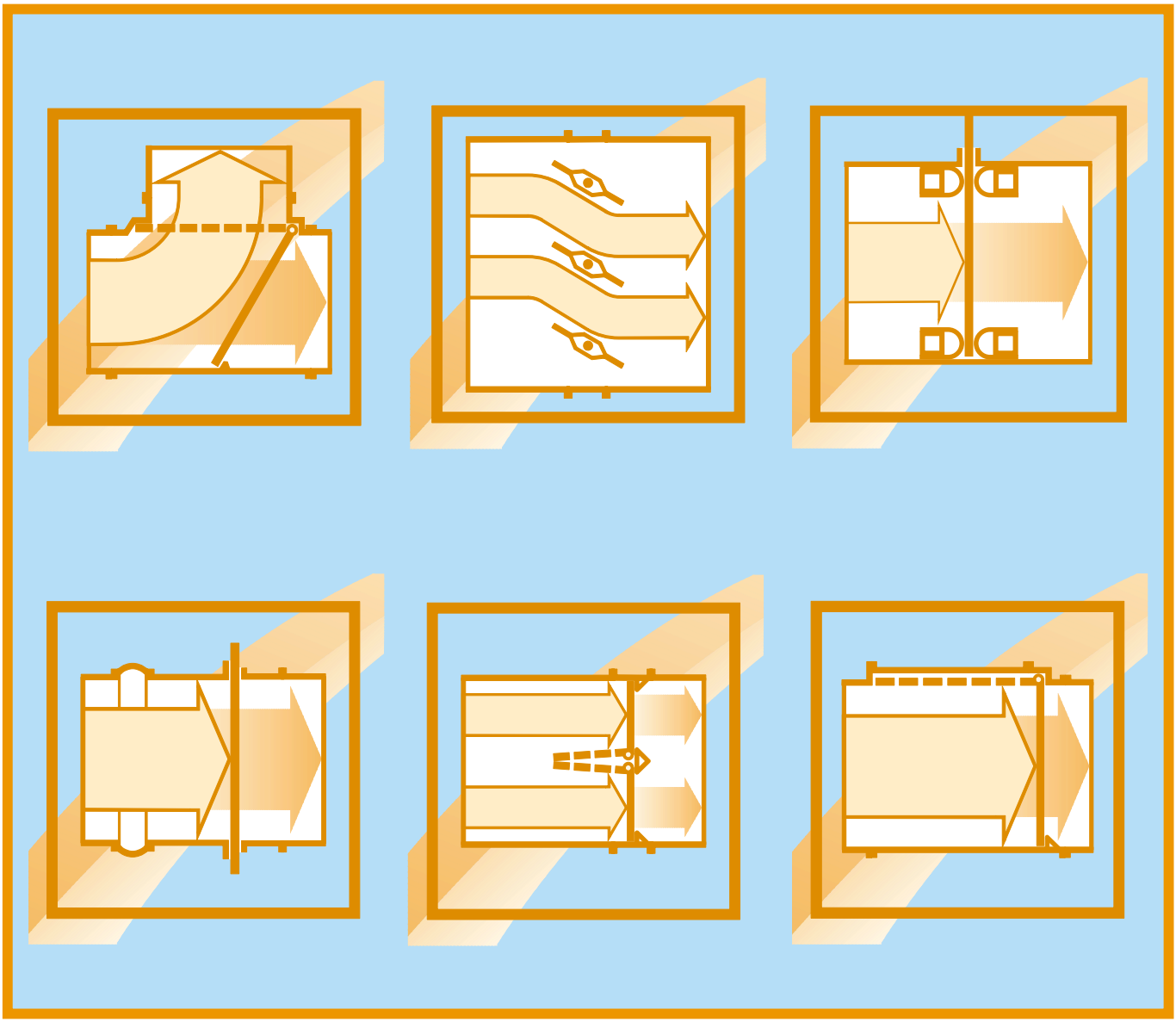
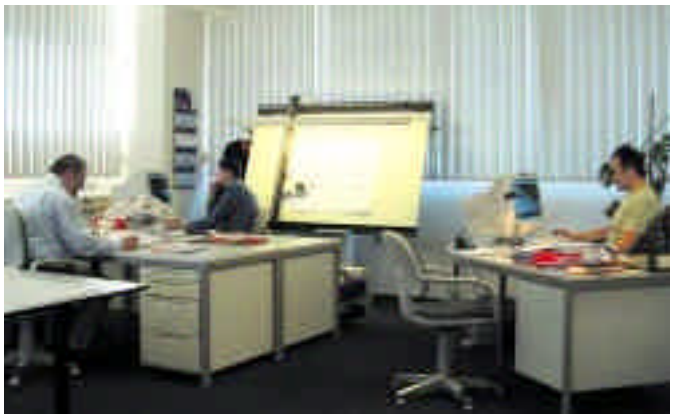
RAUMAG JANICH

Flue gas modulation and shut-off dampers for Powerstations and Industrial plants

For over 30 years – JANICH Spezialarmaturen
10 years RAUMAG-JANICH Systemtechnik





Welcome at RAUMAG-JANICH

RAUMAG-JANICH is one of the leading designers and manufacturers of flue gas shut-off and modulating dampers. Building upon the 30 years of experience accumulated by our associated company, JANICH Spezialarmaturen Beckum, has enabled us, during the last few years, to acquire a competitive edge by introducing a number of innovations, some patented, which secured us the encouragement and goodwill of our customers.

Our dampers are in service in powerstations, FGD-plants, DeNox-plants, combined cycle powerstations, garbage incinerating plants, cement – and steel plants, as well as other industrial plants all over the world.

In addition we supply telescopic steel covers for the slide way protection of large machine tools and process apparatus.
Our engineers and designers carry out their work with the aid of the most modern, computer assisted, methods.

Our quality management meets ISO 9001 and has been certified by the TÜV Hessen.

RAUMAG-JANICH commands an excellent fabrication potential. CNC controlled machine tools, qualified welding technology based upon the certificate of competency to DIN 18800, an abundant production area of more than 4000 m² and last, not least, an experienced workforce, enables us to fabricate economically, yet with high accuracy. This makes us your reliable and competent partner from project stage through to manufacture and erection up to after sales service.

RAUMAG-JANICH stands for:

Perfect technique, Quality and Security

RAUMAG-JANICH manufacturing facilities encompass:

- 2 modern production bays, each 24 m x 72 m with three 8 tons overhead cranes.
- CNC controlled sheet metal fabrication plant, externally programmeable and interlinked, able to guillotine, notch, punch and bend.
- Comprehensive welding equipmen in-cluding band sealing and spot welding machines and others.
- Level beds up to 6 m x 6 m.
- CNC controlled flame cutting plant.
- Plate shears and saws.
- Profile bending and Plate rollers.
- Hydraulic presses.
- Set of machine tools for turning, milling, shaping, grinding, drilling, threading, keyway slotting and others.
- Sand blasting and painting facilities in a seperate shed, 10 x 25 m, equipped with 3 tons overhead crane.

Picture above: Plate rolling of a cement cooler casing, 3200 mm dia.

Centre picture: Machining of a Dopex damper casing, 1500 mm dia.

Picture below: CNC controlled sheet metal fabrication plant.

Picture above:
CNC controlled bending press.

Picture below:
CNC controlled plate shear

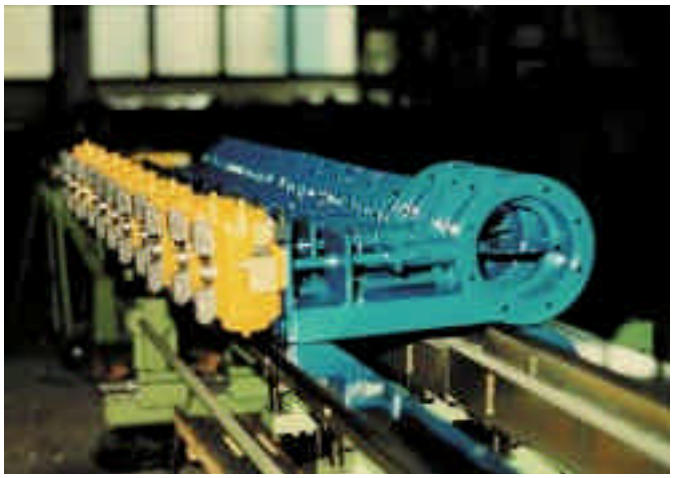
Successful innovations are recoguised

For more than 30 years the name **JANICH** has been synonymous with development and design of large, special purpose flue gas dampers. Numerous guiding designs such as Diverters, Diverters for combined cycle gasturbine plants, Sickle and Goggle isolators,Guillotine dampers, Louver and Double louver dampers as well as Tandem dampers were evolved in cooperation with process engineers, contractors and plant operators and are in service today in a variety of plants all over the world. Based upon new perceptions, several design improvements have been introduced during the last few years, amongst which are the louver damper with lattice supported single shell blade, the new sealing system NICROFLEX-HIPERFORM and a Diverter damper for gasturbine applications with a unique lattice structure reinforced blade design.

