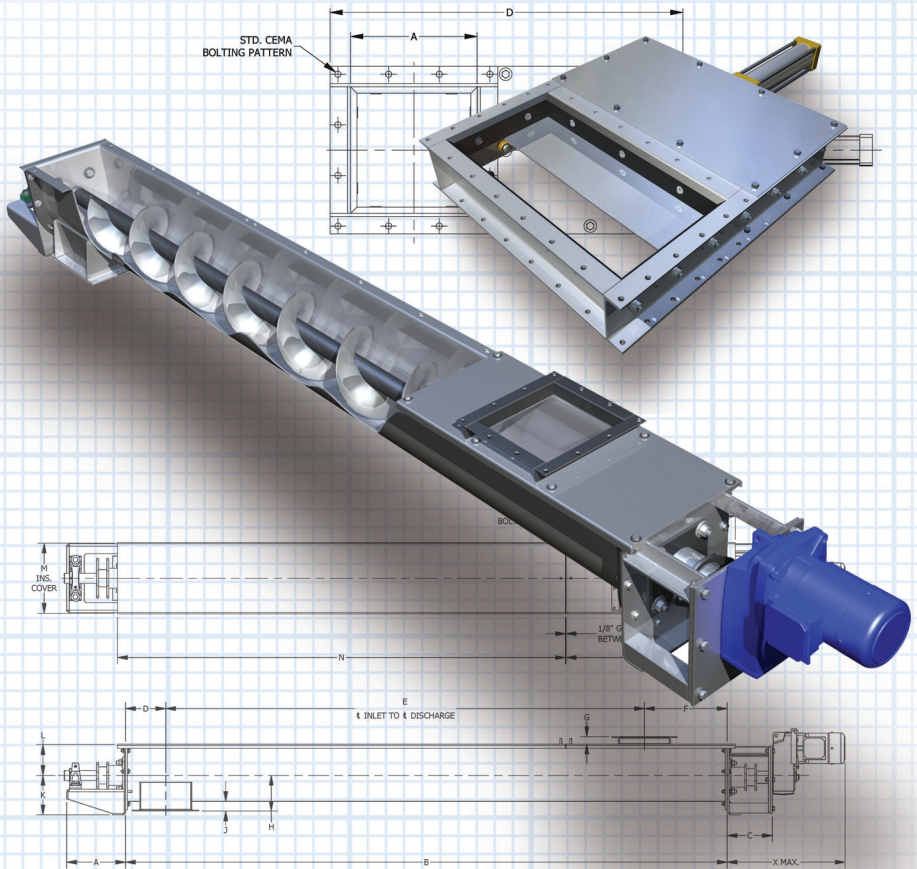




Conveying Knowledge, Workmanship, Solutions

**SAFETY MANUAL**

# SAFETY, INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR SCREW CONVEYORS AND SLIDE GATES



ISO 9001  
Certified



## KWS HISTORY

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Founded in 1972, KWS Manufacturing Company, Ltd. is the leader in the design and manufacture of conveying equipment for the bulk material handling industry.

Our vast product line includes -

- Screw Conveyors – Shafted and Shaftless
- Screw Feeders – Shafted and Shaftless
- Vertical Screw Conveyors – Shafted and Shaftless
- Live Bottom Feeders – Multiple Screw Feeders
- Belt Conveyors
- Drag Conveyors
- Bucket Elevators
- Slide Gates
- Hoppers, Bins and Silos
- Structural Supports
- CEMA Standard Stock Components
- Made-to-Order Components

Our corporate office and manufacturing facilities are located in Burleson, Texas (convenient to the Dallas/Fort Worth Metroplex). Our manufacturing facility continues to expand and is currently 125,000 square feet.

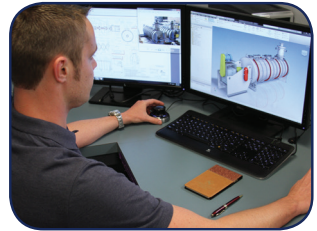
As an ISO 9001 certified manufacturer, KWS provides the highest quality equipment and service to our customers. Our large number of repeat customers shows our commitment to customer satisfaction. Our quality system ensures that your equipment is designed and manufactured to rigid specifications and validated by exceeding performance expectations.

## MARKETS SERVED

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Working closely with our customers, KWS provides cost-effective solutions to the many markets and industries including aggregate, brewing, cement, chemical, food, gypsum, ice handling, minerals processing, power, pulp & paper, rendering and wastewater treatment.

From complete systems to replacement parts, KWS will meet all of your bulk material handling needs.



**ISO 9001  
Certified**



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**SAFETY DEVICES:** KWS will supply only such safety devices as are specified in customer furnished purchase orders. Any additional safety measures or devices which may be required by law, or which the customer wishes to add, are to be furnished by the customer or, at the customer's written request, the safety devices will be furnished by KWS at additional cost to the customer. The aforementioned safety devices include, but are not limited to; interlocks, limit switches, overflow relief switches, shear pins, emergency stop switches, emergency stop pull cables and point-of-operation switches.



## SAFETY

## REFERENCE – CEMA DOCUMENT SCOM-001

Read **ALL** instructions in this manual and manufacturer's manuals **BEFORE** installing, operating and maintaining the equipment.

Safety begins with a plan that considers every possible danger and potential hazard. Operation and maintenance personnel must be thoroughly trained in safe operating procedures, recognition of possible hazards, and maintenance of a safe area around equipment.

CEMA has a comprehensive safety program that includes:

- Warning and Safety Reminder for Screw Conveyors, Drag Conveyors and Bucket Elevators – (CEMA Document: SC2004-01)
- CEMA Safety Label Brochure – (CEMA Document: 201)
- CEMA Safety Label Placement Guidelines:
  - Screw Conveyor – (CEMA Document: SC-2)
  - Vertical Screw Conveyor – (CEMA Document: SC-3)
- Screw Conveyor Safety Poster – (CEMA Screw Conveyor Safety Poster)
- Screw Conveyor, Drag Conveyor and Bucket Elevator Safety Video – (CEMA Document: AV6) This video describes key safety practices that personnel must follow when operating and maintaining screw conveyors, drag conveyors and bucket elevators.

