Saxlund INTERNATIONAL

Bulk Solids Handling

Welcome

Here at Saxlund, we thrive on being at the forefront of the bulk solids handling and storage industry. Our dedicated team of professionals are constantly developing new machinery and components, to ensure we give you the customer the best quality possible and keep Saxlund the industry standard.

Over the last 50 years our group have had constant demand from companies worldwide. We offer a complete solution bespoke design, construction, commissioning and comprehensive "after-sales" support.

Our specialist knowledge, with particular expertise in flat bottom silos and bunkers, can be applied to bulk materials and alternative energy solutions for industries including cement, bioenergy, wastewater and recycling.

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Contents

Sliding Frame

Sliding Frame technology was developed and patented by Saxlund back in the 1960's as a method of discharging non-free flowing materials from a round flat bottom silo. Since then the Saxlund Sliding Frame has been successfully used extensively around the world in thousands of installations.

The original Saxlund Sliding Frame utilised a single element reciprocating across the bottom of the silo, recently we have patented a new Twin Element Sliding Frame. This design has some advantages for special cases and for larger silo designs.

Operating principle:

Non-free flowing materials will generally form a bridge across any hole or chute used to discharge the material and require some form of device to "dig" the material out and break any bridges that form.

The Saxlund Sliding Frame is driven by powerful hydraulic cylinders that reciprocate the sliding frame(s) across the silo floor. The Sliding Frame is designed with a cross-section that when travelling in one direction, slides under the stored material, in the other direction will push and pull the material.

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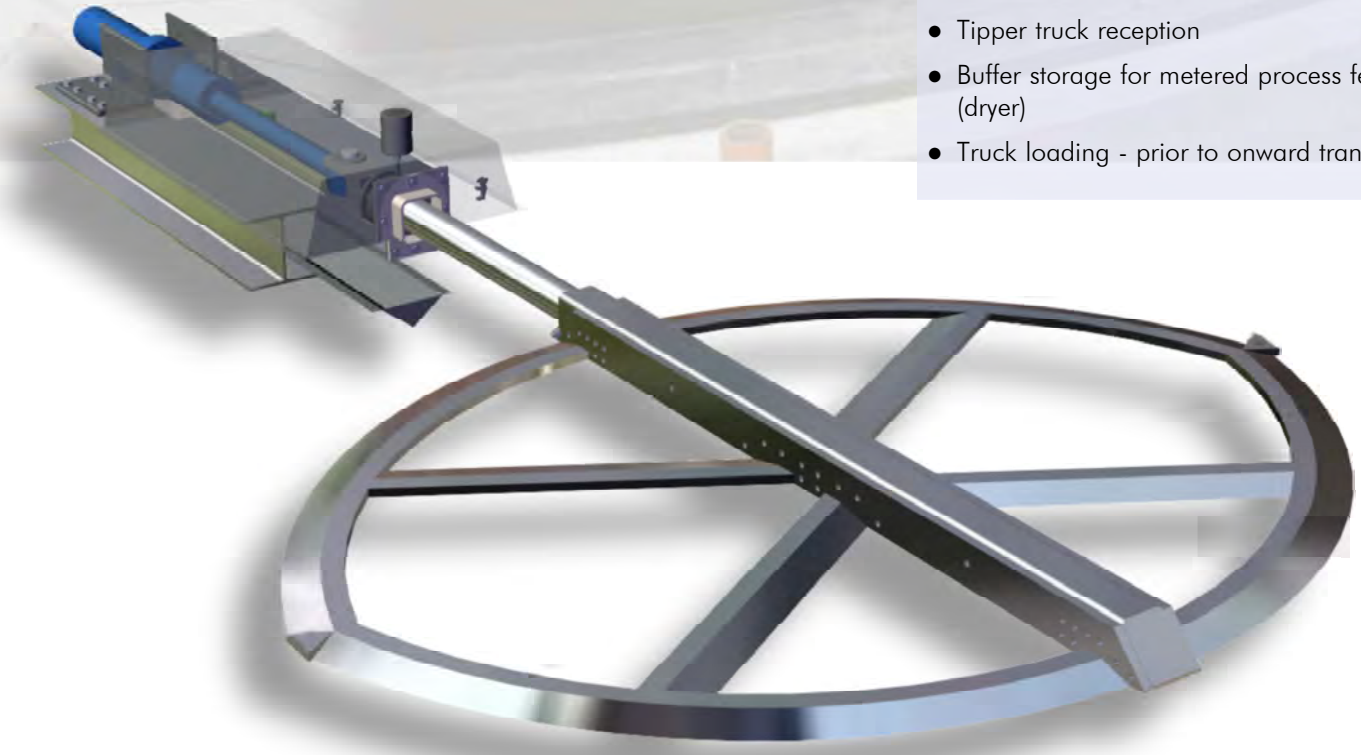
Therefore the Sliding Frame is designed to break any bridges when moving in one direction, and slide under the material when moving the opposite direction, thereby promoting bulk material flow.

