Demand-Controlled Exhaust Systems for Commercial and Industrial Bakeries

TRUE GREEN SOLUTIONS

With or Without Heat Recovery

U.S. GREEN BUILDING COUNCIL MEMBER SM

EXHAUSTO

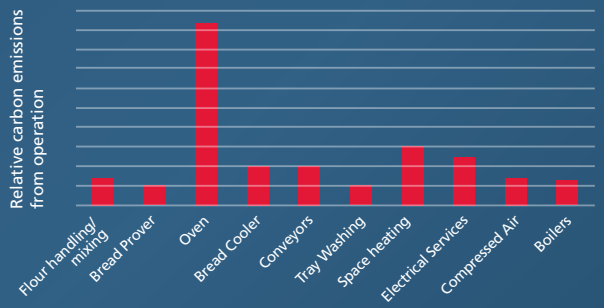
GREEN before green was IN

EXHAUSTO brings energy savings and green operations to the bakery industry

Commercial and industrial bakeries looking to reduce their energy costs should look closely at the amount of energy expended by their baking, deck and tunnel ovens. Even with the sophisticated controls designed to precisely manage the temperature and humidity of the environment, external factors such as atmospheric pressure, outside temperature and wind, can all cause excessive heat to exhaust through the chimney system – often at as much as a 35% heat loss.

This heat loss is typically the result of a fixed-rate exhaust system, which operates at the same level regardless of the demand. EXHAUSTO's Chimney Exhaust System offers a solution based on demand-controlled exhaust, which senses the changes in the environment and adjusts the exhaust accordingly.

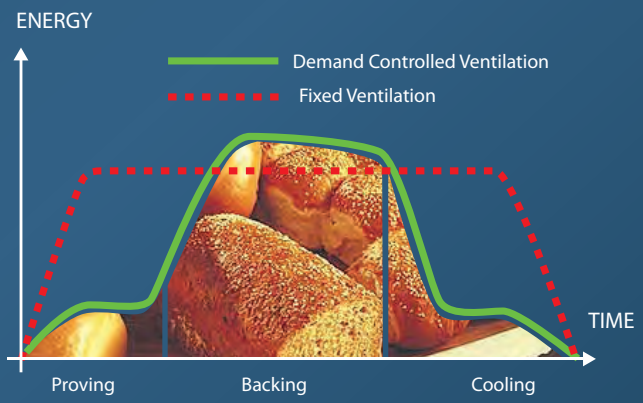
Energy use in Bakeries

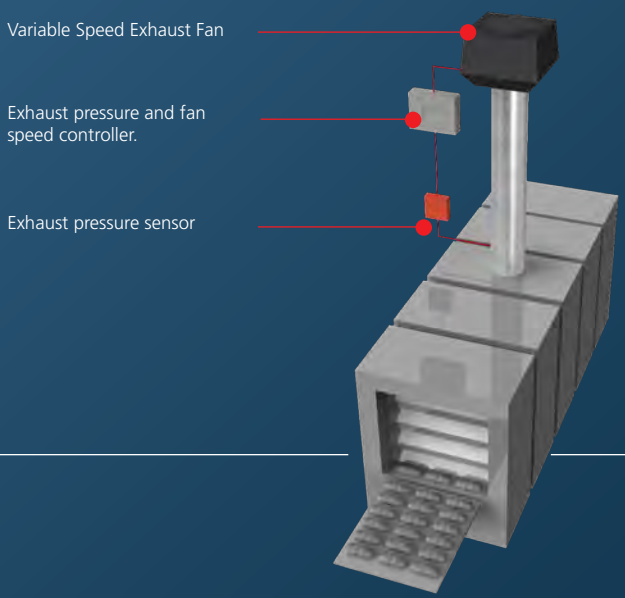


Why demand-controlled exhaust is more efficient than fixed-speed exhaust

The energy required by a bakery varies based on the time of day and the time of year. At peak baking time and during seasons with wide outdoor temperature variations, the bakeries operate at peak capacity, which means exhaust is at peak capacity. Conversely, when baking has slowed or when outdoor temperatures are more moderate, the exhaust requirements are not as high.

