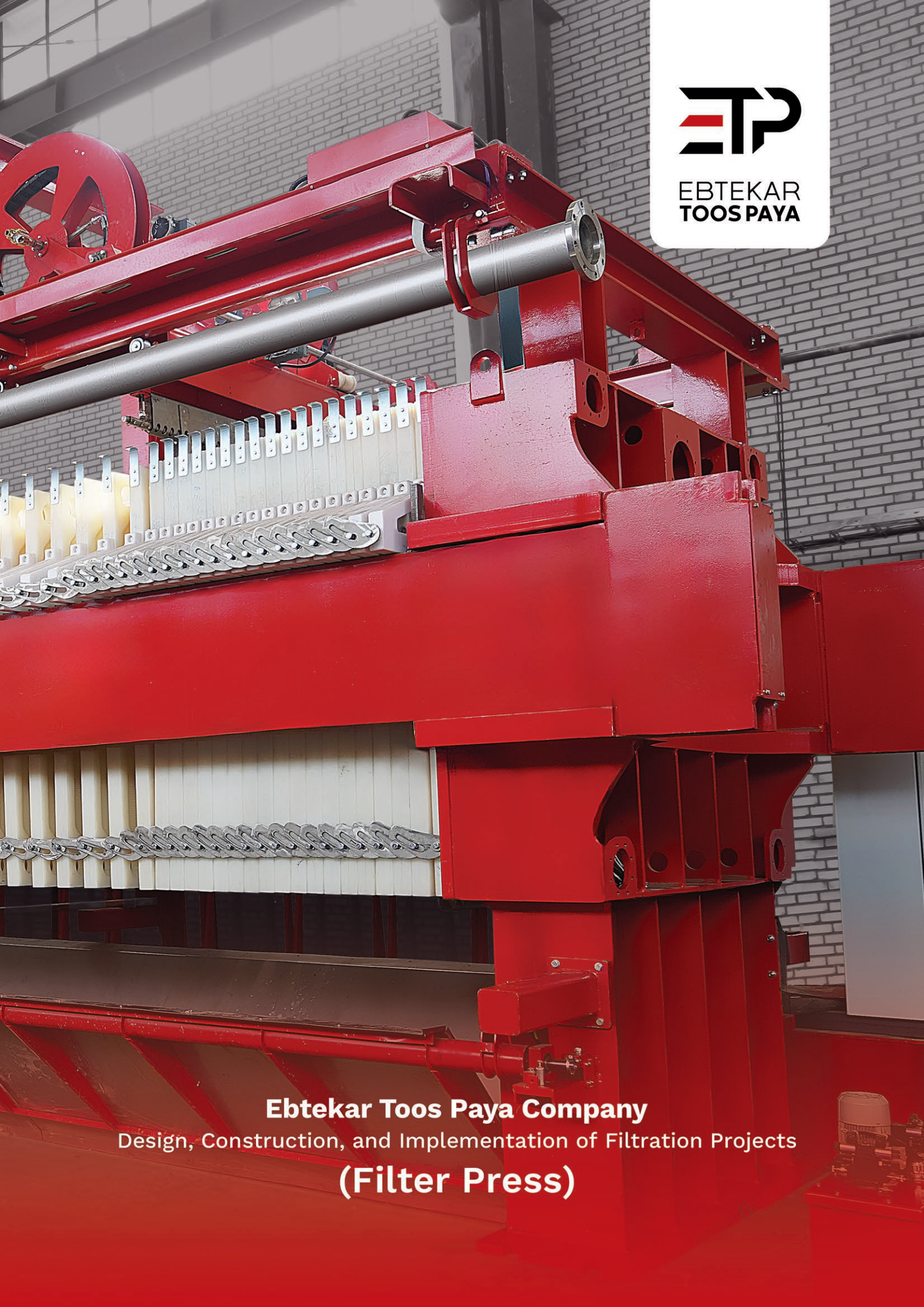

EBTEKAR
TOOS PAYA

Ebtekar Toos Paya Company

Design, Construction, and Implementation of Filtration Projects

(Filter Press)


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Introduction

Access to water has always been one of humanity's most important challenges. In addition to the social impacts of this issue, the continuation of industrial activities requires optimal water consumption. Environmental challenges such as water management, waste management, and industrial and mining wastewater are among the most significant issues in various industries. The consumption of water resources is crucial since it emphasizes the rights of future generations to benefit from natural resources, ensuring that the needs of future generations are met as well. Principles of effective water management, such as optimizing water use, reducing environmental harm to water resources, developing water-saving technologies, and fostering international cooperation, are of utmost importance in today’s world. Consequently, water recovery emerges as a critical issue.

