is reduced while extending equipment life expectancy.



Vertical mounting. Can be installed at the bottom of the vertical for easy access.

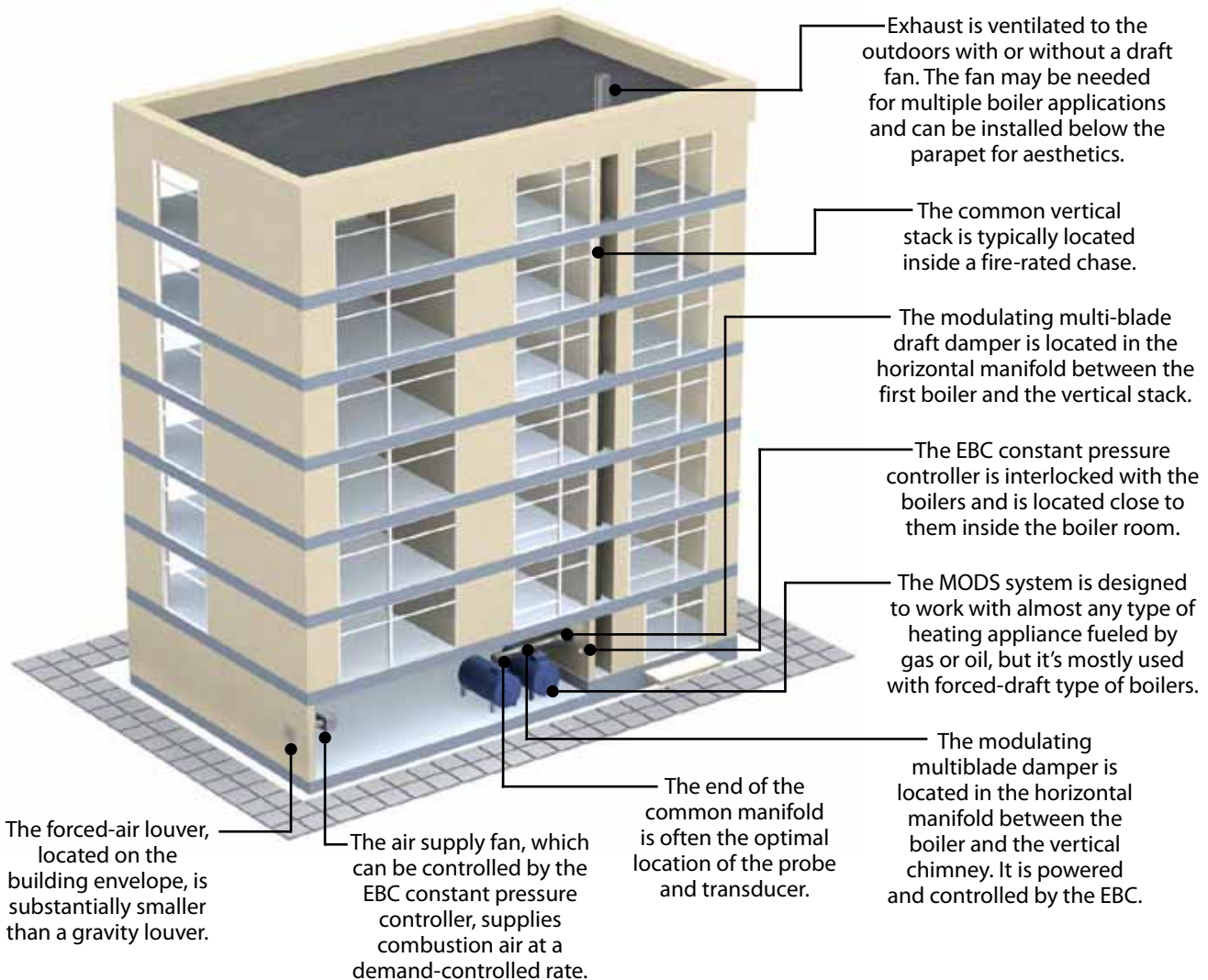
Horizontal mounting. Can be installed in the horizontal manifold for easy installation and access.

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MODULATING OVER-DRAFT DAMPER (MODS)

The Modulating Over-Draft System (MODS) is a demand-controlled exhaust system that's designed for buildings that experience excessive draft in the chimney, which impacts the ability of the heating system to operate efficiently.