Accidents can be avoided by implementation and enforcement of an in-plant safety program. Examples of safety precautions are included in this manual. The information provided is for reference and is not exclusionary or exhaustive. Carefully study and follow the safety precautions and employ best practices.

**WARNINGS AND SAFETY REMINDERS**

*APPROVED FOR DISTRIBUTION BY THE SCREW CONVEYOR SECTION OF THE CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)*

It is the responsibility of the contractor, installer, owner and user to install, maintain and operate the equipment, components and, assemblies in such a manner as to comply with the Williams-Steiger Occupational Safety and Health Act and with all state and local laws and ordinances and the American National Standards Institute (ANSI) B20.1 Safety Code for Equipment.

In order to avoid unsafe or hazardous conditions, the assemblies or parts must be installed and operated in accordance with the following minimum provisions.

1. Equipment shall not be operated unless all covers and/or guards for the equipment and drive unit are in place. If the equipment is to be opened for inspection, cleaning, maintenance or observation, the energy to the drive unit driving the equipment and all energy must be **LOCKED OUT AND TAGGED OUT** in such a manner that the equipment cannot be restarted by anyone; however remote from the area, until equipment cover or guards and drive guards have been properly replaced. Each individual cover must be securely bolted on each end with at least two tamper-resistant safety bolts that require a special tool for removal. It is the responsibility of the owner to supply the tamper-resistant safety bolts and special tools.
2. If the equipment must have an open housing as a condition of its use and application, the entire equipment is then to be guarded by a railing or fence in accordance with ANSI standard B20.1.(Request current edition and addenda).
3. Feed openings for shovel, front loaders or other manual or mechanical equipment shall be constructed in such a way that the equipment opening is covered by a grating and does not create a hazard. If the nature of the material is such that a grating cannot be used, then the exposed section of the equipment is to be guarded by a railing or fence and there shall be a warning sign posted.

**SAFETY****REFERENCE – CEMA DOCUMENT SCOM-001**

4. Do not attempt any maintenance or repairs of the equipment until power has been LOCKED OUT AND TAGGED OUT.
5. Always operate equipment in accordance with these instructions and those contained on the caution labels affixed to the equipment.
6. Do not place hands, feet, or any part of your body, in the equipment.
7. Never walk or step on equipment.
8. Do not use equipment for any purpose other than that for which it was intended.
9. Do not poke or prod material into the equipment with a bar or stick inserted through the openings.
10. Keep area around equipment drive, slide gates and control station free of debris and obstacles.
11. Eliminate all sources of stored energy (materials or devices that could cause equipment components to move without power applied) before opening the equipment.
12. Do not attempt to clear jammed equipment until power has been LOCKED OUT AND TAGGED OUT and all sources of potential energy removed.
13. Do not attempt field modification of equipment or components.
14. 14. Equipment is 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. Equipment may be designed to handle these materials. Equipment is 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 equipment is to be subjected to internal or external pressure, manufacturer should be consulted prior to any modifications.



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**SAFETY****REFERENCE – CEMA DOCUMENT SCOM-001**

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CEMA insists that disconnecting and locking out power and removing all potential energy to the unit provides the only real protection against injury. Secondary safety devices are available; however, the decision as to their need and the type required must be made by the owner-assembler as KWS Manufacturing has no information regarding plant wiring, plant environment, the interlocking of the screw equipment with other equipment, extent of plant automation, etc. Other devices should not be used as a substitute for locking out the power prior to removing guards or covers. We caution that use of the secondary devices may cause employees to develop a false sense of security and fail to lock out power before removing covers or guards. This could result in a serious injury should the secondary device fail or malfunction.

There are many kinds of electrical devices for interlocking of equipment systems such that if one mechanism in a system or process is stopped other equipment feeding it or following it can also be automatically stopped.

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer, owner and user to supplement the materials and services furnished with these necessary items to make the equipment installation comply with the law and accepted standards.

Equipment inlet and discharge openings are designed to connect to other equipment or machinery so that the flow of material into and out of the equipment is completely enclosed.

One or more warning labels must be visible on equipment. If the labels attached to the equipment become illegible or are dislodged order replacement warning labels from the OEM or CEMA.



## **SAFETY**

## **REFERENCE – CEMA DOCUMENT SCOM-001**

The Conveyor Equipment Manufacturers Association (CEMA) has produced an audio-visual presentation entitled “Safe Operation of Screw Conveyors, Drag Conveyors, and Bucket Elevators.” CEMA encourages acquisition and use of this source of safety information to supplement your safety program.

**NOTICE:** *This document is provided by KWS as a service to the industry in the interest of promoting safety. It is advisory only and it is not a substitute for a thorough safety program. Users should consult with qualified engineers and other safety professionals. KWS makes no representations or warranties, either expressed or implied, and the users of this document assume full responsibility for the safe design and operation of equipment.*

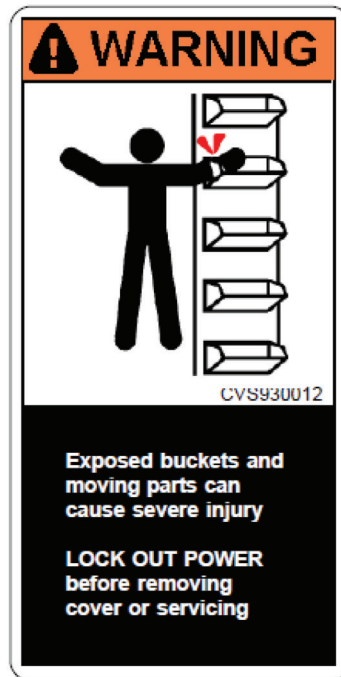
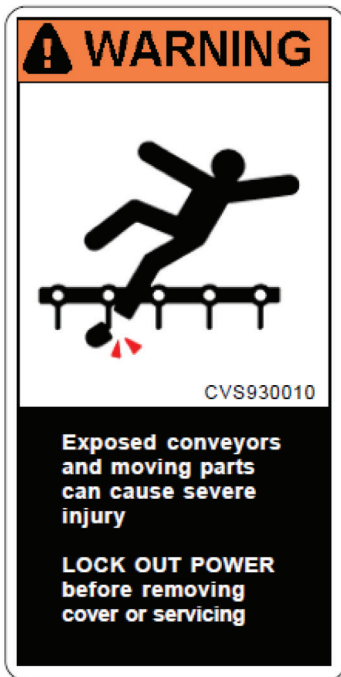
CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION  
6724 Lone Oak Blvd., Naples, Florida 34109  
239-514-3441  
[www.cemanet.org](http://www.cemanet.org)



