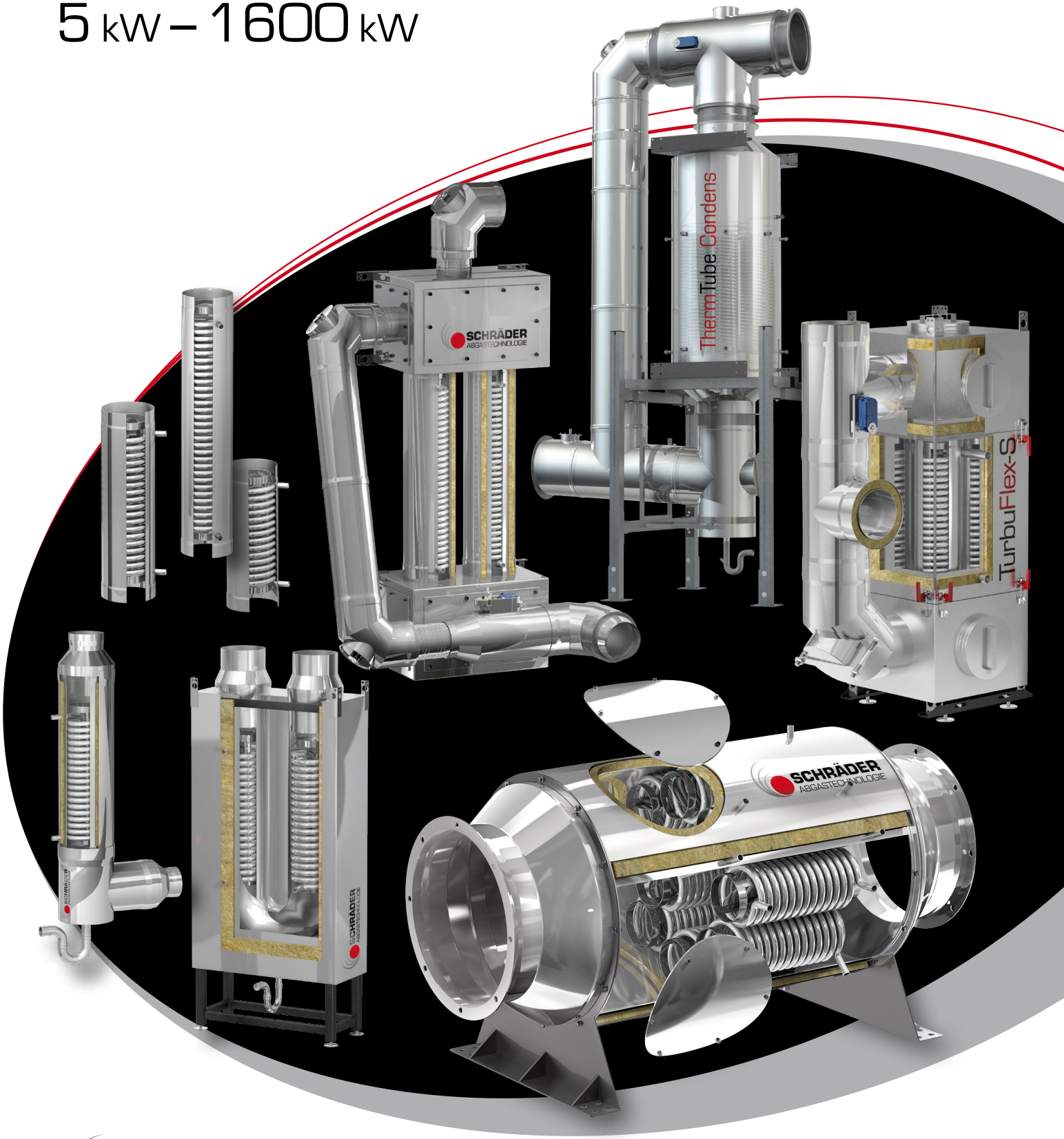
Increase energy efficiency - –
with the TurbuFlexS heat exchanger
5 kW – 1600 kW



SCHRÄDER
ABGASTECHNOLOGIE

TurbuFlexS Advantages:

- **Hot water in a short time**
- **Universally applicable**
- **For solid, liquid and gaseous fuels**
- **Little space required**
- **Vertical, horizontal or inclined mounting**
- **Low installation effort**
- **Suitable for dirty flue gases**
- **Low flue gas pressure losses**
- **Robust design, low susceptibility to faults due to high pollution tolerance**
- **Variable design variants for customised customer applications**
- **Suitable for new systems and retrofits**
- **For more energy efficiency and climate protection**
- **Eligible for state subsidies, BAFA/KfW**

Your benefit:

- **Reduce costs**
- **Use energy reserves**
- **Protect the environment**

With natural draught:

- **Bessere Verbrennung wegen längerer Verweildauer der Rauchgase im Brennraum**
- **Komfortsteigerung durch die Ofenregelfunktion (automatische Drosselklappe)**

Increase energy efficiency - reduce costs

Enormous amounts of heat are generated in domestic or commercial boilers, combustion plants and industrial processes. The waste heat is released into the atmosphere via the chimney.
Part of the energy generated remains unused and is lost!

