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CONVEYORS

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CONVEYORS

A ThomasNet Buying Guide

Conveyors are mechanical devices or assemblies used to move items or packages with minimal effort. They usually consist of frames that support rollers, wheels, or belts and may be motor powered or manual devices. They are used to move bulk material too, such as gravel or aggregate. They include belt conveyors that use moving belts, bucket and vertical conveyors that lift material, vibrating conveyors that use vibratory motion to move material, and overhead conveyors from which items hang during transport. Other types include screw conveyors for moving bulk material, chute conveyors which rely on smooth surfaces and gravity, and drag or tow conveyors that use cables to drag objects along. Walking beam conveyors move objects to predetermined positions for manufacturing operations.



Types of Conveyors

Slat/Apron

Apron/Slat Conveyors are material handling systems that use steel, wood, or other materials typically mounted on roller chains to convey product. Key specifications include the intended application, configuration, load capacity, slat width and overall conveyor length, along with electrical specifications as required. Apron/slat conveyors are used primarily in material handling applications for moving large, heavy objects including crates, drums, or pallets in heavy-industry settings such as foundries and steel mills. The slats allow for heavy duty use with less wear and tear. These conveyor systems are usually powered and come in many sizes and load capacities.

Ball Transfer

Ball Transfer Conveyors are material handling systems that use a series of mounted ball casters to allow for unpowered, multi-directional conveyance of the product. Key specifications include the intended application, load capacity, ball material and size, as well as the overall conveyor length and width. Ball transfer conveyors are used in material handling applications such as assembly lines and packaging lines, among others. Many sizes and load carrying capacities are available. Ball transfer conveyors are not powered and rely on external forces to move the product along the conveyor.



Belt



Belt Conveyors are material handling systems that use continuous belts to convey products or material. Key specifications include the intended application, belt type, load capacity, conveyor length and width, as well as electrical specifications as required. Belt conveyors are used material handling applications such as food services, baggage handling, packaging, scrap handling, and postal service, among many others. Various belt materials are available including metals and non-metals depending on the application requirements. Belt conveyors are typically powered and can be operated at various speeds depending on the throughput required. The conveyors can be operated horizontally or can be inclined as well.

Beltless Magnetic

Beltless Magnetic Conveyors are material handling systems that use moving magnets beneath stationary plates, tables, etc. to move magnetic (ferrous) materials usually in the form of machining scrap, etc. Key specifications include the intended application or conveyed product, throughput, and electrical requirements. Systems can be horizontal, vertical, or combinations.



Bucket



Bucket Conveyors are material handling systems that use multi-sided containers attached to cables or chains to convey products or materials. Key specifications include the intended application or conveyed product, configuration, bucket and load capacity, throughput, as well as the electrical requirements. Bucket conveyors are used in applications such as parts, bulk material, or food handling. This conveyed material can be liquid or dry such as sludge, sand, manure, sugar, etc. or relatively light materials or product. The systems can be used horizontally or can be inclined to change levels of the delivered products. Many sizes and load carrying capacities are available depending on the application.



Chute

Chute Conveyors are material handling systems that use gravity to convey product along smooth surfaces from one level to another. Key specifications include the intended application, load capacity, and chute material, as well as the physical dimensions such as length and chute width. Chute conveyors are used for scrap handling, packaging, postal service, etc. Their chutes are generally smooth allowing the product to slide easily and can be straight or curved depending on the application.

