Pipe Conveyors
Flexible and environmentally friendly pipe conveyor systems
Cost-effective and reliable material transport, even in difficult topography

Tight curves. Large angles of inclination. Rough, broken and hilly terrain. Restricted operating spaces. Environmentally sensitive topography. Excessive dust and noise emissions. Expensive transfer towers. Unprotected commodities. These all can be challenges when you need to efficiently and safely convey material from point to point.

FLSmith has engineered a cost-effective and reliable material transport solution that meets these challenges head on.

Secure your materials and protect the environment with our dust- and noise-controlled pipe conveyor systems. They’re suitable for all types of bulk materials, from cement to coal, phosphate granulates, and wood chips.

Our pipe conveyor systems are easily integrated into existing and new installations and handle all types of bulk material transport for reliable in-plant and long-distance conveying.

Key benefits
- Reduces dust for 98% of the conveyor length
- Cost-effective and reliable
- Secure materials and protect the environment
- Suited for use in difficult topography

Reduced dust and noise conveying
The pipe conveyor forms an enclosed system just a short distance from the loading zone, meaning dust-free transportation of your bulk materials, all along the conveyor, once the belt is closed. The material is totally enclosed along the belt resulting in reduced damage to rollers. Less damage to rollers reduces noise issues and decreases noise emissions. Dust and noise issues are further reduced by the ability to transport material without the need for transfer points.

Secure your materials and protect the environment
We take our responsibility to the environment very seriously. Our totally enclosed pipe conveyors allow transportation over roads, tracks, waterways or open seas, through existing plants, over public streets, and in virtually any environmentally-protected zone, without contaminating the environment or contaminating the transported material.

Suited for use in difficult topography and tight spaces
The innovative design of our pipe conveyors easily handles long distances and problematic topographic areas, including uphill and downhill conveying, and horizontal, vertical and even 3D curvatures. We customise the design to incorporate your complex needs, using the experience we have gained in designing and building systems for vast array of applications and commodities.

Cost-effective and reliable material transport
Our pipe conveyors deliver substantial savings within limited spatial requirements, as they eliminate the need for high-cost, maintenance-intensive and dust prone transfer stations.

They are very cost-effective, integrating optimally into existing plants, and minimising conveying distances regardless of the landscape parameters. The result is secure conveyance without expensive transfer points. Reliability is also a given as our many satisfied and returning customers can attest. We’ve installed over 300 pipe conveyor systems worldwide.

Reduces CO₂ footprint
Easily integrated into existing plants, our pipe conveyors replace haul trucks (and their associated exhaust and noise emissions) to ensure reliable long-distance transportation. A single pipe conveyor can also replace multiple conventional conveyors, transfer stations and dust control systems. They provide transport of bulk materials which is:
- totally enclosed
- almost dust-free
- spill-free
- reduced noise

This is achieved:
- over roads, tracks and public streets
- across waterways or open seas
- in environmentally protected zones
- through existing plants or underground tunnels
- bypassing factory buildings.

Dealing with difficult topography? Need protection for your materials during transport? Need protection for the environment during transport? Trying to convey material within a limited space? A smart solution in long-distance bulk material transport
Proven conveying solutions in minimum space requirements and at a lower cost

How does it work?
In the material loading area, the conveying belt is still open when the material loads onto the belt in the same manner as with conventional belt conveyors. Over a length of several metres, the belt closes and is forced by special devices into a tubular form. From that point, the belt forms an enclosed pipe that travels the entire conveying line before opening up at the discharge end.

Flexibility
The flexible belt pipe design allows directional changes without the need for additional transfer stations. Its curves can either be horizontal or vertical, or a combination of both. The belt opens on its own before reaching the material discharging point. Following the material discharge, the belt on the lower strand is closed again on its return. This eliminates spill material over the entire pipe conveyor line and has the advantage that the carrying (dirty) side of the belt is once again inside the tube.

Protection for your materials and for the environment
The enclosed conveying means that your material is protected against external environmental factors, such as wind, humidity and rain, while the pipe configuration protects the environment against dust or any potential material loss. Where the environment is a concern, pipe conveyors have become the default choice, even preferred by regulatory bodies. There is no spillage on the return platform to carry out belt splicing in the pipe forming/opening section. Enhancing operational reliability. Our systems are designed to handle 30-degree inclinations. We have engineered and installed systems with conveying angles from plus 29-degrees to minus 26.5.

