

# Aeromechanical vs. CONVEYORS

- ✓ Dust-free enclosed system
- ✓ Occupies less space
- ✓ Direct material flow
- ✓ Energy - Efficient
- ✓ Flexible layout
- ✓ Quiet



**HOW DO YOU  
CLEAN  
IT  
?**



- ⊘ Cable Life is Short
- ⊘ Product Damage upon Impact
- ⊘ Can't Start/Stop
- ⊘ Difficulty Starting Under Load
- ⊘ Must Empty System between Runs
- ⊘ Speed May Fluidize Product

**641-673-8451**  
**Go to [compare.cablevey.com](http://compare.cablevey.com)**  
**for a more complete comparison**



The aeromechanical conveyor, also known as a rope-and-disc conveyor, has been in use since the early 1960s. The aeromechanical conveyor is a completely enclosed, high capacity mechanical conveyor that can convey pellets, flakes, powders and granules. It can be used to move a variety of products including plastics, tea leaves, coffee beans, and even titanium dioxide.

This type of device is perfect for transporting materials from 10 feet to 85 feet, vertically, horizontally or varying angles. An aeromechanical conveyor can be designed and custom-made for the materials that will be conveyed.

A typical aeromechanical conveyor contains the following main components: inlet housing, outlet housing, set of conveyor tubes, rope-and-disc assembly, electric drive motor and a gravity inlet. The conveyor's constant-diameter tube contains a series of discs mounted at fixed intervals on a cable plus a motor that thrusts the discs through the tube at such a high speed that it creates a moving current of air in which to convey the materials. A dust hood can be installed over the hopper to reduce or eliminate dust during feeding of an aeromechanical conveyor.

Materials in an aeromechanical conveyor can be conveyed at capacities of up to 120 tons per hour and speeds of 702-1175 ft./min. Solids that are finer and fluidize more easily can be run at 351-587 ft./min.

As the material is fed in, the air stream aerates or fluidizes it and transports it to the outlet, where it is ejected by centrifugal force. Because of the way it is conveyed there is very little degradation to certain types of material. Unlike screw conveyors that can cause some products to cake up, the aeromechanical conveyor efficiently moves the material without any problem because of its fluidizing action.

However, certain problems can occur with aeromechanical conveyors.

One problem is that the material being moved can often bridge at the inlet of the conveyor. When that happens, the conveyor will run, but it won't move the materials and/or the rate of throughput through the system is not consistent.

The problem occurs because most of the gravity-flow chutes of the conveyor's inlets are angled at 45 degrees and most moist, fatty, or cohesive materials can't flow at that angle without some help. Additionally, problems with the flow in the equipment that feeds the conveyor like the stream hoppers and ductwork can also cause bridging at the conveyor's inlet. As mentioned, these problems can cause your conveyor to run without transporting your materials or to move the materials at an inconsistent rate.

Most makers of aeromechanical conveyors can outfit an inlet with a vibrator that helps move moist, fatty or cohesive materials. And some manufacturers offer a fluidization membrane that can be affixed to the shallow slope of the inlet to help transport these materials. However, this adjustment



won't remedy problems with the flow in the ductwork, upstream hoppers or other mechanisms. You should consult with your supplier to make sure that the upstream equipment is designed so that your materials can flow into the inlet at a consistent rate.

Another problem with aeromechanical conveyors is that the conveyed material can build up on its interior components. When this happens one or more of the following symptoms will occur: the drive motor stops working, the conveyor stalls, the V belts slip, and the rope-and-disc assembly slips.

The build up occurs when a material that contains a large amount of fat or moisture, or a cohesive material that is inclined to cake, builds up in the conveyor, usually in the sprocket discharge housings, stopping the discs from sweeping freely around the sprocket. This, then, enhances the drag on the rope-and-disc assembly, which, in turn, can cause the V belts to stop and also cause the motor to fail.

If the conveyor slows down because of the increased drag the material can fill nearly half of the space between the discs, even filling it completely on occasion. If this happens, the rope-and-disc assembly can pull apart or the conveyor can stall.

In addition, the same problems that occur when the conveyed material builds up on its interior components can occur when the discharge spout is plugged with material. Because the symptoms are the same, it's important to determine if the material is building up inside the conveyor or plugging up at the discharge spout.

The discharge spout can get plugged up when its design doesn't let the centrifugal force eject the material because the discharge connection has a smaller opening than discharge spout, which is typically 6 to 8 inches in diameter. The discharge connection is often added to the opening of the discharge spout to guide the material to a receiving hopper or other downstream equipment.

If the discharge connection has a smaller opening or is placed at an angle, preventing the material from exiting freely, the material can back up in the discharge connection as well as in the ductwork between the connection and the receiving hopper, plugging up the discharge spout.

If the material can't be ejected, it will circulate through the conveyor again, causing a heavy load that can cause the drive motor to stop working, the conveyor to stall, the V belts to slip, and/or the rope-and-disc assembly to slip.