Fixed-speed exhaust systems operate at peak capacity 24/7, which accounts for the tremendous heat loss that's often seen in bakeries. A demand-controlled exhaust system accounts for operational variations by sensing an increase or decrease in exhaust demands and adjusting the fans accordingly. The result is significant energy savings.





Sustainability and Savings

Implementing a sustainable solution into the bakery environment doesn't have to be expensive. EXHAUSTO Chimney Exhaust System demonstrates how going green can save you money.

TRUE GREEN SOLUTIONS

Economical

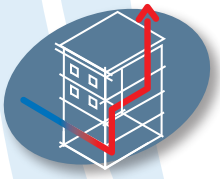
In most bakery environments, a demand-controlled system costs 20% less to operate than a fixed-speed system. The energy savings are the results of combustion-efficiency improvements, and the return on investment is typically very short.

Emission Savings

Improving the oven exhaust control and combustion efficiency reduces carbon emissions – one of the leading causes of greenhouse gasses.

Energy Savings

With more precise exhaust control, the excess air rate can be reduced dramatically, improving the combustion efficiency for an annual savings of anywhere from 5 to 20%.



Material and Labor Savings

Demand-controlled exhaust systems feature fewer exhaust flues with smaller diameters, which reduces the need for multiple roof penetrations.

Other benefits

- Whisper-quiet operation
- Allows for integration with six ovens (standard), or as many as necessary with add-on relay boards
- Easy programming of essential functions
- Choice of termination or inline exhaust fan for use with direct or indirect fired baking ovens
- Listed to UL378, Standard for Draft Equipment and CSA3-B255-M81 for Mechanical Flue Gas Exhausters

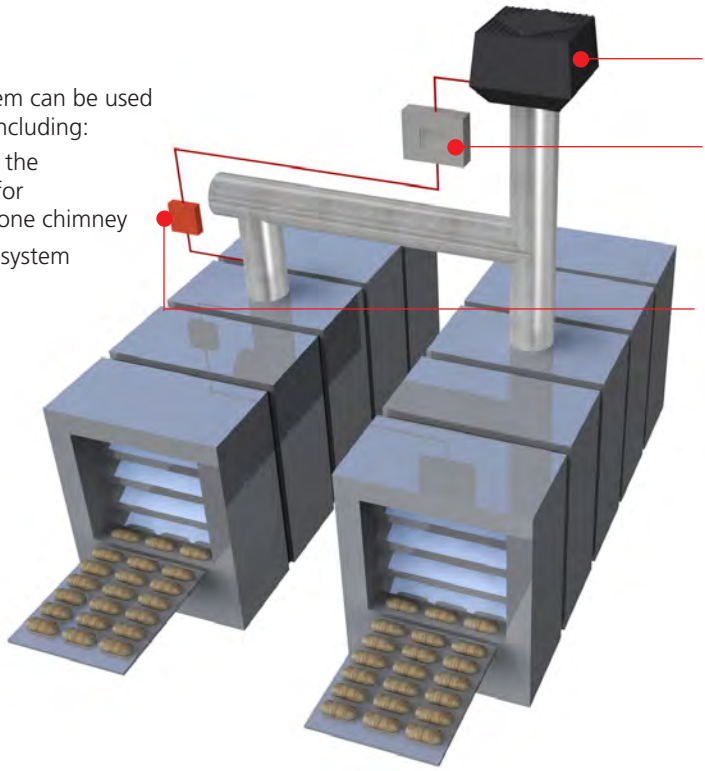
EXHAUSTO Demand Controlled Exhaust Systems

The CASV Chimney Exhaust Systems™

The EXHAUSTO Chimney Exhaust System can be used to achieve several different objectives including:

- A constant and optimum pressure in the chimney for single bakery ovens, or for multiple bakery ovens connected to one chimney
- Design flexibility in the flue/chimney system

