TSP TECH
Smart Solution, Optimal Design

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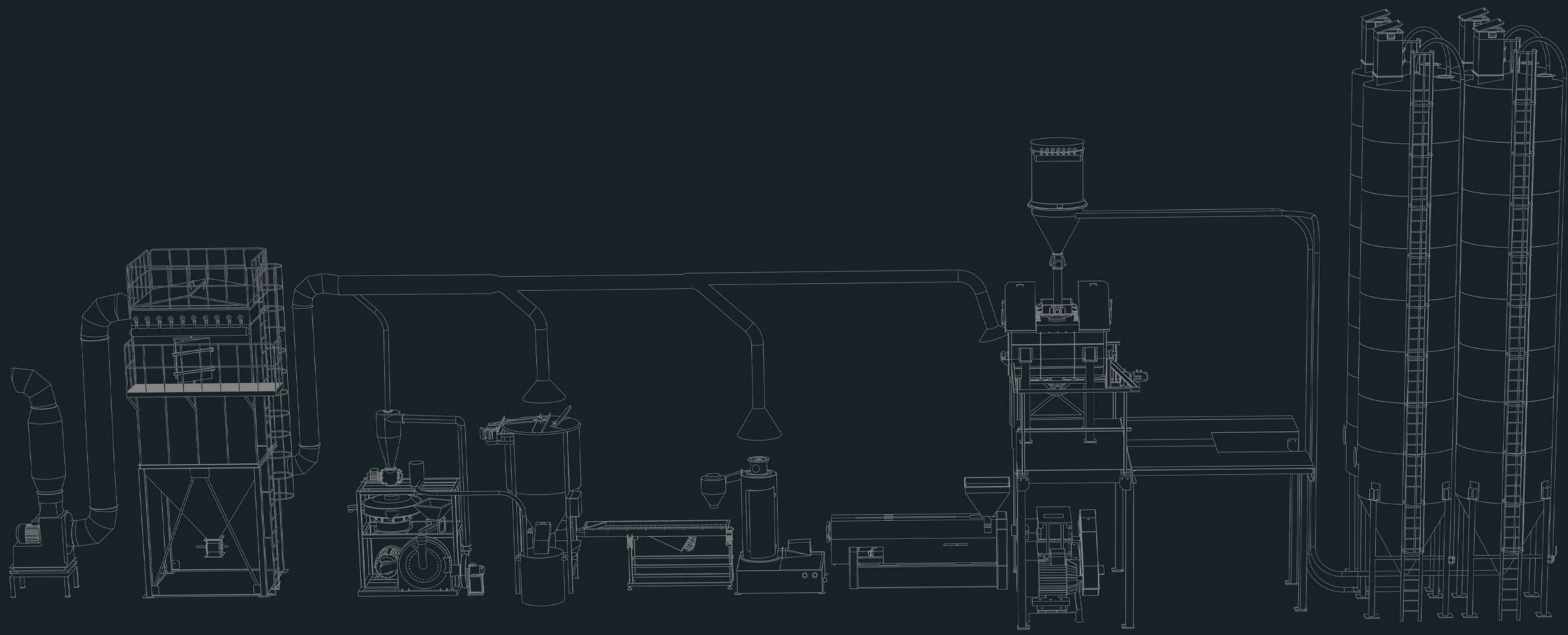

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Polymer Equipment and Machinery

Consult, Design, Implementation

Tarah Sanat Pooya Company Initiated its core activities in 2013 from the technical engineering department of Pooya Polymer Tehran Co., Then,Utilizing global knowledge and technology, and drawing on the valuable experiences of its team of engineers and specialists, the company has engaged in design, manufacture, and consulting in various industrial sectors of the country, particularly in the **plastic and polymer industry, petrochemicals, steel, food** and **pharmaceutical** industries. The current main products and services of the company are as follows:

- Design and manufacture of various material handling systems using pneumatic phase dilute and dense, screw conveyor and disc elevator methods.

- Design and manufacture of pulverizer machines with different capacities for various polymeric materials such as PE, PS, ABS, PET, and even temperature-sensitive materials like PP, TPU, EVA.

- Design and manufacture of various dust collection and industrial ventilation systems with different capacities according to customer needs.

