



ZVVZ

**SUPPLIER OF EQUIPMENT
FOR ENVIRONMENTAL PROTECTION**

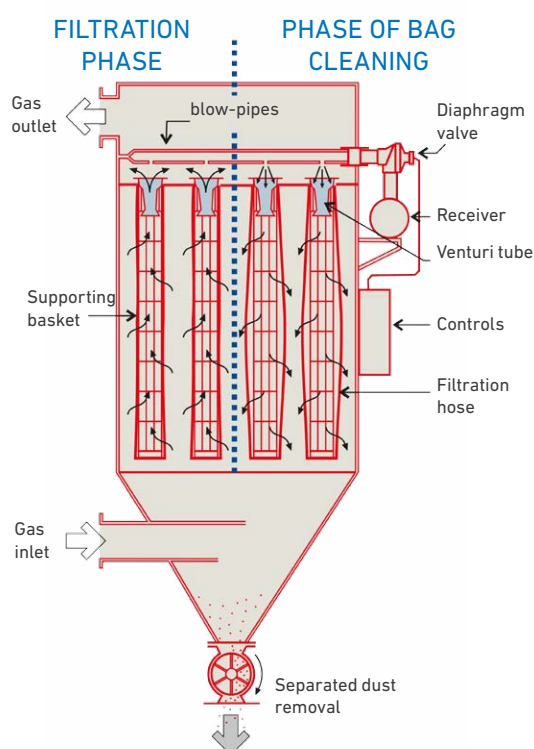
BAG FILTERS



**ZVVZ ENVEN
ENGINEERING**
Member of the ZVVZ GROUP

FUNCTIONAL DESCRIPTION

ZVVZ-ENVEN ENGINEERING, A.S. BAG FILTERS ARE DUST EXTRACTION DEVICES, WHICH SEPARATE SOLID PARTICLES FROM POLLUTED AIR OR GAS BY DRY METHODS AND WHICH ARE APPLICABLE IN ALL SECTORS OF INDUSTRIAL PRODUCTION. ZVVZ-ENVEN ENGINEERING, A.S. SUPPLIES BAG FILTERS WITH PULSE REGENERATION OF FILTRATION HOSE (PULSE-JET). THESE FILTERS FUNCTION FULLY AUTOMATICALLY, MOSTLY IN NEGATIVE-PRESSURE AND POTENTIALLY IN POSITIVE-PRESSURE MODE.



Gas containing solid pollutant particles enters the hopper where large dust particles are initially separated as a result of the fall in speed and changes in the direction of gas flow. The polluted gas then rises to the vertically suspended filtration hoses. The remaining solid particles are separated on the exterior surface of the filtration hoses and the gas then passes into the clean gas chamber and exits the bag filter. The dust particles create a continuous layer of dust on the exterior surface of the filtration hoses, which is regularly removed through pulse regeneration. Actual regeneration is carried out by means of short pulses of compressed air, which is blown into the filtration hose from openings in the flush pipe through the venturi pipe. The effect of the compressed air pulses on the interior side of the filtration hose results in the settled layer of dust breaking away from the exterior surface of the filtration hose. The dust gradually falls into the hopper and is removed from there through the relief valves out of the area of the bag filter. The frequency and duration of the compressed air pulses is assured by the regeneration system with diaphragm valves, which are controlled through solenoid valves by the control unit. The regeneration process is controlled on the basis of loss of pressure in the bag filter or according to a fixed time schedule, so that pressure loss does not increase excessively and so that there is a constant layer of dust on the filtration hoses, the so-called "filtration cake", which increases the filtration effect of the bag filter.

PROPERTIES OF THE FILTRATION BAG

	polypropylen	polyester	polyakrylonitril homopolymer	m-aramid	polytetrafluorethylen	polyphenyl-sulfid	polyimid	tkané sklo
operating temperature °C	90	140	125	200	250	190	240	250
maximum temperature °C	95	150	140	220	280	200	260	270
resistance to:								
alkali	●	●	●	●	●	●	●	●
acids	●	●	●	●	●	●	●	●
hydrolysis	●	●	●	●	●	●	●	●
oxidants	●	●	●	●	●	●	●	●
solvents	●	●	●	●	●	●	●	●

● excellent ● good ● limited ● bad

BAG EFV VENTILATION FILTERS



These are intended for separating solid particles from the flow of gas when ventilating silos and when extracting small volumes of gas of a volume of up to 9 000 m³/h and a temperature of up to 140 °C. The hoses are installed and replaced from the working side of the filter through a side door, which is also used to inspect the hoses. EFV bag filters are supplied to the construction site assembled, including the control unit, in several versions.