Heat exchanger - The principle of heat recovery

Heat exchangers enable the transfer of heat from a warm medium to a colder medium. In the Turbu-FlexS AWT, the exhaust gas is led past a coil, heating the water conducted in the coil coils. The bimetallic baffles inside the coil cavity deflect the hot exhaust gases several times. The heated water raises the boiler return temperature or can supply individual consumers directly with hot water.

Schräder supplies the technology that not only reduces your costs, but also contributes to emission reduction and thus to active climate protection.

1 Guide plate unit is hooked in via maintenance opening

- Accessible via large maintenance opening
- Function check without disassembly
- Simple and quick cleaning

2 Adjustment of baffle angle, swivel function

- 4 different setting options for the angular preloads for adaptation to different temperature requirements

3 Bimetallic spiral: sensor and actuator in one

- Max. Operating temperature 550° C
- High corrosion resistance due to stainless steel alloys

4 Pipe coil

5 Exhaust pipe

The baffles in the flue gas heat exchanger, which can be swivelled alternately from baffle to baffle, are deflected depending on the temperature. In the process, the hot flue gases in the centre of the flue gas pipe are transported to the outer areas of the coil. The flue gases penetrate the air gaps in the coil and intense turbulence is created.

The swivel angles of the baffles automatically adjust to the flue gas temperature:

low temperature = no swivel function

high temperature = strong swivel function

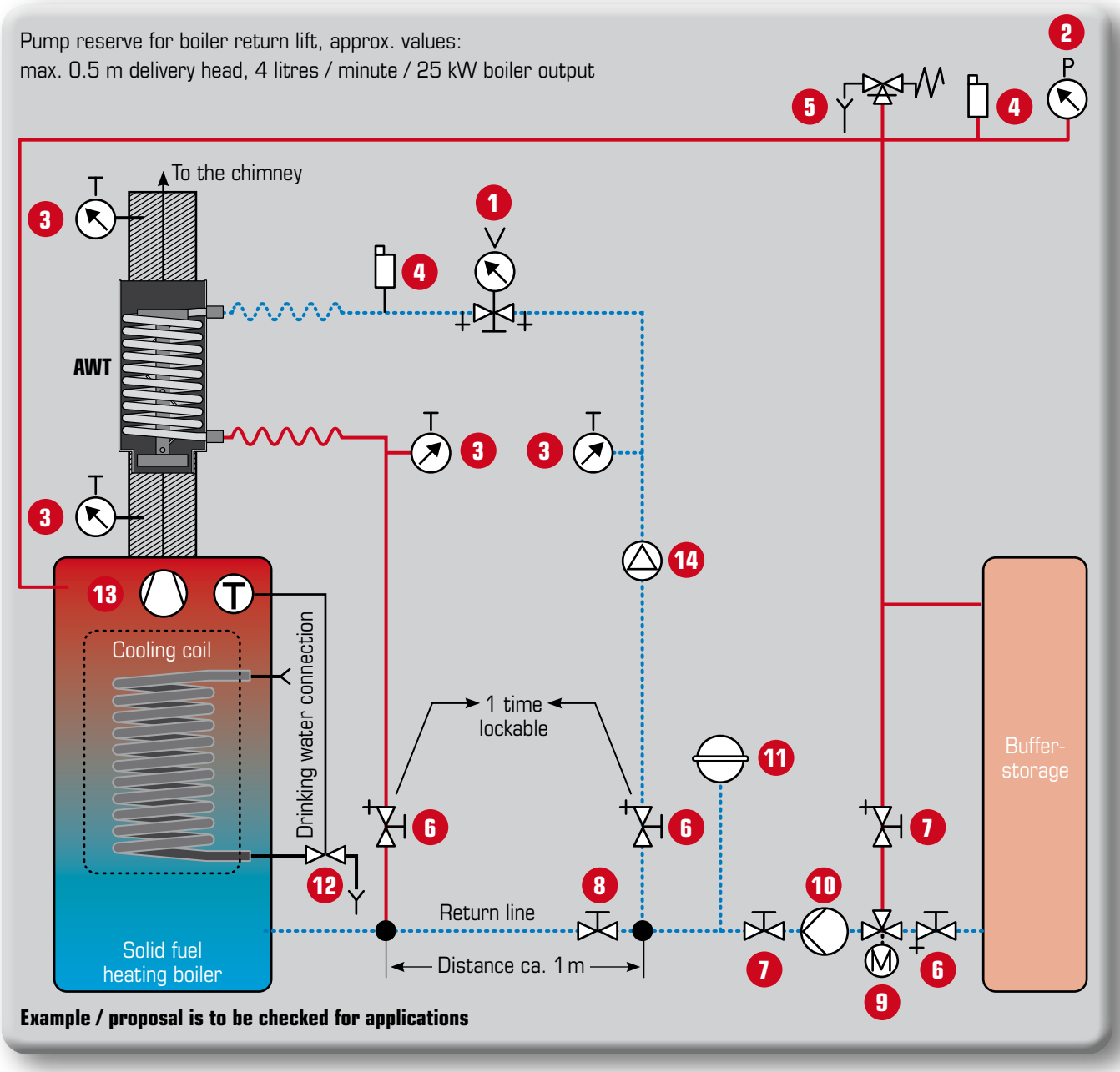
TurbuFlexS Standard Boiler Return Booster (Example / suggestion to explain the function)

