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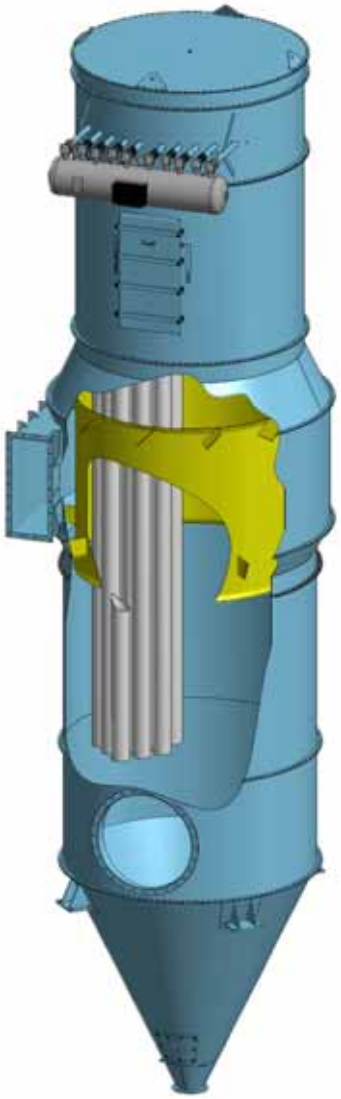
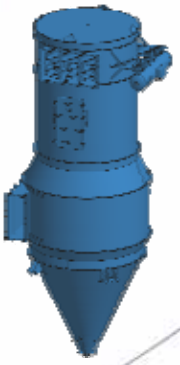
Filter Technology

SimPact® 4T-R
Modular Pulse-Jet Filter





SimaTek

SimPact® 4T-R

Modular Pulse-Jet Filter

The modular SimPact® 4T-R filter is a further development of the cylindrical 4T filter concept:

Unique Features

- Efficient pulse-jet cleaning of the filter bags in rows
- Continuous operation
- Optimum utilization of the entire filter area
- Flexible modular system & compact design
- Pressure-shock resistance up to 2.0 bar
- Manufacturing according to the ATEX Directive
- Indoor installation with explosion relief according to EN 14491 or VDI 3673
- High suitability even for explosive dust types

Sugar factory in Germany
4 x SimPact® 4T-R filters

Fields of Application

The SimPact® 4T-R filter holds remarkable qualities for the separation of dry as well as slightly sticky dust particles and powders in different industries, such as:

- Building material
- Chemical
- Ceramic, Colour, and Enamel
- Fertiliser
- Food processing
- Foundries
- Grain and Feedstuff
- Incineration
- Metal and Mineral
- Plastics
- Textile
- Wood and Paper

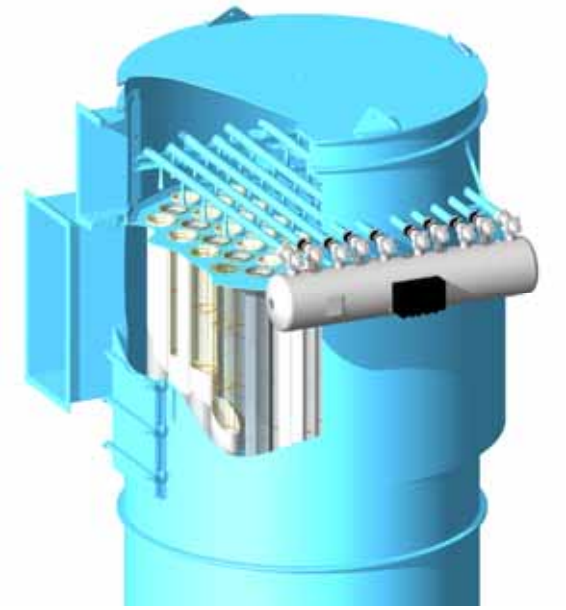
Low Cost of Ownership

The SimPact® 4T-R filters in industrial plants provide a short pay-back time of the investment, based upon product recovery, service life, and consumption of utilities.

SimPact® 4T-R

Continuous Pulse-Jet Cleaning

The SimPact® 4T-R filter is designed for continuous pulse-jet cleaning of the filter bags in rows during operation.



Pulse-Jet cleaning of the filter bags in rows

Pulse-Jet System

Simatek's expert knowledge in pulse-jet technology forms the basis of the proprietary SimPact® 4T-R bag cleaning system which, differing from conventional filters, offers a unique pulse-jet cleaning ensuring an efficient and continuous utilization of the installed filter area.

