INDUSTRY PROCESS FILTRATION

Nilesh Sharma

BUSINESS DEVELOPMENT MANAGER AIR POLLUTION CONTROL
Northern Europe

- Business development manager
  Air Pollution Control
- Over 15 year of experience in Ventilation fan
  & Industrial Process filtration
- Located in Sweden.

AGENDA

- DUST filtration solutions for battery manufacturing
- What is important to consider?
- Explosion risks & protection

PROCESS FILTRATION SOLUTION FOR BATTERY MANUFACTURING

BATTERY BUSINESS EVENT

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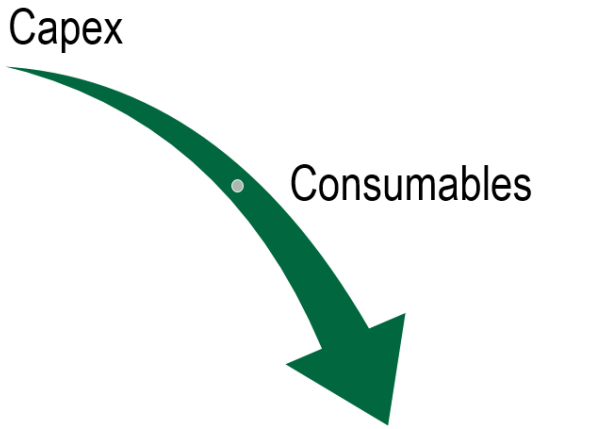
AIR FILTRATION OR DUST EXTRACTION?

A cleanable solution is suitable when static filters lead to short operational life.

If the concentration is too high for non-cleanable filters, a dust collector should be considered and will probably be the best solution to decrease the Total Cost of Ownership (TCO).

VS



TCO
(Total Cost of Ownership).

Some other factors that may affect the breaking point are:

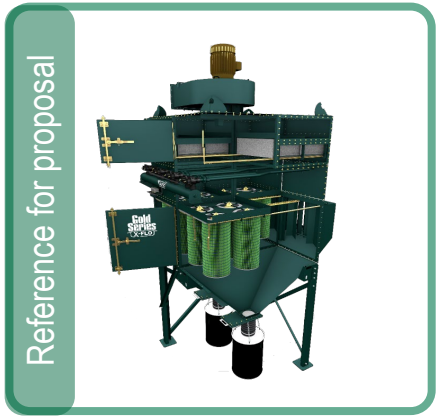
- Sticky dust
- Space constraints
- Temporary system

DUST EXTRACTION SOLUTIONS MIX

HIGH DUST LOAD
>0.1 mg/m3

Full Containment

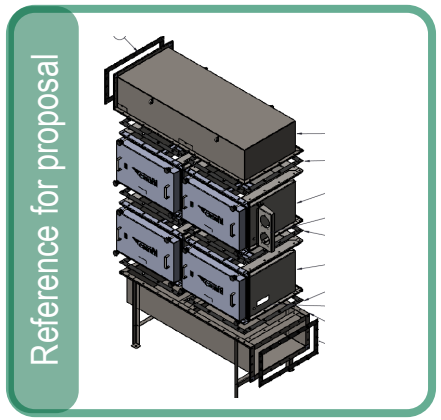
Half Containment



No Containment

Expected frequency of filter changes elements <u>above 12 months</u>
(most likely above 24 months)

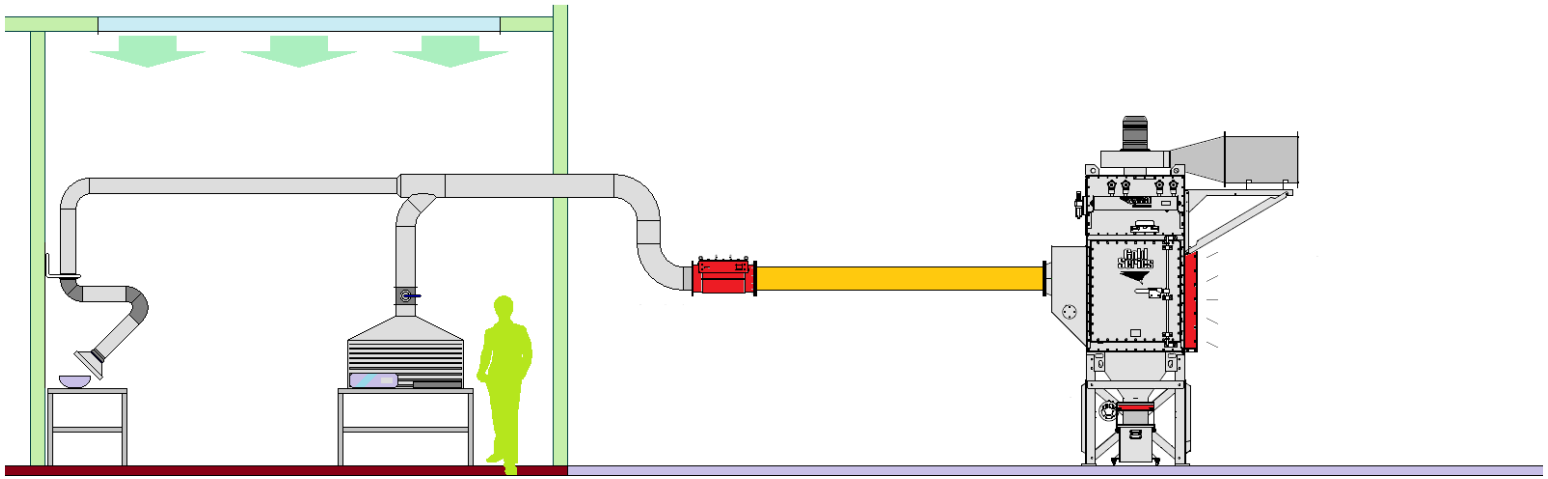
LOW DUST LOAD
< 0.1 mg/m3

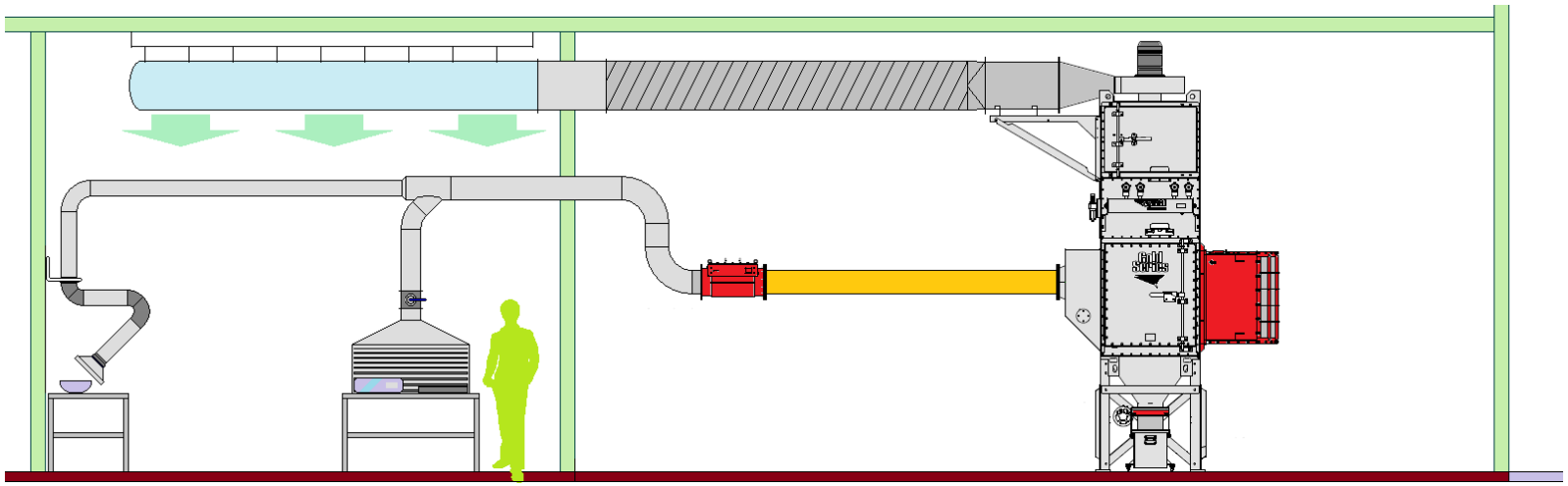


2 Stages, Full Containment

Expected frequency of filter changes elements <u>below 12 months</u>

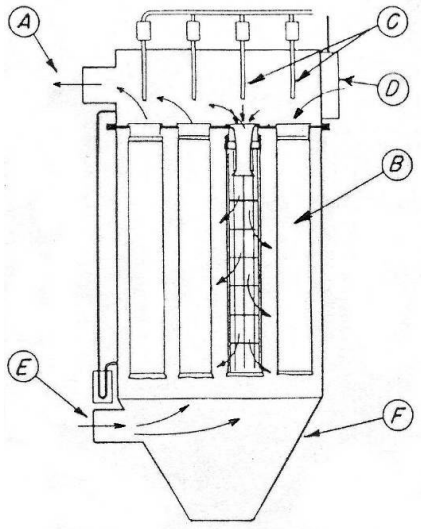
WHAT DOES AN EXTRACTION SYSTEM CONSIST OF?





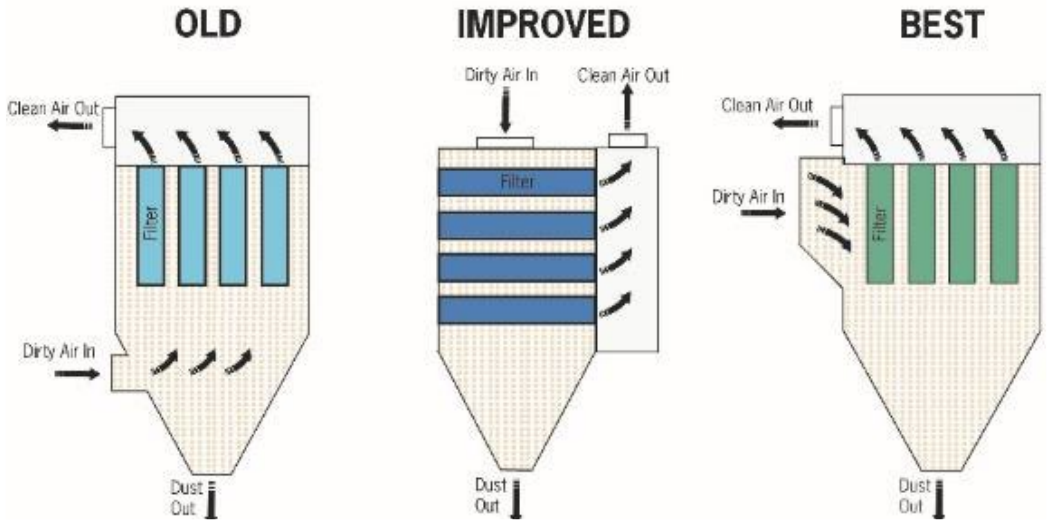
A DUST COLLECTOR

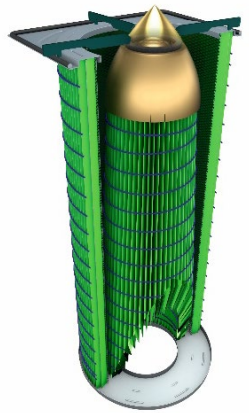
BAG FILTERS



Symbols	Parts
A	Clean air outlet
B	Fabric element
C	Reverse jet piping
D	Solenoid valves & controls
E	Dirty air inlet
F	Dust hopper

CARTRIDGE FILTERS





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VERTICAL VS HORIZONTAL CARTRIDGES

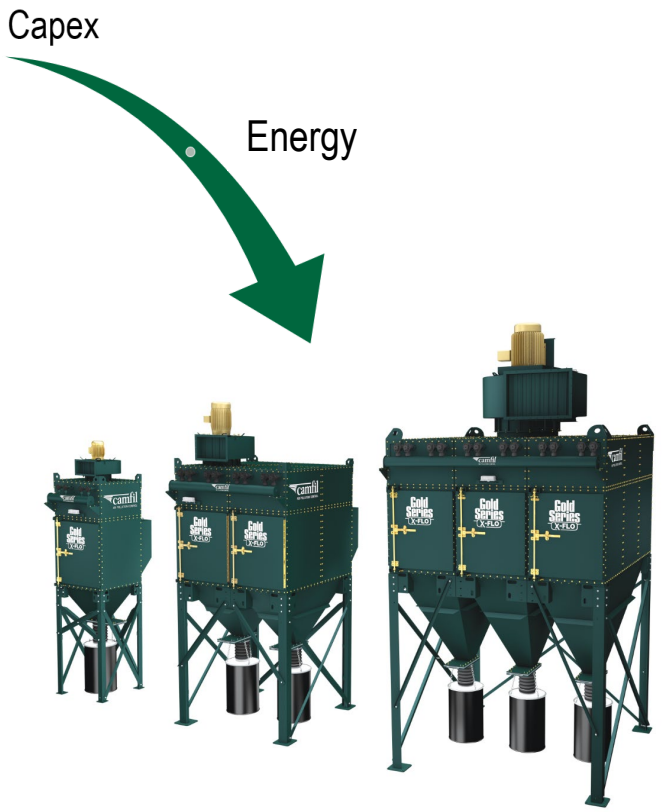
HORIZONTAL

VERTICAL

GOLD SERIES X FLO – NON BIBO BATTERY PRODUCTION APPLICATION

DRIVING DOWN THE OVERALL COST OF DUST COLLECTION

- ✓ Optimal **air tightness** class D:
  meet class “D” according to EN12237/ EN1507 and ensure minimal level of humidity is reintroduced into the process during air recirculation.
- ✓ Energy Efficient :
  - ✓ Pulse system uses less compressed air
  - ✓ Gold Cone filters reduce filter usage
  - ✓ VSD driven fan motors.
- ✓ Reduced footprint with optionally Integrated ISMF HEPA Filter
- ✓ Designed, tested and certified to NFPA & ATEX standards
- ✓ Design for Easy maintenance
- ✓ Modular Design adaptable to specific airflow



