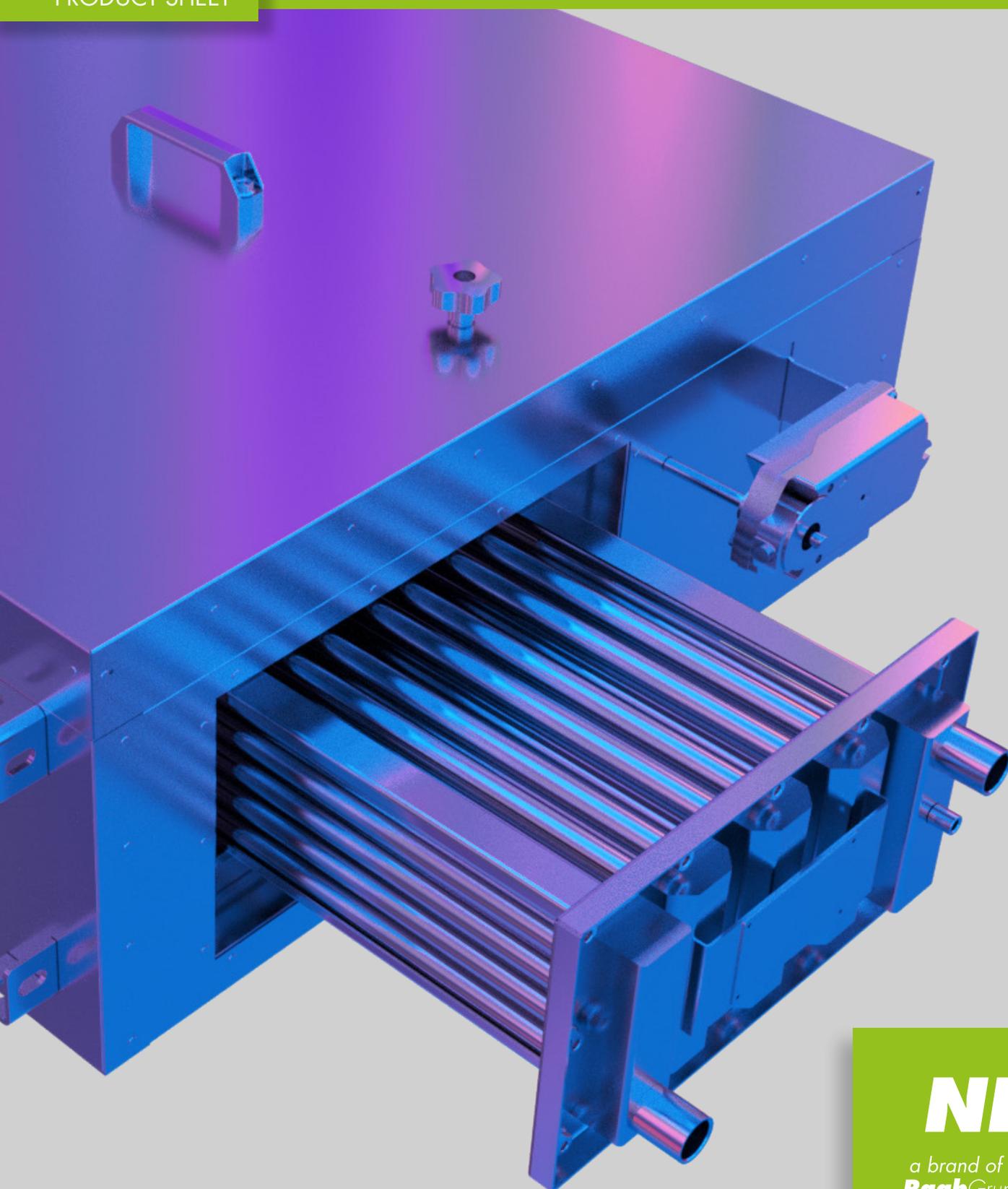


THERMOJEKT®

Heat recovery for trade and industry

PRODUCT SHEET



NET

a brand of the
Raab Gruppe 

HEAT RECOVERY WITH NET

HOW IT WORKS

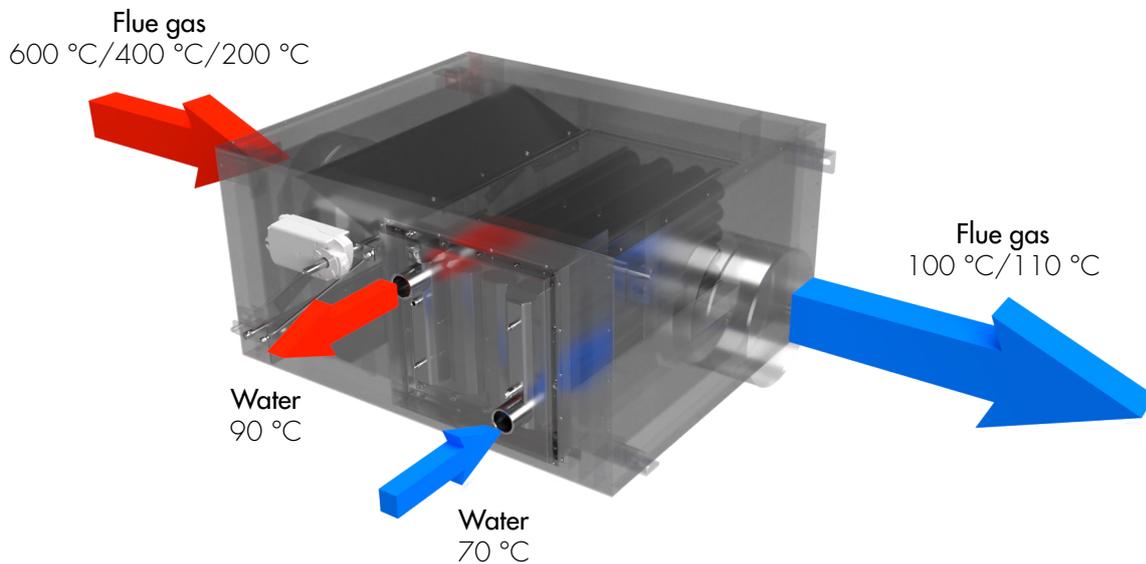
Companies with energy-intensive thermal production processes can significantly reduce their energy costs and emissions by systematically recovering heat from flue gases or fume extraction systems with the help of heat exchangers. In this way, heat from exhaust gases is not discharged unused, but recovered and can be used during ongoing operation. The heat exchangers can be easily integrated in new plants as well as in existing ones.

A flue gas heat exchanger works according to the following principle: The heat exchanger transfers the waste heat from the flue gas or fume extraction to the water that flows through the heat exchanger's coil. This heats the water and cools the flue

gas. The heat recovered from the flue gas can be further used elsewhere, for example for heating buildings and production facilities, for air heating, for preheating production water, for hot water production and much more.

NET's Thermojekt heat exchangers are particularly efficient. They are available in various designs. The flue gas heat exchangers with smooth or finned tubes recover the heat from flue gases.

With vapour condensers, the high condensation heat can be recovered from polluted humid air, such as baking vapours or fume extraction systems contaminated with suspended particles.



ADVANTAGES

