

Trough Screw Conveyor



Capacity: up to 243 m³/h.

HANDLING OF BULK GRANULATED OR POWDERED PRODUCTS

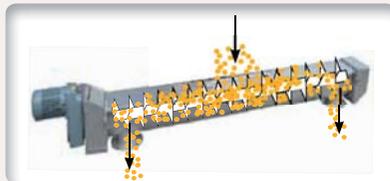
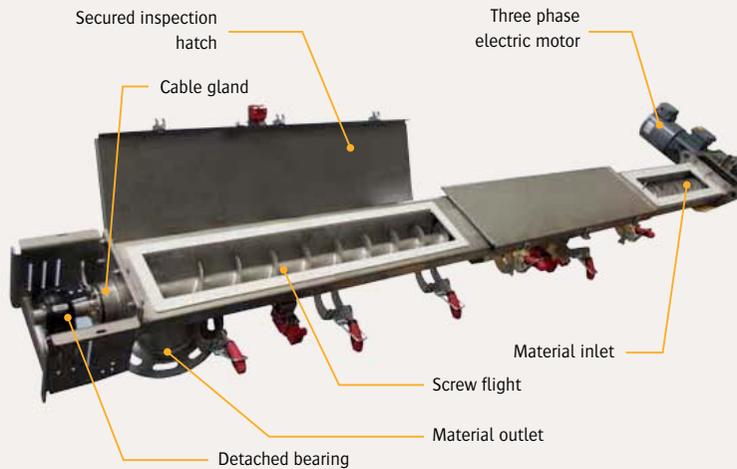
The PALAMATIC PROCESS trough screw conveyor allows the handling of bulk or delicate powders, thanks to its low speeds of operation. This mechanical screw conveying system is widely used in industries such as food & feed, plastics industry or chemistry, environmental technology, cement, lime and plaster, as well as mining. Depending on the application, the inlet and outlet of the screw can be customized to respond to the constraints of the equipment/materials.

TECHNICAL SPECIFICATIONS

Manufacturing: mild steel, stainless steel 304L
Helical blades welded onto the central tube
Inlet/outlet opening: from Ø114 to Ø660 mm.
Maximum slope: 40° (depends on the load rate of the screw)
Engine: electric 400 v. three-phase asynchronous
ATEX zone 20/22
Section: U or V trough section
Length: 1 to 13 m.
Transmission type: direct, belt or chain
Operating temperature up to 60°C (higher temperature on request)



This equipment is suitable for dosing operation



Example of screw with 2 directions of rotation with one central rectangular inlet with two opposed round outlets.

3 DESIGNS

Depending on the type of application, the designs differ by the plate thickness and the diameters of the shafts.

- Light duty** is used for conveying powdery or granular materials in the sectors of food & feed production, plastic, fine chemicals...
- Heavy duty** is used in woodworking industries, chemicals, water treatment plants...
- Very heavy duty** is mainly used in industries dealing with cement, lime or plaster and mines.



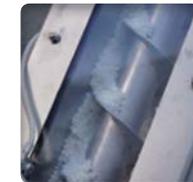
Multi-outlets trough to feed several receiving points



Openable hinged bottom to completely drain the screw



Different types of helicoil to allow the conveying of different materials

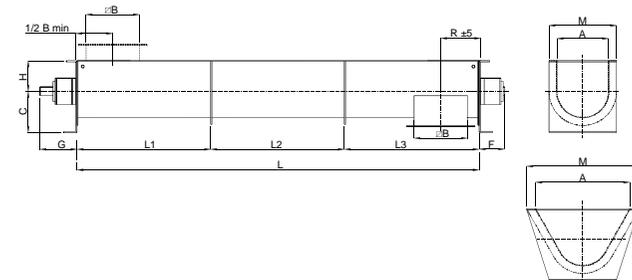


Through with hinged cover with security hatch to easily access to the inside of the trough or plexiglass

Advantages



DIMENSIONS IN MM.