1. Line regulating valve with filling and flushing device with flow rate indicator l/min
2. Pressure gauge
3. Thermometer
4. Automatic venting
5. Safety overpressure valve
6. Shut-off devices with drainage:
   Attention, Lockable shut-off device in flow or return of the return of the AWT
7. Shut-off device
8. Shut-off device for manual adjustment of the flow resistance
9. 3-way mixing valve for return temperature increase
10. Circulating pump
11. Membrane expansion tank
12. Thermal discharge safety device (Protection-RS, STW, type Th) with drain connection
13. Induced draught fan device (negative pressure area)
14. Additional pump (optional)

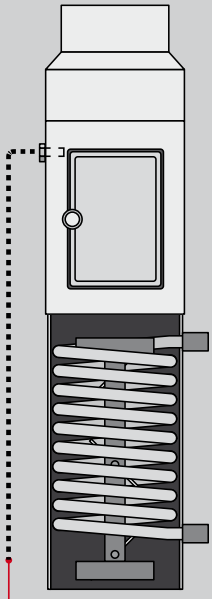
Hose connection

Forerun

Return

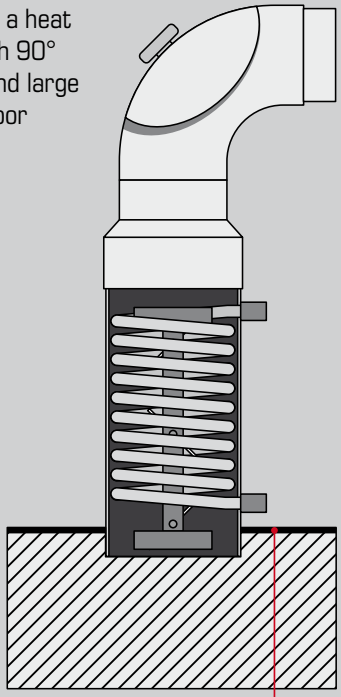


Mounting examples



Vertical, horizontal or inclined on a heat source with straight flue pipe and large cleaning door

Option:
Temperature sensor



Vertical on a heat source with 90° flue pipe and large cleaning door

Upper edge of oven chamber

Examples of heat sources:

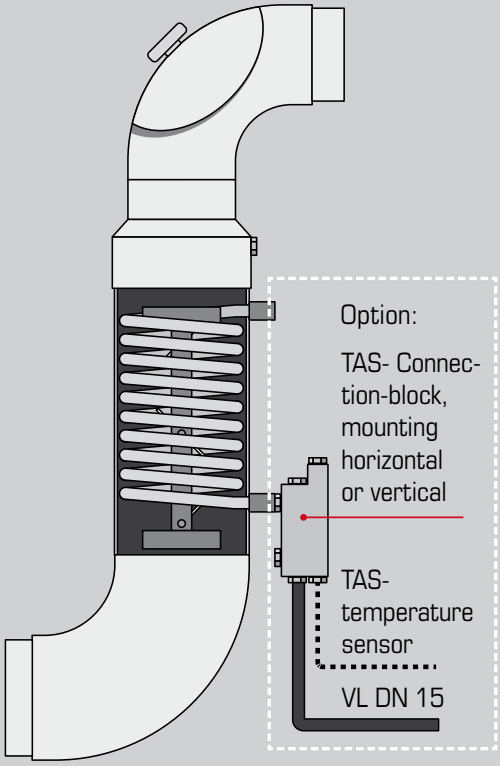
Heating boiler with the fuels:
Wood chips, logs, pellets, oil, Gas, coal

Combustion units: Stoves, heating tiled stoves, hot-air stoves, ovens, pizza ovens, hardening units, drying units, roasting units, kitchen units, units for process heat generation

Options:

- Temperature sensor required if the pump control TurbuFlex Basic Control is used

- Connection block for the thermal Drainage safety device (TAS) available if safety cooling is required. (e.g. only necessary for single-room firing systems without existing safety devices)



Vertical or diagonal on a heat source with 2 x 90° flue pipes and large cleaning door cleaning door as S-shaped surface-mounted variant

Selection of TurbuFlexS heat exchangers

Realisation proposal		Exhaust gas temperature in C°														
		120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
Firing capacity in kW	10	300	300	600	600	600	600	600	600	600	600	600	600	600	600	600
	20	300	600	600	600	600	600	600	600	600	600	600	600	600	600	600
	30	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
	40	600	600	600	600	600	600	600	600	900	900	900	900	900	900	900
	50	600	600	600	600	600	600	600	900	900	900	900	900	900	900	900
	60	600	600	600	600	600	600	900	900	900	900	900	900	900	900	900
	70	600	600	600	600	600	900	900	900	900	900	900	900	900	900	Comb.
	80	600	600	600	600	900	900	900	900	900	900	900	900	900	Comb.	Comb.
	90	600	600	600	900	900	900	900	900	900	900	900	900	Comb.	Comb.	Comb.
	100	600	600	900	900	900	900	900	900	900	900	900	Comb.	Comb.	Comb.	Comb.