Larger companies are legally obliged to reduce primary energy consumption through energy audits and energy management systems. Although these regulations do not yet apply to small and medium-sized enterprises (SMEs), competitive advantages can be achieved through lower production costs by using heat recovery.

As a rule, companies in Germany also benefit from a subsidy from the Federal Office of Economics and Export Control (BAFA), which reduces investment costs.

Regardless of the size of the company, the use of heat recovery systems means:

- ✓ Significant energy cost savings
- ✓ Reduction of emissions
- ✓ More environmentally friendly production
- ✓ Less dependence on energy prices
- ✓ Use of subsidies and tax breaks
- ✓ Image improvement for your company

AREAS OF APPLICATION

Energy is usually one of the most important production factors for industry and commerce and often one of the largest cost factors. The ambitious climate targets, in Europe and world-wide, and the limited resources make the economic and efficient use of energy increasingly important. Especially in energy-intensive industrial plants, heat recovery can make production more cost-saving, efficient and environmentally friendly. The following industries are particularly suitable for this:

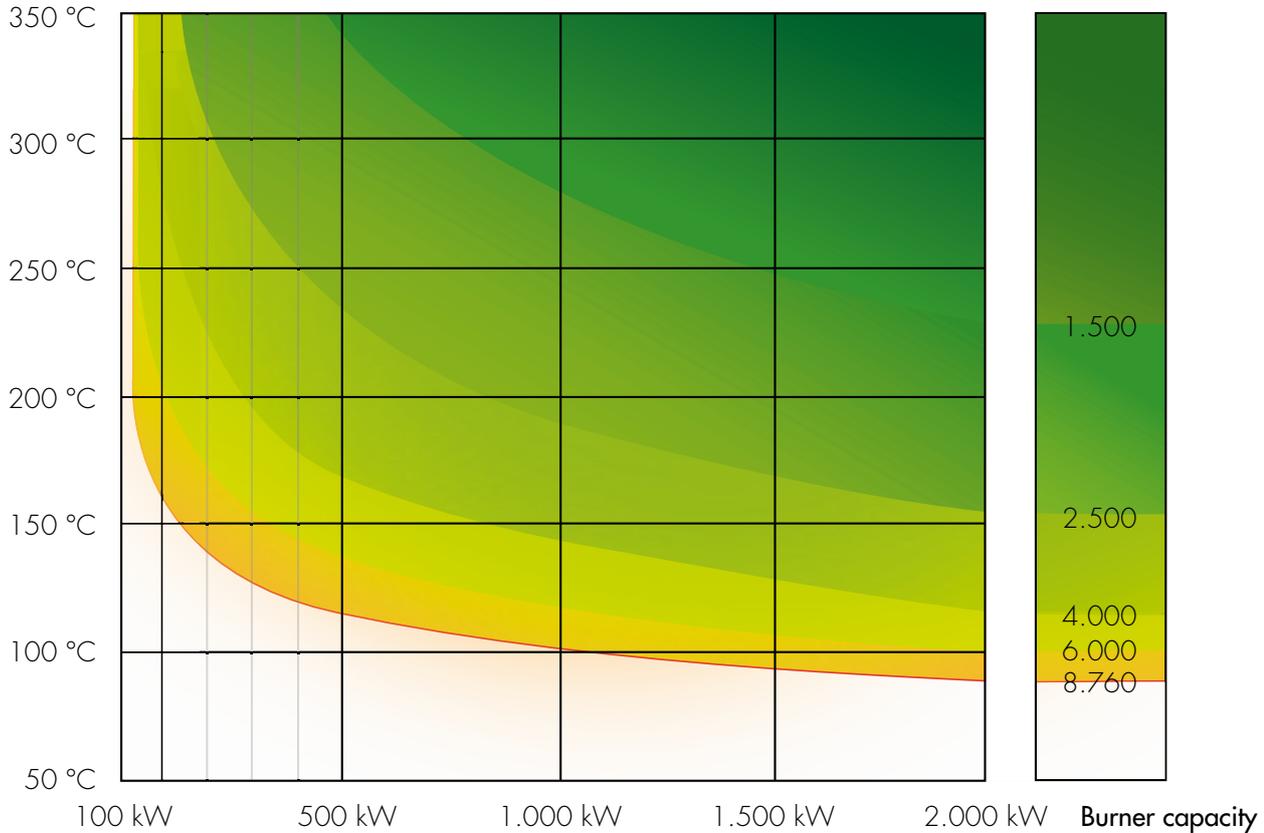
- ✓ Industrial bakeries
- ✓ Food industry
- ✓ Hardening shops
- ✓ Foundries
- ✓ Metal processing companies
- ✓ Companies for plastics production
- ✓ Ceramic industry
- ✓ Companies with thermal processes
- ✓ Companies with combustion of industrial solvents