**SAFETY**
**REFERENCE – CEMA DOCUMENT SCOM-001**
**CEMA Safety Labels**

The CEMA safety labels shown below must be used on screw conveyors, drag conveyors, slide gates, and bucket elevators. Safety labels must be placed on inlets, discharges, troughs, covers, inspection doors & drive guards. See CEMA Safety Label Placement Guidelines on CEMA Web Site:

<http://www.cemanet.org/safety/guidelines.html>



**PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT**

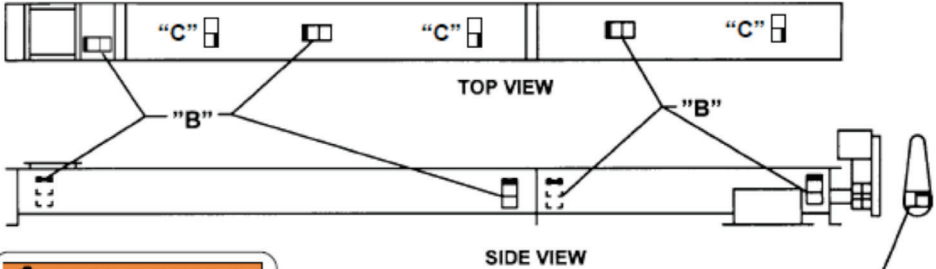
**Note:** Labels alone are not a substitute for a thorough in-plant safety training program centered on the hazards associated with operating your installed equipment. Contact CEMA or KWS for Replacement Labels



**SAFETY**

**REFERENCE – CEMA DOCUMENT SCOM-001**

**Equipment: Screw Conveyor**



**"B"**

To be placed on inlets and discharges, troughs, covers, and inspection doors of screw conveyors to provide warning against exposed moving parts while in operation.





**"A"**



**"C"**

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards.

-  NEAR SIDE
-  FAR SIDE

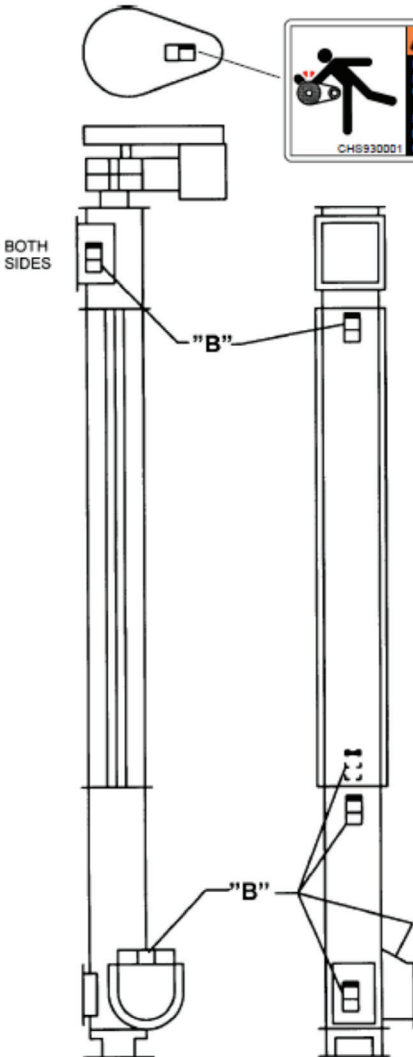
USE LABEL "A" ON BELT GUARD  
USE LABEL "B" ON ENDS OF TROUGH, MIDDLE OF COVERS, AND AT INLET OPENINGS  
USE LABEL "C" ON TOP OF COVERS



## SAFETY

## REFERENCE – CEMA DOCUMENT SCOM-001

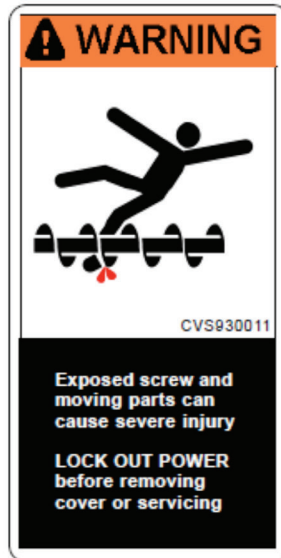
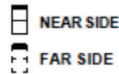
## Equipment: Vertical Screw Conveyor



To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards.

"A"

USE LABEL "A" ON BELT GUARD  
USE LABEL "B" ON ENDS OF TROUGH, ON INTAKE INSPECTION DOOR, AND BOTH SIDES OF DISCHARGE SPOUT



To be placed on inlets and discharges, troughs, covers, and inspection doors of screw conveyors to provide warning against exposed moving parts while in operation.