To make sure that the material can be discharged via centrifugal force, ensure that the diameter of the discharge connection is the same diameter as the discharge spout. In addition, position the opening of the discharge spout as close as you can to the receiving hopper in order to minimize the amount of ductwork between the spout and the hopper



Another problem with aeromechanical conveyors is the frequent failure of the rope-and-disc assembly, which happens because over the lifetime of the system the wire rope travels around the sprockets millions of times at high speeds, causing it to wear out and lose flexibility.

That means you need to replace the conveyor's rope-and-disc assembly regularly, usually after every 1,500 to 3,000 hours of operation. For that reason, aeromechanical conveyors are best for batch operations.

And because the tension of the rope needs to be adjusted at regular intervals, especially during the start-up period, and checked periodically, maintenance costs can also run higher than with other types of conveyors. And because the rope is a series of strands, cleaning it is not an easy proposition. An aeromechanical conveyor can be dry-cleaned or washed throughout with a cleaning fluid and run on empty for a while to dry.

A tubular drag conveyor is an enclosed mechanical conveyor that uses a cable-and-disc assembly to continuously move materials through a tube at high speeds. The speeds, however, can be adjusted on some systems to fit various applications.

A tubular drag conveyor handles material gently, so friable and other delicate materials can be transported without degradation. Blended materials can also be moved with very little segregation. A tubular drag conveyor can also transport hot or highly abrasive materials and it can move foods and other materials that need to be kept sanitized.

Depending on a company's application, the conveying tubes can have diameters of 2 inches, 4 inches, 6 inches, or 8 inches or greater. The materials in tubular drag conveyors are transported to discharge points in enclosed conveying tubes, so harmful dust, and toxic or flammable materials don't escape into the environment. And the materials are protected from the atmosphere because they are completely sealed within the tube.

Tubular drag conveyor systems can have a wide variety of configurations and options, so they're very flexible. The conveying tubes come in a variety of lengths, can be straight or curved, and can be laid out in various configurations including vertical, horizontal or angled parallel lines; a loop; or multiple-corner shapes. The drive unit provides power to move the cable-and-disc assembly through the conveying tubes and the tension turnaround unit maintains the proper cable tension.

A tubular drag conveyor can include multiple inlets and outlets and can move material vertically, horizontally, around corners and at an angle so you save space, energy and money because you don't need multiple conveyors.

Tubular drag systems gently convey dry bulk materials including powders, chunks, flakes, pellets, prills, parts, shavings, crumbles, granules, fluff, regrind and dust through an enclosed tube without the use of air. These systems can convey up to 1,500 cu. ft/hour.



Tubular drag conveyors, like Cablevey conveyors, control dust, so you can save money on dust collection systems. In addition there are no filters to clean and product degradation and separation are virtually eliminated as well.

And, like Cablevey conveyors, tubular drag conveyors operate on low horsepower—1- 5 horsepower – single- or variable-speed motors, saving you money on energy. They're quiet, so they reduce the noise level in your plant and they're self-cleaning, so they eliminate the build-up inside the tube.

Tubular drag conveyors offer many advantages to material handling over aeromechanical systems, according to a \*knowledgeable equipment representative.

One of the key factors is that you can start and stop a Cablevey at any given time, but you have to empty an aeromechanical, he said.

"If, in fact, the aeromechanical stops during transport that material is no longer fluidized and it drops down to the bottom," he said. "It sits and they don't have the torque capability of starting everything back up and they have to get their high speed up to be able to fluidize the material and that's almost impossible if it's sitting down between those flights."

He went on to say that aeromechanicals are not quite as gentle as a tubular drag conveyor like a Cablevey because the material is flying around inside the conveyor.

"[Aeromechanical suppliers] like to tout that, but they would not be good for something like a coffee bean, for example, because those coffee beans would have to stay fluidized which means they're bouncing around inside the conveyor," he said. "So aeromechanicals are OK for a powder or something that's a granule but not something where we have to worry about degradation."

In addition, aeromechanical conveyors have to have almost a metered amount of material going in because they can't afford to get clogged, he said. That means you cannot flood feed them because they can't afford to take in too much material.

"You have to have some sort of feeding device on the front end to feed in the materials," he said. "On the other hand, you can do that with a Cablevey because you can put in a whole hopper of material in there and what you do is you slightly choke off and it takes just the right amount of material and then it keeps on moving away, but remember it's moving at a little bit slower speed."

The key things for me are the gentleness of the Cablevey, which is important even when you're not worrying about the degradation of your materials, because with a Cablevey the materials aren't getting beat all over the place, either, he said.



"The starting and stopping is extremely important to me because I have to use conveyors in many cases to fill hoppers," he said. "If I use an aeromechanical conveyor, I have to run it a lot longer to fully empty it. So I have to shut off my metering device on the front end, run it long enough to fully empty it because I can't start it up under load—well that means that I'm running it a lot longer period of time and my energy consumption and everything else goes up.

\*knowledgeable equipment representative – name redacted by request