WHEN DOES HEAT RECOVERY MAKE SENSE?

Today, rising energy prices allow for shorter and shorter payback periods. The operating times and the size of the system determine how long the amortisation takes.

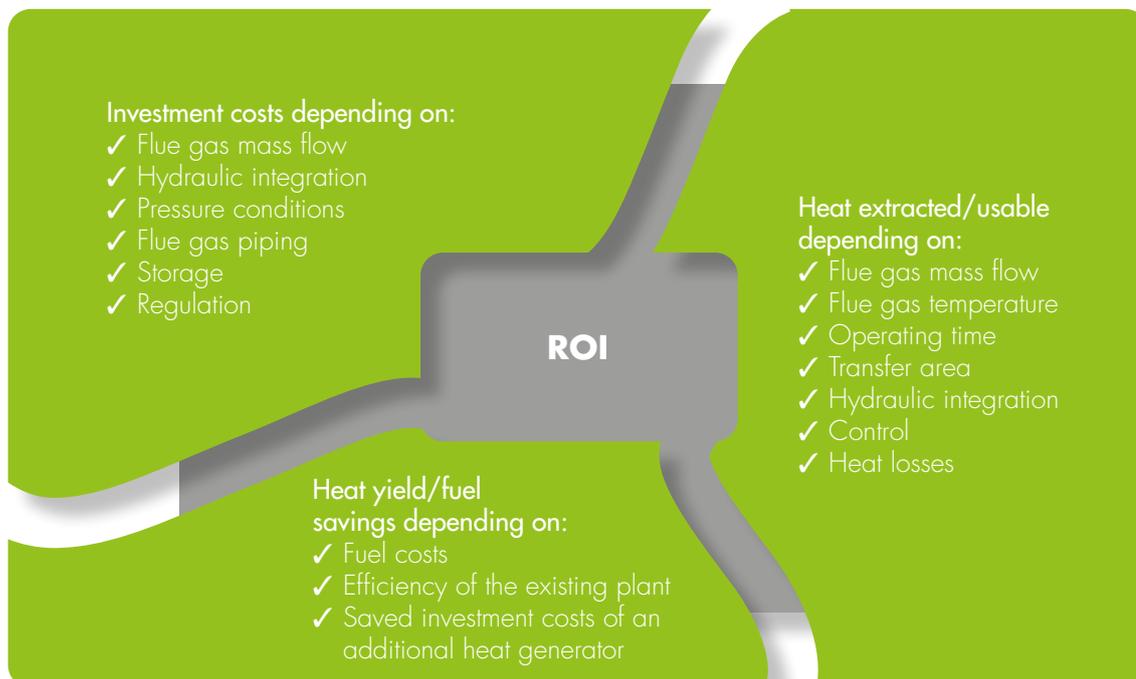
Flue gas temperature

Operating hours per year



Heat price 4.0 ct/kW, maintenance costs 2%/year based on the investment, payback period 5 years, interest rate 1.4%, one-time subsidy 30%.

