

# Central Extraction Systems

## ***Central Extraction Systems Tailored to Your Application***

Side Channel Blowers  
High and Medium Pressure Fans  
Rotary Piston Blowers  
Filter Cyclones  
Modular Filter Systems

### **Application Range**

Agricultural Processing  
File Shredding  
Automotive Supplier Industry  
Construction Industry  
Printing Industry  
Electronics Industry  
Vehicle and Auto Body Plants  
Precision Mechanical Industry  
Aircraft Industry  
Research and Development  
Automotive Repair Shops  
Plastics Processing Plants  
Food Processing Industry  
Machine Building Industry  
Metalworking Industry  
Engine Manufacturing Plants  
Mills  
Paper Industry  
Pharmaceutical Industry  
Recycling and Waste Processing Facilities  
Ship Building Industry  
Shoe Manufacturing Plants  
Welding Facilities  
Vacuum Systems  
Tobacco Companies



# Central Extraction Systems

## ESTA Extraction Systems – Introduction

### Introduction



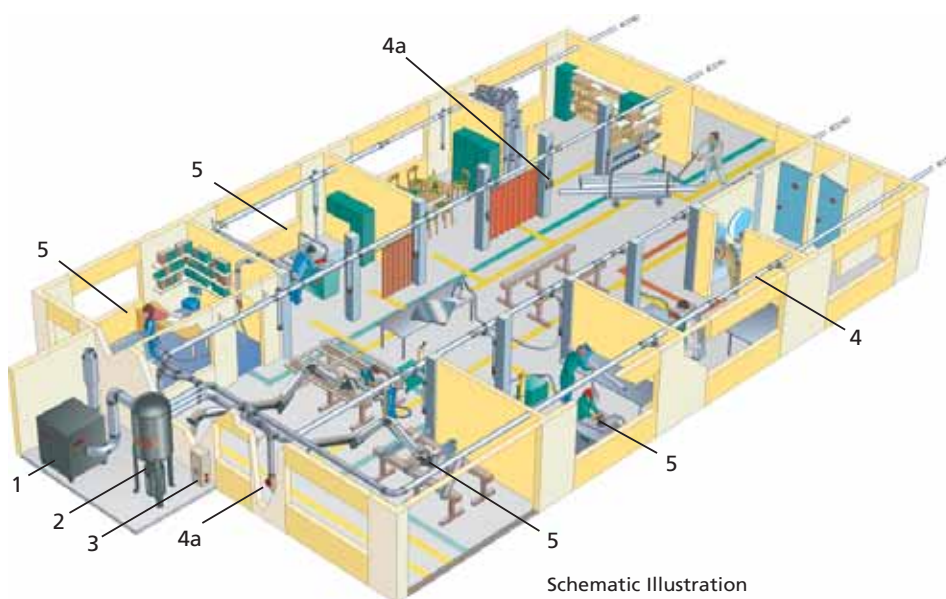
Central extraction systems can extract dust simultaneously from multiple machines through a suitable pipe system. Whether you need to extract coarse or fine dust, wet or dry, vapours or smoke - ESTA extraction systems can be adapted to the requirements of each specific application.

The modular design of ESTA central dust extraction systems makes it possible to offer systems that are customized to your specific application. Our sales engineers will configure a complete system including a suitable pipe system, filtration unit and a central vacuum generator.

- Very high efficiency
- Quiet operation through sound insulation and if necessary special sound dampening enclosures
- Wear resistant and maintenance free design
- Low operating costs through cleanable long life filters and high energy efficiency of the systems



- Complete service from design through installation to start-up operation and maintenance



**1 Central Vacuum Producer**  
Side channel blowers, fans, rotary piston blowers, high and medium pressure fans

**2 Filtration Unit**  
Cyclone, Modular filtration units

**3 Electric Control Unit**

**4 Pipe System**  
Flapper valves (4a)

**5 Extraction Devices**  
Extraction hoods, extraction arms and nozzles

**Your Benefits at a Glance**

**Side Channel Blowers**

- High negative pressure
- Quiet operation through sound insulation and suitable positioning
- Wear and maintenance free design
- Low operating costs through high energy efficiency

**Product Description**

Side channel blowers generate high negative pressure, which makes them ideal for applications requiring high vacuum performance such as with central dust extraction systems. These powerful units are wear and

maintenance free and operate very quietly. Depending on the application different models are available. The table below shows a small selection of side channel blower units.