Company Introduction

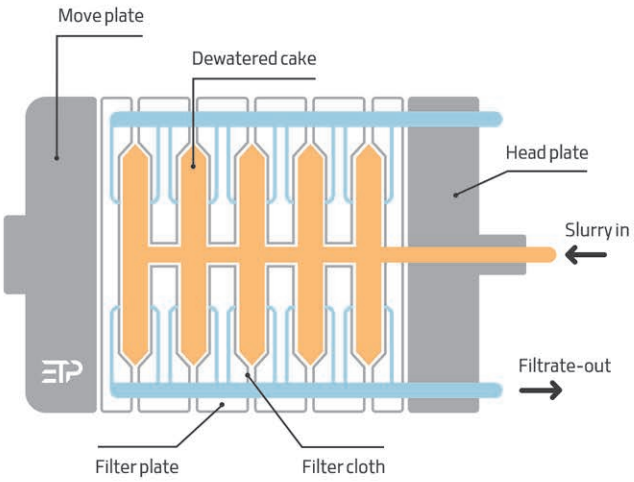
Ebtekar Toos Paya, a knowledge-based company, is recognized as a reputable name in various industries including mining, water and wastewater management, petrochemicals, and food and hygiene industries. With four decades of experience in the design and manufacturing of filter presses and their components, the company has established itself as a leader in providing optimized solutions to enhance efficiency and reduce costs.

Ebtekar Toos Paya has successfully achieved a significant position in the design, construction, and implementation of filtration and water recovery projects. Committed to raising industrial standards and offering innovative solutions for various challenges, the company is always ready to collaborate with its clients on the path to shared success.

What is a Filter Press?

A filter press is a widely-used piece of equipment in industrial filtration processes, designed to separate liquids from solids. In this device, plates are arranged parallel to each other, and a filter cloth or membrane is installed on the surfaces of each plate. Liquid materials containing suspended solid particles, known as slurry or sludge, enter the space between the plates. After applying positive pressure and allowing the majority of the liquid to pass through the cloth, the solid materials are compressed into a cake with some moisture. Once the plates are separated, the cake is discharged by gravity.

The main stages of a filter press operation cycle include feeding, compression, cake discharge, and cloth washing. Depending on the type of materials and the moisture content of the final cake, additional processes such as secondary compression and air drying may also be implemented.