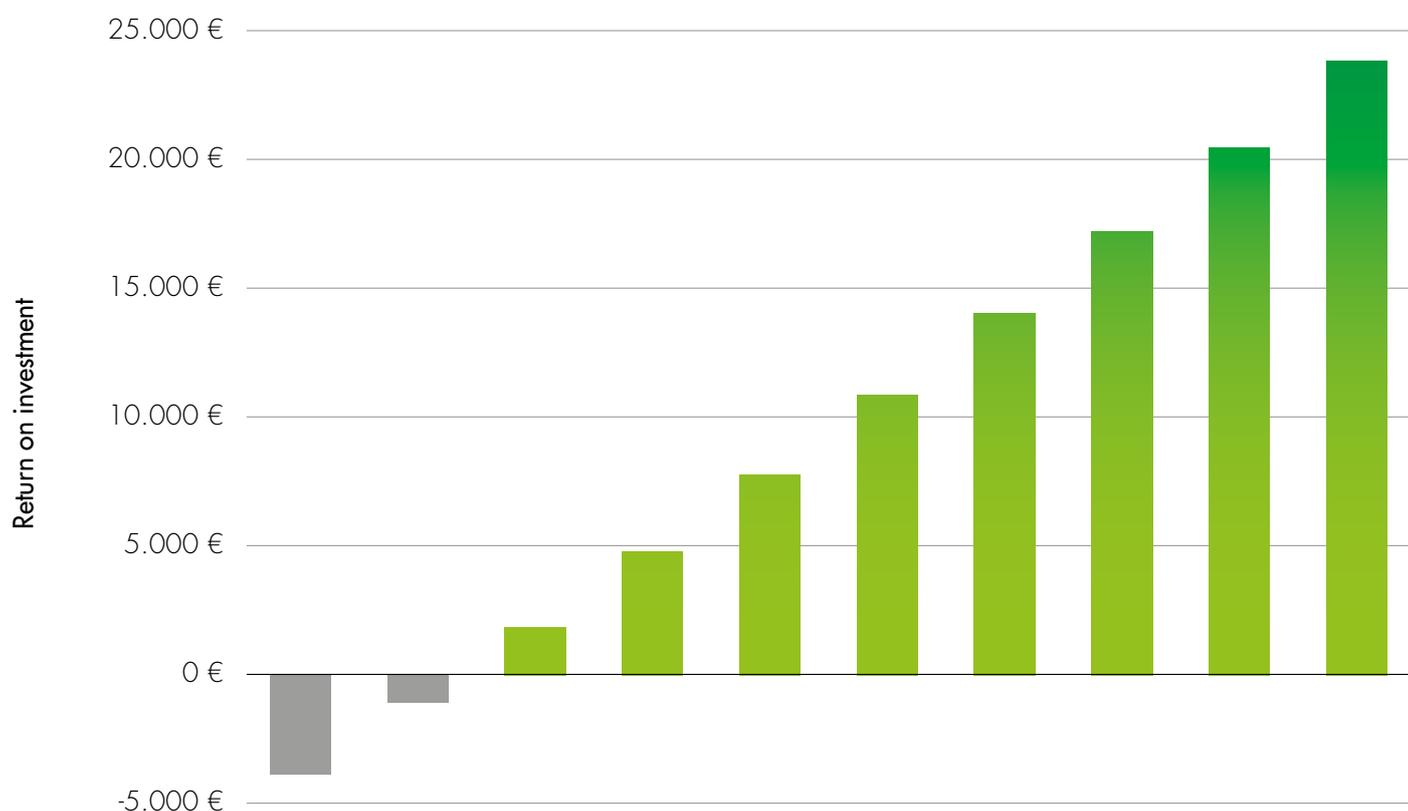
THE AMORTISATION PERIOD OF A HEAT RECOVERY SYSTEM DEPENDS ON MANY DIFFERENT FACTORS:



POTENTIAL RETURN ON INVESTMENT OF A HEAT RECOVERY PLANT

EXEMPLARY CALCULATION:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Investment heat exchanger (+ energy consulting, installation costs)	15.000 €									
Total costs (incl. maintenance, operating costs etc.)	15.980,€	982,16 €	984,35 €	986,56 €	988,80 €	991,06 €	993,36 €	995,68 €	998,02 €	1.000,40 €
Total savings (incl. energy costs, other savings)	2.218,32 €	2.284,87 €	2.351,42 €	2.417,97 €	2.484,52 €	2.551,07 €	2.617,62 €	2.684,17 €	2.750,72 €	2.817,27 €
Annual result (incl. funding, depreciation)	-3.761,68 €	2.802,71 €	2.867,07 €	2.931,41 €	2.995,72 €	3.060,01 €	3.124,26 €	3.188,49 €	3.252,69 €	3.316,87 €
Return On Investment (ROI)	-3.761,68 €	-958,97 €	1.908,10 €	4.839,51 €	7.835,24 €	10.895,24 €	14.019,50 €	17.208,00 €	20.460,69 €	23.777,56 €



Heat generator with 79 kW, 6 days/week (312 days/year),
Ø load condition burner 50 %, total kWh 237

Energy data:

Energy recovery per year: 73944 kWh, 7394.4 m³
Savings: 7.11 Euros/day, 2218.32 Euros/year

