



**Design
Engineering
Manufacturing**

Conveying Knowledge, Workmanship, Solutions

Approval Drawing Submittal by KWS Manufacturing Rev. 1

Prepared For:

KWS MANUFACTURING COMPANY, LTD.

3041 Conveyor Drive | Burleson, TX 76028 | PH (817) 295-2247 Fax (817) 447-8528 | sales@kwsmfg.com | <http://www.kwsmfg.com>



**ISO 9001
Certified**





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Section 1:

Structural and Mechanical Drawings

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COMPONENT PART TOLERANCE

UNLESS OTHERWISE SPECIFIED

DECIMAL .X = $\pm .03$
 .XX = $\pm .01$
 .XXX = $\pm .005$

FRACTIONAL $\pm 1/16"$

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

MACHINED SURFACES			FABRICATION		
STRAIGHTNESS	—	$\pm .005$	STRAIGHTNESS	—	$\pm 1/8"$
FLATNESS		$\pm .003$	FLATNESS		$\pm 1/8"$
CIRCULARITY		$\pm .003$	CIRCULARITY		$\pm 1/8"$
PERPENDICULARITY		$\pm .5^\circ$	PERPENDICULARITY		$\pm 1^\circ$
ANGULARITY		$\pm .5^\circ$	ANGULARITY		$\pm 1^\circ$
CONCENTRICITY		$\pm .005$	CONCENTRICITY		$\pm 1/4"$
POSITION		$\pm .005$	POSITION		$\pm 1/16"$
TOTAL RUNOUT		$\pm .010$	TOTAL RUNOUT		$\pm .030$

REVISIONS			
NO.	DATE	BY	DESCRIPTION
1			

SECTION No.

PAGE No. 1

COMPONENT PART
TOLERANCE STANDARDS



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ENGINEERING STANDARD

DRAWING BY: DLE CHECKED BY: DATE 2/5/07 SCALE NTS. DRAWING NO. CPT-1 REV.

⚠ DANGER SITUATIONS WHERE AN IMMEDIATE HAZARD WILL CAUSE DEATH OR SERIOUS INJURY TO WORKERS AND/OR THE GENERAL PUBLIC IF NOT AVOIDED. THIS DESIGNATION IS TO BE USED ONLY IN EXTREME SITUATIONS.

1. EQUIPMENT IS FURNISHED WITHOUT SHAFT GUARDS, THE OWNER OR END USER IS RESPONSIBLE FOR PROVIDING PROPER GUARDING OF ROTATING SHAFTS IN THEIR FACILITY BASED ON THE LOCATION OF THE EQUIPMENT AND THE POTENTIAL FOR A HAZARD, FAILURE TO PROVIDE PROPER GUARDING MAY EXPOSE PERSONNEL TO ROTATING EQUIPMENT AND CAUSE SEVERE INJURY.

⚠ WARNING SITUATIONS WHERE A POTENTIALLY HAZARDOUS CONDITION EXISTS THAT COULD RESULT IN DEATH OR SERIOUS INJURY TO WORKERS AND/OR THE GENERAL PUBLIC IF NOT AVOIDED.

1. DRIVE BASE MUST BE SUPPORTED ONCE CONVEYORS HAVE BEEN FIELD INSTALLED, FIELD SUPPORTS ARE THE RESPONSIBILITY OF THE END USER, FIELD SUPPORTS MUST BE DESIGNED BY A QUALIFIED PERSON, FAILURE TO PROVIDE PROPER FIELD SUPPORT MAY EXPOSE PERSONNEL TO STRUCTURAL FAILURE AND CAUSE SEVERE INJURY.
2. 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.
3. EQUIPMENT IS FURNISHED WITH ELECTRICAL COMPONENTS WHICH MUST BE WIRED CORRECTLY AND OPERATIONAL PER THE ELECTRICAL COMPONENTS MANUFACTURER'S RECOMMENDATIONS PRIOR TO START-UP AND OPERATION, FIELD WIRING IS THE RESPONSIBILITY OF THE END USER AND MUST BE PERFORMED BY A QUALIFIED PERSON, FAILURE TO CORRECTLY WIRE OR INSTALL WIRING MAY EXPOSE PERSONNEL TO ELECTRICAL SHOCK AND CAUSE SEVERE INJURY.
4. TROUGH AND COVER WEAR MUST BE MONITORED TO ENSURE A HOLE IN THE TROUGH CAUSED BY ROTATING SCREW DOES NOT ALLOW EXPOSURE TO ROTATING EQUIPMENT, POSSIBLE HAZARDOUS BULK MATERIALS, SLIP HAZARDS, AND/OR EXPLOSION HAZARDS, REPLACE WORN COMPONENTS AS REQUIRED, CONSULT THE KWS OIM MANUAL FOR ADDITIONAL DETAILS.
5. SHAFT AND SEAL WEAR MUST BE MONITORED TO ENSURE LEAKAGE DOES NOT OCCUR, FAILURE TO DO SO MAY RESULT IN EXPOSURE TO POSSIBLE HAZARDOUS BULK MATERIALS, SLIP HAZARDS, AND/OR EXPLOSION HAZARDS.
6. SEALS ARE NOT ADJUSTED PRIOR TO SHIPMENT AND MUST BE ADJUSTED BY OTHERS IN FIELD TO ENSURE A POSITIVE SEAL, FAILURE TO DO SO MAY RESULT IN EXPOSURE TO POSSIBLE HAZARDOUS BULK MATERIALS, SLIP HAZARDS, AND/OR EXPLOSION HAZARDS.
7. THE OWNER OR END USER IS RESPONSIBLE FOR ENSURING INLET/DISCHARGE CONNECTIONS ARE RIGIDLY MOUNTED, GASKETED AND BOLTED TO THE REQUIRED TORQUE SPECIFICATIONS, FAILURE TO DO SO MAY RESULT IN EXPOSURE TO POSSIBLE HAZARDOUS MATERIALS, SLIP HAZARDS, AND/OR EXPLOSION HAZARDS.
8. SCREW CONVEYOR SUPPORTS SUCH AS SADDLES AND FEET MUST BE ORIENTATED IN SUCH A WAY TO PREVENT SHIFTING OF THE EQUIPMENT, FAILURE TO PROVIDE PROPER FIELD SUPPORT MAY EXPOSE PERSONNEL TO STRUCTURAL FAILURE AND CAUSE SEVERE INJURY.

⚠ CAUTION SITUATIONS WHERE A NON-IMMEDIATE POTENTIAL HAZARD PRESENTS A LESSER THREAT OF INJURY THAT COULD RESULT IN MINOR OR MODERATE INJURIES TO WORKERS AND/OR THE GENERAL PUBLIC.

1. EQUIPMENT MAY HAVE HOT SURFACES, PROPER INSULATION, BARRIERS AND/OR GUARDS MUST BE PROVIDED BY THE END USER TO ENSURE PERSONNEL EXPOSURE TO HEATED SURFACES IS PREVENTED, FAILURE TO DO SO MAY RESULT IN A BURN HAZARD.

☐ APPROVED
☐ APPROVED AS NOTED
☐ REVISE AND
☐ RESUBMIT

BY: _____
DATE: _____

APPROVAL 08-04-2020

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CEMA

CEMA STANDARD NO: SCOM - 001
Approved: September 19, 2012
Copyright: September, 2012

CEMA Document: SC 2004-01

CEMA Safety Labels

The CEMA safety labels shown below should be used on screw conveyors, drag conveyors, and bucket elevators. Safety labels should 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>

WARNING
Exposed moving parts can cause severe injury
LOCK OUT POWER before removing guard
CH930001

WARNING
Walking or standing on conveyor covers or grating can cause severe injury
STAY OFF
CH159 1026

WARNING
Exposed screw and moving parts can cause severe injury
LOCK OUT POWER before removing cover or servicing
CH930011

WARNING
Exposed conveyors and moving parts can cause severe injury
LOCK OUT POWER before removing cover or servicing
CVS930010

WARNING
Exposed buckets and moving parts can cause severe injury
LOCK OUT POWER before removing cover or servicing
CVS930012

PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT
SEE PREVIOUS PAGE FOR SAFETY REMINDERS

Note: Labels alone do not substitute for a thorough in-plant safety training program centered on the hazards associated with operating your installed equipment.