Schematic illustration of a side channel blower with direct drive



Two side channel blowers as part of a central dust extraction system

**Features**

**Application Range:**

- Extraction from multiple workstations in industrial manufacturing and processing
- Multi-shift operation

**Technical Data**

Side channel blowers		TDS-13	TDS-18,5	TDS-22	TDP-11	TDP-18,5	TDP-22	TDP-26
Max. airflow	m <sup>3</sup> /h	1.140	1.140	1.140	790	2.100	2.100	2.100
Intake diameter	mm	140	140	140	100	180	180	180
Max. negative pressure	Pa	23.500	38.000	40.500	30.000	23.500	27.000	31.500
Voltage	V	400	400	400	400	400	400	400
Motor	kW	13	18,5	22	11	18,5	22	26
Motor speed	1/min	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Dimensions (B/W/T)	mm	990 x 1.730 x 1.200	990 x 1.730 x 1.200	990 x 1.730 x 1.200	990 x 1.730 x 1.200	990 x 1.730 x 1.200	990 x 1.730 x 1.200	990 x 1.730 x 1.200
Order Number		301.101	301.103	301.105	301.100	301.102	301.104	301.106

Please inquire with us about additional units

# Central Extraction Systems

## Your Benefits at a Glance

### High and Medium Pressure Fans

- Constant high airflow volume
- Quiet operation through sound insulation and remote positioning
- Industrial strength and maintenance free design
- Low operating costs through high energy efficiency

### Product Description

ESTA extraction fans combine high negative pressure with high airflow volume. This ensures a stable characteristic curve of the system and results in consistently powerful extraction performance even under varying operat. conditions.

### Features

#### Application Range:

- Extraction from multiple workstations in industrial manufacturing and processing
- Air intake and exhaust air fans e.g. for cooling
- Central welding fume extraction



Schematic illustration of a direct drive high pressure ESTA fan



High pressure fan combined with an ESTA filter cyclone

### Technical Data

High and medium pressure fan		MDV-7,5	MDV-15	HDV-11	HDV-18,5	HDV-22	HDV-30
Max. airflow	m <sup>3</sup> /h	3.400	6.700	2.000	3.000	3.800	6.000
Intake diameter mm *)	mm	280	355	260	250	280	355
Max. negative pressure	Pa	4.400	4.500	8.200	10.300	10.400	10.300
Voltage	V	400	400	400	400	400	400
Motor	kW	7,5	15	11	18,5	22	30
Motor speed	1/min	3.000	3.000	3.000	3.000	3.000	3.000
Dimensions (B/W/T)	mm	1.310 x 1.676 x 1.600	1.310 x 1.676 x 1.600	1.310 x 1.676 x 1.600	1.310 x 1.676 x 1.600	1.310 x 1.676 x 1.600	1.310 x 1.676 x 1.600
<b>Order Number</b>		<b>301.000</b>	<b>301.001</b>	<b>301.002</b>	<b>301.003</b>	<b>301.004</b>	<b>301.005</b>

Please inquire with us about additional units \*) Depending on the type of application

## Your Benefits at a Glance

### Rotary Piston Blowers

- Extremely constant negative pressure
- Quiet operation through sound insulation and remote positioning
- Industrial strength and maintenance free design
- Low operating costs through high energy efficiency



Rotary piston blower

### Product Description

Rotary piston blowers operate extremely quietly. They have an extremely constant characteristic curve, which makes it possible to connect far reaching pipe systems and many extraction locations.