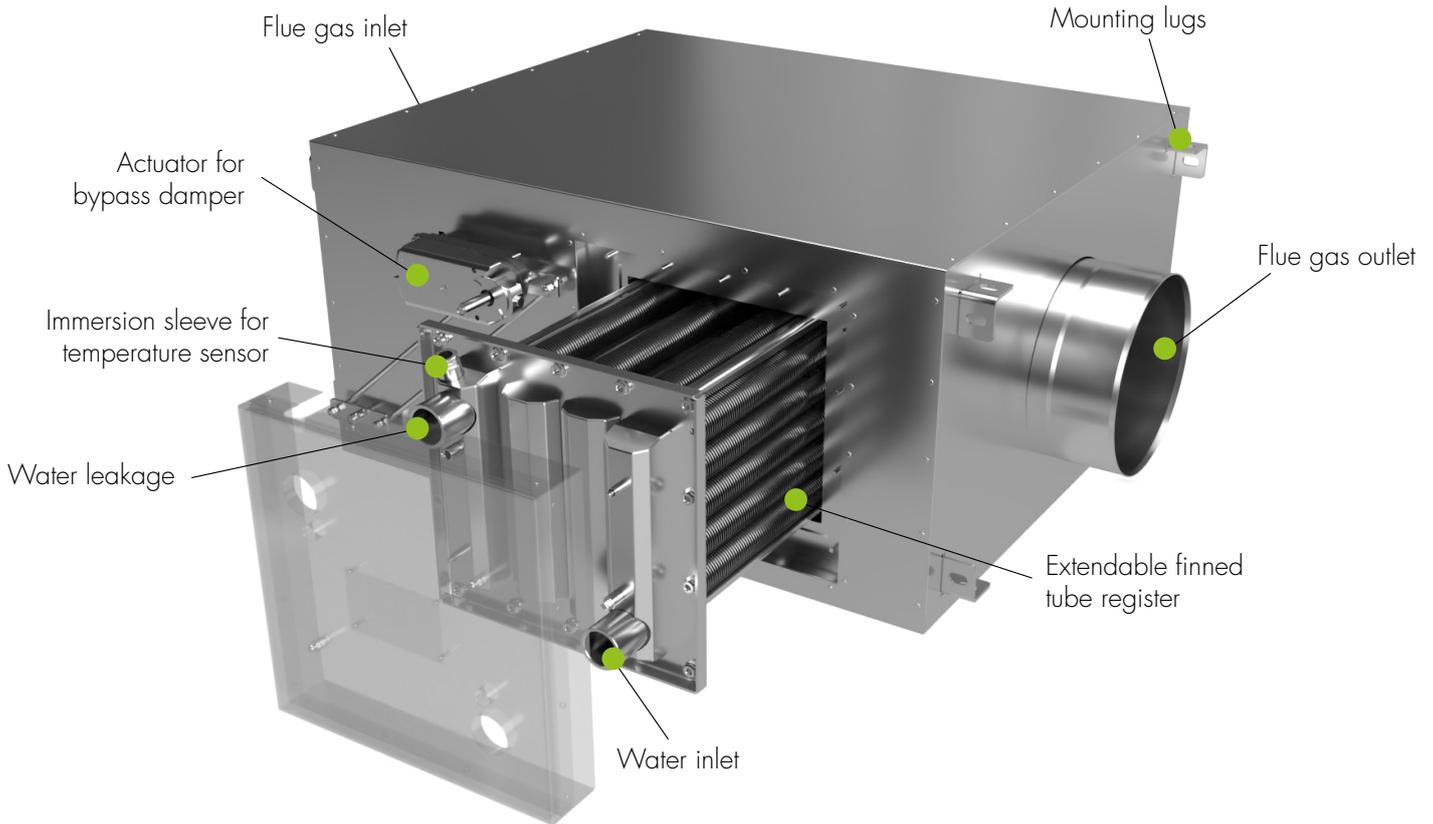
Hot water calculation:

Temperature spread: 20 °C
Daily water quantity: 884 litres

CO₂ calculation (natural gas):

CO₂ savings: 59 kg CO₂/day, 18.3 t CO₂/year

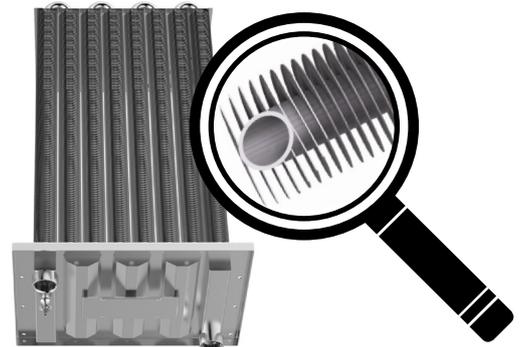
NET HEAT EXCHANGER



THERMOJEKT® R + RB

The Thermojekt heat exchangers are based on the water-guided (cross-counterflow) principle: Cold water flows through an extendable finned tube register. The hot flue gases flow around the register and heat the cold water, which is thus heated and made available in a corresponding heat storage tank for further use. If no heat is required, the hot flue gases can be routed past the register with the aid of a bypass.

The Thermojekts R (without bypass) and RB (with bypass) are efficient heat exchangers with a coil made of 12.5 mm high finned tubes of high-alloy stainless steel (1.4571/1.4521). Their range of application is heat recovery from clean and slightly polluted hot air or waste gases from oil and gas firing as well as from process air up to 400 °C. Higher temperatures are possible on request. DIBt-Zulassungsnummer Z-43.31-458.



Pull-out register with ribbed tubes

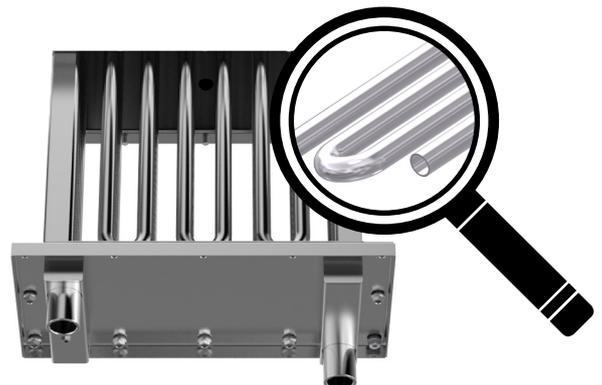
The pull-out coil enables easy and thorough cleaning. This is necessary if deposits have formed on the heat exchanger surfaces after prolonged operation. During cleaning, the casing remains firmly in place. The register can simply be pulled out after loosening a few screws.