DUST COLLECTOR – FUNCTIONAL PRINCIPLE

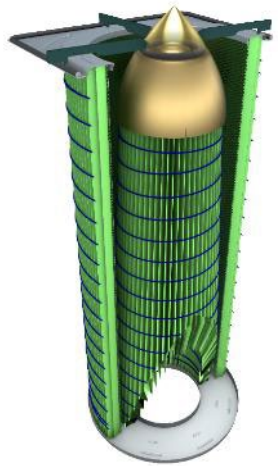
1. Process exhaust air is led into the dust collector and through the filter cartridges, handling high dust concentrations
2. The filter cartridges separate the airborne particles from the airstream
3. Filters get cleaned by a pulse of compressed air and the dust particles are discharged into a hopper
4. The cleaned air is led through an optional HEPA filter stage
5. Filtered air is extracted by the fan
6. Clean air is returned to the production or exhausted to atmosphere

Gold Series X-Flo - Driving down the overall cost of dust collection

- ✓ Pulse system uses less compressed air
- ✓ Gold Cone filters reduce filter usage
- ✓ Innovative baffles maximise filter life
- ✓ Improved airflow increases efficiency

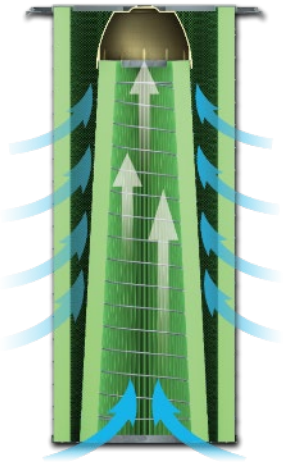
GOLD CONE FILTER CARTRIDGES

Independent lab tests demonstrate that Camfil filter cartridges capture more air pollutants and release more of those pollutants when pulsed, creating a safer, cleaner work environment with less maintenance.



Gold Cone™ X-Flo cartridges

Improved aerodynamic cartridge, cone design benefits pulse cleaning efficiency from top to bottom.

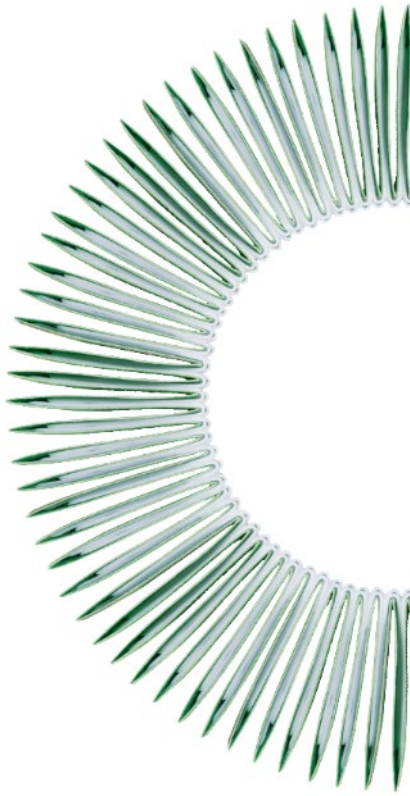


HEMIPLEAT® Cartridge

Pleats made with HemiPleat technology are uniform across the entire media and are held open instead of pressed together.

DURA-PLEAT® Cartridges

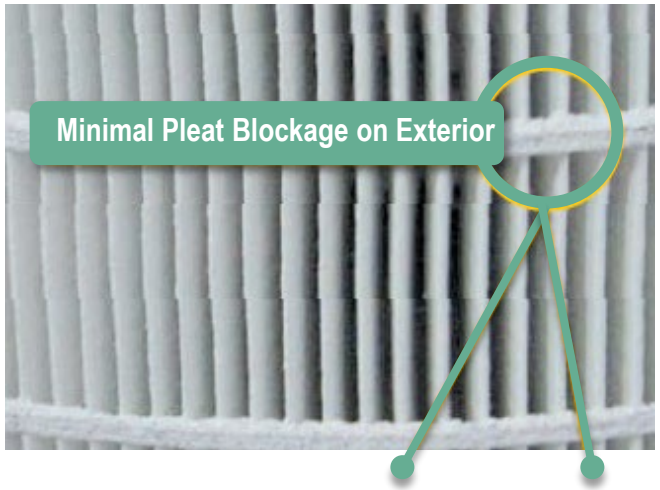
Combines the best of both worlds: the high efficiency of pleated media and the versatility of synthetic materials.



HEMIPLEAT VS. COMPETITOR

CAMFIL HEMIPLEAT

Dirty HemiPleat Exterior
After Pulse

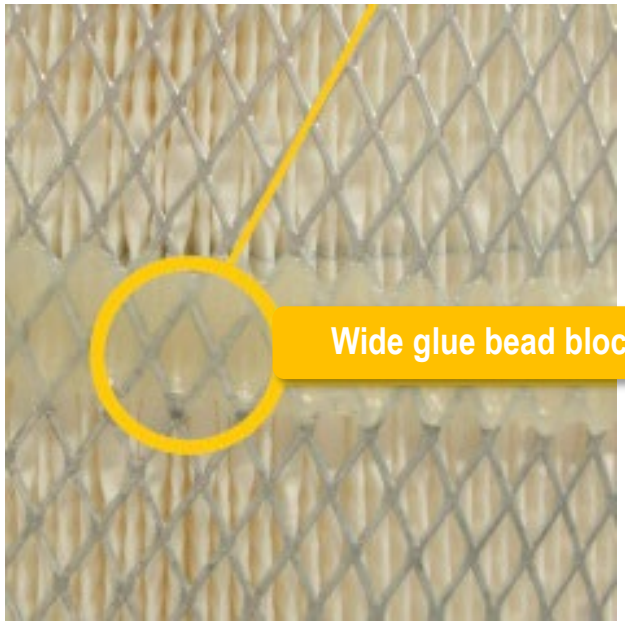


More media available for filtration

- Improved performance
- Longer life

COMPETITOR

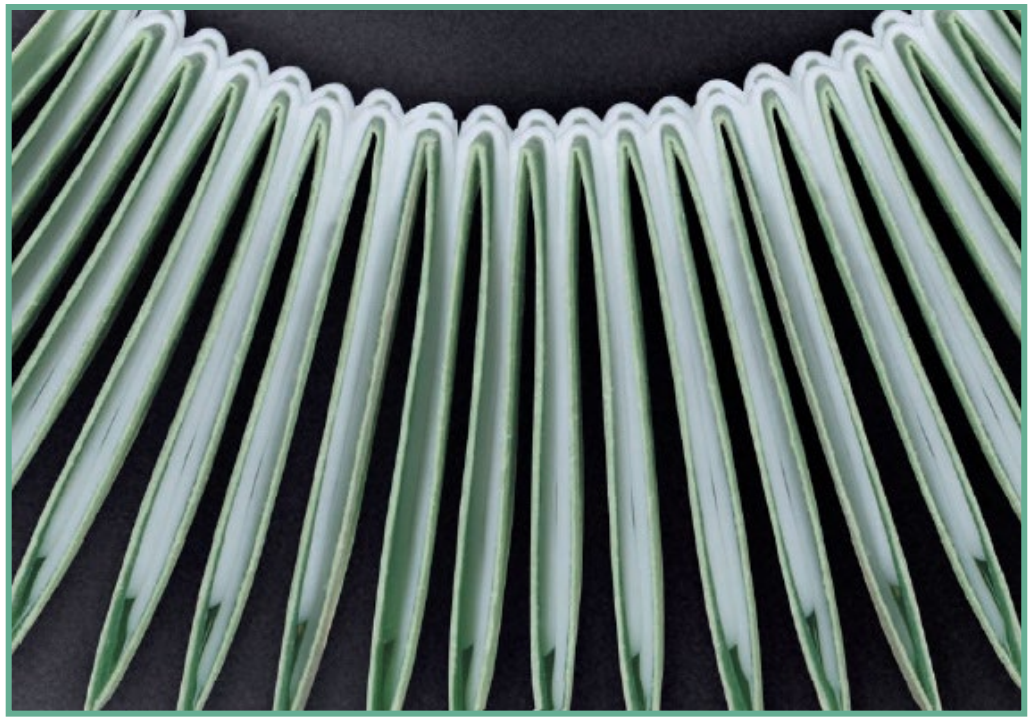
Leading Aftermarket
Cartridge Exterior



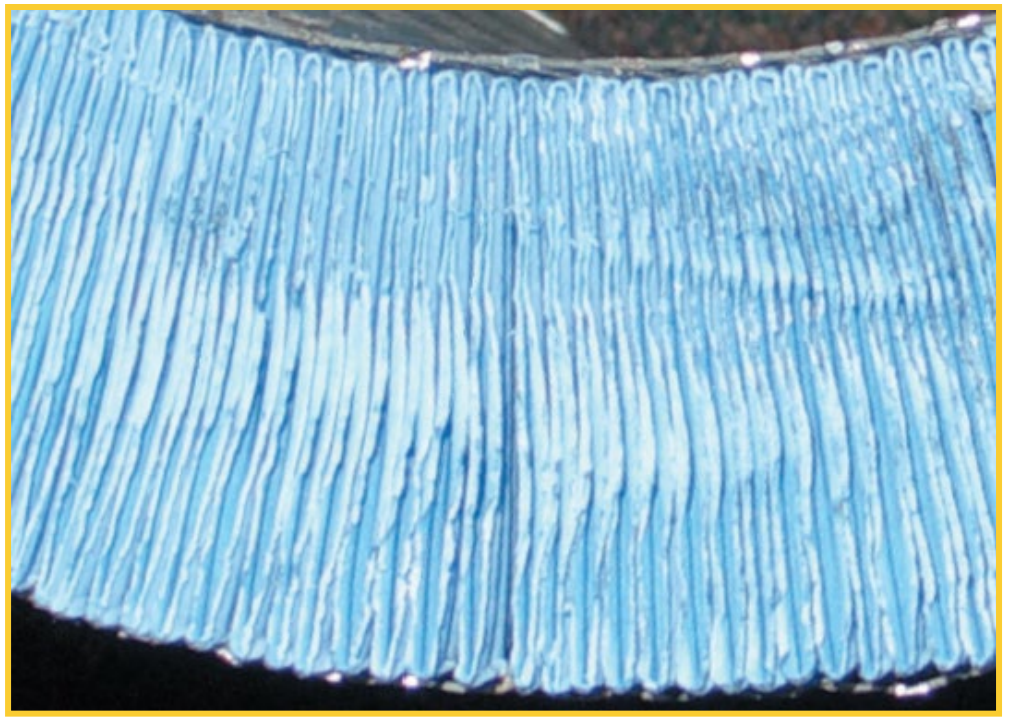
Leading OEM's
Tightly Packed Exterior
Construction