The MODS system can be combined with a CASV or CASI Chimney Automation System or/and a MCAS Modulating Combustion Air-Supply System that provides combustion air to a mechanical room.



Eliminate Large Air Louvers

Combustion air supply louvers require a large amount of wall space and can compromise the aesthetics of a building. Although it may be impossible to eliminate them, a mechanical air supply system can reduce the louver size dramatically. This can also eliminate the risk for frozen water pipes and drains in cold climates.

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IPVB-ECO POWER VENTER WITH BOILER ECONOMIZER

Save Energy, Reduce Emissions

The unique, patent-pending IPVB-ECO Power Venter with integrated Boiler Economizer is designed for use with any boiler or water heater with round stacks. The combustion source can be any steam boiler or hot water boiler whether of atmospheric or forced draft design.

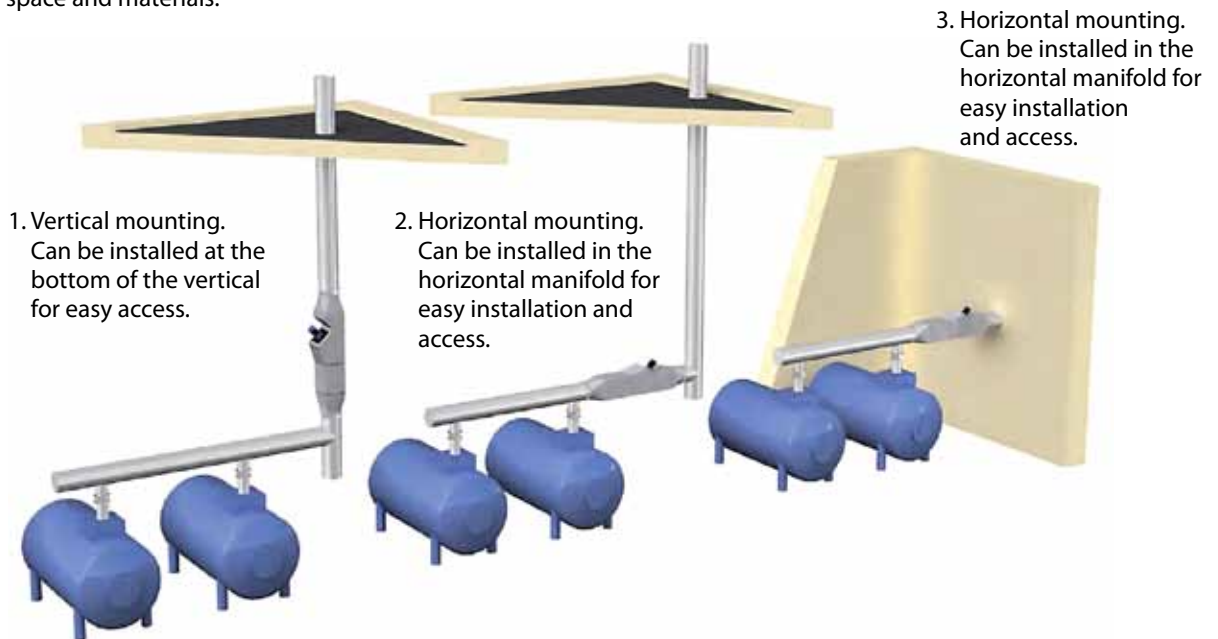
For the first time, the IPVB-ECO allows atmospheric appliances to utilize a boiler economizer. The extremely compact economizer represents a substantial pressure loss in the stack system, but with the assistance of the IPVB power venter, the loss is negated and an EBC30/35 draft controller assures perfect draft at all times and thus perfect boiler operation.

A single economizer can handle multiple boilers. There is no longer a need for individual boiler economizers in commonly vented boiler systems. Downsizing of the stack system is also possible.

The power vented economizer is available in 7" off the shell" sizes and can be installed on any size of boiler stack. It is also possible to down-size the chimney system for additional savings in space and materials.

Typical applications are: boiler feedwater, makeup water, hot water return, hot water storage tank, condensate tank, process water, potable water

- Compact and highly efficient
- A single IPVB-ECO economizer can handle multiple appliances
- Condensing or non-condensing
- Natural gas or LP
- Entering gas temperatures: 300°F (150°C) to 700°F (370°C)
- Ultra-quiet
- Variable speed and direct drive
- Copper or stainless steel fin-tubes
- Simple installation
- Mounting flanges for bolting to mating flanges or adapters



Installation Inside – Vertically or Horizontally

The patent pending design provides a great deal of flexibility. The IPVB-ECO can be installed in virtually any part of the chimney system because it is a true inline fan. It can be installed inside in the vertical section or the horizontal section of the chimney. It can also be installed just inside a wall for sidewall vented applications.

