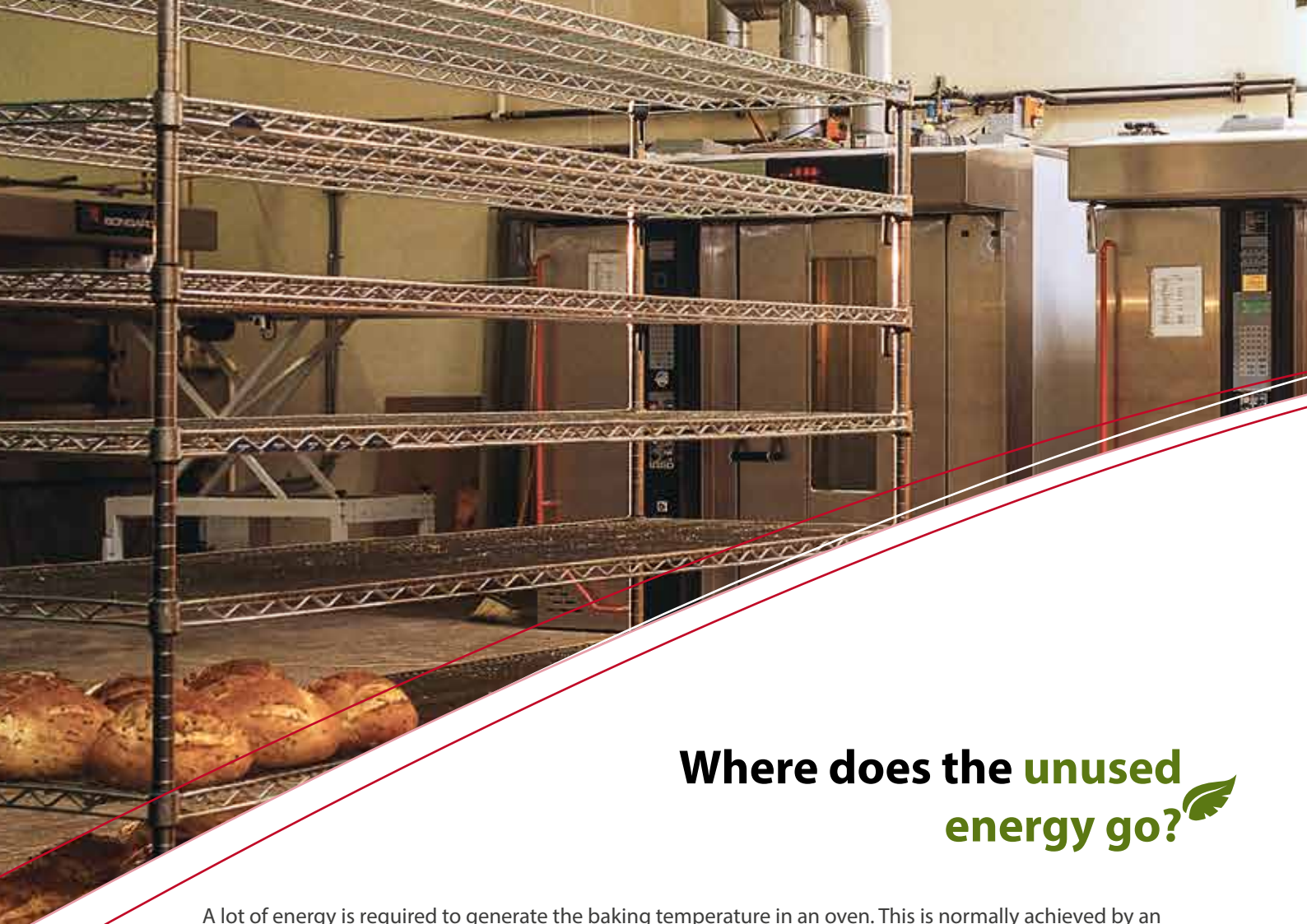




# Heat Recovery

in the bakery

**exodraft**



## Where does the **unused energy** go?

A lot of energy is required to generate the baking temperature in an oven. This is normally achieved by an oil or gas burner. The hot flue gases resulting from this are guided through the oven and a portion heats this up. The rest travel unused into the open air via the chimney.

Dough contains a lot of water, which evaporates during the baking procedure. Additionally, the dough is sprinkled with cold water in the course of the baking process, which also evaporates. This water vapour contains a high quantity of energy which is guided, unused, into the open air via the chimney.