Contact CEMA or Your Equipment Manufacturer for Replacement Labels

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION
5624 Strand Court, Suite 2, Naples, Florida 34110
239-514-3441
<http://www.cemanet.org>

WARNING
Exposed screw and moving parts can cause severe injury
LOCK OUT POWER before removing cover or servicing
CVS930011

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.

CEMA

CEMA STANDARD NO: SCOM - 001
Approved: September 19, 2012
Copyright: September, 2012

CEMA Safety Labels **Placement Guidelines**

Product: Bulk Handling Equipment
Equipment: Screw Conveyor

TOP VIEW

SIDE VIEW

WARNING
Exposed screw and moving parts can cause severe injury
LOCK OUT POWER before removing cover or servicing
CVS930011

WARNING
Exposed moving parts can cause severe injury
LOCK OUT POWER before removing guard
CH930001

WARNING
Walking or standing on conveyor covers or grating can cause severe injury
STAY OFF
CH159 1026

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.

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 OPENING.
USE LABEL "C" ON TOP OF COVERS

SC-2

NOTE: THE OWNER OR END USER IS RESPONSIBLE FOR PUBLISHING AND FOLLOWING LOCK OUT TAG OUT PROCEDURES PER OSHA REFERENCE:- "29 CFR 1910.147 - THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)"

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SCREW CONVEYOR
SAFETY INFORMATION / DRAWING

DESIGNER NJR	P.M. JJB	CHECKED BY	CREATION DATE 8/4/2020	DRAWING NO. 0158151-SD
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GENERAL NOTES:

- 1- SHOP ASSEMBLED; MATCH MARK AND KNOCK DOWN ONLY AS REQUIRED TO SHIP.
- 2- FINISH REQUIREMENTS:
- A - SCREW ASSEMBLY: KWS INDUSTRIAL FINISH 15
WELD: WELD SPATTER AND SLAG REMOVED, 40-50 GRIT FINISH, PITS AND CREVICES PERMISSIBLE (CEMA II)
FLIGHT SURFACE: MILL FINISH, NO GRINDING ON STEEL SURFACES
PIPE: MILL FINISH, NO GRINDING ON STEEL SURFACES
- B - TROUGH ASSEMBLY: KWS INDUSTRIAL FINISH 11 - INTERIOR AND EXTERIOR
WELD: SPATTER AND SLAG REMOVED, 40-50 GRIT FINISH, PITS AND CREVICES PERMISSIBLE (CEMA II)
TROUGH SURFACE: MILL FINISH, NO GRINDING ON STEEL SURFACES
- C - ALL PLATE, 3/16" AND UP TO BE BEAD BLASTED ON EXTERIOR SURFACES ONLY TO UNIFORM FINISH.
GAUGE MATERIAL WITH 2B FINISH TO BE CHEMICALLY CLEANED ON EXTERIOR WELDS ONLY.
- 3- DO NOT PAINT STAINLESS STEEL SURFACES.
- 4- ALL BEARINGS, SEALS, DRIVE COMPONENTS AND OTHER PURCHASED COMPONENTS WILL BE FURNISHED WITH MANUFACTURERS STANDARD PAINT SYSTEM, SAFETY GUARDS TO BE SAFETY YELLOW.
- 5- DO NOT PAINT SCREWS.
- 6- DESIGN PARAMETERS:
- A- **DESIGN TEMPERATURE: PER PRESSURE VESSEL NAMEPLATE.**
B- **DESIGN PRESSURE: PER PRESSURE VESSEL NAMEPLATE.**
C- **SCREW TO BE SHOP / HYDROSTATICALLY TESTED AT 195 PSIG.**
D- **TROUGH JACKET TO BE SHOP / HYDROSTATICALLY TESTED AT 195 PSIG.**
- 7- TAG AS FOLLOWS:
- A- TAG: 4IN. X 6IN X 1/32IN THK ALUMINUM
B- LOCATION: AT DRIVE END IN CLEARLY VISIBLE LOCATION
C- LETTERING: 3/16 IN. MINIMUM HEIGHT
D- INFORMATION: KWS STANDARD
E- **USE KWS ALUMINUM PRESSURE VESSEL NAMEPLATES FOR JACKET AND SCREW. (PER DETAIL).**
- 8- EQUIPMENT IS FURNISHED WITH SAFETY BOLTS AT COVERS, DROP BOTTOMS, AND/OR GUARDS, ONE SPECIAL TOOL IS SUPPLIED FOR EVERY 50 FEET OF UNIT LENGTH.
- 9- THE GEAR REDUCER BREATHERS MUST BE CHECKED IN THE FIELD AFTER INSTALLATION FOR PROPER ORIENTATION AND OPERATION. THE BREATHER ACTS AS A CHECK-VALVE TO ALLOW THE REDUCER TO DISSIPATE INTERNAL PRESSURE AND SHOULD BE LOCATED ON THE TOP OF THE REDUCER, ANY BLOCKAGE OF THE BREATHER MUST BE REMOVED BEFORE OPERATING THE EQUIPMENT.
- 10- THE DRIVE SHAFT WILL HAVE ANTI-SEIZE THROUGH THE SHAFT MOUNT REDUCER.
- 11- EXPOSED CARBON STEEL SHAFTING WILL BE COATED WITH RUST INHIBITOR.
- 12- THIS EQUIPMENT IS BEING SHIPPED WITHOUT OIL IN THE DRIVE REDUCER OR GREASE IN THE BEARINGS. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ADD PROPER LUBRICATION PRIOR TO THE OPERATION OF THIS EQUIPMENT.
- 13- EQUIPMENT IS NOT DESIGNED TO START UNDER UPSET CONDITIONS (100% TROUGH LOADING).
- 14- PROPER EQUIPMENT ALIGNMENT IS CRITICAL TO SUCCESSFUL LONG-TERM OPERATION. ALIGNMENT MUST BE CHECKED IN BOTH HORIZONTAL AND VERTICAL DIRECTIONS. MAXIMUM DEVIATION IN EITHER DIRECTION IS 1/8 INCH. PLEASE REFER TO KWS OPERATIONS AND MAINTENANCE MANUAL FOR ADDITIONAL INFORMATION.
- 15- AC VARIABLE FREQUENCY DRIVE (VFD) TO BE SUPPLIED BY OTHERS. VFD MUST BE SIZED FOR AT LEAST 2 TIMES FULL-LOAD AMPS OF MOTOR TO ALLOW FOR HIGH INRUSH OF CURRENT DURING SCREW FEEDER STARTING. VFD MUST BE PROGRAMMED FOR FULL TORQUE WITH LEAST AMOUNT OF DELAY AT START UP. VFD SOFT-START FEATURE MUST BE DISABLED. PLEASE REFER TO CEMA ENGINEERING STANDARD 351-2007. FOR MORE INFORMATION, CONTACT KWS MANUFACTURING CO. LTD.

THERMAL PROCESSOR NOTES:

- 16- ASSEMBLED UNIT WILL Laterally EXPAND UP TO 4" INCH AT MAXIMUM TEMPERATURE, ONE END OF UNIT MUST BE FREE AND ALLOW FOR EXPANSION.
- 17- PLEASE REFER TO "PRESSURE TESTING GUIDE" DRAWING FOR PRESSURE TESTING ARRANGEMENT(S)/ PROCEDURE(S) FOR THE JACKET AND HOLLOW FLIGHT ONLY.
- 18- DRIVE BASE NEEDS TO BE SUPPORTED ONCE CONVEYOR HAVE BEEN FIELD INSTALLED. ALL FIELD SUPPORT(S) WILL BE RESPONSIBILITY OF OTHERS.
- 18- MTR's ARE REQUIRED FOR ALL PURCHASED PRESSURE RETAINING 316SS & 304SS STAINLESS STEEL PARTS, AS INDICATED ON THE TOP LEVEL B.O.M. WITH A **.
- 19- MATERIAL SPECIFIC HEAT:
PRODUCT INLET TEMP:
PRODUCT OUTLET TEMP:
COOLANT INLET TEMP:
COOLANT OUTLET TEMP:
JACKET COOLANT FLOW:
HOLLOW FLIGHT COOLANT FLOW:
- 20- ALL WELDS ARE WPS (P8 - P8) & (P8 - P1) UNLESS OTHERWISE SPECIFIED.
- 21- IDENTIFICATION MARKINGS REQUIRED ON ALL MATERIALS IN PRESSURE AREA INCLUDING MATERIAL GRADE, TYPE AND CLASS.
- 22- ALL ORIGINAL MARKINGS ON ALTERED ANSI FLANGE MUST BE COPIED (PHOTOGRAPHED), THEN REMOVED.
- 23- MATERIAL SEGREGATION REQUIRED FOR ALL PURCHASED MATERIALS.
- 24- WELDS FOR SCREW, JACKET, NOZZLES AND CIRC. SEAMS PER WPS# ASME - SEC IX P8 TO P8 & P8 TO P1.