300 **TurbuFlexS-300** 600 **TurbuFlexS-600** 900 **TurbuFlexS-900** Comb. **Combination**

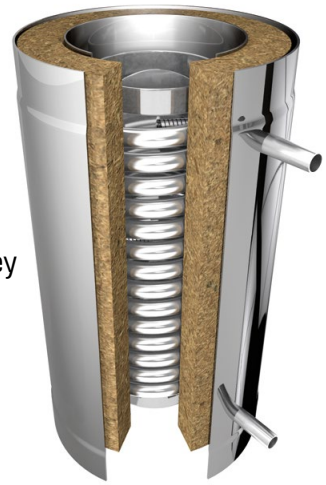
The three product variants TurbuFlexS-300, TurbuFlexS-600 and TurbuFlexS-900 are available as as single units (single versions) tested and approved (DIBt approval No. Z-43.31-462). All have a DN 200 stainless steel flue pipe with a material thickness of 1.5 mm. The pipe inlet is wide in the standard version and the pipe outlet is available narrow, so that the flue gas heat exchanger can be installed like a standard flue gas pipe. Several heat exchangers can also be combined in a series or parallel connection. The designs can be flexibly realised based on customer-specific requirements.

The proposed selection of TurbuFlexS heat exchanger types is based on the expected amount of energy that can be extracted from the flue gas. For this purpose, the rated variables firing rate and flue gas temperature at the inlet to the heat exchanger are used. The proposed heat exchanger selection results from the intersection of the selected vertical flue gas temperature line with the horizontal firing capacity line. On customer request, a user-specific design of the AWT can be carried out.

Further information on possible applications, technical solutions, prices and payback periods is available on request. We would be happy to provide you with an attractive offer for your individual application.

Optionally available:

- Senotherm lacquered (grey or black)
- Rock wool insulation with stainless steel jacket (see picture)
- Integration in stainless steel chimney systems
- Transition with flange
- Flue pipe adapter (reduction / extension)



TurbuFlexS-300 / Technical data

Nominal diameter Exhaust gas heat exchanger	200 mm
Total length flue gas heat exchanger	450 mm
Coil heat exchanger length	ca. 300 mm
Heat exchanger surface	ca. 0,3 m²
Heat exchanger capacity	ca. 1 Liter
Flow and return connections, Welding sleeves	½ Zoll
Material housing / coil stainless steel V4A, temperature stable and acid resistant*	1.4404 / 1.4571
with 3 baffles, with a height of	356 cm
Max. Exhaust gas temperature	550 °C

TurbuFlex S-300	Exhaust gas temperature in C°							
Firing capacity in kW	120	160	200	240	280	320	360	400
10	0,5	0,7	0,9	1,1	1,2	1,4	1,6	1,8
20	0,7	1,0	1,2	1,4	1,7	1,9	2,2	2,4
30	0,8	1,1	1,3	1,6	1,9	2,1	2,4	2,6
40	0,8	1,1	1,4	1,6	1,9	2,2	2,5	2,7
50	0,8	1,1	1,4	1,7	1,9	2,2	2,5	2,8
60	0,8	1,1	1,4	1,7	1,9	2,2	2,5	2,8
70	0,8	1,1	1,4	1,7	1,9	2,2	2,5	2,8
80	0,8	1,1	1,4	1,7	1,9	2,2	2,5	2,8
90	0,8	1,1	1,4	1,7	2,0	2,2	2,5	2,8
100	0,8	1,1	1,4	1,7	2,0	2,2	2,5	2,8
	approx. heat output in kW							

TurbuFlexS-600 / Technical data

Nominal diameter Exhaust gas heat exchanger	200 mm
Total length flue gas heat exchanger	750 mm
Coil heat exchanger length	ca. 600 mm
Heat exchanger surface	ca. 0,6 m²
Heat exchanger capacity	ca. 2 Liter
Flow and return connections, Welding sleeves	½ Zoll
Material housing / coil stainless steel V4A, temperature stable and acid resistant*	1.4404 / 1.4571
Construction as for the 300. with 4 baffles, with a height of	542 cm
Max. Exhaust gas temperature	550 °C

TurbuFlex S-600	Exhaust gas temperature in C°							
Firing capacity in kW	120	160	200	240	280	320	360	400
10	0,8	1,2	1,7	2,2	2,6	3,1	3,5	4,0
20	1,3	2,0	2,7	3,5	4,2	4,9	5,6	6,4
30	1,6	2,5	3,4	4,2	5,1	6,0	6,9	7,8
40	1,8	2,7	3,7	4,7	5,7	6,7	7,7	8,7
50	1,9	2,9	4,0	5,0	6,1	7,1	8,2	9,2
60	1,9	3,0	4,1	5,2	6,3	7,4	8,5	9,6
70	2,0	3,1	4,2	5,3	6,4	7,5	8,6	9,8
80	2,0	3,1	4,2	5,4	6,5	7,6	8,7	9,9
90	2,0	3,1	4,3	5,4	6,5	7,7	8,8	9,9
100	2,0	3,2	4,3	5,4	6,6	7,7	8,8	10,0
	approx. heat output in kW							