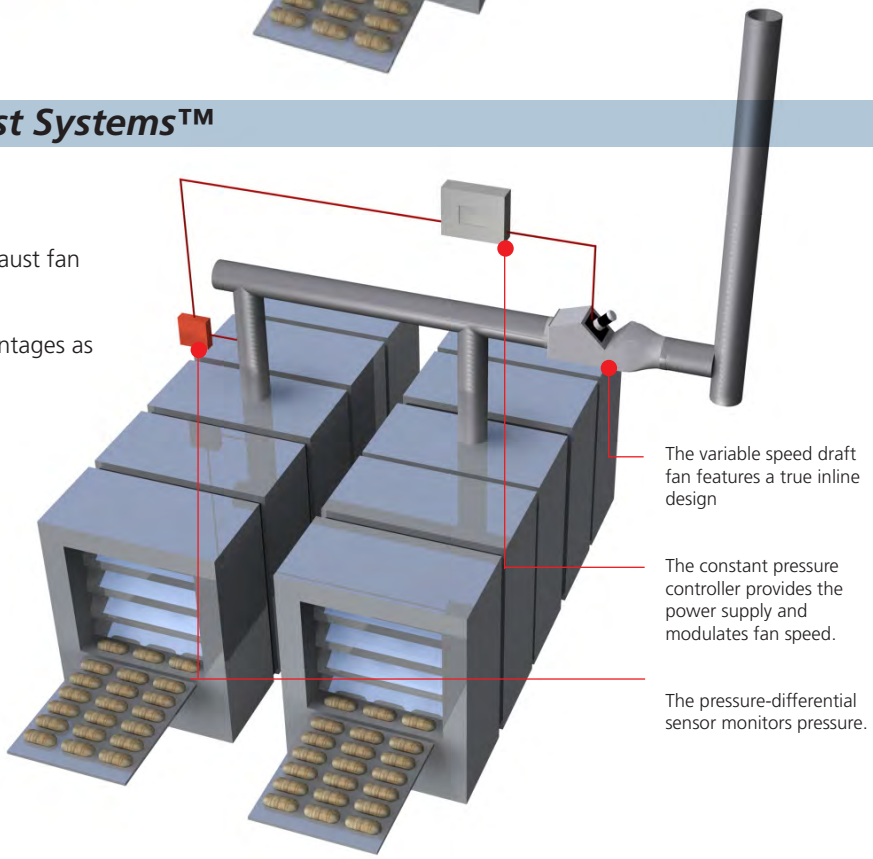
The CASV version is designed around an exhaust fan mounted at the termination of the exhaust.



The CASI Chimney Exhaust Systems™

The CASI version is designed around an exhaust fan mounted inline - normally indoors.

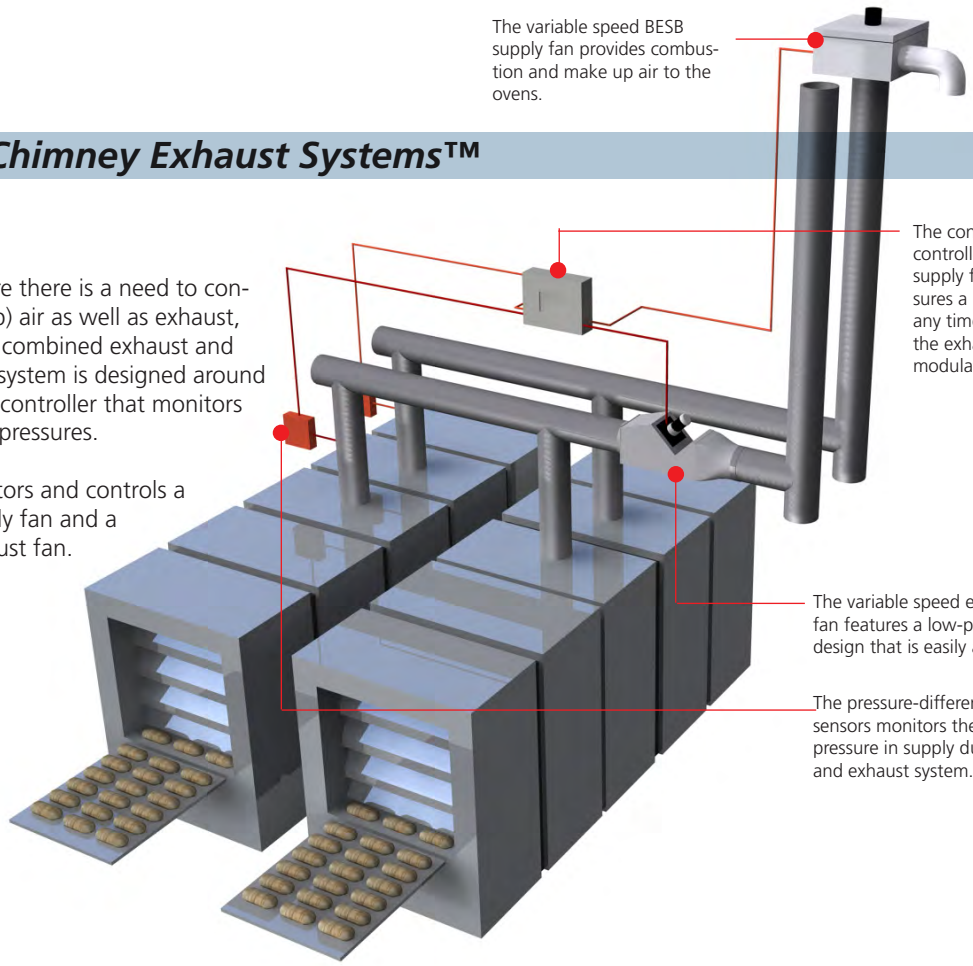
This system has the same features and advantages as the CASV system, but it is accessible inside.