☐ APPROVED	BY: _____
☐ APPROVED AS NOTED	DATE: _____
☐ REVISE AND RESUBMIT	

APPROVAL 09-18-2020

1	9/18/20	JMN	REVISED PER CUSTOMER COMMENTS
REV	DATE	DESIGNER	DESCRIPTION
REVISIONS			

WEIGHT: 3900 LBS. [DEAD LOAD].

CUSTOMER: _____

SHIP TO: _____



Design Engineering Manufacturing

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12" DIA. SCREW THERMAL PROCESSOR
GENERAL NOTES, SHIP LOOSE ITEMS & ISO VIEW

DESIGNER NR	P.M. JJB	CHECKED BY	CREATION DATE 8/3/2020	DRAWING NO. 0158151-GN
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BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	REV
B	1	KADANT JOHNSON, #16G68095, 2" NPT, LEFT HAND, MALE, SKD ROTARY UNION, DUAL FLOW.	

NOTE:- MOUNT TROUGH JACKET NAMEPLATE AND SCREW NAMEPLATE ON ITEM #3A, DRIVE PEDESTAL U-TROUGH END ASSEMBLY'S SIDE PLT AS SHOWN. IN A CLEARLY VISABLE LOCATION.

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TROUGH JACKET

MDMT 0°F at 110 psi
MAWP 110 psi at 1695°F
MAEWP 0 psi at 1695°F

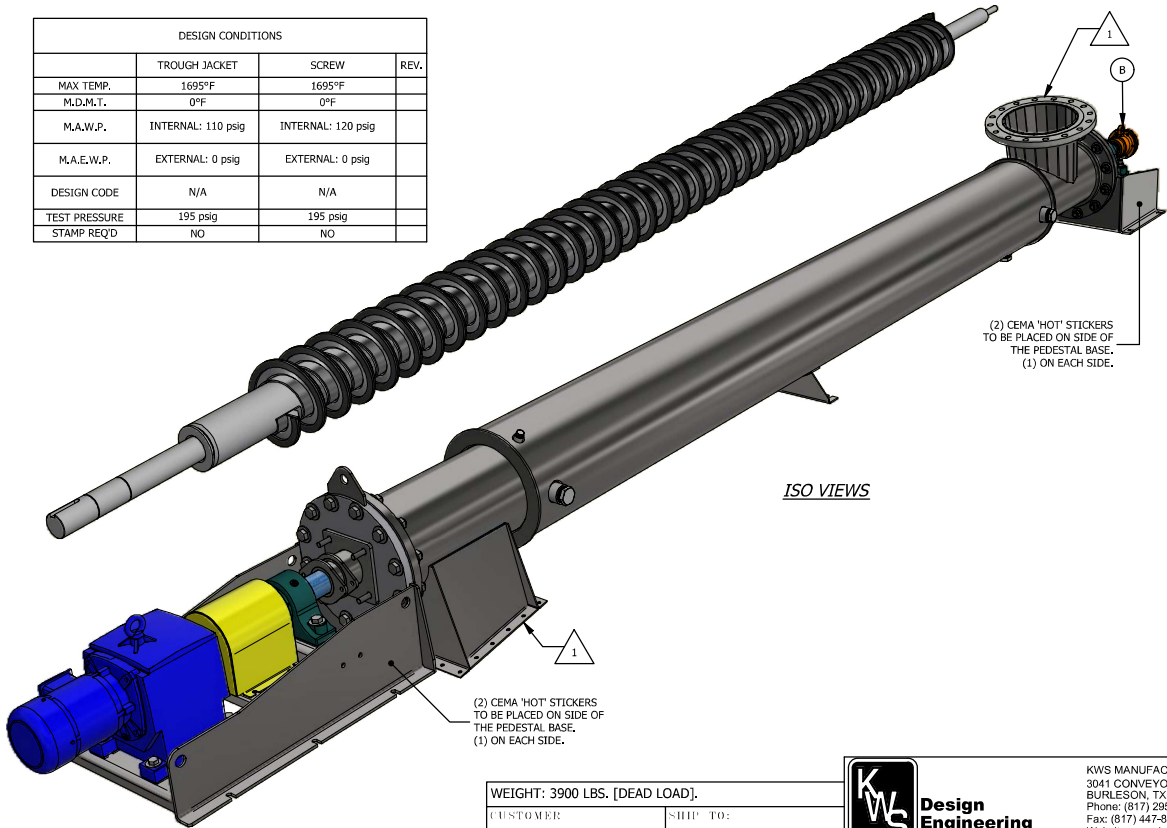
TROUGH JACKET NAMEPLATE DETAIL

CERTIFIED BY
KWS MANUFACTURING COMPANY, LTD

SCREW

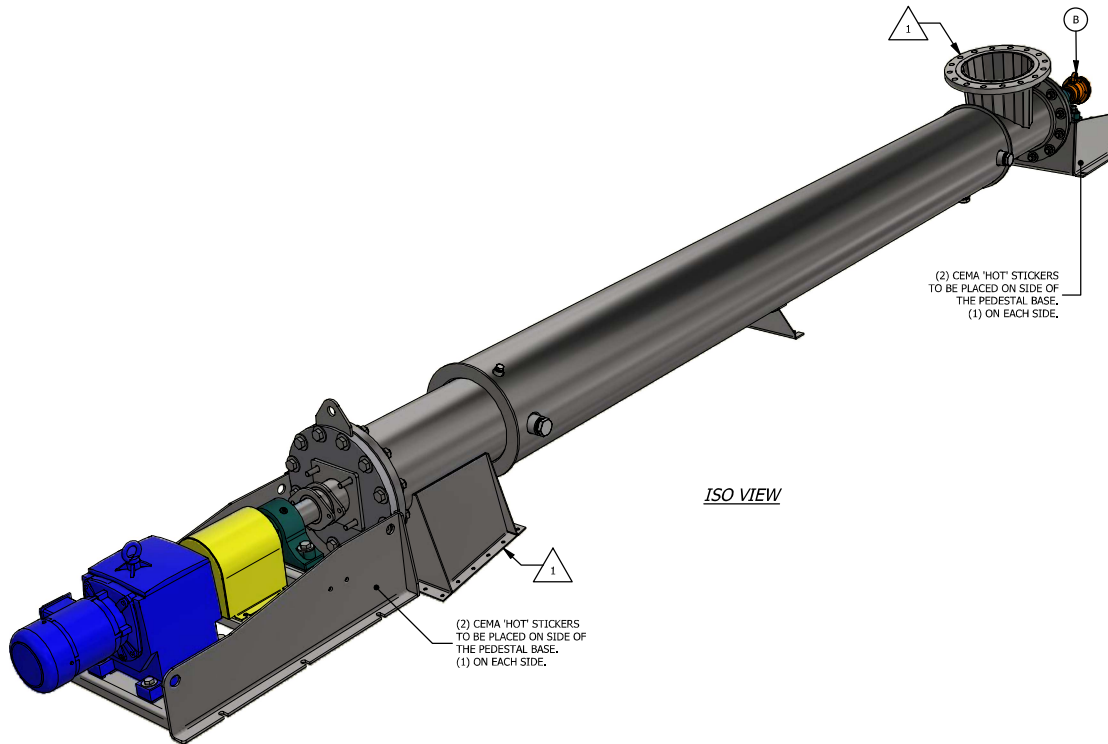
MDMT 0°F at 120 psi
MAWP 120 psi at 1695°F
MAEWP 0 psi at 1695°F