Rotary piston blower application photo

### Features

#### Application Range:

- Extraction at multiple workstations in industrial manufacturing and processing
- Applications where constant negative pressure is required

### Technical Data

Rotary piston blowers		DKG-11	DKG-15	DKG-37	DKG-75
Max. airflow	m <sup>3</sup> /h	510	840	1.860	3.720
Intake diameter	mm	80	100	150	200
Max. negative pressure	Pa	40.000	40.000	40.000	40.000
Motor	V	400	400	400	400
Motor	kW	11	15	37	75
Motor speed	1/min	2.915	2.925	2.945	2.970
Dimensions (B/W/T)	mm	1.230 x 1.306 x 1.200	1.230 x 1.306 x 1.200	1.655 x 1.820 x 1.600	2.110 x 2.330 x 1.750
Weight	kg	550	600	1.180	2.500
Order Number		302.101	302.102	302.103	302.104

Please inquire with us about additional units

# Central Extraction Systems

## Your Benefits at a Glance

### Cyclonic Filtration Units

- The dual filter system is suitable for coarse and fine dust
- Quiet operation through sound insulation and remote positioning
- Industrial duty and maintenance free design
- Low operating costs through cleanable filters and high energy efficiency
- Suitable for applications requiring high negative pressure

### Product Description

ESTA cyclonic filters, which have a tripod base, separate coarse and fine dust through centrifugal force. Cartridge filters trap the remaining fine dust with a filtration efficiency of more

than 99.8%. With the addition of a programmable control unit cleaning of the filters can be performed during operation of the system.



Cyclonic filtration unit



Two cyclonic filters as part of an extraction system

### Features

#### Application Range:

- Extraction from multiple workstations in industrial manufacturing and processing

#### Special Features:

- Compact design
- Can accommodate large quantities of dust
- Resistant to extreme negative pressure

### Technical Data

Cyclonic filtration unit		FZ-1003	FZ-1503	FZ-3003	FZ-5003	FZ-7003	FZ-11003
Cartridge filter (Ø/L)	mm	150/660	150/1.000	325/600	325/1.000	325/600	325/1.000
Intake diameter *)	mm	159	159	355	355	400	400
Number of cartridges		4	4	3	3	7	7
Filter surface per cartridge	m <sup>2</sup>	2,5	3,6	10	16,7	10	16,7
Total filter area	m <sup>2</sup>	10	14,4	30	50	70	117
Dust collection container	Litre	100	100	100	100	200	200
Dimensions (Ø/H)	mm	600 x 2.240	600 x 2.580	1.760 x 3.000	1.760 x 3.350	2.727 x 3.650	2.727 x 4.050
Diameter	mm	674	674	1.340	1.340	1.920	1.920
<b>Order Number</b>		<b>300.027</b>	<b>300.031</b>	<b>300.032</b>	<b>300.033</b>	<b>300.034</b>	<b>300.035</b>

Please inquire with us about additional units \*) Depending on the type of application

## Your Benefits at a Glance

### Modular Extractors DUSTEX

- Modular design (expandable as your production expands)
- Adaptable to "Your" particular type of dust
- Customer specific system configuration
- Low operating costs



DUSTEX

### Product Description

The modular extractors of the DUSTEX series can be adapted to the individual requirements of your company. Our basic systems include four different types of model series with the possibility to customize each of them to the individual customer requirements (see page 94).



DUSTEX F-144 in the metalworking industry

### Features

#### Application Range:

- Extraction from multiple workstations in industrial manufacturing and processing

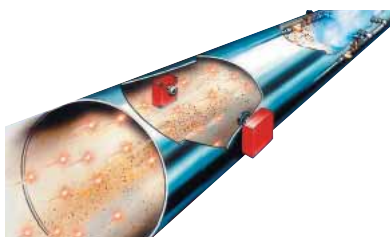
#### Special Features:

- Separation of the extracted materials
- Highly efficient filter cleaning process during operation of the system
- Compact design
- The modular design makes it possible to adapt the system to each specific application
- Customized system layout to meet individual customer requirements
- Special design features make use of pre-separation principles

Data given depending on the type of application

### Technical Data

Model	Page
DUSTEX P (Powder) with cartridge filters	32
DUSTEX S with tubular bag filters	33
DUSTEX F (Fumes) with cartridge filters	64
DUSTEX X for custom configurations	92



Spark detection for DUSTEX

### Filter Systems



DUSTEX P (with cartridge filters)



DUSTEX S (with tubular bag filters)

# Central Extraction Systems

## Your Benefits at a Glance

### Custom Configurations DUSTEX X

- Modular design (expandable as your production expands)
- Adaptable to "Your" particular type of dust
- Customer specific system configuration

## Product Description

The possibility of custom configurations (several of the DUSTEX filtration units in series) ensures optimal system configurations. The fan unit for the system will be set up in a separate housing.