Specially developed pulse-jet nozzles along with the bag-to-valve proportion provide an optimum utilization of the entire filter area, thereby affording a minimum filter area, a lower differential pressure, a lower emission, a higher capacity, and a longer lifetime of the filter bags.

Control System

The standard filter control unit cleans the filter bags continuously at fixed intervals.

Filters with a standard control unit have a mechanical pressure gauge indicating the pressure drop across the filter bags. A pulse-jet cleaning time and a pause time are set in the control unit. The filter control has a "shut down cleaning" system which makes it possible to run 2-3 cycles after the fan has stopped.

The optional, extended control unit is, however, equipped with a differential pressure transducer displaying the pressure drop by LEDs on the filter control board.

The extended control unit adjusts the cleaning frequency to the actual pressure drop, keeping the pressure drop at a constant level. Thus the consumption of compressed air is minimized and the emission values improved.

SimPact® 4T-R

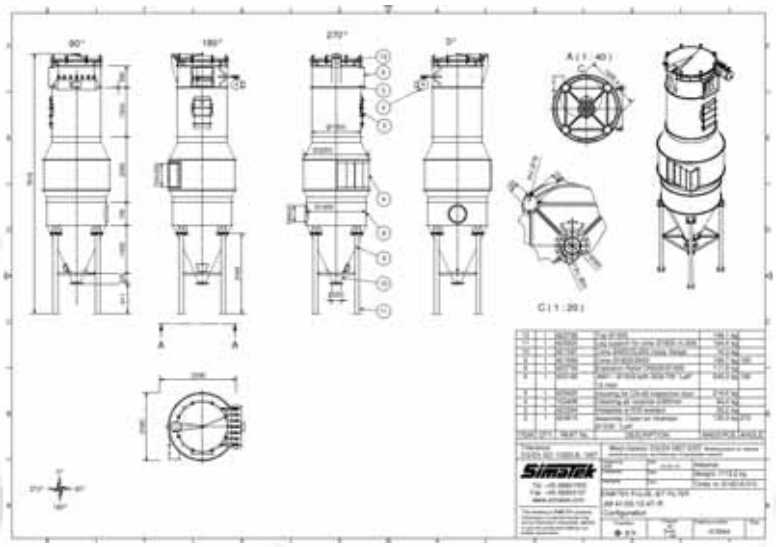
Remarkable Configuration Flexibility

The SimPact® 4T-R filter concept offers a high degree of flexibility when configuring the filter for each specific application. In addition to the selection of the inlet type, the construction form, the pressure-shock resistance requirements etc., the individual orientation of each filter module finally ensures the adaptability to almost any customer requirement.

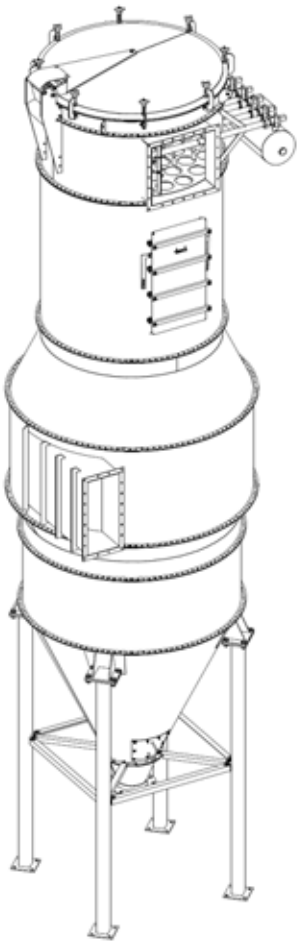
Together with Simatek's sales department the SimPact® 4T-R filter is configured to fit into the application in question, and 2D and 3D drawings are available for the further project planning.

Early Delivery of 2D and 3D Drawings

Available 2D and 3D drawings, exemplified by a SimPact® 4T2-R Construction form 12 filter:



2D drawing in AutoCad file format



3D drawing in SAT file format

All details of filter sections, their individual orientation angle independently of each other, explosion venting requirements etc., are specified at this early stage, before you place the order, and provide for a clear definition and overview of the scope of supply all the way through the order handling, manufacturing process and till the filter is delivered.

