

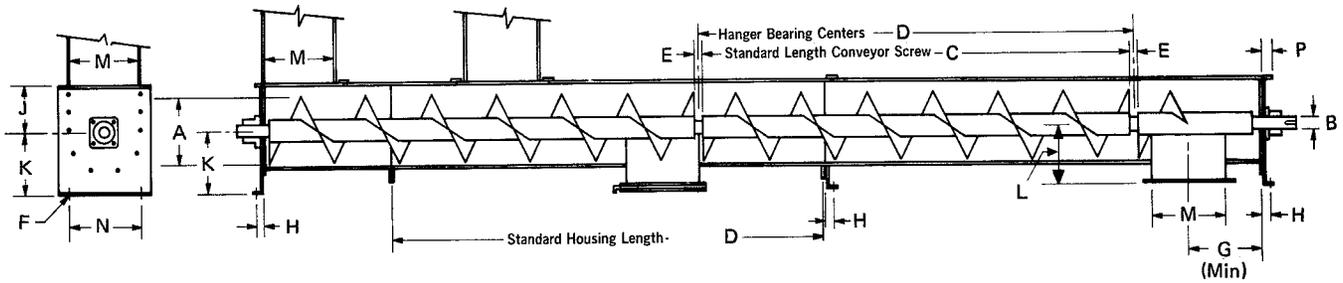
# **Design and Installation Supplement**