THERMOJEKT® G + GB

The Thermojekts G (without bypass) and GB (with bypass) are efficient heat exchangers with a register of plain tubes made of high-alloy stainless steel (1.4571/1.4521). Their range of application is in heat recovery from solid fuels such as pellets, wood chips and biomass at a process air of up to 600 °C.

Extendable coil with smooth tubes

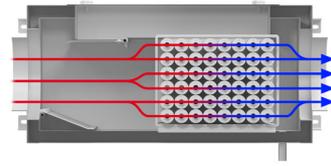
The optimised design of the heat exchanger ensures maximum condensation in the smallest possible space. The register consists of smooth tubes that are very easy to clean.



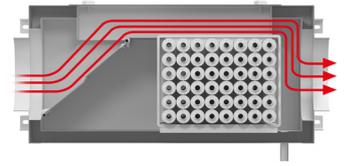
INTERNAL BYPASS OF THE TYPES RB + GB

If no heat is required at times, the hot air or flue gases can be routed past the register through the internal bypass. The bypass flaps in the heat exchanger are moved by a maintenance-free servomotor outside the casing. These flaps are controlled by a thermostat or a controller with a temperature sensor on the heat accumulator and the heat exchanger.

Bypass damper in open state: The flue gas flows through the register.

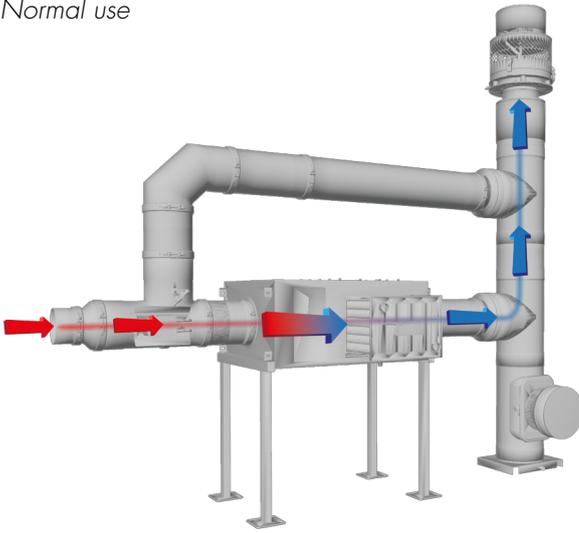


Bypass damper in closed state: The flue gas flows past the register.

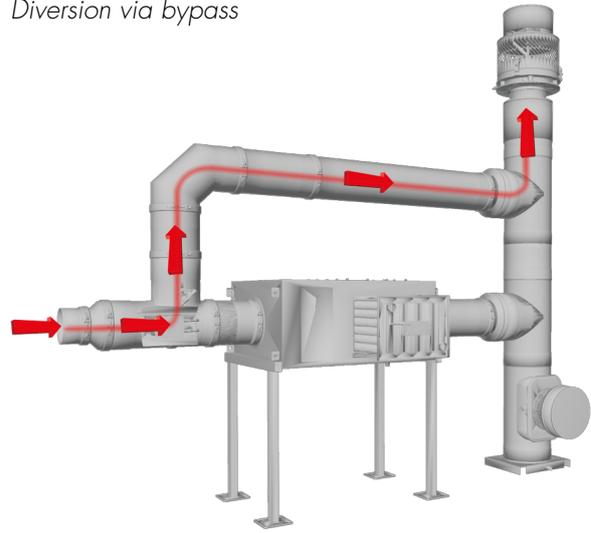


EXTERNAL BYPASS OF THE TYPES R + G

Normal use



Diversion via bypass



NET VAPOUR CONDENSER

THERMOJEKT® SK

The Thermojekt SK without internal bypass is a very efficient heat exchanger with a register of smooth tubes made of high-alloy stainless steel (1.4404/1.4571).

Its range of application is heat recovery from condensation heat from polluted humid air, such as baking vapours or fume extractors contaminated with suspended particles, of any kind and with any degree of pollution.



ACCESSORIES



CONTROL FOR OPTIMUM HEAT RECOVERY

This controller can be adapted to many different system configurations by means of freely programmable function modules. Since each function module can be used several times, even complex system configurations with a maximum of six heat exchangers and several buffer storage tanks can be realised. If required, several controllers can also be connected together to control even larger systems.

- ✓ Regulation of the flow temperature
- ✓ Switching of the bypass damper
- ✓ Control of the 3-way mixing valve
- ✓ Sensor package included



THE DIAJEKT® CHIMNEY FAN

Chimney fans ensure reliable removal of the flue gases and influence the operational safety of the flue gas system and the fireplace.