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COMPONENTS

REDUNDANCY FOR CRITICAL INSTALLATIONS

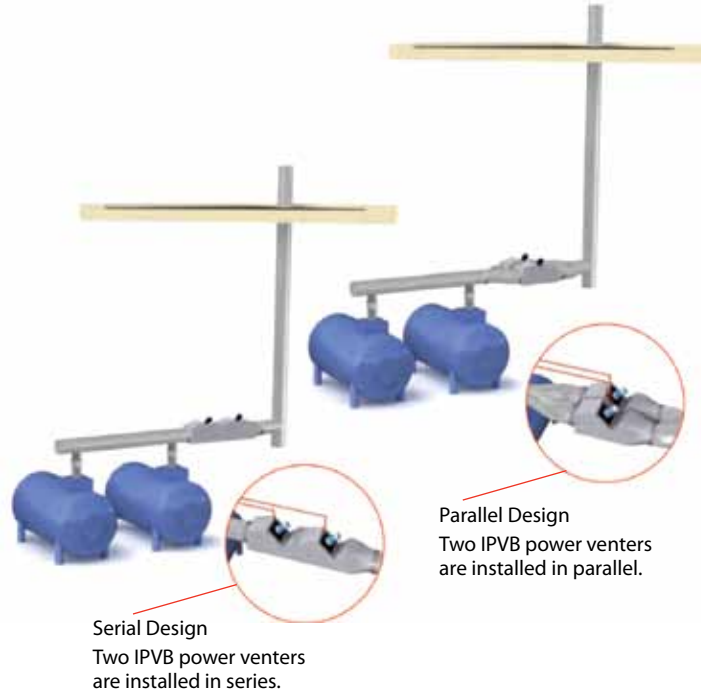
Extra Safety and Guaranteed Uptime

Redundancy is critical in many applications such as hospitals and hotels – just to mention a couple. These are applications where possible downtime during repair, maintenance or system failure is not acceptable. Examples of other redundant systems are pumps, steam boilers, water heaters, generators etc.

ENERVEX offers redundant mechanical draft systems, overdraft damper systems and combustion air supply systems – or a combination of all.

A typical redundant mechanical draft system consists of two individually operated CASI, Chimney Automation Systems, where the inline IPVB Power Venters are installed in a serial or parallel configuration. Each system is individually powered and has its own EBC30 or 35 control, Variable Frequency Drive, and Pressure Sensor. One is designated the “Primary” and the other the “Secondary” system.

The two systems are connected to an EBC25 Redundancy Controller, which monitors the operation of both systems. In case of a component failure, a general mechanical failure or an electrical failure, the EBC25 immediately switches the operation to the “Secondary” system while signaling the Building Management system and/or sending an audible alarm.



IMPROVE BOILER ROOM SAFETY WITH CO MONITORING

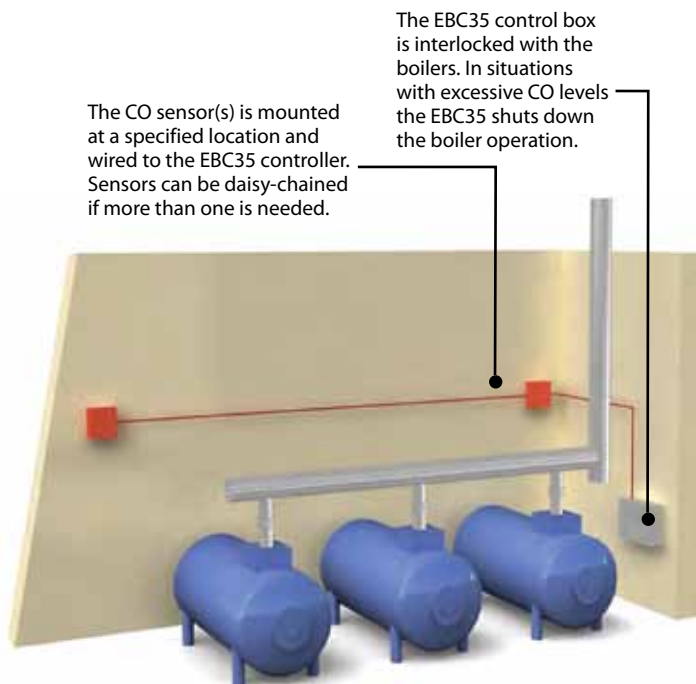
For the Safety of Your Employees

Boiler room safety is becoming increasingly important due to the number of accidents occurring every year.

