SELNIKEL.COM

Industrial Filter
Catalogue

INDUSTRIAL **FILTERS**

DUST COLLECTING SYSTEMS

This catalogue is supported by AR technology.

Selnikel 1955
Enerji • Isı • Hava Teknikleri

since **1955**

Selnikel specializes in energy, heat, air technics and it is one of the most prominent actors of the Turkish industry since 1955.

Today, manufacturing and administrative operations are carried out by highly qualified staff in the production plant possessing 24.000m² closed area.

The main line of activity is the design, manufacturing, installation, commissioning and after sales services of Industrial Fans, Dust Collecting Systems, Industrial Boilers and Burners.

TURKEY'S HIGHEST CAPACITY AND MOST MODERN PLANT IN ITS INDUSTRY

EXPERIENCE IN QUALITY

Our founder **Mr. Faik HIZIROĞLU** was not satisfied with only establishing our company on sound footing. His vision also became the source of Selnikel's success with his establishment of universal working principals and acting as the guardian of them.

Quality, continuous improvement, reaching the highest standards in expertise with constant training and putting this expertise in use are **Selnikel**'s indispensable principals from past to present.

Selnikel is the first industrial fan manufacturer of Turkey.

Selnikel designs and manufactures industrial dust collection systems within capacities ranging from 1.000 m³/h to 2.000.000 m³/h in line with its expertise in industrial processes, engineering infrastructure and over 65 years of experience.

INDUSTRIAL DUST COLLECTING SYSTEMS

- Jet Pulse Bag Filters
- Off-Line Jet Pulse Bag Filters
- Jet Pulse Cyclonette Filters
- Cyclone
- Spark Arrester
- Dust Collecting Duct Design
- Filtration System Automation Softwares
- Filtration System Inspection and Enhancement Engineering Services
- Filtration System Servicing and Spare Parts

OVERVIEW OF FILTER SYSTEMS

Dust particules of industrial origin are amongst the most crucial environmental and atmospheric pollutants and if they spread into the air, these particles are an important threat to human beings and environment. These type of pollutants such as exhaust and ambient emissions in industrial and process industries are tightly controlled and limited by laws and sactions by almost all countries in the world. Furthermore, these restrictions and related emission limits are periodically being reduced to lower values. These dust particules with such pollutant properties can also be a part of the process in certain industries as the product themselves. In these industries, when particles are emitted to the environment or atmosphere this practically causes production losses.

For above mentioned reasons, removing dust particles from the air became a requirement in order to to provide the necessary conditions for human and environmental health and to minimize production losses. Dust particle filtering industry was formed in accordance with this necessity.

Over the years, many dust filtering equipment design has emerged according to the industry related production processes and dust properties. However many of these designs were phased out during their course since these were simply failing to comply with continuously reducing emission limits and technological advancements. The most commonly used dust holding equipment of today, their advantages and comparative disadvantages are explained below.

The selection of the most suitable filter for your needs is made by the expert engineers of Selnikel, depending on the system in which the filter will be used and other factors specific to the process.

ESP RETROFITS

During ESP retrofits, the upper part of the filter is redesigned according to the principles of jet pulse bag filters and assembled to the ESP body equipment system by using the existing electro filter body parts as much as possible. With this transformation, the efficiency of filtration systems is significantly increased by providing emission limit values that standard ESPs cannot reach. How much of the ESP's body parts can be used is determined in line with on-site examinations and system capacity.

Since Jet Pulse filter pressure losses are 80-100 mmSS higher than ESP pressure losses, it may be necessary to change the filter suction fans in order to compensate these additional system losses. ESP retrofit services are amongst the services we offer to our customers with our experienced engineers.