TurbuFlexS-900 / Technical data

Nominal diameter Exhaust gas heat exchanger	200 mm
Total length flue gas heat exchanger	1050 mm
Coil heat exchanger length	ca. 900 mm
Heat exchanger surface	ca. 0,9 m²
Heat exchanger capacity	ca. 3 Liter
Flow and return connections, Welding sleeves	½ Zoll
Material housing / coil stainless steel V4A, temperature stable and acid resistant*	1.4404 / 1.4571
Construction as for the 300. with 6 baffles, with a height of	844 cm
Max. Exhaust gas temperature	550 °C

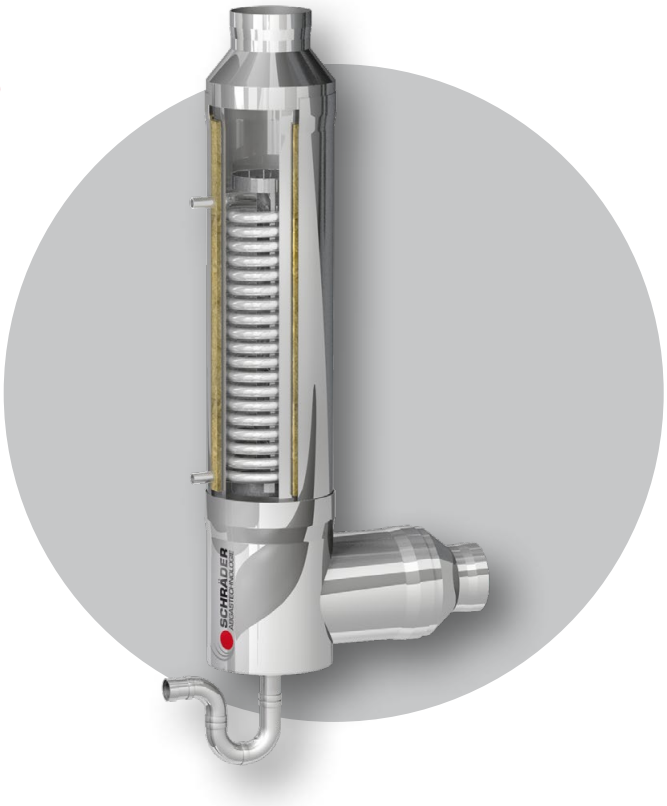
TurbuFlex S-900	Exhaust gas temperature in C°							
Firing capacity in kW	120	160	200	240	280	320	360	400
10	0,8	1,3	1,8	2,4	2,9	3,4	3,9	4,4
20	1,4	2,3	3,2	4,0	4,9	5,8	6,7	7,5
30	1,8	3,0	4,1	5,3	6,4	7,5	8,7	9,8
40	2,1	3,5	4,8	6,1	7,4	8,8	10,1	11,4
50	2,4	3,8	5,3	6,7	8,2	9,7	11,1	12,6
60	2,5	4,1	5,6	7,2	8,7	10,3	11,9	13,4
70	2,6	4,2	5,9	7,5	9,1	10,8	12,4	14,0
80	2,7	4,4	6,1	7,7	9,4	11,1	12,8	14,4
90	2,8	4,5	6,2	7,9	9,6	11,3	13,0	14,7
100	2,8	4,5	6,3	8,0	9,8	11,5	13,2	15,0
	approx. heat output in kW							

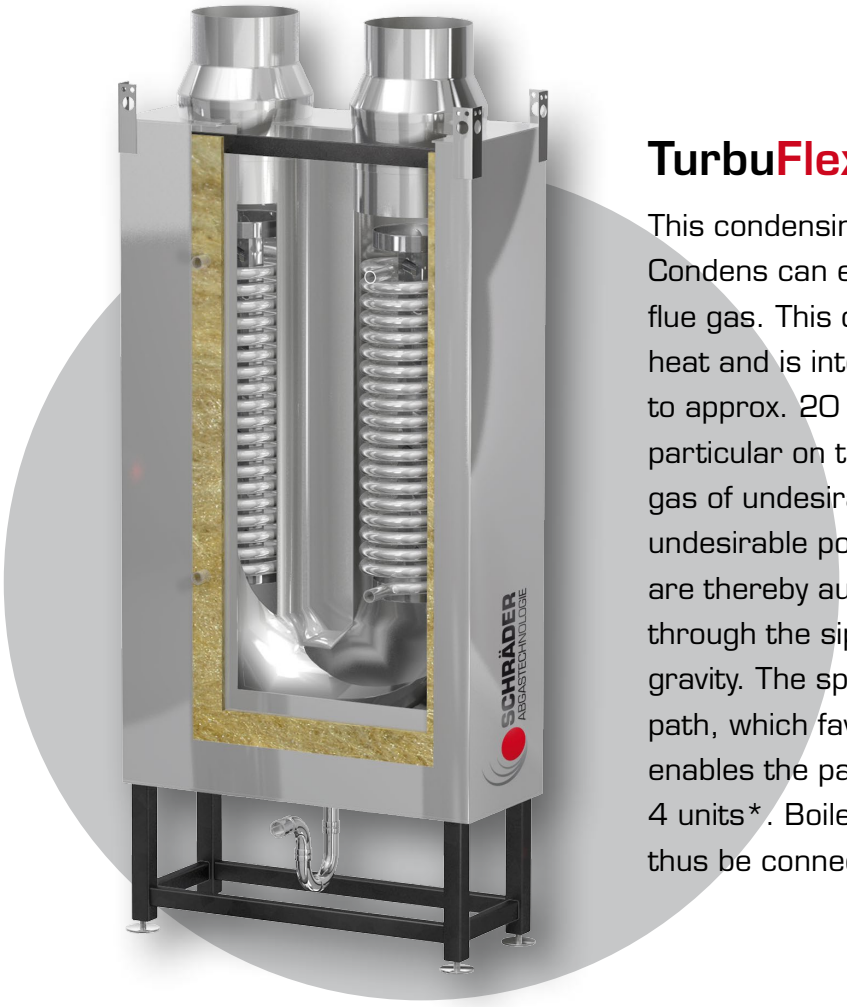
*Available on request: Other steel grades, paintwork, insulation, flange attachments, Exhaust pipe adapters (reductions / extensions)