SCREW NAMEPLATE DETAIL



ISO VIEWS

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ISO VIEW

BILL OF MATERIALS					
ITEM	QTY	*	DESCRIPTION	**	REV
A	ONE		12" DIA. SCREW THERMAL PROCESSOR TO CONVEY SOLIDS AT APPROXIMATELY TROUGH LOADING. TO BE SHOP ASSEMBLED AND CONSISTING OF:		
1A	1		SPL, 12" DIA. X 5" PITCH X 1/4" THK. (316SS) RIGHT HAND, SECTIONAL HOLLOW FLIGHT SCREW, CONTINUOUSLY WELDED BOTH SIDES TO A 6" SCH 80 PIPE (316SS), BUSHED AT BOTH ENDS FOR 3 7/16" DIA. KWS SHRINK FIT SHAFTS. DISCHARGE END TO HAVE BARE PIPE. (PER DETAIL)	**	
1A.1	1		SPL, 3 7/16" DIA. (C-1045) KWS SHRINK FIT TAIL SHAFT. (PER DETAIL).	**	
1A.2	1		SPL, 3 7/16" DIA. (C-1045) KWS SHRINK FIT DRIVE SHAFT. (PER DETAIL).	**	
2A	1		SPL, 12" DIA. X 3 7/16" DIA. X 3/8" THK. (316SS/304SS) TAIL PEDESTAL SLIDER BASE TROUGH END w/ 4" TRAVEL. (PER DETAIL). FITTED WITH:	**	
2A.1	1	*	FGS3716, 3 7/16" DIA. (CS w/ ZINC PLATING) FLANGED GLAND SEAL w/ 3 RINGS OF HI-TEMP ROPE PACKING.		
2A.2	1	*	DODGE, #EP2B-52-307RE, (CATALOG #071410), 3 7/16" DIA. S-2000 EXPANSION SPHERICAL ROLLER BEARING w/ TYPE "E" DIMENSIONS & 2-BOLT BASE.		
3A	1		SPL, 12" DIA. X 3 7/16" DIA. X 3/8" THK. (316SS/304SS) DRIVE PEDESTAL TROUGH END. (PER DETAIL). FITTED WITH:	**	
3A.1	1	*	FGS3716, 3 7/16" DIA. (CS w/ ZINC PLATING) FLANGED GLAND SEAL w/ 3 RINGS OF HI-TEMP ROPE PACKING.		
3A.2	1	*	DODGE, #P2B-E-307R, (CATALOG #023021), 3 7/16" DIA. ROLLER BEARING w/ TYPE "E" DIMENSIONS & 2-BOLT BASE.		
3A.3	1	*	DODGE, #1090T10, (CATALOG #006757), TYPE T10 STRAIGHT BORE GRID LIGN COUPLING w/ (1) #006795 X 2 1/2" DIA. BORE HUB & (1) #006792 X 3 7/16" DIA. BORE HUB. NOTE: BORES TO BE CLEARANCE FIT.		
3A.4	1		SPL, GRID LIGN COUPLING SAFETY COVER, 12 GA (C.S.). (NOTE: PAINT SAFETY YELLOW), (PER DETAIL).		
4A	1		SPL, 14" SCH 40S (316SS) PIPE TUBULAR TROUGH w/ JACKET. (PER DETAIL). FITTED WITH:	**	1
4A.1	2		SPL, 14" CLASS 150 (316SS) ANSI RFSSO FLANGE. (NOTE: TO BE USED AS PLATE END FLANGES).	**	
4A.2	2		SPL, 16" DIA. TO 14" DIA. (316SS) INLET SPOUT w/ 16" CLASS 150 (316SS) ANSI RFSSO FLANGE. (PER DETAIL).	**	1
4A.3	1		SPL, 18" SCH 40S (304SS) PIPE JACKET w/ 3/4" THK. (304SS) END PLATES & 3/8" THK. (304SS) BAFFLES. (PER DETAIL).	**	
4A.4	1		SPL, 15" INS. SQ. X 3/16" THK. (316SS) DISCHARGE SPOUT TO MATCH GRADE. (PER DETAIL)		1
5A	1		SPL, 12" DIA. X 3/8" THK. (304SS) SADDLE. (PER DETAIL).	**	
6A	LOT	*	3/4" WIDE X 1/4" THK. GORE PTFE TAPE (OR EQUAL) AS FLANGE & COVER GASKET. (PER DETAIL) AND (18-8SS) ASSEMBLY BOLTS.		
7A	ONE		3 HP 9.7 RPM CLASS II SCREW CONVEYOR DRIVE MOUNTED @ 12 O'CLOCK BY KWS & CONSISTING OF:		
7A.1	1		SK63-180TC, REDUCER w/ C-FACE ADAPTOR 180 TC, (RATIO 180.57:1), POSITION M1, 2 1/2" DIA. X 5" SOLID SHAFT, FOOT MOUNT, SHAFT KEYS, AUTOVENT, DOUBLE OUTPUT SHAFT SEALS, FLUORO RUBBER SEALS, SYNTHETIC POLYALPHAOLEFIN OIL w/ EP ADDITIVE.		
7A.2	1		WEG, #00318ST3QIE182TC-W22, 3 HP 1800 RPM 3/60/230-460V, INVERTER DUTY w/ A MAX. 20:1 TURNDOWN, PREMIUMIUM EFFICIENT C-FACE 182 TC MOTOR w/ THERMOSTAT & IECEB41 MOTOR CATEGORY.		
		*	NOTE: ALL ITEMS MARKED WITH AN ASTERISK (*) ARE RECOMMENDED SPARE PARTS		

NOTE: MTR's ARE REQUIRED FOR ALL PURCHASED STEEL / ASME CODED ITEMS IN THE B.O.M THAT ARE MARKED WITH A **.

☐ APPROVED	BY: _____
☐ APPROVED AS NOTED	DATE: _____
☐ REVISE AND RESUBMIT	

APPROVAL 09-18-2020

1	9/18/20	JMN	REVISED PER CUSTOMER COMMENTS
REV	DATE	DESIGNER	DESCRIPTION
			REVISIONS

WEIGHT: 3900 LBS. [DEAD LOAD].