HEMIPLEAT VS. TYPICAL PLEATS

HEMIPLEAT - BREATHABLE MEDIA PLEATS

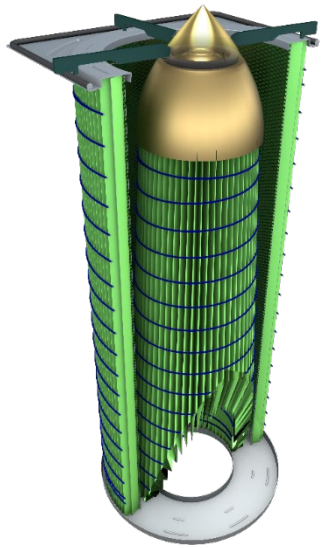


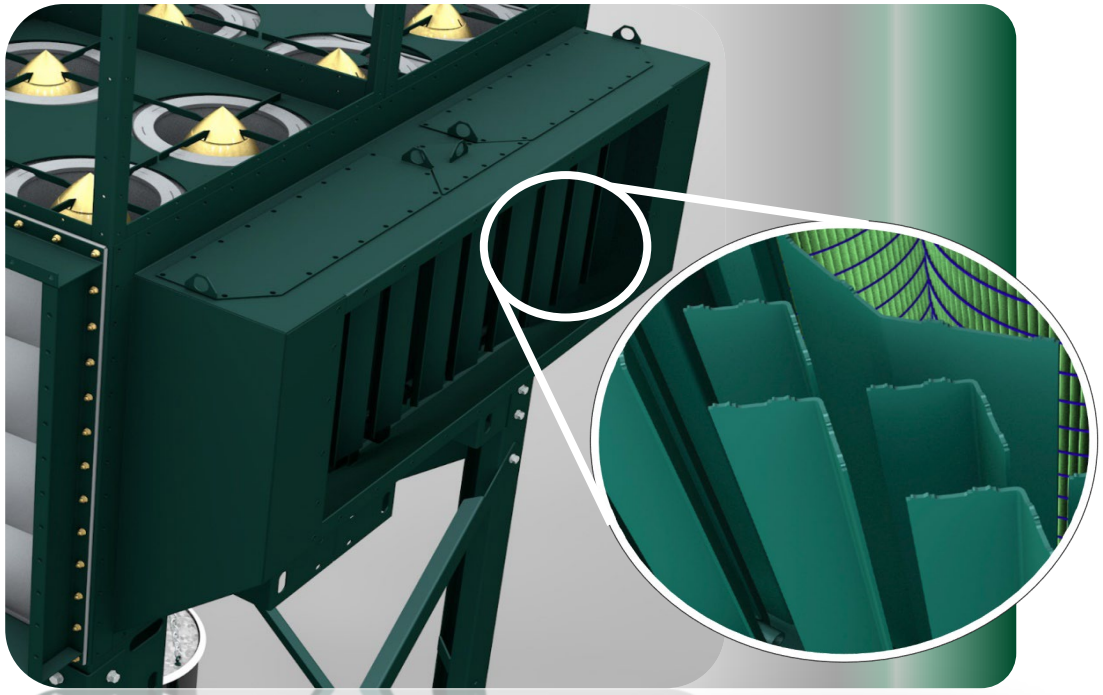
TYPICAL INDUSTRY PACKED MEDIA PLEATS



GOLD SERIES X-FLO - DRIVING DOWN THE OVERALL COST OF DUST COLLECTION

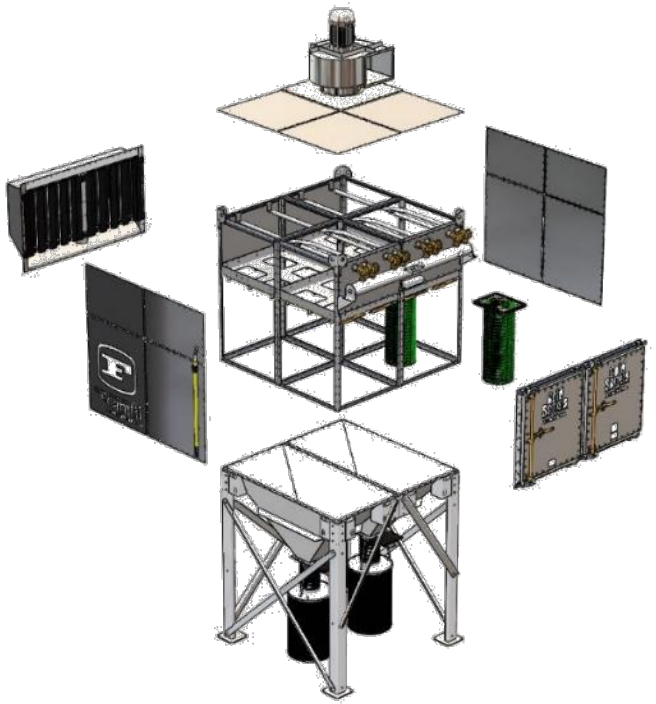
- Pulse system uses less compressed air
- Gold Cone filters reduce filter usage
- Innovative baffles maximize filter life
- Improved airflow increases efficiency





GOLD SERIES X-FLO - MODULARITY

- Modular construction to fit any application
- Limitless sizes and configurations
- Optional integrated second stage filter
- Top mounted fan options



INSTALLATIONS

- Customizable configurations
- 800 m³/h – 180,000 m³/h
- Indoor / Outdoor
- Safe Area / Atex

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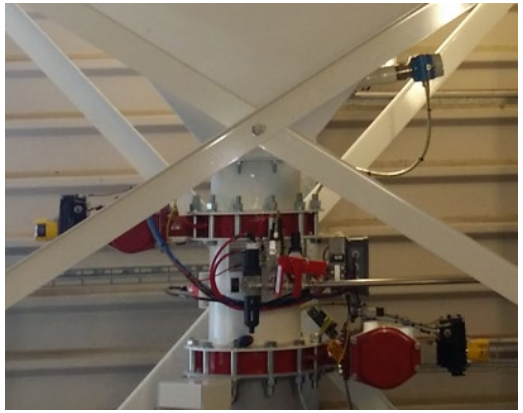
MANAGING COLLECTED DUST

Discharge adapted to the quantity and type of dust collected




Continuous recovery Solutions





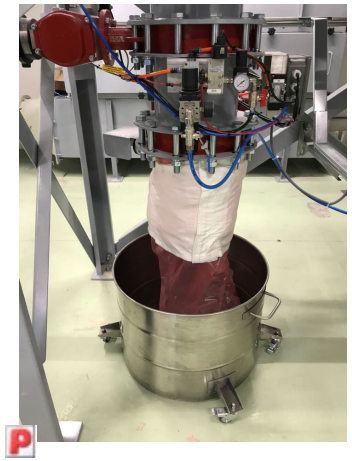
SAFE CHANGE FOR DISCHARGE SYSTEM

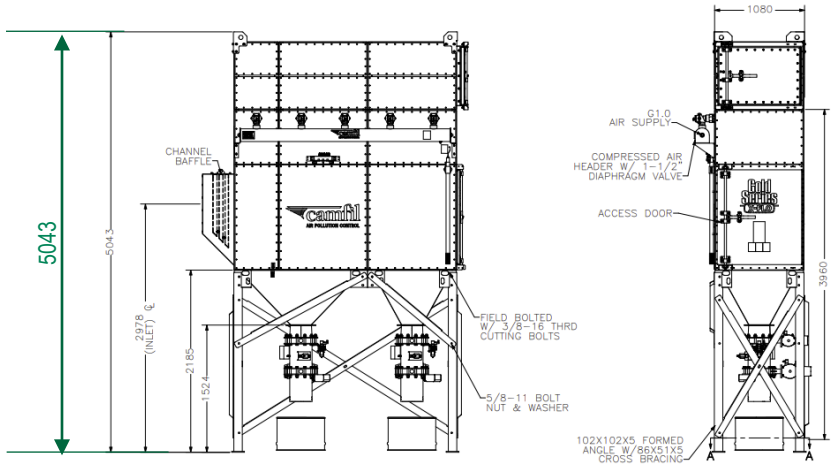
Continus liner solutions CLD

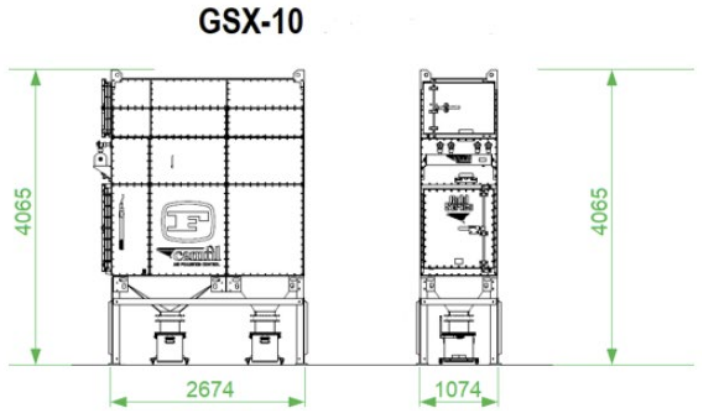
- ✓ Used for continuous applications
- ✓ Automatic operation
- ✓ Surrogate tested OEB5

35/50L BIBO Bin

- ✓ Used for small dust volumes
- ✓ Helps to reduce the height of the dust collector (a much shorter option than the continuous liner with the dual valve)







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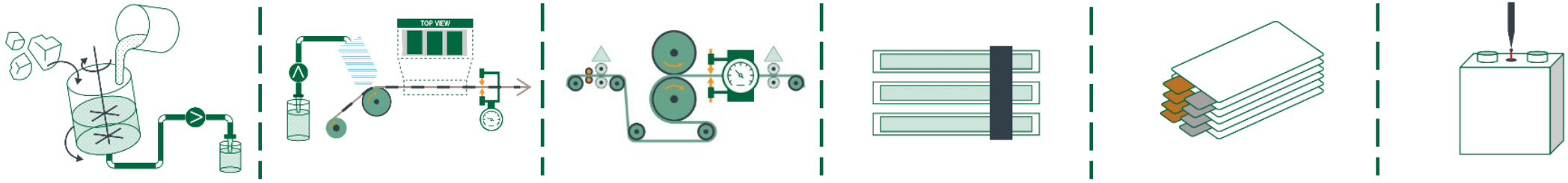
BATTERY CELL MANUFACTURING

Slurry Mixing → Coating → Calendering → Electrodes Cutting → Cell Stacking → Electrolyte Filling



CARCINOGENIC METAL DUSTS

Anode → no hazardous dust → no BIBO

Cathode → hazardous dust → BIBO required

VOC (NMP, DMC, EMC)

Anode → no hazardous VOC

Cathode → hazardous VOC → Absorber required

FIRE AND EXPLOSION PROPERTIES

- Burning index ≤ BZ 3
- Ignition temperature ≥ 400°C (dust cloud)
- Minimum ignition energy ≥ 10 mJ
- LEL ≥ 60 g/m³
- Kst value ≤ 199 bar*m/s
- Pmax ≤ 8 bar
- Dust Class IIIC
- Gas Class IIB
- Gas ignition temperature class T4

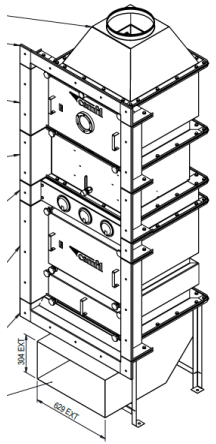
CONTROLLER OPTIONS

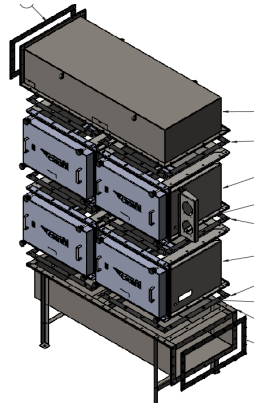
- Inverter drive in IP54 enclosure.
- Integrated pressure transducer for consent pressure/ volume control.
- TouchScreen pulse controller (6 cleaning modes).
- High pressure alarms for primary and secondary filters. Low pressure alarm for compressed sir supply.
- Rotary valve, screw conveyor, dual valve integrated controls.
- Run & standby fans controlled via a selector/ timer/ BMS up to 132kW.
- Run okay, service & fault alarm outputs (NO/NC contacts).
- E-stops for external input, fan overload, fire & explosion alarm.
- Compression air treatment kit with auto-drain and low pressure
- GS module isolation for maintenance (inlet/ outlet dampers).
- RPB heaters for below -10 deg. C (outside installations).
- Broken bag/ cartridge detectors.

GOLD SERIES CAMTAIN (GSC) – BIBO BATTERY PRODUCTION APPLICATION

DRIVING DOWN THE OVERALL COST OF DUST COLLECTION

- ✓ Optimal **air tightness** class D:
  meet class "D" according to EN12237/ EN1507 and ensure minimal level of humidity is reintroduced into the process during air recirculation.
- ✓ Market leading safe change filter function.
  Uses BIBO (Bag-In Bag-Out) methodology.
- ✓ Continuous bin liner for safe bin bag change
  Tested up to OEB 5
- ✓ Provides production and maintenance personnel with the easiest and safest operation available.
- ✓ Modular **Camsafe HEPA housing with BiBo Feature**.
- ✓ Energy Efficient :
  - ✓ Pulse system uses less compressed air
  - ✓ Gold Cone filters reduce filter usage
  - ✓ VSD driven fan motors.
- ✓ Designed, tested and certified to NFPA & ATEX standards
- ✓ Modular Design adaptable to specific airflow





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GOLD SERIES CAMTAIN

The dust collector designed specifically for containment applications.