**LAYOUTS**

**INSTALLATION AND MAINTENANCE**

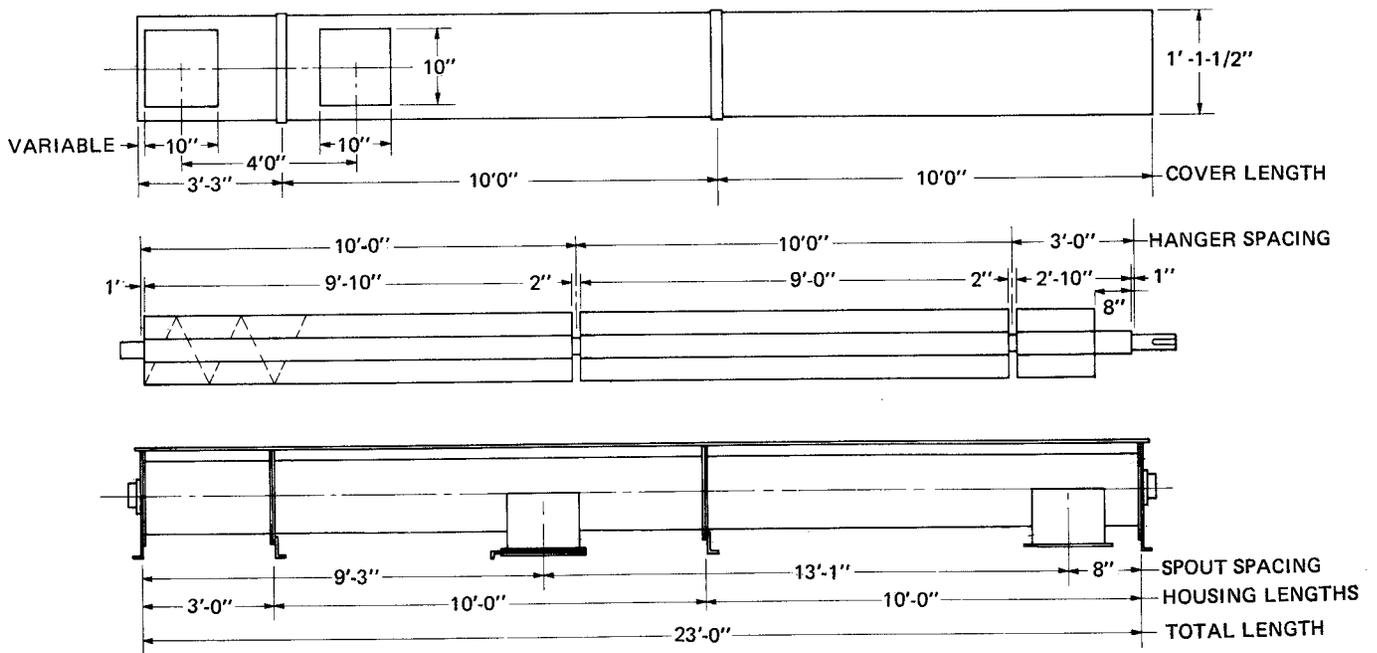
**END FLANGE BOLT PATTERNS**

## TROUGH

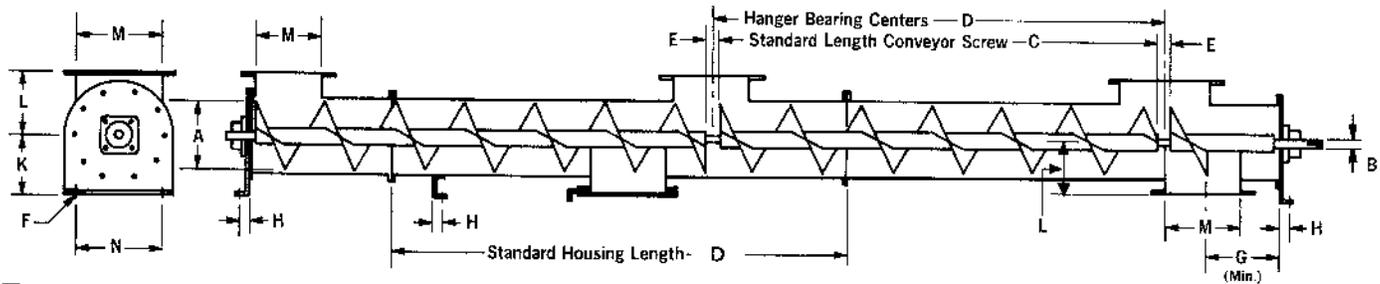


A Screw Dia.	B Coupling Dia.	C Length	D Length	E	F	G (Min)	H	J	K	L	M	N	P
4	1	9-10-1/2	10	1-1/2	3/8	4-1/2	1	3-5/8	4-5/8	3-3/4	5	5-3/4	1-7/16
6	1-1/2	9-10	10	2	3/8	6	1	4-1/2	5-5/8	5	7	8-1/8	1-1/2
9	1-1/2 2	9-10	10	2	1/2	8	1-1/2	6-1/8	7-7/8	7-1/8	10	9-3/8	1-5/8
10	1-1/2 2	9-10	10	2	1/2	9	1-9/16	6-3/8	8-7/8	7-7/8	11	9-1/2	1-3/4
12	2 2-7/16 3	11-10 11-9 11-9	12	2 3 3	5/8	10-1/2	1-5/8	7-3/4	9-5/8	8-7/8	13	12-1/4	2
14	2-7/16 3	11-9	12	3	5/8	11-1/2	1-5/8	9-1/4	10-7/8	10-1/8	15	13-1/2	2
16	3	11-9	12	3	5/8	13-1/2	2	10-5/8	12	11-1/8	17	14-7/8	2-1/2
18	3 3-7/16	11-9 11-8	12	3 4	5/8	14-1/2	2	12-1/8	13-3/8	12-3/8	19	16	2-1/2
20	3 3-7/16	11-9 11-8	12	3 4	3/4	15-1/2	2-1/4	13-1/2	15	13-3/8	21	19-1/4	2-1/2
24	3-7/16	11-8	12	4	3/4	17-1/2	2-1/2	16-1/2	18-1/8	15-3/8	25	20	2-1/2

### TYPICAL METHOD OF DETAILING

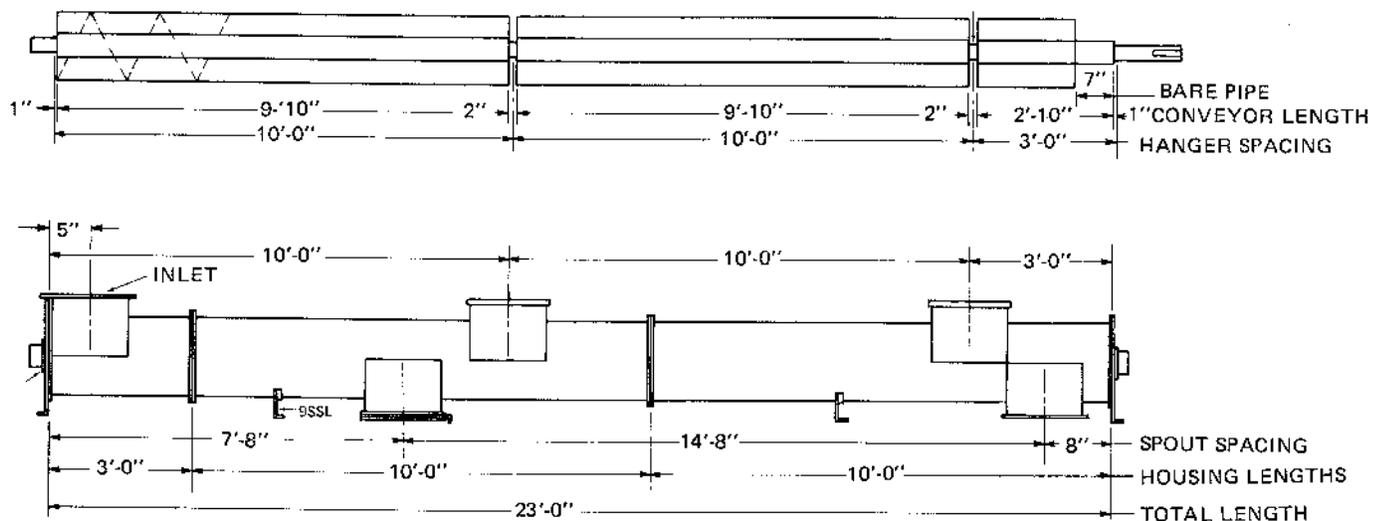


## TUBULAR HOUSING



A Screw Dia.	B Coupling Dia.	C Length	D Length	E	F	G (Min.)	H	J	K	L	M	N	P
4	1	9-10-1/2	10	1-1/2	3/8	4-1/2	1	3-5/8	4-5/8	3-3/4	5	5-3/4	1-7/16
6	1-1/2	9-10	10	2	3/8	6	1	4-1/2	5-5/8	5	7	8-1/8	1-1/2
9	1-1/2 2	9-10	10	2	1/2	8	1-1/2	6-1/8	7-7/8	7-1/8	10	9-3/8	1-5/8
10	1-1/2 2	9-10	10	2	1/2	9	1-3/4	6-3/8	8-7/8	7-7/8	11	9-1/2	1-3/4
12	2 2-7/16 3	11-10 11-9 11-9	12	2 3 3	5/8	10-1/2	1-5/8	7-3/4	9-5/8	8-7/8	13	12-1/4	2
14	2-7/16 3	11-9	12	3	5/8	11-1/2	1-5/8	9-1/4	10-7/8	10-1/8	15	13-1/2	2
16	3	11-9	12	3	5/8	13-1/2	2	10-5/8	12	11-1/8	17	14-7/8	2-1/2
18	3 3-7/16	11-9 11-8	12	3 4	5/8	14-1/2	2	12-1/8	13-3/8	12-3/8	19	16	2-1/2
20	3 3-7/16	11-9 11-8	12	3 4	3/4	15-1/2	2-1/4	13-1/2	15	13-3/8	21	19-1/4	2-1/2
24	3-7/16	11-8	12	4	3/4	17-1/2	2-1/2	16-1/2	18-1/8	15-3/8	25	20	2-1/2