### Example of a system DUSTEX XF-432

Central extraction system for ten welding stations and two robots consisting of three DUSTEX Modules, extraction fan unit and sound dampening muffler.

**Operating Point:** 22.000 m<sup>3</sup>/h  
**Filter Surface:** 432 m<sup>2</sup>  
**Output:** 45 kW



Work station extraction



Filtration unit DUSTEX XF-432

## Dust Removal

Collection and removal of the extracted dust – with three different methods depending on

your application. For additional collection and removal options please inquire with us.



Mobile dust collection container



Removal through rotary valve



Directly into a container

## Your Benefits at a Glance

### DUSTEX – Modules

- Custom system design
- Suitable for any application
- Complete handling of the project through ESTA - from the consulting and design phase through start up operation

### Central Extraction Systems

The modular design of the ESTA DUSTEX model series makes it possible to adapt these central extraction systems to the individual applications and conditions at the customer's production

facilities. This guarantees that our customers receive the most suitable extraction system for their particular situation. On pages 89 through 92 you will find a selection of possible

system combinations. Our sales engineers are always available for a personal consultation at your company to determine the best possible configuration of your extraction system.



### Extraction Fans

Generally there are two types of extraction fans – high and medium pressure fans. Medium pressure fans are characterized by high airflow volumes to ensure the most complete extraction of the dust or fumes to be captured. High pressure fans produce

high air velocity to capture dust or fumes at the source. Fans with an output of up to 15 kW are usually mounted on the filtration unit. Larger fans will be positioned as stand alone units next to the filtration units (see Page 84).

### Filtration Unit

The filtration unit(s) is (are) the “heart” of the central extraction system. Depending on the type of dust, quantity of dust and its composition the filtration units will be equipped with different types of filters. During and after operation the filters will

automatically be cleaned with a pulse-jet cleaning system. The geometry of the filter housing is a key factor for a long filter life and for effective filter cleaning. It ensures the ventilation technologically correct airflow conditions inside the filter housing.

### Dust Removal

There are several methods available to collect the material that has been filtered out. In most cases the dust will be collected in a drum that is positioned at the tapered bottom of the filtration units. For this purpose we have drums of 50, 100 or 200 Litres capacity available. Other

methods are rotary valves for continuous removal, high capacity containers, shuttle valves or pinch valves.

# Central Extraction Systems

## Modular Filtration Unit DUSTEX

### Tubular Bag Filters

Tubular bag filters are used for dust types, which due to their temperature, humidity and hygroscopic characteristics have the tendency to clog the filter media.

The tubular bag filters used by ESTA can be adapted in their design (materials and special coating) to the specific conditions of different applications. The table illustrates the possible

combinations of the individual modules of a tubular bag filter system DUSTEX S.

### Cartridge Filters

Cartridge filters have a very large filter surface with a very compact space requirement. Therefore they are particularly well suited for the extraction of dry, pourable types of dust and the extraction of fumes from

applications such as welding, laser cutting or plasma cutting. The cartridge filters utilized by company ESTA can be adapted to specific applications with the use of different materials, geometries and coatings.

**New: Filter cartridges with pleat corrugation** for a very long filter life even under high load and continuous duty applications.

### Possible Combinations

The red illustrated fan models can be mounted flat on their side on the associated filter units.

The violet field shows the available filtration units with the number of filters per filtration unit.

The green shaded field shows the possible combinations of the dust removal options.

