

## Deichmann materials recovery and air filtration

Systematic industrial dust extraction

Bag Jet Filter SJV

Product brochure



Deichmann Dust-extraction systems

## Economically and ecologically convincing

**For more than 60 years now, Deichmann Filtertechnik has developed systems for industrial dust extraction. The result is components and equipment systems that have set ecological and economic standards.**

Today, very strict regulations apply to industrial and commercial work involving dust pollution in the air. Most activities that release air pollutants must observe emission limits, building and equipment regulations, as well as internal company operational stipulations, in order to properly protect staff and the environment. At the same time, the many requirements for air treatment have become increasingly more complex. In light of these challenges, companies throughout Europe have consequently come to trust the competence of Deichmann Filtertechnik.

Toward solution of many and various problems involving air purification, Deichmann Filtertechnik offers a broad spectrum of system components for extraction of solid and gaseous substances.

As system partner, we offer you not only filter systems, but also comprehensive expertise for exact design of the system best suited to your needs.

### **Extensive spectrum of application:**

- Dust collection
- Gas conditioning
- Sorption of pollutants
- Product recovery
- Odor removal





Deichmann Hose-filter plant

## Deichmann system solutions

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# First choice for air purification, dust extraction and materials recovery

**Engineering by Deichmann Filtertechnik assures choice of optimal components and systems for all requirements.**

Fine-particulate dust and ultrafine particles represent substances that especially endanger human health. All efforts must be taken to protect men and women from these hazards. But, important as they are, health and environmental aspects are not the only issues involved in dust extraction. Whereas for many companies, dust is simply an undesirable waste product, other operators have discovered dust as an important recycling product. As a result, our portfolio includes not only products for efficient air treatment and dust extraction, but also systems for efficient materials recovery.

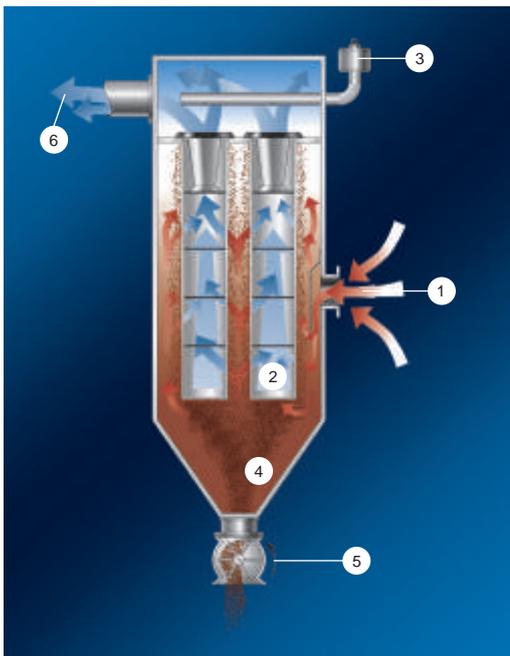
The function of a plant system is influenced by many product and operation parameters. In advance, all parameters should be evaluated that will have an effect on the filter system. In all cases, our engineering specialists will contribute the required expertise in order to optimally implement your future system from both technical and cost-efficiency standpoints. For this purpose, our experts employ an extensive complex of technical facilities. These include analysis systems for gas and dust, as well as measurement-technology testing facilities and equipment for investigation of existing filter systems.

**Filter equipment and dust-extraction systems by Deichmann are employed in a great number and variety of industrial sectors and processes:**

- Stone and earth materials
- Wood processing
- Processing of plastics
- Metallurgy
- Energy
- Waste incineration plants
- Power-plant dust extraction
- Blast-furnace plants
- Chemical industry
- Foods, beverages, and luxury foods
- Hazardous goods
- Thermal processes
- Combustion processes, and many more.

