Roller Conveyor Speeds

Conveyor speed is dictated by the nature of the load, how it is loaded and unloaded on the conveyor, and what is done to the load during conveying. Table 2 shows the basic conveyors and their typical operating speeds.

Table 2 — Typical Operating Speeds

Conveyor	Speed (ft./min.)
Continuous bucket elevator	75 to 150
Centrifugal bucket elevator	200 to 300
Slat or flat top conveyor	50 to 150
Carrier conveyor[1]	50 to 150
Assembly line conveyor	5 to 15
Drag and scraper conveyors	50 to 100
Apron conveyors	10 to 60

[1]Material conveyed directly on chain

Roller Conveyor Installation and Operation

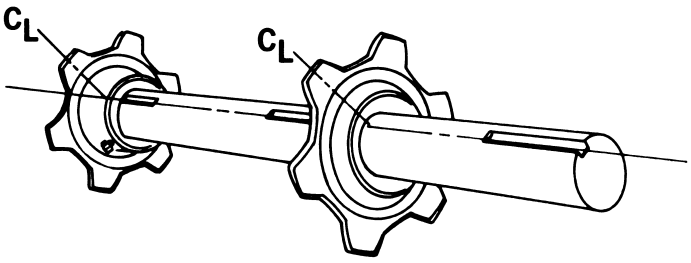
Shaft Alignment

Shaft alignment is ensured by rigidly supporting shafts in properly designed bearings. Align the shafts horizontally with a leveling device. Head and tail shafts must be parallel and at 90˚ to the direction of travel of the conveyor. Take-ups provide the means for shaft alignment and chain tension adjustment.

Sprocket Alignment

Sprockets must be in a line and not offset on the shafts. When two or more strands of chain operate as a single unit, as in a double-strand conveyor, the sprocket teeth on the head shaft must be timed to pick up the load on each chain simultaneously. First align the keyways in the shaft. Then align the keyways of the sprockets on tooth centerline. Sprockets should be "keywayed-in-line and matched in pairs." Since the tail shaft is an idling shaft, key it to only one sprocket. The other sprocket is held in alignment by set collars and is allowed to turn freely. In this way the sprocket can position itself if uneven wear takes place in the chain strands.

Headshaft Sprockets Keyed In Line



Chain

Place the chain around the sprockets with the free ends meeting one another. When assembling straight sidebar chains, insert the connecting link and then the closing bar over the pins. Drive the closing bar onto both pins at the same time, taking care not to bend the link. Most chains are designed with a "press-fit" between the pins and sidebars. Do not grind away a pin end so that it fits loosely in the chain sidebar.

Freedom from Interference

The chain should not come into contact with adjacent objects. Clearance should provide for normal chain sag and take-up movement. Guides and tracks should be smooth and free of foreign objects.

Start-Up

Adjust the chain tension. For high-temperature applications, adjust the chain while cold. Jog the conveyor through one complete cycle. Start the conveyor and run with no load, making certain that all chain joints flex freely.

For oil-lubricated applications, lubricate each chain joint well with a good grade of nondetergent petroleum base oil. The oil should be applied between the sidebars at each joint and be of a viscosity such that it will flow freely into the pin-bushing area. Grease may be used if it can be forced directly into the pin-bushing area.

A break-in running period of 8 to 12 hours under no load will allow the chain joints to seat properly. After this initial running period adjust take-ups again to compensate for initial elongation of chain.

Chain Tension

Make sure you have the correct amount of chain slack; when the chain is too tight the working parts of the chain carry a much heavier load.

Frequency of Adjustment

The chain will elongate at the beginning of operation due to slight distortion of its component parts. After this initial change in the chain, it elongates slightly, but constantly, due to normal wear. Maintain the proper chain tension by adjustments made according to the following suggested schedule (Table 3).

Table 3 — Suggested Adjustment Schedule

Time in Operation	Frequency of Adjustment
Week 1	Once a day
Weeks 2-4	Twice a week
After week 4	Twice a month

Note: This frequency schedule is based on eight hours of operation per day. For longer operation days, adjust the schedule accordingly.