### TYPICAL METHOD OF DETAILING



**BOLT REQUIREMENTS**

**BOLTS RELATED TO CONVEYOR DIAMETER**

COMPONENTS ASSEMBLED	CONVEYOR DIAMETER																							
	4		6		9		10		12		14		16		18		20		24					
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size				
Covers to Housings * (Per 10' Section)	10	1/4X1	10	1/4X1	10	1/4X1	10	1/4X1	12	3/8X1														
Ends to Housing Flanges Discharge Ends (U-Trough/Rectangular)	4	3/8X1-1/4	4	3/8X1-1/4	4	3/8X1-1/4	4	3/8X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	6	5/8X1-1/2				
Flush Discharge Ends	8	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	10	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
U-Trough Tubular	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Inside Pattern (U-Trough)	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1	8	1/2X1-1/4	8	1/2X1-1/4	10	1/2X1	10	1/2X1	12	1/2X1				
Std. Outside Pattern	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
U-Trough Flared	X	X	8	3/8X1-1/4	8	3/8X1-1/4	X	X	8	1/2X1-1/4	10	1/2X1-1/4	10	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Tubular	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Rectangular	7	3/8X1-1/4	7	3/8X1-1/4	9	3/8X1-1/4	9	3/8X1-1/4	9	1/2X1-1/4	9	1/2X1-1/4	9	5/8X1-1/2	11	5/8X1-1/2	11	5/8X1-1/2	13	5/8X1-1/2				
Flanges	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
U-Trough	X	X	8	3/8X1-1/4	8	3/8X1-1/4	X	X	10	1/2X1-1/4	10	1/2X1-1/4	10	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Flared	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Tubular	6	3/8X1-1/4	6	3/8X1-1/4	8	3/8X1-1/4	8	3/8X1-1/4	8	1/2X1-1/4	8	1/2X1-1/4	8	5/8X1-1/2	10	5/8X1-1/2	10	5/8X1-1/2	12	5/8X1-1/2				
Rectangular	7	3/8X1-1/4	7	3/8X1-1/4	9	3/8X1-1/4	9	3/8X1-1/4	9	1/2X1-1/4	9	1/2X1-1/4	9	5/8X1-1/2	11	5/8X1-1/2	11	5/8X1-1/2	13	5/8X1-1/2				
Flange Foot to Housing	2	3/8X1-1/4	2	3/8X1-1/4	2	3/8X1-1/2	2	3/8X1-1/2	2	1/2X1-1/2	2	1/2X1-1/2	2	5/8X1-1/2	2	5/8X1-1/2	2	5/8X1-1/2	2	5/8X1-1/2				

\* FOR DUST TIGHT DOUBLE THE QUANTITY.