A total cost-effective solution
Our pipe conveyor systems are the go-to solution if you want to connect your mine or port to your plant for raw material; plant to port for finished product, or from plant to mines for waste disposal through the same conveyor. If you are upgrading an existing brownfield plant and have space constraints or are looking to tackle spillage from minerals handling conveyor systems, the pipe conveyors provide a cost-effective solution. In turn, maintenance and operating costs are also lowered.

Forward-thinking technology, operationally tested results
Pipe conveyors require up to only 60 per cent of the space of conventional systems and ensure reliable long-distance transportation. They have a smaller footprint compared with troughed conveyors, and one pipe conveyor can replace several conventional belt conveyors.

Our pipe conveyors are specially-designed to ensure high availability and low investment costs for the transport of all types of bulk materials.

We incorporate our extensive know-how of conveyor design and experience working with a varied range of materials into each pipe conveyor we build. Our numerous specially developed design elements, many of them patented, have been fully tested and optimised in actual operation.

With more than 300 installed systems and over 200 km of conveying length located in over 40 countries, our pipe conveyors are clearly the world’s foremost. No other pipe conveyor system is so fully developed, installed in so many applications, and so successfully tested in operation.

Features:
- Reduced dust and spillage
- Low noise emissions
- Inclines up to 30°
- Horizontal and vertical curves as small as 45 metres
- Steep downhill conveying with high slope angles
- Multiple feed and discharge points
- 8 km and greater distances possible without transfer stations
- Simultaneous conveying of different materials in both directions
- Intelligent drive control systems reducing belt stress by torque-sharing
- Handling of all kinds of bulk materials
- Lump sizes up to 200 mm (pipe diameter = 2.5 to 3 times maximum lump size).

Patented features and additional bonuses
Why choose FLSmidth to supply your pipe conveyor solution?
Our systems incorporate patented features to deliver enhanced performance.
- Unique belt rotation monitoring system to ensure that the pipe conveyor is not damaged due to uncontrolled rotation.
- If you’re operating a two-way conveying system, a unique gear arrangement of the casing of the carry and return lines simplifies discharge design and improves overall layout.
- Unique roller holding brackets that ensure ease of installation and maintenance.

Additional reasons why you should consider operating our pipe conveyors:
- Unique safety element to ensure the pipe conveyor is not damaged because of oversized load or overfilling – in the case of overfilling, the upper part will be filled, and an electrical switch will be activated to immediately stop the conveyor.
- World-class belt quality assurance, ensuring this critical component runs trouble-free. We utilise an in-house test rig to check for fatigue in the belt (ack of rigidity) and inspection reports and belt samples are always available to ensure the belt meets your requirements.
- Adjustable idlers are uniquely designed so they provide a flat platform to carry out belt splicing in the pipe forming/opening zones on the carry side.
- DEM analysis of the transfer chute design to ensure correct material flow.
Suitable for a wide range of bulk materials and industries

FLSmidth Pipe Conveyors reliably transport the most diverse of materials, including, but not limited to:

- Limestone
- Wet and fly ash
- Coal and substitute fuels from recycled industrial waste
- Wood chips and straw material
- Pellets
- Filtered slurries and biomass
- Coarse overburden
- Fine powder such as alumina or cement
- Copper concentrate
- Iron ore.

They handle conveying tasks in mines, power plants, lime mills, cement plants, paper product industries, particle board, and synthetic fibre industries, as well as smelting plants – all in an environmentally secure system that protects the material while saving space and costs.

Our pipe conveying systems are suitable for tunnelling projects, the removal of earth and rocks, and temporary installations (even hinged at the tunnel ceiling). The small vertical and horizontal radii allow easy adaption to the tunnel structure. Tunnel width can be reduced as our system is narrower than conventional conveying systems. In addition, the pipe conveyor design allows for the option of one side walkway for maintenance access rather than walkways on both sides.

Unbeaten technology, operationally tested

With over 300 systems implemented, you can trust that our pipe conveying systems are the result of unbeaten technology as well as state-of-the-art planning and design aids, such as specialist software and extensive data banks. These form the basis for the success of our pipe conveyor performance. We maintain an association with well-known international research institutes to continue ensuring we offer you any available upgrades and the best technology available on the market.

Double guarantee against overfilling

We have tested and optimised the systems during operation, assuring the highest reliability; even with widely fluctuating load factors. The design of our pipe conveyors uses the finite element method and computer simulations. Using overload panels and a level monitor for the material flows, our pipe conveyor, in its base model, provides a double guarantee against overfilling. The belt scale, which can be installed in the closed belt pipe section, has been specifically developed for use in our pipe conveyor systems.

