



Safety

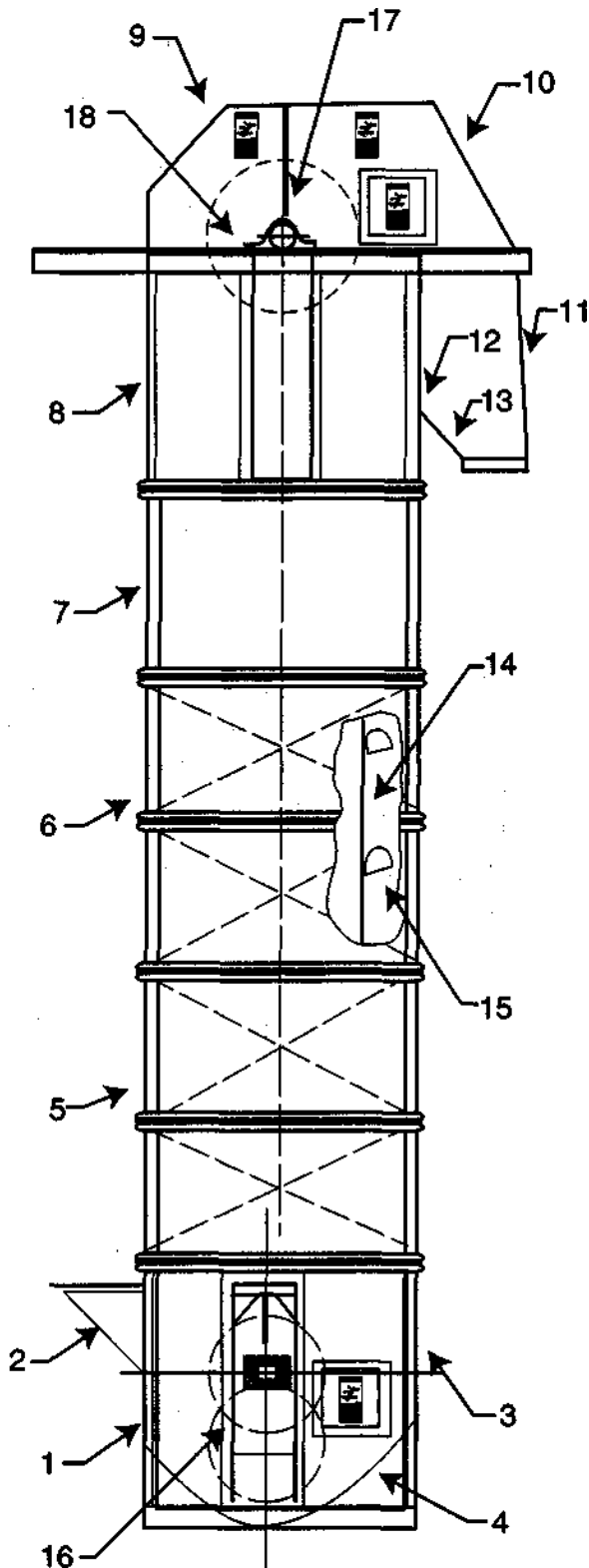
Safety must be considered a basic factor in machinery operation at all times. Most accidents are the result of carelessness or negligence. The following safety instructions are basic guidelines and should be considered as minimum provisions. Additional information shall be obtained by the purchaser from other sources including the American society of Mechanical Engineers; Standard ANSI B20.1; Standard ANSI B15.1; Standard ANSI A12.1; Standard ANSI MH4.7; Standard ANSI 2244.1-1982.

It is the responsibility of the contractor, installer, owner and user to install, maintain, and operate the bucket elevator and elevator assemblies manufactured and supplied by KWS Manufacturing Company, Inc., in such a manner as to comply with the Occupational Safety and Health Act (OSHA) and with all state and local laws and ordinances and the American National Standard Institute Safety Code.

