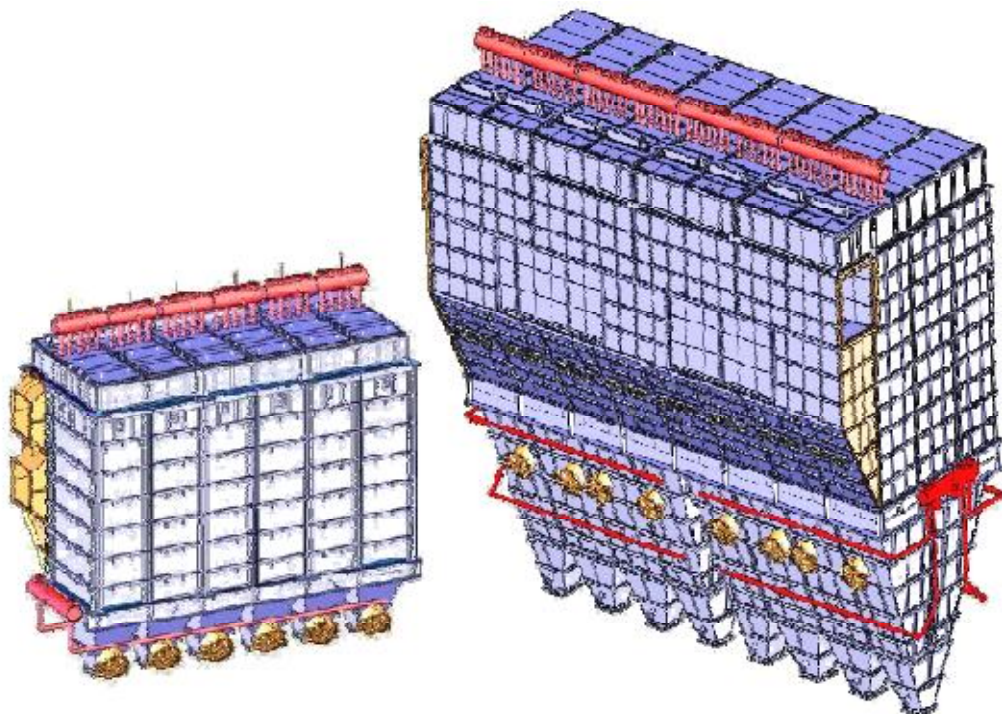


## BAG HOUSE FILTERS

### Description of the filter structure.

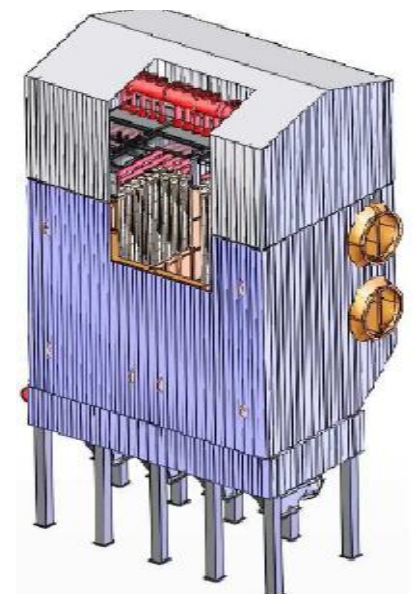
“DEMZ-Engineering” Ltd bag house filter is a modern type of fabric filters. We paid a lot of attention during development of this filter to decrease exploitation expenses (prolongation of exploitation period, decrease of pressure differential and pressed air consumption). Capital expenses were also decreased (e.g. smaller weight of steel constructions, installation of standard construction parts, decrease of manufacturing, transportation and assembling expenses).



DEMZ-Engineering” Ltd bag house filters dust and gas distribution system provides efficient economical and technical advantages. Significant flexibility of the construction provides options for preferable size and technical characteristics of the filter that will suit any requirements.

### Principals of work.

The size of the filter and its structure are developed for intensive continuous work in long term period and will





require minimal service and attention. Technical service of the filter can be performed during its work. Bag house filter with pulse cleaning system contains a row of round-shaped hoses, suspended on pipe fence that is used for partition of units with inlet and filtered gases, installed in one unit.

Each hose has an internal wire carcass that supports it and prevents from destruction. Filtered gases enter internal capacity of the filter through special pipeline system.

Dust that is collected on external surface of the hose, clean gases pass through to the top part above the pipe grid and then into outlet pipeline. Dust is removed from hoses with impulses of pressed air. During filtering process dust falls down into bunkers and then it's eliminated into dust elimination system.

### **Outlet gases distribution system.**

Mainly filter has a low speed of gas filtration in hoses. Filtered gas enters outlet pipe line from technological equipment and flows on the partition part at the inlet into separate units that contain bag house filters.