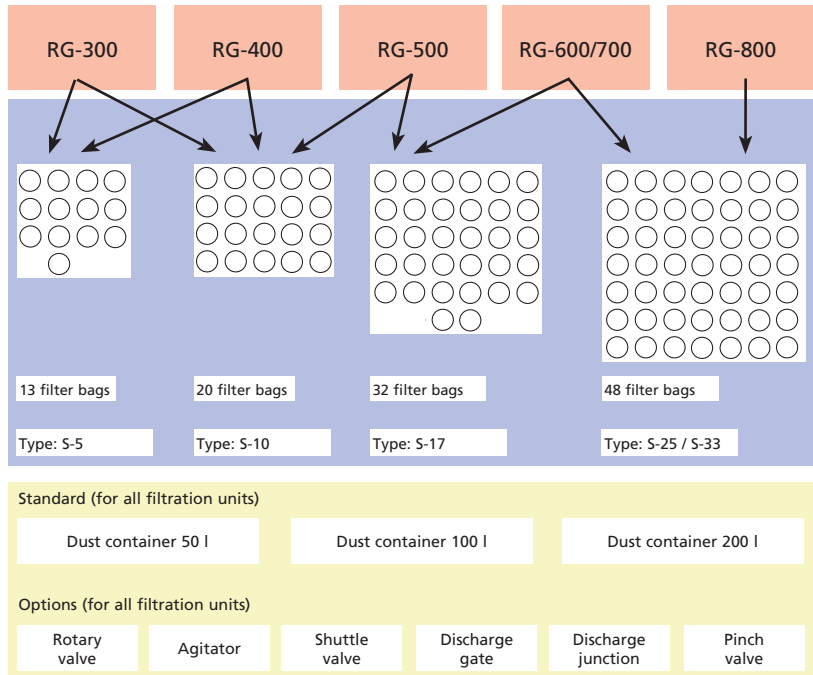
For the technical data of the components please see the data sheet of the individual modules on page 92.

This illustration merely clarifies the principle of the modular system design and the possible combinations. There are of course many more possibilities of system configurations.

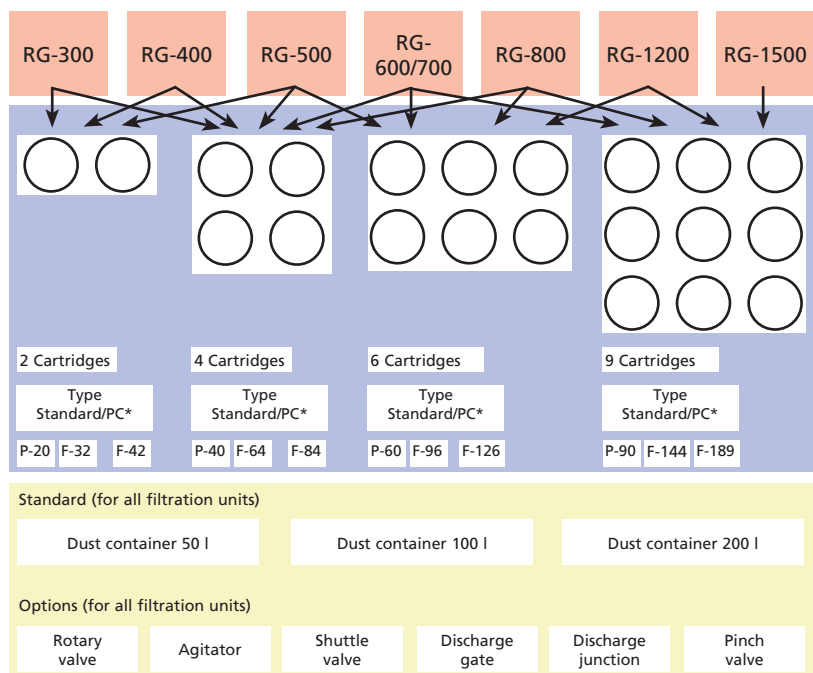
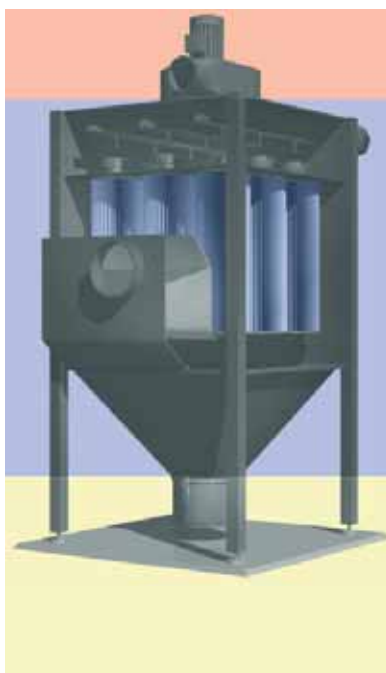
**Our sales engineers will be happy to make recommendations. Give us a call:  
Phone: +49 (0) 73 07/80 4-0**

# Modular Extraction & Filtration Unit DUSTEX

## Tubular Bag Filters



## Cartridge Filters



\* pleat corrugation

# Central Extraction Systems

## Modular Extraction & Filtration Unit DUSTEX

The following table describes the technical data of the individual modules that can be combined in a central ESTA extraction and filtration system. The possible combinations can be found on pages 90 and 91.