Because of this bulk material flow the Saxlund Sliding Frame is a "First in, First out" technology, which is an added benefit for materials that can degrade over time such a sewage sludge cake.

Material removed by the Saxlund Sliding Frame is then discharged into one or more screw conveyors, the control scheme of the Sliding Frame is to ensure that these screws are always kept full of product, to ensure accurate metering.



Typical Discharge Rate

- Up to 130m³/hr (dependent on material and application)

Typical Sizes

- Diameters 2.5 to 11m
- Silo capacities5 to 2,500m³

Advantages

- Effective and simple operation
- Uniform drawdown of material on "first in, first out" principle provides mass flow
- Largest size discharge openings possible
- Accurate discharge and metering of stored material on demand
- Enclosed design – no odour
- External maintenance possible - even with the silo full
- Sliding Frame moves only required loose materials resulting in
  - Low power usage -
  - Low maintenance costs
- Flat bottom silos - more economical to manufacture/maximize storage

Typical Materials

- Sewage sludge cake
- Paper sludge
- Sugarbeet pulp
- Woodchip

Typical Applications

- Tipper truck reception
- Buffer storage for metered process feed (dryer)
- Truck loading - prior to onward transport

Push Floor

Designed for difficult non-free flowing bulk solids, the Saxlund Push Floor is mainly suitable for the cement industry, timber and wood board industries as well as for sludge cake handling in the water industry as well as many other industries worldwide.

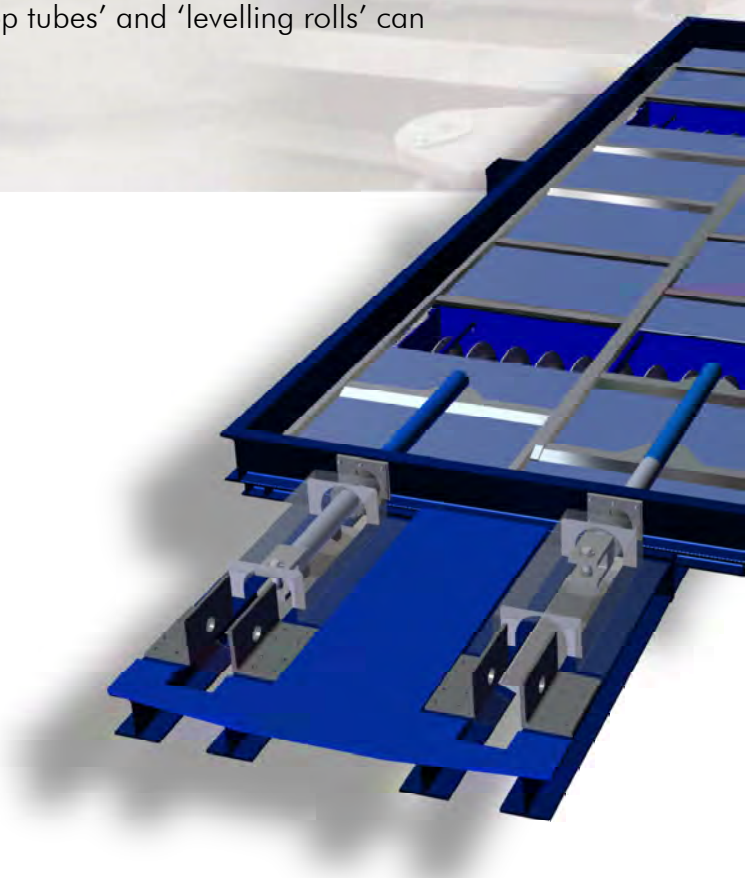
The Push Floor is an 'original' discharger design by the Saxlund International Group for square and rectangular bunkers. The flat bottom floor concept gives many advantages and can be used in a number of different configurations to suit the client's particular requirement.