"B"



**SAFETY**

**REFERENCE – CEMA DOCUMENT SCOM-001**

**Screw Conveyor Safety**

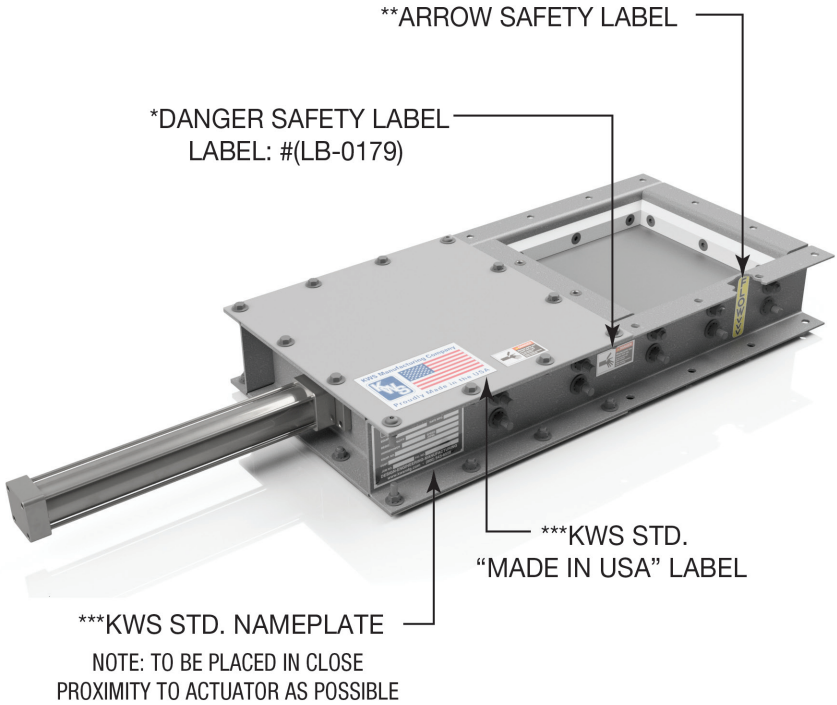
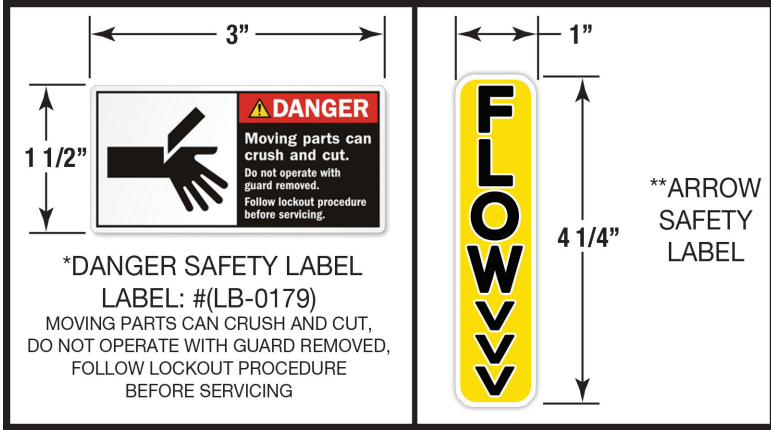
 <p>Do Not Climb, Sit, Stand, or Walk on Conveyor at Any Time.</p>	 <p>Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic, And Gravity Energy Sources Have Been Locked Out and Blocked</p>	 <p>Operate Equipment Only With all Approved Covers and Guards in Place.</p>
 <p>LOCK OUT ALL Power and Block Gravity Loads Before Servicing.</p>	 <p>Ensure That All Personnel Are Clear Of Equipment Before Starting.</p>	 <p>Allow Only Authorized And Trained Personnel to Operate Conveyors and Accessories.</p>
 <p>Keep Clothing, Body Parts, and Hair Away from Conveyors.</p>	 <p>Clean Up Spillage Near Moving Parts ONLY When Power is Locked Out AND Guards Are In Place.</p>	 <p>Do Not Modify Conveyor Or Controls.</p>
 <p>Ensure That All Controls are Visible and Accessible.</p>	 <p>Operate Equipment Only With All Approved Covers, Guards, and Safety Labels in Place.</p>	 <p>Report All Unsafe Conditions.</p>