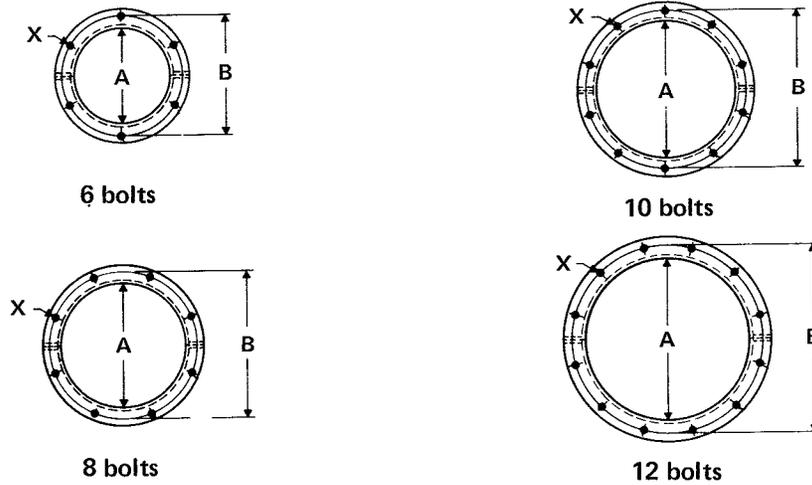
**BOLTS RELATED TO SHAFT SIZES**

COMPONENTS ASSEMBLED	SHAFT DIAMETER													
	1"		1-1/2"		2"		2-7/16"		3"		3-7/16"			
	Qty.	Size	Qty.	Size	Qty.	Size	Qty.	Size	Qty.	Size	Qty.	Size		
Bearings (End) to Housing End	3	3/8X1-1/2	3	1/2X2			3	5/8X2-1/4			3	3/4X2-1/2	3	3/4X2-3/4
Babbitt, Discharge	4	3/8X1-1/2	4	1/2X2			4	5/8X2			4	3/4X2-1/2	4	3/4X2-3/4
Babbitt, Flanged	3	3/8X1-1/2	3	1/2X2			3	5/8X2			3	3/4X2-1/2	3	3/4X2-3/4
Ball, Discharge	4	3/8X1-1/2	4	1/2X2			4	5/8X2			4	3/4X2-1/2	4	3/4X2-3/4
Bearings (Thrust) to Ends	X	X	4	1/2X2-1/2			4	1/2X2-1/2			4	3/4X3-1/2	4	3/4X3-3/4
Type RTB														
Seals, Shafts														
Flanged Gland			4	1/2x1-1/2			4	1/2x1-1/2			4	1/2x1-1/2	4	5/8x1-1/2
Plate w/Ball or Babbitt			4	1/2x2			4	5/8x2-1/4			4	3/4x3	4	3/4x3
Plate w/Roller			4	1/2x2-1/2			4	1/2x3			4	3/4x3-1/2	4	3/4x3-1/2
Split Gland			2	1/2x1-1/2			2	1/2x1-1/2			2	5/8x1-3/4	2	3/4x2-1/4
Waste Pack, w/Ball or Babbitt			4	1/2x3-1/2			4	5/8x3-5/8			4	3/4x4-1/2	4	3/4x4-1/2
Waste Pack, w/Roller			4	1/2x4			4	1/2x4			4	3/4x4-1/2	4	3/4x4-1/2
Pillow Block Ball	2	3/8x1-3/4	2	1/2x2-1/2			2	5/8x3			2	7/8x3-1/2	2	7/8x4
Pillow Block Roller	X	X	2	1/2x2-1/2			2	5/8x3			2	3/4x3	2	7/8x3-1/2

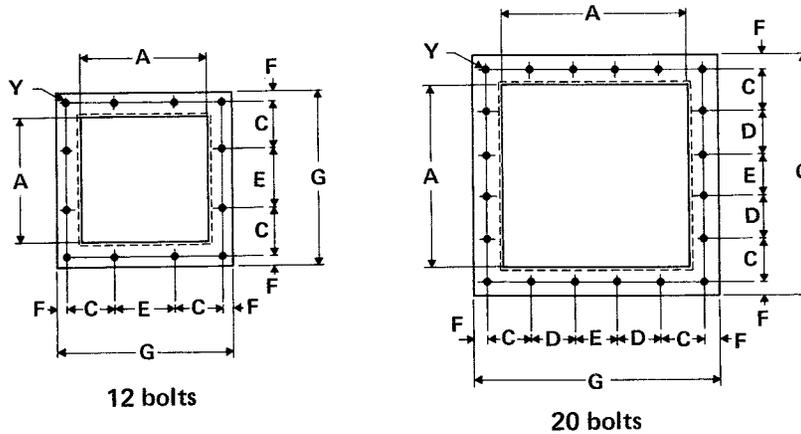
**HANGER BOLTS**

Hanger Size	Hanger Number														
	650		670		216		220		225		230		326, 316, 370		
Screw Dia.	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	
4	X	X	X	X	4	3/8X1	4	3/8X1	4	3/8X1	X	X	4	3/8X1	
6	1-1/2	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1
9	1-1/2	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1
9	2	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1
10	1-1/2	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1
10	2	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1	4	3/8X1
12	2	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4
12	2-7/16	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4
12	3	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4
14	2-7/16	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4
14	3	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4	4	1/2X1-1/4
16	3	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2
18	3	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2
20	3	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2	4	5/8X1-1/2
20	3-7/16	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	3-7/16	X	X	X	X	X	X	X	X	X	X	X	X	X	X

### TUBULAR HOUSING FLANGES

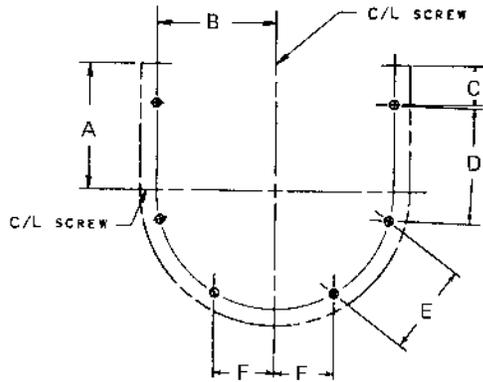


### INTAKE & DISCHARGE FLANGES

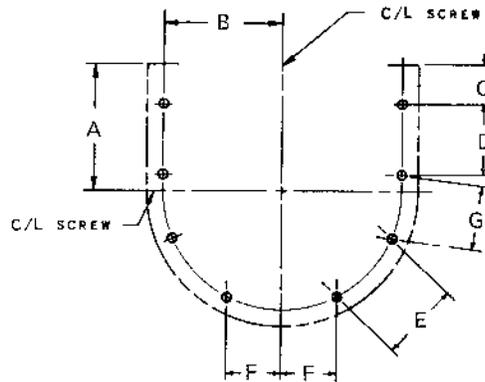


Screw Size	Flange Bolts		A	B	C	D	E	F	G
	Tubular X	Discharge Y							
4	6-3/8	12-1/4	5	7	2-1/4	-	2-1/4	3/8	7-1/2
6	6-3/8	12-3/8	7	8-7/8	2-13/16	-	3	11/16	10
9	8-3/8	12-3/8	10	12-1/2	4	-	4	5/8	13-1/4
10	8-3/8	12-3/8	11	13-1/4	4-5/16	-	4-3/8	5/8	14-1/4
12	8-1/2	12-3/8	13	15-7/8	5-1/8	-	5-1/4	7/8	17-1/4
14	8-1/2	20-3/8	15	17-7/8	3-1/2	3-1/2	3-1/2	7/8	19-1/4
16	8-5/8	20-3/8	17	20	3-3/4	4	4	7/8	21-1/4
18	10-5/8	20-1/2	19	22	4-7/16	4-3/8	4-3/8	1-1/8	24-1/4
20	10-5/8	20-1/2	21	24-3/8	4-7/8	4-3/4	4-3/4	1-1/8	26-1/4
24	12-5/8	20-1/2	25	28-1/2	5-5/8	5-5/8	5-1/2	1-1/8	30-1/4

