The flue damper product range
Intelligent solutions for flue and heating technology

Innovation—Environment—People

Kutzner + Weber is certificated according to DIN EN ISO 9001:2000

GENERAL OVERVIEW
The current climate of environmental concerns has produced a market segment where our flue products are relevant both now and in the future. Innovation has been part of our company history for more than 70 years and includes the successful Diermayer damper for preventing heat losses, systems for locating and solving noise problems and devices for optimising combustion processes.

Innovation, Environment, People
These products are born out of a desire to take a responsible attitude towards the natural environment while satisfying the high demands for the comfort of modern times. Most of our products help to reduce atmospheric pollution. We are equally committed to bringing quiet and safety into the home. Our products help to increase the quality of life and wellbeing in each room by providing a more uniform burn while reducing the operating noises.

Development and quality
When developing new solutions, Kutzner + Weber has always worked in collaboration with scientists and researchers from established institutions. We have been operating under a licence agreement with the Fraunhofer Institute of Building Physics since 2001. The high quality of our products and the skill and expertise we demand from our staff on a daily basis reflect our investment in development and in the constant search for better solutions using the most up-to-date technology.

Complete and qualified
Customers all over the world are benefiting from our high quality products and solution-oriented service. Kutzner + Weber, a subsidiary of the Raab group, produces a full range of flue-gas products in association with the manufacturer of stainless-steel flue systems. Thus, we are able to offer you compatible components from a single source for both domestic and industrial applications.

Flue dampers and economics
This brochure contains a complete overview of flue dampers which are available from one source. These also include the Diermayer damper on which the success of Kutzner + Weber is based. This non-hinged flue damper which is controlled by a bimetallic strip was patented by Mr. Diermayer 1934 and manufactured by Kutzner + Weber. Flue dampers prevent escaping heated compartment air via the atmospheric combustion device. The energy loss this causes is avoided and the fuel consumption and emissions are reduced.

"We help you to save energy and reduce emissions."
The **energy saved with flue dampers**

**Energy losses from atmospheric combustion appliances**
Depending on the design, energy is lost from atmospheric combustion heating appliances while the heating appliance is not working. With these systems, the heated room air can escape via the chimney to the outside more or less unhindered, taking the energy stored in the stove with it. Until now, this process has been often accepted as an unavoidable loss. However, the Energy Conservation Act (EnEV) has now made it necessary to control this loss. The EnEV takes into account the energy savings which are technically feasible in heating systems for heat conservation. If the combustion appliance is operating in a room which is hermetically shielded to the house, avoiding these losses is counted as a heat or energy gain to the building envelope.

**Saving energy with flue dampers**
Depending on the combustion heating appliance and the outside conditions, the loss of energy due to room air spillage via the chimney to the outside can amount to more than 4000 kWh per year. This loss can be avoided with flue dampers. They are installed between the stove and chimney, sealing off the route to the chimney as soon as the stove is switched off. The damper is operated either by a bimetal mechanism or by an actuator. The costs of the installation can be quickly recouped by the energy and fuel savings produced. The payback periods which are calculated according to the flue damper, location and chimney diameter are shown in the tables below.

**Capital payback periods**
The "Capital payback periods" chart shows the times taken for the cost of installing a thermal flue damper to be recouped by the savings achieved by installing it. The potential savings depend on the prevailing weather conditions which, in this case, have been taken into consideration according to the location.

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**Legend**
- **TL**: Temperature air
- **Tu**: Temperature lowest
- **Th**: Temperature highest
- **Tsoil**: Temperature soil
The purpose of saving energy

The energy lost from buildings by room air escaping through combustion heating appliances and flue systems has been calculated as part of a study (recognised by experts in the field) which was carried out by Professor Dr. Ing. Rawe, Gelsenkirchen University of Applied Sciences. The results show clearly the benefits of flue dampers.

The fact that energy savings can be proved makes it possible to take them into consideration when calculating the energy balance of your property. The energy consultant can take flue dampers into account or suggest them as a means of energy conservation. They are one means of minimising energy consumption and their consequent emissions.