FILTER VERSION

- › Filter without a hopper, which is installed directly to the silo flange or conveyer housing.
- › Filter with hopper, hopper relief valve and supporting steel structure.
- › Filter with integrated fan on the clean gas chamber.
- › Filter with exit flange for connecting to the exhaust piping.
- › Positive pressure filter with gas outlet into the surrounding environment.

EFR CARTRIDGE FILTERS

Cartridge filters utilise specially shaped dust filtration elements, which have a filtration area several times larger for the specific diameter and length. These are mainly used to separate dust from small volumes of extracted gas, especially for local separation at transfer points and hoppers, dust transportation, extraction of very fine dust, in the case of requirement low emission limits and in small spaces.

KEY CHARACTERISTICS

- › A large filtration area with minimum requirements for space.
- › Achievement of low drift concentrations (up to 1 mg/m³).
- › Temperature of the extracted gas and dust max. 80 °C.
- › Simple replacement of filtration elements (cartridges).
- › Option of various filtration materials.

EXPLOSIVE DUST FILTRATION

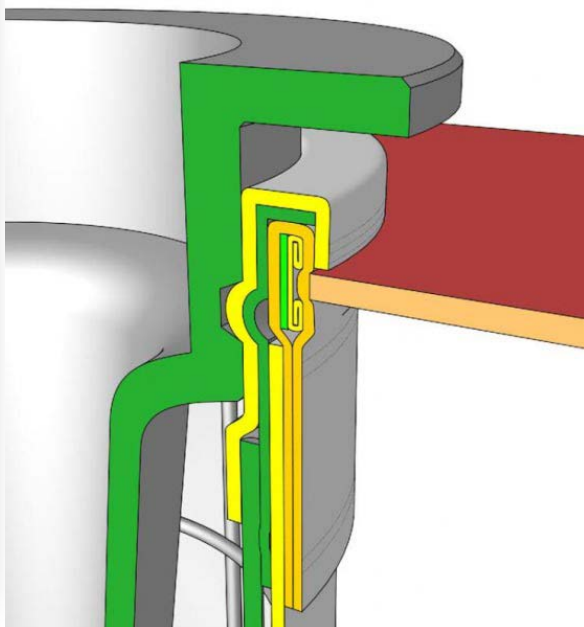
ZVVZ-Enven Engineering, a.s. supplies bag filters for separating explosive dust up to class ST 2. These filters are intended for explosive dust, such as coal and wood dust, dust produced during the processing of sugar, grain, plastic, etc.

The filters are designed as reinforced and are fitted with filtration hoses with anti-static treatment, explosion

vents and rotating feeders, which have AT EX certification. In the event of an explosion, the installed vents immediately open and allow hot gases to escape into the atmosphere and prevent damage to the actual filter.

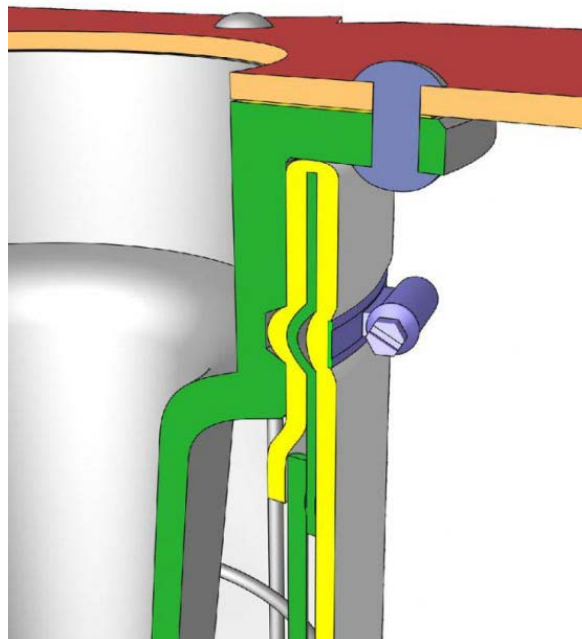
HOSE ATTACHMENT

The clean gas chamber and working side of the bag filter are separated from each other by a tube plate in which the filtration hoses with supporting baskets are attached. ZVVZ-Enven Engineering, a.s. supplies two original methods of attaching the hoses.