- ✓ Diajekt made of stainless steel
- ✓ Universal mounting on brick chimney heads
- ✓ Adaptation to all common stainless steel systems by means of slide-in adapter
- ✓ Diagonal ejection
- ✓ Maximum flue gas temperature 300 °C
- ✓ Diajekt Silence for particularly quiet operation



THE LINEJEKT® INDUSTRIAL FAN

If a production process requires constant or production-adapted exhaust air volumes at all times, this can only be achieved by means of special fans and associated control units. Only this way a consistent quality of all products can be achieved. For this purpose, Kutzner + Weber developed the powerful and universally applicable Linejekt industrial fan.

- ✓ Consistent quality during the entire production
- ✓ Delivery volume up to 17,400 m³/h
- ✓ Negative pressures up to 1,400 Pa
- ✓ Flue gas temperature resistant up to 400 °C
- ✓ Indoor and outdoor installation possible
- ✓ Simple plug-in installation or connection by flange, thus low installation costs due to simple assembly in the system
- ✓ Extensive range of accessories



CONTROL CFC 10

Fully automatic control for maximum comfort for the chimney fan operation. Particularly suitable for larger firing systems. The CFC 10 controls and monitors the set target pressure in the flue gas system and ensures safe operation of the firing system.

The CFC 10 provides inputs and outputs for two boiler systems. As standard, the demand signal of the boiler systems is evaluated as the start signal. Alternatively, however, the temperature can also be configured and evaluated as the start signal.

- ✓ Fully automatic control
- ✓ Suitable for all chimney fans
- ✓ Start by means of thermocouple or heating request (start signal)



SINGLE AND DOUBLE-WALLED STAINLESS STEEL FLUE GAS SYSTEMS

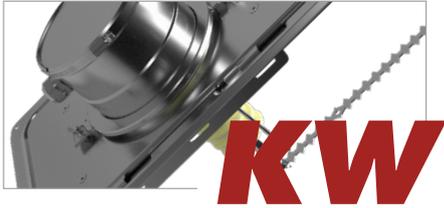
One of the many advantages of stainless steel flue gas systems is their versatility. Their light weight, flexible installation and attractive finish mean that there are no technical or aesthetic limits when choosing a particular installation site.

- ✓ DN 80–600
- ✓ Wide variety of components
- ✓ Temperature resistant up to 600 °C
- ✓ Made of stainless steel
- ✓ For indoor and outdoor use

SYSTEM SOLUTIONS FROM THE RAAB GROUP



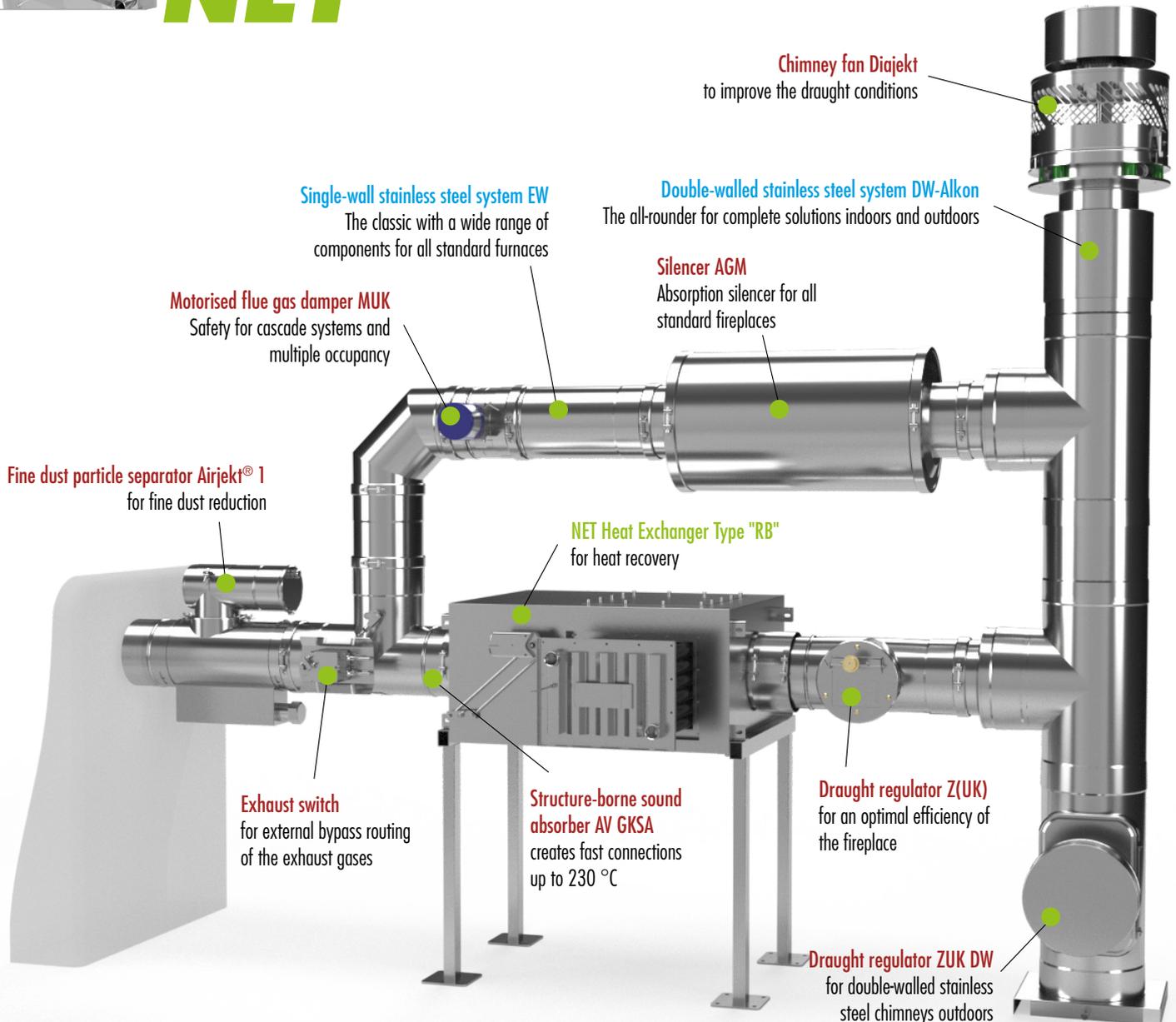
The Raab Group is one of the leading suppliers of environmentally friendly and energy-efficient stainless steel flue gas system solutions. **Joseph Raab GmbH & Cie. KG** was founded in 1898 and is still a family-owned company today. The production program at the Luckenau site, near Leipzig, includes stainless steel flue gas systems for individual room fireplaces, such as chimney and tiled stoves, through to large-scale systems for commercial and industrial use.