### Calculation of the annual ventilation losses from special gas-fired boilers

#### Inputs/assumptions connection piece

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Inputs zeta values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat length:</td>
<td>1 m</td>
</tr>
<tr>
<td>Effective height:</td>
<td>0.3 m</td>
</tr>
<tr>
<td>Flow preventer:</td>
<td>3.0</td>
</tr>
<tr>
<td>Bend and SS inlet:</td>
<td>1.5</td>
</tr>
</tbody>
</table>

#### Input chimney specifications

| Chimney height: | Stainless steel, aluminium, plastic |
| Chimney diameter: | Refractory-clay shaped bricks |
| Chimney roughness: | Masonry flues |
| Pipe-friction coefficient: | 0.048 |

#### Input wind data

<table>
<thead>
<tr>
<th>Average wind speed</th>
<th>Total joint length</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2 m/s</td>
<td>40 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow condition (cp-value)</th>
<th>Joint passage coefficient a</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.77</td>
<td>0.6</td>
</tr>
</tbody>
</table>

#### Load step

<table>
<thead>
<tr>
<th>Load step</th>
<th>Average air temperature in the chimney</th>
<th>Average chimney outlet temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 %</td>
<td>24° C</td>
<td>22° C</td>
</tr>
<tr>
<td>30 %</td>
<td>26° C</td>
<td>23° C</td>
</tr>
<tr>
<td>48 %</td>
<td>27° C</td>
<td>25° C</td>
</tr>
<tr>
<td>63 %</td>
<td>28° C</td>
<td>26° C</td>
</tr>
</tbody>
</table>

#### Input wind data

<table>
<thead>
<tr>
<th>Load step</th>
<th>Average air density in the chimney</th>
<th>Average chimney outlet temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 %</td>
<td>1,187</td>
<td>1,179</td>
</tr>
<tr>
<td>30 %</td>
<td>1,183</td>
<td>1,175</td>
</tr>
<tr>
<td>48 %</td>
<td>1,182</td>
<td>1,172</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load step</th>
<th>Underpressure due to lift or draw in Pa</th>
<th>Underpressure due to wind flow in Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 %</td>
<td>6.2</td>
<td>13.0</td>
</tr>
<tr>
<td>39 %</td>
<td>9.3</td>
<td>13.3</td>
</tr>
<tr>
<td>48 %</td>
<td>11.2</td>
<td>13.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load step</th>
<th>Total underpressure in Pa</th>
<th>Total losses in kW</th>
<th>Total losses in kWh/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 %</td>
<td>19.2</td>
<td>0.290</td>
<td>1477.71</td>
</tr>
<tr>
<td>30 %</td>
<td>22.6</td>
<td>0.959</td>
<td>810.52</td>
</tr>
<tr>
<td>48 %</td>
<td>26.7</td>
<td>1.162</td>
<td>866.68</td>
</tr>
<tr>
<td>63 %</td>
<td>30.0</td>
<td>1.429</td>
<td>578.76</td>
</tr>
</tbody>
</table>

**Total losses:** 3954.16 kWh/yr.
The thermal and motorised flue dampers

The first flue damper was patented by Mr. Diermayer in 1934 and then manufactured and marketed by Kutzner + Weber. Diermayer thermal dampers were the first flue dampers but it was not until 1973 that the application range was extended with a motor-actuated version.

Thermal flue dampers

These are largely maintenance-free and operate fully automatically, while being regularly checked by the chimney sweep. Exploiting their close proximity to the heating appliance - the dampers, which are mounted on non-hinged bearings, open via a bimetal mechanism as soon as they are hit by a hot current of air. The special bearing means that the dampers require no maintenance and operate reliably over many years. Thermal flue dampers are used with atmospheric gas-fired appliances because they operate automatically without auxiliary energy.