# Efficiency – a question of technology

- 1 Entry of dust-laden air
- 2 Filter Elements
- 3 Pulse-jet cleaning
- 4 Dust bunker
- 5 Dust-removal unit
- 6 Clean-air outlet



Schematic of a Deichmann filter system

**Products by Deichmann Filtertechnik for dust extraction, air purification, and materials recovery represent the state of the technical art. The processes involved include solutions for dust filtration, pulse-jet cleaning of filters, and dust disposal.**

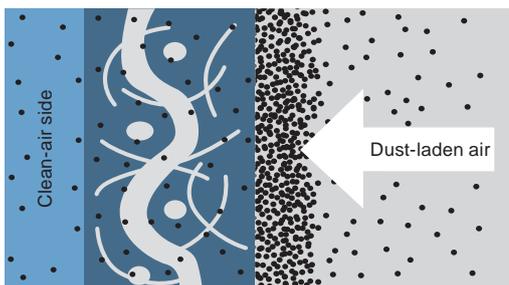
## Functioning of a Deichmann filter system

Dust-laden air passes through untreated-air passages and fittings into the filter chamber. The air flows through the filter elements, to which the dust adheres. A pulse jet blasts the collected dust away from the filter elements, and the dust falls into dust-collection bins. Dust-removal units (e.g., a cellular wheel sluice) carry the dust away. The purified air then passes along, through clean-air passages and fittings, into the direction of a suction fan.

## Dust extraction and filtration

### Depth filtration

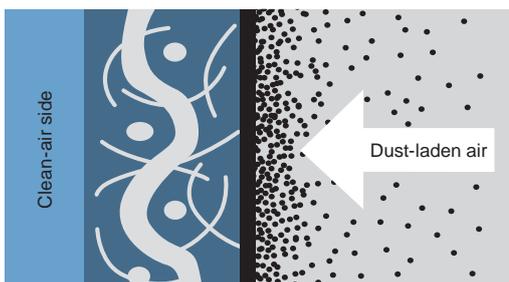
In the obstruction phase, particles lodge in the filter medium as a result of their inertia, diffusion, electrostatic effects, adsorption, and sieve effects. In depth filtration, the particles are retained in the interior of the filter layer. Depth filtration, which is characterized by great retention capacity, performs the major share of work in a filter process. Depth-filter layers are clogged relatively late. The full filter effect is achieved when the filter material is permeated by dust and a supplementary filter layer has been created.



Principle of depth filtration\*

### Surface filtration

The function of a coffee filter is a good example of the principle of surface filtration. The filtered particles are retained by the mesh of the filter or on the surface. In practice, this is achieved by a membrane over a two-dimensional surface that remains unchanged. In surface filtration, separation takes place on the surface of the filter medium. The micro-porous structure of the membranes used as media here separates even the smallest dust particles. In contrast to filtration with conventional filter media, the captured particles cannot penetrate into a felt network and clog it over the course of time. Such highly effective filter membranes achieve filtration efficiency of more than 95%. Since dust particles do not penetrate into the carrier material of the filter medium, the system operates with minimum pressure drop. This increases the gas flow and thus the productivity of the plant. Cleaning the filtered dust from the filter medium is therefore simpler and less damaging.



Principle of surface filtration\*

\* As illustrated by Gore

## Pulse-jet cleaning

All Deichmann dust-extraction systems are automatically cleaned by pulse-jet blasting. The pulse-jet cleaning lasts between 80 and 200 ms. One pulse is provided to clean each row of filter elements. The pulse-jet cleaning system, developed by Deichmann Filtertechnik, was designed to assure highly efficient and yet economical cleaning of filter elements.

### Mode of functioning of the pulse-jet cleaning system

Dust enters the system in the air conducted through the intake passages. Initial flow-deflection and impact effects at the filter intake initially act to separate part of the dust from the air. The remaining dust lodges on the surface of the filter hoses. There, the dust forms a filter layer that is critical for uniformly high filtration efficiency. Pulse-jet blasts of air periodically clean the filter hoses. The agglomerated dust falls into the dust-collection funnel or trough, and is continuously removed from the filter unit by systems such as cellular wheel sluices and double flap valves.