Ø	A (U section)	A (V section)	B	C (U section)	C (V section)	F	G	H (U section)	H (V section)	M (U section)	M (V section)	R
100	-	175	175	-	145	114	156	-	115	-	261	170
120	-	175	175	-	145	114	156	-	115	-	261	170
150	175	375	175	145	145	124	182	115	175	261	481	170
200	225	425	225	185	185	124	182	135	200	311	531	195
250	275	525	275	215	215	143	225	160	225	361	651	220
300	325	525	325	245	245	151	233	195	250	433	653	260
350	375	625	375	275	275	151	233	235	270	483	753	290
400	425	730	425	305	305	162	267	270	290	533	898	340
500	525	830	525	380	380	180	310	340	340	653	998	390
600	625	1.040	625	465	465	180	310	420	420	753	1.248	440

Trough Screw Conveyor

Technical Specifications

3 POSSIBLE TRANSMISSIONS



1. Gear motor direct coupling

2. Sprockets chain drive

3. Pulley or belt transmission

2 OPERATING MODES

The screw is used as conveying or extraction.



1. Conveying

Used as a conveyor, the screw only ensures the conveying. It has an identical pitch along its entire length which is equal to the diameter of the screw flight. The conveying pitch is an elongated pitch which avoids the compaction of the material.



Extraction tight pitch

2. Extraction

The extraction screw is implanted under hoppers and ensures the dosing of the material. It includes a pitch at the beginning of the screw flight and a conveying pitch. The extraction pitch is a tight pitch.

2 TYPES OF BEARINGS

Depending on the type of the handled materials, the bearings can be plated or detached.



1. Flanged bearings for low pulverulent materials.



2. Detached bearing for dusty and abrasive materials. Air blowing can be added with a lantern ring system.

Installations



Trough Screw Conveyor

Capacities

SCREW FLOW RATES

Ø	Screw flight diameter (mm)	Shaft diameter (mm.)	Pitch (mm)	Filling rate	Rotation speed	Flow rate* in m³/h.	Flow rate* in kg/h.	Max. length without bearing
100	100	48	67	80%	48.5	0.94	1,360.24	3,500
120	120	48	80			1.77	2,565.50	3,500
150	150	60	100			3.46	5,010.75	4,000
200	200	60	133			8.87	12,867.11	4,000
250	250	60	167			17.95	26,025.85	3,800
300	300	114	200			28.16	40,830.45	5,750
350	350	114	233			46.72	67,740.38	5,500
400	400	114	267			71.68	103,929.48	5,250
500	500	114	333			144.45	209,447.55	5,000
600	600	168	400			242.65	351,840.49	6,000

* Figures given for a filling rate of 80%, variable depending on the angle, the type of material and the size of the loading flange.

CASE STUDY: PETROCHEMICAL INDUSTRY, BARITE PROCESS

Loading of wagons with powders (rate 600 sacks/h., 30 t./h.)

The treated material is barite of high density and abrasive, used as binding agent in the drilling muds in order to facilitate the work of the bit.

The installation consists of a tube lifter for sacks with a 7-meters long inclined belt and an automatic sack opening machine. Due to the abrasivity of the product, the machine is fitted with a centralized lubrication system and the cutting blades with a diamond coating to prevent premature wear.

A dust collector, with a declogging device for fines, is installed directly on top of the machine.

It allows a confined circulation of fines in closed circuit.

The obtained discharge coefficient is of the order of 99.97%.

The sack, once emptied, is discharged to a polyethylene sheath ensuring a better containment of the operation.

Barite is discharged through a vibrating chute with a 10 mm grid to two 6 meters long screw conveyors.

The screws are mounted in series in order to prevent intermediate bearings and to limit the preventive maintenance due to abrasion.

At the extremity of the screw, a truck loading sleeve allows filling the wagons and the sending of the material to the processing center before routing it to drilling platforms.



ATEX



ATEX

ATEX SAFETY: SPECIFICATIONS AND BENEFITS



SPECIFIC CHARACTERISTICS OF ATEX SCREWS

Conveying crews can be implemented in ATEX gas and dust areas.

- **Rotation sensor:** located at the shaft end, it controls the proper screw operation.
- **Temperature sensor:** it operates on cable glands to avoid hot spot.
- **Helicoil rectified by machining:** the gap between the helicoil and the tube is ensured by a rectification of the diameter of the helicoil
- **Nitrogen blowing:** performed at the level of cable glands, it may be necessary according to the ATEX characteristics of the location area.



Rotation sensor



Temperature sensor

The peripheral speeds are necessarily less than 1m/s

ATEX REGULATIONS: AUDIT AND COMPLIANCE

In production processes, industrialists are very frequently faced with the explosive nature of several materials (powder, gas, liquid).

When the atmosphere is explosive, a small spark is enough (e.g. that of an electric switch or from the mechanical heating of a part of the machine) to cause an accident or a disaster.