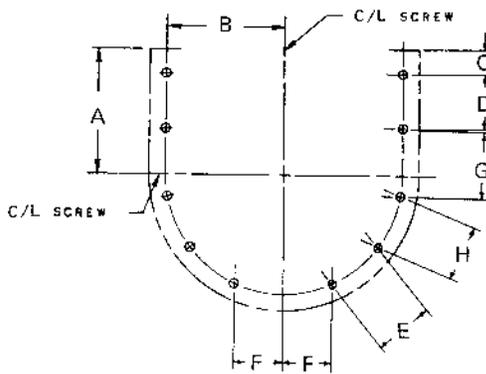
## BOLT PATTERNS U-TROUGH END FLANGES



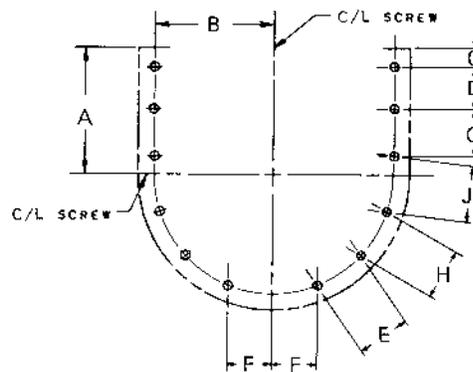
6 Hole Flange Connection



8 Hole Flange Connection



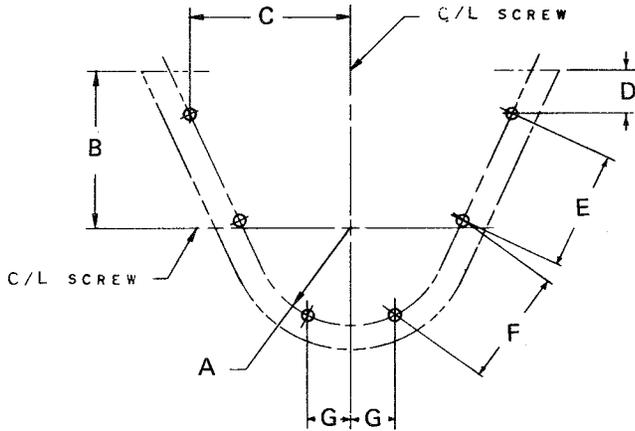
10 Hole Flange Connection



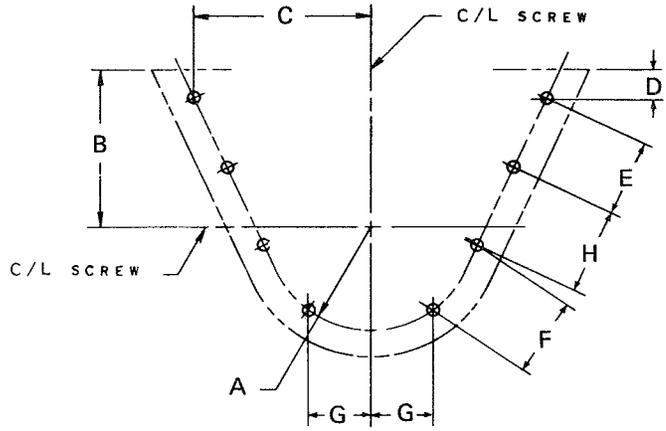
12 Hole Flange Connection

Screw Dia. Inches	Bolts		A	B	C	D	E	F	G	H	J
	Dia. Inches	Holes									
	Inches										
6	3/8	6	4-1/2	4-7/16	1-1/32	4-1/8	4-1/16	2-1/32	-----	-----	-----
9	3/8	8	6-1/8	6-1/4	1-3/16	4-1/8	3-3/4	2-9/16	4-1/8	-----	-----
12	1/2	8	7-3/4	7-15/16	1-1/2	5-5/16	4-1/16	3-7/8	5-3/16	-----	-----
14	1/2	8	9-1/4	8-15/16	2-17/32	5-5/8	5-15/16	3	5-15/16	-----	-----
16	5/8	8	10-5/8	10	2-5/8	6-3/8	6-5/8	3-3/4	6-5/8	-----	-----
18	5/8	10	12-1/8	11	2-23/32	5-15/16	5-7/8	2-15/16	5-7/8	5-7/8	-----
20	5/8	10	13-1/2	12-3/16	2-25/32	6-1/4	6-11/16	3-11/32	6-11/16	6-11/16	-----
24	5/8	12	16-1/2	14-1/4	2-25/32	6-1/8	6-5/8	3-5/16	6-5/8	6-5/8	6-5/8