### Overview of Deichmann jet-pulse filter cleaning:

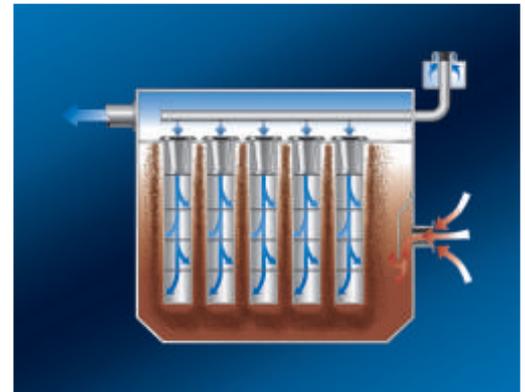
- Fully automatic cleaning, at periodic time intervals
- Filter cleaning in accordance with filter pressure drop
- Online or offline filter cleaning
- Cleaning by jet-pulse blasts or by reverse air flow

## Dust removal and transport

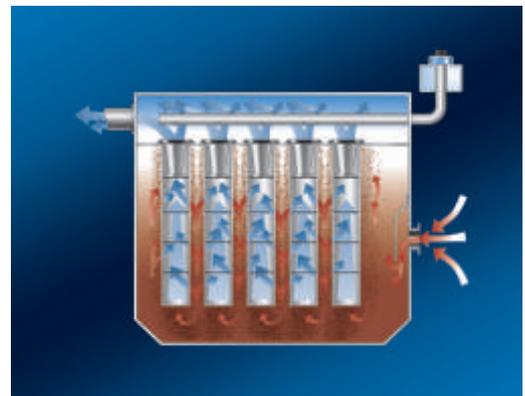
In conjunction with its dust-extraction systems, Deichmann Filtertechnik has also developed matching dust-conveying systems to enable effective and profitable removal and exploitation of dust as a raw material. Conveyor screws installed in pipes and troughs are among the primary systems used to remove dust from the extraction units.

Conveyor screws by Deichmann can be effectively used in horizontal or slanting configuration to remove bulk material from industrial processes, and to ensure continuous conveying. All these conveyor screws are coordinated to the requirements of the material being transported. Transport distances beginning at 6 m are already considered standard. Long transport distances can be spanned by customized system designs.

- Dust conveyor screws
- Cellular wheel sluice
- Double flap valves with gravity or motor operation



Filter cleaning by jet-pulse blast

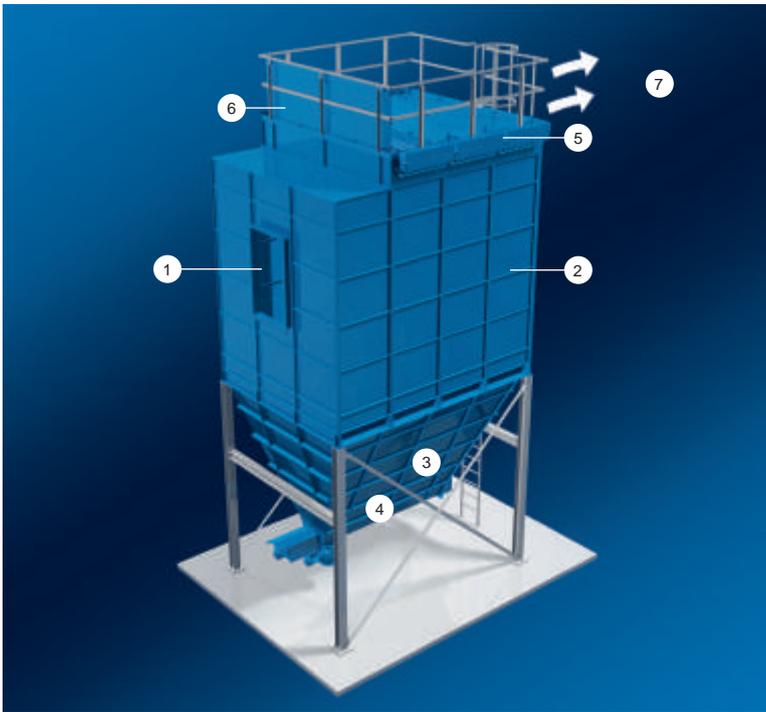


Filtration



Deichmann dust-collection screws in a dust bunker

## Dust removal with jet-pulse cleaning



Configuration of a Deichmann hose filter system

- ❶ Entry of dust-laden air, with interior-mounted baffle plate
- ❷ Filter chamber with filter elements installed
- ❸ Dust bunker
- ❹ Dust-removal conveyor screw
- ❺ Pulse-jet cleaning of filters with integrated cleaning valves and complete compressed-air maintenance unit
- ❻ Deck doors with weight relief
- ❼ Clean-air outlet (with variable configuration)