SimPact® 4T-R

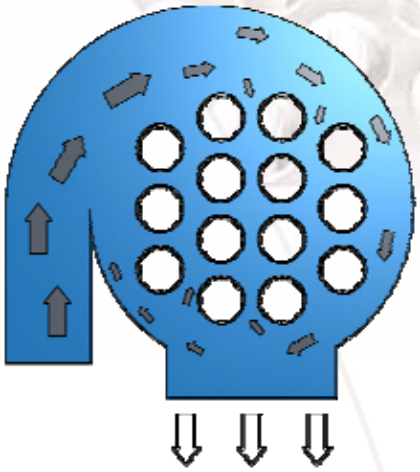
Inlet Designs

Tangential Inlet Design

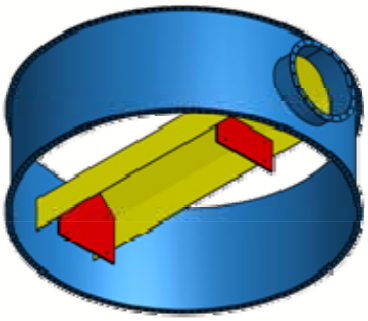
The airflow is introduced tangentially in the top of the filter through a 180° scroll, ensuring a very even air and dust distribution into the filter.

The cylindrical walls ensure that there are no "dead corners" thereby eliminating product deposits and the risk of low temperature pockets (reduced corrosion risk).

Top entry of the airflow gives a downward air velocity, hereby helping the fine dust particles to be conveyed to the bottom dust outlet.



Radial Inlet Design (Patented)



The SimPact® 4T-R construction form 17 and 17 WB have radial filter inlet with an integrated diffuser system, introducing the airflow below the filter bags.

Independent of the air capacity, a low air velocity into the filter is ensured, thus protecting the filter bags against abrasive dust.

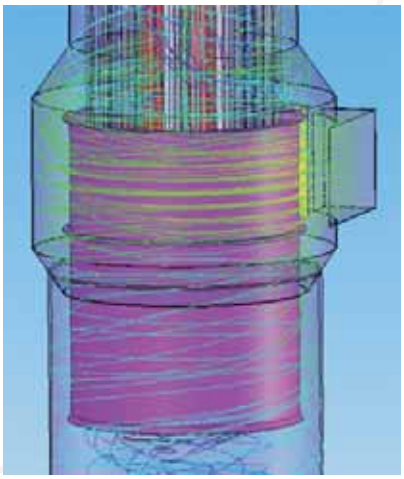
The inlet is dimensioned for maximum capacity and is - with no risk of dust depositing - capable of handling unlimited dust loads.

2-Step Separator (Patented)

The SimPact® 4T-R construction forms 12 and 14 have a tangential filter inlet with an integrated, dynamic preseparator.

The integrated air distributor and rotation dampers ensure a stable flow behaviour around the filter bags, qualifying the filter for abrasive products.

The greater part of the airflow is down-flow filtrated, thereby maintaining a minimum pressure drop and a significant filter capacity.



SimPact® 4T-R

Construction Forms

The SimPact® 4T-R filters are available in different sizes and construction forms, affording flexibility and adaptability to almost any industrial process and application.

Filters for Small and Medium Dust Loads

Filter with Bottom Cone

Construction Form 04

The filter holds a tangential scroll inlet in the top.

The construction form 04 filter is applicable for a wide range of filtering jobs.

The separated dust is collected in the filter cone and discharged through the bottom outlet.

Constr. form 04

Constr. form 05

Filter with Scraper Bottom

Construction Form 05

The filter holds a tangential scroll inlet in the top.

The flat scraper bottom is applicable for products which would possibly build up in a cone outlet, as a slowly rotating scraper continuously moves the collected dust to the bottom outlet. Furthermore the flat bottom design offers the advantage of a reduced height for installation by limited ceiling height.

Dome Filter for Direct Mounting

Construction Form 03

The dome filter is designed for mounting direct on silos or machinery with no inlet socket or bottom cone. The airflow is taken directly from the silo or machinery and the recovered product is returned to the product flow.

The explosion venting is most often provided for in the silo or machinery.

Constr. form 03

SimPact® 4T-R

Filters for High and Unlimited Dust Loads

Construction Form 12

The SimPact® 4T-R High-Capacity Separator for total separation is based on a 2-step principle, constituting a unique filter concept for medium and high product loads.

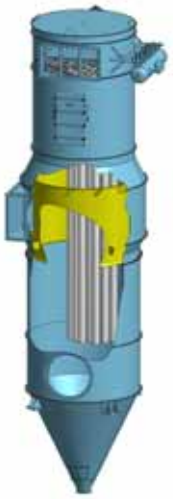
The first step is an integrated, dynamic preseparator where the main product flow is separated; a process replacing the ordinary cyclone before the filter. The second step is the very pulse-jet bag filter with a tangential inlet in the top of the filter, performing an efficient down-flow filtration of the remaining dust and collection of even submicron particles.