The CASI Chimney Exhaust Systems™

In applications where there is a need to control supply (make-up) air as well as exhaust, EXHAUSTO offers a combined exhaust and supply system. This system is designed around a constant pressure controller that monitors supply and exhaust pressures.

The controller monitors and controls a variable speed supply fan and a variable speed exhaust fan.



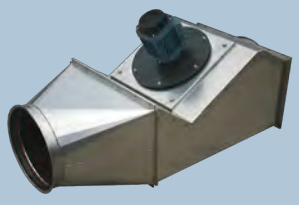
Comprehensive components that deliver value

EXHAUSTO combines quality components, superior technology and experienced personnel to deliver a system that is economical, environmentally sustainable, aesthetically pleasing and reliable. In addition, our custom engineering and space-saving design ensure that the project meets code requirements, as well as the high standards of today's builders.

The following are some of the key components of the EXHAUSTO system:

RSV Low Energy Fan

This fan features a vertical exhaust in a compact design, as well as a high-efficiency aluminum impeller, which guarantees solid performance. It's made of tamper and corrosion-resistant material, has a variable speed class H motor and is available in four sizes. All in Spark Resistant design.



IPBV Low Energy Fan

Made from 316 stainless steel, this compact, low-energy fan is a true inline fan with high performance. It includes a variable speed class A motor and comes available in seven sizes.

BESB Low Energy Fan

This compact, low-energy fan is insulated for quiet operation and delivers high performance. It includes a variable speed class A motor and comes available in four sizes. All in Spark Resistant design.

EBC 30 Modulating Pressure Control

The EBC 30 is a full-featured control that reduces power consumption of the fan and saves energy by supplying constant pressure in the exhaust duct and for the combustion air supply.