Patents for various design details and licence agreements underscore the high level of technical development reached.

- **Sealing systems** of metal elastic, ceramic, flexible, elastomere based and adjustable configuration,
- **Shaft bearing** supports in various designs,
- **Shaft seals** for any service requirement,
- **Damper blades** in a variety of forms for different purposes,
- **Drive systems** for fast and very fast opening or closing,
- **High temperature designs,**
- **Water and aircooled applications,**

enable us to select and supply the correct solution for each requirement. Furthermore, we develop and design dampers for entirely new processes and applications. We also design and fabricate in accordance with customer ideas and specifications.



Air-modulating and shut-off dampers,
may be supplied in circular or rectangular configurations and with single or multiple blades.

Tandem shut-off dampers,
all gas exposed parts are made of stainless steel. The damper is fitted with a double seal of the NICROFLEX-MLS type and is, with seal air, 100% gastight in terms of UVV regulations.

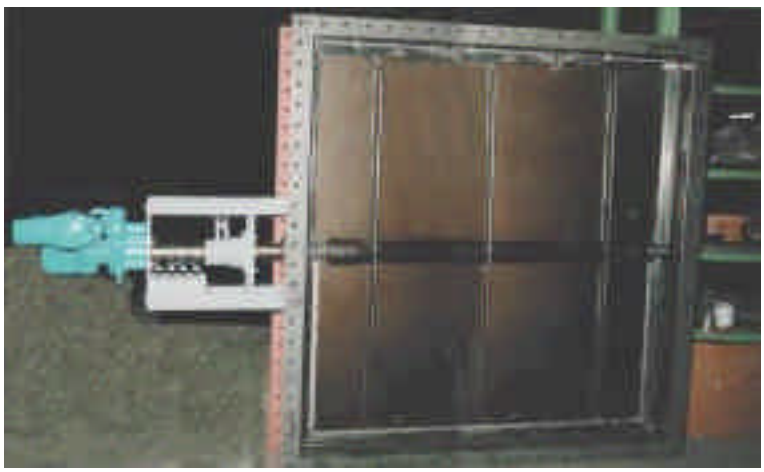
Burner modulation dampers,
for a coal fired powerstation. Depending on requirements, these dampers are supplied with single or multiple blades. Individual blades may be driven seperately.

Shut-off dampers,
casing and flanges are designed to meet respective pressure levels. The bearings, shaft glands, blade design, construction materials and the type of damper sealing system are selected to suit the conditions of service. The depicted dampers feature a metal leaf seal (area equivalent tightness 99,98%) and have been supplied to a refinery.

Sandwich dampers,
are inserted between two existing flanges of a duct. Damper shafts can be supported on bearings fitted either inside the casing or on outboard brackets. Several sealing methods are available and selected in accordance with requirements. Damper casing, blade and shafts may be made of a number of different materials.

High temperature gas dampers with internal refractory lining,
for high temperature service, dampers can be lined with castable refractory. The damper blade is designed to prevent distortion. Several design alternatives are are on hand for the radial and axial bearing supports, depending on requirements.

Shut-off dampers with rubber lining,
for service in fluegas desulphurisation plants or other chemically agressive processes. All internal components, including the damper shafts, may be rubber lined.



Hot gas guillotine damper,
for high temperature service the casing, and if necessary the damper bonnet, can be refractory lined. The design of the Guillotine blade ensures that only technically acceptable distortion occurs when it is subjected to sudden, high heat exposure.

The depicted damper has been installed in the exhaust duct of a wood fired boiler.

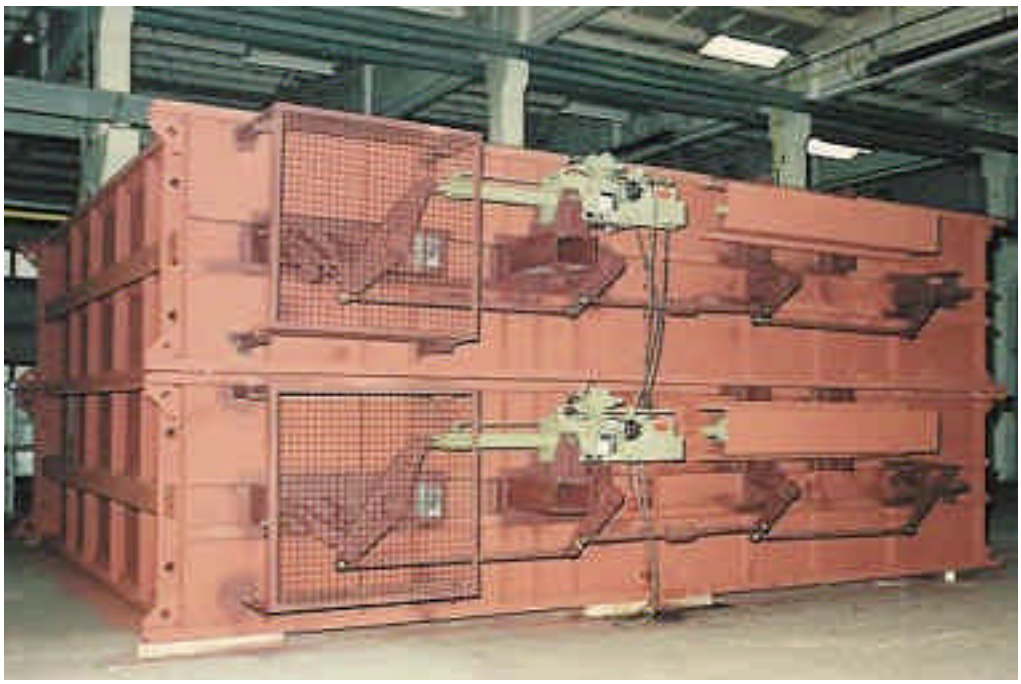
Louver dampers are employed for the modulation and isolation of flue gas systems. Depending on site conditions or system position round or rectangular configurated dampers can be supplied. When equipped with seals of the NICROFLEX type, an area equivalent tightness of at least 99,98% is achieved. Double louver dampers with seal air injection are 100% gastight in terms of UVV regulations.

For service in FGD plants or other chemically agressive processes the dampers may be of stainless steel construction, alternatively, they may be rubber lined or protected with corrosion resistant coatings.

In order to improve their modulation characteristics dampers can be supplied with opposed turning blades by means of corresponding linkage arrangements.

All available actuators may be employed, including very fast opening or closing types with emergency function. Available is further an emergency actuating mechanism of our own design with an integral toggle link system and spring induced fail safe feature.

Depending upon the application, a number of different blade designs are available for selection. Compared with conventional blades, the new, patented, lattice supported single shell damper blade causes only minimal cross blade pressure drop. While the loss of free area caused by conventional blades may be as high 25 to 30%, the new, improved design reduces this figure to approx. 7% only. The energy requirement of the fan is therefore correspondingly lower when the damper is fully open. Furthermore, the new design facilitates the construction of longer blade spans and avoids heat distortions.