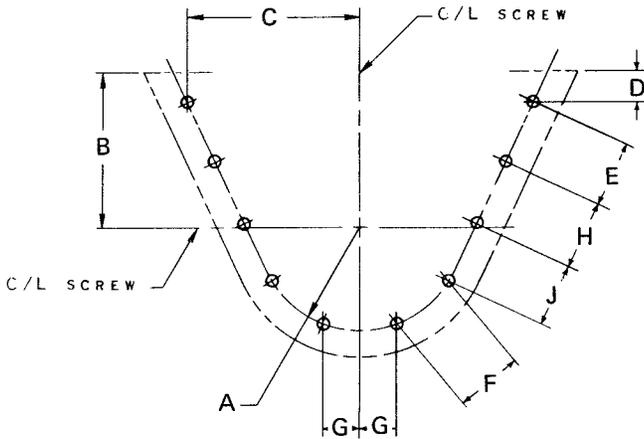
## BOLT PATTERNS FLARED TROUGH END FLANGES



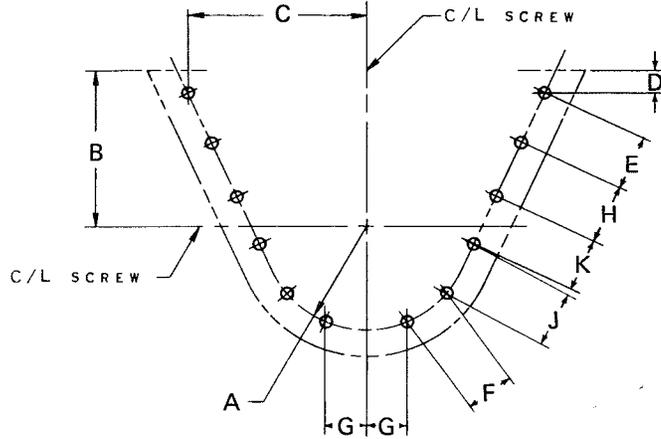
6 HOLE FLANGE CONNECTION



8 HOLE FLANGE CONNECTION



10 HOLE FLANGE CONNECTION



12 HOLE FLANGE CONNECTION

Screw Dia. Inches	Bolts		A	B	C	D	E	F	G	H	J	K
	Dia. Inches	Holes										
6	3/8	6	4-7/16	7	7-3/16	1-27/32	5-1/4	5-1/4	2-1/32	-----	-----	-----
9	3/8	8	6-1/4	9	9-21/32	1-43/64	5	5	2-9/16	5	-----	-----
12	1/2	8	7-15/16	10	11-13/16	1-13/16	5-3/4	5-3/4	3-7/8	5-3/4	-----	-----
14	1/2	10	8-15/16	11	12-49/64	2-1/16	5-1/8	5-1/8	3	5-1/8	5-1/8	-----
16	5/8	10	10	11-1/2	14-11/16	2-15/64	5-1/2	5-1/2	3-3/4	5-1/2	5-1/2	-----
18	5/8	10	11	12-1/8	16	2-5/8	6-3/16	6-3/16	2-15/16	6-3/16	6-3/16	-----
20	5/8	10	12-3/16	13-1/2	17-7/8	2-9/32	7	7	3-11/32	7	7	-----
24	5/8	12	14-1/4	16-1/2	20-61/64	2-5/16	6-7/8	6-7/8	3-5/16	6-7/8	6-7/8	6-7/8



## INSTALLATION AND MAINTENANCE

KWS'S SCREW CONVEYOR SYSTEMS MAY BE FURNISHED AS COMPLETE ASSEMBLIES OR IN INDIVIDUAL COMPONENTS. SHOP ASSEMBLED SYSTEMS ARE ALIGNED AND MATCH MARKED FOR EASE OF ASSEMBLY IN THE FIELD. THESE UNITS ALSO INCLUDE ALL NECESSARY HARDWARE INCLUDING BOLTS. INDIVIDUAL COMPONENTS SHOULD BE MORE CAREFULLY ASSEMBLED TO INSURE PROPER ALIGNMENTS FOR THE MOST EFFICIENT OPERATION.

**NOTE:** UPON DELIVERY OF CONVEYORS, CHECK SHIPMENT WITH PACKING LIST TO BE SURE ALL COMPONENTS ARE PRESENT AND NOT DAMAGED. IF DAMAGE HAS OCCURRED IN TRANSIT, A CLAIM SHOULD BE FILED WITH THE CARRIER IMMEDIATELY.

### **ASSEMBLY**

- PLACE THE CONVEYOR HOUSING SECTIONS IN THEIR PROPER SEQUENCE, USING MATCH MARKS OR DRAWING. CONNECT THE END FLANGES LOOSELY. DO NOT TIGHTEN BOLTS. ALIGN AND LEVEL THE HOUSING BOTTOM CENTERLINES PERFECTLY, THEN TIGHTEN FLANGE BOLTS. **NOTE:** A CONVEYOR ASSEMBLY SHOULD ALWAYS BEGIN AT THE THRUST END. IF THE SYSTEM DOES NOT REQUIRE A THRUST BEARING UNIT, ASSEMBLY SHOULD BEGIN AT THE DISCHARGE END.
- IF THRUST END IS DESIGNATED, ASSEMBLE THE HOUSING END PLATE AND THRUST BEARING.
- INSERT THE END OR DRIVE SHAFT IN THE BEARING. DO NOT TIGHTEN SET SCREWS.
- PLACE THE FIRST CONVEYOR SCREW SECTION IN THE HOUSING, SLIPPING THE END OR DRIVE SHAFT INTO THE CONVEYOR PIPE END. SECURE WITH COUPLING BOLTS.