**POST IN PROMINENT AREA**



**SAFETY**

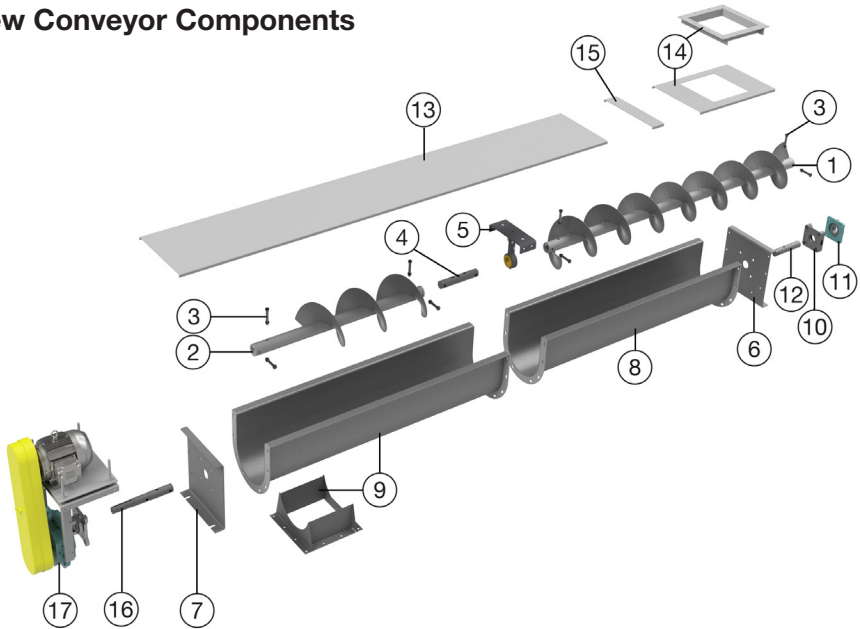
**Slide Gate Safety Labels**





## INSTALLATION

### Screw Conveyor Components



Bill of Materials

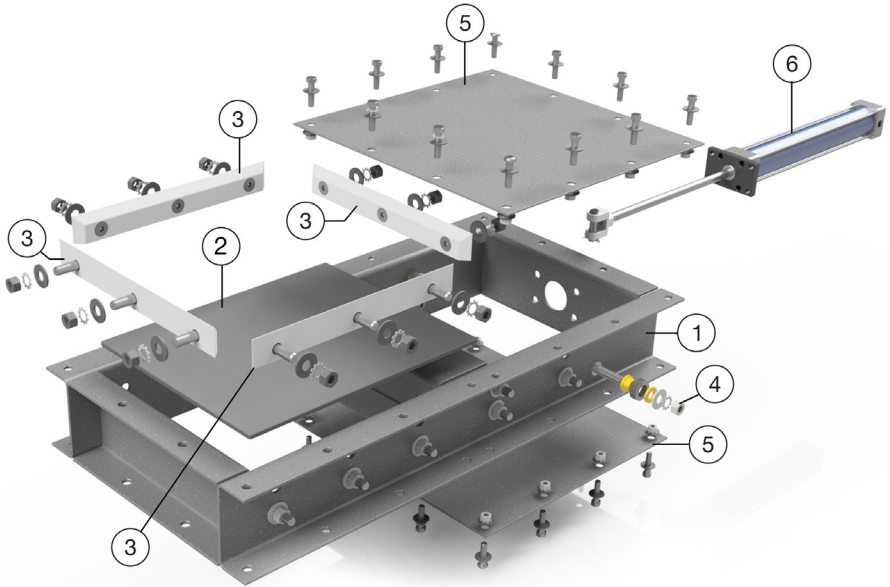
Item	Description
1	Screw
2	Screw with Bare Pipe At Discharge
3	Coupling Bolts
4	Coupling Shaft
5	Hanger with Bearing
6	Tail End Trough End
7	Trough End for Screw Conveyor Drive
8	Trough
9	Trough with Discharge Spout
10	Seal
11	Bearing
12	Tail Shaft
13	Flanged Cover
14	Flanged Cover with Inlet
15	Buttstrap
16	Drive Shaft
17	Screw Conveyor Drive Unit with Motor Mount, V-Belt Drive and Guard

**Note:** The above diagram is representative only.

Consult contract drawings for specific items on each conveyor.

## INSTALLATION

### Slide Gate Components



Bill of Materials	
Item	Description
1	Frame Weldment
2	Slide Plate
3	Seal
4	Roller Assembly
5	Cover Plate
6	Cylinder/Actuator

**Note:** The above diagram is representative only. Consult contract drawings for specific items on each slide gate.



## INSTALLATION

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### Handling and Installing Products

#### Receiving

1. Equipment may be ordered as individual components with all the assembly operations performed in the field, or assembled completely by the manufacturer, with drawings and bill of materials.
2. Immediately upon receipt all items in the shipment should be checked against shipping papers for shortages and inspected for damage.
3. All components and assemblies are to be inspected for damage upon receipt.
4. DO NOT ATTEMPT TO INSTALL DAMAGED COMPONENTS OR ASSEMBLIES.

#### Lifting and Moving

1. Extreme care must be taken to prevent damage when moving assembled equipment or components.
2. Spreader bars with slings are the recommended support method for lifting conveyors. Straps and lifting tables may be better suited for slide gates depending on the location, height, and accessibility.
3. Unsupported spans should be no greater than 12 feet.
4. NEVER LIFT A CONVEYOR WITH ONLY ONE SUPPORT POINT.
5. Unusually heavy items such as drives or gates shall be considered when choosing support points because of load balance and their bending effect.
6. Shop assembled conveyors are typically match marked and shipped in the longest sections for practical shipment.

#### Assembly

1. Mounting surfaces supporting conveyors must be level and true.
2. Screw conveyor troughs must be assembled straight and true with no distortion.
3. Place troughs in proper sequence with discharge spout properly located.





## INSTALLATION

4. Connect the joints loosely. **DO NOT TIGHTEN BOLTS.**
5. Assemble each trough end to proper end of conveyor.
6. Attach piano wire full length of conveyor at centerline. Make sure piano wire is pulled tight. Refer to Figure 1 at the end of this section.
7. Tighten trough flange bolts keeping the trough assembly true to piano wire. Alignment must be checked in both horizontal and vertical directions. Maximum deviation in either direction at any point along the length of the conveyor is 1/8". Torque bolts to proper torque rating per Bolt Torque Guide.
8. Anchor trough assembly to mounting surface. Make sure entire length of trough is straight and true. CEMA recommends supporting trough assemblies every 10 to 12 feet. Saddles and feet may be required.
9. Mount drive or thrust unit on correct trough end. Drive or thrust units are normally located at discharge end of conveyor. Make sure drive or thrust unit is centered in seal and trough end openings. Torque bolts to proper torque rating per Bolt Torque Guide.
10. Place the first screw section in the trough starting at the drive or thrust end. Install screw so end lugs are opposite carrying side of flight.
11. Insert screw onto drive shaft and install coupling bolts. **DO NOT TIGHTEN COUPLING BOLTS.**
12. Insert coupling shaft into opposite end of screw and install coupling bolts. **DO NOT TIGHTEN COUPLING BOLTS.**
13. Pull screw section away from drive or thrust unit to seat thrust connection.
14. Insert hanger onto coupling shaft.
15. Raise hanger and screw section until hanger top bar is flush with top of trough. Make sure correct clearance exists between outside diameter of screw and inside of trough. Match mark and drill troughs to mount hanger assembly. Insert hanger assembly bolts and hand tighten.
16. Assemble screw sections, couplings and hangers until all are installed by repeating steps 10 through 15. Install screw sections so flighting is 180-degrees from end of flighting of previous screw section.