Gas flow velocity significantly decreases in gas distribution unit, therefore major part of dust directly flows into bunkers and that decreases dust load on bag house filter. Gas distribution camera has upward current that reflects on reflection plates that provide even flow along entire gas distribution screen.

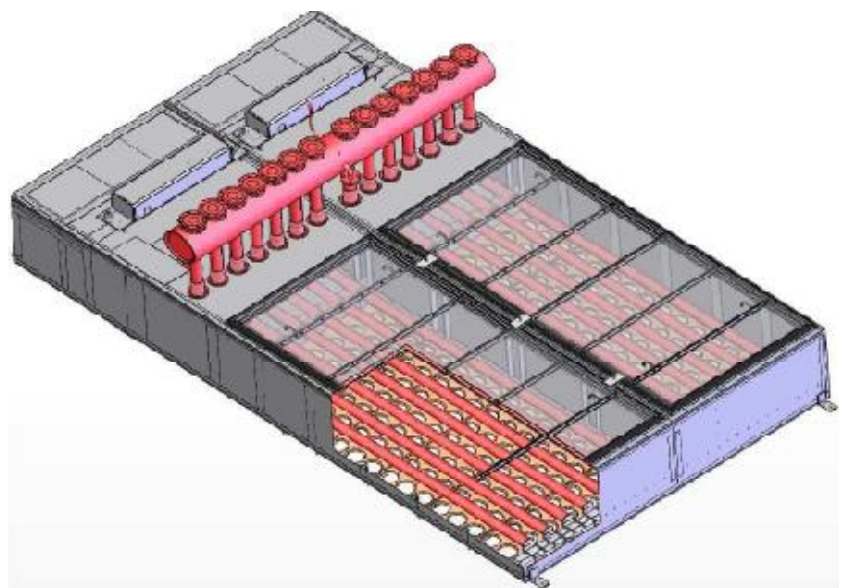
Filtered gases pass through screens and spread in bag house filter evenly.

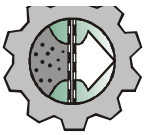
Due to the above we successfully decrease required amount of pressured air for impulse cleaning that leads to decreasing of power consumption and prolongation of exploitation terms.

### **Impulse cleaning system.**

Filtered gas unit contains parallel scavenging pipes in assembled top unit.

Each scavenging pipe has small apertures- sprayers concentrically located above inserts of each hose.





Pressured air is securely isolated from scavenging pipe by membrane valve. Membrane valve is connected to pneumatic-distribution unit with electromagnetic control system that starts up by filter regeneration control system.

Duration and impulse interval are regulated by controller in order to optimize work of the filter and decrease pressured air consumption.

Filtering cycle is started by controller after corresponding signal from pressure differential sensor inside filter's hoses. Measurement pipelines are installed between inlet and outlet pipelines in order to simplify transmission of this signal.

Pressure differential sensor controls the difference of static pressure between inlet and outlet part of the filter. Values of pressure differential are defined during start up period of the filter.

Each time when controller starts-up the electromagnetic valve, corresponding valve will open and feed pulsating pressured air into scavenging pipe. This air exits scavenging pipe through small apertures downwards into hoses row and simplifies cleaning of this row. Fast acceleration of air supply helps to expand the hoses. Textile hoses have eventual expansion size. When they reach eventual size expansion stops fast. Dust that precipitated on external hoses surface continues its movement and removes from the surface.

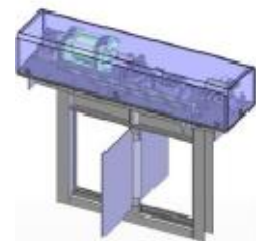
## **Pressured air.**

Each air collector is fed with clean dry pressured air. Quantity of pressured air is defined during contract period and due to Client's requirements or recommendations of "DEMZ-Engineering" Ltd specialists.

Air for the filter is passes through compressor - oil filter and drying equipment.

## **Clean and dirty gas valves.**

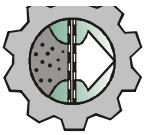
Dirty and clean gas valves are used for isolation of filter units during technical service period. Clean gas valve closes automatically during regeneration of filter hoses.



## **Top part of the filter's casing.**

Filter's casing is separates into sections with pipe grid of the top level that separates bottom part of gases for filtering from the top gas-storage unit that contains filtered gases.