Specifications/Benefits:

- ✓Safe-change containment systems for filter cartridges & discharge system
- ✓High-efficiency filters up to E12 99.5% at MPPS (most penetrating particle size), or greater than 95% at ePM1
- ✓Specially treated filter media repels fine particulates for a lower pressure drop and longer filter life

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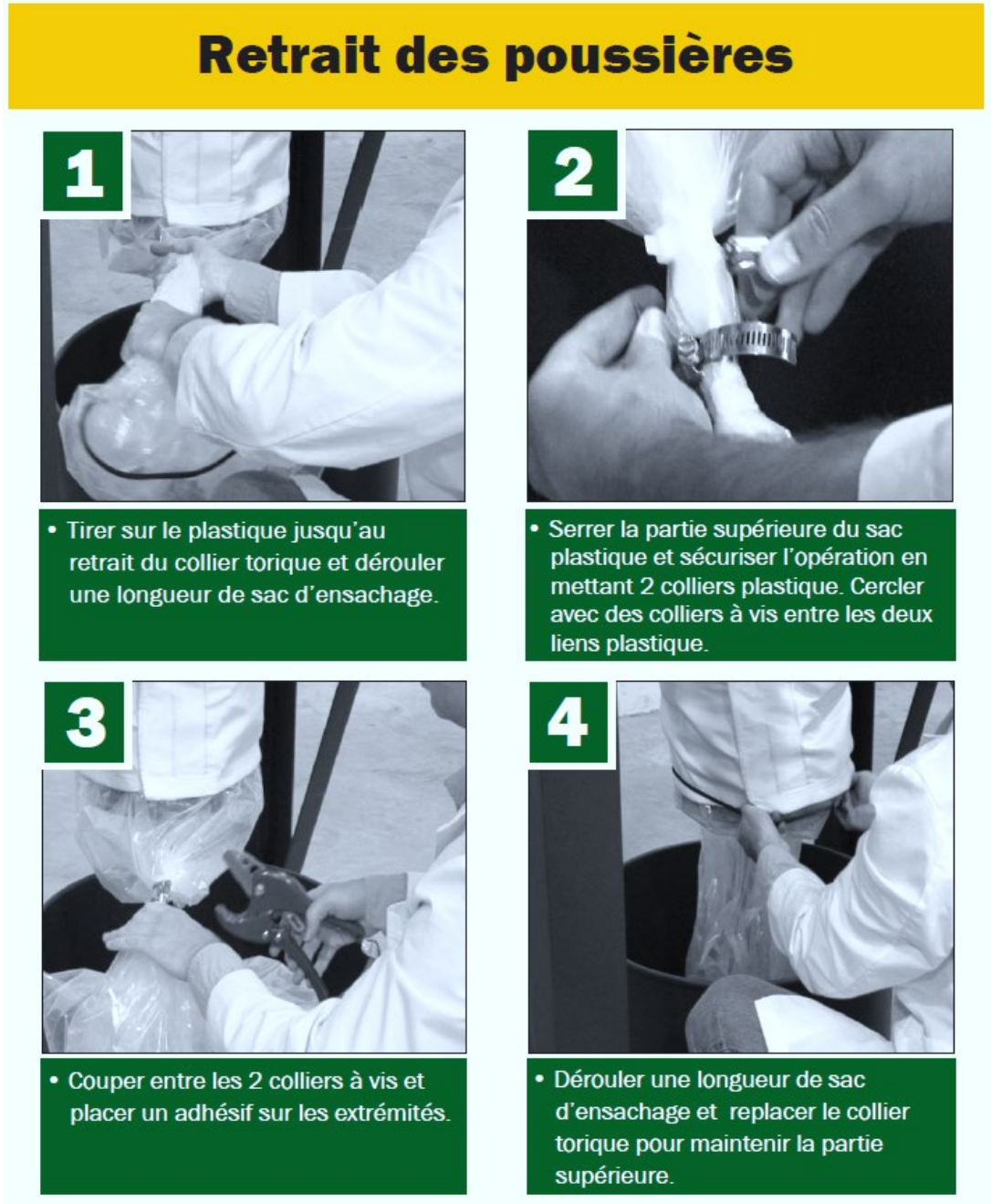
CONTAIMENT WITH CONTINUOS LINER

- Airlock system with 2 butterfly valves, for continuous dust recovery.
- The dust is collected in a BIBO containment tube bag



CONTAIMENTS ON MAIN FILTER ELEMENTS

- Ensure no contact with extracted dust while replacing filter elements.
- A procedure must be indicated to avoid any risk of mishandling.

QUAD PULSE PACKAGE SERIES

A product family with a mission: cleanliness, safety and efficiency for hazardous dust.

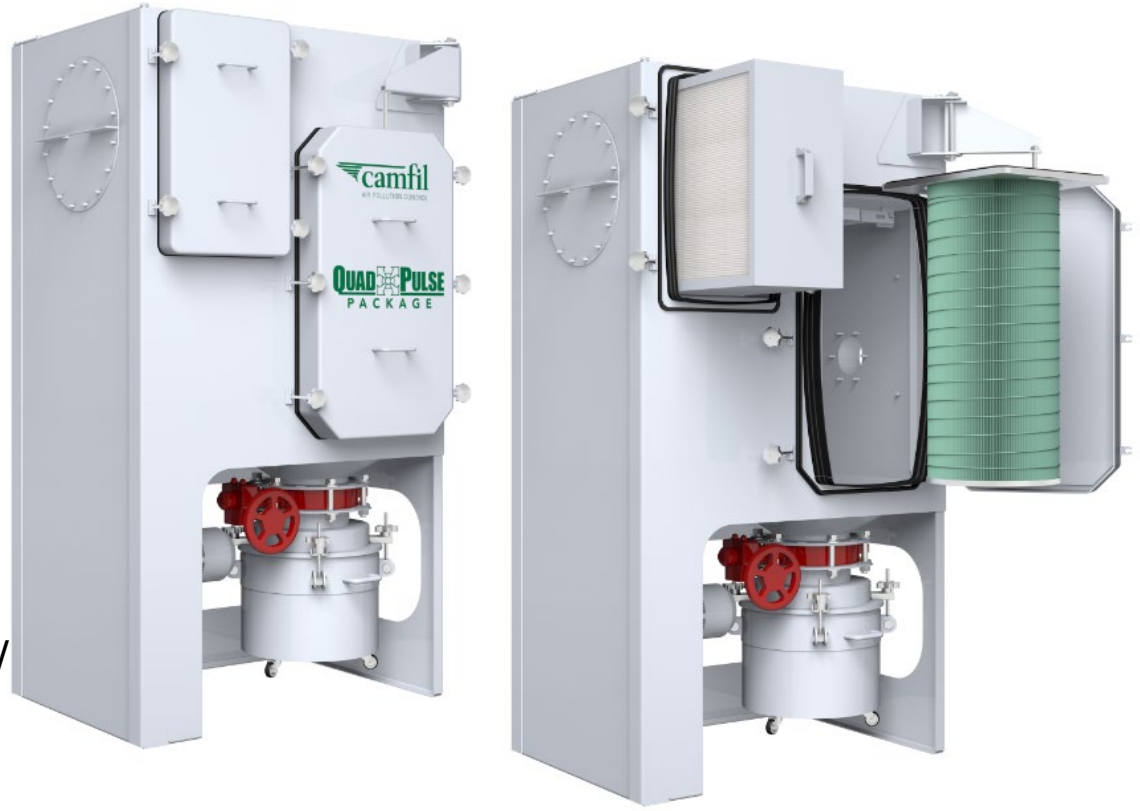
Specifications/Benefits:

- ✓Compact design / 1 or 2 filter catridges
- ✓Clean online without interrupting operations
- ✓Easy installation
- ✓BIBO safe-change
- ✓Integrated explosion protection
- ✓HV-applications

ATEX

QPP1 PXI – INTEGRATED FAN

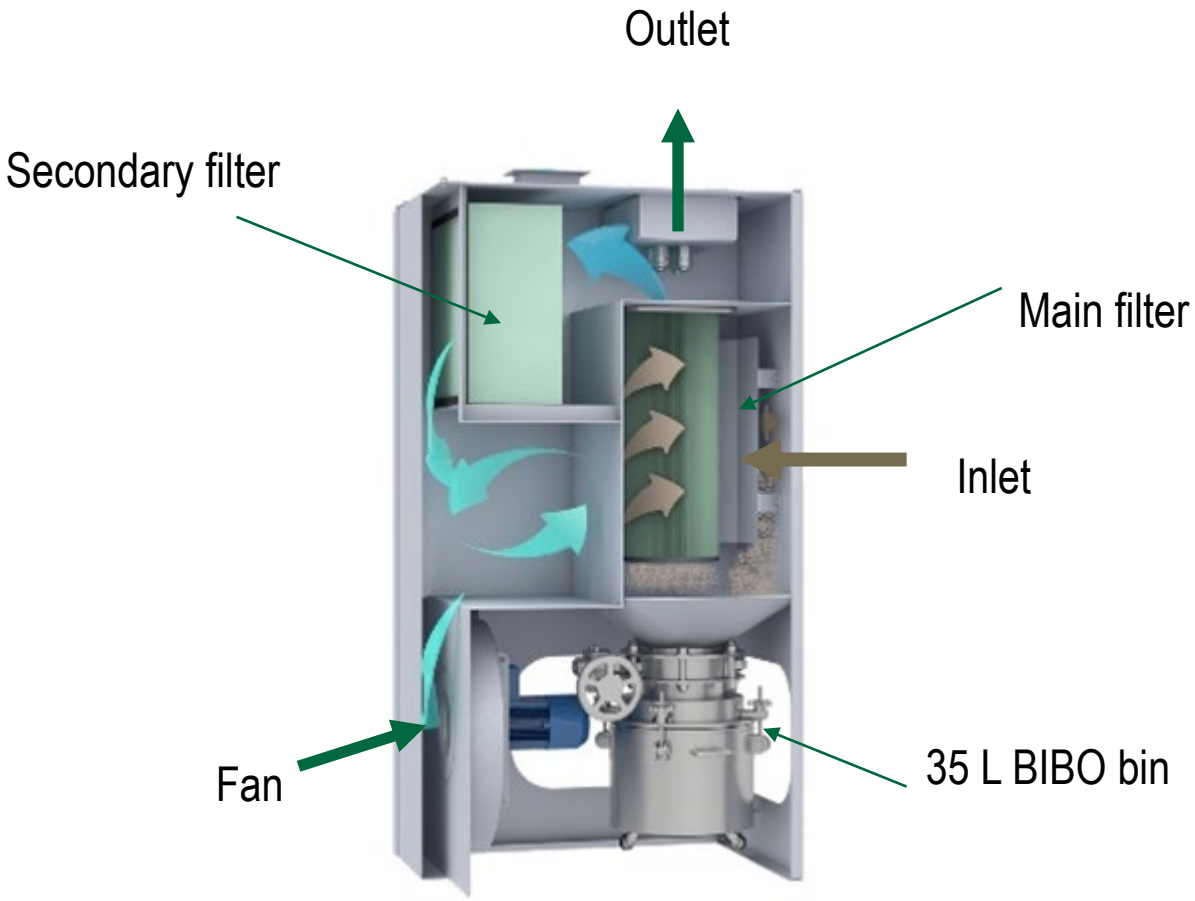
- **1 cartridge**
- **Air Volume:** 500 - 1,200 m³/h
- **QPP1 PX1** with an integrated fan.
- Max. external suction pressure of -5 kPa. The integrated fan simplifies installation but limits the suction range.



Key advantages:

- The Quad Pulse HEPA filter captures fine dust particles and avoids the need for costly add-on explosion protection.
- Extensive testing to cover main cartridge failure and still maintain safety
- Additional, expensive explosion safety devices are not required within given limits except inlet isolation.
- The ExPSR pressure resistant housing maintains its integrity during an explosion event. QPP1 limited to 299 Bar m/s
- No pressure relief or suppression required
- ATEX Rating 2/3 D for QPP 1 and 1/3 D For QPP2

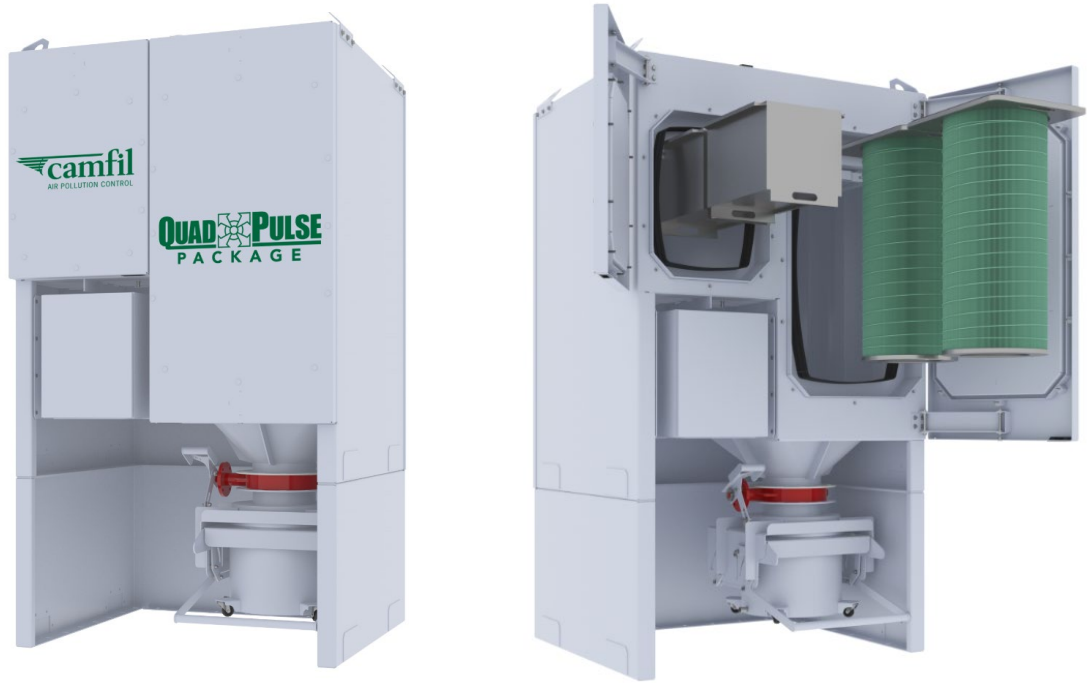
QPP1 PXI –VIEW INSIDE & TECHNICAL DETAILS