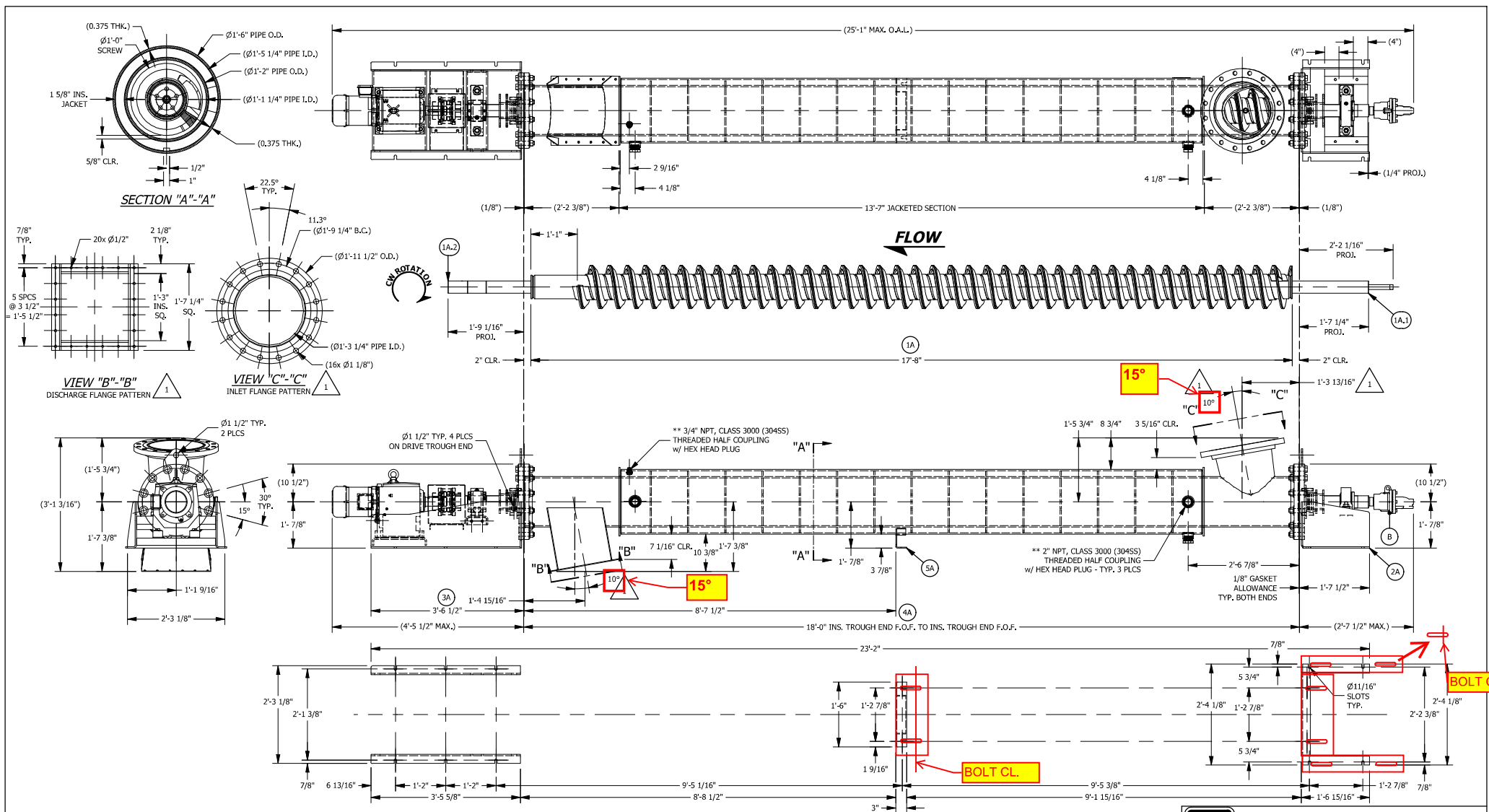
CUSTOMER: _____ SHIP TO: _____



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Email: sales@kwsmlg.com

12" DIA. SCREW THERMAL PROCESSOR
B.O.M. & ISO VIEW

DESIGNER	P.M.	CHECKED BY	CREATION DATE	DRAWING NO.
NJR	JJB		8/3/2020	0158151-A



☐ APPROVED ☐ APPROVED AS NOTED ☐ REVISE AND ☐ RESUBMIT	BY: _____
	DATE: _____

APPROVAL **09-18-2020**

1	REV	DATE	DESIGNER	DESCRIPTION
1	REV	9/18/20	JMN	REVISED PER CUSTOMER COMMENTS
				DESCRIPTION
				REVISIONS

FOOTPRINT

WEIGHT: 3900 LBS. [DEAD LOAD].

CUSTOMER: _____ SHIP TO: _____



**Design
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**12" DIA. SCREW THERMAL PROCESSOR
ARRANGEMENT**

DESIGNER	P.M.	CHECKED BY	CREATION DATE	DRAWING NO.
NJR	JB		8/3/2020	0158151-A1



**Design
Engineering
Manufacturing**

Conveying Knowledge, Workmanship, Solutions

Section 2:

Installation, Operation, and Maintenance Manual

KWS MANUFACTURING COMPANY, LTD.

3041 Conveyor Drive | Burleson, TX 76028 | PH (817) 295-2247 Fax (817) 447-8528 | sales@kwsmfg.com | <http://www.kwsmfg.com>



**ISO 9001
Certified**





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KWS MANUFACTURING CO. LTD

3041 CONVEYOR DRIVE

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12" DIA. X 18'-0" LG. SCREW THERMAL PROCESSOR

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

August 10, 2020



**Design
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Manufacturing**

History

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 9001-2015 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

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.





**Design
Engineering
Manufacturing**



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**Design
Engineering
Manufacturing**

SECTION A

SAFETY, OPERATION & MAINTENANCE

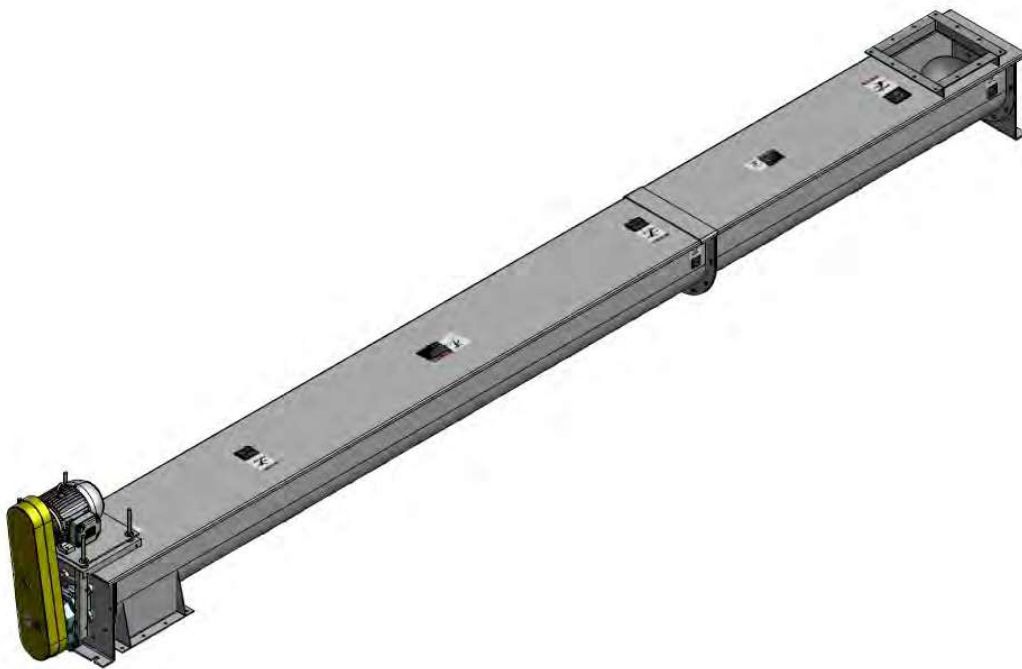


CEMA STANDARD NO: SCOM - 001

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SCREW CONVEYOR SAFETY OPERATION AND MAINTENANCE MANUAL



**Provided by the Members
of the
Screw Conveyor and Bucket Elevator Section
of the
Conveyor Equipment Manufacturers Association
as a service to the industry**



DISCLAIMER

The information provided herein is advisory only.

These recommendations provided by CEMA are general in nature and are not intended as a substitute for professional advice. Users should seek the advice, supervision and/or consultation of qualified engineers, safety consultants, and other qualified professionals.

Any use of this publication, or any information contained herein, or any other CEMA publication is made with the agreement and understanding that the user and the user's company assume full responsibility for the designs, safety, specifications, suitability and adequacy of any conveyor system, system component, mechanical or electrical device designed or manufactured using this information.

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INTRODUCTION

The Screw Conveyor and Bucket Elevator Engineering Committee of the CEMA (Conveyor Equipment Manufacturers Association) Engineering Conference was assigned the task of bringing together, under one cover, the accumulated experience of many individuals and their companies in an effort to provide a common basis for the safety, operation and maintenance of screw conveyors.

The CEMA Safety, Operation & Maintenance Manual contains instructions for the safe installation, operation and maintenance of screw conveyors. The reliability and service life depend on the proper care taken while installing and preparing the equipment for its intended use.

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



SECTION A - SAFETY

Screw conveyor 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 screw conveyors.

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.

Screw conveyor accidents can be avoided by implementation and enforcement of an in-plant safety program. A number of safety precautions are included in this manual. Carefully study and follow the safety precautions. Remember - accidents are usually caused by negligence or carelessness.