- Design and manufacture of laboratory film blowing machine for examining the properties of polymer films, including optimizing production parameters and testing the dispersion of materials in polymer masterbatches.

- Design and manufacture of various mass powder and granule bagging machine.

- Design and manufacture of various single-screw and twin-screw extruders with different applications and capacities in the polymer industry.

- Design and manufacture of various auxiliary equipment for plastic industry production lines, such as screen changers, water ring pelletizers, vibrating sieves, cooling drums, and mixers.

- Design and manufacture of material weighing systems in various continuous gravitational mass, discontinuous gravitational mass, and volumetric weighing types.

- Design and manufacture of oil temperature control packages for optimal oil heat transfer with high efficiency and very safe and risk-free.

- Consulting, design, supervision, establishment, and implementation of industrial manufacturing factories.

Our determination and will are always directed towards advancing the industry of the country, solving the problems facing factories and manufacturing industries to find intelligent and optimal solutions with the highest productivity and most reasonable cost.

Material Handling Systems

Choosing an appropriate material handling system with maximum efficiency for the transfer of dry bulk materials such as powder, granules, and flakes is crucial. Selecting an unsuitable system, even if complex, can be unreliable, leading to high maintenance and repair costs, low productivity, and potentially causing a complete system shutdown.

When selecting and designing a material handling system, the characteristics of the materials, such as size, shape, specific surface area, density, and the length and number of bends in the transfer path, are very important factors.

Generally, the most common material handling systems in various industries are as follows:

- Dilute phase pneumatic conveying
- Dense phase pneumatic conveying
- Disc elevators
- Screw conveyors

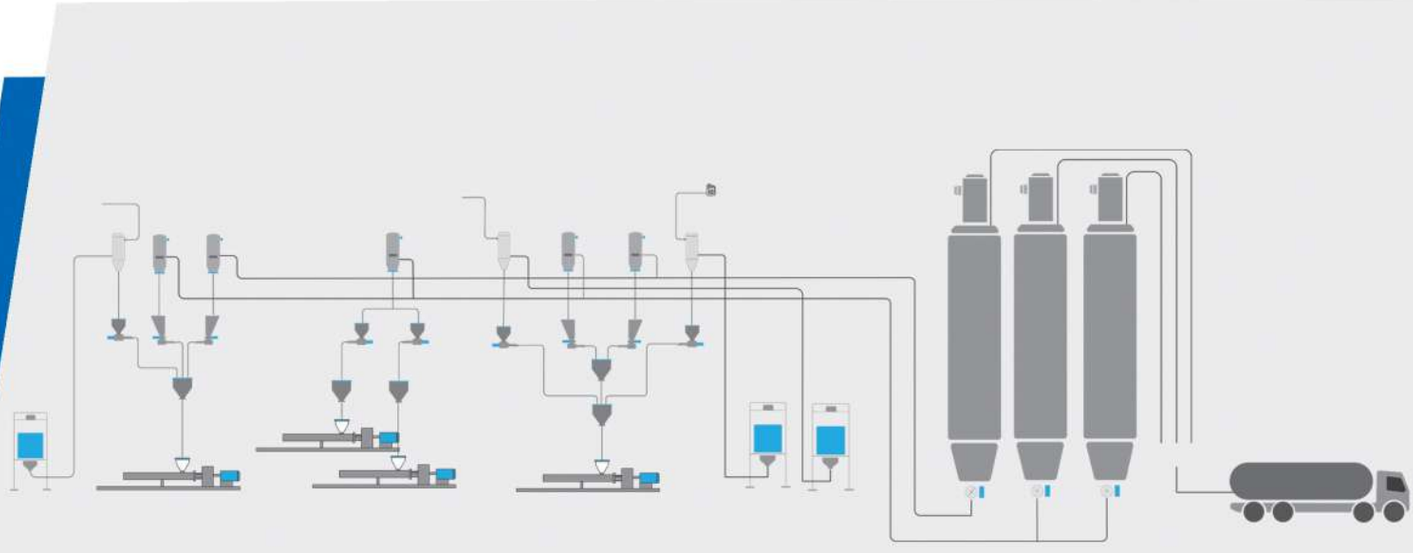
Dilute Phase Pneumatic Conveying System

This system is used for a wide range of dry solid materials and is structurally relatively simple and economically cost-effective. In simple terms, materials are uniformly added to a high-speed air flow using a rotary valve and transported through the pipeline to the receiving station. The dilute phase system allows the use of flexible piping (vertical, horizontal, and bending). By utilizing standard piping and special filters, a completely isolated, leak-free, pollution-free, and safe transfer system is created.