Reliable discharge and accurate metering can be achieved on demand, providing 'Live Storage' feed solutions to a down stream process for bulk solids, particularly non-free flowing, heavy, wet and difficult to handle materials.

Operating Principle:

A series of parallel pusher frames (ladders) are connected to a series of hydraulic cylinders located at one side of the Push Floor.

Each ladder performs a reciprocating motion on the flat bunker floor shearing a layer of material from the bunker into a collection conveyor. 'Stop tubes' and 'levelling rolls' can be incorporated for smoothed discharge if required.



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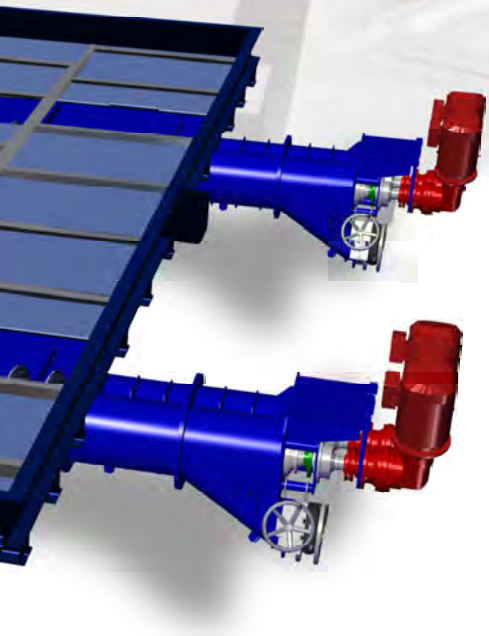
The Push Floor discharge machine can be used in three basic configurations.

- SB pushes material to one end of bunker
- ZB pulls material to one end of a bunker
- SZB push and pulls material to the centre of a bunker

The Push Floor can be used to fill a screw conveyor, chain conveyor or solids pump etc. according to the feed requirements of the next process.

The Push Floor can also be used as a 'drive in, tip and leave' machine or indeed as a stockpile reclaimer.



Typical Discharge Rates

- Up to 500m3/hr per module

Typical Floor Sizes

- Up to 9m wide per section of floor
- Up to 25m long
- Multiple floors can be used dependent on space constraints

Advantages

- Effective and simple operation
- Uniform draw down of material on "first in, first out" principle provides mass flow
- Accurate discharge and metering of stored material on demand
- External maintenance possible - even with full bunker
- Low power usage - ladders move only required loose material
- Low maintenance costs
- Flat bottom bunkers - economic to construct and maximize capacity

Typical Materials

- Wood chips
- SRF and RDF
- Wood pellets
- Tyre chips
- Shredded waste wood
- Palm nut kernels
- Peanut husks/olive waste
- Sludge cake
- Bark

Typical Applications

- Biomass Power Station Fuel Store
- Secondary Fuel Store
- Truck Reception Bunker
- Truck Loading System

TubeFeeder®

The TubeFeeder® provides continuous reclaim of bulk materials from rectangular bunkers, large-diameter silos and open-to-air stockpiles.

The patented TubeFeeder® consists of an open screw conveyor housed inside a rotating tube. The tube is perforated with a regular slot pattern permitting 'activated' material to fall on to the screw conveyor eliminating the external static material pressure on the screw and presenting a uniform feed to the internal screw conveyor.

Designed to provide continuous, high-volume reclamation of bulk materials, the TubeFeeder® system is energy efficient, consuming as little as 25% of the power needed for traditional open screw reclaim systems.