The hot flue gases are cooled further in a flue gas heat exchanger, or the water vapour is condensed in a vapour heat exchanger and the recovered energy can be used again by means of corresponding heat and storage systems.

### **80% heat recovery**

The energy loss from flue gases and vapour is on average approximately 15%, wherein approximately 80% of this can be recovered with an exodraft heat recovery system.

### **ROI in less than 3 years**

Calculations show that the investment in an exodraft heat recovery system is paid off in most cases in less than three years.

### **Latest generation**

exodraft exclusively uses modern plate heat exchangers. These heat exchangers make use of robust and highly-efficient plate modules which have been used in heating technology for many years and little by little will replace existing systems. These are complemented by sophisticated control systems and accessories for the optimisation of the system.





## Competence, knowledge and experience

**exodraft** is a leading global supplier of heat recovery systems for flue gas and process heat. An important requirement for efficient heat recovery is knowledge about chimney and combustion technology. We have made use of this knowledge for more than 50 years. This experience is reflected in our products.

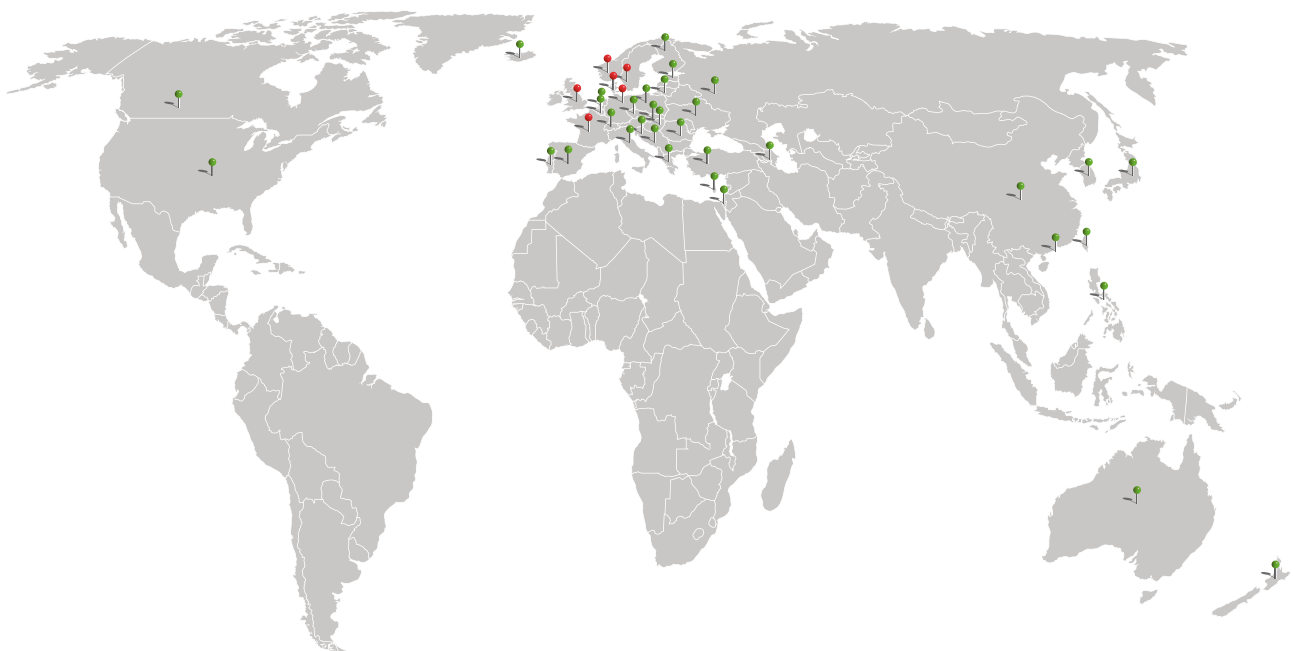
### The widest product range

exodraft offers the widest and most modern product range of chimney fans, controls, heat exchangers and accessories. exodraft chimney fans are able to be used for all types of fuels. In combination with the highly-efficient heat recovery systems, exodraft offers a unique concept, which stands for an optimum use of energy. Not only an advantage for you, but also for the environment.

### Uncompromising quality

Our products are manufactured according to ISO 9001 and stand for a high degree of safety, reliability and uncompromising quality. The market-leading solutions by exodraft set new standards for chimney fans and heat recovery systems.