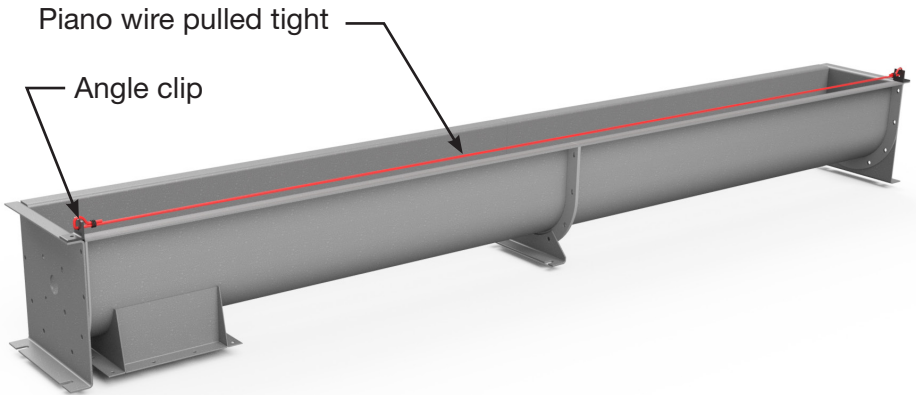
## INSTALLATION

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17. Center hanger bearings between screw sections. Torque hanger assembly bolts to proper torque rating per Bolt Torque Guide.
18. Assemble seal and bearing to opposite trough end. Make sure end shaft is centered in seal and trough end openings. Torque bolts to proper torque rating per Bolt Torque Guide.
19. Insert end shaft through end bearing and into last screw section and install coupling bolts. **DO NOT TIGHTEN COUPLING BOLTS.**
20. Rotate entire screw assembly to check alignment and adjust hanger assemblies as required.
21. Torque ALL coupling bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.
22. Adjust seals as required.
23. Slide gates are installed to a rigid assembly. Control mechanisms are installed which may include electrical, electronic, pneumatic, and/or hydraulic connections. Make sure control mechanisms are connected appropriately.
24. Ensure all safety considerations are made before energizing equipment.
25. Safety equipment must be installed to ensure compliance with all federal, state, and local regulations.
26. Remove all debris from conveyor.
27. Install covers in proper sequence starting at inlet end and attach with provided fasteners.
28. Lubricate drive and all bearings in accordance with manufacturer's instructions. **DRIVES GENERALLY SHIPPED WITHOUT OIL.**
29. **MAKE SURE ALL SAFETY LABELS ARE IN PROPER LOCATIONS.**

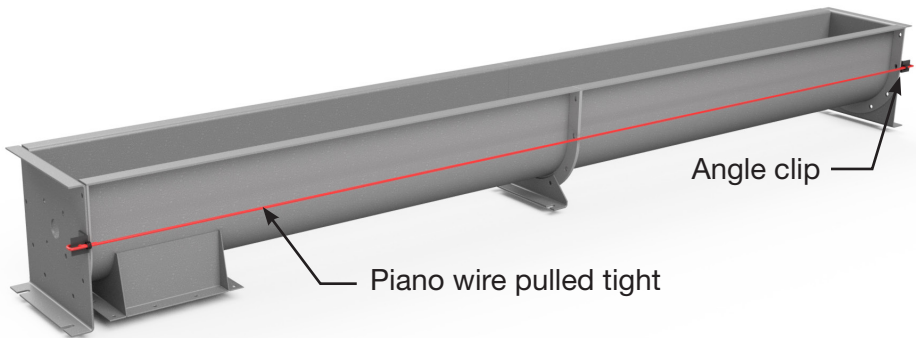


## INSTALLATION



### CEMA Commonly Used Wire Setup

Piano wire attached to the top of the conveyor on side



### Optional Piano Wire Setup

Piano wire attached to the centerline of the conveyor on side



## OPERATION

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### **Before Initial Start-Up:**

1. LOCKOUT/TAG OUT ALL POWER AND ENERGY.
2. Lubricate all bearings in accordance with manufacturer's instructions.
3. Lubricate all gear reducers in accordance with manufacturer's instructions. Gear reducers are normally shipped without lubrication.
4. Check conveyor to ensure all tools and foreign materials have been removed.
5. Turn drive unit by hand to check for alignment and obstructions.
6. Check conveyor to ensure all covers, guards and safety devices are installed and operating properly.
7. Attach gates to inlet and discharge chutes, where applicable. Ensure personnel are protected from hazards in compliance with local, state and federal requirements.

### **Initial Start-Up (Without Material):**

1. Re-energize power to conveyor and ancillary equipment as required.
2. Start conveyor momentarily to check for proper conveyor rotation. If conveyor rotation is NOT correct, quickly shutdown and have qualified electrician change wiring.
3. Actuate slide gate to check for proper direction of movement. If direction of movement is NOT correct, quickly shutdown and have qualified technician correct.
4. Operate conveyor without material for several hours as a break in period. Observe for excessive bearing temperature, unusual noise or drive misalignment. If these conditions occur refer to Troubleshooting Section of this document.
5. Stop the conveyor and LOCKOUT/TAG OUT ALL POWER AND ENERGY.
6. Remove covers and check tightness of coupling bolts. Torque bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling



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## OPERATION

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bolts. Replace covers.

7. Check all assembly and mounting bolts. Torque bolts to proper torque rating.
8. Check conveyor discharge. Discharge must be clear to ensure that material flow out of conveyor will not be impeded.
9. If slide gates are installed check operation to ensure controls are working and correct.

### **Initial Start-Up (With Material):**

1. Re-energize power to conveyor.
2. Start conveyor and operate without material for several minutes.
3. Feed material gradually until design capacity is reached.
4. **DO NOT EXCEED CONVEYOR SPEED, CAPACITY AND MATERIAL DENSITY.**
5. Start and stop conveyor several times. Operate conveyor for several hours with material. Verify operation of slide gates where installed.
6. Check motor amperage when conveying at design capacity and compare to full load amperage of motor. Problems may exist if amperage is excessive. Check voltage to ensure that it is within normal operating limits.
7. Stop the conveyor and **LOCKOUT/TAG OUT ALL POWER AND ENERGY.**
8. Remove covers and check tightness of coupling bolts. Torque bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.
9. Check hanger bearings and realign if necessary.
10. Replace covers.
11. Check all assembly and mounting bolts. Torque bolts to proper torque rating per Bolt Torque Guide.



## MAINTENANCE

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### Maintenance Check List

#### Objective:

The purpose of the maintenance checklist is to prolong the life of the equipment by providing the owner or end user a list of common components requiring maintenance on equipment. Additional component maintenance may be required based on individual equipment designs. Regular inspections are recommended to help prolong equipment life. The owner or end user is responsible for determining the frequency of inspections, and for using a qualified person for performing inspections.