WARNING AND SAFETY REMINDERS FOR SCREW , DRAG , AND BUCKET ELEVATOR CONVEYORS

*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 conveyor, components and, conveyor assemblies in such a manner as to comply with the 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.

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

1. Conveyors shall not be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection cleaning, maintenance or observation, the electric power to the motor driving the conveyor must be LOCKED OUT in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor cover or guards and drive guards have been properly replaced.

2. If the conveyor must have an open housing as a condition of its use and application, the entire conveyor 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 conveyor opening is covered by a grating. If the nature of the material is such that a grating cannot be used, then the exposed section of the conveyor is to be guarded by a railing or fence and there shall be a warning sign posted.

4. Do not attempt any maintenance or repairs of the conveyor until power has been LOCKED OUT.

5. Always operate conveyor 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 conveyor.

7. Never walk on conveyor covers, grating or guards.

8. Do not use conveyor for any purpose other than that for which it was intended.

9. Do not poke or prod material into the conveyor with a bar or stick inserted through the openings.

10. Keep area around conveyor drive and control station free of debris and obstacles.

11. Eliminate all sources of stored energy (materials or devices that could cause conveyor components to move without power applied) before opening the conveyor

12. Do not attempt to clear a jammed conveyor until power has been LOCKED OUT.

13. Do not attempt field modification of conveyor or components.

14. Conveyors 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. Conveyors may be designed to handle these materials. Conveyors 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 conveyor is to be subjected to internal or external pressure, manufacturer should be consulted prior to any modifications.

CEMA insists that disconnecting and locking out the power to the motor driving 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 we have no information regarding plant wiring, plant environment, the interlocking of the screw conveyor 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 conveyors and conveyor systems such that if one conveyor 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 conveyor installation comply with the law and accepted standards.

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

One or more warning labels should be visible on conveyor housings, conveyor covers and elevator housings. If the labels attached to the equipment become illegible, please order replacement warning labels from the OEM or CEMA.

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.

SEE NEXT PAGE FOR SAFETY LABELS



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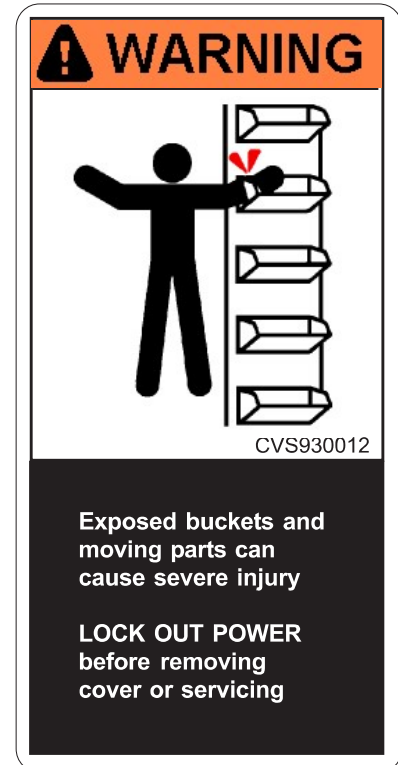
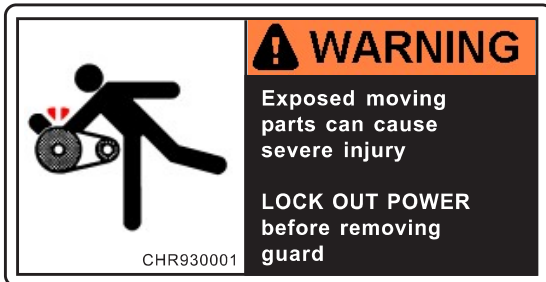
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CEMA Safety Labels

CEMA Document: SC 2004-01

The CEMA safety labels shown below should be used on screw conveyors, drag conveyors, and bucket elevators. Safety labels should 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>



PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT

SEE PREVIOUS PAGE FOR SAFETY REMINDERS

Note: Labels alone do not substitute for a thorough in-plant safety training program centered on the hazards associated with operating your installed equipment.

Contact CEMA or Your Equipment Manufacturer for Replacement Labels

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

5624 Strand Court, Suite 2., Naples, Florida 34110

239-514-3441

<http://www.cemanet.org>





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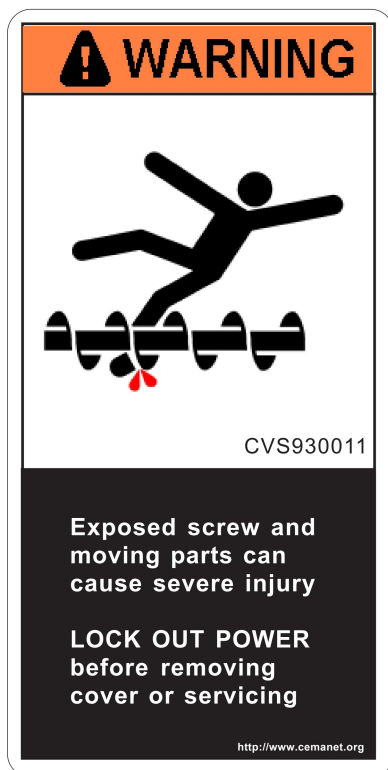
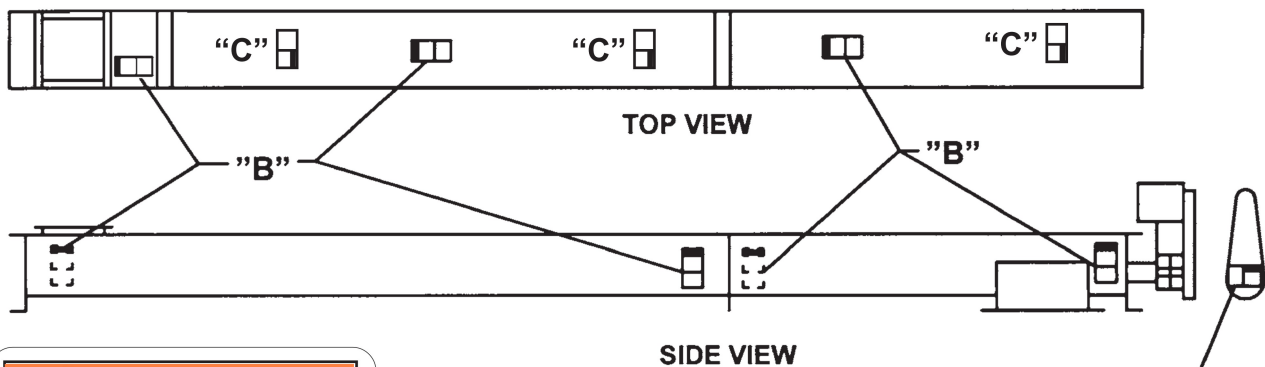
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CEMA Safety Labels

Placement Guidelines

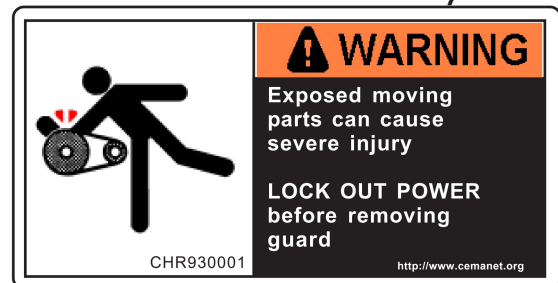
Product: Bulk Handling Equipment

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.