Types of Filter Presses

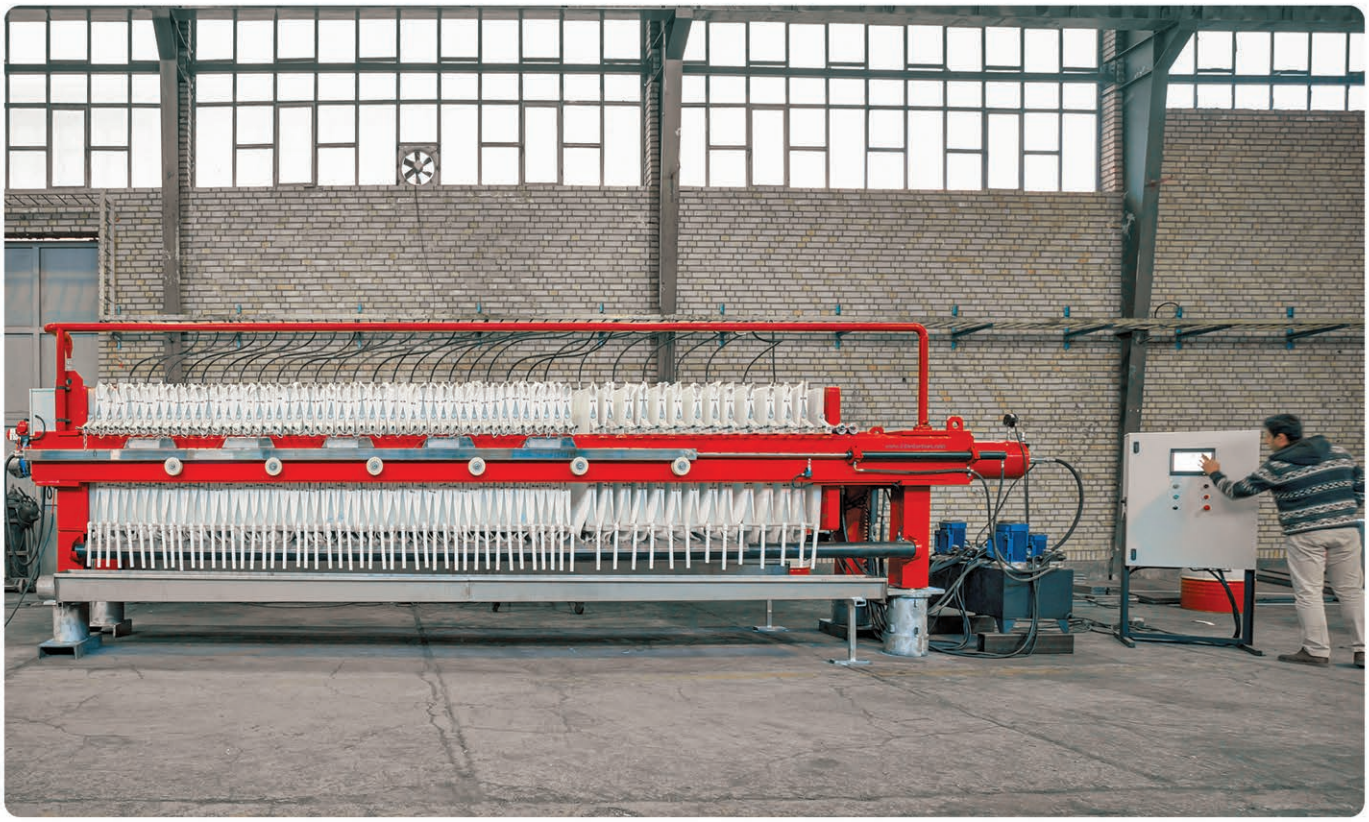
Filter presses can be categorized into two main types based on their structure: overhead and sidebar.

Sidebar

Overhead

Sidebar Filter Press

In sidebar filter presses, the plates are supported and slide on the sides of the machine, using handles that are positioned on rails embedded in the main body arms. In this design model, the main body arms not only facilitate the movement of the plates but also serve as tensile members to counteract pressure forces and maintain its integrity. Sidebar filter presses are divided into two categories: trolley and robotic, each addressing various industrial needs with its unique features and capabilities. This design diversity allows for optimal utilization of filter presses in different processes.



The general features of this filter press design model are as follows:

- Simpler design
- Lower cost
- Variety in the selection of the number of jacks
- Capability to manufacture in small sizes
- Improved access to plate shifting components for operational and maintenance purposes
- Increased force concentration at the junction of the main arms and the machine body
- Access to the contaminated plate shifting area due to its position on the side of the plates, with the possibility of
- materials and water spilling onto the shifting components

Drawbacks:

- Limitations in the number of plates
- More limited access to plates for inspection and discharge of remaining cakes
- Need for plate shift to replace cloth