Bottom part is made out of hoses rows. Top part with top unit contains scavenging pipes for hoses and provides access for exchange of hoses and carcasses. Filter is equipped



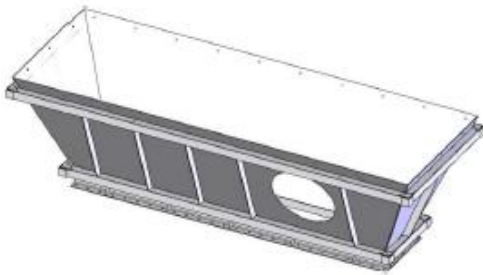
with large isolated hatches with seals, assembling loops and fastening elements, for access to hoses.

Entire casing of the filter is made out of low-carbon steel. Rigidity of construction from inside and outside is secured with steel rolled shapes and pipes. These measures provide resistance of the pressure, wind loads and earthquake.

### **Bunkers.**

Filter can have one or more bunkers depending on width and length of it. Arrangement of bunkers provides load bearing capabilities for the exploitation.

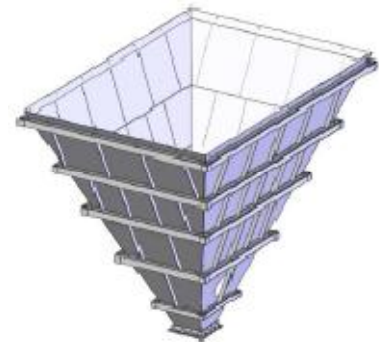
The bunker is equipped with partitions under each field. Partitions prevent gas infiltration under electrode system. Bottom part of the bunker has a service hatch.



Longitudinal bunkers have a channel shaped bottom part for installation of scraping chain or helical conveyor. Bunker can be emptied through special protection device at the bottom of the channel.

Bunkers can have different wall angulations. An angulation is defined according to dust characteristics.

According to technological process of your company we can supply bottom parts of the bunkers with heating systems that can be regulated with thermal relay and will sustain required wall temperature.



### **Dust extraction.**

All the dust collected inside bunkers and will be removed with dust extraction system. Precipitated dust from filter bunkers can be extracted with scraper transporter, helical conveyor, sluice, pneumatic or hydro extraction system. Hermetic properties of the bunker are procured with rotation, valve, louver or hydraulic gate. Equipment type can be chosen according to:

- Customer's special requirements.
- Abrasiveness and viscosity of dust.



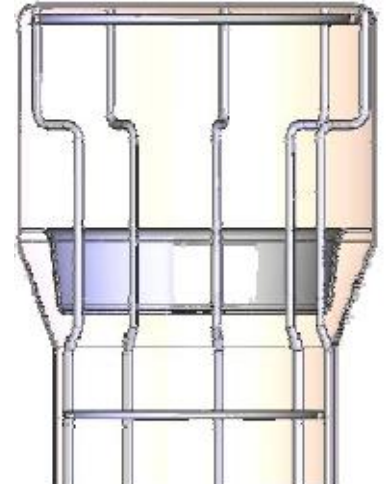
## Hoses and nets.

Quality of filtering material is defined during contract stage, according to requirements of the Client.

### Typical material for filters.

### Temperature limits C°

Teflon needled felt.	260
Sulphide polyphenilene needled felt.	190
Fiber glass with Teflon membrane.	260
Poliamide needled felt.	240
Polyester needled felt.	150
m-Aramid needled felt	200

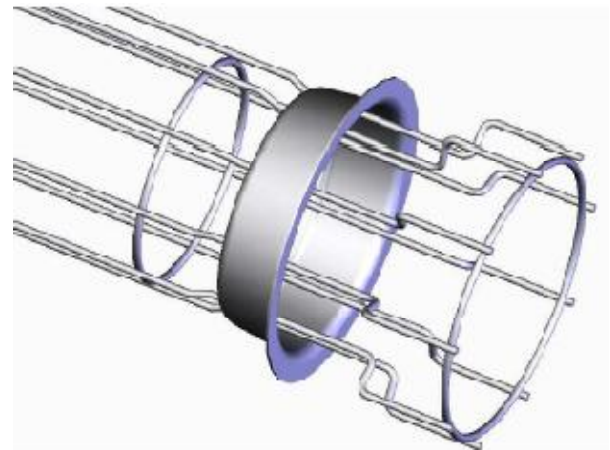


Each hose has a thrust steel ring attached on the top. Ring will be securely fastened in tubular grid and will provide sealing effect.

Hoses are equipped with soft steel wire carcasses to support the shape. The net supports material equally and decreases sagging and abrasive wear, and provides optimal rapping of the dust during cleaning. Carcasses are provided with or without plug connections.

Each net contains 10-16 vertical wire elements, depending on the chosen material. Elements are located in circle and connected to horizontal rigid rings located on corresponding distance along entire length.