"Flue dampers prevent unnecessary energy losses."
Motorised flue dampers
These also seal the flue path to the chimney but can be operated independently of the flue-gas temperature, installation position and location. This energy conservation is possible for almost all applications in the private and industrial sectors. It can be used with all kinds of fuel and, with cascade installations (several heating appliances connected to one chimney) can prevent the flow of dangerous flue gases into the room. By using different materials and motor designs, almost all applications can be covered, e.g. in the form of a bypass damper for a heat exchanger or a supply-air damper.

The motorised version can be actuated in different ways, e.g. manual control via a power switch, temperature-dependent control via an upstream thermostat or automatic control via a stove regulator (see also Page 14). With solid-fuel heating appliances, the motorised flue damper can be used to control the quality of the combustion according to the application - with solid fuels, these can be used selectively to make the combustion more efficient.

Motor-actuated flue dampers
These are suitable for all kinds of fuel and, because they are temperature dependent, can effectively control the quality of combustion.

The applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Motorised flue damper</th>
<th>Thermal flue damper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric gas-fired appliances</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Freestanding boilers and wall-mounted appliances</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Boilers with forced-draught burner</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Solid-fuel heating appliances</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Biomass boilers</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Tiled stoves, woodburning stoves and open fires</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Gas single stoves</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Gas cooking hobs with gaspipe</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Combustion air ducts for combustion heating appliances</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Stoves on air-flue-gas systems</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
The choice of flue damper

Application options
Flue dampers must be chosen according to the application and the combustion heating appliance. Thermally activated flue dampers are often preferred for atmospheric gas-fired appliances. Motorised flue dampers can also be used with oil-fired appliances with forced-draught burners. When used in combination with a stove regulator (see Page 14), motorised flue dampers affect the quality of combustion of wood-burning appliances. The quantity of combustion air supplied can be optimised by recording the conditions of combustion in relation to the phase of combustion. With several heating appliances connected to a flue system, the flue paths of all the combustion heating appliances which are not in operation are sealed off.

Extract from the technical regulations for flue dampers
With Type B1 and B2 gas-fired appliances, flue dampers may be installed in the connection pieces. Compliance with the standard is mandatory: DIN 3388 Part 4 applies to thermally actuated flue dampers and DIN 3388 Part 2 applies to mechanically actuated flue dampers which must be approved and bear the CE symbol. All flue dampers must be installed according to the manufacturer’s instructions which will indicate whether the model concerned is designed to be used on a certain appliance.

With Type B1 gas-fired appliances, thermally-controlled flue dampers may only be installed after (downstream of) the flow preventer. In order to improve the effectiveness of shared flue systems, they should preferably be fitted to the lower gas-fired appliance. Tight-closing flue dampers according to DIN 3388 Part 2 are only permitted for type B2 gas-fired appliances. In order to improve the pressure conditions of shared flue systems, the flow resistance of an existing flue damper may be taken into consideration for the operating condition ‘not in operation’ according to EN 13384-1, provided that the flue damper complies with DIN 3388-2 or DIN 3388-4 and that the damper is also guaranteed to close when there is a pressure difference of 3 Pa after no more than 3 minutes.

Thermally controlled Diermayer dampers for type B1 gas-fired appliances

Type: GWR
NW: 90-110/130
Type: HOS
NW: 60–110
Type: HOK
Type: HKS
Type: MOK
Type: MOK...AD
Type: MUK

Thermally controlled Diermayer dampers for gas and oil-fired appliances

Type: GWR
NW: 90-110/130
Type: HOS
NW: 60–110
Type: HOK
Type: HKS

Motor-actuated Diermayer dampers for gas- and oil-fired appliances

Type: MOK
NW: 80-600
with minimum opening
Type: MOK...AD
NW: 80-600
metallic tight-closing shut-off plate
Type: MUK
NW: 80-300
metallic tight-closing, condensate-resistant, for overpressure and underpressure flue systems.

*1.) When installed before (upstream of) the flow preventer, follow the special instructions of the equipment manufacturers.

*2.) For overpressure flue systems, (calorific value) for appliances according to DVGW-G635 on request.