#### Lockout / Tag Out all power before inspection of equipment.

- Bearings:** Check for proper lubrication. Lubricate all bearings in accordance with manufacturer's instructions. Check hanger bearings for proper alignment and excessive wear. Replace hanger bearings when wear exceeds 1/8 inch. For more information regarding the bearings, please contact KWS Engineering.
- Gear Reducers:** Check for proper lubrication. Lubricate all gear reducers in accordance with manufacturer's instructions. For more information regarding the gear reducer, please contact KWS Engineering.
- Drive:** Check for wear on belts and proper tension. Check for lubrication on chains and proper tension. Replace belts or chains as necessary. For more information regarding the drive, please contact KWS Engineering.
- Screws:** Check for damage, excessive wear and material buildup. Replace screw sections as necessary.
- Troughs:** Check for damage, excessive wear and material buildup. Check trough alignment using piano wire as described in Assembly Section of this document. Replace trough sections as necessary.
- Liners:** Check for excessive wear. Replace liners when wear exceeds 1/8 inch. For more information regarding replacing liners, please contact KWS Engineering.



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## MAINTENANCE

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- Shafts:** Check for bolt hole elongation and wear. Check for run-out. Replace shafts when wear exceeds 1/8 inch.
- Seals:** Check for leakage. Adjust seal or replace worn parts as necessary. For more information regarding seals, please contact KWS Engineering.
- Coupling Bolts:** Check for wear. Replace worn coupling bolts as necessary. It is recommended to replace coupling bolts and lock nuts when replacing screw sections. Torque ALL coupling bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.
- Assembly Bolts:** Check for tightness. Torque ALL assembly bolts to proper torque rating per Bolt Torque Guide.
- Guards:** Check for clearance and bolt tightness. Check oil level on oil-tight guards.
- Slide Gates:** Check fittings for leaks, connections secure.

### Replacing Screw Conveyor Components:

1. LOCKOUT/TAG OUT ALL POWER AND ENERGY.
2. Removal of a screw section must proceed from the end opposite the drive or thrust unit.
3. Remove trough end, screw sections, coupling shafts and hangers until the damaged screw section is reached and removed.
4. Reassemble conveyor components in accordance with the Assembly Section of this document.







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## SHUTDOWN AND STORAGE

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**NOTE:** Quick disconnect screws can be removed at intermediate locations without first removing adjacent sections.

### Emergency Shutdown

An emergency shutdown may be necessary to clear obstructions or to replace damaged or worn components.

1. LOCKOUT/TAG OUT ALL POWER AND ENERGY.
2. Remove all covers.
3. Remove all obstructions and product from conveyor.
4. Inspect all components for damage or wear. Check conveyor components in accordance with the Maintenance Section of this document.
5. Replace all damaged or worn components. Replace conveyor components in accordance with the Assembly Section of this document.
6. Turn drive unit by hand to check for alignment and obstructions.
7. Replace all covers and guards.
8. Restart conveyor in accordance with the Operation Section of this document.

### Extended Shutdown

An extended shutdown may be necessary if the conveyor is not in operation for a long period of time.

1. Operate conveyor until all product is removed.
2. LOCKOUT/TAG OUT ALL POWER AND ENERGY.
3. Remove all covers.
4. Remove all obstructions and product from conveyor.
5. Inspect all components for damage or wear. Check conveyor components in accordance with the Maintenance Section of this document.
6. Replace all damaged or worn components. Replace conveyor components in accordance with the Assembly Section of this document.
7. Lubricate drive and all bearings in accordance with manufacturer's instructions.



## SHUTDOWN AND STORAGE

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8. Coat all exposed metal surfaces with rust preventative.
9. Rotate screws by hand every week. Screws may sag and permanently deform if not rotated.

**NOTE:** *When operation is to resume, restart conveyor in accordance with the Operation Section of this document.*

### Storage

1. Protect conveyor from weather, moisture and extreme temperatures. DO NOT use coverings that promote condensation.
2. Coat all exposed metal surfaces with rust preventative.
3. Rotate screws by hand every week. Screws may sag and permanently deform if not rotated.

**NOTE:** *When operation is to resume, restart conveyor in accordance with the Operation Section of this document.*



## TROUBLESHOOTING GUIDE

Problem	Cause	Remedy
1. Accelerated Flight Wear	Flight Thickness Too Light	Increase Flight Thickness. Use Abrasion Resistant Materials Or Hardfacing.
	Rpm Too High Or Trough Loading Too High	Reduce Speed. Consult CEMA 350 Book To Determine Recommended Speed And Trough Loading.
2. Hanger Bearing Failure	Incorrect Alignment	Realign Trough Assembly And Hangers In Accordance With Assembly Section Of This Document.
	Improper Speed And Trough Loading	Consult CEMA 350 Book To Determine Recommended Speed And Trough Loading.
	Improper Hanger Bearing Material	Consult CEMA 350 Book To Determine Recommended Bearing Material.
	Excessive Bearing Wear	Replace Hanger Bearing.
3. Premature Trough Failure	Trough Thickness Too Light	Increase Trough Thickness. Use Abrasion Resistant Material. Consult CEMA 350 Book To Determine Recommended Trough Thickness.
	Screw Deflection	Consult CEMA 350 Book To Determine Proper Pipe Size And Screw Length.
	Bent Screw	Straighten Or Replace Screw.
4. Shaft Hole Elongation	Insufficient Number Of Coupling Bolts	Increase Number Of Coupling Bolts
	Conveyor Subject To Frequent Stop/Start	Cease Frequent Stop/Start. Increase Bearing Capacity Of Shaft And/Or Increase Number Of Coupling Bolts
	Frequent Overloads	
5. Drive Shaft Breakage	Excessive Torque	Consult CEMA 350 Book To Determine Proper Torque Rating.