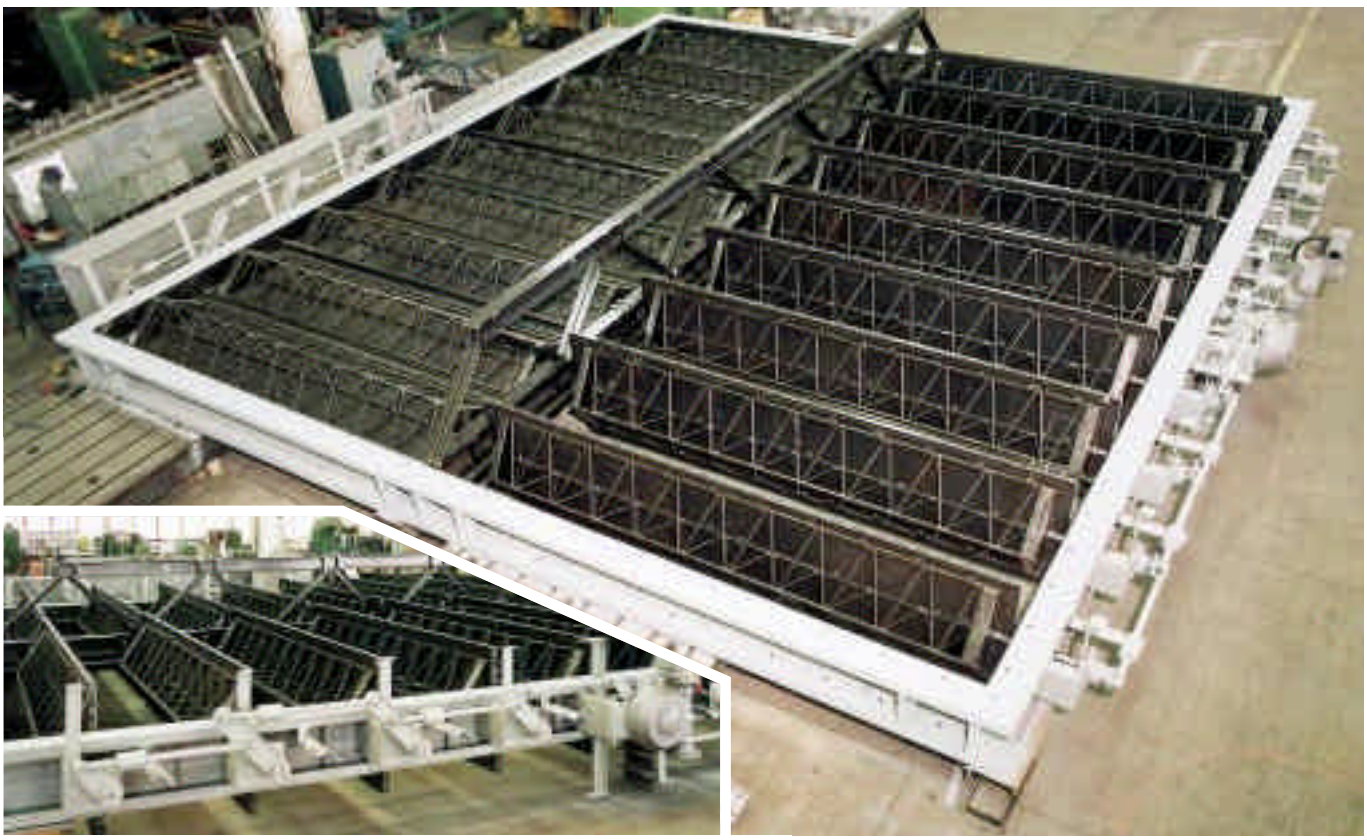


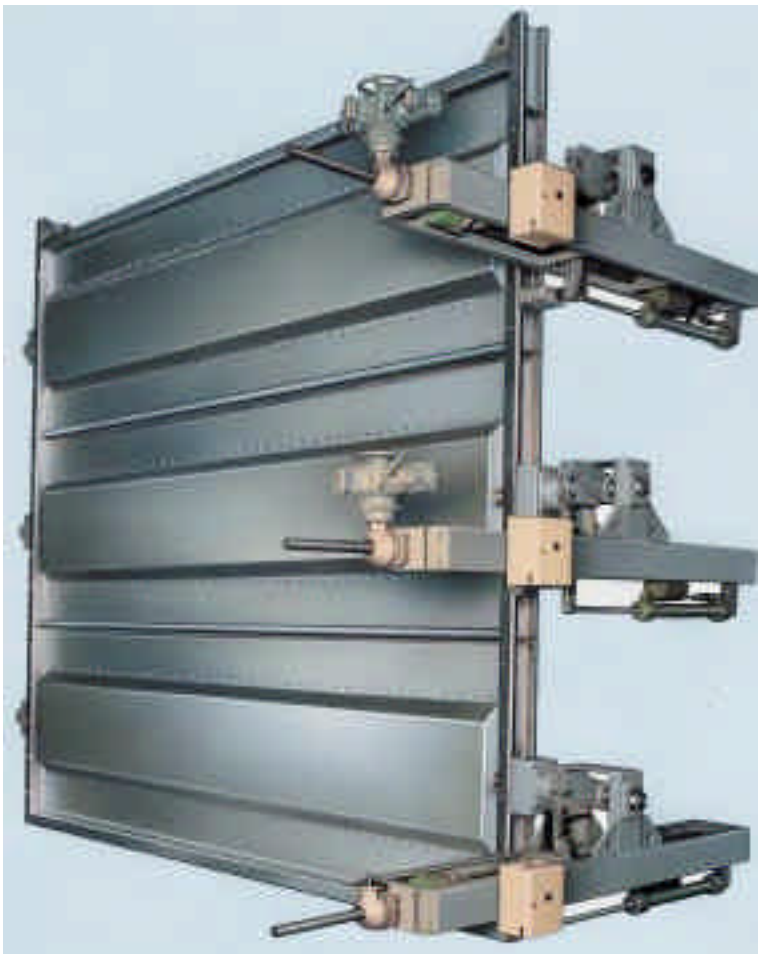
Louver dampers,
ND 6200 x 6200 mm,
for a FGD plant,
undergoing functional and tightness testing at our works.
The dampers are powered by hydraulic actuators with fail safe function.

Louver damper,
ND 8220 x 5300 mm,
for a FGD plant,
designed with profiled blades and NICROFLEX-MLO type seals.

△ **Double louver damper, ND 6780 x 5390 mm**, for FGD plant. With seal air, 100% gastight in terms of UVV regulations. Seals are of the NICROFLEX-HIPERFORM, DBP, type.

▽ **Louver damper, ND 9000 x 10000 mm**, for the gastight isolation of a DeNOx catalytic reactor. The new, patented, lattice supported single shell damper blades, DBP, minimise the pressure drop across the open damper and no distortion occurs when exposed to high temperatures.





Louver and double louver dampers
intended for service in corrosive environments can be made of from suitably selected stainless steels, or alternatively, be protected by corrosion resistant coatings or rubber linings.

If high alloyed stainless steels are necessary in order to withstand corrosive attack it may be cost economic to protect the exposed damper components by means of a thin stainless steel lining.

Damper shafts and packing glands of coated dampers are usually made from high alloyed stainless steel in the vicinity of casing penetration.

In case of rubber lining it is possible to protect also the damper shafts with a hard rubber coating which can subsequently be machined.

Louver damper,
ND 6400 x 6400 mm,
in stainless steel construction.
Each blade is driven separately by means of a fail safe actuator and opens without any external energy. Opening time is adjustable between 0,5 and 10 sec.

Double louver damper,
ND 4400 x 4000 mm,
with chemically resistant coating. With seal air, 100% gastight in terms of UVV regulations. Damper shafts and gland packings are made of stainless steel.

Tandem dampers are used for the gastight isolation of flue gas ducts and meet the UVV regulations. Their blade design is characterized by two narrowly spaced apart plates, attached to a single shaft. Endless seals are fitted to the periphery of each plate. In closed position seal air may be injected into the cavity between the two sealing planes. The advantages of this type of damper are its narrow face to face width, fewer mechanical parts and, consequently, reduced maintenance. Large dampers are designed with entirely hollow blades through which gas can freely flow, thereby reducing the pressure drop across the open damper.

Picture on the left above: **Tandem shut-off dampers, ND 1300 mm dia**. Made entirely of stainless steel. With seal air, 100% gastight in terms of UVV regulations.
Picture on the right above: **Tandem louver damper, ND 3070 x 2790 mm**, for FGD plant service. All gas exposed internal parts are made of stainless steel.
Picture on the left: **Tandem shut-off dampers**, depicted in open and closed position. Serving as emergency dampers of a FGD plant. With seal air, the dampers are 100% gastight in terms of UVV regulations. The spring induced closing time is 2,5 sec.
Picture below: **Tandem louver damper, ND 4700 x 4700 mm**, for isolation of a FGD plant. With seal air, the damper is 100% gastight in terms of UVV regulations. When the damper is in open position, flue gas can freely pass through the hollow section of the blades, DBP. This causes only a low cross blade pressure drop.

Flap dampers and Diverters
are employed for rerouting or total shut-off of flue gas duct systems. Their blades may be driven either directly by means of peripherally positioned shafts with pivoting levers or with internal toggle levers. All types of actuators can be used. With single seals of the NICROFLEX type an area equivalent thightness of 99,98% is achieved while, with double sealing and seal air, they are 100% gastight in terms of UVV regulations. Depending on temperature or chemical composition of the gas, corrosion resistant stainless steels or coatings can be embodied into the damper design.