It also provides gentle handling of the materials and can be installed in flat-bottomed bunkers and silos with large spans and diameters, in addition to open-air stockpiles.

The TubeFeeder® is well suited for processes that require a high level of accuracy, offers a superior solution for industries that place exacting demands on efficiency and performance of their materials handling processes.

Tube Feeder

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Operating Principle:

- The tube feeds along its entire length as it rotates.
- Material is fed through special toothed slots as the tube rotates.
- Material bridges over the slots when not in operation.
- The tube activates a layer of material around it when rotating.
- The head load is eliminated since the tube virtually floats subject only to radial forces.
- The internal screw conveys material to the end where it is collect by a (belt) conveyor.
- In rectangular bunkers, the unit is supported at both ends by electric- driven trolleys on rails.
- The reclaim rate is almost proportional to tube rotation speed and can be accurately adjusted.
- The linear TubeFeeder® reverses direction of rotation according to travel preventing foreign objects from wedging between the tube and floor.

Typical Discharge Rate

- Up to 400m3/hr (with a 4:1 turndown)

Standard sizes:-

- Linear: - 14m working section
- Radial:- 19m working diameter

Advantages

- Energy consumption typically 25% of conventional travelling or sweeping open screw
- Consequently – low energy consumption = low wear on components = long design life
- Homogenous even feed through slots along the whole tube length
- Full section reclaim evens out material quality (moisture or size) variations
- Creates mass flow with 'first in, first out' pile handling
- No axial forces – "closed force system" between auger and tube
- No jamming of material against floor
- Static material head load eliminated due to tube action in pile section
- Low wear - tube undercuts material, so is not subject to full head load
- Proven technology with many references

Typical Materials

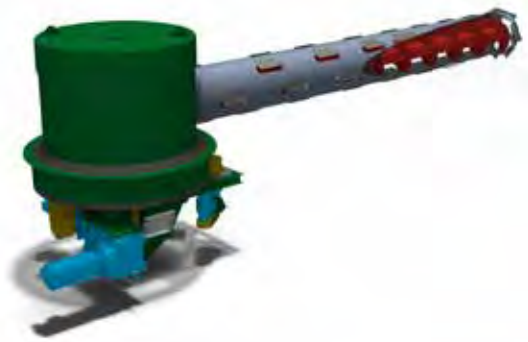
- Hacked wood chips
- Re-cycled chips
- Sawdust
- RDF

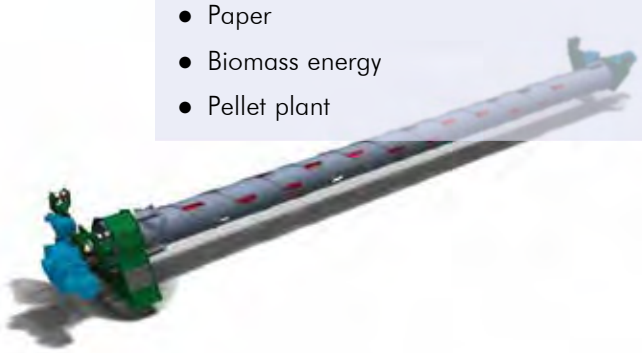
Typical Applications

- Biomass Power Station Fuel Feed Store
- Particle Board Industry Raw Material Store

Industries

- Board
- Paper
- Biomass energy
- Pellet plant





Hydraulic Rotor

Another silo and bunker discharge machine offered by Saxlund International is the Hydraulic Rotor system. To start its operation at low power, the rotor is actuated without the hydraulic system at first.

After a delay of about 20 to 30 sec, the hydraulic system is switched on and the rotor arms dig into the stored material and convey it through openings in the silo floor to the metering screw conveyor below. The Hydraulic Rotor discharge is mainly used for wood applications.

This discharger creates mass flow in flat bottomed circular silos for non free-flowing and difficult to handle materials on a 'first in, first out' basis. This is particularly important for silos as non-laminar discharge from a silo can cause the silo's structures to be exposed to uneven pressure which in the worst case can cause the silo to collapse.