**IMPORTANT** - THE SUPPORTING LUGS ON THE FLIGHTING SHOULD BE OPPOSITE THE MATERIAL CARRYING SIDE OF THE FLIGHTS. CLEARANCE IS REQUIRED BETWEEN THE HOUSING ENDS AND THE CONVEYOR PIPE ENDS. ALSO, BE SURE THE CONVEYOR SCREW CLEARS THE BOTTOM OF THE HOUSING BY 1/2".

- INSERT COUPLING SHAFT INTO THE OPPOSITE END OF THE FIRST SCREW SECTION. TIGHTEN COUPLING BOLTS.
- INSERT COUPLING SHAFT THROUGH HANGER BEARING AND BOLT HANGER TEMPORARILY TO THE HOUSING.

**CAUTION** - BEFORE BOLTING EACH HANGER BEARING IN PLACE, FORCE ALL ASSEMBLED SCREWS AWAY FROM THE DISCHARGE END. THIS REMOVES ALL "SLACK" DUE TO COUPLING BOLT HOLE CLEARANCE AND PLACES THE CONVEYOR SCREW SECTIONS LONGITUDINALLY IN THE POSITION THEY WOULD ASSUME UNDER FULL THRUST LOAD DURING OPERATION. THIS IS PARTICULARLY IMPORTANT IN LONG CONVEYORS TO PREVENT THE SCREW PIPE FROM CONTACTING HANGER BEARINGS AND TRANSFERRING THRUST LOADS THAT WOULD RESULT IN EARLY FAILURE. A MINIMUM CLEARANCE OF 1/3" MUST BE ALLOWED BETWEEN THE CONVEYOR PIPE END AND THE HANGER BEARING ON THE SIDE NEAREST THE CONVEYOR DISCHARGE. SOME USERS PREFER TO ALLOW CLEARANCE ON THE INLET SIDE BY MOVING THE HANGER TOWARD THE INLET END WITH ONLY FREE RUNNING CLEARANCE BETWEEN THE HANGER BEARING AND PIPE END. REVERSIBLE CONVEYORS SHOULD HAVE CLEARANCE BETWEEN THE HANGER BEARING AND PIPE ENDS DIVIDED EQUALLY ON EACH SIDE. FOR CONVEYORS SUBJECT TO HIGH TEMPERATURE MATERIALS, EXPANSION TYPE HANGERS SUCH AS NO. 326 SHOULD BE USED.

- TIGHTEN END BEARING SET SCREWS FIRMLY AGAINST THE FIRST END OR DRIVE SHAFT.
- TIGHTEN THE FIRST HANGER BOLTS. BE SURE THAT THE HANGER IS AT RIGHT ANGLES TO THE HOUSING.
- INSERT A COUPLING SHAFT IN THE SECOND CONVEYOR SECTION AND SECURE WITH COUPLING BOLTS. ATTACH THE OPPOSITE END TO THE COUPLING SHAFT IN THE FIRST SCREW SECTION. SECURE WITH COUPLING BOLTS. BE SURE TO ALLOW THE 1/32" CLEARANCE BETWEEN THE HANGER BEARING AND THE PIPE END OF THE SECOND SECTION AFTER FORCING THE SCREW SECTIONS TOWARD THE INLET END.
- REPEAT THE PRECEDING STEPS FOR EACH CONVEYOR SCREW SECTION.
- INSERT THE FINAL END OR DRIVE SHAFT INTO THE LAST SCREW SECTION AND ATTACH COUPLING BOLTS.
- ATTACH THE HOUSING END AND END BEARING TO THE SHAFT AND BOLT THE END TO THE HOUSING.
- LUBRICATE BEARINGS IF REQUIRED.

**CAUTION** - TO INSURE THERE IS NO BINDING OR MISALIGNMENT IN THE SYSTEMS, ROTATE THE CONVEYOR SLOWLY BY HAND. IF THE SYSTEM IS TOO LARGE TO TURN BY HAND, APPLY POWER ONLY MOMENTARILY AND CHECK CONVEYOR THOROUGHLY.

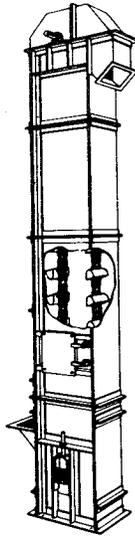
**MAINTENANCE - LUBRICATION** - SCREW CONVEYOR SYSTEMS UTILIZE MANY DIFFERENT DESIGNS OF BEARINGS; THEREFORE, LUBRICATION REQUIREMENTS MAY VARY FOR DIFFERENT SYSTEMS. BALL AND ROLLER BEARINGS SHOULD BE LUBRICATED TO MANUFACTURER'S LUBRICATION STANDARDS. BABBITT OR OTHER TYPE FRICTION BEARINGS SHOULD BE LUBRICATED PERIODICALLY. THE FREQUENCY OF LUBRICATION SHOULD BE BASED ON CHARACTERISTICS OF MATERIAL BEING HANDLED, AS WELL AS THE OPERATING CONDITIONS. OIL IMPREGNATED BRONZE, GRAPHITE-IMPREGNATED BRONZE, OIL IMPREGNATED WOOD, HARD IRON, HARD SURFACED AND MANY TYPES OF PLASTIC BEARINGS REQUIRE NO PERIODIC LUBRICATION.