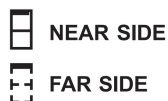


"A"



"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



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

SC-2



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CEMA Safety Labels

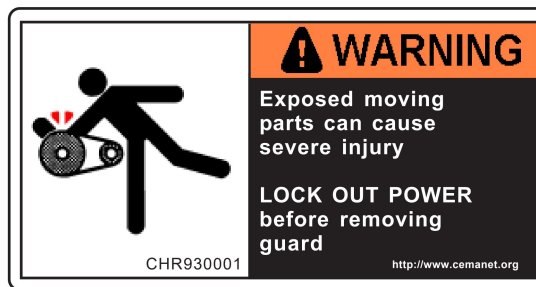
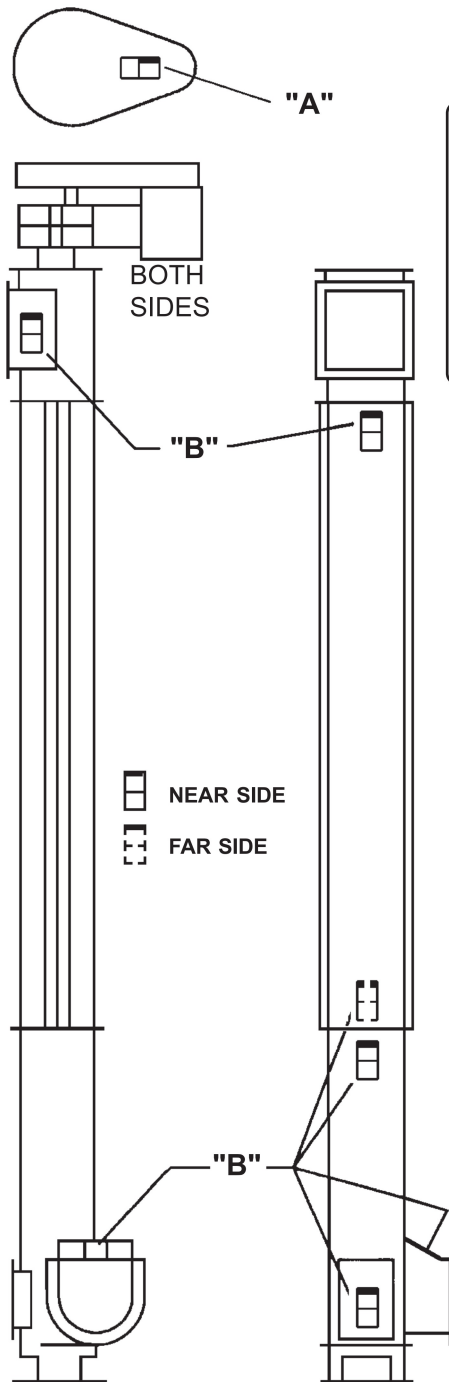
Placement Guidelines

Product: Bulk Handling Equipment

Equipment: Vertical Screw Conveyor

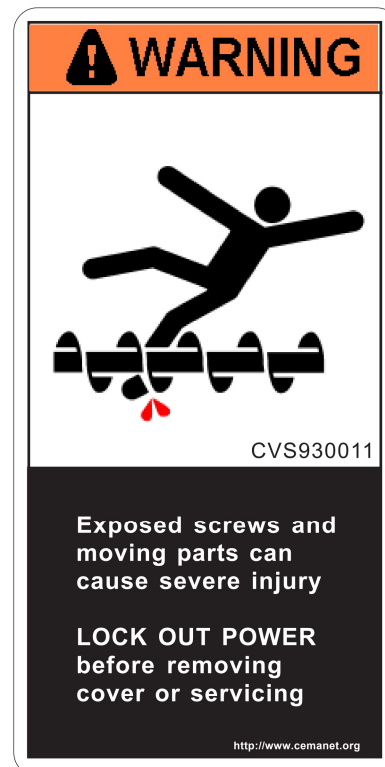
USE LABEL "A" ON BELT GUARD

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



"A"

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



"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.

SC-3



CEMA STANDARD NO: SCOM - 001

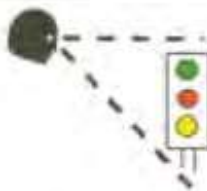
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Screw Conveyor Safety