The main products typically transferred in dilute phase systems include various flours, minerals, solid resins, and generally granular and pelletized products.

Common types of dilute phase systems include:

- Positive pressure: Used to transfer materials from one source to multiple destinations with high efficiency.
- Vacuum or negative pressure: Used to transfer materials from multiple sources to one destination and operates dust-free.

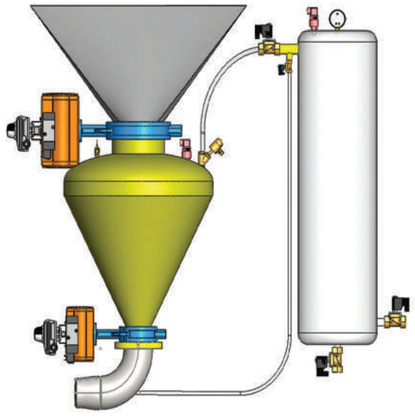


Dense Phase Pneumatic Conveying System

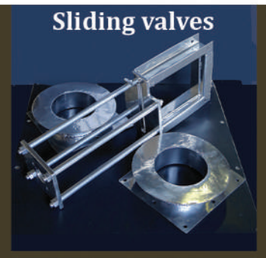
This system is used for the transfer of hard, abrasive, and fragile materials at low speeds. Materials are transferred with a small amount of air or other gases at high pressure. Using available compressed air reduces operational costs and increases efficiency. This process is typically used to transfer materials from a single source to one or more destinations.

Some advantages of using a dense phase system include:

. High-efficiency transfer of abrasive and fragile materials
. Low operational cost due to low air consumption
. Minimal wear inside the system and pipes over the long term
. Minimal material degradation
. Low maintenance costs



Some common equipment and accessories in material handling systems:





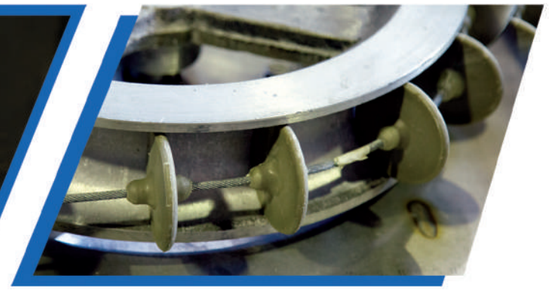




Disc Elevator Conveying System

In this method, materials are transferred using wear-resistant polymer discs attached to a cable at regular and specific intervals inside the pipeline. These discs and the cable connected to them move inside the pipes through the driving force of an electro-gearbox, carrying the materials with them. This system allows for single or multiple inlets and outlets and can transfer through horizontal, vertical, and diagonal pipe.





Screw Conveying System

One of the simplest and most common systems for transferring materials in the form of powder, granules and flakes is the screw conveyor system. In this method, materials are transferred horizontally, vertically, diagonal, or in combination through the rotation of a screw driven by a motor and gearbox inside the pipe. The design of the system, the diameter, angle, shape and pitch of the screw are based on the type of materials and the transfer distance.

Our experts in the design and engineering department, after initial sampling of the materials and site inspection of the project location, considering all key factors of the system, design and propose the most suitable, efficient, and economical transfer system.