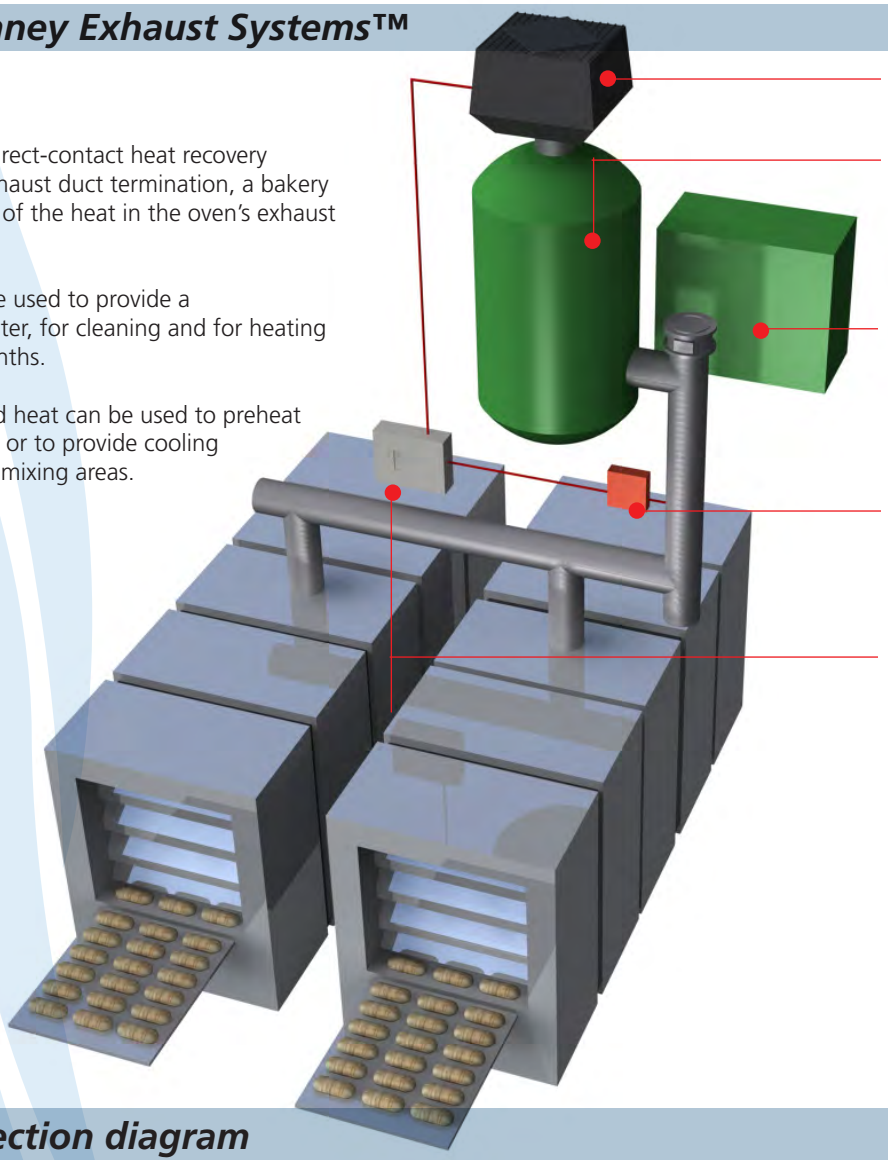
EXHAUSTO Demand Controlled Exhaust System with Direct-Contact Heat Recovery

The CASV Chimney Exhaust Systems™

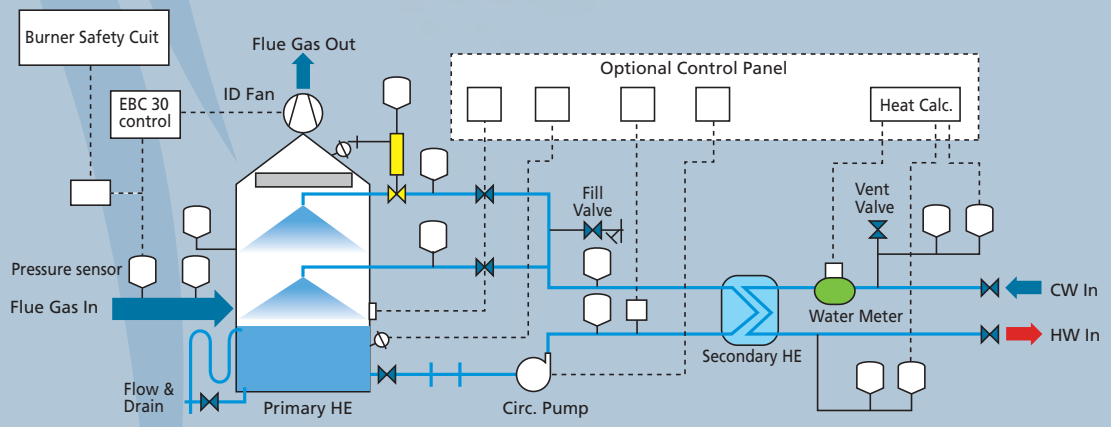
By installing a Greenvex direct-contact heat recovery system in line or at the exhaust duct termination, a bakery can recover 15% or more of the heat in the oven's exhaust gas.