*3.) For combustion heating appliances with electrically controlled fuel supply only.

*4.) With damp-insensitive flue systems or together with a KW draught limiter only.

*5.) For suitable combustion heating appliances according to the manufacturer’s specifications.
The performance testing and installation situation

Performance testing the flue system
After installing the flue damper in the gas-fired appliance, a performance test must be carried out on the entire flue system according to Section 8.3 of the Technical Regulations for Gas Installations (TRGI’86) Edition 96. On each gas-fired appliance, with the windows and doors of the dwelling closed, no flue gas must be found to escape at the flow preventer five minutes after starting. With several combustion heating appliances installed in the same dwelling, both with the internal doors closed and open. The test must be carried out with the highest thermal output possible for the gas-fired appliances and, with the gas-fired appliances to be tested, with the smallest thermal output also. With gas-fired appliances which have a flue-gas monitoring system, the performance of this device must also be tested according to the manufacturers’ instructions. If flue gas is found to escape during the tests, then perfect operation is not guaranteed. This fault must be eliminated immediately. See the following for possible causes ...

Flue system
Chimney draw after the flow preventer less than 3 Pa; effective chimney height too small; chimney mouth not above roofridge; chimney cross sectional area incorrect; flue pipe too long; too many changes in direction; incline too small; incorrect connection; insufficient supply of combustion air (joint-light windows or locked ventilation openings).

Gas-fired appliance
Flue gas temperature too low where the flue-gas damper is installed; short operating periods (frequent switching on and off); combustion chamber and/or burner nozzles contaminated with greasy vapours (kitchen); increased dust (washing machine or tumble dryer); excessive use of spray.

Flue damper
Wrong flue damper; incorrect installation; blocked movement of the control and/or shut-off elements; dirty bimetallic strip.

- Diameter remains the same, since additional thermal load is less than 25%
- Down and up permanently marked
- Only applies to a chimney connection for space heaters up to 3.5 kW
- Up to three combustion heating appliances permitted on chimney with flue from different appliances
- Gas-fired appliance max. 20 kW
- Solid-fuel heating appliance max. 20 kW
- Instantaneous boilers with locking system and separate connection piece are considered as one combustion heating appliance
- With more than five full floors or forced-draught burners, each combustion heating appliance usually has its own chimney

\[
H = \text{effective height of chimney} \\
A = \text{distance between lowest and highest combustion heating appliance} \\
V = \text{effective height of the connecting piece}
\]

Comments:
- Chimney 1 connected to one flue pipe according to EN 13384
- Chimney 2 connected to several flue pipes
- Chimney 3 connected to flue pipes from different appliances

Exemption see TRGI1986, Edition 96, Sections 6.2.1 and 6.2.2
The thermal flue dampers

Thermal flue damper operation
Thermal flue dampers are used exclusively with atmospheric gas-fired heating appliances. With these stoves (open according to design), the chimney draught continues to extract heated air from the room with the corresponding energy after the flame has been extinguished. During this process, a large amount of the heat energy from the combustion stored in the stove is also lost. Thermal flue dampers respond to the prevailing operating state of the burner according to the heat generated - shortly after the burners switch off, the damper closes and prevents the energy losses described above. When the temperature reaches 40°C, the flue damper already starts to open and therefore quickly responds to the combustion heating appliance starting up. Since the mechanism is temperature dependent, the opening and closing of the damper is closely linked to the burner switching on and off. Although this feature limits its use to type B11 to gas-fired heating appliances, it is ideal for the purpose for which it was designed. The motorised flue damper is the correct solution for all other combustion heating appliances (see Page 12).

Saving energy with the thermal flue damper
With thermal flue dampers, up to 4,000 kWh and more can be saved per year depending on the system (see also Page 5). Thus, the relatively low cost of the installation is recouped after only a very short time. Since the expected service life of the flue damper is long, an effective saving rapidly come into effect. As a result of the lower fuel consumptions, the flue damper also reduces emissions and for many, this is reason enough to install this component.