Simple Design | Low Cost | Easy Repair | Some Limitations

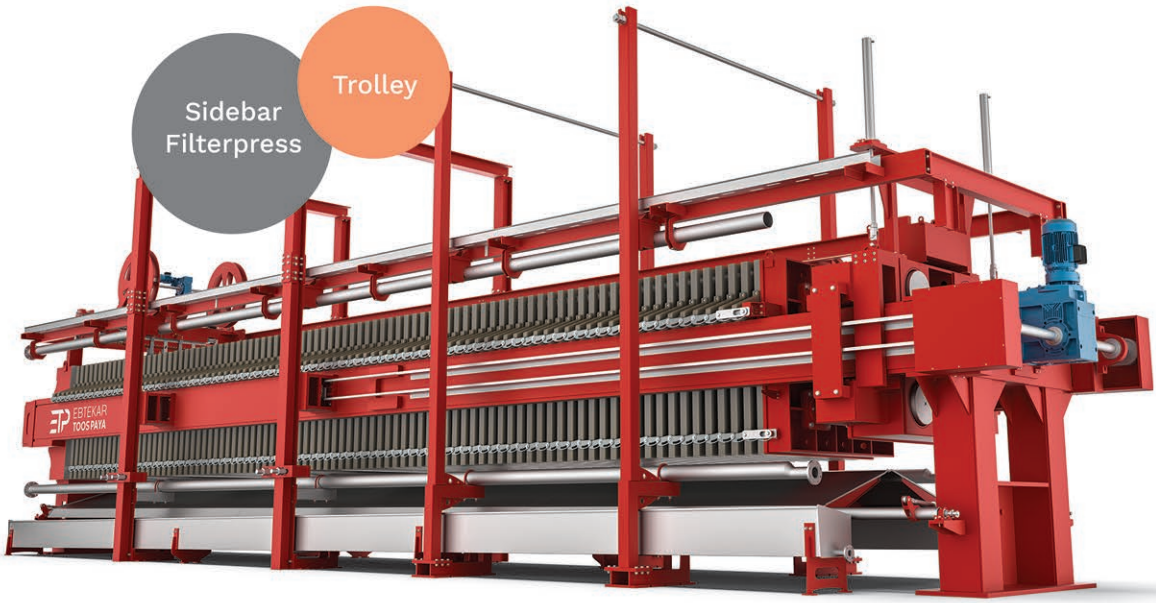
Features of Trolley Sidebar Filter Press

Suitable for both product and waste
Maximum plate size up to 2 meters
Quick opening and closing of plates to reduce cycle time using the trolley mechanism
Ability to install a cloth vibrator
Capability to install both high-pressure and low-pressure washing systems for the plates

High and Low Pressure

Large Plates

Fast Operating



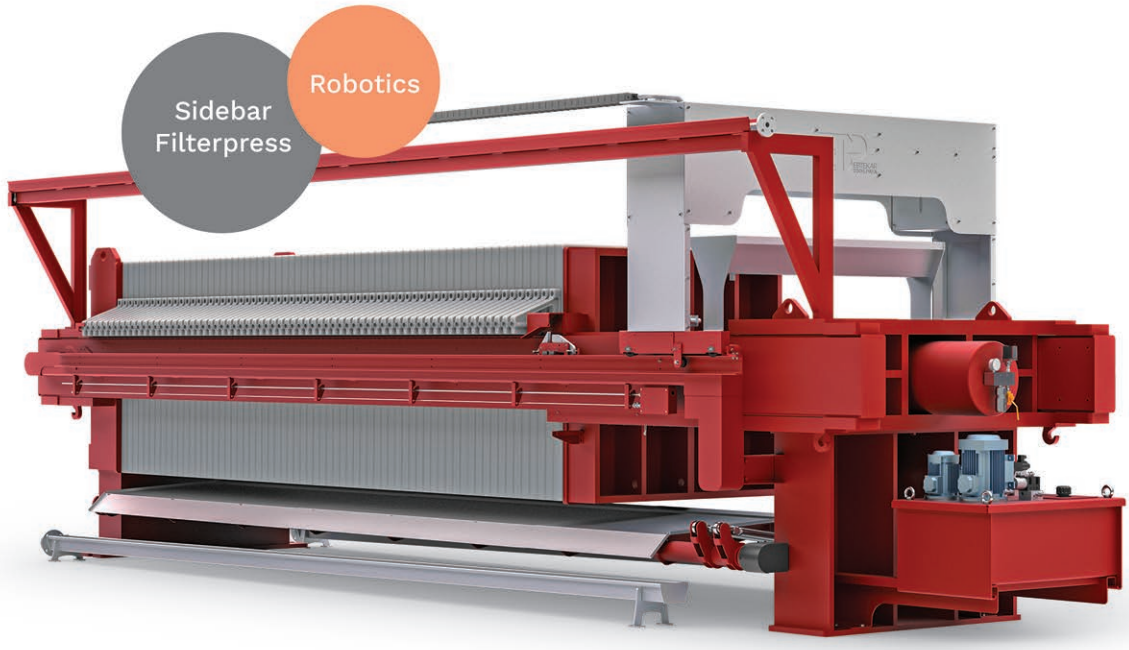
Features of the Robotic Sidebar Filter Press