EQUIPMENT NAME	ADVANTAGES	DISADVANTAGES	MAX. WORKING TEMPERATURE
Cyclone	Successful in retaining coarse grained particules. These can be used as a pre-holder and seperator for different size particules rather than being the main dust collector.	It cannot hold the fine-grained particules and volatile dust.	600 °C and above
ESP (Electro Static Filter)	These type of filters can operate at high gas temperatures. Differential pressure losses within the filter are low.	Emission rates are above European Norms.	450 °C
Jet Pulse Bag and Cartridge Filters	Low emission rate and high dust holding efficiency. It can be designed for all kinds of processes. depending on the type of bag and cartridge. High performance in bag cleaning. Ability to work autonomously with automation.	Depending on type of bag and cartridge, these type of filters cannot operate at very high temperatures.	280 °C
Fresh Air Clean-up Filters	Low emission rate and high dust holding efficiency. No requirement for compressed air and compressors.	Can be used in systems at a maximum pressure of 350 mmWG. Low energy efficiency. Inability to work at very high temperatures depending on type of bag used.	280 °C
Mechanical Vibrating Bag Filters	Low emission rate and high dust holding efficiency. No requirement for compressed air and compressors.	Low bag cleaning performance, Mechanical vibrating system results in vibration that shortens the equipment lifespan. Low energy efficiency, Depending on type of bag used, inability to work at very high temperatures.	280 °C

Filter Type	**: Off-Line**
Number of Compartments	**: 8**
Filter Capacity	**: 300.000 m³/h**

JET-PULSE BAG FILTERS

For dust holding processes, Selnikel designs and manufactures jet pulse bag filters due to their high dust holding efficiency and ability to operate even in high temperature processes.

The term "Jet-Pulse" indicates a cleaning method in bag filters. Mechanical vibrating filters and fresh air filters are also classified as bag filters, however, the jet pulse cleaning system cleans the bag filter more efficiently than all other bag cleaning system. In this way, it decreases the pressure losses of filter and increases the efficiency. In addition to these advantages, it extends the lifespan of bags and reduces operating costs.