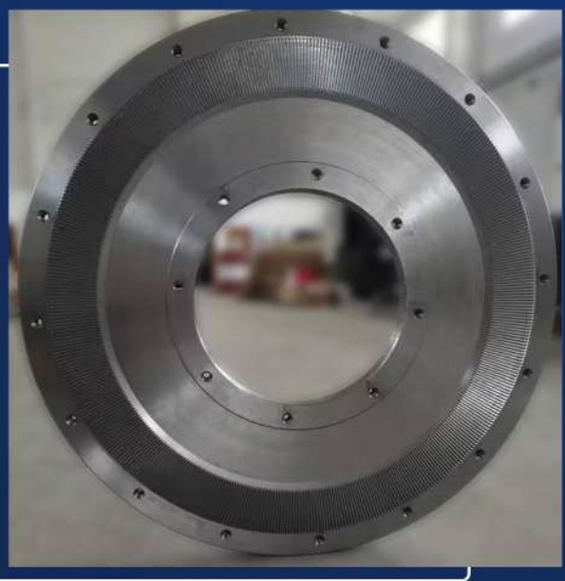
Pulverizer

The FG series pulverizer machines produced by Tarrah Sanat Pouya are used for making powder of semi-hard, brittle, impact-resistant, and even temperature-sensitive materials. The operation of the machine in a simple words is: granules of materials sized 4 to 9 millimeters are guided by a vibratory feeder into a chamber with high-speed rotating blades. The materials are powdered by the shearing force generated by the rotation of the moving blade and the granules being caught between the stationary and moving blades. The resulting powder is then carried by an air flow into a cyclone and subsequently a separating sieve. After passing through the sieve with the desired size, the powder is transferred through an outlet pipe into a bag for packaging. Additionally, the dust generated from this process is collected by a filtration system.



The final powder size can be adjusted by setting the distance between the blades and changing the mesh of the sieve.

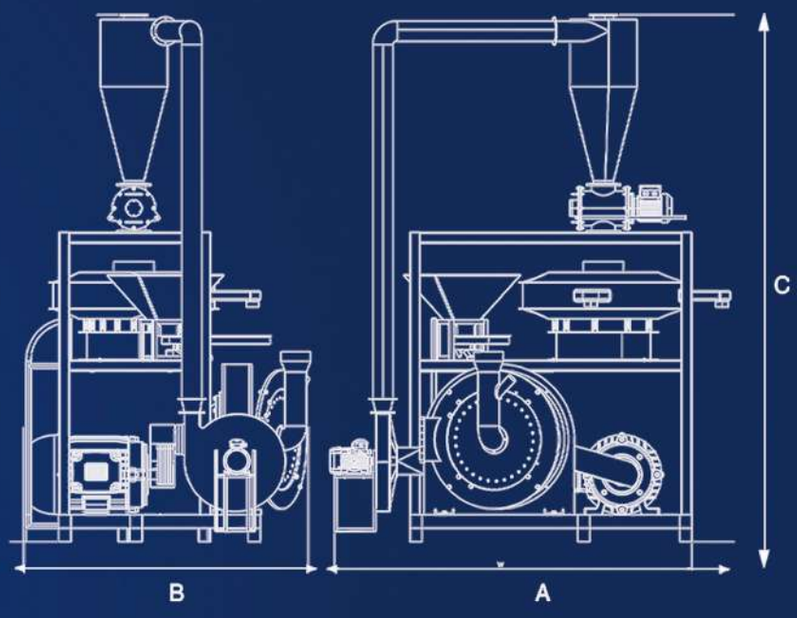




In the design and manufacture of the machine, high speed of disk rotation, small cross-sectional area of the cutting zone, blade design, and an effective process to minimize additional impact and properly control the temperature inside the chamber using a smart cooling system. This ensures that the materials are immediately removed from the powder-making chamber after cutting, minimizing the residence time that could lead to temperature increases. As a result, a high output capacity can be achieved with minimal motor power and optimal energy consumption.

Main advantages of the FG series pulverizer:

- Suitable for a wide range of polymeric materials, even temperature-sensitive ones like PP and EVA.
- Optimal energy consumption thanks to the modern blade design and the use of an inverter during startup.
- High production capacity and the use high technology in design and manufacture.
- Adjustable powder output size ranging from 150 to 700 microns.
- Space-saving and efficient str design.
- Easy operation and maintenance with minimal costs.
- Designed for high-speed operation with appropriate bearing systems.
- Uses of special alloy block blades with a hardness of 60 HRC.
- Blades can be re-sharpened and replaced individually.