PRECAUTIONS:

01. MAINTAIN a safety training and safety equipment operation/maintenance program for all employees.
02. BUCKET ELEVATORS shall not be operated unless the elevator housing completely encloses the elevator moving elements and power transmission guards are in place. *If the elevator is to be opened for inspection, cleaning or observation, the motor driving the elevator is to be locked out electrically in such a manner that it cannot be restarted by anyone, however remote from the area, unless the elevator housing has been closed and all other guards are in place.*
03. IF THE elevator must have an open housing as a condition of its use and application, the entire elevator is then to be guarded by a railing or fence.
04. RUGGED GRATINGS may be used where necessary. If the distance between the grating and moving elements is less than 4 inches, the grating opening must not exceed 1/2 inch by 2 inch. In all cases, the openings shall be restrictive to keep any part of the body or clothing from coming in contact with moving parts of the equipment. SOLID COVERS should be used at all other points and must be designed and installed so that personnel will not be exposed to accidental contact with any moving parts of the equipment.
05. ALL ROTATING equipment such as drives, gears, shafts and couplings must be guarded by the purchaser/owner as required by applicable laws, standards and good practices.
06. SAFETY DEVICES AND CONTROLS must be purchased and provided by the purchaser/owner as required by applicable laws, standards and good practices.
07. PRACTICE good housekeeping at all times and maintain good lighting around all equipment.
08. KEEP ALL operating personnel advised of the location and operation of all emergency controls and devices. Clear access to these controls and devices must be maintained.
09. FREQUENT INSPECTIONS of the controls and devices, covers, guard, and equipment to insure proper working order and correct positioning.
10. DO NOT walk on elevator hood, gratings or guards.
11. DO NOT poke or prod material in the elevator.
12. DO NOT place hands, feet or any part of the body or clothing in the elevator or opening.
13. DO NOT overload elevator or attempt to use it for other than its intended use.
14. INLET and DISCHARGE openings shall be connected to other equipment in order to completely enclose the moving elements of the elevator.
15. BEFORE POWER is connected to the drive, a pre-startup safety check shall be performed to insure the equipment and area are safe for operation and all guards are in place and secure.
16. BUCKET ELEVATORS are not normally manufactured or designed to handle materials that are hazardous to personnel. These materials which are hazardous include those that are explosive, flammable, toxic or otherwise dangerous to personnel. Elevators may be designed to handle these materials. Elevators are not manufactured or designed to comply with local, state, or federal codes for unfired pressure vessels. If hazardous materials are to be conveyed OR IF the elevator is to be subjected to internal or external pressure, KWS Manufacturing Company, Inc., should be consulted prior to any modifications.
17. ALL EQUIPMENT shall be checked for damage immediately upon arrival DO NOT attempt to install a damaged item.
18. ALL BUCKET elevators manufactured by KWS Manufacturing Company, Inc., have warning labels affixed in many easily seen locations. Additional stickers are available upon request.

Installation



1. Boot Assembly
2. Inlet Spout
3. Removable Sprocket/Pulley Access Door
4. Curved Boot Plate
5. Intermediate Section. Access Doors Maybe Located At Any Convenient Position
6. Plain Intermediate Section
7. Plain Intermediate Section. Usually the Odd Length Located Under Lower Head Assembly
8. Lower Head Assembly
9. Back Section of Hood
10. Front Section Of Hood
11. Discharge Spout
12. Adjustable Bibb
13. Discharge Spout Liner (Optional item)
14. Elevator Chain or Belt
15. Elevator Buckets
16. Boot Take-up
17. Head Shaft Pillow Blocks
18. Pillow Block Stops (Optional)

NOTE:

It is the purchaser's responsibility to provide a suitable foundation and bolts to receive the elevator.

RECEIVING:

It is important to carefully examine incoming shipments for condition and completeness. Shortages and damage must be reported immediately to the transportation company. **DO NOT ATTEMPT TO INSTALL A DAMAGED ELEVATOR OR COMPONENTS.**

Normally head and boot sections are factory assembled and include sprockets or pulleys, take-ups, pillow blocks, etc.

Chain or belt, buckets, gaskets, nuts and bolts, special fittings, etc. are usually shipped in separate containers or on pallets/skids.

Intermediate casings are shipped separately.