Other combinations for central extraction systems of other designs with higher airflow volumes or larger filter areas are possible as well.

## Individual Modules

Fan		RG-300	RG-400	RG-500	RG-600	RG-700	RG-800	RG-1200	RG-1500
Voltage	V	400	400	400	400	400	400	400	400
Motor	kW	2,2	3,0	4,0	5,5	5,5	7,5	11,0	15,0
Max. airflow	m <sup>3</sup> /h	2.600	3.500	4.500	5.400	7.800	9.700	10.300	14.000
Max. negative pressure	Pa	2.000	2.600	3.200	3.200	3.800	3.800	4.400	4.400
Exhaust air outlet Ø	mm	280	300	355	400	400	450	500	560
Order Number		30002054	30001348	30001195	30000028	30001256	30001316	30000128	30000129

Tubular Bag Filters		S-5	S-10	S-17	S-25	S-33	S-50	S-66
Intake connection	Ø	280	355	355	450	450	2 x 450	2 x 450
Number of filter bags		13	20	32	48	48	96	96
Filter surface	m <sup>2</sup>	5	10	17	25	33	50	66
Order Number		66700510	66701010	66701710	66702510	66703310	66705010	66706610

Cartridge Filter (Powder)		P-20	P-40	P-60	P-80	P-90	P-120	P-180
Intake connection	Ø	280	355	355	2 x 355	450	2 x 355	2 x 450
Number of cartridges		2	4	6	8	9	12	18
Filter surface	m <sup>2</sup>	20	40	60	80	90	120	180
Order Number		66402010	66404010	66406010	66408010	66409010	66412010	66418010

Cartridge Filter (Fume)		F-32	F-42*	F-64	F-84*	F-96	F-126*	F-144
Intake connection	Ø	280	280	355	355	355	355	450
Number of cartridges		2	2	4	4	6	6	9
Filter surface	m <sup>2</sup>	32	42	64	84	96	126	144
Order Number		66503210	66604210	66506410	66608410	66509610	66612610	66614410

Cartridge Filter (PC*)		F-168	F-189*	F-192	F-252	F-288	F-378
Intake connection	Ø	2 x 210	450	2 x 355	2 x 355	2 x 450	2 x 450
Number of cartridges		8	18	12	12	18	18
Filter surface	m <sup>2</sup>	168	189	192	252	288	378
Order Number		66616810	66618910	66519210	66625210	66528810	66637810

Order number for filter unit with 100 l collection container. For other combinations please inquire with us.

Collection Container		50	100	200
Content	Litre	50	100	200

Control Cabinet		Standard	Standard	Standard	Comfort	Comfort	Comfort
Output	KW	3,0-4,0	5,5-7,5	11-15	3,0-4,0	5,5-7,5	11-15
Order Number		302110	302310	302510	302210	302410	302610

For other system control units please inquire with us.

\* pleat corrugation

## Your Benefits at a Glance

### Extraction Hoods

- Hoods designed for different applications and tasks
- Custom designed and manufactured hoods
- Wear resistant and low maintenance designs

#### Product Description

It is obvious: The best dust extractor is useless if the dust particles "fly by". Only complete capture of the dust ensures optimal conditions. We can custom design and manufacture extraction hoods that will not let anything escape.

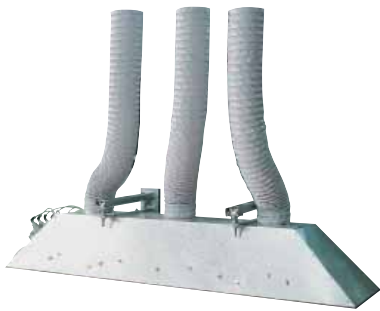
#### Features

##### Application Range:

- Extraction from multiple workstations in industrial manufacturing and processing

##### Special Features:

- Individual calculation of the extraction hoods according to ventilation technologically optimised principles
- Recommended for the best possible extraction of dust and fumes