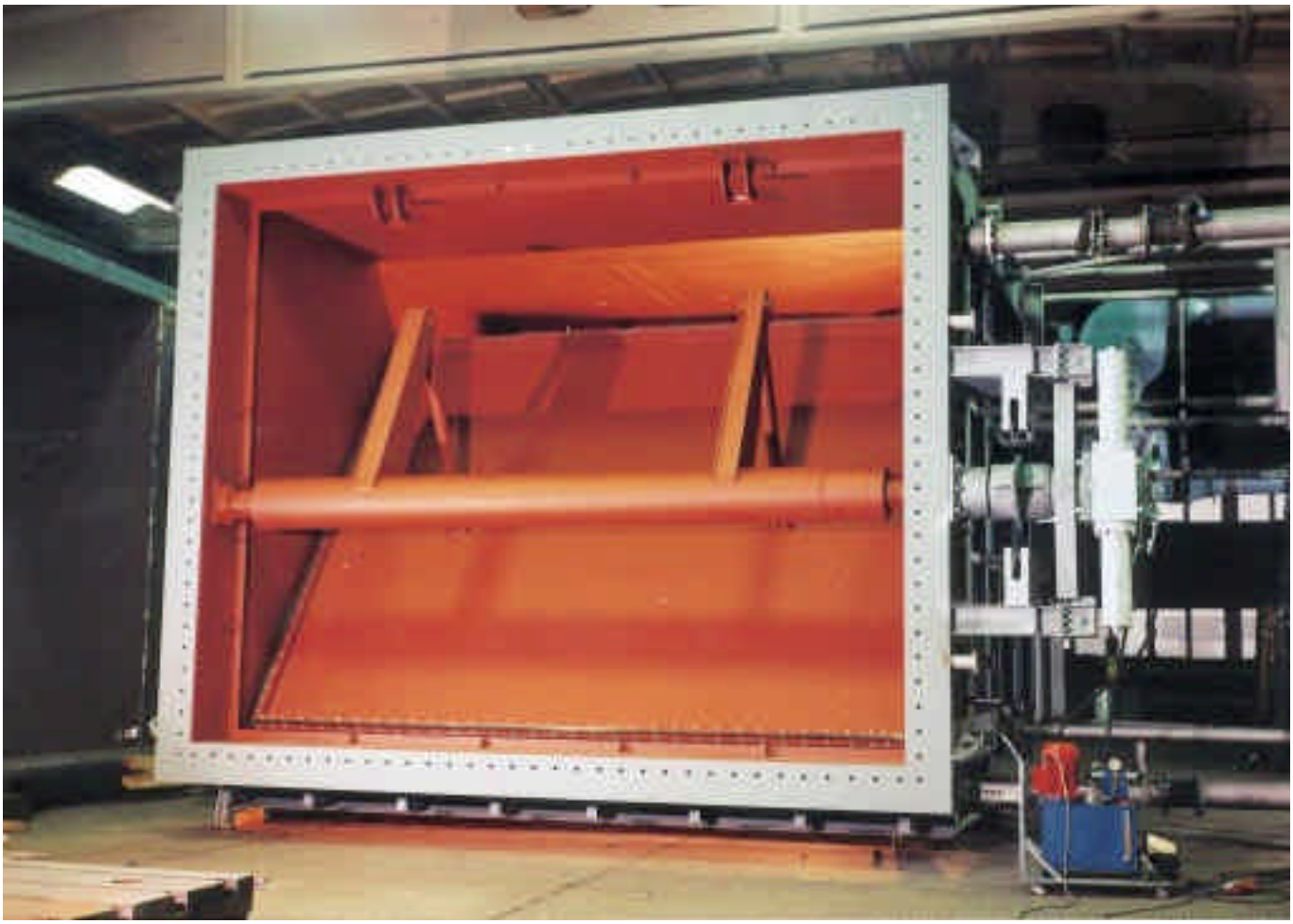
Picture on the left, above:
Two-bladed lever flap damper, 1800 x 1800 mm, with double sealing and seal air system.

Picture in the center, left:
Diverter damper, 2300 x 2300 mm, with double sealing and seal air system. All gas exposed components on one side of the damper are cladded with stainless steel. Damper is driven by a pneumatic actuator.

Picture below:
Flap damper, with internal toggle lever actuation, ND 9000 x 4500 mm, with double seal and seal air system. 100% gastight in terms of UVV regulations.

Picture on the right:
Flap damper,
ND 7000 mm dia.,
with internal toggle lever actuation, double sealing and seal air system. 100% gastight in terms of UVV regulations.

Picture below:
Diverter damper,
ND 5000 x 4000 mm,
with double sealing and seal air system. 100% gastight in terms of UVV regulations. Equipped with internal toggle lever system, hydraulic actuator and Siemens SP-control.



Thrust seated guillotine isolators for flue gas desulphurization plants. These isolators provide a 100% gastight isolation in terms of UVV regulations. The sealing is hermetic and compares to that of a blind flange connection. A coaxially moveable sealing frame is retracted before the blade can be driven in or out of the duct. The sealing frame can be hydraulically, pneumatically or electrically operated.

By retracting the sealing frame with attached seal the latter is not subjected to frictional wear. In both end positions the sealing element is pushed forward against the respective mating face and thus protects itself in service against any wear and sediment coating.

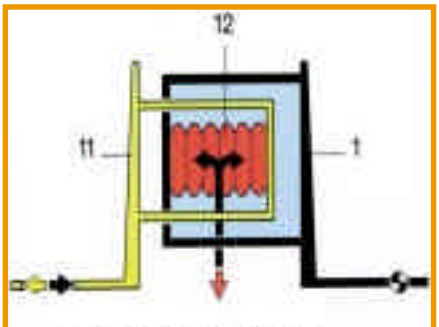
Blade actuation itself is effected by means of a rack and pinion system in combination with an electric actuator.

The illustrations in the centre depict the arrangement of the retractable sealing frame. It is connected to the fixed casing by means of two flexible joints. The drive components are protected and are not exposed to flue gas during plant operation.

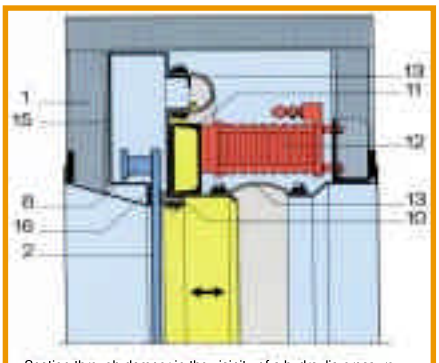
The retraction of the sealing frame is effected, in this case, by hydraulic pressure bellows whose function is depicted below, on the right.

Picture on the left: **Thrust seated guillotine isolator, ND 3210 x 6810 mm,** designed for vertical installation into a horizontal duct.

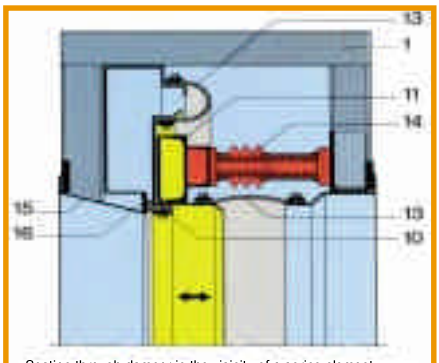
Picture below: **Thrust seated guillotine isolator, ND 4400 x 5500 mm**, for horizontal installation into a horizontal duct.