The EBC35 Draft Control and CO Monitor is an easy way to safeproof your boiler facility. Installation is simple and the control can be interlocked with up to six (6) boilers in a standard configuration and a virtually unlimited number of boilers in a custom configuration.

An integrated Proven Draft Switch function assures that if sufficient draft cannot be maintained, the control will lock out the boiler(s) within an adjustable time period.

The CO transmitter with LCD display monitors CO levels on location and can be daisy-chained, if needed. The CO monitor meets OSHA and other safety requirements and can be set specifically for the individual application. If a dangerously high CO level – or the pre predetermined max. level – is reached the control automatically locks out the boiler(s) within an adjustable time. Automatic reset avoids nuisance lockouts and the need for manual reset. The pressure sensor has dual pressure transducers for monitoring of safe sensor operation. Sensor failure generates an alarm and locks out appliance operation.



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COMPONENTS (cont'd)

RSV CHIMNEY FAN

- Rugged and compact design
- High-efficiency aluminum centrifugal impeller
- Made in cast aluminum for outdoor installation
- Variable speed, direct drive, TEFC motor
- 5 sizes available, ETL and ETLc listed to UL378



		RSV 200	RSV 250	RSV 315	RSV 400	RSV 450
Power Supply	VAC	1 × 120 (1 × 220-240)			3 × 208-240 / 3 × 380-400	
Amperage	Amp	1.4	2.9	5.8	3.5 / 2.1	6.5 / 3.8
Motor Output	HP	0.15	0.2	0.5	1.0	2.0
RPM		1600			1720	
Weight	Lbs	47	60	88	97	128
Duct Connections	Inch	8	10	12	16	16
Max Capacity	CFM	500	1,150	2,000	2,900	3,900

BESB LOW ENERGY SUPPLY FAN

- Low energy fan in compact design
- High-efficiency aluminum centrifugal impeller
- Made in corrosion resistant material for indoor and outdoor installation
- Variable speed, direct drive, TEFC motor
- 4 sizes available, ETL and ETLc listed to UL705



		BESB 250	BESB 250	BESB 315	BESB 400	BESB 500
Power Supply	VAC	1 × 120	1 × 220-240	3 × 200-240 / 3 × 400-480		
Amperage	Amp	5.8	2.9	3.1 / 1.7	6.5 / 2.9	9.0 / 4.0
Motor Output	HP	0.5	0.5	1.0	2.0	3.0
RPM		1600	1400	1720	1720	1720
Weight	Lbs	70	70	84	132	170
Duct Connections	Inch	10	10	12	16	20
Max Capacity	CFM	1,500	1,200	2,400	4,300	5,800

SFTA SUPPLY FAN

- Tubeaxial fan in compact design
- Steel housing and cast aluminum propeller
- Variable speed, direct drive, TEFC motor
- 6 sizes available, ETL and ETLc listed to UL705



		SFTA 16	SFTA 18	SFTA 21	SFTA 24	SFTA 30	SFTA 36
Power Supply	VAC	3 × 200-240 OR 3 × 440-480					
Amperage	Amp	2.8 / 1.4	2.8 / 1.4	4.0 / 2.0	8.2 / 4.1	14.2 / 7.1	23.0 / 11.5
Motor Output	HP	1.0	1.0	1.5	3.0	5.0	10.0
RPM		1750					
Weight	Lbs	53	60	85	97	149	234
Duct Connections	Inch	16	18	21	24	30	36
Max Capacity	CFM	4,000	5,000	7,000	11,000	17,000	31,000

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COMPONENTS (cont'd)

IPVB POWER VENTER

- True inline exhaust fan in compact design
- High-efficiency aluminum centrifugal impeller (stainless steel in 620-models)
- Made in 316SS for indoor and outdoor installation
- Variable speed, direct drive, TEFC motor
- 7 sizes available, ETL and ETLc listed to UL378