The greater part of the product flow is down-flow filtrated, thereby maintaining a minimum pressure drop and a significant filter capacity.

The SimPact® 4T-R filter construction form 12 includes a dynamic preseparator, rotation dampers, and an air distributor and is especially ideal for grinding, pneumatic conveying and abrasive dust applications.

Depending on the actual application and product load, the lower filter chamber is equipped with an inner housing for wear protection of the filter bags.

The same characteristics are achieved in a construction form 14 filter, which is equipped with a scraper bottom instead of the bottom cone.



Constr. form 12

Construction Form 17

This filter is ideal for high product loads, and especially well suited for pneumatic conveying of materials.

The SimPact® 4T-R construction form 17 filter has a radial inlet with an integrated diffuser system below the filter bags, protecting the filter bags against abrasive dust.

The inlet and the filter chamber are dimensioned to reduce the can velocity (up-stream air velocity) and are - with no risk of dust depositing - capable of handling unlimited dust loads. The design allows for installation of the explosion venting device in the same housing module as the inlet, thereby saving building height.

Constr. form 17 Wide-body
Extended diameter of inlet
module and filter chamber

SimPact® 4T-R

Regulatory Requirements

ATEX - Explosion Protection Measures

The standard execution of the SimPact® 4T-R filter is designed for installation in zone 22.

For filters handling explosive dusts, constructive explosion protection measures apply as stated in the BIA-Report 13/97 (Combustion and explosion characteristics of dusts).

If there is a risk of ignition sources in the system, measures must always be taken to limit or suppress a possible explosion; thereby preventing any personal injury or property damage. Most commonly an explosion relief, in form of a rupture disc, is installed in the filter along with a vent duct into the open.

High Pressure-Shock Resistance

The high pressure-shock resistance of the SimPact® 4T-R filters provides for indoor installation with explosion venting devices according to the EN 14491 European Standard or the VDI 3673 guidelines. Round venting devices are applied when possible, enabling very long vent ducts into the open.

The filter design holds a high pressure-shock resistance up to 2.0 bar according to the EN 14460 European Standard or the German VDI 2263 guidelines, cf. TÜV Nord reg. no. TK-VA-012913.

The SimPact® 4T-R filters are manufactured in accordance with:

- The ATEX Directive
- The European Standard EN 14460
- The German guidelines VDI 2263, Part 3

Simatek's experience is your guarantee for the right guidance to ensure a safe filter operation, also in applications handling explosive dusts.

Documentation

Simatek delivers documentation in accordance with the relevant directives, such as the EU Directive for Machinery 2006/42/EC and the ATEX Directive 94/9/EC.

An example is the Declaration of Incorporation IIB, specifying which important safety and health requirements of the EU Directive for Machinery are fulfilled.

SimPact® 4T-R

Optional Extras

Stainless Steel Execution

For applications involving aggressive or corrosive dust, the SimPact® 4T-R filter is available in stainless steel, AISI 304 or AISI 316.

Fluid bed with a Simatek filter in stainless steel

If the need for a stainless steel execution is limited to the product-side parts, the top section and the filter cages can be delivered in mild steel.

Sanitary Design with or without Wet Cleaning

For applications requiring a filter in sanitary execution, including Cleaning in Place - CIP-able design - please see our separate brochure on Process Filters.

Ancillary Equipment and Services

In connection with a filter project Simatek offers flange-to-flange pulse-jet filters and related ancillary equipment and services, such as:

- Key components for filter systems (fan, rotary valve, piping etc.)
- Design of and guidelines for aspiration systems
- Pipe dimensioning
- Flow & pressure drop calculations
- Explosion protection according to European standards

Filter Systems

Central Vacuum Cleaning and Aspiration Systems

Central vacuum cleaning system, Denmark

SimVac

Central Vacuum Cleaning Systems

Daily cleaning of the production facilities is usually needed, especially if there is a risk of explosive dust particles in the building.

An excellent and easy way to keep the area clean and free of dust is achieved by the installation of a central vacuum cleaning system.

Simatek offers complete central vacuum cleaning systems, including pulse-jet filter, vacuum pump, and piping system along with a range of cleaning accessories.

For further details, please see our brochure on SimVac systems.

Aspiration Systems

In the field of dusty bulk handling, an efficient aspiration system is essential.

The key purpose of an aspiration system is to establish and maintain a negative pressure in the system, thereby preventing the escape of dusty air into the surroundings through any leak.

Simatek has long experience and expertise in designing the exact technical solution satisfying the actual customer requirements. The equipment will ensure the negative pressure and removal of only a minimum of product dust.