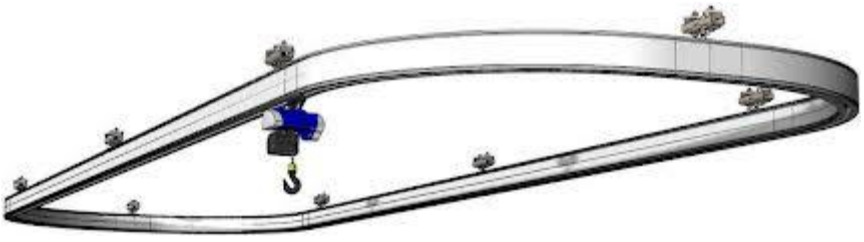
Drag/Chain/Tow

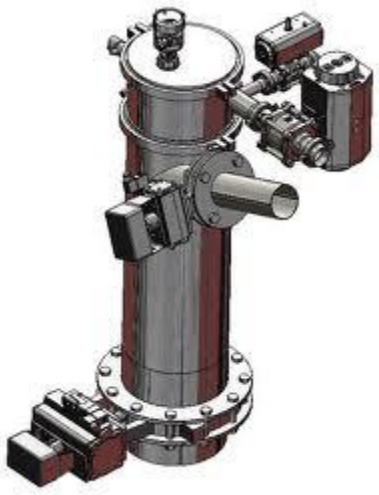


Drag/Chain/Tow Conveyors are material handling systems that use mechanical devices attached to moving members, usually chains or cables, to drag or tow products. Key specifications include the intended application, conveyor type and configuration, load capacity, and power rating, as well as other electrical requirements. Drag/chain/tow conveyors are used primarily in material handling applications to drag or tow various products in different manners. Chain conveyors are used for product being attached to, and conveyed directly by, the chain and used for moving pallets or other hard-to-convey products. Tow conveyors use cables or chains, usually in the floor or just above it, to tow product directly or to tow wheeled carts or dollies. Drag conveyors are used to convey bulk materials in bins, flights, or other attachments and can have multiple discharge or loading points. Tubular drag conveyors are able to convey product in any direction.

Overhead

Overhead Conveyors are material handling systems mounted from ceilings that use trolleys or carriers moved by chains, cables, or similar connections. Key specifications include the intended application, conveyor type and configuration, control type, and load capacity, as well as the required electrical specifications. Overhead conveyors are used primarily in material handling applications where the product needs to be hung such as dry-cleaning garment lines, paint lines, or parts handling systems, of for cooling and curing. Various configurations are available including electric track, monorail, trolley, as well as inclined or ramped. Depending on the application, the load carrying capacity may be critical. Most overhead conveyors systems are powered and controlled, while others are hand operated.





Pneumatic/Vacuum

Pneumatic / Vacuum Conveyors are material handling systems that use air pressure or vacuum to transport materials or items in or through closed tubes or ducts or along surfaces. Key specifications include the intended application, conveyor type or configuration, and working pressure, as well as the power requirements. Pneumatic/vacuum conveyors are used primarily in materials handling applications such as dust collection, paper handling, ticket delivery, etc. and in processes such as chemical, mineral, scrap, and food. Materials for the conveyors can be metallic or non-metallic depending on the media being conveyed. Various sizes are available depending on the load and throughput requirements.

Powered Roller

Powered Roller Conveyors are material handling systems that use powered rollers mounted in frames to convey products. Key specifications include the drive type, load capacity, roller diameter and material, and the axle center dimension, as well as the power requirements. Powered roller conveyors are used primarily in material handling applications that require powered conveyance of the product. Various drive types include belts, chains/sprockets, and motorized rollers. Many applications of powered roller conveyors include food handling, steelmaking, packaging, etc.



Roller

Roller Conveyors are material handling systems that use rollers mounted in frames to convey product either by gravity or manually. Key specifications include the load capacity, roller diameter, and axle center dimensions, along with the conveyor overall length and width as required. Roller Conveyors are used primarily in material handling applications such as on loading docks, for baggage handling, or on assembly lines among many others. The rollers are not powered and use gravity, if inclined, to move the product, or manually if mounted horizontally. The conveyors can be straight or curved depending on the application and available floor space.





Screw

Screw Conveyors are material handling systems that use helical elements to convey products. Key specifications include the conveyor type and configuration, load capacity, throughput, and length, as well as the required electrical requirements. Screw conveyors are used primarily in material handling applications including food handling, concrete, and chemicals, among others. Screw conveyors can also convey various mechanical parts. A typical use may be for bottling applications to convey the bottles discretely. The screw can be of a paddle or ribbon design depending on the application and can be driven via a chain and sprocket, gears, or direct drive. Materials can be metal or non-metal depending on the media being conveyed.