In 1997, **Kutzner + Weber GmbH** was acquired, a company that develops and sells chimney components for reducing flue gas emissions, for noise reduction and for increasing the efficiency of the flue gas system.



With the acquisition of the company **NET – Neue Energie-Technik** in 2015, the product portfolio was completed with heat exchangers for exhaust gas heat recovery. The Raab Group is a supplier to the trade and an OEM supplier for well-known companies.



Example structure. You can find more products at www.raab-gruppe.de

DATA ACQUISITION CALCULATION HEAT EXCHANGER

General data

Company:

Phone number:

Name*:

E-mail address*:

Street, No.*:

Zip code, City*:

Country*:

Heat generator data

Heating capacity burner	kW	Make/Type	Year of construction	
altern. Heat output heat generator	kW	Flue gas temperature	°C	
altern. Efficiency	%	Impurities	%	
Lambda value/excess air		Type of fireplace:		
Running time of the plant	days/year	Boiler	Baking oven	Prod. plant
Full load	h/day	Fuel:		
Partial load	h/day	Gas	Oil	Other
Flow/return temperature	°C	Domestic hot water	l/h	
Usable heating capacity	kW	Floor heating	m ²	

Heat recovery from process exhaust air or baking vapour:

Medium to be cooled	Flue gas	Flue air
Mass flow rate		kg/h
Volume flow measured		m ³ /h
Temperature		°C
Moisture content relative	% absolute	g/kg
For baking systems size of baking area		m ²

Installation heat exchanger:

Flue gas from left	Flue gas from right
Flue gas from below	Flue gas from above
Bypass:	
yes	no
<i>if yes:</i>	
internal	external

Exhaust system data

Chimney Ø

Total length

Effective chimney height

Chimney type:

Single-wall flue gas system

Double-walled flue gas system

Ceramic chimney

Masonry chimney

Connecting line

mm Connecting pipe Ø

mm Stretched length

mm Effective height

Number of bends

single wall

double wall

Degree

°

Sketches/Notes

PROJECT SOLUTIONS

RAAB PLANT ENGINEERING – THE DEPARTMENT FOR COMPLETE TECHNICAL SOLUTIONS.



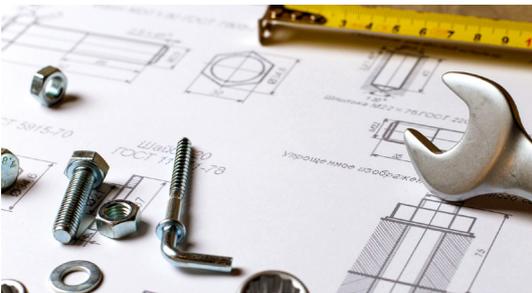
Concept development

Already during the concept development phase of your project, we are at your side with help and advice. All the trades involved are included **to ensure the smooth running of your project.**



Planning

Optimised processes through systematic planning. Leave nothing to chance in your project. Whether on the construction site or in the office, our specialists stand for a consistently coordinated planning of your project through their know-how and experience. **Efficiently and with the best price-performance ratio.**



Construction

Whether it is the perfectly adapted design of a heat exchanger, the complex calculation of mass flows or the consideration of pressure ratios - all components are perfectly matched by the Raab design and development department. **For maximum efficiency and service life.**



Manufacturing of the components

All components are manufactured exclusively in Germany. Only high-quality materials are used. State-of-the-art manufacturing processes, highly qualified employees and efficient quality management **ensure a high level of quality and operational reliability of the systems.**



Installation

Thanks to a comprehensive network of installation partners, your system can be installed at any location in Germany and neighbouring countries. It is guaranteed at all times that technical rules, standards and regulations are adhered to. **Raab stands for smooth installation – even during ongoing operation.**



Maintenance and service

Repair, special services or full service – our expert staff will be happy to look after you even after the installation of your system.

Make an appointment with our specialists today!

info@raab-gruppe.de

RaabGruppe
KW | Raab | NET



WWW.NETENERGIE.DE

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