Even Adjustment of Take-up

Even adjustment of take-up can be easily obtained with screw type or counter-weight take-ups. Where two parallel chains are adjusted by two independently operated take-ups, ensure even stroke on both the left and right side. An uneven adjustment will cause an overload when the link plate and the side of the sprocket teeth interfere with each other.

Insufficient Take-up Adjustment

If the chain is still too long after the take-up adjustment, take out one or two pitches to shorten the chain.

Loading Conveyors

Support the loading area as much as possible to minimize loading shock to the system. Reduce impact by loading as gently as possible. Slide load onto the conveyor when possible to reduce surges caused by rough loading. Unload a conveyor before shutting it down. Starting a loaded conveyor places extra strain on the system. Run the conveyor occasionally during extended shut-down periods to keep the system free from corrosion.

Installation of Bucket Elevator Chains, Sprockets, and Traction Wheels

Position foot take-ups at the top position of travel and head take-ups at the bottom position to provide maximum adjustment once the chain is installed.

Install chain from the top of the elevator casing when possible. Assemble the chain to form a single strand without buckets attached. Establish a lifting point slightly off center of the strand so that one leg is long enough to go around the foot sprocket and up to the inspection door.

Lower the chain from its lifting point into the elevator casing. Once the longer leg has been drawn around the foot sprocket and up close to the inspection door, block the head sprocket from moving. Disconnect the lifting hook and re-connect it to the long leg of the chain about two links short of the end. Draw chain ends together and attach them with the connecting pin. Adjust take-ups to create proper tension on the chain. Install buckets through rear panel door. Be sure to prick punch the bolt threads at the nuts to prevent them from loosening.

Adjust take-ups or check functioning of gravity take-ups before putting elevator into operation. Start the elevator chain by jogging the system through one complete cycle. Then run the chain for about four hours without a load. After this break-in period, begin regular operation.

Of Special Note

- Material should not be allowed to build up in the boot by overloading. Properly regulating flow, within the capacity of the buckets, will extend service life and prevent surging caused by the buckets digging out the boot.
- During normal operation start the elevator empty. This prevents overload of the chain and alleviates the danger of backrun.
- For traction wheels, securely mount the solid or split hub to the shaft. Bolt the traction wheel segments or segmental rim sprockets in place loosely. Tighten with a torque wrench. All segmental rim bolts must have nuts tightened to not more than the maximum torque values suggested on page C-34.

Special Environments

Standard conveyor chain can be operated normally in ambient temperatures between 15°F and 140°F without trouble.

When the chain is operated in very low or high temperatures, or in an abrasive or corrosive atmosphere, the following should be taken into account (Table 4).

(1) Under very low or high temperatures:
Chain must be selected in a different manner when it is operated in freezing chambers, cold areas, when it passes through a heat-treatment furnace, or is affected by heat from the material conveyed.

(2) In wet conditions:
When chain is exposed to water, e.g., in a sterilizer or water screen, excessive wear due to insufficient lubrication and rust may shorten chain life. In these cases, a larger chain size provides less bearing pressure and stainless steel or plated chain will provide rust prevention.

(3) In corrosive conditions:
When chain is exposed to an acidic or alkaline solution and/or operated in a corrosive atmosphere, excessive wear may occur due to chemical corrosion on the chain parts in addition to mechanical wear. Hydrogen embrittlement may also occur in an acidic atmosphere. Conveyor chain is more affected by acid than alkali. In special cases, electrochemical corrosion may occur on the chain due to sea or mine water. Refer to Table 6 "Corrosion Resistance Guide" for the corrosion resistance of various materials.

(4) In dusty conditions:
When conveyor chain is operated in dusty conditions, e.g., in the presence of coke, metal powder, and sand, etc. the chain wears more because foreign material gets between the parts of the chain and also the engaging surfaces of the sprocket teeth and chain. In such cases, select a larger chain size to reduce the bearing pressure or choose a chain especially designed for high wear resistance.

The foregoing information is intended to provide general guidelines for conveyor chain selection. Please consult Union Chain for specific application problems.