- Weight (incl. filters): 1,050kg
- System dimensions: 1,152 x 852 x 2,200 mm (W x D x H)
- Noise level: Lp AEQ 90s = 73.2dB
- Air capacity: 1,000 m³/h (range 500-1,200 m3/h)
- Process air temperature: 0 – 40°C non-condensing
- Suction Capacity PXI: 5 kPa
- Motor: ATEX ExnA T3 3D T125C, IE3, Class S1, 3x400V, 4kW, 7.3 A, IP55/66 for 3D IIIC
- Starter: DOL (this will be mounted in an external cabinet)
- Integrated Control System

PRODUCT DETAILS –CATHODE QPP 2 PX- FOR 2 SUCTION POINTS

- 2 cartridges
- Air Volume: 1,000 - 3,000 m³/h
- Using the same Quad Pulse technology as in the first generation, but with a GS sized cartridge with bigger filter area
- Two main cartridges, two HEPA to get the increased capacity up to 3,000 m³/h (application dependent)
- Bigger and more user friendly dust container. Option to use a DualValve dust discharge system
- Utilize the same ACDC2 Control system as the QPP1 with capability to be remote controlled via MODBUS (and others using a converter) and also to control a DualValve system
- Category 1/3 D ATEX approval
- Explosion Pressure Shock resistant to KST 350 by only adding inlet insulation



QPP2 – BUILT UP

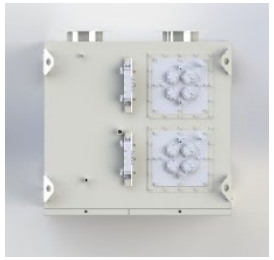
Efficient filter stages:

- **Stage 1:** Primary filter with excellent filtration efficiency removes the majority of collected dust and prolongs the service life of the second-stage filter.
- **Stage 2:** Quad Pulse Cleaning System.
- **Stage 3:** HEPA filter up to **H13,** providing 99.995% filtration efficiency to capture the finest, most hazardous dust particles.

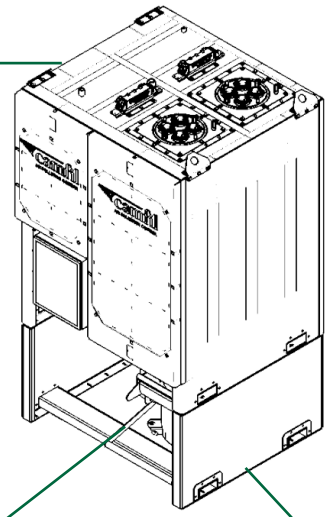
QPP2 – USP´S

- ✓ Explosion pressure shock resistant for dusts up to KST 350 (organic)
- ✓ ATEX Ex 1/3D, The highest safety rating
- ✓ Full containment for both filter stages and the collected dust
- ✓ Simple installation with integrated second filtration stage
- ✓ Possible to transport in low ceiling height rooms
- ✓ Possible to use the simple to use 50L BIBO bin or the Camfil APC Dual Valve system
- ✓ The benefits of the QPP system that gives a more even suction and reduced back pulsing

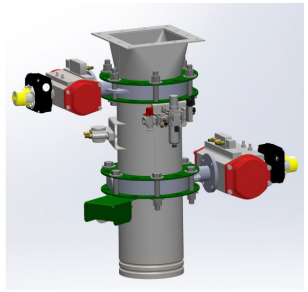
QPP2 – OPTIMIZED UNIT DESIGN



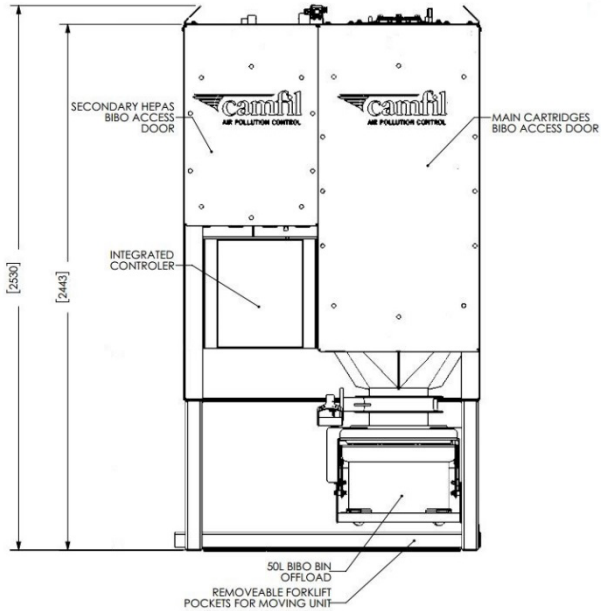
Top side with the two tanks, RPB's and injection port for test aerosol.

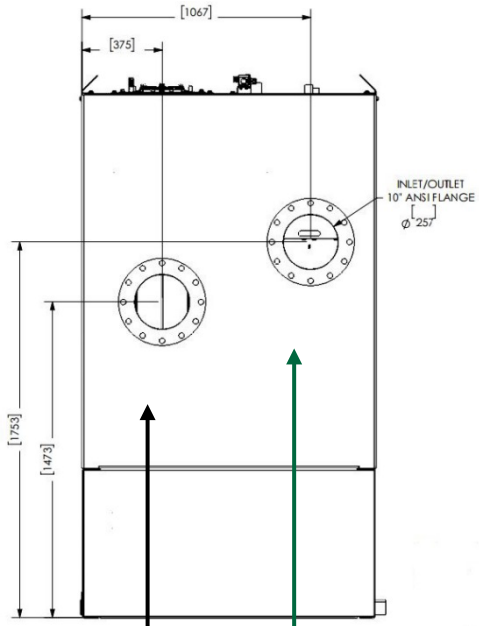


Front side operation
50 L BIBO drum easier to operate compared to the version used in QPP 1 and GS.



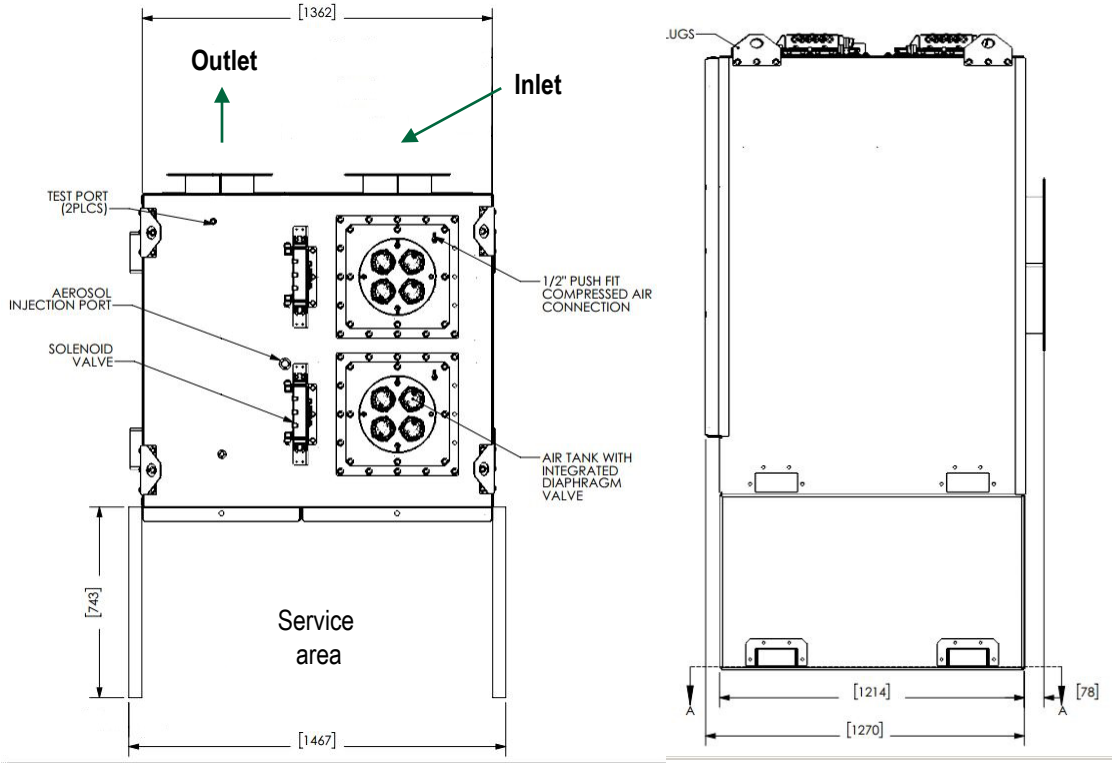
Option to use the DV system. This is also included in the Cat 1 type approval.

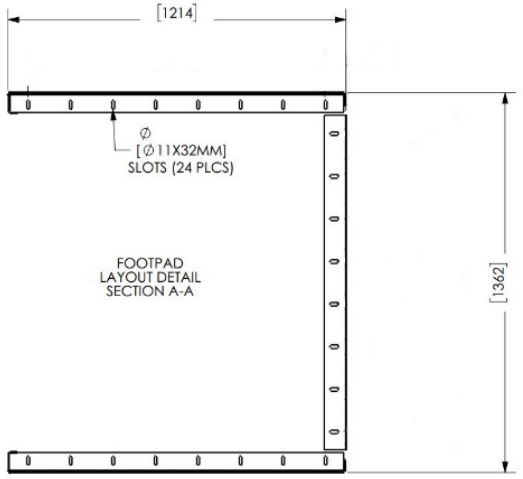




Inlet and outlet on the back for easier parallel connection

QPP2 – OPTIMIZED UNIT DESIGN





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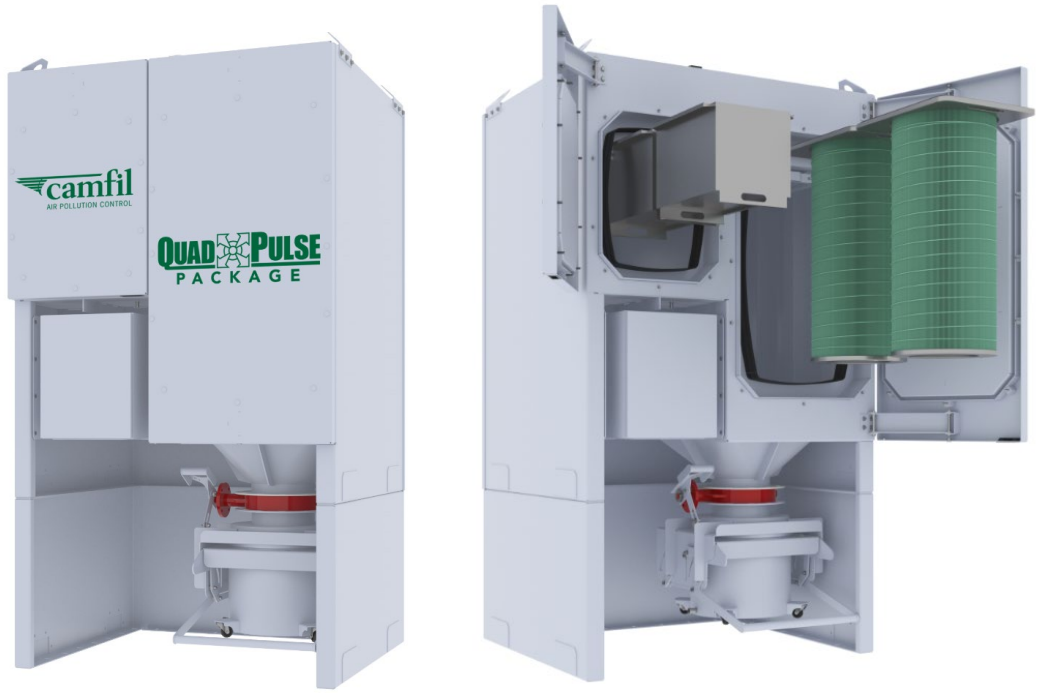
- Using the same Quad Pulse technology as in the first generation, but with a GS sized cartridge with bigger filter area
- Two main cartridges, two HEPA to get the increased capacity up to 3,000 m³/h (application dependent)
- Bigger and more user friendly dust container. Option to use a DualValve dust discharge system
- Utilize the same ACDC2 Control system as the QPP1 with capability to be remote controlled via MODBUS (and others using a converter) and also to control a DualValve system
- Category 1/3 D ATEX approval
- Explosion Pressure Shock resistant to KST 350 by only adding inlet insulation



QPP2 – BUILT UP

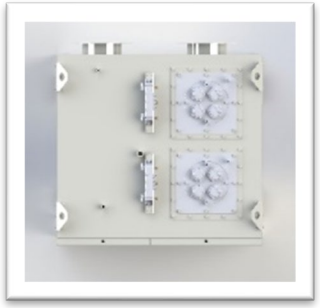
Efficient filter stages:

- **Stage 1:** Primary filter with excellent filtration efficiency removes the majority of collected dust and prolongs the service life of the second-stage filter.
- **Stage 2:** Quad Pulse Cleaning System.
- **Stage 3:** HEPA filter up to **H13,** providing 99.995% filtration efficiency to capture the finest, most hazardous dust particles.