### Standard ranges of models

#### ■ Range SJV

Approx. 10 - 2,000 m<sup>2</sup> of filter surface, with bolted sheet-steel enclosure made of RSt 37 - 2 (1.0038) or stainless steel

#### ■ Range SJR

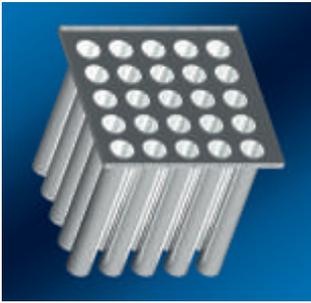
Approx. 5 - 300 m<sup>2</sup> filter surface, round sheet-steel enclosure made of RSt 37 - 2 (1.0038), with other features similar to SJV

**Deichmann Bag Jet Filters are dust-extraction systems that are completely automatically cleaned by compressed-air jet pulses. The capacity for dust extraction is air flow rates of 10,000 to 500,000 m<sup>3</sup>/h. These filters are designed for application in all industrial areas with serious dust burdens.**

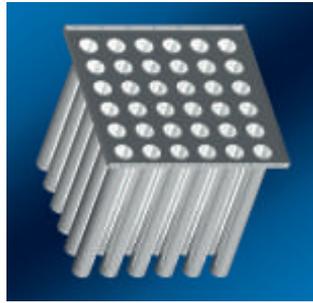
In close collaboration with leading manufacturers of filter media, Deichmann Filtertechnik applies the filter material that is optimal for the respective applications. As a result, use is primarily of needle felt made of synthetic fibers such as polyester, polypropylene, polyacrylonitrile, and polyphenylene-sulfide. At higher gas temperatures, the filter hoses are made of Teflon or aramids. In temperature ranges above 260°C, the use of woven fabric hoses made of stainless steel is effective. Gaseous pollutants are absorbed from the exhaust gas with the aid of additives, and are separated by Deichmann Bag Jet Filters.

Filter hoses with diameters of 120 or 150 mm are installed in chambers with modular configuration. The dust that has been removed from the filters by pulse-jet cleaning is collected in hoppers or funnels, where it is removed. Large service hatches with weight relief at the filter cover simplify the access to the clean-air zone. Installation and removal of the filter hoses and supporting baskets takes place on the clean-air side. Snap rings in the hose support secure and seal the filter hoses. The pulse-jet nozzles, which are mounted above the filter hoses, are easily installed with plug-in connectors with O-ring seals.