Typical Diameters

- To suit silos up to 8m

Advantages

- Starting torque remains low as rotor arms in
- folded in - low power consumption.
- Hydraulic arms driven out as required to prevent bridge
- Arms return to rest position when not required - less power consumption
- Working pressure of arm activation is adjustable outside silo
- Low maintenance of parts inside silo - no special hooks
- High reliability
- Creates mass flow of material in silo
- Minimum power = low forces = low wear = low maintenance

Typical Materials

- Saw dust
- Woodchip

Typical Applications

- Hacked wood chip storage
- Sawdust storage

Industries

- Alternative energy
- Timber processing
- Chipboard industries

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Chain Conveyor



The Saxlund Chain Conveyor is a continuous operating conveyor enclosed within a bolted rectangular cross-section casing. It may be arranged horizontally or inclined with bends to suit the application.

Material is fed in at the inlet/bottom end. The conveying chain runs on a special wear resistant floor and conveys the material through the upper or lower section to the discharge opening where it is discharged. The drive station is also installed at this outlet end.

The construction type of the conveyor chain is according to the specific bulk material to be transported. All chain links are manufactured from high grade drop forged steel with welded flights or to suit the application. Some materials are conveyed in the lower strand and others in the upper strand according to their characteristics.

Saxlund Chain Conveyors are renowned for their long service life, quiet operation and gentle handling of the bulk solid material.

Typical Discharge Rate

- Standard range to 400 m^3/h
- Larger rates on request

Typical Sizes

- Standard sizes to 1.55m
- Max inclination (depends on materials)

Advantages

- Effective and simple operation
- Low maintenance costs
- Accurate metering
- Made from high grade material
- Complete systems from one experienced supplier

Materials

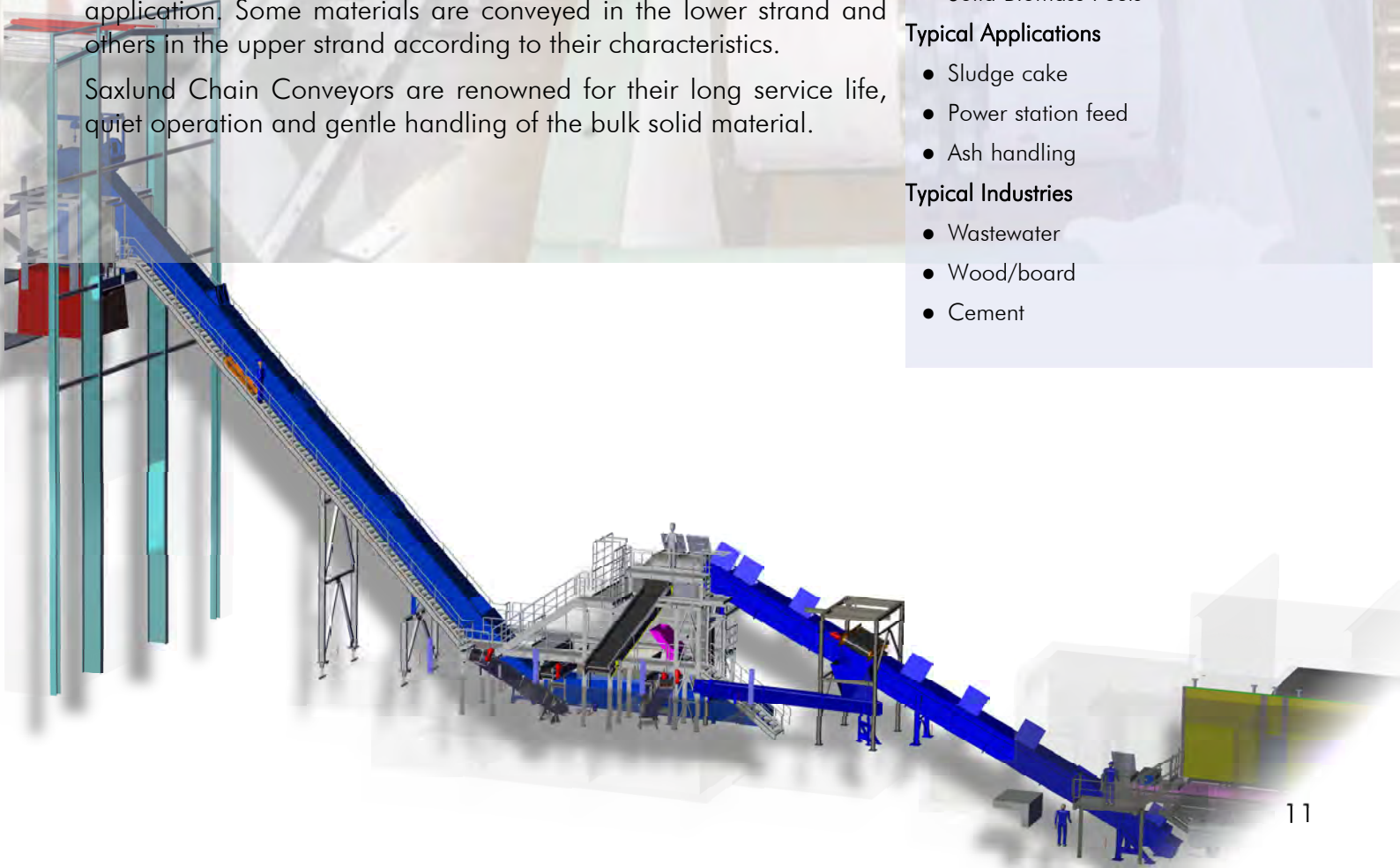
- Sludge
- Wood chip/sawdust
- Gypsum/tyre chips
- Solid Biomass Fuels