In case of malfunction of the separate hose, it can be individually closed at the level of tubular grid, without scavenge pipes, grid or hose removal. Up to 5% of hoses can be closed without unnecessary interference to the work of the filter.



In order to perform significant exchange of hoses we developed next procedure:

- Close dirty/clean gas valves.
- Open observation hatches.
- Remove scavenge pipe that feeds row of exchange pipes.
- Remove the carcass.
- Remove the hose, lifting in along the tubular grid or foresee falling of the filter to the bunker and take it out through bunker hatch.
- Install new hoses in inverse order.



### **Entrance to the filter.**

In order to provide access to parts of the filter and to platform under inlet/outlet pipeline that are protected from meteorological conditions, we can supply the filter with ladder tower, in case if it is required by the Employer.

Vertical emergency ladder is installed for exit from superstructure at the top part of the filter.

Access to hoses can be gained by next steps: screw out the bolts and then remove the hatch lids by monorail system. One monorail has an extension in order to use a lift loading mechanism for material delivery to the filters area, which is protected from meteorological conditions. Top area of the filter and it's parts are covered with isolation material and steel sheet- grants safe movement on top of the filter.

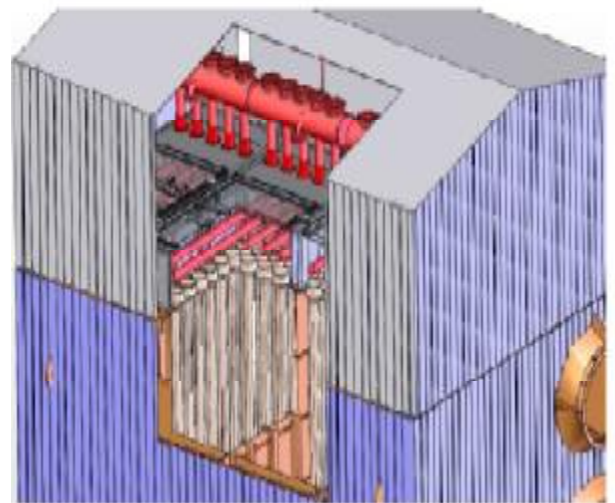
Safe lockable hatches are installed on each bunker for secure internal service works.

### **Pressure differentiation control.**

Differential relay of pressure is installed for flow resistance control inside the filter and for cleaning system start-up.

Microprocessor controls valves and cleaning cycle in order to provide precise sequence of the operation.

Hoses sequential cleaning continuous until pressure differentiation inside the filter will not decrease to required values. Afterwards controller stops cleaning cycle.



When the pressure differentiation increases again controller turns on cleaning cycle.

### **Protection Shelter for meteorological conditions.**

In case if the filter is outdoors it can be equipped with protection shelter, in order to provide conditions for observation and service in it. We provide our filters with single storerooms or with dismountable storerooms. Axial-flow fan is installed inside of the shelter for ventilation.

### **Isolation- external sheathing.**

Main factor of workability and life duration of the filter is an effective isolation system. in order to prevent condensation that leads to corrosion and to avoid uncontrolled heat



expansion and deformation, entire surface of the electric filter should be covered up neatly in mineral wool isolation. Thickness of the isolation is 50-200 mm.

**Control system. Programmable impulse controller.**

“DEMZ-Engineering” Ltd has developed modern control system for bag house filters. Control system includes large range of programs that support exploitation of the filter with minimal expenses and can detect malfunctions that can be removed instantly.

Control system is designed for parallel or sequential interface with plant’s control system or with filter parts (calves, membranes, devices).

**Control system of the filter.**

*Measurements:*

1.  $\Delta$  size of the filter between inlet and outlet pipelines is minimal.
2. Pressure in pressured air pipe line.

*Detection.*

1. Presence of the dust in filtered gas. Next row must be cleaned (separate command)
2. Position of the damper.

*Results:*

Optimal air consumption,  $\Delta$  size of the filter and hoses wear.  
Control of valve work accuracy and pressured air supply.

*Results:*

Ability to detect and define location of malfunction.  
Information about work of the unit.

**Plant’s control system.**

*Measurement/ detection:*

1. Level indicator inside the bunker.
2. Temperature inside the bunker (if required)

*Result:*

Alarm signal.  
Remove condensation inside the bunker with controlled heating system

If you are having interest to this information please do not hesitate to contact us: DEMZ-Engineering Limited, 20B Lenin Avenue, Zaporozhye 69063 Ukraine phone: +380 61 224 4207, fax: +380 61 224-4426, email: [info@demz.org](mailto:info@demz.org) or visit our WEB page [www.demz.org](http://www.demz.org) and you can have all information or send your request.