TurbuFlexS variants

TurbuFlexS-600 Condens

Compact condensing version TurbuFlexS-600 Condens for firing outputs up to approx. 30 kW. This condensing heat exchanger variant is part of the flue gas pipe.



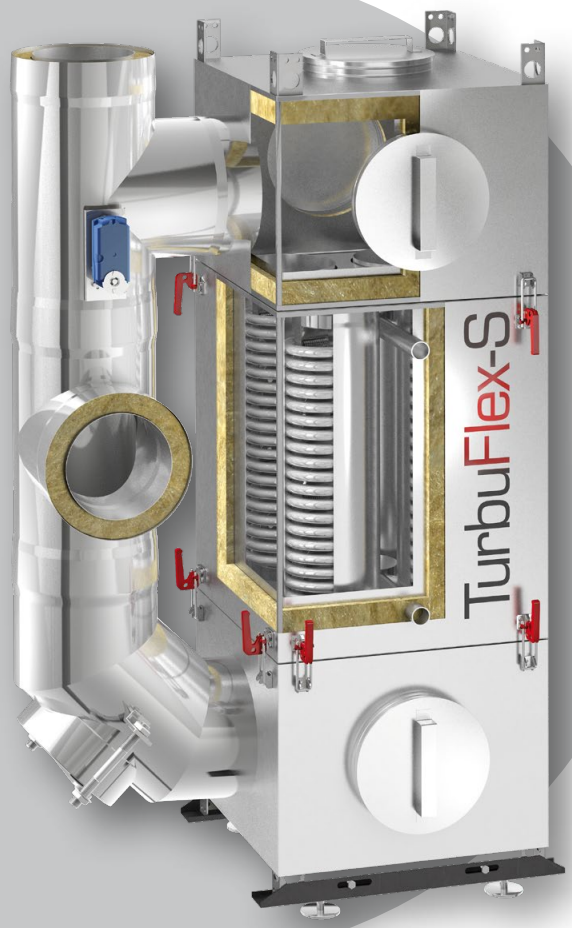


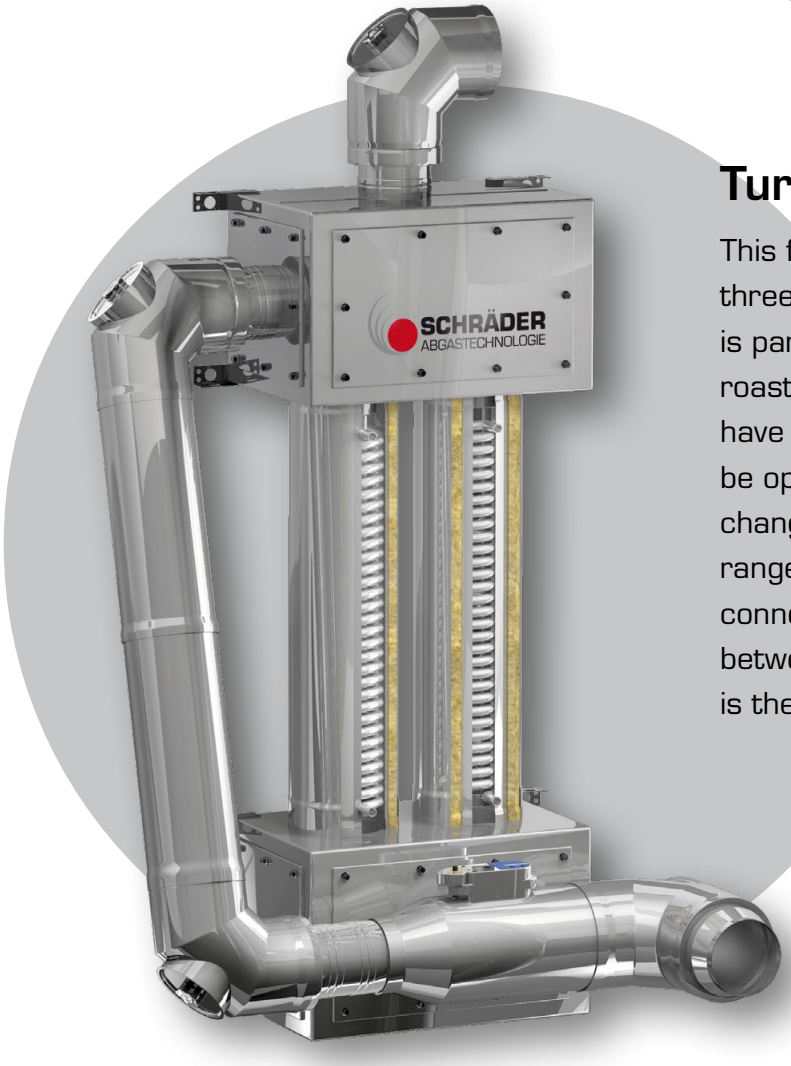
TurbuFlexS-1200 Condens

This condensing heat exchanger TurbuFlexS-1200 Condens can extract the last bit of heat out of the flue gas. This condensing variant utilises the latent heat and is intended for combustion outputs of up to approx. 20 - 60 kW. The condensate forms in particular on the coil surface and cleans the flue gas of undesirable pollutants the flue gas from undesirable pollutants. Soot particles and fine dust are thereby automatically discharged downwards through the siphon into the drain as a result of gravity. The special U-shape results in a very long path, which favours condensation. The flat design enables the parallel connection of up to of up to 4 units*. Boiler outputs of up to 250 kW can thus be connected.

TurbuFlexS-BOX

In order to make even better use of the energy contained in the hot flue gases in the future, Schräder has added further performance stages to the TurbuFlexS flue gas heat exchanger, which is particularly suitable for biomass furnaces. This enables boiler outputs of up to approx. 