Types of flue damper
Flue dampers have been tested and approved for the suitable gas-fired heating appliances according to DIN 3388 Part 1 (see also Page 8) in each case. Different versions are therefore available (see also below or Page 8).

Housing made from stainless steel with integrated shut-off elements and at least two independently operating controllers consisting of thermo-bimetallic strips, plated with stainless steel on both sides, opening at approx. 40°C flue gas temperature at the installation position, suitable for all gas-fired appliances, power-regulated with/without pilot light (electrical), with flue gas monitoring mechanism and with CE ID number.

Series GWR wall-mounted units
For instantaneous gas-fired boilers and combi-boilers

Series HKS freestanding appliances
For gas-fired boilers, storage water heaters and heating inserts

Series HOS small appliances
For space heaters, storage water heaters and heating inserts

Series HOK special appliances
Gas-fired appliances according to manufacturer’s specifications
Advantages of thermal flue dampers

- Conserve energy
- Reduce losses when combustion heating appliance is switched off
- Prevent heated room air from escaping via the chimney
- Prevent loss of heat stored in the stove
- Improve building energy balance
- Prevent flue-gas back-flow
- Protect environment by decreasing emissions
- Reduce fuel consumption
- Very short payback periods

Key data of thermal flue dampers

- Opening starts from approx. 40°C
- Fully open from 70°C or 90°C
- Flow resistance < 2 Pa
- Independently operating dampers
- Corrosion resistant
- Robust design
- Not susceptible to contamination
- Maintenance-free (test carried out by chimney sweep)
The motorised flue dampers

Motorised flue damper operation
Motor-actuated flue dampers can be used for all oil- and gas-fired appliances with or without forced draught burners and for solid-fuel heating appliances. Unlike thermal Diermayer dampers, they open before the burner starts or optimise the combustion of the solid fuel in combination with the stove regulator. During the times when the combustion heating appliance is switched off, the flue path is sealed off so the heated room air is prevented from escaping via the chimney and cooling the appliance as it passes.

The motorised version can be actuated in different ways, e.g. manual control via a power switch, temperature-dependent control via a thermostat installed upstream or fully automatically via the stove regulator (see also Page 14).

Saving energy with the motorised flue damper
Up to 4,000 kWh and more can be saved per year with motorised flue dampers depending on the system. The payback period for motorised dampers is somewhat longer than the payback period for thermal dampers. Because the expected service life is long, motorised flue dampers are always a profitable investment. Since flue dampers reduce fuel consumption, emissions are also reduced and for many, this is reason enough to install the device.

Safety and reliability with cascade systems
With systems connected to many appliances, the flue is operating more and more under conditions of overpressure. Back-flow preventers are therefore specified to prevent the backflow of flue gas through appliances which are switched off. Tight-closing motorised flue dampers according to DVGW code of practice G 635 are ideal for this task to ensure high operating reliability.

Types of flue damper
Motorised flue dampers have been tested and approved for suitable gas-fired heating appliances according to DIN 3388 Part 2 (see also Page 9) in each case. Different versions are therefore available (see also Pages 8 and 12).

Motor-actuated flue dampers according to DIN 3388 Part 2 for gas- and oil-fired systems as well as solid-fuel boilers on underpressure and overpressure flue systems, CE symbol according to EC directives 89/392/EEC, 73/23/EEC and 89/336/EEC.

Series MOK
For appliances with pilot light and solid fuels with minimum gapping to underpressure flue systems. For flue gas temperatures up to 400°C.

Series MOK... AD
For appliances without pilot light, without condensate deposits, metallic tight closing for underpressure flue systems, up to 400°C. Housing up to Ø 300 mm in plug-in version.

Series MUK
For appliances without pilot light with condensate deposits or cascade plants, metallic tight-closing, condensate-resistant, for overpressure and underpressure flue systems up to 200°C. With version with sealing rim up to 140°C. Pressure and condensate-tight shaft bushing.