## TROUBLESHOOTING GUIDE

Problem	Cause	Remedy
6. Slide Gate Won't Move	Damaged control connection	Repair connection
	Excessive head load	Remove material to reduce head load
7. Motor Overload	Motor Undersized	Consult CEMA 350 Book To Determine Proper Horsepower Requirements.
	Upset Loading Condition	Empty Trough, Control Feed And Operate Under Design Specifications.
8. Trough End Bearing Failure	Bearing Contamination	Upgrade Or Replace Seal. Change To Outboard Bearing.
	Insufficient Lubrication	Lubricate In Accordance With Maintenance Section Of This Document.
	Improper Shaft Runout	Check Screw Straightness And Replace As Necessary.
9. Coupling Shaft Breakage	Excessive Torque	Consult CEMA 350 Book To Determine Proper Torque Rating.
	Incorrect Alignment	Realign Trough Assembly And Hangers In Accordance With Assembly Section Of This Document.
	Excessive Shaft Wear	Replace Coupling Shaft.

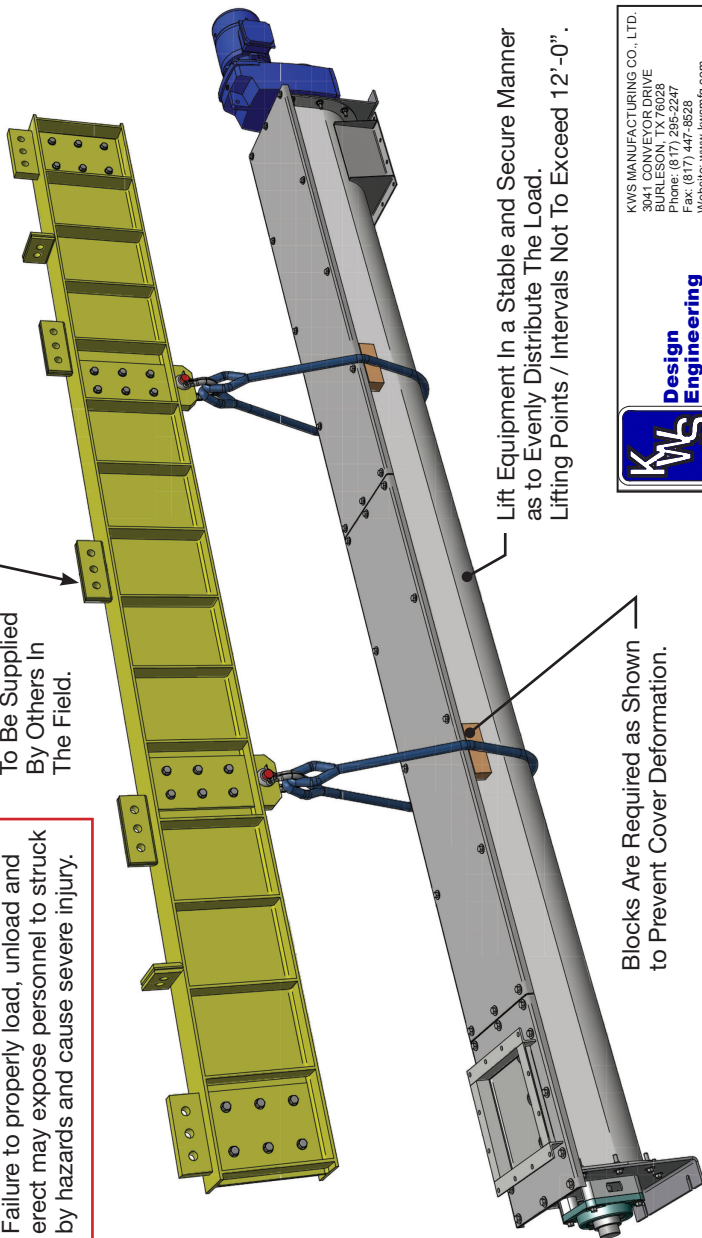
## BOLT TORQUE GUIDE

GENERAL BOLT TIGHTENING TORQUE (Ft. Lbs.)					
Bolt Dia. (inches)	Threads Per Inch (UNC)	SAE 2	SAE 5	SAE 8	18-8 & 316 Stainless Steel
1/4	20	5	9	12	6
5/16	18	11	18	25	11
3/8	16	18	31	44	20
7/16	14	28	49	69	29
1/2	13	44	73	105	40
9/16	12	63	108	149	52
5/8	11	96	147	212	86
3/4	10	158	252	351	115
7/8	9	219	389	552	180
1	8	316	589	784	240

# CONVEYOR LIFT STANDARD

Equipment must be properly loaded, unloaded and erected by trained and certified rigging professionals. Failure to properly load, unload and erect may expose personnel to struck by hazards and cause severe injury.

Spreader Bar Shown For Reference Only. To Be Supplied By Others In The Field.



Lift Equipment In a Stable and Secure Manner as to Evenly Distribute The Load. Lifting Points / Intervals Not To Exceed 12'-0".

Blocks Are Required as Shown to Prevent Cover Deformation.

	KWS MANUFACTURING CO., LTD. 10001 W. STATE HIGHWAY BURLESON, TX 76028 Phone: (817) 295-2247 Fax: (817) 447-8628 Website: www.kwsmf.com Email: sales@kwsmf.com		
	CONVEYOR LIFTING STANDARD STANDARD LIFTING ARRANGEMENT FOR SCREW CONVEYORS		
NJR	APM	11/15/2016	CONVEYOR LIFT STD

**Conveyor Lifting Arrangement  
ISO View**







## What makes KWS different from other manufacturers?

At KWS we understand the needs and exceed the expectations of our Customers. As an ISO-9001 certified company, quality is integrated into every aspect of our processes. Quality is defined by the Customer, and derived from the total KWS Customer experience. It's not just product quality, but quality throughout every step of the Sales, Engineering and Manufacturing processes. Quality starts with our first Customer contact and never ends.

*Conveying Knowledge, Workmanship, Solutions*



Part No. 0402030M

Revision 1 – Release Date 4.1.19



ISO 9001  
Certified



MADE IN THE USA

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