Typical Applications

- Sludge cake
- Power station feed
- Ash handling

Typical Industries

- Wastewater
- Wood/board
- Cement



Solids Pump

The Saxlund Solids Pump has been reliably conveying all types of sludge cake for many years. Transporting sludge cake in closed systems keeps it separate from its surroundings and the environment.

Unpleasant odours are now a thing of the past.

Even problem sludge cakes can be pumped without risk.

Our many years of experience are your guarantee of maximum reliability - even when pumping over long distances 24 hours a day.

Typical Discharge Rate

- 4 - 50m³/hr

Pumping Pressures

- Up to 100bar

Advantages

- Cost-effective modular system
- Pumping up to 45% dry solids
- Vertical or horizontal versions
- Hydraulic seals for lower wear
- Capable of pumping foreign particles up to 200mm
- Compact arrangements available (optional)
- Wear indicator
- Easily extended with parallel pump units
- Top entry valve design easily exchanged
- Upstream twin-shaft screw for optimum filling ratio

Typical Materials

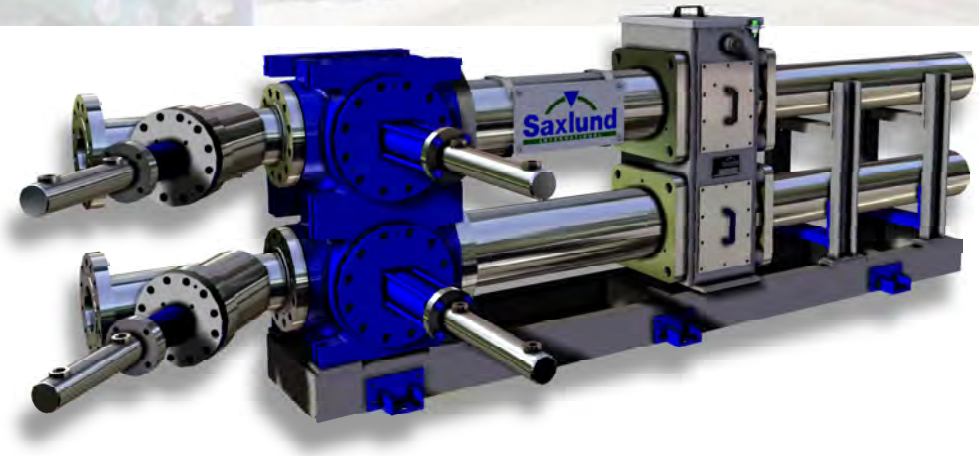
- Sludge cake

Typical Applications

- Pumping sludge cake into storage
- Pumping into incinerator

Industries

- Wastewater



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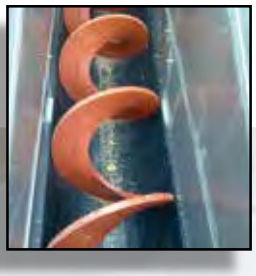
Screw Conveyor