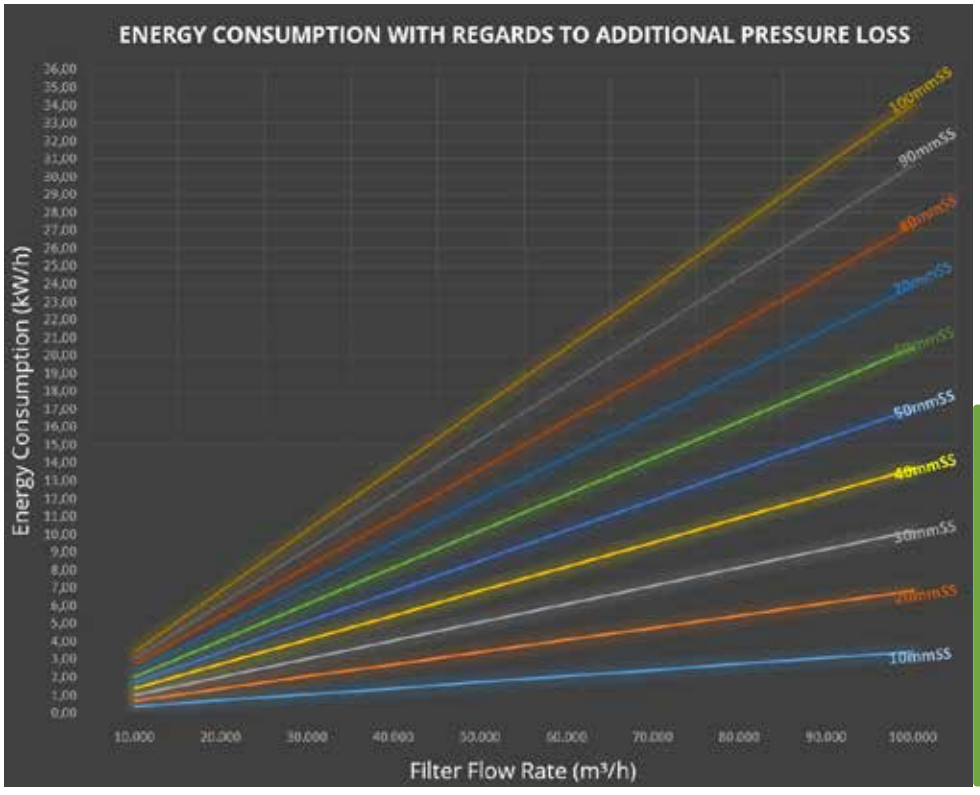
WORKING PRINCIPLES OF JET PULSE BAG FILTERS

In Jet Pulse Bag Filters, as with all bag filters, the outer surface of the filter bag holds the dust. Dust type, operation conditions and temperature values are determined while designing the Jet Pulse Filter. When designing a filter, the first criterias to be considered are the type of material to be used in bag, permeability rate of the filter bag, coating or the applications on the outer surface of the bag and required quantities and size of the filters.

The next process after the initial design, is to determine the gas flow conditions depending on fluid mechanics calculations of the isolated dusty air from external environment within a room that contains all filter bags (filter casing). Three main factors have to be considered while determining these conditions. First one is by using the force of gravity, pouring as much as possible dust (which enters the casing) into the bunkers before it reaches the filter bag. These bunkers are located under the filter bag and the dust collected by the filter also reaches there. The second important factor is to minimize the dust carrying ability of the air in the upward flow of dusty air entering into the filter body (lower upward air velocity). The third important factor is to minimize pressure losses in the filter while ensuring the first and second conditions are obtained. For this reason, it is important to determine the bag characteristics and quantities correctly, as much as it is also important to determine the general steel construction structure of the filter in filter design. Otherwise, with an incorrect steel construction, it is possible to produce an inefficient filter even though when the bag type and quantity is determined correctly.

Another important factor while determining the filter steel construction design is the correct design of the bag cleaning system. This includes the works of; the design of wire mashes placed in filter bags, the design of venturi that is placed on wire mashes which increases the efficiency of shock air, the design of blowing pipes for the distribution of compressed air to bags, the determination of size and number of pulse valves and the design of compressed air stock tanks. All the design criterias mentioned above directly affect the energy efficiency and operating costs of the filter.

The energy consumption when the pressure losses in the filters are higher than the average flow rates due to the design is shown in the diagram below.



ACCEPTANCES

Fan Efficiency : 80% (if the fan efficiency rate is lower than 80%, the electric consumption rate shall increase at the same rate)

Altitude: Sea Level

Temperature: 20 °C

FILTER BAG SELECTION CRITERIAS

Filtering operation occurs in filter bags. Determining which materials that these bags will be manufactured of is a matter of expertise depending on the type of dust and process conditions. The most important factor affecting the dust holding efficiency of the filter system is to determine the bag material and to design the filter bag quantities and dimensions according to the process.
The most commonly used material in filter bags is fabric. Quality properties of the fabric are shown in the table below.

Kimyasallara Göre Filtre Dayanıklılıkları / *Filter Durability Against Various Chemicals*

Elyaf Yapısı Kısaltmalar Fiber Structure	PP	PP	PES	PPS	m-AR	GL	PL	PTFE
Sürekli Çalışma Sıcaklığı C° Continuous Operation Temperature C°	90	125	140	180	200	250	240	260
Kısa Süreli Sıcaklık C° Short Term Temperature C°	100	140	150	200	240	300	260	280
Direnç / Resistance								
Mineral Asitler Mineral Acids	■	■	■	■	■	■	■	■
Organik Asitler Organic Acids	■	■	■	■	■	■	■	■
Alkaliler Alkalies	■	■	■	■	■	■	■	■
Oksidanlar Oxidants	■	■	■	■	■	■	■	■
Organik Çözücüler Organic Solvents	■	■	■	■	■	■	■	■
Nem / Hidroliz Moisture / Hydrolisis	■	■	■	■	■	■	■	■

■ Mükemmel / Excellent ■ İyi / Good ■ Sınırlı / Limited

Ferrule Headed Filter Bag

Snap Ring Connected Filter Bag

FILTER WIRE MESH SELECTION CRITERIAS

Filter wire meshes are mounted into the filter bags and prevent the filters from collapsing inside during vacuuming. There shouldn't be any burrs, pointed edges or any other objects which can damage the fabric at wire mesh surfaces that are in contact with the filter.