For many years, authorities and industries have worked on developing safety rules governing work conditions in such dangerous environments: explosive atmospheres.

PALAMATIC PROCESS provides its expertise to classify your risk zones based on nature, frequency or duration of the presence of an ATEX regulation.

Today, PALAMATIC PROCESS delivers to its customers ATEX installations certified by notified organisms (Inéris, LCIE...).

PALAMATIC PROCESS has developed in a standard way some equipment conforming to ATEX 0-20 / 1-21 / 2-22.

Also, our engineers perform the zoning and drafting of risk analysis on new equipment and facilities.

PALAMATIC PROCESS ensures safe operation and full compliance with these standards.



▶ MULTI-INLETS AND/OR MULTI-OUTLETS

Simultaneous supply of several points of feeding.

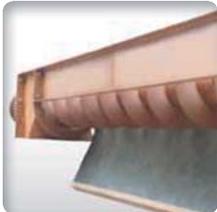
This configuration allows the apportionment of the material according to the operating rate.



▶ ROTATION CONTROLLER

Rotation control of the conveying screw.

This rotation controller is used for ATEX configurations.



▶ INSPECTION HATCH/OPENABLE BOTTOM

For integral discharge of the screw and easy cleaning.



▶ WIDENED LOADING MOUTHS

According to equipment used upstream and the solubility of the material treated, we offer different geometries of loading mouths (bell bottom screw).



▶ DETACHED BEARING

For perfect sealing and a maximum life span of the bearings, the shaft passage is provided by a set of braids and an air blowing system.



▶ INTERMEDIATE BEARING

It is used for important conveying lengths.

For configurations where screw conveyors have long lengths, one or more intermediate bearings are provided.



▶ TRANSMISSION

Depending on the dimensional constraints and the required rotational speeds, several transmission systems are suggested: gear motor, chain or belt.



▶ SPECIAL GASKETS

When processes or treated materials require it, PALAMATIC PROCESS incorporates special gaskets to ensure the compatibility of materials. A material certification is supplied with the equipment.



▶ CLEAN IN PLACE (CIP)

Ease of cleaning and maintenance

For food or pharmaceutical processes, screws must be fitted with a washing bar for cleaning by splash or spray.



▶ GAS AND DUST ATEX CONFIGURATIONS

Various options are available for installation in classified areas.

Rotation sensor, temperature sensor, turn rectified by machining, blowing nitrogen...

▶ GRINDING LINE

Company: Energy research laboratory

Material: Sawdust

Installation details: At the output of the big bag emptying station, the screening machine feeds the loading screw of the mill.

Sawdust is conveyed from the output of the centrifugal sieve to supply the process with a product free of foreign particles.



▶ RECONDITIONING IN BIG BAGS FROM SACKS OF 25KG

Company: Extinguishers recycling

Material: Fireproof powder

Installation details: Flexible screw conveyor to feed the big bag filling system from a manual bag dump station with an integrated vibrating screener.



▶ STORAGE LINE FOR GRANULATES IN MAGHREB

Company: National company specialized in the supply of aggregates

Material: Granulates

Installation details: The collecting screw conveyor supplies the main bucket elevator which ensures the feeding of the two conveying screws via a set of bypass and dropping tubes.

These screws load the silos fitted with filters and fluidized bottoms. This installation, located outside, provides high production capacities and guarantees very high operating rates due to its robust design.



▶ JUICE PRODUCTION PROCESS

Company: Fresh products manufacturing plant

Material: Raw food material in powder

Installation details: Trough screw conveyor with a capacity of 5t./h., manufactured in 304L stainless steel.

The screw conveyor is positioned under a big bag and sack emptying station and feeds a disperser. The screw is connected to the mixer with a flexible fitting. It has a large input section (bell bottom type).



▶ MIXER FEEDING FROM A BIG BAG EMPTYING INSTALLATION

Company: Manufacture of glues and adhesive products

Material: Resin

Installation details: A big bag emptying station and a conveying screw are implanted on load cells to ensure the filling of the mixer. By its design, the screw is located on a rotating flange allowing its release and thus the full opening of the mixer.



▶ HYGIENIC PACKAGING OF BABY FOOD PRODUCTS

Company: Baby milk manufacturer

Material: Powdered milk

Installation details: Conveying screw with high flow rate to feed an automated big bag filling unit.