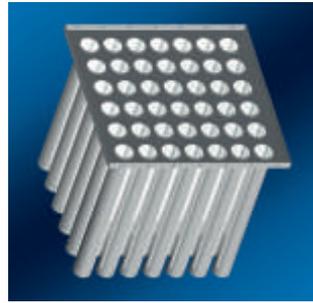
# Available configurations



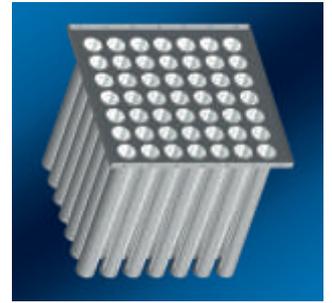
System Ø150  
5 x 5 hose configuration



System Ø120  
6 x 6 hose configuration

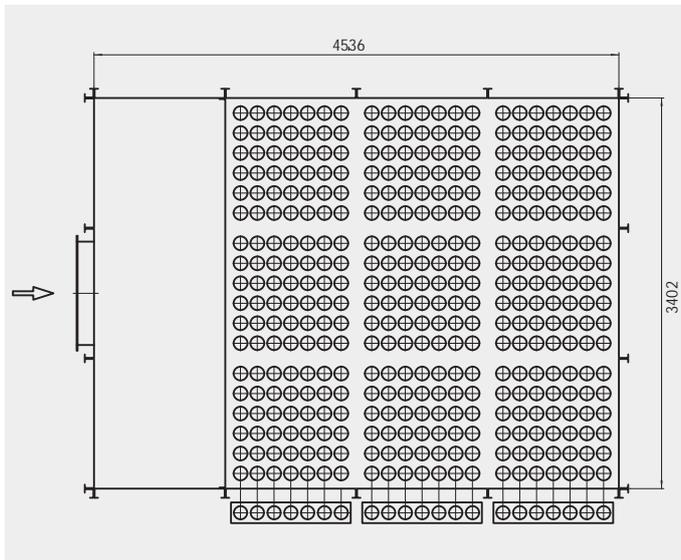


System Ø120  
6 x 7 hose configuration



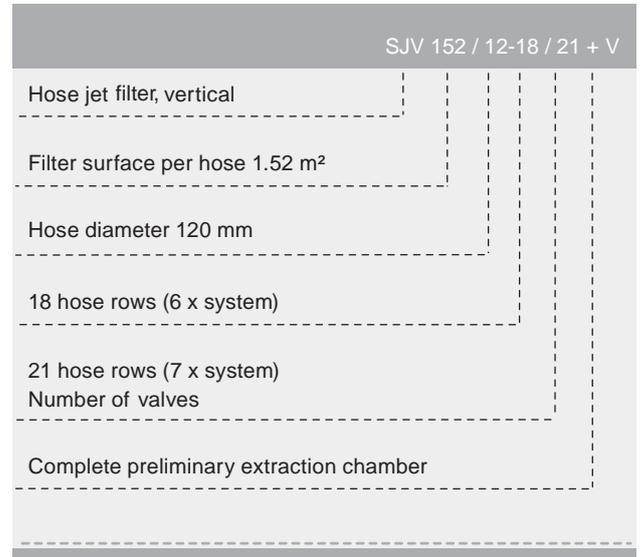
System Ø120  
7 x 7 hose configuration

## Filter-hose configuration in the casing



Cross-section

## Type key for Deichmann Hose jet filter



Total filter surface: 1.52 m<sup>2</sup> x 18 x 21 = 575 m<sup>2</sup>

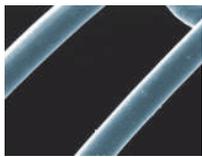
Hose configurations	Hose diameter-Ø	Breakdown	Filter surface <sup>1)</sup> per module	Lift surface <sup>2)</sup> per module
15-5 / 5	Ø 150 mm	205 x 205	11,77 m <sup>3</sup> / m   100 %	0.84 m <sup>2</sup>   100 %
12-7 / 5	Ø 120 mm	145 x 205	13,19 m <sup>3</sup> / m   112 %	0.89 m <sup>2</sup>   106 %
12-6 / 6	Ø 120 mm	174 x 174	13,56 m <sup>3</sup> / m   115 %	0.88 m <sup>2</sup>   105 %
12-7 / 6	Ø 120 mm	145 x 174	15,83 m <sup>3</sup> / m   134 %	0.81 m <sup>2</sup>   96 %
12-7 / 7	Ø 120 mm	145 x 145	18,46 m <sup>3</sup> / m   157 %	0.73 m <sup>2</sup>   87 %

<sup>1)</sup> Filter surface: total surface of all filter hoses

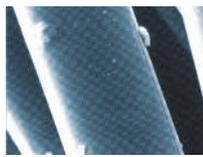
<sup>2)</sup> Lift surface: free surface for unfiltered air within the enclosure

## The right selection

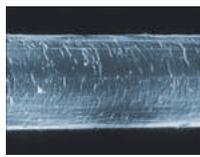
Needle felts made of synthetic fibers such as the following are especially used as filter materials: polyester, polypropylene, poly-acrylonitrile, and polyamide (see table above). By various combinations and outfitting possibilities, we can find the optimal solution for your application. The combined expertise of plant engineering and process technology is essential in finding the optimal solution with the greatest cost-benefit efficiency (or cost effectiveness). Woven glass fiber allows air temperatures up to 260°C. The use of additives (such as calcium nitrate) also allows pollutants such as hydrogen chloride (HC<sub>1</sub>), hydrofluoric acid (H<sub>2</sub>F<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>/ SO<sub>3</sub>) to be absorbed from exhaust gas and to be separated as solids in bag jet filters.