**exodraft** products are sold globally in more than 40 countries and fulfil national and international standards.





## High energy costs and lack of **consistent quality** in your baked products

Have you ever considered how much energy is truly needed to reach the high baking temperatures required for steaming and baking the water out of baked goods, and how much expensive energy is expelled via the chimney into the environment after the baking process?

Or have you ever asked yourself why you achieve different baking results in winter and in summer?

Generations before us have already examined these problems and, as a consequence, have adapted their baking technique to the weather.

So in summer they would simply bake earlier when it was still cool outside, or not all baked goods were available, depending on the weather conditions.

However, present customer demands, the diverse range of baked goods and just-in-time deliveries for large customers no longer allow for this working method.

Also, the amount of wasted energy that can be found today in many bakeries can no longer be accepted with the high energy prices and the unnecessary CO<sub>2</sub> emissions.

## Why are you putting up with this?

The correct chimney flue at any baking time and modern heat recovery systems can be optimally combined, lead to the reduction of your energy prices and ensure constant production results of your work.





## What does baking have to do with the chimney?

### The correct chimney is crucial

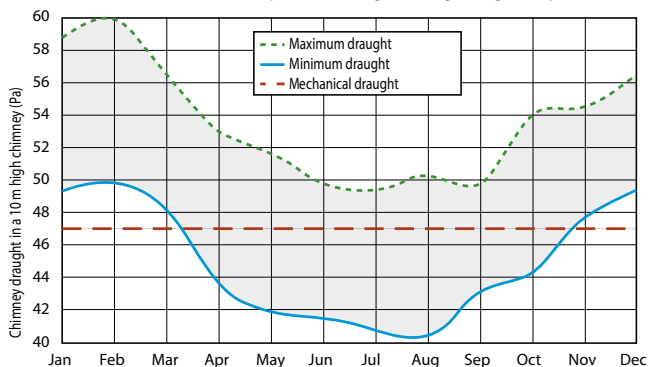
The chimney is the motor of any fireplace. It generates a vacuum using its uplift and conveys flue gas and baking vapours outwards.

The performance of the chimney is limited by the natural uplift which results from the difference in density between warm air in the bakery and cold air outside, and is influenced by the weather. Large resistances due to energy-efficient ovens, filter systems and flue gas heat exchangers can often no longer be overcome with a conventional chimney.

What is accepted as a loss in comfort in private households is unthinkable in modern production plants. Reliable functioning of the chimney must be ensured here for all limiting conditions. These requirements can only be implemented by means of a "mechanical flue gas system".

### Annual variations in chimney draught

At the maximum and minimum temperature, having an average flue gas temperature of 180 °C



Conventional chimneys are subjected to an annual fluctuation in draughts of 40 Pa, such that they often have too high a chimney draught in winter and little to no draught in the summer.

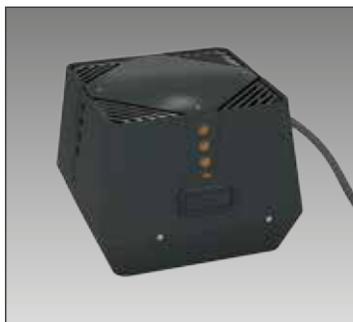
## Additional costs are **saved**

Resulting additional costs can be saved by savings in the system design. Owing to the use of chimney fans, you'd still only need one chimney for several ovens, and you'd have less wastage thanks to consistent baking results. A worthwhile investment!

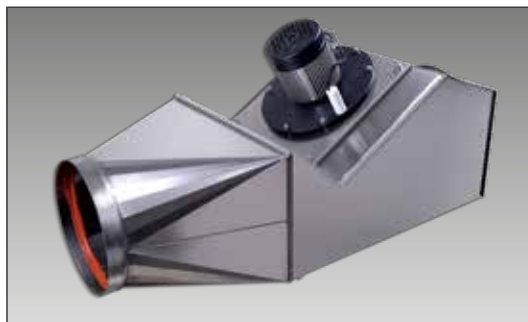
**exodraft RSHT**



**exodraft RSV**



**exodraft CFI**



# A solution for your energy recovery

## Application

Heat recovery systems are used additionally to use the heat which results - and is discharged, unused - via the chimney.

## Baking vapours, -flue gases, -hot air

### Function

The heat recovery from baking vapours and flue gases occurs using a special air/water heat exchanger which is mounted in the vapour path or in the flue gas path. The recovered energy is delivered into the water carrier medium via the heat exchanger and is conveyed to an on-site buffer storage. The recovered heat is directly available, depending on the type of control, for example to support or replace the heating system.