		IPVB 300	IPVB 300	IPVB 350	IPVB 400	IPVB 500
Power Supply	VAC	1 × 120	1 × 220-240	3 × 200-240 / 3 × 400-480		
Amperage	Amp	5.8	2.9	3.1 / 1.7	6.5 / 2.9	9.0 / 4.0
Motor Output	HP	0.5	0.5	1.0	2.0	3.0
RPM		1600	1400	1720	1720	1720
Weight	Lbs	34	34	43	58	83
Duct Connections	Inch	12	12	14	16	20
Max Capacity	CFM	1,350	1,200	1,200	3,600	5,400

		IPVB 620-5	IPVB 620-7	IPVB 620-10
Power Supply	VAC	3 × 400-480		
Amperage	Amp	7.5	11.3	15.0
Motor Output	HP	5.0	7.5	10.0
Max. RPM	(Hz)	1,350	1,500	1,740
Weight	Lbs	434	434	444
Duct Connections	Inch	24		
Max Capacity	CFM	10,000	11,500	13,500

IPVB-ECO POWER VENTER WITH ECONOMIZER

- True inline exhaust fan in compact design
- High efficiency cast alu impeller (stainless steel in 620-models)
- Made in 316SS
- Variable speed, direct drive, TEFC motor
- Economizer coil in copper or stainless steel
- 7 sizes available, ETL and ETLc listed to UL378



		IPVB 300	IPVB 300	IPVB 350	IPVB 400	IPVB 500
Power Supply	VAC	1 × 120	1 × 220-240	3 × 200-240 / 3 × 400-480		
Amperage	Amp	5.8	2.9	3.1 / 1.7	6.5 / 2.9	9.0 / 4.0
Motor Output	HP	0.5	0.5	1.0	2.0	3.0
RPM		1600	1400	1720	1720	1720
Weight	Lbs	34	34	43	58	83
Duct Connections	Inch	12	12	14	16	20
Max Capacity	CFM	1,000	890	1,750	3,000	4,750
Max MBH*		2,000	1,800	3,500	6,000	9,000

		IPVB 620-5ECO	IPVB 620-7ECO	IPVB 620-10ECO
Power Supply	VAC	3 × 400-480		
Amperage	Amp	7.5	11.3	15.0
Motor Output	HP	5.0	7.5	10.0
RPM		1,350	1,500	1,740
Weight	Lbs			
Duct Connections	Inch	24		
Max Capacity	CFM	9,000	10,000	12,000
Max MBH*		18,000	20,000	24,000

* Depending on boiler type

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COMPONENTS *(cont'd)*

EBC30 MODULATING PRESSURE CONTROLLER

- Constant pressure fan speed controller for fan or ventilator
- Used with single, modulating heating appliance
- Provides 0-10V or 10-120V signal
- ETL and ETLc listed

Power Supply	VAC (Hz)	1 × 120 (60Hz) / 1 × 240 (50-60Hz)
Amperage	Amp	6.3 / 3.15
Operating Temperature	°F (°C)	-4 to 104 (-20 to 50)
Range of Operation	In WC (Pa)	0-0.6 (0-150)
Output	VAC	10-120 / 20-240
	VDC	0-10
Weight	Lbs	3.0



EBC35 DRAFT AND CO SAFETY CONTROLLER

- Constant monitoring of CO-level and draft
- Can be used as constant pressure fan speed controller as the EBC30
- Used with single, modulating heating appliance
- Provides 0-10V or 10-120V signal
- ETL and ETLc listed
- With CO monitoring

Power Supply	VAC (Hz)	1 × 120 (60Hz) / 1 × 240 (50-60Hz)
Amperage	Amp	6.3 / 3.15
Operating Temperature	°F (°C)	-4 to 104 (-20 to 50)
Range of Operation	In WC (Pa)	0-0.6 (0-150)
Output	VAC	10-120 / 20-240
	VDC	0-10
Relays		2
Range	ppm	0-125
Response Time	seconds	<60
Weight	Lbs	3.0



MICROVLT VARIABLE FREQUENCY DRIVE

- Variable speed drive for use with 3-phase fans and power venters
- Pre-programmed from factory – no field programming needed
- Available for 200-240VAC and 400-480VAC



MDF MODULATING DAMPER CONTROL

- Multiblade damper in 304 stainless steel (316SS available)
- Stainless steel shaft and bearings
- Fast-acting damper motor with brushless DC motor
- Operating temperatures up to 750°F (400°C)
- Equipped with EnerDrive failsafe system
- 16 sizes available



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