Saxlund Screw Conveyors are an essential part of many conveying and storage systems. Simple design and easy maintenance, screw conveyors successfully move most non-free flowing materials. Saxlund have a long history and experience in the design and construction of Screw Conveyors. We manufacture three main types:

1. Standard Shafted Screws/Conveyor Centre shafted with fully welded flights of stainless or mild steel according to application without a hanger bearing, these screws are used for all general applications and up to 12m in length and 1000mm in diameter. Drives can be chain wheel, shaft-mounted or direct driven to client's request.
2. Shaft-less Screw/Conveyor
   These are generally used for screws longer than 10m and have their casing manufactured in 304 stainless steel. The casing is always lined with low friction UHMWPE plastic material and they are driven by shaft mounted gear motors. Vertical screw conveyor systems can be supplied.
3. Ribbon Screws/Conveyor
   Generally used for conveying very sticky materials that otherwise cause 'logging' in a standard screw.

Typical Rate

- 1 - 200m3/hr

Typical Sizes

- Up to 1000mm in diameter
- Up to 20m in length

Advantages

- Enclosed conveying of materials
- Odour and emissions contained
- Controlled Large inlet to promote the flow of difficult materials
- Smooth and even discharge characteristics
- Superb easy clean facilities
- Easy assembly and replacement of component parts

Typical Materials

- Sludge cake
- Wood products
- Cement

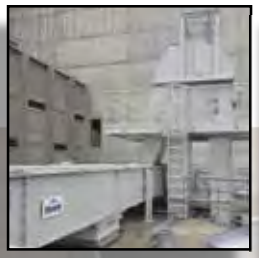
Typical Applications

- Sludge cake conveying
- Wood chip conveying
- Volumetric metering
- Under centrifuge conveying

Industries

- Board
- Wastewater
- Paper
- Recycling
- Biomass energy industries

Bucket Elevator



Saxlund Bucket Elevators are used in many industries for transporting a variety of bulk solid materials up a vertically use the minimum power to perform this operation.

Saxlund manufactures two types of bucket elevator

- Steel buckets fastened to chains running over chain wheels for heavy applications
- Steel buckets bolted to wire reinforced rubber belting running over special pulley drums.

The elevator casing is of welded steel modular bolted construction with anti-run back drive arrangement at the upper discharge end.

Tensioning is either by weights at the lower end or by screwed rods depending upon the application. Individual buckets lift material vertically from an inlet and centrifugal action discharges the buckets at the top of the elevator into a discharge chute.

The bucket elevator requires material to be fed at a controlled rate into the inlet hopper (not flood feed).

Typical Sizes

- 6 standard sizes from 15 to 400 m^3/h conveying capacity

Advantages

- Minimum factory space
- Lower power consumption
- Reasonable maintenance expenses
- Freedom from jamming

Typical Materials

- Ash
- Wood chips
- Wood pellets

Industries

- Particle board
- Biomass fuel handling
- Cement

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Trailer Docking Station

Saxlund Trailer Docking Station (TDS)

The TDS is designed to allow Walking Floor trailers to reverse, dock into the system and discharge materials without spillage into a conveying system.

The TDS utilises screw conveyors to meter the material as it is removed from the trailer and discharge into a chain or belt conveyor for transportation onto the next process.

The TDS is supplied with: a roller shutter door pneumatic expanded bellows seal with the trailer and an integrated dust filter (optional) to provide negative pressure to minimise leaks into the environment.

As an option the TDS can also be supplied with an optional hydraulic power pack to provide motive power to a walking floor trailer, which can then be used to discharge the material into the process when required, thus using the trailer as a small storage silo.