Vertical

Vertical Conveyors are material handling systems that move product vertically between levels of conveying lines. Key specifications include the configuration, load capacity, lift speed, and maximum load height, as well as the dimensions of height and width and the electrical requirements. Vertical conveyors move material or product to higher levels within a facility. They are further classified as continuous lifting or reciprocating. Various sizes and load capabilities are available depending on the application.

Vibrating

Vibrating Conveyors are material handling systems that use rotary or linear vibration to move material along their system beds. Key specifications include the intended application, load capacity, and throughput, along with the physical dimensions and electrical requirements. Vibrating conveyors are used to move dry, bulk materials such as aggregate, gravel, coal, etc. The bed of the conveyor vibrates to move the material along its length. The conveyor can be a trough or a flat, table top. Many sizes are available depending on the application.



Walking Beam

Walking Beam Conveyors are material handling systems that use a combination of static supports and moving supports to index workpieces through manufacturing cells. Key specifications include the intended application, load capacity, and throughput, along with the physical dimensions and electrical requirements. Walking beam conveyors are used on automation and assembly lines, where items



need to be placed in specific locations in a sequential manner. The item being supported at a stationary position is picked up by the walking beam and indexed to its next position, where another manufacturing step takes place. This is repeated over the length of the conveyor.

Wheel

Wheel Conveyors are material handling systems that use unpowered wheels to move objects along their lengths by gravity or manual power. Key specifications include the intended application, load capacity, and throughput, along with the physical dimensions and electrical requirements. Wheel conveyors are used for item or package handling, and are commonly employed for loading and unloading trucks and for moving packages, pallets, etc. through facilities or along assembly lines. The conveyors are configured by number of wheels and wheel spacing, depending on the load requirements and the application.



Applications and Industries

Conveyor selection depends on product type, throughput or speed, elevation change, and in some cases industry focus. Belt conveyors, for instance, come in variety of sizes and can range from foot-long units used on packaging lines to mile-long systems used for mining operations. Conveyors can be hand powered—where products are moved along manually over rollers or wheels—or air powered, engine powered, etc. In general, though, they are driven by ac and dc motors either directly or through reduction gears, chains and sprockets, etc.

Products generally ride on the top surfaces of conveyors though some exceptions exist. Overhead conveyors, as found at dry cleaners, slaughterhouses, etc., suspend their loads from trollies which ride along overhead tracks. Other conveyors such as screw and pneumatic types convey their products through semi-enclosed troughs or tubes. These conveyors often handle dry products and powders.

Some conveyors are designed to locate products precisely between manufacturing operations. Walking beam conveyors are an example of this type. Other conveyors transport hard to handle products such as cosmetic bottles through fillers, labelers, etc. by holding each container in individual pucks or pallets.

Conveyors are sometimes custom designed from modular components such as straightaways, curves, transitions, merges, dividers, etc. Manufacturers of such components often provide design expertise and installation assistance. Other conveyors are stand-alone systems, complete with drives and controls. An example of this is a take-away conveyor used at the discharge of an extrusion line, pictured at right.



Manual type roller and wheel conveyors can often be purchased in discrete sections and bolted up to form material handling systems of nearly any length.

In general, powered conveyors employ headshafts and tailshafts where the head end provides the drive arrangement and the tail end provides for adjustment of the chain or belt tension. Controls can be simple on/off varieties, slightly more sophisticated soft-start types which cushion loads upon start up, or variable frequency drives that can control the speed, acceleration, etc. of ac motors. Many additional control options exist.

Very long belt conveyors transporting ore, etc. often rely on conveyor belt idlers to form troughs in the belts to better contain the materials.

Considerations

Conveyors systems are often fairly complex in their design and construction owing to their large scales and integration into many various factory processes. Still, the modular nature of many conveyor components makes even long and complex systems readily achievable. Manufacturers of such systems can offer design assistance.

Conveyors that move things mainly horizontally need not rely on friction or other means to prevent product slippage, whereas inclined conveyors need to take this into account. Cleats, high friction belting, buckets, etc. are common forms of preventing product slip. A heavily loaded inclined belt conveyor can slip backwards when the drive is off and such conveyors employ backstopping brakes that engage automatically with de-energization of their motors. Often, the brake is releasable in order to allow the conveyor to reverse for unloading prior to servicing.