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

POST IN PROMINENT AREA

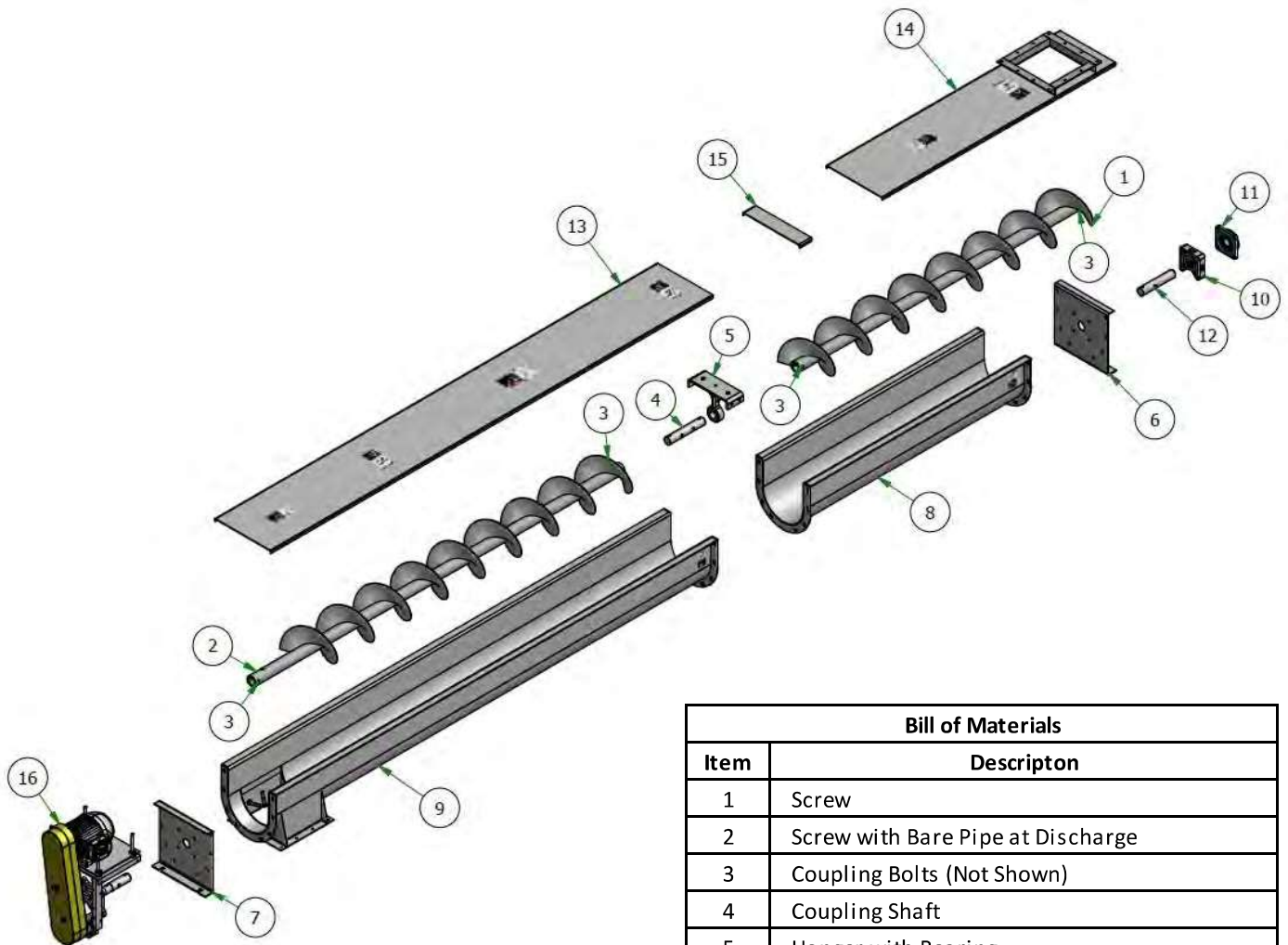


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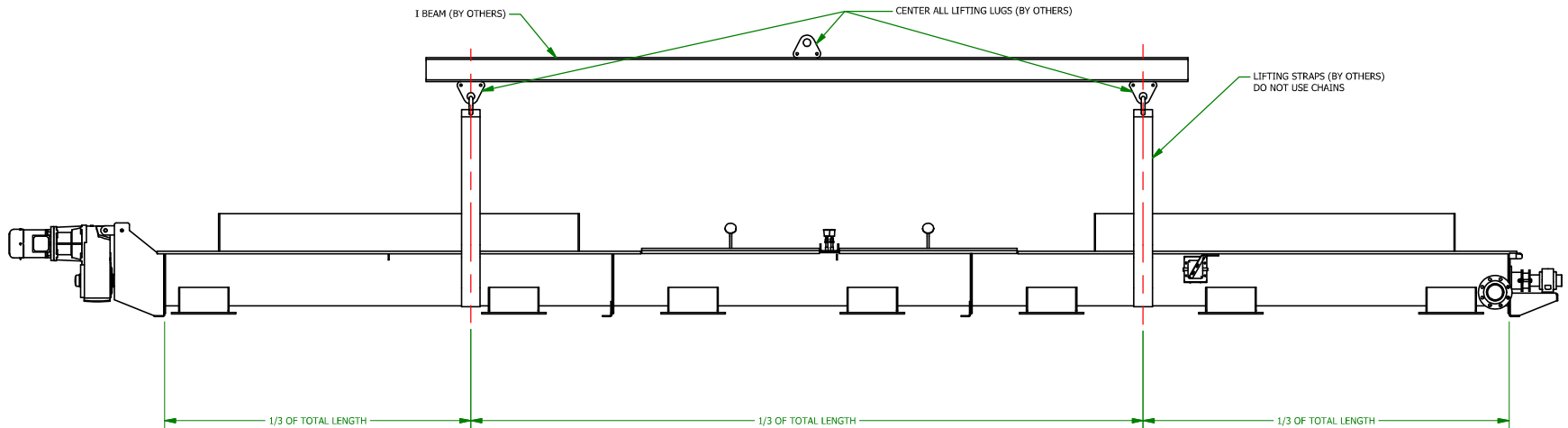
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SCREW CONVEYOR COMPONENTS



Bill of Materials	
Item	Description
1	Screw
2	Screw with Bare Pipe at Discharge
3	Coupling Bolts (Not Shown)
4	Coupling Shaft
5	Hanger with Bearing
6	Tail End Trough End
7	Trough End for Screw Conveyor Drive
8	Trough End for Screw Conveyor Drive
9	Trough with Discharge Spout
10	Seal
11	Bearing
12	Tail Shaft
13	Flanged Cover
14	Flanged Cover with Inlet
15	Buttstrap
16	Screw Conveyor Drive Unit with Motor Mount, V-Belt Drive, and Guard

STANDARD LIFT DETAIL FOR SCREW CONVEYOR



LIFTING DETAIL ALL LIFTING APPARATUSES BY OTHERS

***NOTES:**

- 1- NO SINGLE UNSUPPORTED LENGTH TO EXCEED 12'-0"
- 2- ALL LIFTING APPARATUSES TO BE SIZED AND SUPPLIED BY OTHERS

REVISIONS			
NO.	DATE	BY	DESCRIPTION
1			

SECTION No.
PAGE No.
**CONVEYOR
LIFT
STANDARD**



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ENGINEERING STANDARD

DRAWING BY: LAM	CHECKED BY:	DATE 11/22/2011	SCALE N/A	DRAWING NO. CONVEYOR LIFT STD	REV.
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SECTION B - INSTALLATION

RECEIVING

1. Screw conveyors 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. Items to be inspected include troughs, screws, covers and drive units.
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 conveyors or components.
2. Spreader bars with slings are the recommended support method for lifting.
3. Unsupported span 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

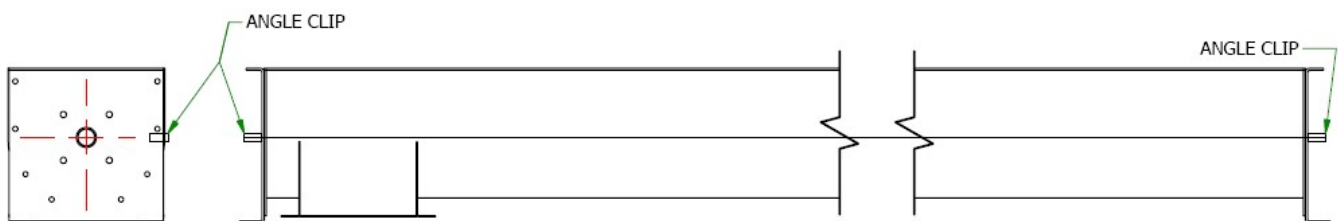
1. The mounting surface for supporting the conveyor must be level and true.
2. Screw conveyor troughs must be assembled straight and true with no distortion.
3. Place troughs in proper sequence with discharge spout properly located.
4. Connect the joints loosely. **DO NOT TIGHTEN BOLTS.**
5. Assemble 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 Chart A.
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 Chart A.
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 exist 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.



17. Center hanger bearings between screw sections. Torque hanger assembly bolts to proper torque rating per Chart A.
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 Chart A.
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. Remove all debris from conveyor.
24. Install covers in proper sequence starting at inlet end and attach with provided fasteners.
25. Lubricate drive and all bearings in accordance with manufacturer's instructions. DRIVES GENERALLY SHIPPED WITHOUT OIL.
26. MAKE SURE ALL CEMA SAFETY LABELS ARE IN PROPER LOCATIONS.



CEMA COMMONLY USED PIANO WIRE SETUP
PIANO WIRE ATTACHED TO TOP OF CONVEYOR ON SIDE



OPTIONAL PIANO WIRE SETUP
PIANO WIRE ATTACHED TO CENTERLINE OF CONVEYOR ON SIDE

Figure 1 - Piano Wire Setup Diagrams



SECTION C - OPERATION

BEFORE INITIAL START-UP:

1. LOCKOUT/TAGOUT ALL POWER.
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.

INITIAL START-UP (WITHOUT MATERIAL):

1. Reenergize power to conveyor.
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. 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.
4. Stop the conveyor and LOCKOUT/TAGOUT ALL POWER.
5. 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. Replace covers.
6. Check all assembly and mounting bolts. Torque bolts to proper torque rating.
7. Check conveyor discharge. Discharge must be clear to ensure that material flow out of conveyor will not be impeded.

INITIAL START-UP (WITH MATERIAL):

1. Reenergize 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.
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/TAGOUT ALL POWER.
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 Chart A.



SECTION D – MAINTENANCE

Practice good housekeeping. Keep area around conveyor clean and free of obstacles to provide easy access and to avoid interference with the function of the conveyor.

Establish routine periodic inspection of the entire conveyor to ensure continuous maximum operating performance. LOCKOUT/TAGOUT ALL POWER BEFORE INSPECTION OF CONVEYORS. Periodic inspections should be made of the following:

- 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.
- Gear Reducers – Check for proper lubrication. Lubricate all gear reducers in accordance with manufacturer's instructions.
- Drives – Check for wear on belts and proper tension. Check for lubrication on chains and proper tension. Replace belts or chains as necessary.
- 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.
- 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 packing as necessary.
- 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 **Chart A**.
- Guards – Check for clearance and bolt tightness. Check oil level on oil-tight guards.

REPLACING SCREW CONVEYOR COMPONENTS:

1. LOCKOUT/TAGOUT ALL POWER
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.

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



SECTION E – SHUTDOWN AND STORAGE

EMERGENCY SHUTDOWN

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

1. LOCKOUT/TAGOUT ALL POWER.
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/TAGOUT ALL POWER.
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.
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.



SECTION F – 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 SCRW 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.



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SECTION F – TROUBLESHOOTING GUIDE - Continued

PROBLEM	CAUSE	REMEDY
6. 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.
7. 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.
8. 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.



CHART A - 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

All bolted applications should be evaluated to determine optimum tightening torque.

K factor in the formula below is considered an estimate.

The most commonly used K factor is 0.20 for plain finished bolts.

Formula: $T = K \times D \times P$

- T Target tighten torque (the result of this formula is in inch pounds, dividing by 12 yields foot pounds)
- K Coefficient of friction (nut factor), always an estimation in this formula
- D Bolts nominal diameter in inches
- P Bolt's desired tensile load in pounds (generally 75% of yield strength)
[P(lbs) = (75%) Yield Strength * Tensile Stress Area]

Bolt Torque Guide is for fasteners used to assemble screw conveyors and does not include coupling bolts. 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

END OF DOCUMENT



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