Intake Rate

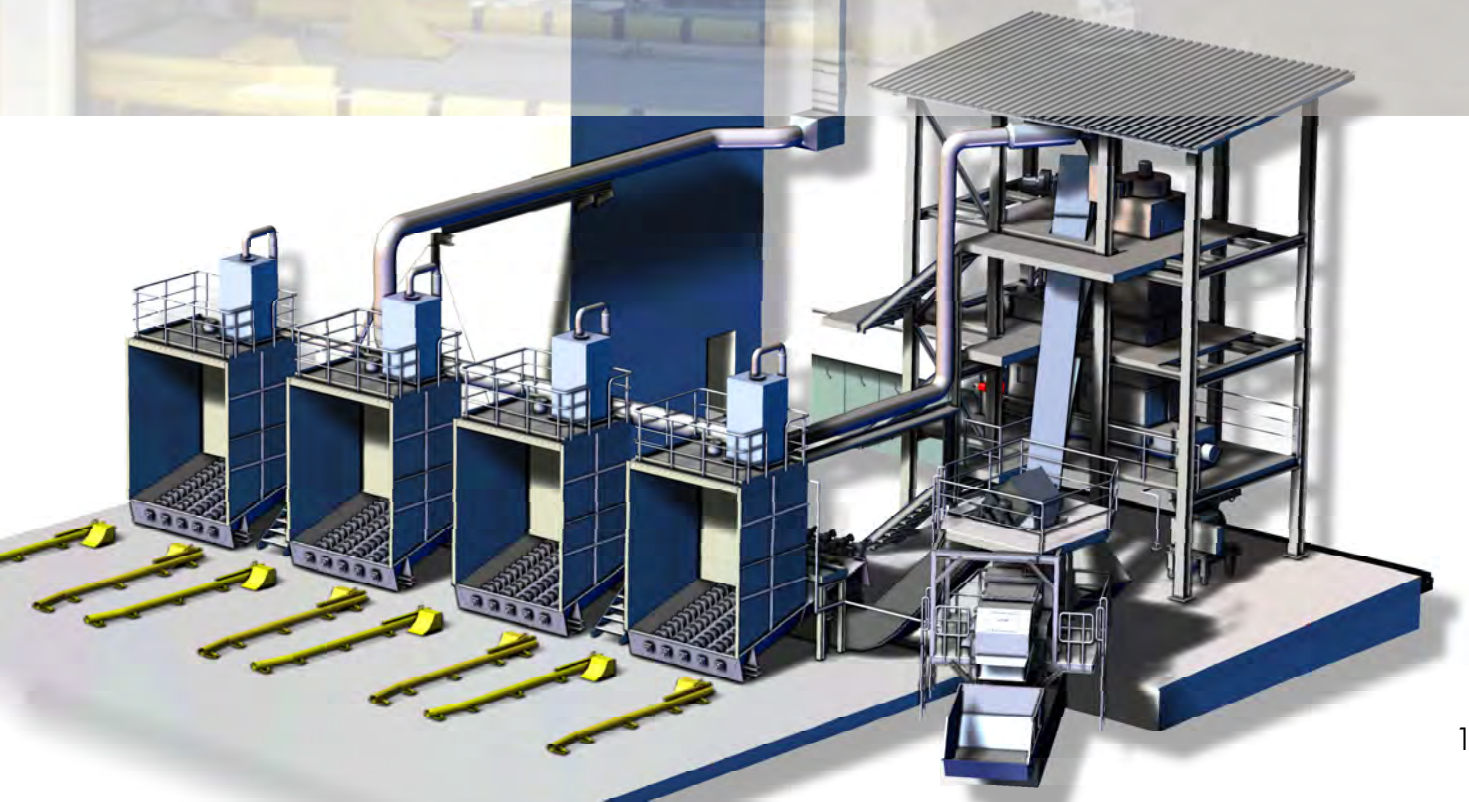
- 10 - 300m³/hr

Advantages

- Self-contained
- Minimises spillage
- Full enclosed for dust control
- High throughput
- Compact
- Low power consumption

Typical Materials

- Virgin wood chips
- Recycled wood chips
- RDF / SRF
- Wood Pellets
- Bark
- ProFuel
- MBM - Meat & Bone Meal



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