MODEL	DISC DIAMETER (MM)	MOTOR POWER (KW)	CAPACITY (KG/H)	COOLING SYSTEM	A(m)	B(m)	C(m)
FG400	400	37-45	100-150	COMPRESSED AIR-WATER CIRCULATION	1	2	2/1
FG600	600	45-55	150-250	COMPRESSED AIR-WATER CIRCULATION	1/8	2/3	3
FG800	800	75-90	250-400	COMPRESSED AIR-WATER CIRCULATION	2/7	2/75	4



Customization options for one or a set of pulverizer machines with very high capacity based on customer needs.



Industrial Ventilation

The design and implementation of industrial ventilation in manufacturing plants are often crucial due to issues such as permissible limits for industrial pollutant emissions, high levels of dust, the release of toxic vapors and gases, increased heat, explosion risks, or health requirements. Industrial ventilation differs from air conditioning and requires extensive experience in various industries and knowledge of different industrial pollutants.



Point Ventilation

Point ventilation and dust collection at the source of pollution are among the most important and effective solutions for industrial ventilation. Point ventilation is used in many cases, such as welding and grinding stations, assembly and welding areas in automatic lines, inlet and outlet hoppers of coal conveyors, sugar factories, in the steel rolling process, etc.

Local Ventilation

Local ventilation is used for dispersed dust, gases, and warm vapors. We provide the best suitable hoods, suction systems, and dust collection and purification systems for this purpose.



Industrial Dust Collector

Industrial dust collectors are air pollution control devices used in various industrial units. These devices collect and filter dust, suspended particles, and harmful fumes from production processes, thereby preserving and improving the quality of the workplace air and increasing safety. If possible, they also enhance production efficiency by returning valuable dust from the process back into the production cycle.



Common Types of Industrial Dust Collectors:

1. Bag filters (jet pulse, vibratory)
2. Inertial separators (cyclones)
3. Cartridge collectors
4. Scrubbers
5. Electrostatic precipitators

Bag filters are among the most common dust collection systems due to their high efficiency. The type of filters and the filtration area, considering the dust type and particle size, as well as the environmental conditions such as temperature, humidity, and dust volume, are the most important parameters in designing and selecting a bag filter system.

The working nature and goal of these devices are generally the same, which includes collecting air pollutants, filtering and separating the purified air from the pollutants, returning clean air to the workplace or environment, and ultimately returning valuable dust to the production cycle.





The engineers and designers at Tarah Sanat Pouya design, manufacture, and implement the most optimal dust collection system based on the type of application and the conditions of the industrial unit.

Our Specialists' Design and Solution Delivery Steps:

- Sampling the existing dust for analysis
- Site visit and environmental condition assessment
- Consultation, re-engineering, modification, and optimization of existing customer systems if possible
- Designing, manufacturing and implementing a system according to the dust material, industry type, pollution level, capacity, and working conditions
- Complete design and implementation of ductwork compatible with the designed system
- Pre-delivery device testing
- Installation and commissioning
- Support and after-sales services

Silo Dust Collectors

Silo dust collectors are used to prevent material waste and pollution during the discharge of dry bulk materials into various storage tanks and silos. These systems are commonly used in industries such as cement, plastics, grains, ash, lime, clinker, food products, etc.

Our designed systems are of the jet pulse and vibratory type, and the filters are automatically and regularly regenerated. The dust collector is directly connected to the silo or via a flange. For high-capacity use and to quickly vent silo air and prevent leakage at connections, the use of a fan at the dust collector outlet is recommended.



Main Components of the Dust Collection

1. Fan or Blower
2. Dust filters
3. Dust filter cleaning system
4. Dust collection receptacle
5. Ductwork and hood assembly

Dense Phase Pneumatic Conveying System

The laboratory film blowing machine is used to examine the properties of polymeric films, including optimizing production parameters and testing the dispersion and distribution in polymeric masterbatches. Utilizing this machine allows for high-precision simulation and comprehensive examination of influential parameters, and due to the low raw material consumption during testing, it reduces waste.