300 kW* are covered. The TurbuFlexS boxes are installed vertically or horizontally. In each case, the baffle unit is hooked into the coil via the maintenance opening. Due to its modular design, the TurbuFlexS can be used universally, is easy to install and can be put into operation quickly. In addition, the maintenance intervals are extremely long due to the large exhaust gas cross-sections in the heat exchanger.





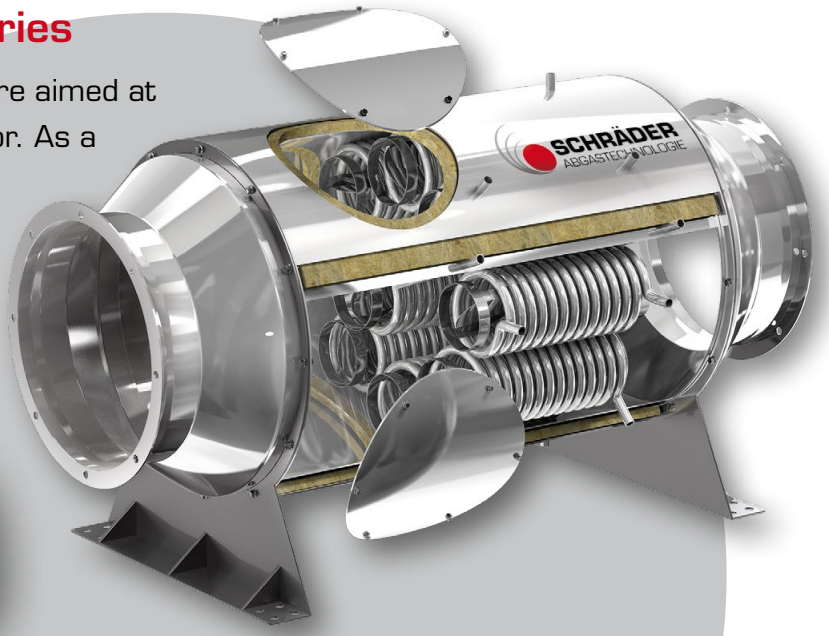
TurbuFlexS ParallelBox

This flue gas heat recovery system is available in three variants (TurbuFlexS-300, 600 & 900) and is particularly useful for firing systems (bakeries, roasting plants, distilleries, pizza ovens, etc.) that have higher flue gas temperatures and must also be operated in summer mode without a heat exchanger by means of a bypass. The typical output range for this parallel design with space-saving connection boxes at the top and bottom is approx. between 33 - 200 kW firing capacity. (Shown is the TurbuFlexS-900 ParallelBox)

* The power input limit depends on the flue gas temperature when entering the heat exchanger, in individual cases an application-specific calculation is required

TurbuFlexS* ThermTube series

These flue gas heat recovery variants are aimed at high boiler outputs in the biomass sector. As a rule, these are pellet or woodchip boiler systems up to 1600 kW*, which, with this compact tube-in-tube design, have efficiency reserves as a of the flue gas pipe in the smallest possible space.