Extraction hood with compressed air injection



Extraction at a robotic workstation

#### Additional Application Examples



Slotted extraction hoods in the automotive industry



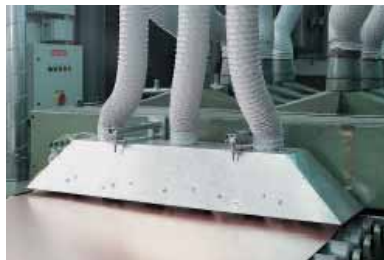
Extraction wall with perforated metal insert



Large surface extraction hood in the concrete industry



Oval hood in the cosmetic industry



Specialized hood 120 x 30 cm



Extraction of aluminium chips

# Central Extraction Systems

Central extraction system for vacuuming vehicle interiors at carwashes, gas stations and car dealerships



ESTA Sales and Distribution Partners

## Product Description

Central vacuum systems are gaining increasing popularity for commercial use in vacuuming the interior of vehicles. Theoretically an unlimited num-

ber of vacuum stations can be set up whereby the vacuum performance remains constant. Central vacuum systems make much more efficient use of your

property (number of possible vehicle vacuum stations) compared to solutions with individual vacuum systems.



Dust extraction at multiple vacuum locations



Side channel blower with cyclonic filter



A rigid pipe installation connects the vacuum locations with the cyclonic filter



The mobile dust collection container with plastic bag insert makes disposal of the dust an easy no mess job.



Contact us for a brochure with more detailed information.



**References**

- Daimler-Chrysler  
Research Centre, Ulm
- Philip Morris, Berlin

Research and Development  
(Automotive Industry)



Research centre, Ulm Germany

**Description**

Direct extraction of dust and chips in model building applications and from different machines



Extraction system with custom paint finish positioned outside

**Features**

**Daimler-Chrysler,  
Research Centre, Ulm**

High vacuum extraction system with a 13 kW side channel blower and cyclonic filter FZ-1500 for general clean-up purposes and for direct extraction from different machines

Medium pressure system with 7.5 kW fan unit and cyclonic filter FZ-5000 for direct extraction of dust and chips in model building

Tobacco Industry



Pipe system for exhaust air with integrated cooling system

**Description**

Extraction of tobacco particles at several extraction locations and on several production levels



Filter system with dust removal through rotary valves and parallel operating rotary piston blowers

**Features**

**Philip Morris, Berlin**  
(two separate systems)

86 and 65 extraction locations (flapper valves where hoses can be plugged in) on five and three production levels

Simultaneous operation of up to eight extraction locations at each production level

Operating Point:  
Appr. 4,200 m<sup>3</sup>/h at 220 mbar

Five rotary vane vacuum pumps  
DKG 18.5 kW

Two cyclonic filters FZ-5000

Clean air cooling system

# Central Extraction Systems

## References

- RIMAC, Mauer, Germany
- Progida, Istanbul, Turkey

### Concrete Plant



Special design extraction hood

### Description

Extraction of cement dust during the production of concrete



Tubular bag filter unit with separate extraction fan unit

### Features

#### RIMAC, Mauer, Germany

- Cyclone pre-separator with rotary valve and spout
- Filtration unit DUSTEX XS-66
- High pressure fan HDV 22 kW (11,000 m<sup>3</sup>/h at 4,280 Pa)
- Custom designed hood
- Pipe system
- Water spray injector in the extraction pipe

### Food Industry



Capturing of the dust above the conveyor belts

### Description

Extraction in peanut processing and at a sorting and separating system



Bag filter unit DUSTEX XS-99

### Features

#### Progida, Istanbul, Turkey

- Filtration unit DUSTEX XS-99
- Medium pressure fan MDV 30 kW (14,000 m<sup>3</sup>/h at 4,500 Pa)
- Cyclone filter FZ- 5003
- High pressure fan HDV 22 kW (2,700 m<sup>3</sup>/h at 13,500 Pa)
- Cyclone pre-separator ZA 213 VA with rotary valve

## References

- Stegherr, Jettingen, Germany
- Allgaier Werke, Uhingen, Germany

### Plastics Industry



Pipe system with connection for extraction hoses

### Description

Extraction of chips during plastics profiling



Extraction system DUSTEX XS-17 with fan mounted

### Features

- Stegherr, Jettingen, Germany**
- Filtration unit DUSTEX XS-17
- Medium pressure fan MDV-4 kW
- Motor protection switch
- Muffler Ø 300-900 mm
- Pipe system
- Installation