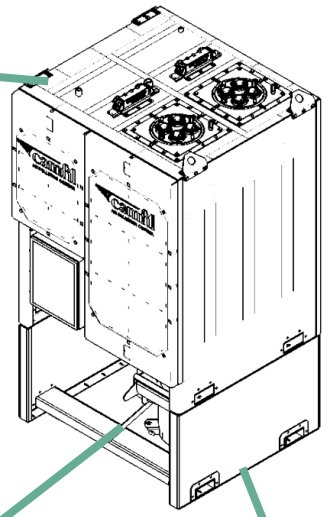
QPP2 – USP´S

- ✓ Explosion pressure shock resistant for dusts up to KST 350 (organic)
- ✓ ATEX Ex 1/3D, The highest safety rating
- ✓ Full containment for both filter stages and the collected dust
- ✓ Simple installation with integrated second filtration stage
- ✓ Possible to transport in low ceiling height rooms
- ✓ Possible to use the simple to use 50L BIBO bin or the Camfil APC Dual Valve system
- ✓ The benefits of the QPP system that gives a more even suction and reduced back pulsing

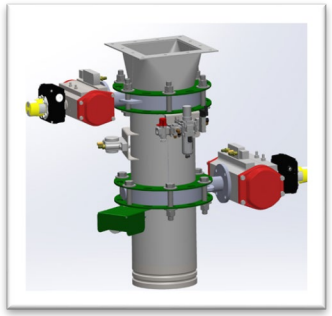
QPP2 – OPTIMIZED UNIT DESIGN



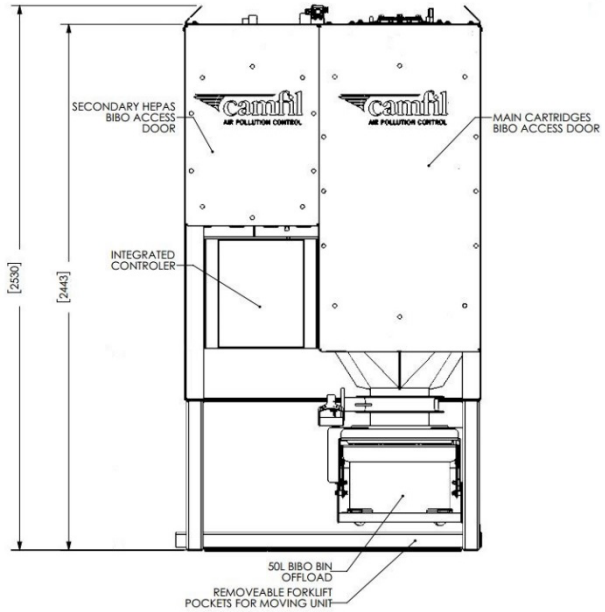
Top side with the two tanks, RPB's and injection port for test aerosol.

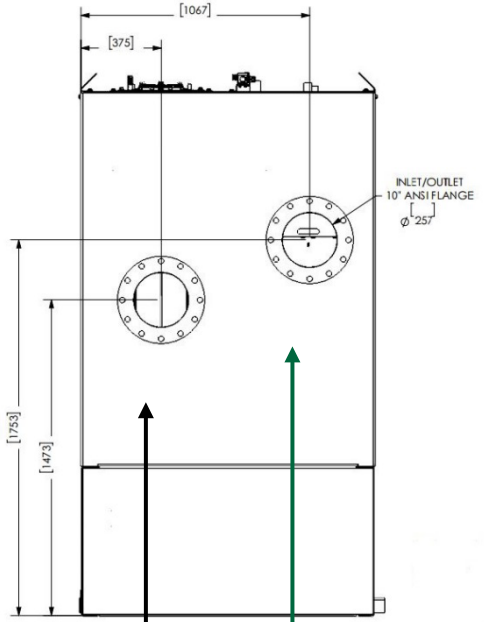


Front side operation 50 L BIBO drum easier to operate compared to the version used in QPP 1 and GS.



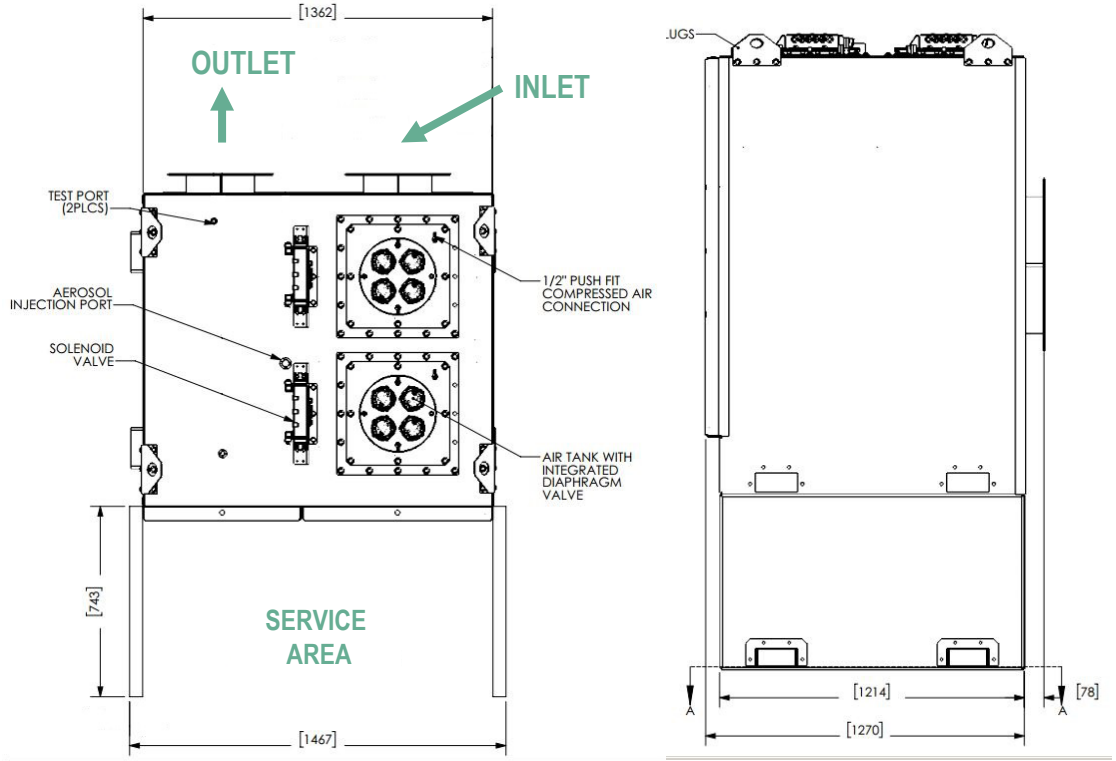
Option to use the DV system. This is also included in the Cat 1 type approval.

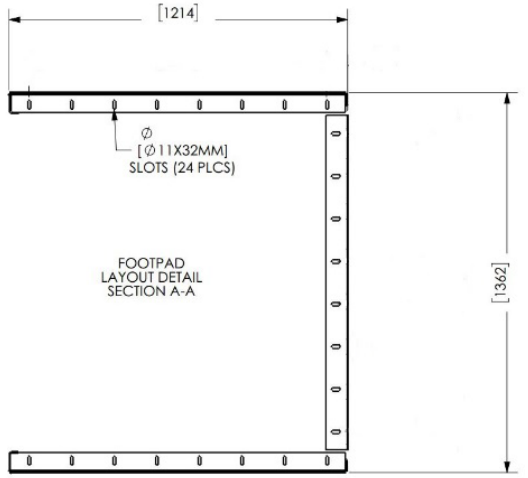




Inlet and outlet on the back for easier parallel connection

QPP2 – OPTIMIZED UNIT DESIGN



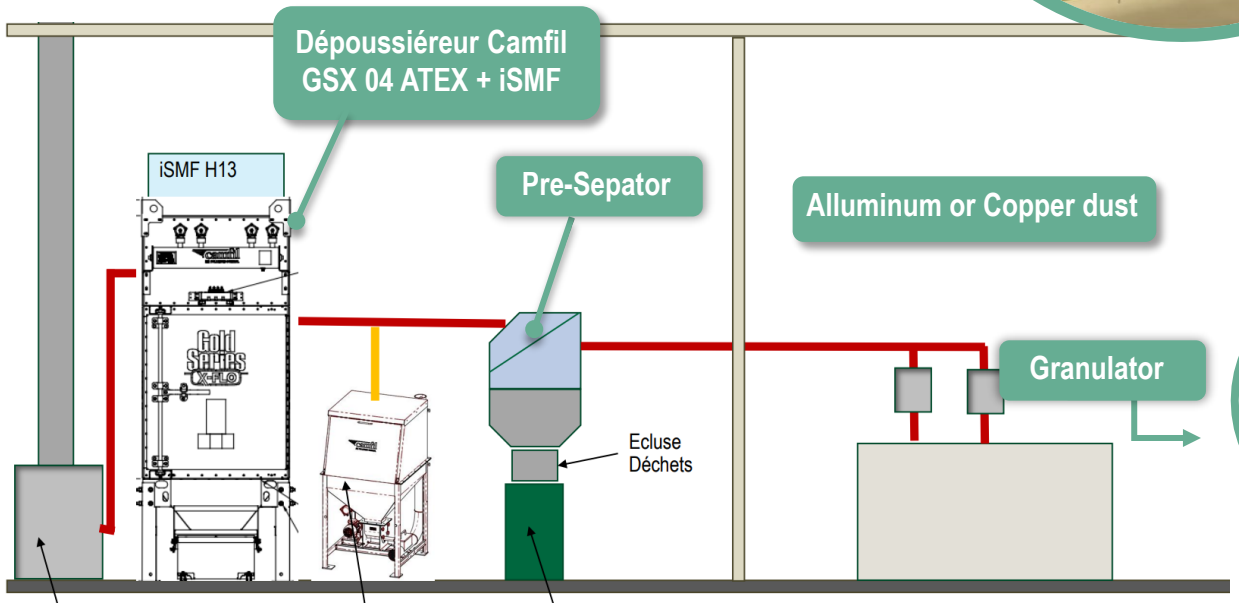


QPP2 PX – CUSTOMER INSTALLATIONS

PRE-SEPATOR FOR METAL TRIM

WHY TRIM, SEPARATOR ARE REQUIRED?

SOLUTION



camfil

GOLD SERIES HV

- ✓ Heavy duty 5mm construction
- ✓ Vessel strength 55 kPa vacuum
- ✓ Tangential inlet minimizes dust impact on the filters
- ✓ Straight anti abrasion inlet available for heavy loads
- ✓ Two & four cartridge models total 18 different variations
- ✓ Ideal for central vacuum cleaning applications
- ✓ ATEX approved
- ✓ Safe change BIBO (bag-in/ bag-out) available for pharmaceutical/ hazardous dusts
- ✓ Pulse cleaning system for continuous operation
- ✓ 2 and 4 filter cartridge

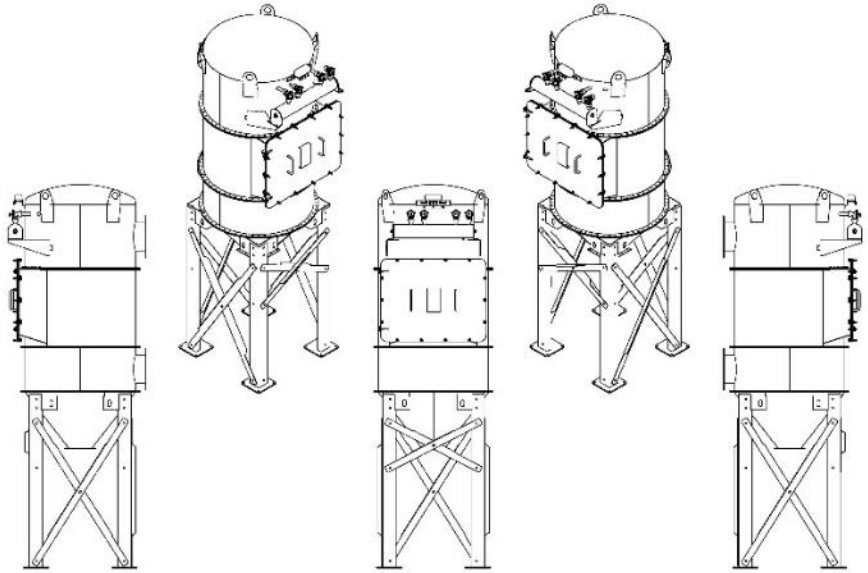
Standard

Camtain

GS HV – OPTIMIZED FOR INDUSTRY

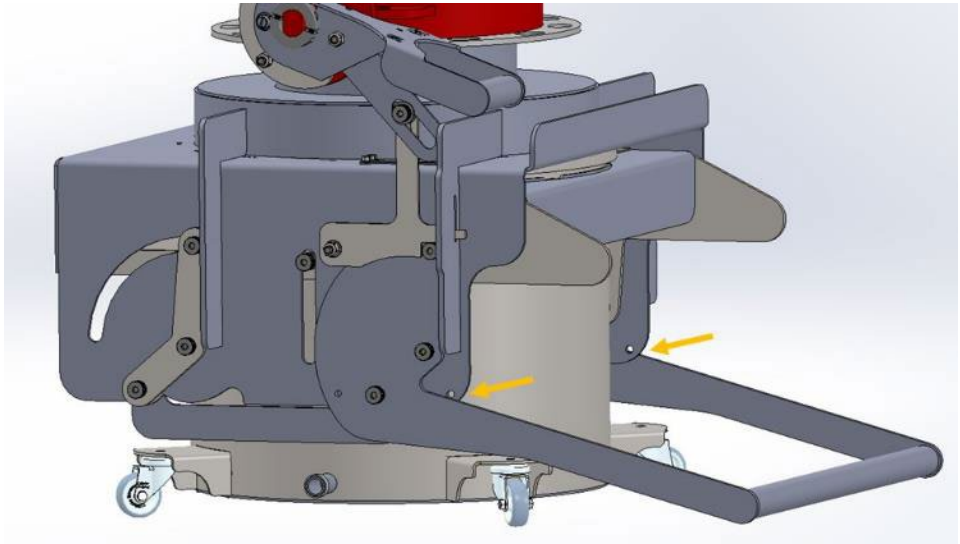
- Flexible design with possibility to modify the configuration at site if required.
- Designed, tested and certified to NFPA & ATEX standards