Alternatively, this can also be stored so as to be available for a later production process, for example for shower water, process water or a washer system.

If the loading capacity of the buffer storage is reached, the heat in the flue gas variant is passed over a bypass in the heat exchanger. A safety temperature limiter protects the system from overheating.

### Advantages

- A high level of usage owing to highly efficient plate heat exchangers
- Quick amortisation
- Simple assembly thanks to compact, space-saving design
- Simple maintenance and cleaning
- Complete, self-explanatory system control
- Compatible with all **exodraft** chimney fans



**exodraft** chimney fans ensure an optimum and reliable chimney draught every time

**Flue gas heat exchanger**

**Water vapour heat exchanger**

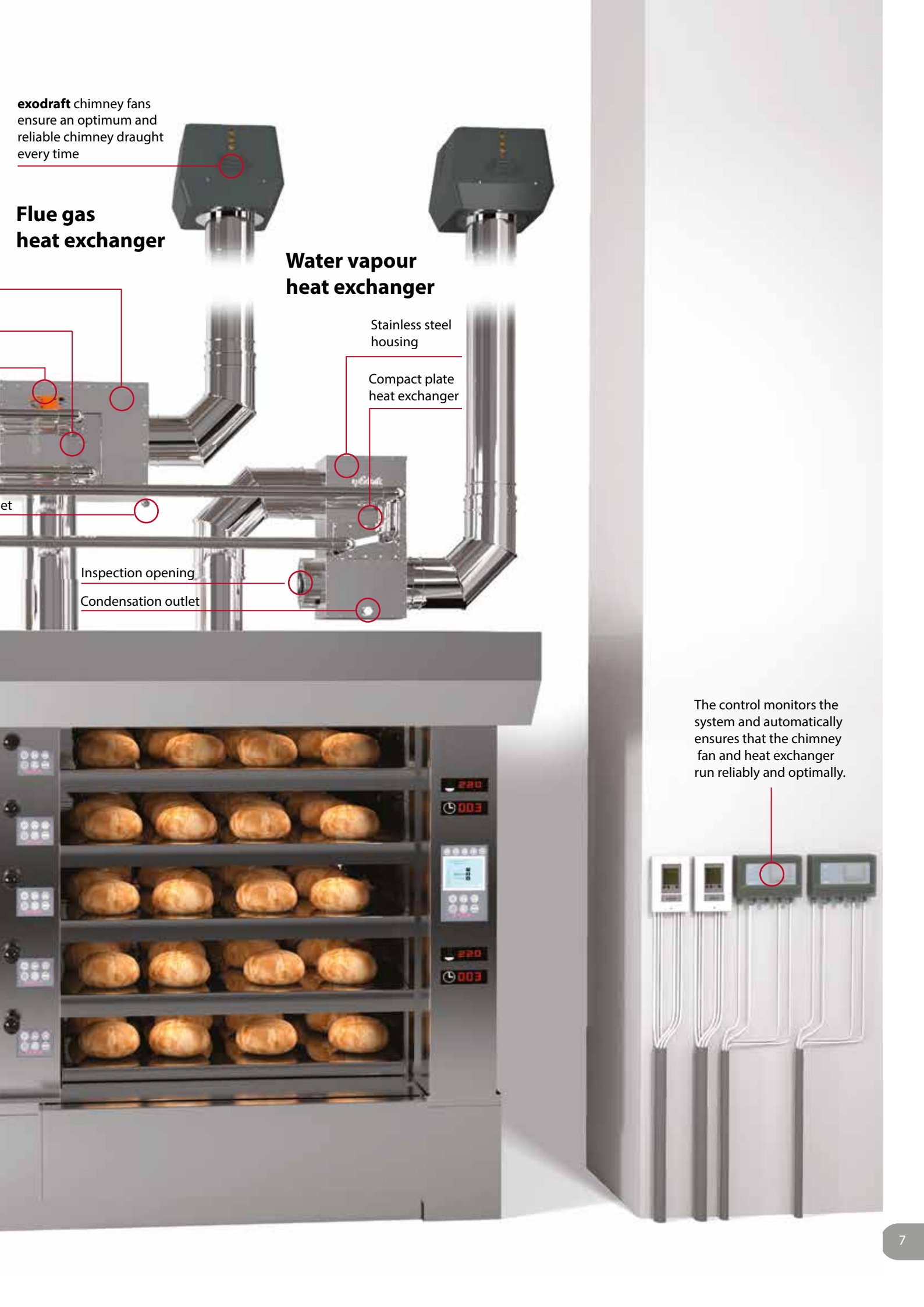
Stainless steel housing

Compact plate heat exchanger

Inspection opening

Condensation outlet

The control monitors the system and automatically ensures that the chimney fan and heat exchanger run reliably and optimally.