It can be used for testing raw materials such as:

- Various types of polyethylene
- Various types of polypropylene
- Polyamide
- Other polymer compounds with blow molding grade



Advantages of Using the Laboratory Film Blowing Machine

- Possibility of developing new material formulas
- Easy testing and evaluation of different physical and mechanical characteristics of blow films
- Examination of the quality of dispersion and appearance of filler and color masterbatches (black, white, etc.) used in the film industry
- Optimization of the blow film production process
- Capability to produce films in various thicknesses from 20 micrometers and above
- No need for large space, portable and usable in laboratory environments
- Suitable for producing polyethylene films with various formulations on a small scale
- Savings in raw material consumption
- Low-cost investment with high returns

Single-Weighing Granule Bagging Machine

For various powders and granules

Open mouth – with valve



- Capacity: 100-300 bags per hour
- Bag capacity: 10-50 kilograms per hour
- Material contact body:304 stainless steel
- Chassis: ST37 with electrostatic paint
- Weighing accuracy: ±0.1 percent
- Control system: PLC with a 7-inch touch panel
- Reporting capability
- Control of the number of filled bags
- Intelligent feeding
- Ability to adjust the desired weight
- RS232 and USB ports for data extraction and system updates
- Quick and easy installation

Custom Design and Manufacturing

Single Screw Extruder

With over 10 years of experience in consulting, designing, and manufacturing all items of single screw extruders, including cylinder, screw (design according to the type of product), heaters, various cooling and temperature control systems, die head, screen changer, and pelletizer, we are ready to serve.

Twin Screw Extruder

Calculation, design, and manufacturing of cylinder, splined shaft, various segments,barrel, die, breaker, screen changer in different sizes, and also providing the best suggestions regarding gearbox and motor according to the application, are carried out by our team in a specialized and scientific manner.

Design, Modification, Installation, and Commissioning of PLC Control Systems, Cooling Systems, and Temperature Control, Various Heaters Our specialists work scientifically and professionally in cosuing, designing, and manufacturing various parts and accessories for twin screw extruders.



Water Ring Pelletizer

The water ring system is a type of pelletizer used at the output of extruders for granulation. These devies are suitable for most polymers, especially for PE/PS/EVA/TPU and various filler masterbatches.



Features of this machine include:

- Uniformity in the final shape of the granule
- High production capacity
- Insensitivity to polymer flow disturbances
- No water contact with the die and extruder head
- Closed water circuit
- Shortening the length of the production line
- Easier use compared to strand pelletizers and easy installation
- Safe granulation process
- Optimal water consumption
- Minimizing waste
- Easy and quick cleaning

The main components include a pelletizer with a water ring, water circulation system, water centrifuge, and vibrating sieve.

Considering the advantages and characteristics of our water ring pelletizers, their use in recycling extruders, which leads to product uniformity and increases capacity from 300 to 800 kilograms per hour, is highly recommended.

Screen Changer Machine

The screen changer is equipment installed at the end of the extruder line, which allows for the quick and efficient replacement of metal screens for product filtration before granulation, minimizing waste. The timely replacement of screens using the screen changer ensures the purity and quality of the final product. Our screen changers are hydraulic and feature a durable steel body and high-quality, high-performance heaters.



Advantages of Using a Screen Changer:

- Quick and easy screen replacement
- Simple installation and assembly
- Low maintenance and repair costs
- No material leakage with the use of special seals

Separation and Cooling Systems

Vibrating Sieves

Vibrating sieve equipment is used for sizing and separating contaminants or waste materials (such as wood pieces, metal, plastic, wire, etc.) from the final product. In these equipment, a punch plate with hole sizes selected according to the product is used to separate the appropriate size and direct unsuitable sizes and waste out of the system.

The length and dimensions of the device, the slope, the type of vibration motor, and the size and type of punch plate are directly related to the type, shape, dimensions of the materials, and the production line capacity.



Cooling Drum

The cooling drum is practical equipment used for cooling the product while also sizing it. This device can have one or several layers and is designed and manufactured according to the produced materials, especially their temperature.

This equipment has steel punch tunnels on its layers, where the materials cool down at an appropriate speed and time through rotary motion inside the tunnels, and the granulation and separation of waste and contaminants occur simultaneously.

It can be said that the cooling drum complements the vibrating sieve and ensures the granulation and temperature of the product for packaging.The length and dimensions of the equipment, the slope, the rotation speed, and the number of layers are directly related to the type, shape, and temperature of the materials, as well as the production line capacity.



These systems are used to increase accuracy, reduce man-hours, and overall improve productivity.