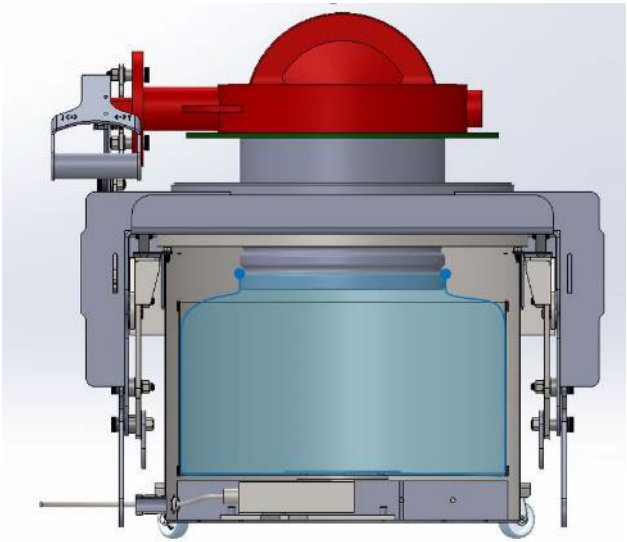
- Heavy duty construction & powder painted housing fitted available in 4 different sizes.
- Efficient cleaning system to effectively clean larger filters and increase filter life.
- Optimized filter design, inlet and cleaning system put more dust into the hopper.



50 L BIBO BIN

- Pressure and explosion tested for NFPA & ATEX compliance
- Easy access
- Contained dust handling
- Compact design
- Reduces overall height of installation when there may be height restrictions

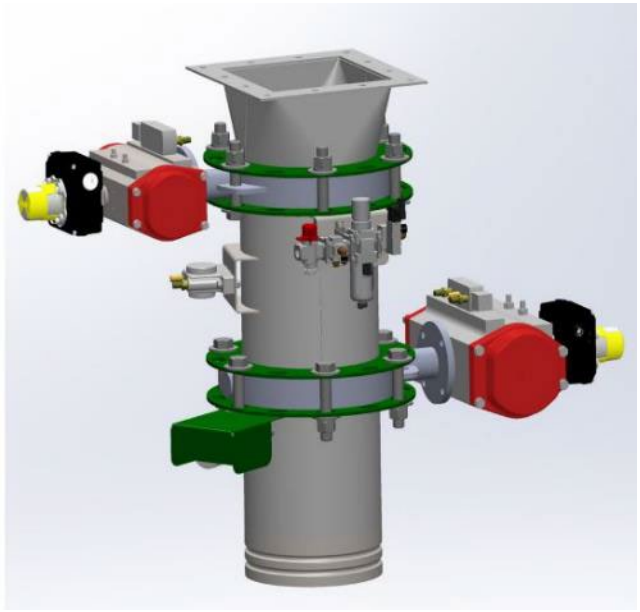




DUAL VALVE CONTINUOUS LINER

- Automatic feed out
- Possibility to have a contained dust free dust handling.
- Pressure and flame proof tested
- Meets the highest safety demands

- 13.3 m²



camfil

WHAT IS IMPORTANT TO CONSIDER

WHAT IS IMPORTANT TO CONSIDER?

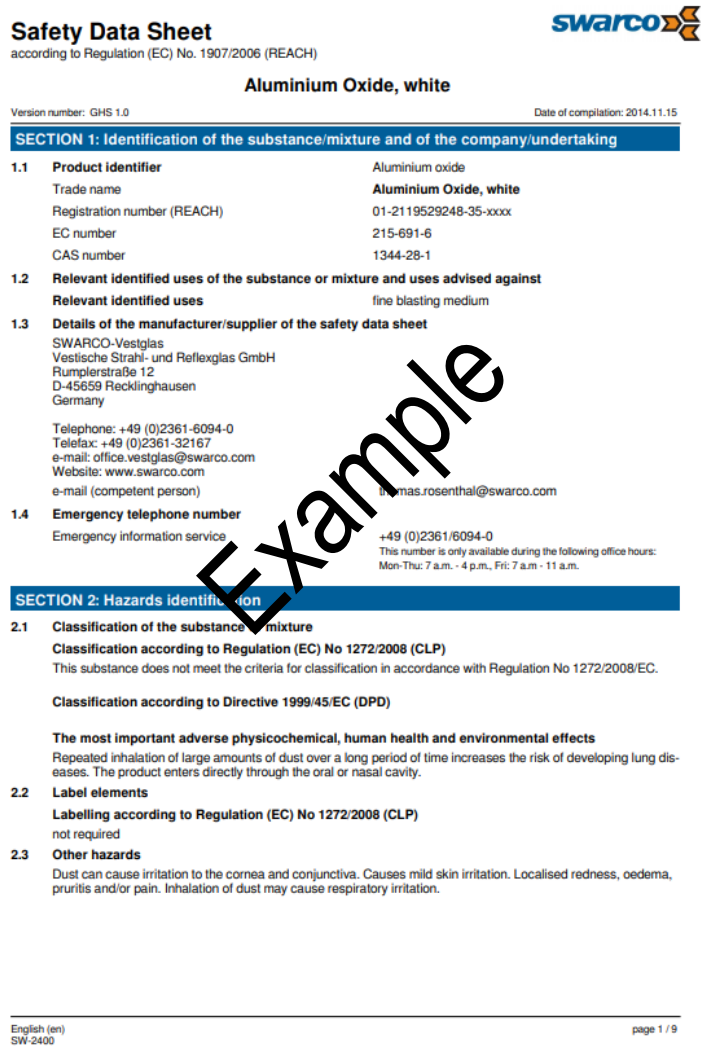
- Capture point
- Type of dust / fume / mist
- Operation hours
- Temperature
- RH% and will any moisture form? (Dew Point)
- Air Volume
- Filter / filter media selection
- Dust potentially explosive/Combustible?

BASIC INFORMATION

“Emission Properties”

- Formation process?
- Air temperature / ambient temperature?
- Dirty air (dust load) concentration?
- Particle size distribution?
- Physical properties?
  (adhesive, hygroscopic, bulk density)
- Physiological effect?
  (harmless, carcinogenic, toxic)
- Characteristic values of the combustion and explosion of the substances?

Look for the safety data sheet!



Safety Data Sheet
according to Regulation (EC) No. 1907/2006 (REACH)

swarco

Aluminium Oxide, white

Version number: GHS 1.0 — Date of compilation: 2014.11.15

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier — Aluminium oxide
Trade name — **Aluminium Oxide, white**
Registration number (REACH) — 01-2119529248-35-xxxx
EC number — 215-691-6
CAS number — 1344-28-1

1.2 Relevant identified uses of the substance or mixture and uses advised against
Relevant identified uses — fine blasting medium

1.3 Details of the manufacturer/supplier of the safety data sheet
SWARCO-Vestglas
Vestische Strahl- und Reflexglas GmbH
Rumplerstraße 12
D-45659 Recklinghausen
Germany

Telephone: +49 (0)2361-6094-0
Telefax: +49 (0)2361-32167
e-mail: office.vestglas@swarco.com
Website: www.swarco.com
e-mail (competent person) — thomas.rosenthal@swarco.com

1.4 Emergency telephone number
Emergency information service — +49 (0)2361/6094-0
This number is only available during the following office hours: Mon-Thu: 7 a.m. - 4 p.m., Fri: 7 a.m - 11 a.m.

Example

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 (CLP)
This substance does not meet the criteria for classification in accordance with Regulation No 1272/2008/EC.

Classification according to Directive 1999/45/EC (DPD)

The most important adverse physicochemical, human health and environmental effects
Repeated inhalation of large amounts of dust over a long period of time increases the risk of developing lung diseases. The product enters directly through the oral or nasal cavity.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008 (CLP)
not required

2.3 Other hazards
Dust can cause irritation to the cornea and conjunctiva. Causes mild skin irritation. Localised redness, oedema, pruritis and/or pain. Inhalation of dust may cause respiratory irritation.

English (en) SW-2400 — page 1 / 9

BASIC INFORMATION

“Characteristic values of the combustion of dust”

- Combustion factor according VDI 2263-1:1990-05?
- Self-combustible or self-igniting?
- Self-ignition temperature?
- Minimum ignition temperature?
- Smoldering temperature?

Combustion factor according VDI 2263-1:1990-05	
BZ 1	no burning
BZ 2	short-term ignition/quick extinction
BZ 3	local burning or glowing
BZ 4	smouldering
BZ 5	outbreak of open fire
BZ 6	burning off like a deflagration

BASIC INFORMATION

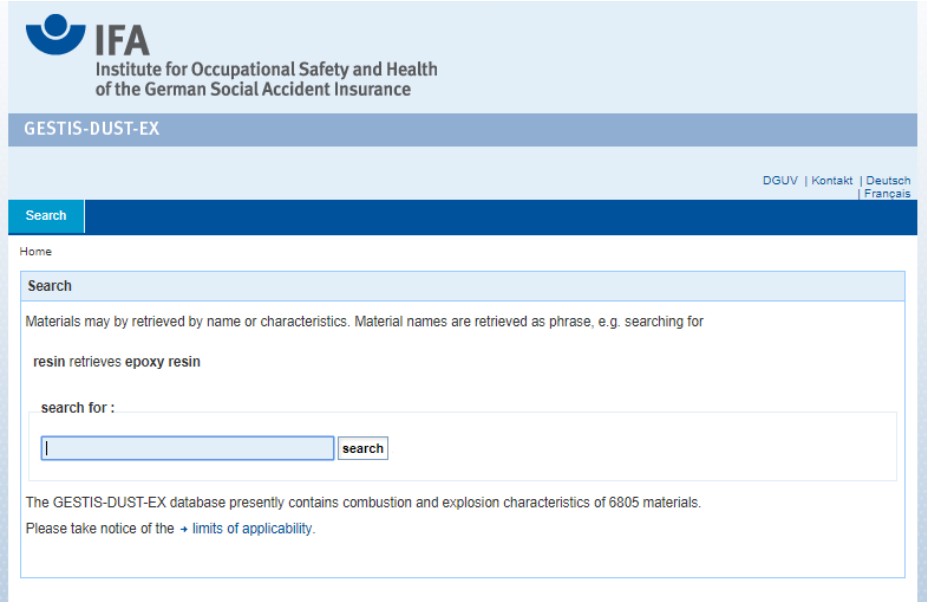
“Characteristic values of the explosion of dust”