Lightweight and cost-effective structure
Suitable for products and waste with a maximum plate size of up to 2 meters
Capability to install a high-pressure plate washing system

High Pressure

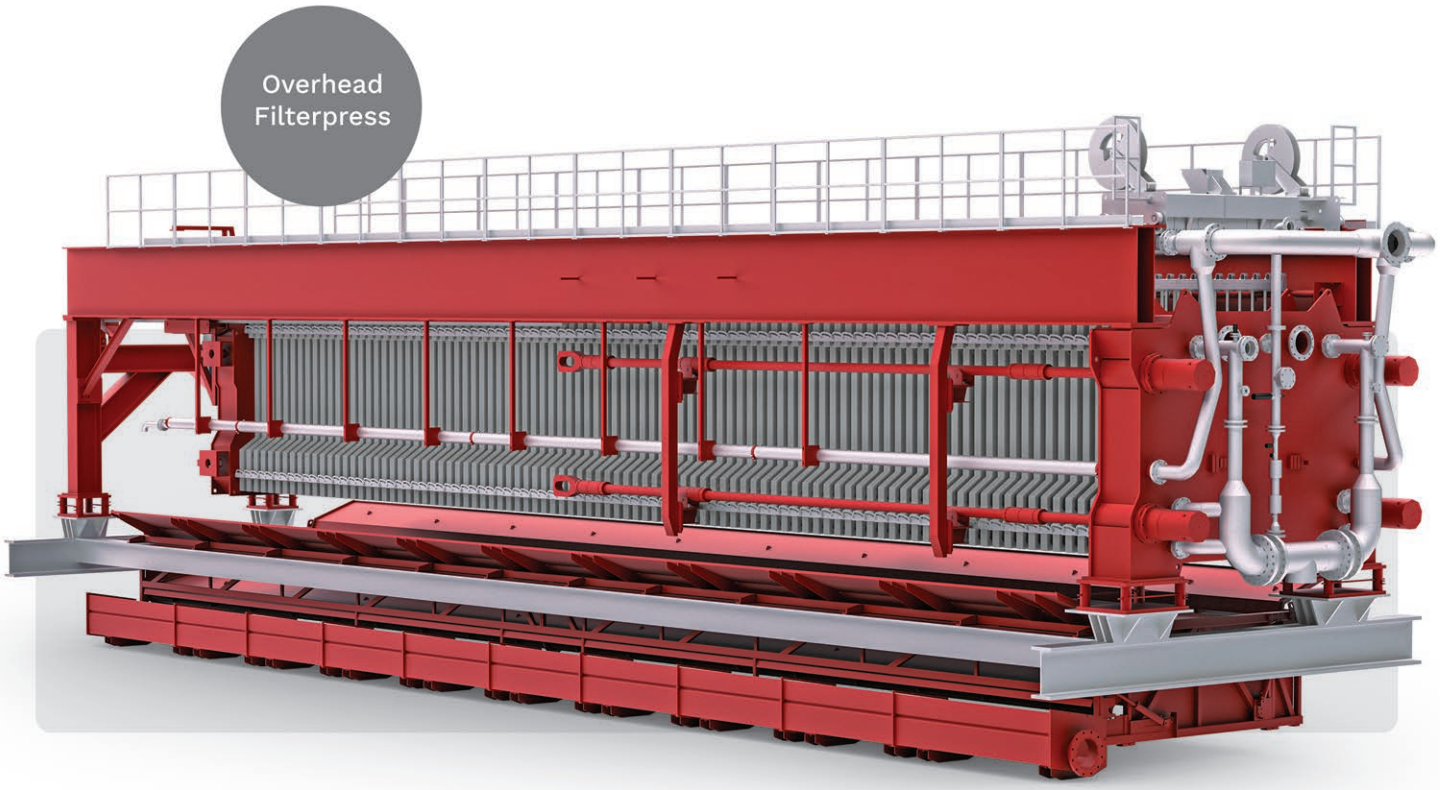
Large Plates

Low Cost



Overhead Filter Press

In the overhead filter press design, the plates are suspended from a guide beam located at the top of the machine and are simultaneously pressed by four hydraulic jacks. Full access to the machine's plates for inspection and performance evaluation is a notable feature of this design model.