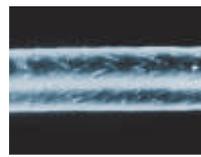
Polypropylene \*



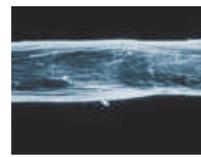
Polypropylene (Trol) modified \*



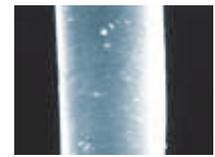
Polyamide \*



Homopolymeric polyacrylonitrile \*



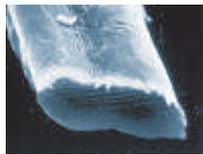
Copolymeric polyacrylonitrile \*



Polyester \*



Polyphenylene-sulfide \*



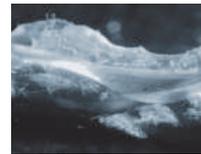
M-aramide \*



Polyimide Pi \*



Polytetrafluoroethylene \*



Woven glass \*\*

\*Photos by BWF Tec GmbH & Co. KG

\*\*Photo by Donaldson Membranes

### Filter materials

Fiber type	Abbreviation	Commercial name	term temp.	Long-peak temp.	Short resistance	Hydrolysis resistance	Acid resistance	Alkaline-tion agent	Oxida-Solvent
Polypropylene	PP	Meraklon	90 °C	100 °C	very good	very good	very good	moderate	good
Polypropylen	modified	Trol	125 °C	130 °C	very good	very good	very good	moderate	good
Polyamide	PA	Perlon, Nylon, Grilon	100 °C °	120 °C	good	poor	good	poor	good
Homopolymeric polyarylonitrile	PAN	Dolanit, Ricem	125 °C	140 °C	good	moderate	poor	good	good
Copolymeric polyarylonitrile	PAC	Orion	110 °C	120 °C	good	poor	poor	good	good
Polyester	PE	Trevira, Diolen, Terylene	140 °C	150 °C	poor	moderate	poor	good	good
Polyphenylene-sulfide	PPS	Ryton, Procon, Forton	180 °C	220 °C	very good	very good	very good	moderate	very good
M-aramide	m-AR	Nomex, Conex	180 °C	220 °C	poor	poor	poor	moderate	very good
Polyimidefibes	PI	P84	200 °C	230 °C	good	good	moderate	good	good
Polytetrafluoroethylene	PTFE	Teflon, Rastex, Toyroflon	250 °C	260 °C	very good	very good	very good	very good	very good
Glas	GL	Glas	260 °C	280 °C	very good	good	good	good	good

# Protection as per ATEX – up to 9.5 bar g

The presence of hazardous gas mixtures and dangerous dust concentrations means that dust-extraction systems require special protection. Jet filters by Deichmann that are explosion pressure-shock resistant provide this security in accordance with the regulations of ATEX.

Hazardous dust concentrations can destroy entire factories. One flour-dust explosion in Germany killed more than a dozen people and caused millions of damage. The new requirements for explosion protection in plants and companies is considerably stricter since the new Industrial Safety Regulations ATEX have gone into force. The new regulations make plant operators responsible for the implementation of the required safety measures. In some explosion-endangered cases – for example, in painting operations or wood-processing plants – explosive gases and explosive dust can even occur simultaneously. Deichmann Filtertechnik therefore manufactures dust-extraction systems that are explosion pressure-shock resistant for processes with explosive dust and dangerous gas mixtures. Deichmann explosion pressure-shock resistant filters conform to Zones 0-2 for gases/gas mixtures, and Zones 20-22 for explosive dust-air mixtures, as stipulated in the relevant ATEX regulations. Areas in which hazardous, explosive atmospheres can exist are classified by zones according to the probability of occurrence of hazardous atmospheres. Gas atmospheres are classified in Zones 0, 1, and 2. Dust atmospheres are classified (as mentioned) into Zones 20, 21, and 22.