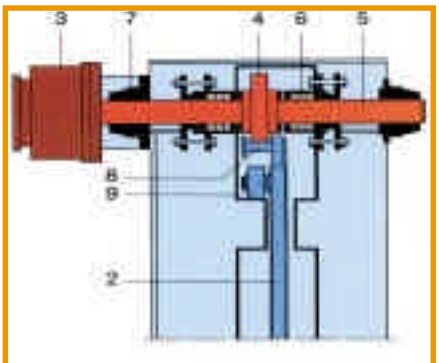
1 casing tie beam
2 guillotine blade
3 actuator
4 drive pinion
5 drive shaft
6 packing glands
7 bearings
8 drive rack
9 guide rollers
10 damper seal
11 retractable sealing frame
12 pressure bellow
13 flexible joints
14 spring element
15 duct wall
16 seal landing surface



Section through damper in the vicinity of a hydraulic pressure bellow. Guillotine blade is inside of duct – damper is closed – seal is in its respective end position

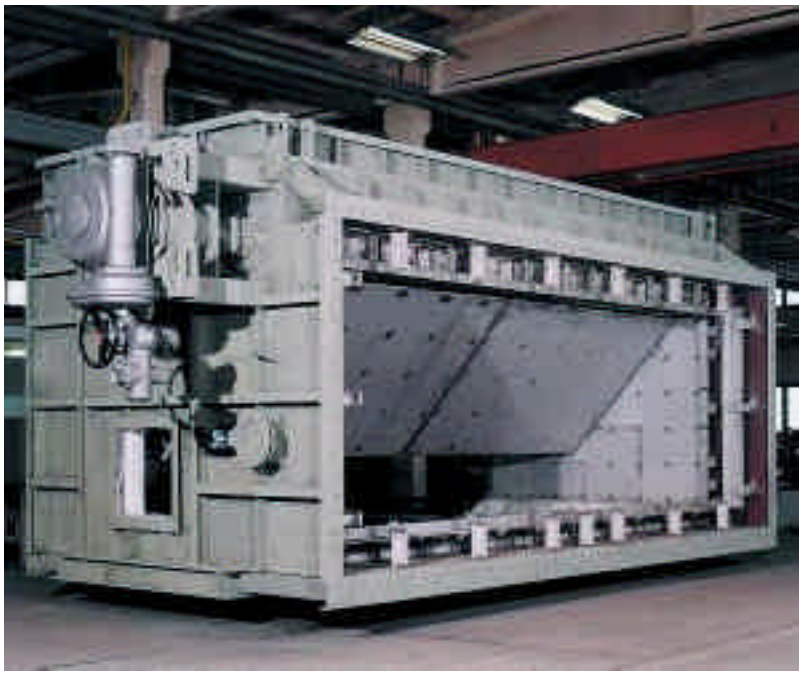


Section through damper in the vicinity of a spring element. Guillotine blade is outside of duct – damper is open – seal is in its respective end position



Section through damper drive arrangement.

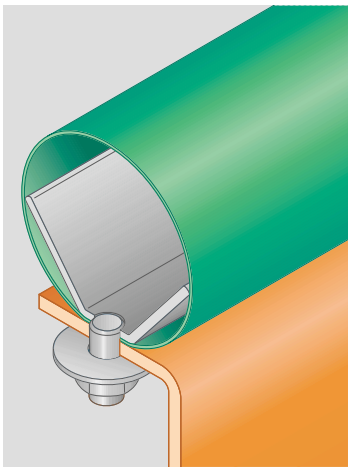
In combined cycle gasturbine powerstations the turbine exhaust gas is directed either to a waste heat recovery boiler or to the waste gas stack by means of single blade diverter dampers. In case of smaller diverters, this blade is pivoted directly by means of a peripherally positioned drive shaft and straight levers, while larger units are actuated by a central shaft and internal toggle lever drive system.
Diverters may be internally or externally insulated. To avoid heat radiation into the closed off plant section, the blade itself can also be insulated.
The patented, lattice structure reinforced blade is invariably incorporated into the design of the diverter. This precludes any heat distortion.
Together with the highly resilient, metallic sealing system **NICROFLEX-HIPERFORM, DBPa,** and seal air, a 100% gastight shut-off is achieved in both positions. The seals permit also operation of the diverter in the modulating mode, because the internal, lateral stabiliser prevents high velocity induced seal vibrations, which otherwise could cause the destruction of the seal.



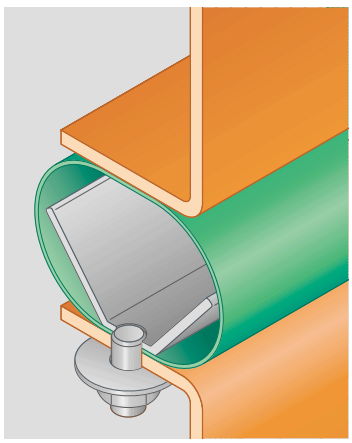
Picture above:
Diverter, DBP, ND 2400 x 6400 mm, during final assembly and testing in the works of RAUMAG-JANICH in Rauenstein. This Diverter is in service behind a LM 6000 General Electric gasturbine. The casing is internally insulated and the damper is operated by an electric actuator. Seal air and double seals of the NICROFLEX-MLO type provide a 100% shut-off in both end positions. The patented, lattice structure reinforced blade remains free of distortions when exposed to high, as well as rapidly fluctuating, gas temperatures.

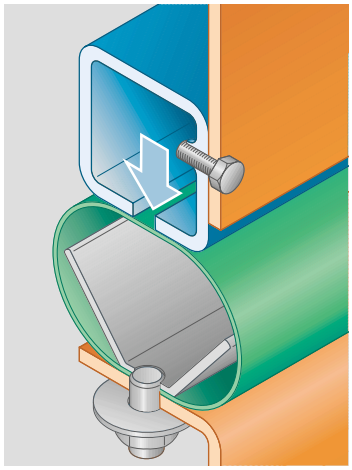
Picture on the left, below:
Diverter damper, DBP, ND 3048 x 3048 mm, for a combined cycle powerstation, supplied by our Indian licensee to BHEL. It is equipped with internal insulation. The patented, lattice structure reinforced damper blade is also insulated on both sides. Seals are of the highly resilient NICROFLEX-HIPERFORM, DBPa, type.

Picture below:
Diverter, DBP, for a combined cycle powerstation, ND 5020 x 4640 mm, during site transport to the place of installation. Due to its size it had to be delivered to site in several sections for reassembly. It is fitted with 200 mm internal insulation and has been installed behind a frame 6 FA General Electric gasturbine. The Diverter is powered by a hydraulic actuator. Design – and operating temperatures are 650 and 580 degrees C respectively.



Picture above: **Diverter, ND 3462 x 3462 mm**, with split casing, during assembly in the Rauenstein workshop.
Centre picture on the left: View into the Diverter casing with blade and internal lagging already fitted. The Diverter is equipped with the new, lattice structure reinforced blade, DBP, to which the double seals of the NICROFLEX-HIPERFORM, DBP, type are attached. The blade is heat insulated on both sides.
The *centre illustrations* on the right depict the highly resilient sealing system NICROFLEX-HIPERFORM in uncompressed and compressed condition. The internal, vee – shaped stabiliser prevents the seals destruction caused by high velocity induced vibrations. In compressed condition the seal flattens and bulges outwards, thereby creating a broad contact surface with the mating face.
Picture on the left: **Diverter, ND 2400 mm dia.**, for off-shore gasturbine plants in Norway.
This Diverter, as well as the one depicted overleaf, was equipped with the **NICROFLEX-HIPERFORM** sealing system *picture below.*





Diverter, ND 2700 x 2700 mm, for off-shore gasturbine plant in Denmark, powered by a hydraulic actuator with fail safe function.
Picture below on the left: depicts the patented NICROFLEX-HIPERFORM sealing system. Its main features are its high resilience and its stability in the face of high gas velocities quite common during operations in the modulating mode. This prevents vibrations which otherwise could cause the destruction of the seal.

Picture below on the right:
Provides a view into the bowels of the **patented Diverter blade clearly revealing** the proven details of the reinforcing lattice structure. High temperature gas can flow almost unrestricted through the structure, each part of which heats up evenly, and thereby averting distortion.

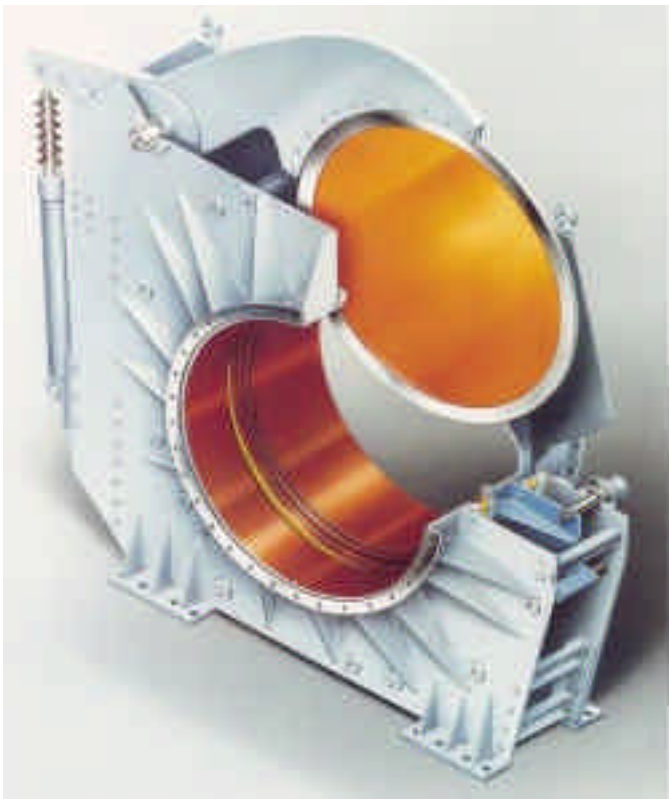
Isolation and gas modulation system, DBP, ND 600 x 17500 mm, for a gasturbine combined cycle power plant.
This damper is used either, to isolate the integrated bypass of the waste heat recovery boiler completely, or to modulate the flow towards it. The blade span of 17500 mm is facilitated by application of the new, patented, lattice supported single shell blade design. The blades are made up of 17500 mm long latticed girders upon which floating diaphragm cover plates are fitted.
Due to their outstanding resilience, the NICROFLEX-HIPERFORM seals, DBP, guarantee a high degree of tightness of the closed blades. When exposed to high velocity gas flow, the seals maintain their formstability, thereby permitting trouble free gas modulating operations. The system may operate at extreme temperatures of up to 700 degrees C. Even at such conditions no distortions of the blades have been observed.