### Automotive Supplier



Extraction hood inside a sanding cabinet

### Description

Extraction of dust generated during sanding and rework of auto body parts



Filtration unit DUSTEX XF-64

### Features

- Allgaier Werke, Uhingen, Germany**
- DUSTEX XF-64 with discharge cone
- Medium pressure fan MDV-7.5 kW (3,400 m<sup>3</sup>/h at 3,000 Pa)
- Control cabinet standard
- Extraction hood 3,000 x 800 x 350 mm
- Sound insulated housing, 9,000 x 5,000 x 4,090 mm, with sliding doors and power supply unit
- Pipe system
- Extraction accessories

# Central Extraction Systems

## References

- Weckerle, Peißenberg and Le Locle (Switzerland)
- Sofragraf, Saint Ame, France

## Cosmetics Industry



Source capture with two extraction arms

## Description

Pigment extraction at a mixer in the production of cosmetics



Filtration unit with separate fan unit

## Features

**Weckerle, Peißenberg and Le Locle (Switzerland)**

Filtration unit DUSTEX XP-90

Medium pressure fan MDV-11kW

Control unit 11 kW

Pipe system and extraction arms

## Ship Building



Dust extraction with an application specific pipe system

## Description

Extraction of glass fibre reinforced plastic dust, in the ship building industry



Filtration unit with explosion protection

## Features

**Sunseeker, Rostock, Germany**

Cyclonic filter FZ-5003

Side channel blower with Housing TDP-18.5 (2,100 m<sup>3</sup>/h at 15,000 Pa)

Control cabinet Comfort

Pipe system with 100 flapper valves

Explosion protection

References

- SAF, Wörth on the Main, Germany
- Robert Bosch, Stuttgart Germany

Auto Body Production



Extraction at a robotic welding station

Description

Extraction of welding fumes and grinding dust from nine workstations and two welding robots



Modular filtration unit

Features

**SAF, Wörth on the Main, Germany**

Filtration unit DUSTEX-XF 432

Medium pressure fan MDV-45 kW (22,000 m<sup>3</sup>/h at 2,800 Pa)

Pipe system

Nine extraction arms,  
Total length of the pipe system: 90 m

Automotive Supplier



Control unit with monitoring lamps

Description

Residual dust extraction during the cleaning of the production line



Cyclonic filter FZ-1003 with 100 Litre collection container

Features

**Robert Bosch, Stuttgart, Germany**

Cyclonic filter FZ-1003 with fill level monitoring

Side channel blower TDP-22 kW (2,100 m<sup>3</sup>/h at 27,000 Pa)

Control unit Comfort

Pipe system

Vacuum accessories

# Central Extraction Systems

## References



Schwenk, Ulm, Germany



Braas, Altheim, Germany



Uhlmann, Laupheim, Germany



Thyssen Krupp Nirosta, Düsseldorf, Germany



OWB, Kisslegg, Germany



Sofragraf, Saint Ame, France

## Additional References

**Schwenk, Ulm, Germany**  
Cement Industry

**Braas, Altheim, Germany**  
Tile Manufacturing Plant

**Uhlmann, Laupheim, Germany**  
Packaging Systems

**Thyssen Krupp Nirosta, Düsseldorf, Germany**  
Metal Production Plant

**OWB, Kisslegg, Germany**  
Metalworking Industry

**Sofragraf, Saint Ame, France**  
Metalworking Industry

**ZI-Jena, Jena, Germany**  
Metalworking Industry

**Solidschuhwerk, Tuttlingen, Germany**  
Shoe Industry

**Wacker Siltronic, Burghausen, Germany**  
Chemical and Semiconductor Industry

**EADS Deutschland, Augsburg, Germany**  
Aerospace Industry

**Liebherr-Aerospace, Lindenberg, Germany**  
Aerospace Industry

**UMP-Kymmene, Augsburg, Germany**  
Paper Industry

**Wieland Werke, Ulm, Germany**  
Metalworking Industry

**H. C. Starck, Hermesdorf, Germany**  
Metalworking Industry