Installation

CASING (All Elevators)

- A. Insure that anchor bolts are securely placed and conform to the pattern of the boot section mounting holes.
- B. Set boot in place insuring that boot section top flange is level and casing is plumb.
This is accomplished by shimming under the bottom flange. Use shims only next to anchor bolts—not elsewhere along flange. Any gap resulting from shimming is generally sealed with a strong structural grout.
- C. It is essential that the boot be set accurately.
- D. Check drawings to determine correct sequence of erecting intermediate casing. Caulk or gasketing (if provided) should be placed between all casing flanges to provide dust tight sealing.
- E. Normally the erection crew should build a lifting bracket to avoid distortion to fabricated assemblies.
- F. Each and every intermediate section must be level and plumb. It is common to find minor deviations in these types of fabricated assemblies.
Most often they can be corrected by rotating 180° or turning end for end.
If this does not solve an out of level or out of plumb condition it will be necessary to use metal shims and caulk the resulting gap.
When a gap occurs in a corner of the casing, metal shims should be used and should extend a minimum of six inches in both directions. Insure that shims do not project inside of casing.
Each intermediate section must be plumbed to less than 1/8" deviation before proceeding to the next section. **Casings must be braced or anchored to a rigid structure every 20 ft. and not more than 4 ft. below the head section.** If a rigid structure is not available, guy wires may be used with the same spacing.
- G. After all intermediate sections are correctly placed, remove the front and back sections of the hood and set the lower head using the same procedures as with the intermediate sections. Replace hood sections after performing all installation steps H thru PC or PB.
- H. It is critical that the head shaft be exactly level. Minor pillow block shimming may be necessary. Check head shaft pillow block set screws for tightness.

MACHINERY (Chain Type)

- 1C. Remove boot sprocket access door.
Drop plumb line from head end sprocket to boot sprocket. Insure that sprockets are centered in casing and are exactly in line with each other.
When erecting a double strand chain elevator, check factory drawings for correct sprocket spacing. Check to insure that the sprocket set screws are tight. Sprockets should be in line when viewed from the narrow side of the casing. Head and boot shafts are generally offset when viewed from the wide dimension of the casing. Check factory drawings for offset. Double strand chain elevators commonly will have no offset as identical sprockets are used at the head and boot sections.
- JC. Move boot take-up to its uppermost position (head end take-up to lowest position.) Make these adjustments uniformly to both sides at the same time. Many bearings will not accommodate much misalignment. Severe damage to internal bearing parts and seals can occur if this procedure is not followed.
- KC. Depending on lifting equipment and access available, the chains and buckets can be preassembled or installed in 10 ft. sections of chain with buckets to be attached later.
When installing offset side bar chain, insure that the widest part of the side bar (open end) points in the direction of chain travel.
Use care not to get a side twist in the chain during handling. LC. It may be necessary to remove up to several links of chain during initial installation.

Installation

MC. Adjust take-up accordingly to provide 1/8" to 1/4" gap between the chain barrel and root of boot sprocket tooth. This gap should occur at 6 o'clock on the boot sprocket.

The gap is to accommodate chordal action of the chain. On long pitch chain this gap can be increased accordingly. Adjust bibb to provide up to 3/4" to 1" clearance to buckets. NC. At this point you may find it desirable to "run in" the chain for a period of several hours.

OC. Install buckets using bolts, nuts and lock washers provided. It is a good idea to peen the bolt threads after the buckets are securely in place.

If plastic buckets are being installed, use care to avoid over tightening. Steel backups may be required. PC. Adjust bibb to provide 3/4" to 1" clearance to buckets. Install upper hood front and back sections.

QC. After satisfactory alignment and trial operation, weld stops at each end of head shaft pillow blocks to prevent bearing movement. Stops may be of angle iron channels, key stock, etc.

NOTES (Chain Type)

AA. If elevator is equipped with gravity type take-up, use a come along or other means to raise takeup box to the upper most portion when coupling the chain together.

Add weight (concrete or steel stampings) to weigh box as required for smooth operation. Weight must be uniformly distributed in weight box.

Boot sprockets will fully engage the chain, however, insure that upward movement is available to accommodate chordal action of chain. Usually 2 to 3 inches is adequate.

BB. When installing double strand chain elevators be sure to lay out chains and verify equal lengths of parallel strands.

Double strand chains are usually matched and tagged left and right.

CC. On double strand elevators, one boot sprocket is keyed to the shaft, the other sprocket floats between shaft collars. Insure that these collars are tight.

Check shaft collars frequently for tightness. After all plumbing and other adjustments are made, it may be necessary to drill a set screw indent into boot shaft to hold shaft collar position.

DD. During normal operations, avoid starting and stopping any elevator when loaded with material.