Picture on the left, above: damper closed
Picture on the right, above: damper open

Centre picture:
4-way damper, ND 2500 mm dia.,
for Diesel-generator plant.
Design temperature: 500 degrees C. Fabricated completely from stainless steel. Two of the pneumatic actuators are mechanically linked and incorporate a spring operated fail safe device.

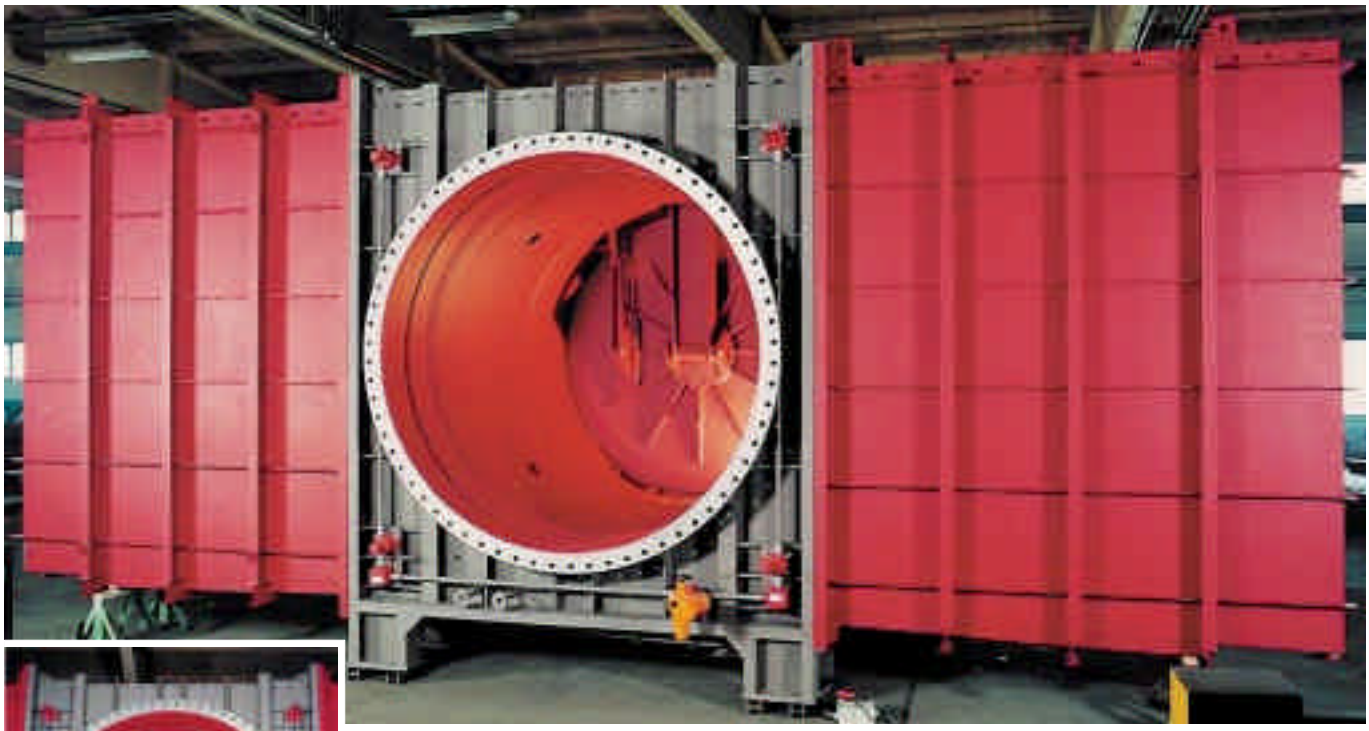
Picture on the left, below:
Blanking plate guillotine with internal insulation,
for gasturbine plant.
During normal plant operation, the insertable blanking plate is positioned outside the duct. Its seals are therefore accessible for inspection. With double seals and seal air, a 100% gastight isolation in terms of UVV regulations is achieved.

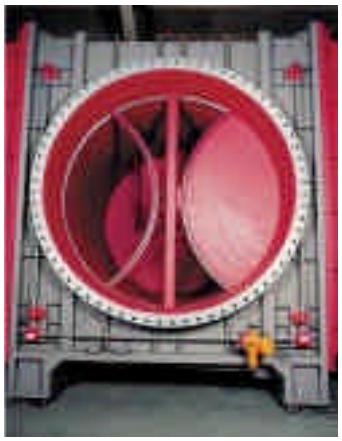
Picture on the right below:
Stack cap for gasturbine plant,
ND 5400 x 5400 mm. The damper provides automatic pressure relief and opens without external energy when a pre – adjustable pressure level is reached.



Sickle isolators are used for handling blastfurnace exhaust or other dust laden gases. Duct sealing is hermetic and corresponds to that of a blind flange connection in terms of UVV regulations. A blind disc pivots around a fixed point positioned outside the duct. A coaxially moveable sealing frame is first retracted, thereby creating a slot through which the disc travels. The sealing frame is either actuated hydraulically or electrically. Once locked, the seal between disc and frame remains intact, even upon loss of all external energy.

Picture left above: **Sickle isolator, ND 2200 mm dia.**, for cement factory, with electric actuator.
Picture on the left below: **Sickle isolator, ND 3000 mm dia.**, with hydraulic actuation, installed as main system isolator ahead of a blastfurnace gas fired boiler.
Picture below: **Sickle isolator, ND 2200 mm dia.**, for metallurgigal plant. Hydraulically actuated.





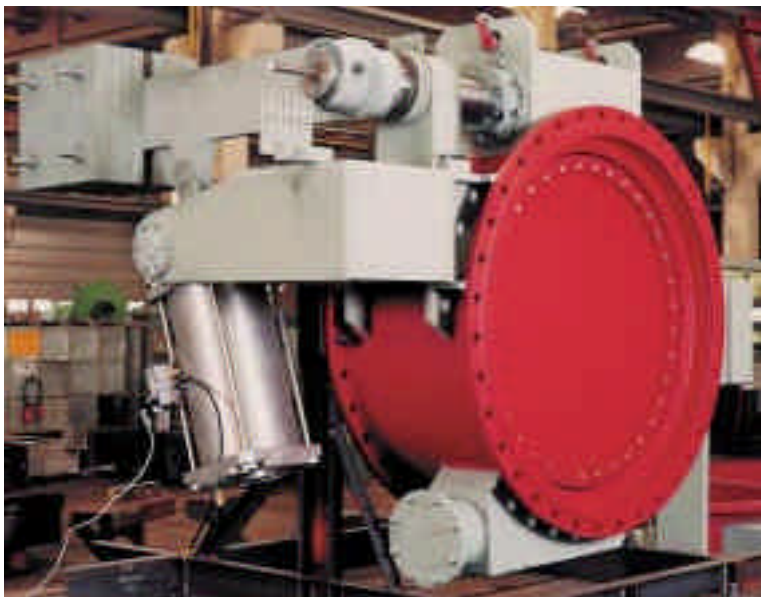
Goggle valves provide a 100% gastight isolation of gas mains in terms of UVV regulations, without a sealing media. The gastight shut-off is maintained even upon loss of external energy and corresponds to that of a blind flange connection. They are used for the shut-off of blastfurnace – or cokegas mains. Actuation may be by electric or hydraulic drives.

Picture above and on the left:
Goggle isolator, ND 3000 mm dia., DVGW approved, with gastight casing, serving as main isolator in terms of UVV regulations, in the gas supply duct of a blastfurnace gas fired boiler. The sealing frame, as well as goggle and blind disc, are electrically actuated.

Picture below:
Goggle isolator, ND 2200 mm dia., for blastfurnace gas. The sealing frame is hydraulically operated.