General Features of This Filter Press Design:

- High capacity, suitable for large filtration volumes
- No limitations on the number of plates; can be designed based on large-scale plates
- Quick opening and closing of plates, resulting in shorter filtration cycle times
- No need to move plates for cloth replacement
- Ability to install a cloth vibrator
- Capability to install both high-pressure and low-pressure washing systems for the plates
- Adequate access to plates for inspection and maintenance
- Lower force concentration and better body strength relative to applied forces
- Less contamination of the plate handling system due to its position above the plates

Drawbacks:

Limited access to the plate handling system for performing repairs and periodic servicing

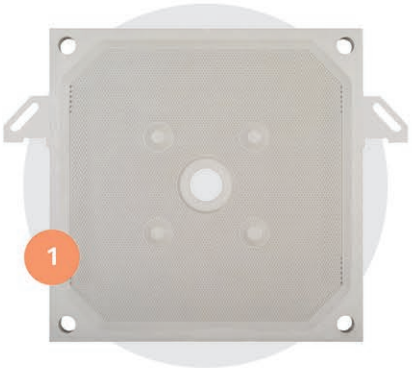
No Limit on the Plates | Fast Operating | High and Low Pressure | Structural Strength | Large Plates

Main Components of a Filter Press

In addition to the main body and structure, there are other components that influence the operation of this equipment, which generally include the following:

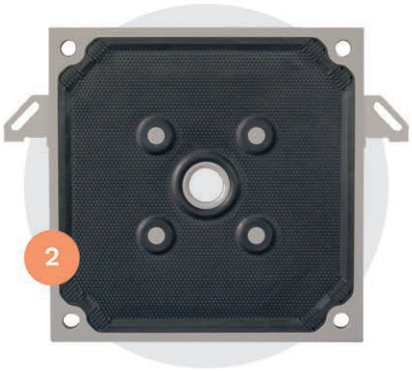
Filter Press Plates

The plates, as a significant component in the operation of the filter press, are made from hard and durable materials, designed and constructed according to the characteristics of the feed and the desired final moisture content. They are generally divided into two categories: fixed-volume plates and variable-volume plates.



Fixed-Volume Plates (Chamber Filter Plate)

These plates are designed and constructed from high-quality, durable materials in various sizes. During the operation of the filter press, two plates form a closed chamber together, where the materials are placed. After applying pressure, the solid cake resulting from filtration is formed in this space.

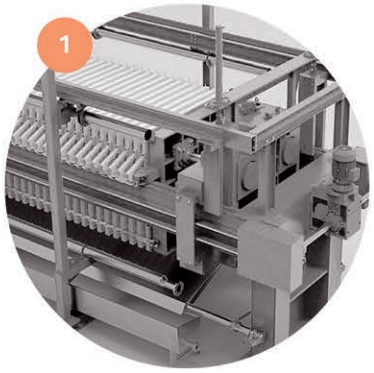


Variable-Volume Plates (Membrane Filter Plate)

In the design of these plates, in addition to a robust and impermeable body, a flexible membrane is also utilized. This allows for water injection in the internal space between the membrane and the plates, which also reduces chamber volume and applies additional pressure to the cake. These plates are used when there is a need to reduce moisture in the final cake.