EE. If elevator components are to be stored at the job site for some time prior to erection, insure that components are protected from elements.

It is not advisable to cover elevator components tightly with polyethylene. Condensation will collect and cause corrosion and premature motor failure.

FF. If elevator is to be erected but not used for a long period of time, it is advisable to run the elevator at least one hour per week.

MACHINERY (Belt Type)

IB. Remove boot pulley access door.

Drop a plumb line from head end pulley to boot pulley.

Insure that pulleys are centered in casing and are exactly in line with each other.

Check to insure that the pulley set screws are tight.

Pulleys should be in line when viewed from the narrow side of the casing.

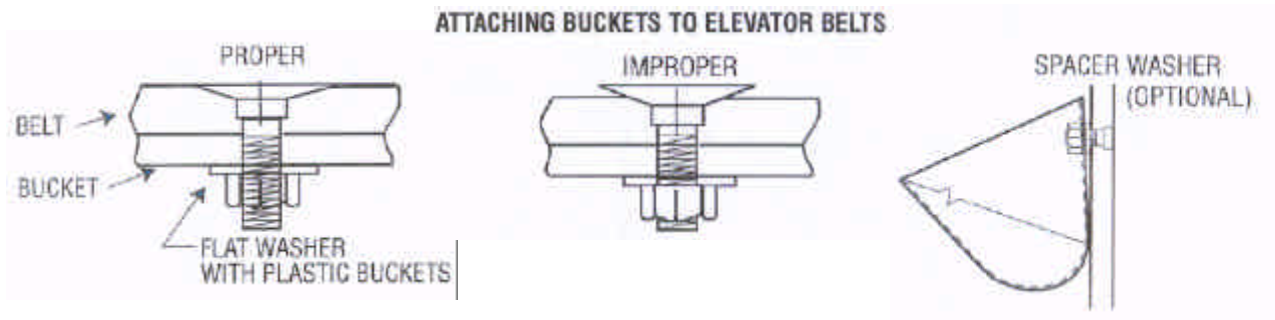
Head and boot shafts are generally offset when viewed from the wide dimension of the casing.

Check factory drawings for offset.