This recovered heat can be used to provide a constant supply of hot water, for cleaning and for heating the offices in the cold months.

Alternatively the recovered heat can be used to preheat the water in steam boilers or to provide cooling for both baking trays and mixing areas.



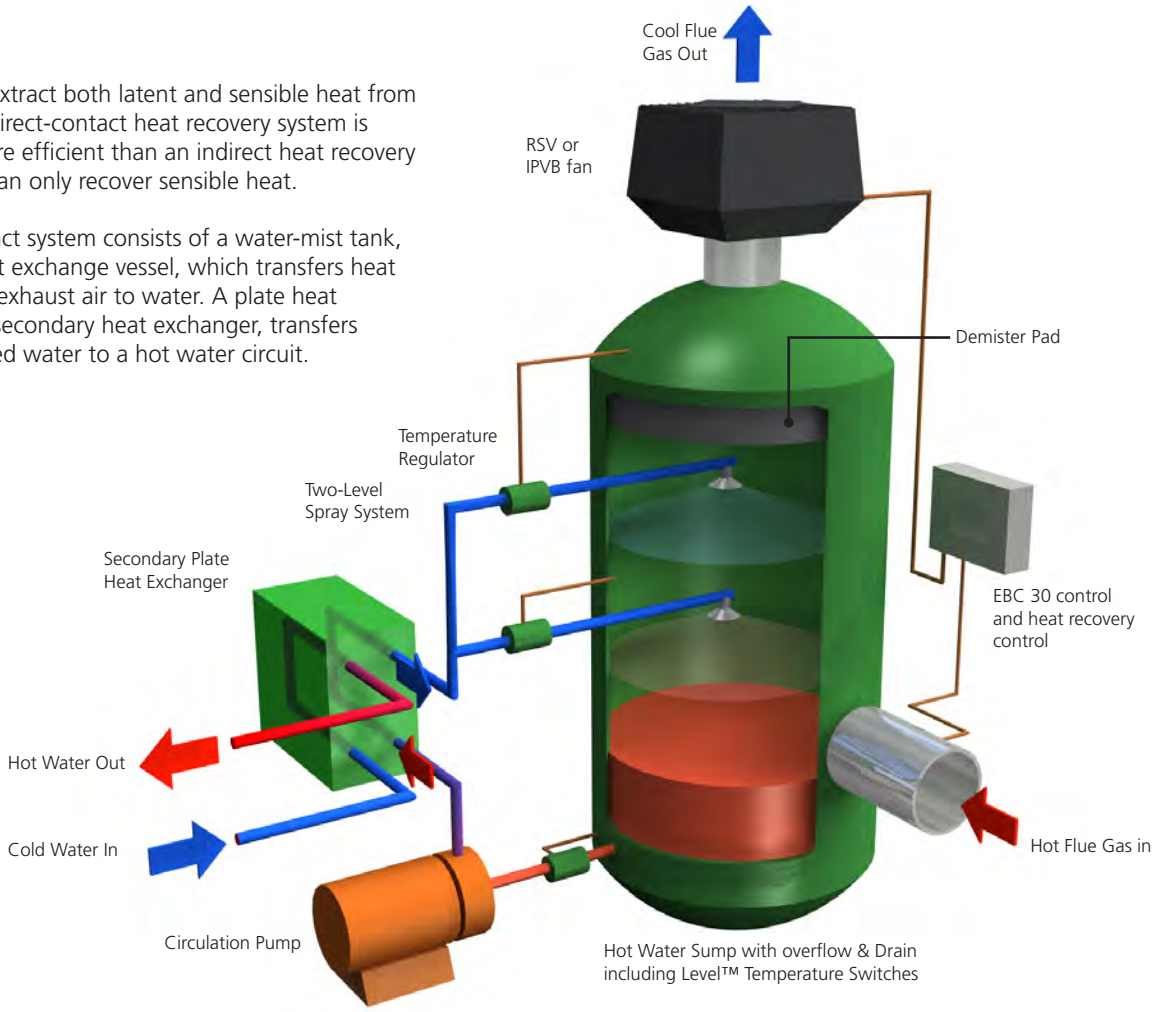
Typical connection diagram



Direct-Contact Heat Recovery – Performance You Can Count on

Because it can extract both latent and sensible heat from the exhaust, a direct-contact heat recovery system is significantly more efficient than an indirect heat recovery system, which can only recover sensible heat.