Plate Shifting Systems in Filter Presses

The systems for opening and closing the plates are used for discharging the cake and are categorized based on the design of the filter press as follows:

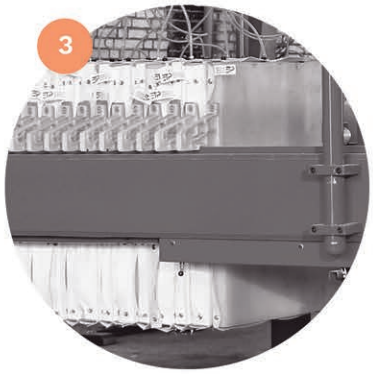


Trolley Type Plate Movement

In this type, all plates are connected via a chain to a trolley, allowing for simultaneous opening and closing of the plates as the trolley moves. This results in reduced operational time.

Robotic Type Plate Movement

In this series of filter presses, a robot engages on both sides of the plate seating rails, facilitating the opening and closing process for single or multiple plates. Compared to the trolley system, this method requires more time.



Manual Plate Movement

In this type, the opening and closing of the plates is performed entirely by the operator, which generally takes more time compared to the other .two methods

Washing Systems for Filter Press Plates

Washing systems are used to prevent clogging of the fabric pores and to remove residual particles between the plates, depending on the filter press design. The types of washing systems in filter presses are as follows:

Full Plate Washing System

In this mechanism, several nozzles cover each plate from all directions. They are utilized simultaneously in every filtration cycle after the cake is discharged, ensuring that all plates are washed. The timing of this system can be adjusted based on the nature and stickiness of the particles.

Single or Multi-Plate Washing System

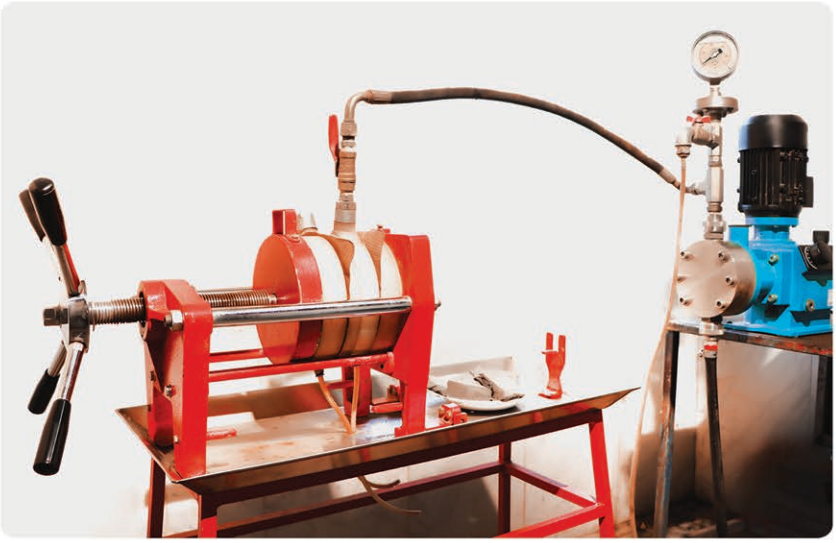
This washing system is designed with a mechanism for cleaning one or multiple plates. A reciprocating pipe containing spray nozzles moves back and forth between the plates, washing both sides simultaneously with high pressure.

Filter Press Fabric

Filter press fabrics are selected based on the characteristics of the materials, with a wide variety of sizes and mesh counts. They are installed on the filter press plates during filtration to prevent the escape of solid particles. The quality of the selected fabric and optimal washing of the fabrics significantly enhance the operation of the device and achieving desired results. Additionally, the longevity of these consumable parts is greatly influenced by proper washing.

Drip Tray System

This system is used to prevent the waste of water or valuable filtered liquid during the filtration process and convey it to the dedicated piping. It also prevents washing water from spilling onto the discharged cake while the plate washing system operates with hydraulic opening and closing.



Research Center

The research center of Ebtekar Toos Paya Company is established to expedite services and ensure the quality of the products offered. In this unit, various effective solutions in the filtration process are monitored through laboratory and semi-industrial testing on samples sent by customers. The results obtained are then used to provide the best possible recommendations to clients.

Closing Remarks

The knowledge-based company Ebtekar Toos Paya, as a leader in providing dewatering solutions and services with over 40 years of experience in dewatering and the design, construction, and implementation of filtration projects, has extensive connections with various industries.

As the pioneering manufacturer of filter presses in Iran, we can address your current and future needs by offering engineering solutions and technical services.

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