Filter wire meshes should be mounted exactly to fit to the base of filter bag without any gaps. Dimensions of the gaps between the rings and longitudinal wire mesh quantities should be precisely determined according to the bag fabric and fabric coating. Longer wire meshes can be designed in a two part structure to provide an easier installation.

VENTURI SELECTION CRITERIAS

Selecting the appropriate venturi has a significant influence on filter bag cleaning efficiency. This selection depends on the compressed air characteristics of the filter system (pressure and gas type), filter bag type, filter bag diameter and the total surface area of filter bag to be cleaned with a valve. Therefore, the pressure losses generated by well cleaned filter bags will be low and this will indirectly result in energy savings.

Selnikel is the first industrial fan manufacturer of Turkey.

PULSE VALVE SELECTION CRITERIAS

Selecting the pulse valve depends on the type of filter bag used, the total filtration area to be cleaned with a valve and the diameter and length of the filter bags.

Incorrect valve selection and quantity calculation can result in decreased cleaning efficiency of the filter bags, deformation of the filter bags in a short time and higher compressed air consumption. For this reason, determining the quantity and selection of the types of pulse valves is crucial.

TIMER AND PLC AUTOMATION SYSTEMS

It is has to be decided that whether the cleaning system will be controlled with a timer or with a PLC. This depends on the process of the filters and the equipment and instruments located on the filter.

Accordingly, the efficiency of the filtration system can be increased by applying the necessary software and panel designs for the cleaning system of the filter system.