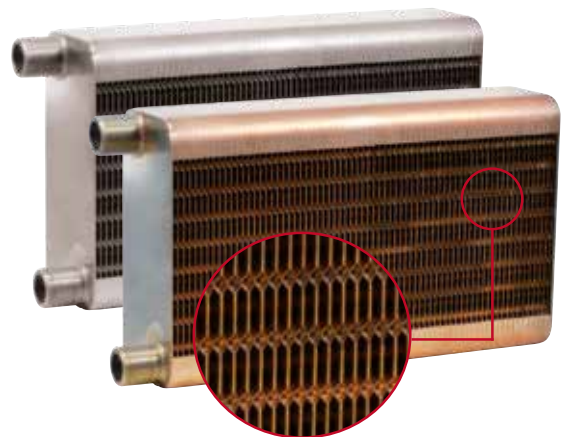
## Heat exchanger uniquely efficient, robust and small

The **exodraft** heat exchangers of the CHR range are compact air/water heat exchanger recovery systems which were specifically developed to recover energy from hot flue gases, process air or steam. The core piece of these systems is the highly-efficient plate heat exchanger which consists of stainless steel and copper. It is distinguished by its robustness and its efficient heat transmission. With its unique and patented design, it ensures a very high efficiency and is also particularly suitable with steam which forms condensation.

For use in acid or alkaline environments, the heat exchanger can be supplied in a combination of stainless steel and nickel. Due to its robust and user-friendly construction, the heat exchanger is easy to clean.

The heat exchanger has a robust stainless steel housing and the flue gas heat exchanger has an integrated bypass. This bypass protects the system from overheating and is also activated if heat consumption no longer occurs.

The **exodraft** heat exchangers have a minimal space requirement due to their compact design.







## Full control and **safety** using the EHC20 control

exodraft ensures the most effective function with maximum safety from the EHC20 control.

### **Control of the bypass function and of the mixing valve**

The EHC20 is the intelligent control for your heat recovery. If the desired temperature of the water is reached, the EHC20 automatically opens the bypass function and the flue gases are discharged again directly into the chimney. Overheating is prevented in this way, and safer operation is ensured.

Furthermore, the EHC20 controls the 3-way mixing valve to ensure the correct circulation and the desired flow temperature.

### **Take a look at the energy that has been saved**

The quantity of energy which is recovered by the heat exchanger can be determined by the integrated heat quantity meter of the EHC20. In this way, you can see the profit of your investment at a glance.

### **Simple start-up with the start-up assistant**

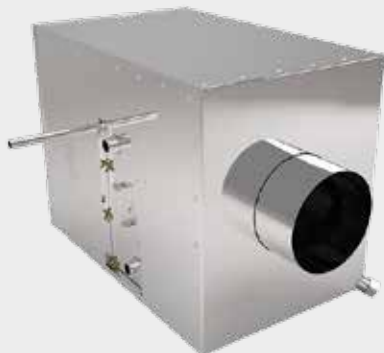
The EHC20 is equipped with a clear display. Using this, you can see all control functions of your heat recovery system. The EHC20 is equipped with an intuitive start-up assistant for simple start-up. All relevant data can be entered here in the simplest manner.

Select your system design from 8 pre-defined heat recovery systems and the start-up assistant guides you through the menu.



# Heat recovery

## CHR-P heat exchanger - flue gas



- For use with dry process air and flue gases
- Available with or without bypass
- Available with or without insulation
- Housing made from stainless steel
- With inspection cover and condensation outlet
- Compact plate heat exchanger
- Available in 9 standard sizes (60-1000 kW)
- For use in connection with oil or gas

	CHR-P 60	CHR-P 80	CHR-P 120	CHR-P 250	CHR-P 300	CHR-P 400	CHR-P 500	CHR-P 750	CHR-P 1000
<b>Burner capacity (kw)</b>	60	80	120	250	300	400	500	750	1000
<b>Max. flue gas temperature (°C)*</b>	350	350	350	350	350	350	350	350	350
<b>Flue gas pipe connection (mm)</b>	150	180	225	250	250	300	350	400	500
<b>Plate heat exchanger</b>	1	1	1	1	2	2	2	4	4