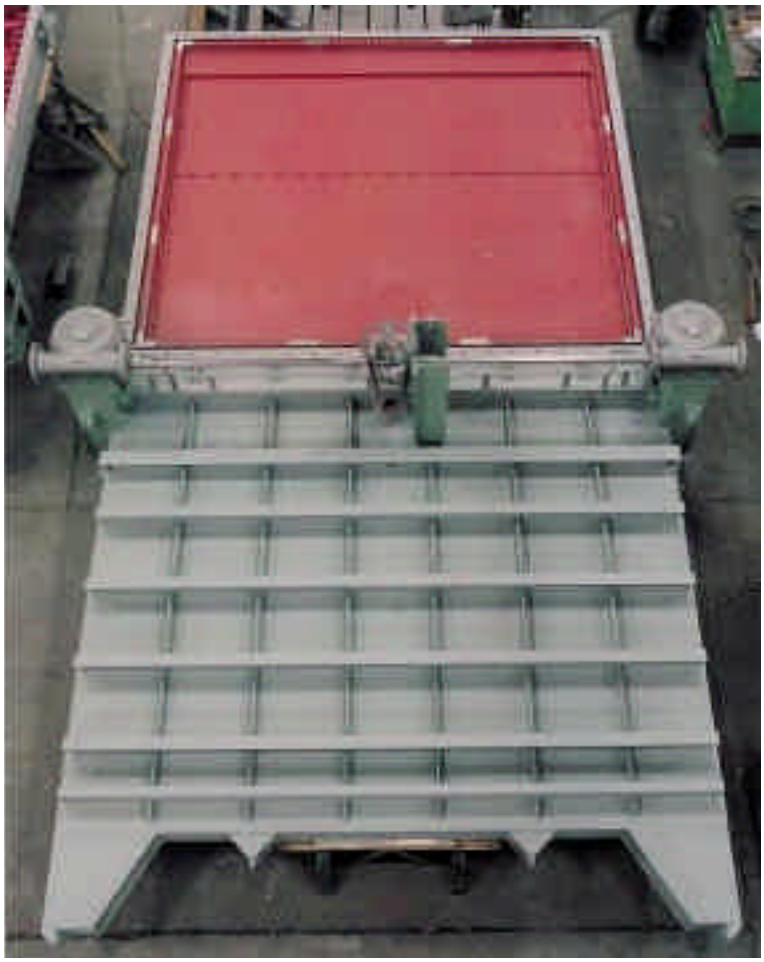
Toggle disc valves are used for the shut-off of gas mains. They are considered technically tight sealing valves. (to DIN 3230)
The high sealing efficiency is achieved by means of an endless sealing element upon which the valve disc is pressed down by the action of the main levers when the valve closes. On opening the valve, the disc moves initially away from the seal in a coaxial direction and is subsequently turned about by means of the toggle levers, until it reaches a position parallel with the centreline of the duct. Operated in this manner, no wear takes place at the seal. Toggle disc valves can be powered by any type of actuator. In combination with counterweights or springs they may serve as emergency valves.

Right: **Toggle disc valve, ND 3000 mm dia.**, DVGW approved, serving as gas deficiency safety device. Upon loss of pressure the valve shuts-off the gas main within 5 sec. without any external energy by means of a counterweight arrangement. The valve is opened hydraulically.



Centre:
Toggle disc valve,
ND 1300 mm dia., DVGW approved, used as safety damper upstream of the burners of a blastfurnace gas fired boiler of a powerstation. Closing time is 2,5 sec.

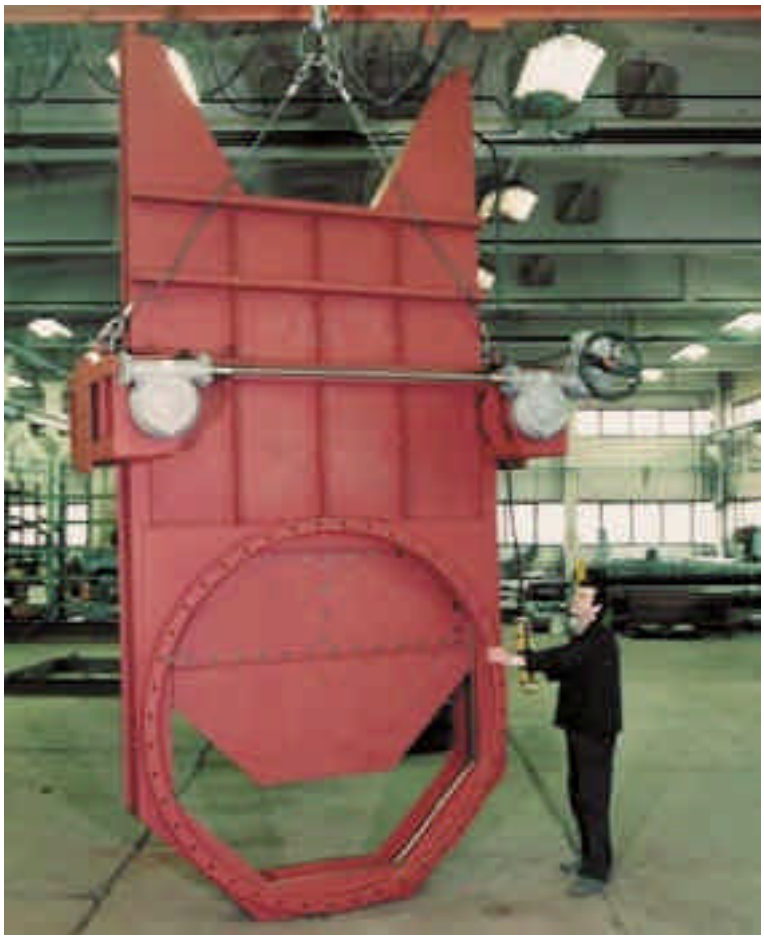
Right:
Toggle disc valve,
ND 3000 mm dia.,
DVGW approved, valve in fully open position. The valve is equipped with a double seal landing bar, thereby providing a cavity into which Nitrogen is injected when the valve is closed. The Nitrogen pressure is used to monitor the valve tightness continuously. The sealing element itself is fitted to the valve disc and is easily replaceable.



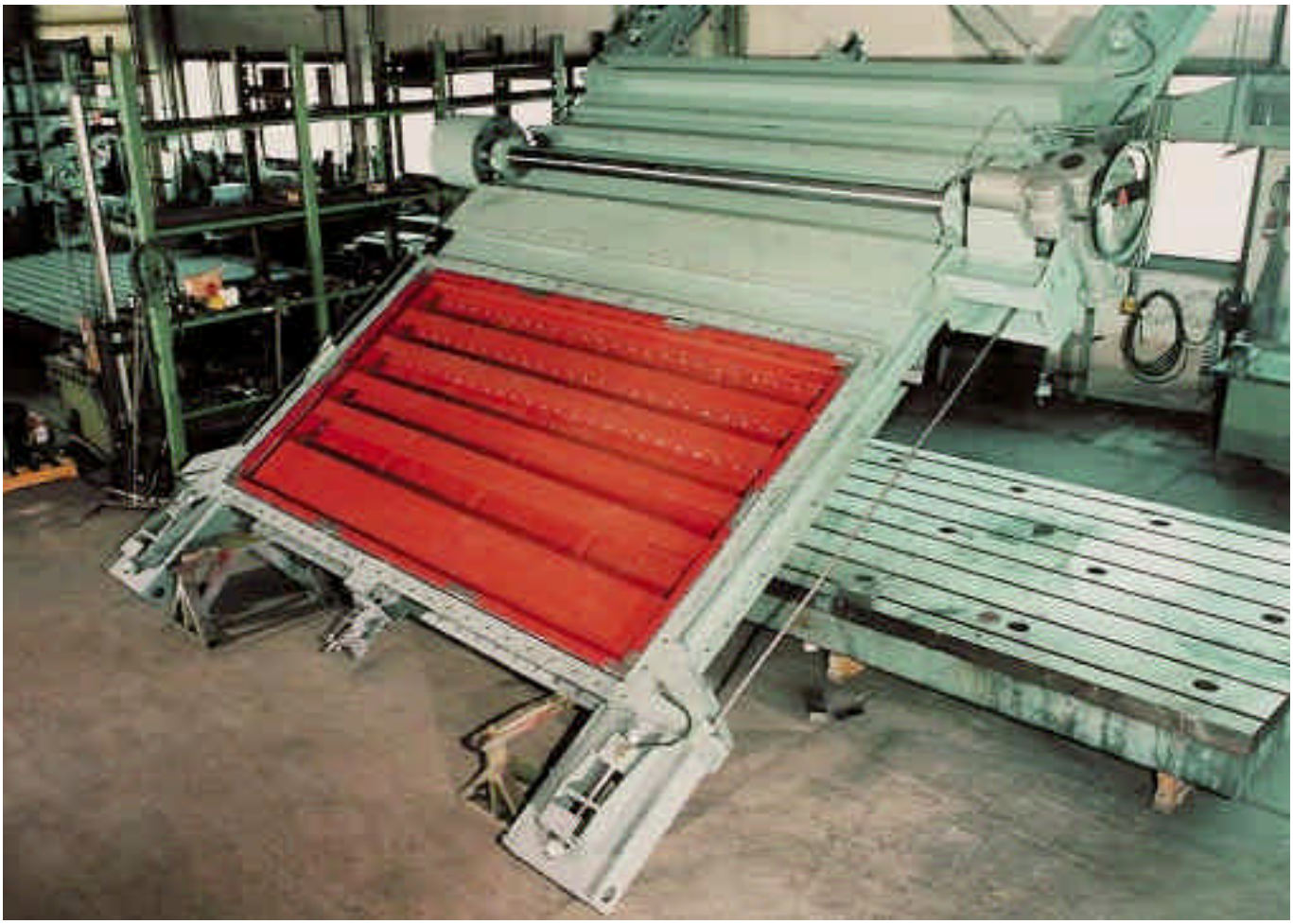
Guillotines are being used for shut-off of dust laden flue gas volumes.
The damper blade with its grid support structure is designed in such a manner that it can only minimally distort when exposed to high temperatures. It is operated by an electric actuator in conjunction with rack and pinion systems engaging it on each side, which ensures a square blade movement.
The design of the rack and pinion system has been improved recently to make it suitable for very high temperatures and severe dust loads in the flue gas.
Depending on actual service conditions, the sealing systems NICROFLEX-MLO, or the patented NICROFLEX-HIPERFORM, may be chosen.
Due to the flexing of the seals during damper operation they clean themselves in service and even sediment coatings break away.
With the recommended seals an area equivalent tightness of at least 99,98% can be provided. With double seals and seal air, a 100% gastight shut-off in terms of UVV regulations is achieved.