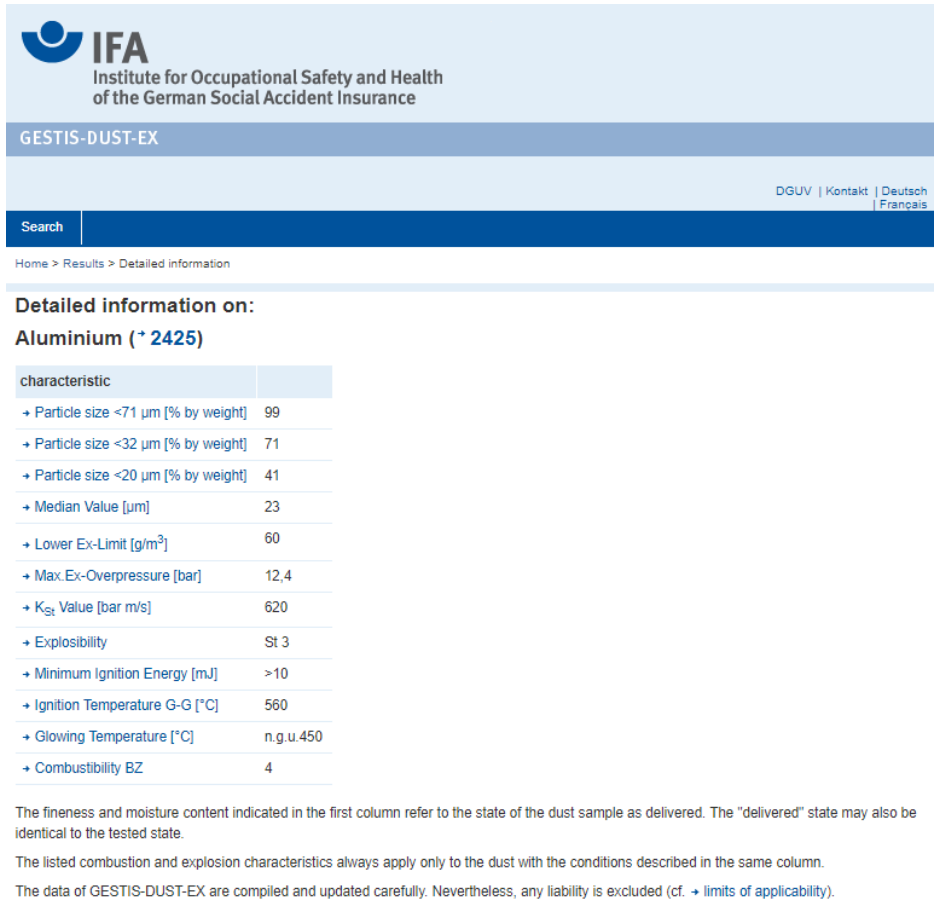
- Conductivity of the dust (yes ➔ ≤ 10^3 Ω)?
- Dust group IIIA (fluffs), IIIB (non-conductivity dust) or IIIC (conductivity dust)?
- Smoldering temperature?
- Cloud-ignition temperature?
- Minimum ignition energy?
- Maximum explosion overpressure p_{max}?
- Maximum rate of pressure rise K_{st}?
- Metall or non-metall dust?
- Lower explosion limit?
- Solvent present? Above 20% of the lower explosive limit ➔ ***Hybrid Mixture!!!***

Minimum Ignition Energy MIE	
MIE > 10 mJ	normal ingintion sensitive
3 mJ < MIE ≤ 10 mJ	particularly sensitive to ignition
MIE ≤ 3 mJ	extremely sensitive to ignition

Maximum rate of pressure rise Kst	
K_{st} < 200 bar*m*s^{-1}	St1
200 bar*m*s^{-1} ≤ K_{st} < 299 bar*m*s^{-1}	St2
K_{st} > 300 bar*m*s^{-1}	St3

BASIC INFORMATION





GESTIS Dust Ex Database:

http://staubex.ifa.dguv.de/explosuche.aspx?lang=e

BASIC INFORMATION

- **Hazard – gas / vapour / mist**
  - Zone 0 – is present continuously or for long periods or frequently
    ➔ gas concentration ≥ 100% LEL
  - Zone 1 – is likely to occur in normal operation occasionally
    ➔ gas concentration ≥ 50% until < 100% LEL
  - Zone 2 – is not likely to occur in normal operation but, if it does occur, it persist for a short period only
    ➔ gas concentration > 20% until < 50% LEL
- **Hazard – powder / dust**
  - Zone 20 – is present continuously, or for long periods or frequently
    ➔ more than 50% of the operating time!
  - Zone 21 – is likely to occur in normal operation occasionally
    ➔ less than 50% of the operating time
  - Zone 22 – is not likely to occur in normal operation but, if it does occur, it persist for a short period only
    ➔ only in case of malfunction and max. 30 min in operation

IMISSION LIMIT VALUES NOISE

- As standard, our systems are equipped as a general rule with sound insulation devices to comply with the following limit values:

“Noise in the workplace:”

- Measuring surface sound pressure level at 1m distance without reflections up to 1.6 m from the hall floor < 75 dB(A)

“Noise at the outlet:”

- Sound pressure level at 1m distance from air outlet without reflections < 75 dB(A)

EXPLOSION RISKS & PROTECTION

EXPLOSIVE DUSTS

- Organic dust.
- Synthetic organic dusts
- Fine metal dusts
- Pharmaceutical dusts

HOW TO MANAGE DUST EXPLOSION RISKS

KNOW THE DUST

USE CERTIFIED EQUIPMENT

TRAIN THE PERSONNEL

ENSURE PROPER MAINTENANCE AND CONTROL ON EQUIPMENT

REDUCE IGNITION RISKS IN THE INSTALLATION SURROUNDINGS

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**
- **Chemical suppression**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**
- **Chemical suppression**
- **Pressure resistant construction**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**
- **Chemical suppression**
- **Pressure resistant construction**

DUST COLLECTOR ISOLATION

Ensures that in case of explosion there is no propagation.

- **Mechanical isolation valve**
- **Fast Acting Valve**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**
- **Chemical suppression**
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DUST COLLECTOR ISOLATION

Ensures that in case of explosion there is no propagation.

- **Mechanical isolation valve**
- **Fast Acting Valve**
- **Chemical barrier**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- **Vent Panel**
- **Chemical suppression**
- **Pressure resistant construction**

DUST COLLECTOR ISOLATION

Ensures that in case of explosion there is no propagation.

- **Mechanical isolation valve**
- **Fast Acting Valve**
- **Chemical barrier**

Same in case or air recirculation:

- **Fast Acting Valve**
- **Chemical barrier**

EXPLOSION PROTECTION

DUST COLLECTOR PROTECTION

Ensures that in case of an internal explosion the collector remain safe.

- Vent Panel
- Chemical suppression
- Pressure resistant construction

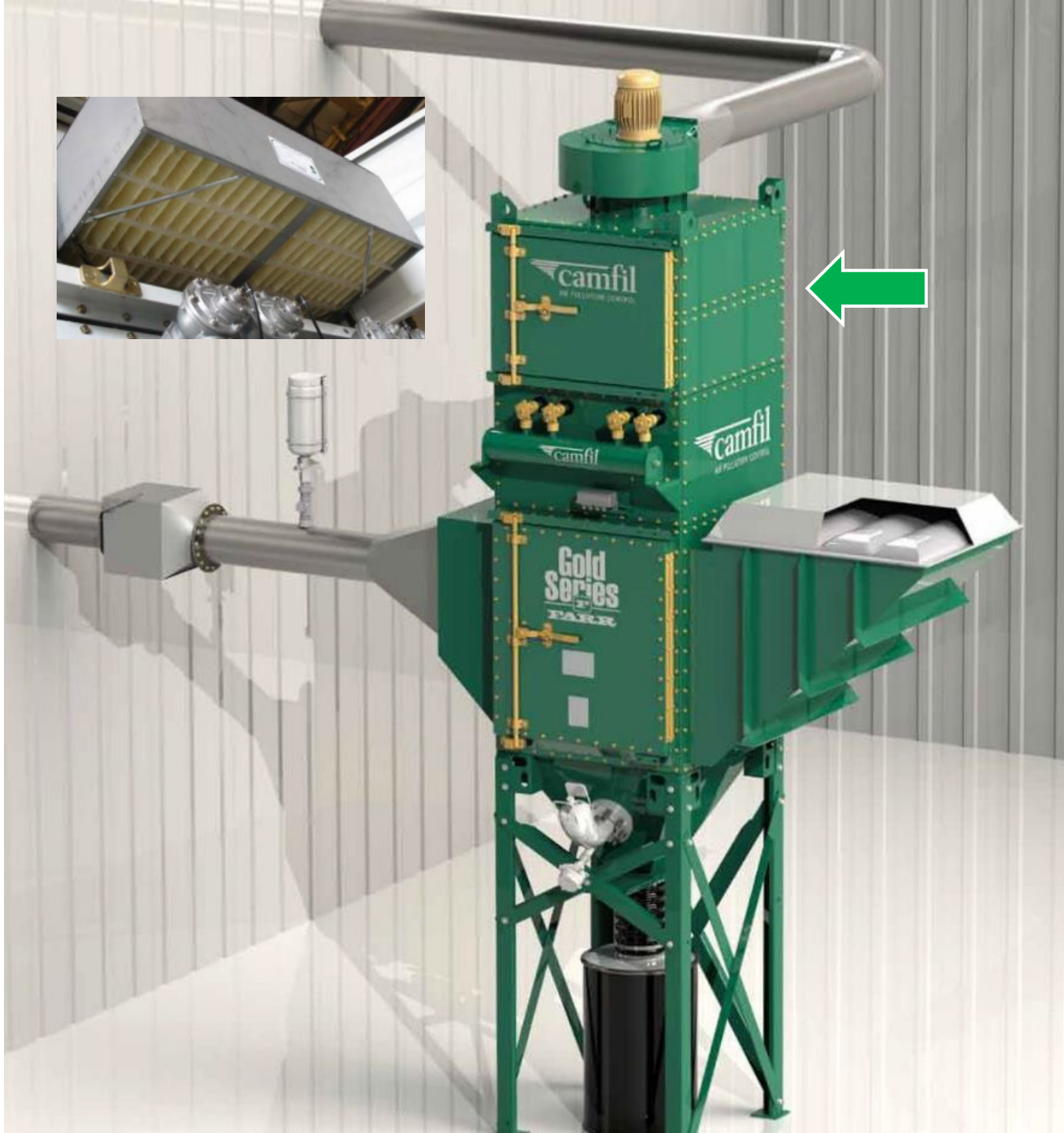
DUST COLLECTOR ISOLATION

Ensures that in case of explosion there is no propagation.

- **Mechanical isolation valve**
- **Fast Acting Valve**
- **Chemical barrier**

Same in case or air recirculation:

- Fast Acting Valve
- Chemical barrier
- Filter as flame barrier



EASE OF MAINTENANCE & CUSTOMER SERVICE

Maintenance:

✓The dust collector was designed with the end user in mind

✓Cartridge change-out is the easiest and simplest in the industry

✓No tools required for filter change

EASE OF MAINTENANCE & CUSTOMER SERVICE

Camfil AirCair™ – Customer Service Program:

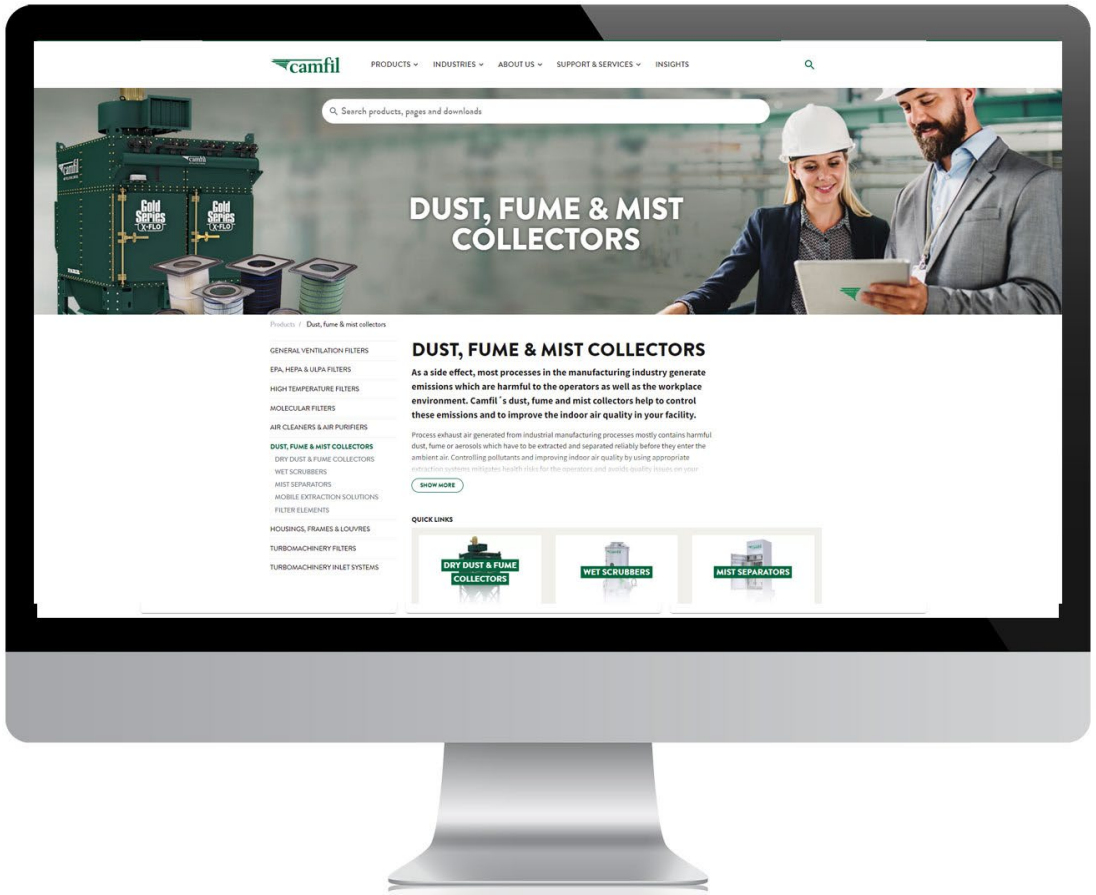
To ensure maximum efficiency and smooth operation during the lifetime of your extraction systems we provide you the best possible tailored service solution:

- ✓ Service / Maintenance
- ✓ Spare Parts
- ✓ Replacement Filters
- ✓ Accessories

AIR CAIR
Taking care of your air

YOU WANT TO LEARN MORE ABOUT CAMFIL APC?

- Visit www.camfil.com/apc and contact your local sales office




QUESTIONS