All data applies for heat exchangers with insulation.  
\*Peak temperatures up to 400°C

## CHR-P-S heat exchanger - water vapour



- For use with vapour
- Housing made from stainless steel
- With inspection cover and condensation outlet
- Compact plate heat exchanger with high condensation capacity
- Available in 4 standard sizes
- Self-cleaning effect

	CHR-P-S 60	CHR-P-S 80	CHR-P-S 120	CHR-P-S 140
<b>Max. vapour temperature (°C)</b>	120	120	120	120
<b>Pipe connection (mm)</b>	150	250	300	350
<b>Plate heat exchanger</b>	1	1	1	1

All data applies for heat exchangers with insulation.



# Chimney fans

## Chimney fans for assembly on the chimney cowl

### exodraft RSV



- Robust and compact design
- Vertical drop
- Highly efficient radial impeller made from aluminium casting
- Housing made from aluminium casting for the external assembly
- Variable speed
- Max. flue gas temperature 250°C

### exodraft RSHT



- Robust and compact design
- Horizontal ejection
- Patented cooling fan
- Stainless steel and aluminium casting housing
- Variable speed
- High temperature resistance  
500°C in continuous operation, up to 700°C peak temperature

	RSV 200	RSV 250	RSV 315	RSV 400	RSV 450	RSHT 009	RSHT 012	RSHT 014	RSHT 016
Power supply (V)	1x230			3x400		1x230			
Max. voltage (amp)	0.4	0.8	1.8	3.5	6.5	0.4	0.6	1.2	1.8
Motor capacity (kW)	0.07	0.16	0.37	0.75	1.5	0.09	0.13	0.29	0.37
Rotational speed (rpm)	1400			1720		1400			
Weight (kg)	18	27	37	52	58	12	15	19	22
Max. capacity (m³/h)	1250	1500	3000	4900	7500	350	720	1300	2350

## Inline fan

### exodraft CFI



- Inline fan in compact design
- Highly efficient radial impeller made from aluminium casting
- Produced from stainless steel for the internal and external assembly
- Continuously adjustable
- Max. flue gas temperature 300°C

	CFI 300	CFI 350	CFI 400	CFI 500
Power supply (V)	1x230		3x230	
Max. voltage (amp)	1.8	2.3	5.5 / 2.9	7.8 / 4.1
Motor capacity (kW)	0.27	0.45	1.4	2.56
Rotational speed (rpm)	1350	1300	1680	1730
Weight (kg)	34	42.5	58	82.5
Input (mm)	301	351	401	501
Output (mm)	303	353	403	503
Max. capacity (m³/h)	1850	3050	6375	9150

# Controller

## EBC22 constant pressure regulator (industrial application)



- Automatic flue gas system for one and two heat sources
- Monitors and regulates the chimney draught via the rotational speed of the chimney fan
- Use with XTP sensor
- Kiwa GASTEC tested

Power supply (V)	230 AC $\pm$ 10%, 50 Hz $\pm$ 1%
Max. power consumption	475 W / 3.7 Amp
Dimensions (H x W x D, mm)	204 x 240 x 77
Operating temperature (°C)	-20 to +60
Operating range (Pa)	-500 to +500
IP classification	54
Weight (kg)	1.62

## EHC20 control for heat exchanger systems



- Automatic control of all heat exchanger functions
- Temperature control of the buffer storage

Power supply (V)	240 AC
Max power consumption (W)	0.3-3
Dimensions (H x W x D, mm)	228 x 180 x 53
Operating temperature (°C)	0-40
IP classification	40



# Accessories

## Accessories for the EHC20 controller



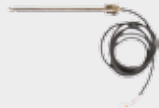
- 3-way mixer
- Internal thread 3/4", 1" or 1 1/4" available



- 3-way mixer servomotor
- 230V



- Sensor for heat quantity metering
- 3/4" for 60-720 l/h (1-12l/min), 1" for 300-6000l/h (5-100l/min) or 1 1/4" for 600-12000l/h (10-200l/min)
- 0-100°C



- Storage sensor for control of an additional heat generator with thermowell



- Adjustment valve - pace setter (controlled by customer)
- Internal thread brass
- TBmax. 100°C, PBmax. 10bar
- Safety temperature limiter with T-joint connection



**Want more information?**

Visit our website

[www.exodraft.com](http://www.exodraft.com)



## Notes

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