Guillotine dampers during final assembly and testing at the Rauenstein works. A total of six units were supplied, two each with the dimensions 3200 x 4600 mm, 4200 x 3200 mm and 4000 x 4200 mm, under cover of one order, to the cement plant Hoping in Taiwan, one of the largest limestone milling plants in the world.
Design temperature: 400 degrees C
Design pressure: 110 mbar
Dust burden: 1100 g/acbm

Picture on the right:
Guillotine damper, ND 2200 mm dia.,
to fit a circular waste gas duct of a cement kiln, equipped with NICROFLEX-MLO seals.
Design temperature: 350 degrees C.
Powered by rack and pinion system and electric Actuator.



Picture below:
Guillotine damper with double cable drive.
This design was developed in order to meet the requirements of very high temperature service combined with extreme gas dust burdens.
The main drive shaft moves both cables synchronuously in both directions thereby ensuring a smooth operation of the damper blade under extreme conditions. First developed in 1971, nearly 1000 units of its type have been successfully put into service all over the world and it has since become a classic.



RAUMAG-JANICH is an established producer of telescopic steel covers for all kinds of machine tool and guide beds. Our workforce can draw upon 20 years of experience with this type of fabrication.

The nearly unlimited scope and adaptability inherent in our CNC controlled sheet metal fabrication plant enables us to manufacture almost any geometrical shape. The precision formed parts together with high grade seals, gliders, rolls and absorbers together make up the RAUMAG telescopic machine bed covers, a product of outstanding quality. It provides the best possible protection for your machine tools against metal cuttings, coolants, swarf, dirt and mechanical damage.

A new spring absorber development permits travelling velocities of up to 60 m/min.

Picture below:
Telescopic covers for machine and guide beds of a horizontal boring mill

Pictures on the right:
Telescopic steel covers of various geometrical shapes

RAUMAG-JANICH meets all criteria for a technologically qualified fabrication of machinery for the chemical process industries.

- **Sufficient production space** for manufacture, assembly and trial operation
- State of the art welding technologics based upon the welding certificate of competency to DIN 18800
- **Quality management certified to ISO 9001**
- **Comprehensively equipped** and tooled up
- **Stable workforce** with extensive experience

We fabricate in accordance with your drawings however, if required, we are able to prepare drawings meeting your specifications and design concepts as well as evolving entirely new designs on the basis of a defined requirement.

RAUMAG-JANICH stands for:

Perfect technique, Quality and Security

Picture below: Boltless wear liner for cement turbo separator

Picture above: Rotor of a cement cooler, 3200 mm dia., length 8500 mm
Picture on the left above: Fluidised bed cooler for pulverized or granular products
Centre picture: Casing of cement cooler, 3200 mm ins. dia., height 11100 mm
Picture below: Damper casing, ND 3000 x 3000 mm

Programme overview

Special purpose dampers for

- **Power stations**
- **Gasturbine plants**
- **Flue gas desulphurisation plants**
- **Flue gas denitrification plants**
- **Cement plants**
- **Steel smelters**
- **Waste heat recovery plants**
- **Garbage incinerating plants**
- **Chemical process industries**
- **Other industrial plants**

Large, tailor designed dampers for Gasturbine plants

- **Diverter** for the isolation, rerouting and modulation of the turbine exhaust gas. With double seals and seal air 100% gastight in terms of UVV regulations.
- **Diverter** for gasturbine-off-shore plants, designed to meet the specific service requirements.
- **Flap dampers,** also for modulating operations, with seal air, 100% gastight in terms of UVV regulations.
- **Louver** and
- **double louver** dampers for modulating service and shut-off.
- **Stack caps**, also as
- **emergency dampers.**
- **Blanking plate Guillotines** for combined cycle plants, also with double seals and seal air for 100% gastight shut-off in terms of UVV regulations.
- **Flexible joints** for combined cycle plants.

Shut-off and modulation dampers

- **Shut-off dampers**, of round or rectangular configuration
- **Shut-off dampers** of high tightness, 99,98% minimum
- **Double-shut off dampers,** with seal air 100% gastight to UVV
- **Tandem dampers**, cost economic alternative to double shut-off damper, with seal air 100% gastight to UVV
- **High efficiency louver dampers**, for modulation or shut-off
- **Double louver dampers**, with seal air 100% gastight to UVV
- **Tandem louver dampers**, cost economic and space saving alternative to Double louver dampers, with seal air 100 % gastight to UVV
- **Lever flap dampers**, also with double sealing and seal air, 100% gastight to UVV
- **Diverter dampers**, with double sealing and seal air, 100% gastight to UVV
- **Emergency dampers**, fast opening or closing, also on loss of energy
- **Stack dampers**, also with emergency features
- **RK10 sandwich dampers**, for fitting between existing flanges
- **Dopex shut-off valves**
- **Toggle disc valves**, DVGW approved, as shut-off or emergency dampers
- **Hot gas valves**, also air or water cooled

Isolators

- **Guillotine dampers** for FGD plants. 100% gastight to UVV
- **High efficiency guillotine dampers**
- **Guillotine dampers**, with double sealing and seal air 100% gastight to UVV
- **Sickle isolator**, 100% gastight to UVV
- **Goggle valves**, DVGW approved, 100% gastight to UVV
- **High temperature isolators**, with or without internal lagging or refractory lining
- **High temperature isolators**, with air or water cooling

Service and maintenance

- **Professional maintenance** of flue gas modulation and shut-off dampers
- **Conversion and modernising** of existing flue gas modulation and shut-off dampers
- **Upgrading of obsolete sealing systems**

Fabrication for industrial machinery and process industries

- **Cooler** for dusty bulk materials
- **Fabricated**, welded components made of **steel and stainless steel**, also machined if required
- **Boltless wear liners** for cyclones and air separators etc.

Telescopic steel covers for the slide way protection of large machine tools

RAUMAG-JANICH: Perfect technique, Quality and Security

RAUMAG JANICH

RAUMAG-JANICH Systemtechnik GmbH
Im Grund 6 · Postfach
D-96528 Rauenstein/Thüringen
☎ 03 67 66/8 81-0 · Fax: 03 67 66/8 10 32

www.raumag-janich.de
E-mail: info@raumag-janich.de

JANICH Spezialarmaturen

JANICH GmbH & Co.
Ennigerloher Str.16 · D-59269 Beckum
Postfach 2224 · D-59255 Beckum
☎ 0 25 25/41 41· Fax: 0 25 25/63 32