A. HOSE ATTACHMENT METHOD FOR INSTALLATION FROM THE CLEAN SIDE OF THE BAG FILTER (EFP TYPE FILTERS)

The hoses are attached to the tube plate using a flexible snap ring. A supporting basket is inserted into the hose, which, together with the venturi tube and upper edge of the hose, ensures that the supporting basket and venturi tube are firmly secured. This hose attachment system is very simple and reliable, without any need for additional connecting parts and without any tools being needed when replacing the hoses.

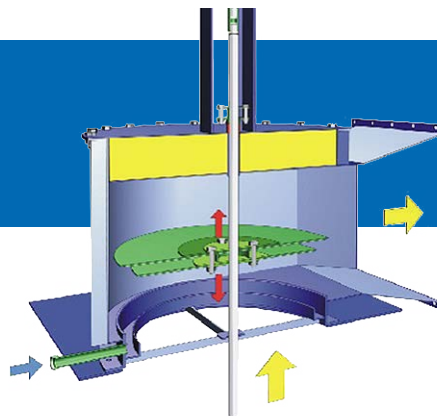


B. HOSE ATTACHMENT METHOD DURING INSTALLATION FROM THE DUST SIDE OF THE BAG FILTER (EFV TYPE FILTERS)

The venturi tube is firmly attached to the bottom part of the tube plate and the supporting basket with the hose is fitted to this. The upper edge of the hose is folded inside the basket and secured using a clip made from anti-corrosive material in order to ensure a tight connection.

BY-PASS DISC VALVE

The by-pass disc valve assures protection of the filtration hoses and other devices during transitional situations, such as shut-down, commissioning or during sudden changes to gas temperature. It separates the working and clean side of the filter during operation. If the permitted temperatures are exceeded, it opens and allows the gas to flow outside the hose space. It is designed for rapid reaction and reliable function. It also functions reliably in corrosive environments.



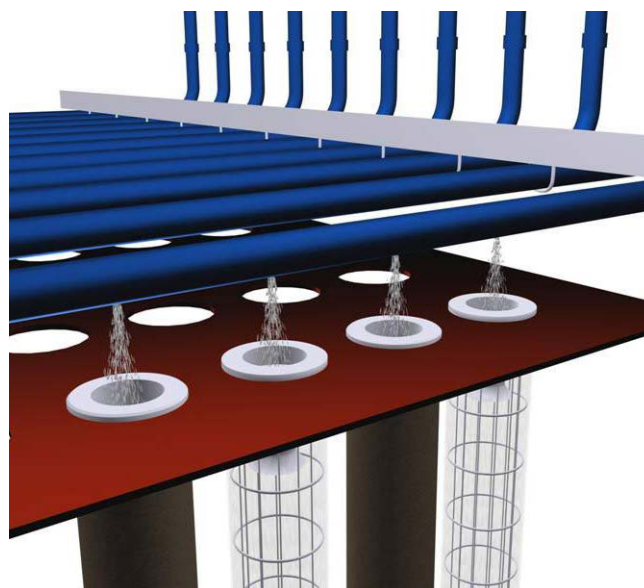
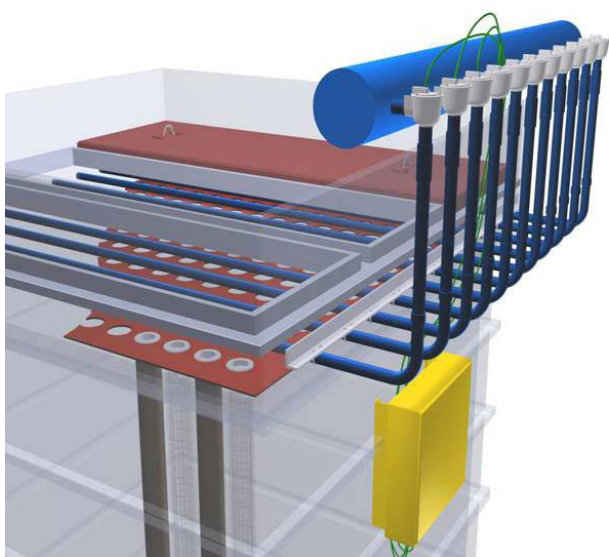
It is controlled by a pneumatic cylinder with limit switch, which registers the position in the filter control system.