The direct-contact system consists of a water-mist tank, the primary heat exchange vessel, which transfers heat from the warm exhaust air to water. A plate heat exchanger, the secondary heat exchanger, transfers the stored heated water to a hot water circuit.



Water Circulation and Spray System

The warm exhaust air, or flue gas, enters the vessel at a low point. As the warm exhaust air rises inside the vessel, a dual spray nozzle cluster system sprays the heat out of the exhaust air. This process transfers the heat to the water droplets that collect in the sump of the vessel. A demister mat located at the vessel discharge collects the vast majority of escaping water mist which then drops the sump. A circulation pump transfers hot water from the sump of the vessel through the secondary heat exchanger to upper and lower spray nozzle clusters.

An exhaust fan installed at the vessel discharge point ensures proper flow through the vessel no matter how much exhaust air has entered the system. The exhaust fan also overcomes the substantial pressure losses inside the vessel and through the demister mat.

Draft Control System

A pressure sensor is positioned between the vessel and the oven(s). The exact location depends on the number of ovens serviced. The draft controller accepts the exhaust pressure signal from the pressure sensor and controls the fan speed via a PID control loop to a variable frequency controller.
The pressure controller includes an integral draft proving switch for connection to the burner management and safety circuit.

Cleaning

Regular cleaning is not required as the sludge that collects in the bottom of the vessel and can be drained.

EXHAUSTO – Made By Experience

EXHAUSTO combines quality components, superior technology and experienced personnel to deliver a system that is economical, environmentally sustainable, aesthetically pleasing and reliable. In addition, our custom engineering and space saving design ensure that the project meets code requirements, as well as the high standards of today's builders. At EXHAUSTO, we don't build a one-size-fits-all venting system. We understand that each project is unique and our three-step process allows us to design a venting system that meets the specific requirements of a given job.

The EXHAUSTO Performance Guarantee

Because EXHAUSTO designs the entire venting system, we take full responsibility for its operation. Contact EXHAUSTO for details.

The FanCalc Difference

One of the many things that set EXHAUSTO apart from our competitors is our proprietary design software, FanCalc. FanCalc allows our engineers to quickly and accurately design a venting system because it contains extensive boiler and water heater data, such as operating and exhaust requirements, exhaust temperatures, efficiency, ducts with k-values, resistance factors, insulation factors and more. Instead of spending days or weeks analyzing data, our engineers can enter the information into FanCalc and receive a report that provides the appropriate sizing information, code violation warnings and even design alternatives.

The EXHAUSTO Process

1. Pre-sales analysis

This phase allows us to gather requirements and create a customized sizing report.

2. System design

Using our FanCalc software, our engineers design a system that takes into consideration proper vent type application, operating temperatures, pressure losses and the risk of condensation. It also provides specific wiring diagrams.

3. Engineering and installation support

Every EXHAUSTO system comes complete with job-specific AutoCAD installation instructions and wiring diagrams. Our engineering support teams have access to these files and are available to answer any questions that come up during installation.

EXHAUSTO and LEED

EXHAUSTO's systems qualify for LEED points under the Energy & Atmosphere (EA), Materials & Resources (MR), Indoor Environmental Quality (EQ) and Innovation & Design Process (ID) sections. EXHAUSTO has actively promoted low-energy installations, energy savings, indoor air quality and recycling for decades – long before it became "in". For years EXHAUSTO has been involved in the European legislation processes and has been a member of United States Green Building Council (USGBC) since 2005. Unlike most manufacturers we didn't have to come up with "new" GREEN solutions – we have made them for decades!

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