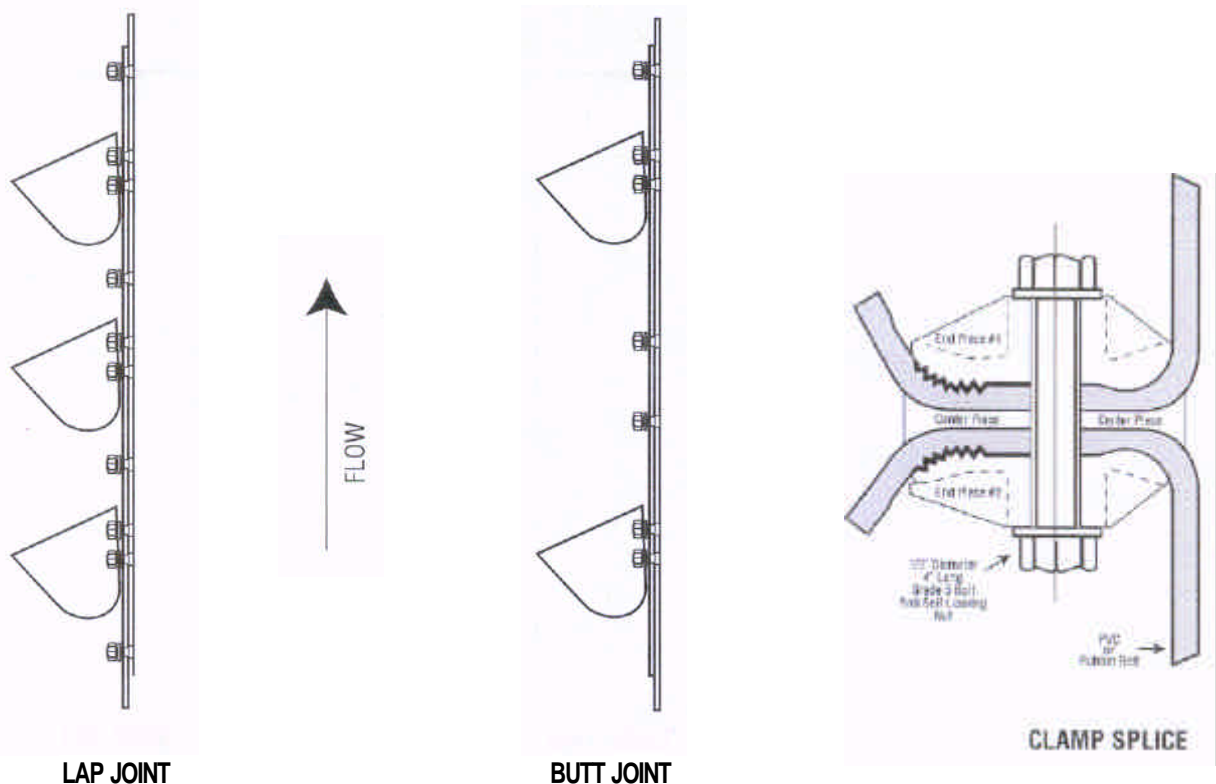
Installation

JB. Move boot take-up to its uppermost position (head end take-up to lowest position.) Make these adjustments uniformly to both sides at the same time. Many bearings will not accommodate much misalignment. Severe damage to internal bearing parts and seals can occur if this procedure is not followed.

KB. It is recommended, especially in cool environments, that the belt be draped over the head pulley and allowed to hang for at least 24 hours. This will relieve stresses resulting from being rolled up and tend to achieve initial stretch common to belting.



If rubber covered belt with unequal thickness covers is used, the thicker cover should be installed on the pulley side.



LB. Select the type of splice to be used from illustrations above.

MB. Clamp belt several feet from both ends using clamping angle irons and pull ends until a snug tension is achieved. Splice belt by installing elevator bolts, nuts, and washers. Often it is desirable to add one or more rows of additional bolt holes between buckets in the splice area. This is accomplished by drilling the holes while the belting is clamped in the pretensioned condition. If clamp splice is used follow instructions supplied with clamps.

Installation

NB. Remove belt clamps and adjust take-ups uniformly to both sides to remove any slack in the belt. Use caution to avoid over tightening the belt as this can cause premature failure of: Belting, shafts, bearings, etc. At this point it is advisable to "run in" the belt for a period of several hours to observe belt tracking and any further initial stretch.

The responsibility to do the splice correctly lies with the installer.

OB. Install buckets using bolts, nuts and lock washers provided. It is a good idea to peen the bolt threads after the buckets are securely in place.

If plastic buckets are being installed, use care to avoid over tightening. Large diameter steel flat washers or fender washers are frequently used with plastic buckets.

PB. Adjust bibb to provide up to 3/4" to 1" clearance to buckets. Install upper hood front and back section.

QB. After satisfactory alignment and trial operation, weld stops at each end of head shaft pillow blocks to prevent bearing movement. Stops can be angle iron, channels, keystone material, etc.

NOTES (Belt Type)

AA. If elevator is equipped with gravity take-up, use a come-along or other means to raise take-up box to the upper most position when splicing the belt.

Add weight (concrete or steel stampings) to weight box as required for smooth operation. Weight must be uniformly distributed in weight box and sufficient to remove slack from belt.

BB. During normal operations, avoid starting and stopping any elevator when loaded with material.

CC. If elevator components are to be stored at the job site for a period of time prior to erection, insure that components are protected from the elements.

It is not advisable to cover elevator components tightly with polyethylene. Condensation will collect and cause corrosion to elevator components and possibly premature motor failure due to moisture in the windings.

DD. If elevator is to be erected but not used for a long period of time, it is least one hour per week.

DRIVES (All Types)

If drive is not factory assembled, install at this time.

1. Gearmotor Drive

Mount driven sprocket securely to head shaft.

Fill reducer with proper lubricant and install driver sprocket. Recommended oil is generally indicated on the reducer name tags.

Set reducer in position and line up drive sprockets.

Shorten center distance by adjusting movable base.

Install chain and connecting links.

Adjust slide base to a point where some sag is noted on the bottom strand of chain when the top strand is tight.

Lock base of reducer into position. Check all mounting bolts for tightness.

Install chain guard and add lubricant if oil bath guard is furnished.

If possible, rotate gearmotor by hand to determine whether the back stop is correctly installed. (See reducer manufacturers instructions for additional details.)