Bi-directional transport – conveying in an upper and lower belt

For a standard pipe conveyor, the material is fed onto the upper strand and is discharged at the end. However, for bi-directional material transport, the system is changed slightly: before the belt closes again in the lower strand, it is turned by a special idler arrangement.

This means the carrying side of the belt remains unchanged and the lower strand can be fed like the upper one. The belt closes again after material loading, with the belt also overlapping on the top side of the pipe, the same as with the upper strand.

At the discharge end, the material is normally discharged sideways in order to leave enough space for the final belt turn. This way, the pipe conveyor enables simultaneous transportation in two directions with different materials.

The newly-patented “Pretzel” solution, however, avoids the side discharge so the discharge is always at the upper strand and the loading point at the lower strand.

Complete life cycle offering

We offer a complete life cycle solution, from concept right through to operations and maintenance, including all spare parts. You can be sure when you purchase our pipe conveyors that we will have the required expertise and equipment on hand to enable you to complete projects reliably and according to time schedules – from the initial layout through the bid process, fabrication, erection and commissioning.

Supplementary components

A multitude of supplementary components are available. These lay the foundation for the development of innovative conveying designs for new tasks, new materials, and new applications. Typical accessories include:

- Spillage conveyor
- Pipe conveyor belt scales
- Metal detectors
- Magnetic separators
- Special tools for the belt installation
- Belt turning stations for the simultaneous conveying of different materials
- Strapping machine
- Self-propelled trolley (for where there is no walkway installed)
- Digital sensors

Double load transport

Structural components - idler panels

Patented pipe conveyor profile monitoring system
FLSmidth – a partner you can trust

We approach your project not just as suppliers, but as partners invested in your success. We provide equipment, software and advisory services to bring your pipe conveying operation to full potential, including electrical automation services for multi-drive synchronisation. Our vast experience and knowledge ensure that you are given the advantage of global technology with a local presence.

We can offer you:
• Equipment on an EP basis (engineering and procurement)
• Equipment on an EPC basis (engineering, procurement and construction)
• Feasibility studies
• Plant audits
• Contract operation and maintenance
• Retrofit (if you wish to change an existing conveyor from one-way to two-way)
• Augmentation (enhancing the pipe conveyor’s capacity)
• Forensic troubleshooting services
• Critical parts (such as the pipe conveyor belt, which we ensure meets the given requirements as they are tailor-made for your equipment)

After-sales service
You receive the benefits of FLSmidth’s supply chain and supplied components.
You know that we will be on board with you all the way.

Additionally, we offer service agreements and training so that your operators will know how best to operate your pipe conveying systems safely and efficiently.

FLSmith provided an 8.2 km long pipe conveyor to connect the Conchán port to the cement plant in Atcongo. At the time of installation, it was the longest pipe conveyor in the world, with a 6.5 km section running in a curvilinear tunnel below the city of Lima.

The pipe conveyor is used for bi-directional conveying, carrying coal, limestone and gypsum from the port to the plant, and cement and clinker from the plant back to the port. It handles up to 690 t/hr of cement or clinker (upper strand) and 515 t/hr of coal, limestone or gypsum (lower strand).

The cement product could not be mixed with the coal and vice versa, so the pipe conveyor was provided with special features to ensure that the conveying surface was properly cleaned at both ends of the conveyor at material discharge and receiving points. This was achieved by cleaning the belt before the loading point via the belt being turned over, using additional scrapers, and belt washing. This ensured that coal and cement did not contaminate each other.

Our pipe conveyor design, utilising minimal radius horizontal and vertical curves, allowed optimum integration into the tunnel – superior to what could be achieved using conventional belt conveyor technology. The system also minimised dust emissions and material spillage, improving ventilation and minimising the need for tunnel maintenance.
Blue Dolphin, Chile

FLSmidth engineered this power plant pipe conveyor system to handle a variety of materials at the Blue Dolphin Mejillones port, located in the north of Chile. At 1.5 km in length and 650 mm in diameter, it is the biggest and longest pipe conveyor in Chile.

The pipe conveyor is used to discharge 3,000 tph of coal, limestone and biomass from the offshore unloading station to the onshore power plant. To avoid dust pollution at the jetty charging station we engineered a special belt sealing system. Before the belt is sealed at the jetty end we also installed a belt scale, accurate to 0.125%.

The system runs both horizontal and vertical curves over the sea and then crosses a public road, with the route continuing to the transfer tower to discharge to different conveyors which feed the power plant.

As material loss must be avoided under all circumstances, the pipe conveyor is the optimal solution, meeting this pre-condition more than satisfactorily.
TOWARDS ZERO EMISSIONS IN MINING

Zero water waste

Zero emissions

Zero energy waste