Series MUK 80/125 and MUK 100/150
For flue systems according to DVGW code of practice G 635 (LAS overpressure), damper seal with sprayed-on EPDM seal, up to 140°C. Pressure and condensate-tight shaft bushing.
Advantages of motorised flue dampers

- Suitable for all fuels
- Regulator element for improving combustion quality
- Conserve energy
- Reduce losses when combustion heating appliance is switched off
- Prevent escape of heated room air via the chimney
- Prevent loss of heat stored in the stove
- Improve building energy balance
- Prevent flue-gas back-flow
- Protect environment by decreased emissions
- Reduce fuel consumption
- Short payback periods

Key data for motorised flue dampers

- Maximum operating reliability due to patented mechanism
- Integrated circuit breaker
- Operation monitoring and manual operation possible
- Simple electrical connection
- Long service life
- Due to early opening, no flue-gas back-up
- Minimum closure times

- Heat resistance up to 800°C, depending on the design of the damper
- Tested according to DIN 3388 Part 2 with DVGW registration number
- Housing from Ø 80 - Ø 1000 mm
- Heat-resistant seal interrupts the heat transfer to the motor
- Housing and damper components made from durable stainless steel
- Tight for systems according to DVGW Code of Practice G 635 with sealing rim only up to 140°C
- Sealing rim made from EPDM
- For underpressure and overpressure systems
- Special motor retaining plate prevents the transfer of heat from damper to motor
- Maximum operational reliability due to shaft being positively connected to the limit switch
- The right control drive for every application (simple electrical connection)
- Operational monitoring and manual actuation
- Long service life due to early opening, no flue-gas back-up
- Minimum closure times
The fire regulator will provide your wood fire with the best conditions for efficient and emission-free combustion.

Energy should develop its potential
Wood-burning fires are very sophisticated and worth making the effort for, burn naturally and can produce any level of heat. Different phases of the heating process demand flexible combustion heating appliances. A wood fire needs different conditions for heating up, burning and when the embers die down in order to make optimum use of the energy stored. This is the purpose of the stove regulator. It creates the conditions required by the stove to generate the maximum quantity of energy with the minimum consumption of fuel. This is also good news for our environment since the emissions from a fire which is regulated in this way are considerably lower than from a fire which is not.

About the difference
Kutzner + Weber prefers to regulate rather than control a fire - the difference is enormous. This provides the fire with the ideal conditions for each phase of the combustion. While a controller uses the existing knowledge about a wood fire in order to control it, the regulator monitors the combustion and compares the result with the target value. It takes into account whether the windows are open, whether the extractor hood is running or whether other parameters are having a negative effect and then takes appropriate measures accordingly. The difference between control and regulation is like the difference between a monologue and a dialogue - the stove controller understands the fire!

"The difference between control and regulation is substantial"
The draught limiter

A small component with a big effect
Draught limiters (also referred to as secondary-air devices in German Standards Institute standard DIN 4795) are mechanical or motorised components which produce uniform underpressure conditions in a flue system. As soon as the draught in the chimney exceeds the optimum value, the draught limiter opens and limits the underpressure by supplementing the amount of air supplied. As soon as the pressure normalises, the damper closes again. This method, which is both simple and effective, facilitates uniform combustion and generates measurable energy savings.

The investment in draught limiters is recouped via the reduced fuel consumption after only a short payback period and is a simple way of reducing heating costs, both in the industrial and domestic sector. Another argument in favour of draught limiters is the reduction in pollution caused by stabilised combustion.

"Draught limiters compensate for fluctuations in underpressure and stabilise the efficiency of your system throughout the whole year."

Motorised draught limiters The motor actuator also facilitates secondary functions such as chimney ventilation or selecthe combustion optimisation (in conjunction with the stove regulator).

Precision draught limiters These draught limiters offer maximum regulation accuracy, are manufactured to a high level of precision and have an overpressure damper as an additional safety feature.

Low-priced draught limiters The basic models concentrate solely on optimising the flue system and facilitating uniform combustion.