Other types of backstops are frequently used. (See manufacturers instructions.)

2. Shaft Mounted Gear Reducers

Assemble back stop to reducer. (See manufacturers instructions.) Assemble reducer to head shaft using bushings and keys if provided.

Installation

Bolt motor in place and install driver and driven sheaves.

Check for alignment.

Attach turnbuckle and turnbuckle mounting bracket.

Install V-belts, tighten turnbuckle and lock in place with lock nuts.

Add oil to reducer. Recommended oil is generally indicated on the reducer name tag.

Install V-belt drive guard.

Connect electric motor.

Operation

START UP (All Types)

Check to insure elevator is free of foreign materials before connecting power.

Check to insure all guards, covers, safety devices and controls are in place and operating correctly.

Initial start up of elevator should commence with several short jogs gradually lengthening in duration without material.

Check take-up adjustment after 8 hours. Re-tighten all fasteners. Check and realign sprockets/pulleys as necessary.

Gradually begin feeding material to the elevator. Increase feed rate slowly until reaching design capacity. Empty elevator. LOCK OUT ALL POWER. Check for loose fasteners. Check alignment of sprockets/pulleys.

Elevator should be checked for loose fasteners and alignment at least once a month.

OPERATION (Chain Type)

When elevator is new it is common to have an occasional tight chain joint. This will cause some vibration but will eventually loosen.

If plastic buckets are used in conjunction with metal breaker buckets, it is normal to experience some pulsation.

Characteristics of the material will affect the degree of pulsation. Pulsation is caused by the difference in bucket projection.

Do not intermix old chain and new chain in parallel strands. Always order matched lengths.

Primary to satisfactory elevator operation is uniform material feed rates—not surge loading and excessive boot flooding.

When consulting the factory regarding a specific elevator, refer to the purchase order number, year of manufacture if known, and equipment number if appropriate.

Regular inspection and maintenance will insure uninterrupted and satisfactory elevator performance.

OPERATION (Belt Type)

If plastic buckets are used in conjunction with metal breaker buckets, it is normal to experience some pulsation. Characteristics of the material will affect the degree of pulsation. Pulsation is caused by the difference in bucket projection.

Primary to satisfactory elevator operation is uniform material feed rates—not surge loading and excessive boot flooding. Regular inspection and maintenance will insure uninterrupted and satisfactory elevator performance.

When consulting the factory regarding a specific elevator, refer to the purchase order number, year of manufacture if known, and equipment number if appropriate.

Operation

PROBLEM

POSSIBLE CAUSE

Elevator
Vibrates

1. Foreign matter in boot
2. Excessively tight chain/belt
3. Excessively loose chain/belt
4. Loose or broken buckets
5. Buckets hitting bibb plate
6. Misaligned elevator head and boot shaft
7. Elevator is not adequately braced. See para. F, installation
8. Chain/belt hitting inside of casing when casing is not plumb

Elevator Will Not
Start

1. Obstruction in boot
2. Electrical problem
3. Backstop incorrectly installed
4. Broken V-Beits or drive chains
5. Reducer failure
6. Boot excessively plugged with material
7. Excessively tight chain/belt

Pillow Blocks Get Hot

1. Over lubrication
2. Under lubrication
3. Excessive chain/belt tension
4. Misalignment of head shaft pillow blocks
5. Misalignment between head and boot shaft

Elevator Not Discharging
Properly

1. Speed incorrect - consult factory
2. Air cushion - vent compartment being discharged into
3. Light fluffy materials - reduce speed up to 15%
4. Certain materials may require perforated buckets*
5. Some materials may be affected by static electricity*

*Consult Factory

Maintenance

Periodic inspections must be performed to determine the wear rate of all chains, buckets, belts and bearings. During these inspections the alignment of sprockets, pulleys and all drive components shall be checked. Retightening of fasteners and checks to insure guards, covers, gratings, contrails, and safety devices are in place, secure, and operating correctly.

Keep a good supply of spare parts. When ordering, refer to our Service Manual and furnish the part identification as well as original order number.

WARNING: Removal of backstop may cause unexpected machinery movement as indicated by note 17 of "Safety" If backstop is installed as part of shaft mount reducer removal of torque arm may also cause unexpected machinery movement.