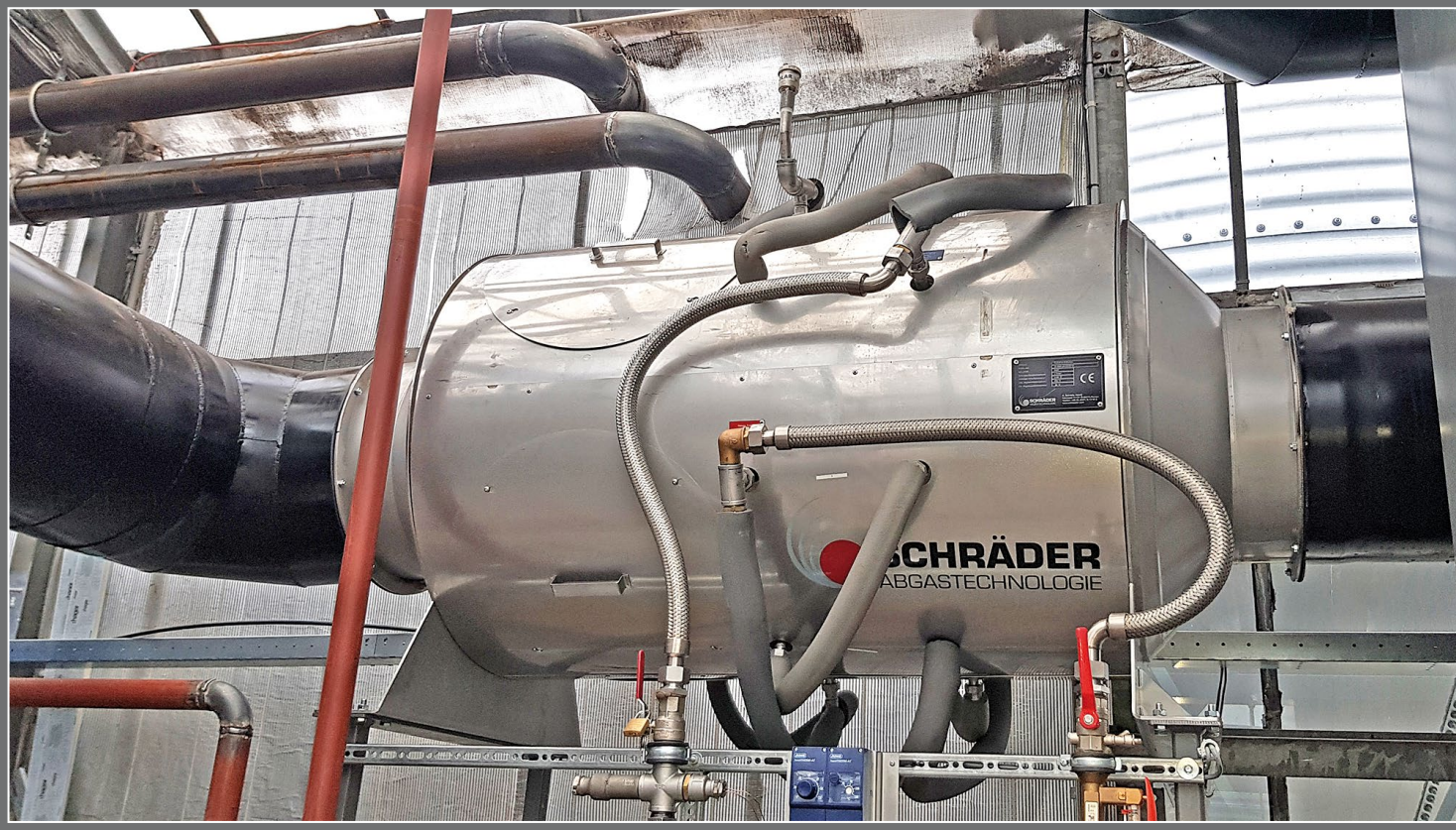


Since 9 TurbuFlexS heat exchangers are arranged here for parallel flue gas flow, this heat recovery system has extremely low flue gas pressure losses. The following design variants are available: TurbuFlexS-300 ThermTube (up to 300kW), Turbu-FlexS-300 Therm- TubeM (up to 150kW), Turbu-FlexS-600 ThermTube (up to 550kW), Turbu-FlexS-900 ThermTube (up to 800kW).

The ThermTube 900 heat exchangers can also be connected in parallel or in series. This allows the output to be doubled to a maximum of approx. 1600 kW*.

Example of power increase through parallel connection TurbuFlexS-900 ThermTube Condens 900, 2-fold (1600 kW)

*To cover firing powers greater than 800kW, the ThermTube types are flowed in parallel, variants available on request.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TODAY
THE FUTURE

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The name „Schräder“ stands for modern exhaust technology made of stainless steel. In the last two decades the company has undergone rapid development and is one of the leading manufacturers in Germany.

Schräder‘s development activities have always been based on a on a concept that produces ecologically sound and efficient products. Schräder has thus since the foundation of the company responsibility and ensures a sustainable handling of our resources.

Schräder‘s motto „The future today future“ accompanies the company every day: Schräder strives to make the world more more sustainable with its products.

As a customer, you can protect the environment by using Schräder technology, you can protect the environment you are already making a contribution today to a future. For example, Schräder achieves this with **the automatic butterfly valve Future OptiPa** as well as with the **Schräder Turbu-Flex heat exchanger** and with the use of **Schräder fine dust filters**.

Schräder‘s innovative technologies ensure that emissions are reduced and thus contribute to active environmental protection. At the same time you also reduce your running costs. This makes it easy for you to be always one step ahead!

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