In some conveyors, a certain amount of slippage is desirable; those handling glass bottles on packaging lines will often employ some form of back-pressure relief to prevent breakage to the bottles as they accumulate in a staging area such as a filler infeed.

Other safety considerations must be exercised due to often long conveyor lengths and their proximity to personnel. Live roller conveyors can be furnished with pop-out rollers that disengage from their drive belts if a person's hand or foot slips between rollers. Crossovers can be supplied to permit people to pass over long sections of belt conveyors. Roller style conveyors often use manual or powered gate sections to accomplish the same ends. Many conveyor safety concerns are taken up in the standards referenced below.

Conveyors often incorporate some type of soft starter or clutch mechanism to avoid overloading motors when starting fully loaded belts, chains, etc. Some belt conveyors are fitted with so-called drum motors which incorporate internal motors and gear drives within the head rollers which eliminate the need for externally mounted motors and power transmission components.

While many conveyor systems are fixed and permanent a great many are also transportable and designed for loading trucks, railcars, silos, etc. Outfeed and infeed conveyors built specifically for packaging operations are often caster mounted for easy transport within a facility.

Important Attributes

Load Capacity per Unit Length

Manufacturers will offer this attribute in cases where the conveyor will be built to a custom length to permit users to determine loading margins.

Maximum Load Capacity

Associated with Load Capacity per Unit Length, this value can be stated for fixed length, purpose built conveyors.

Belt Speed/Rated Speed

Bet conveyors are typically rated in terms of belt speed in ft/min. while powered roller conveyors described the linear velocity in similar units to a package, carton, etc. moving over the powered rollers. Rated speed applies to apron/slat conveyors and drag/chain/tow conveyors as well.

Throughput

Throughput measures the capacity of conveyors that handle powdered materials and similar bulk products. It is often given as a volume per unit time, for instance, as cubic feet per minute. This attribute applies to bucket, pneumatic/vacuum, screw, vibrating, and walking beam conveyors.

Related Product Categories

- **Conveyor Belts** are continuous lengths of various types of material looped around rollers and used to move items and materials.
- **Engineering Chains** are mechanical devices consisting of series of links with pins that are interconnected to form flexible assemblies which are used for conveying, etc.
- **Transfers** are devices, assemblies, or systems, used for moving items, liquids, materials, etc. often between two or more controlled operations, stages, and so forth.
- **Rollers** are cylindrical devices that roll for the purpose of movement, transfer of objects, for creating patterns, or for functioning as tools.
- **Conveyor Belt Idlers** are devices used on belt conveyors to guide and shape the belts and are commonly employed on trough conveyors.
- **Lacing**

Resources

General

General conveyor overviews
http://www.flostor.com/library/introduction_to_conveyors.html
http://www.hytrol.com/brandinfo/hcctraining/abc.html
A (free) old conveyor safety standard (1957) with still-relevant overview material
https://law.resource.org/pub/us/cfr/ibr/002/ansi.b20.1.1957.pdf
or, purchase the latest here
http://webstore.ansi.org/RecordDetail.aspx?sku=ASME+B20.1-2012&source=LP_Conveyors
A good collection of everything conveyors
http://www.cisco-eagle.com/catalog/c-3194-conveyor-tips-info.aspx
Trade groups
http://www.cemanet.org/

Manufacturers and Suppliers

http://www.conveyorcraft.com/index.html
http://chains.ustsubaki.com/viewitems/roller-conveyor-chains/apron-conveyors-2?
http://catalog.jamiesonequipment.com/category/-conveying-equipment-vibratory-conveying-equipment
http://conveyors-ovens.lewcoinc.com/
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http://catalog.kamflex.com/
http://magneticproducts.mpimagnet.com/category/agnetic-and-non-magnetic-material-handling-systems
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http://bagsealingandhandlingproducts.packrite.com/category/conveyors-accumulating-tables
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http://products.rmhinc.com/category/conveyors-2
http://foundry-equipment.moderneq.com/item/aluminum-melting-furnaces/modern-automated-bucket-conveying-system/modern-automated-bucket-conveying-system
http://www.blasdel.net/oven-conveyors-material-handling.html
http://www.lbproducts.com/overhead-conveyor-systems.html
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