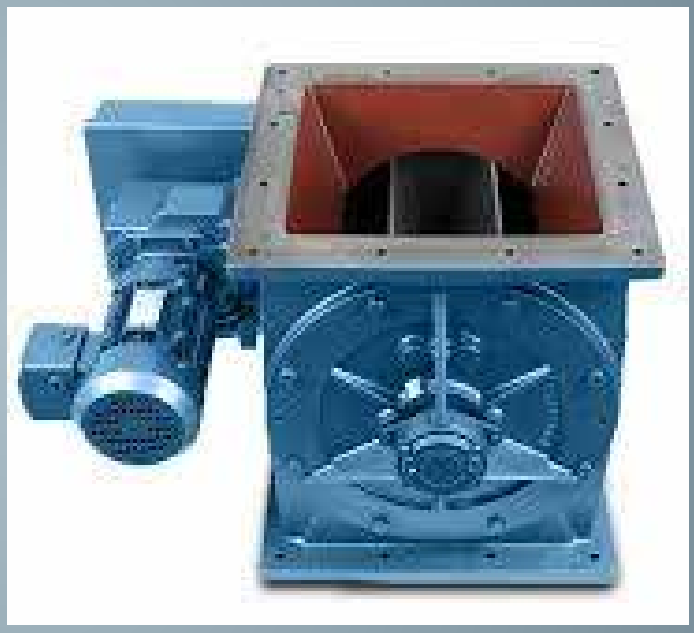
TIMER

PLC

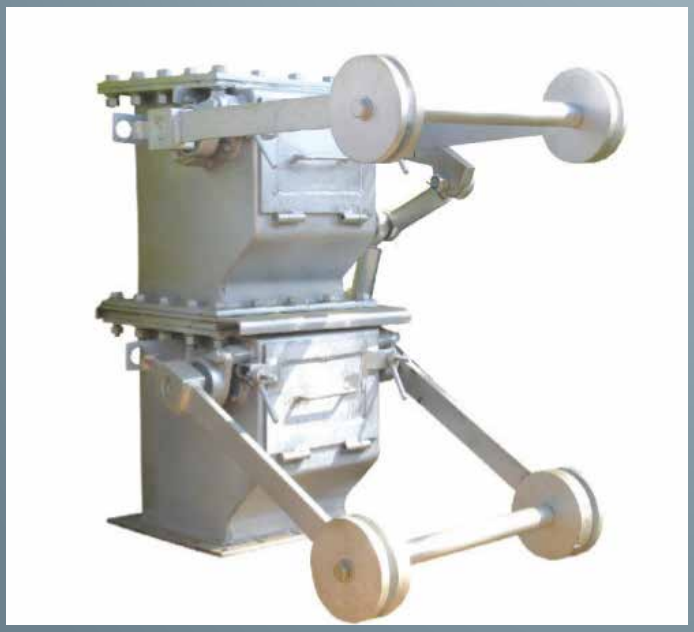
DUST TRANSFER ELEMENTS

There are numerous dust transfer equipment used in order to transfer the dust kept in the filter and the dust collected in the bunker section outside the filter. For small type filters, only one equipment such as air lock, pendulum damper or dust bucket is sufficient. However, a complicated dust transfer system can also be used with increases in filter size and increases in the amount of dust. In case of a rectangular structure of the bunker hopper gate, the transfer elements such as screw conveyor, chain conveyor and air slide are used to collect the dust at one or several hooper points in the bunker. Elements such as air lock, pendulum damper or dust bucket are used at the final hooper gate to transfer the collected dust out of the filter.

The most important selection criteria of these equipment is the amount of dust to be collected in the filter and the type of dust. For example, completely different dust transfer elements need to be used for coal dust, cement dust and wood dust.

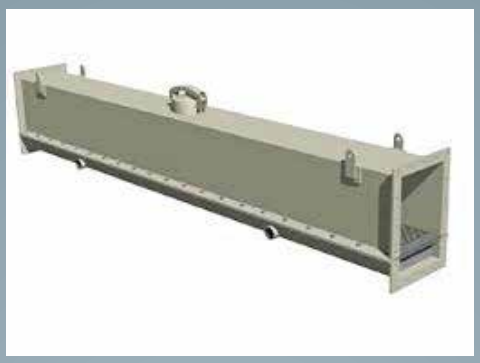


Air Lock



Pendulum Damper

Screw Conveyor



Air Slide

Chain Conveyor

EXPLOSION COVERS

In cases when the dust contained in the filter is flammable and explosive or in cases where there is a fire or explosion that may occur within the filter, explosion covers and fire equipment has to be placed on filter housings to ensure equipment and workers' safety. Types and quantities of these equipment are determined by engineering works and these calculations are of paramount importance in terms of equipment and occupational health and safety.

OUR CUSTOMERS

Our company operates in line with international norms and standards also certifies its production and service quality with ASME S and U, CE, ISO, TÜV, TSE, TURKISH LLOYD certifications.

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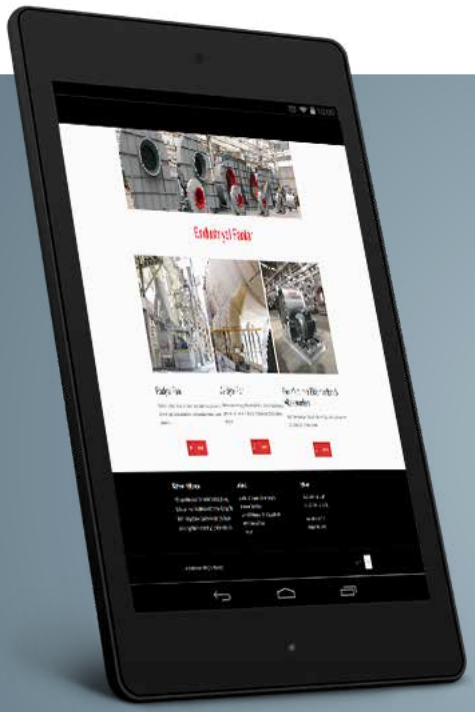

AR APPLICATION

You can view our products using this catalogue with AR **(Augmented Reality)** technology. You can install the Selnikel Fan AR application by scanning the bar-code on your phone.

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