A well-dimensioned aspiration system means everything to a production facility handling dusty products, thereby providing optimal working conditions.

Aspiration system, Denmark

SimPact® 4T-R

Filter Capacity

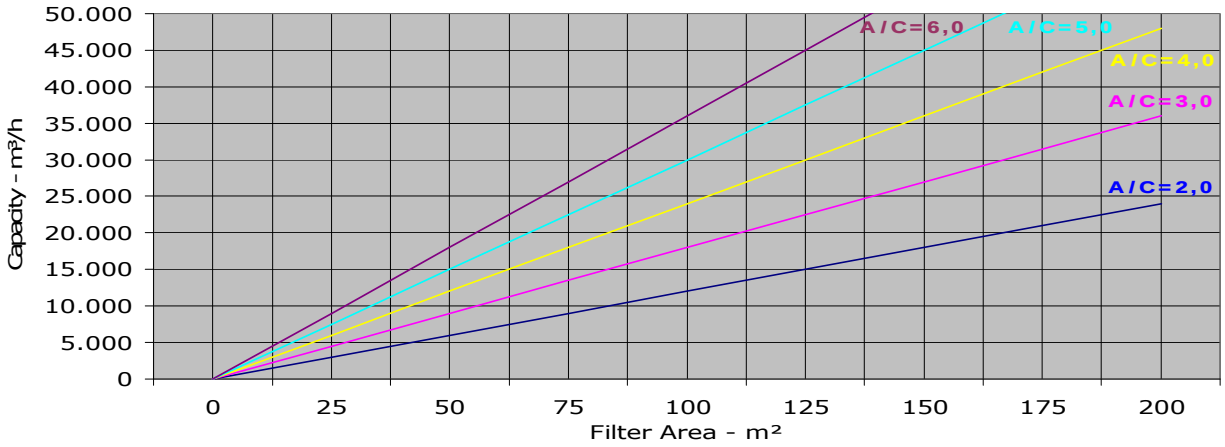
The filter capacity depends on several parameters. The most important factors are:

- Dust -/powder type (e.g. particle size, agglomeration ability, and electrical properties)
- Product load
- Application
- Environment (temperature and humidity)
- Filtering material
- Filter design (construction form)

For the sizing of the filter area of a SimPact® 4T-R filter, the Product Air/Cloth-Ratio ($m^3/m^2/min.$) has a fundamental importance.

Sizing the Filter Area

The diagram below shows an outline of the filtration capacity for an Air/Cloth-ratio ranging from 2,0 to 6,0 m³/m²/min., which is covering most SimPact® 4T-R filter applications.



Selecting the Filter Size

SimPact® 4T-R — Filter area m²

Type JM		7	10	14	21	32	41	52	70	90
Bag Length - dm	10	3,1	4,4	6,2	9,2	14,1	18,0	22,9	30,8	39,6
	15	4,6	6,6	9,2	13,9	21,1	27,0	34,3	46,2	59,4
	20	6,2	8,8	12,3	18,5	28,1	36,1	45,7	61,6	79,2
	25	-	11,0	15,4	23,1	35,2	45,1	57,2	77,0	99,0
	30	-	-	18,5	27,7	42,2	54,1	68,6	92,4	118,8
	35	-	-	21,6	32,3	49,3	63,1	80,0	107,8	138,5
	40	-	-	-	-	-	72,1	91,5	123,2	158,3
	45	-	-	-	-	-	81,1	102,9	138,5	178,1
	50	-	-	-	-	-	90,2	114,4	153,9	197,9

For larger filter sizes, please see our SimPact 4T brochure or contact Simatek's sales department

SimPact® 4T-R

Selecting the Construction Form

03 and 03 WB*	04	05	12	14	17 and 17 WB*
					
Dust load:					
<50 g/m³	<50 g/m³	<50 g/m³	<1000 g/m³	<100 g/m³	Unlimited

** Wide-Body*

Selecting the Top Cover for the Clean-Air Chamber

4T-R	4T1-R	4T2-R	4T3-R
			
Pressure-shock resistant	*Non-pressure shock resistant*	*Pressure-shock resistant top with hinged cover*	*Pressure-shock resistant "Walk in plenum" (Penthouse)*
Side Removal	*Top Removal*	*Top Removal*	*Top Removal*
Installation of bags through the mandoor	*Installation of bags from the clean-air side*	*Installation of bags from the clean-air side*	*Installation of bags from the clean-air side*

Simatek After-Sales Services

- Supervision and Commissioning
- Original Simatek Spare Parts
- After-Sales Service and Maintenance

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