REGENERATION SYSTEM



The specially designed regeneration system with venturi tube assures the high efficiency of regeneration with minimum consumption of compressed air. Compared to a system without an enclosed venturi tube, it generates four times the flow-rate and a pressure nearly three times greater on the internal surface of the filtration hose at the same pulse level, by drawing in additional clean gas.

All functional elements of the system are located outside the active space of the filter. The actual system consists of a receiver and a system of diaphragm valves, which are controlled by solenoid valves and to which the flush pipes are fitted. The individual parts are assembled during manufacture, electrically connected with the filter control system and tested. Disassembly and assembly of the flush pipes in the event of repairs is very simple and easy, even after they are exposed to an aggressive environment for extended periods.



ON-LINE BAG EFP FILTERS



On-line bag EFP filters are mostly used in cement works, lime kilns or in quarries. They are designed for high input concentrations and have a specially designed polluted gas inlet for this purpose.

The process of regenerating the hoses takes place during constant operation of the filter – on-line. Gradual regeneration of individual series of hoses is assured by a fully automatic control system depending on pressure loss in the filters or on a fixed time schedule.

The execution and dimensions of the filters is designed individually depending on the properties of the gas and dust and on available space.

KEY CHARACTERISTICS

gas flow-rate	max. 500 000 m³/h
working temperature	max. 260 °C
inlet concentration	max. 1 000 g/m³
negative/positive pressure	5 kPa, max. 15 kPa
filtration hose diameter	117 mm, 152 mm
filtration hose length	3 až 6 m
cabinet design	single-chamber, fully welded



OFF-LINE BAG EFP FILTERS

Off-line bag filters are mainly used to filter large volumes of gas, very light and fine dust and everywhere long-term and uninterrupted operation is required with regard to the complexity of the production technology. These filters are used mainly to extract dust from technologies in the power industry, in metallurgy, incineration plants, etc.

These filters are intended for filtering gases with a high inlet concentration of abrasive particles. A specially designed polluted gas inlet is used for this purpose.

They are designed as a system of modules with integrated inlet and outlet channel. Each module is equipped with a pneumatically controlled disc valve at the outlet and a flap valve on the inlet.

The module can be regenerated while it is shut-down for a short period by closing the inlet disc valve (off-line system). Filter regeneration is controlled on the basis of filter pressure loss by the superior control system, which also controls potential gradual shut-down of the modules.

Potential inspections or repairs do not require the entire filter to be shut-down. Individual filter modules can be closed on both ends, removed from the filtration process and made available for repairs. The filters may be supplemented by an integrated by-pass.

KEY CHARACTERISTICS

working temperature	20 °C, max. 260 °C
inlet concentration	max. 1 000 g/m ³
negative/positive pressure	5 kPa, max. 15 kPa
filtration hose diameter	152 mm
filtration hose length	4 až 10 m
cabinet design	fully welded modules



FILTER CONTROL

Controls of all ZVVZ-Enven Engineering, a.s. bag filters are designed to comply with the requirements of the chosen technology, with the goal of achieving optimum economic operation and full automation of operation of the equipment. The control units allow problem-free communication with potential superior control systems. Two types of controls are essentially used.

MICROPROCESSOR CONTROLS (MCS)

Microprocessor controls allow configuration of the duration of the pulse, the interval between pulses and the interval between individual regeneration cycles. Hose regeneration is controlled by time switch in two modes:

- › in fixed time mode,
- › depending on pressure loss in the filtration hoses.

This type of control is used for on-line EFV and EFR filters and possibly for EFP on-line type filters.

PLC CONTROLS

A freely programmable computer allows all the filter modules to be controlled. Actual controls over hose regeneration are most often designed in two basic modes:

- › mode with variable intervals between pulses
- › mode with a configurable zone of pressure loss.

This type of control is used for off-line filters and EFP on-line type filters of greater dimensions. It is also suitable for controlling entire system units



Czech
manufacturer



Worldwide
scope



More than
70 years
tradition

COMPLETE SUPPLIER PROGRAM

- › Equipment for flue gas cleaning from solid and gaseous pollutants
- › Equipment for pneumatic transport of bulk materials
- › Equipment for air conditioning and ventilation of nuclear power plants
- › Equipment for building air conditioning and ventilation of industrial buildings, mines, tunnels and subways



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