The most common types are as follows:



• Continuous Gravitational Mass Weighing

This is the most complex weighing method, generally used only for solid materials. To implement this system, dynamic system equipment is required, meaning the component being fed must be weighed, which complicates the process as the materials are mixed in the next stage.

• Discontinuous Gravitational Mass Weighing

This method is the most common and accurate for weighing. It allows for static weighing, thus enabling precise weight adjustment and control.

• Continuous Volumetric Weighing

This system is used for both liquids and solids. For liquids, measurement can be very accurate since density is practically constant. For solids, bulk density varies greatly depending on granulometry and the amount of air between material particles, which is why this system is only used for systems where the weight ratio of materials does not require high precision and importance.

• Discontinuous Volumetric Weighing

This system is similar to continuous volumetric weighing, except that the process is carried out in batches. However, this does not mean increased accuracy. The equipment used in both processes is the same.

Our specialists in continuous and discontinuous gravitational mass weighing design and implement the best and most efficient systems with up-to-date knowledge and valuable technical experience, providing the possibility of implementing weighing systems along with material transferring systems simultaneously.



Hot Oil Temperature Control Package (CTC)Series

Hot oil temperature control is designed for heat transfer applications in high-temperature industries (120-260 degrees Celsius). These systems use a low-pressure, high-flow oil circuit in contact with electric heaters for optimal heat transfer. The main advantage of these systems over similar ones, like boilers, is their precision, high safety, and the longevity of the heaters.



Key Features:

- Operates at low pressure, increasing safety and equipment lifespan, especially connections.
- Operates at high temperatures, enhancing thermal power.
- High safety due to quality heaters, protective modules, low-pressure operation, and easy maintenance.
- Custom design and manufacturing with standard parts.
- Complete system calculation and design for high thermal powers.
- Possibility of designing and implementing piping and insulation systems.
- User-friendly interface with smart performance control.
- High-power standard heaters made of 304 stainless steel.



Model	CTC108	CTC48	CTC24
Thermal power	108	48	24
Pump power (kw)	2/2	1/5	1/5
Operating temperature(C)	120-250		
Operating pressure(bar)	1-2		
W	1	0/9	0/8
D	2	1/5	1/5
H	1/75	1/55	1/2



Consultation, Design, Supervision, Establishment, and Implementation of Industrial and Factories

- Mechanical installations
- Electrical installations
- Installation and commissioning of production lines
- Implementation and product manufacturing
- Process optimization
- Support and updates



Mechanical Installations

- Compressed air systems, pneumatic installations
- Water supply and piping, water circulation, tanks, and pools
- Wastewater collection and disposal, industrial wastewater treatment
- Industrial ventilation, production hall ventilation, warehouses, industrial dust collectors
- Fire extinguishing systems for production halls and warehouses



Electrical Installations

- Transformer room
- Electrical panels and capacitor boards
- Power supply and cabling for equipment and production lines
- Earthing and bonding systems
- Lighting systems, electrical and telephone outlets
- Fire alarm systems for production and storage
- CCTV



Installation and Commissioning

- Production lines layout and assembly
- Installation of auxiliary equipment
- Pilot line setup
- Commissioning and approval of product manufacturing





Implementation and Product Manufacturing

- Operator training
- Production process training
- Training for raw material/production/product storage
- General maintenance training for lines
- Training support (online and in-person)

Process Optimization

- Layout optimization of production lines
- Design, manufacture, and optimization of production line structures
- Design, layout, and optimization of raw material and product storage
- Consulting and supply of production lines and auxiliary equipment
- Supply and equipment of laboratory devices
- Automation of raw material, product storage, and production lines
- Design, supply, and equipment of spare parts storage
- Design, supply, and equipment of mechanical and electrical workshops
- Consulting and supply of electrical and mechanical installation equipment
- Consulting and supply of ventilation equipment
- Consulting and supply of compressed air equipment
- Introduction of vendor list and provision of technical specifications for consumable equipment

Support

- Layout optimization of production lines
- Design, manufacture, and optimization of production line structures
- Design, layout, and optimization of raw material and product storage
- Consulting and supply of production lines and auxiliary equipment
- Supply and equipment of laboratory devices
- Automation of raw material, product storage, and production lines
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