### Structural design and filter media

There is a great range of structural design in Deichmann filter systems. The common denominator, however is: all ATEX filters are subjected to air pressure with reduced explosive pressure to 0.4 bar; with greater pressure, water is used. Testing takes place up to 90% of rated pressure. The testing authority is the German Technical Inspection Agencies (TÜV). Electrostatic charges must absolutely be avoided in Zone 21 to provide protection from hazardous dust explosions. Although explosive dust-air mixtures require greater ignition energy than do gases, dust particles moving at high speed (e.g., by pneumatic means) can lead to especially great charges: which then result in so-called Büsch discharges. It is especially with gas mixtures that it is critical to use electrically conductive filter material. Deichmann supplies the required filter media.



Deichmann explosion-protection systems

- **Explosion pressure release**  
Dimensioning of the filter enclosures and the pressure-release areas as per VDI 3673. Enclosure standard: pressure-shock resistant up to 1.4 bar; bursting plates with a pressure relief surface of 0.5 m<sup>2</sup>.
- **Explosion pressure-shock resistant containers**  
As per VDI 2263, casing standard: explosion pressure-shock resistant up to 11 bar.
- **Explosion isolation**  
The flame path is mechanically or chemically isolated. This prevents expansion of the explosion and increase in pressure. For use inside buildings.
- **Explosion suppression**  
Explosions are detected when they initially develop and are chemically suppressed, which prevents the development of destructive pressures.



## Accessory equipment



Cellular wheel sluices



Double flap valves  
with gravity activation



Double flap valves  
with motor activation



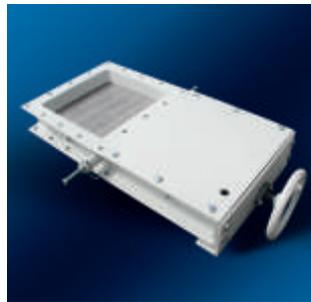
Trough conveyor screws



Pipe conveyor screws



Trough chain conveyors



Flat slide valves



Barrel docking stations



Disk valves



Pneumatic knockers



Rod measuring units



Filling-level measurement aids

# We support you – with engineering, consulting, and after-sales service



### Engineering and consulting

Whereas under-dimensioning can lead to performance deficits, over-dimensioning gives rise to unnecessary costs. Deichmann Filtertechnik prevents both. Long years of experience and extensive process expertise pay off in the exact design of your system. Since the functioning of a filter system is influenced by many product and operational parameters, all these factors that impact on the system must be evaluated in advance. We have a wide selection of possibilities for customized design here. The final result is an equipment system that has been exactly adapted to the customer's individual requirements. For the extraction and the treatment of process gases, or the design of the required equipment assemblies – we will gladly provide you with the necessary consulting and support.

### Pre- and after-sales services

Perfect technology is not everything. Deichmann Filtertechnik supports you additionally with comprehensive services. These include supply of original spare parts, training of your staff, and disposal of exhausted filter elements.

### Readiness to provide services, from A to Z:

- Inspections
- Maintenance and service contracts.
- Exchange of filter hoses.
- Repair of filters and pipes.
- Filter alterations and upgrading.
- Optimisation of existing filter systems.
- Expert disposal of exhausted filter elements as per legal regulations
- Initial startup and staff training
- Modernization of filter control systems

### Accessories and spare-parts service

We can of course help you in selection and supply of air-filtration accessories. Pre-dusting agents, rotation air showers, venturis, diaphragm valves, time or Delta-P controls are all included in our range. We would be glad to furnish you with information on technical issues and spare parts involving our filter systems.

### Do you need a change of air?

The uninterrupted purification of your process air, and other air, is a key part of our comprehensive and systematic service.

If you already have Deichmann filters in service, simply get in touch with us if you have any questions.

The same of course also applies for filtration systems from other manufacturers: we would be glad to examine the safety and the service life of these systems.





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