**INSPECTION** - A PERIODIC INSPECTION OF THE CONVEYOR SYSTEM IS RECOMMENDED TO INSURE PROPER OPERATION. CHECK FOR EXCESSIVE WEAR, DAMAGED OR MISALIGNED COMPONENTS. THE CHECK SHOULD INCLUDE INTAKE AND DISCHARGE POINTS FLIGHTING THICKNESS AT THE OUTER EDGE, BEARING CONDITION AND ALIGNMENT OF SHAFTS. DRIVE SHAFTS ARE SUBJECT TO THE INITIAL LOADS OF THE CONVEYOR; THEREFORE, IT IS RECOMMENDED THAT COUPLING BOLTS BE REMOVED PERIODICALLY TO INSPECT FOR ELONGATION OF BOLT HOLES AND BENT OR WORN BOLTS.

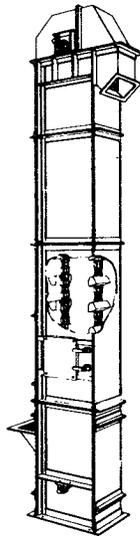


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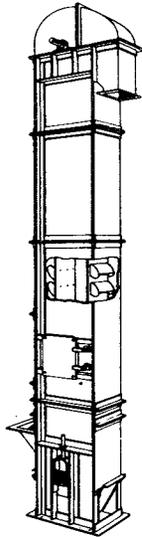
# BUCKET ELEVATORS



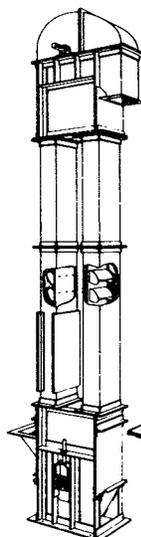
**KWS 100**  
bucket elevator



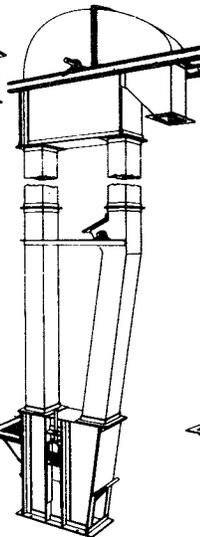
**KWS 200**  
bucket elevator



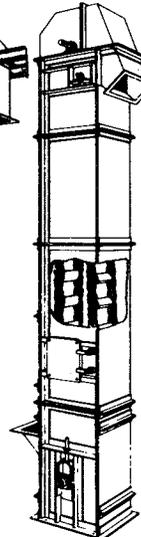
**KWS 500 S**  
bucket elevator



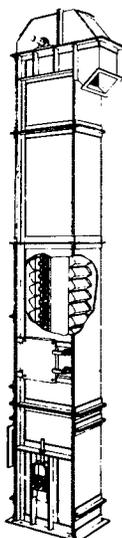
**KWS 500 D**  
bucket elevator



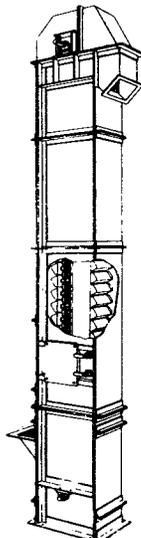
**KWS 500 B**  
bucket elevator



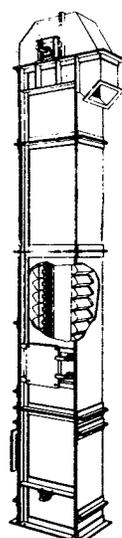
**KWS 600**  
bucket elevator



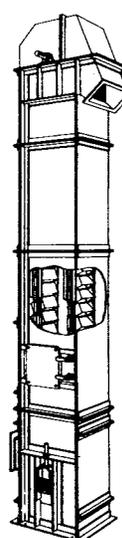
**KWS 700**  
bucket elevator



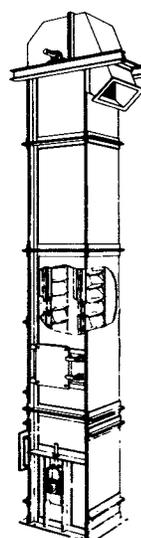
**KWS 800**  
bucket elevator



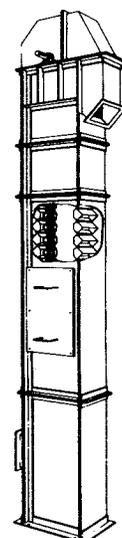
**KWS 800 L**  
bucket elevator



**KWS 1000**  
bucket elevator



**KWS 1100**  
bucket elevator

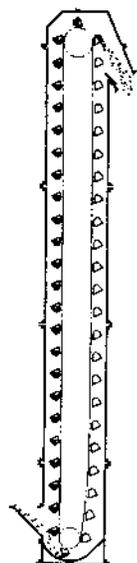


**KWS 1400**  
bucket elevator

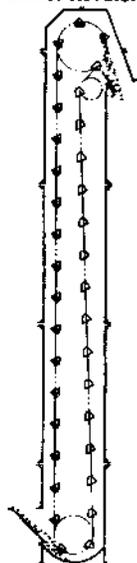


**KWS MANUFACTURING CO., LTD.**

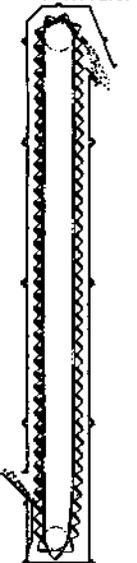
# KWS BUCKET ELEVATORS



Centrifugal discharge bucket elevator



Positive discharge bucket elevator



Continuous bucket elevator

## Centrifugal discharge bucket elevators . . . . . PRICED UPON REQUEST

Elevators of this design predominate in the bulk handling of free-flowing, fine and loose materials with small to medium size lumps. Buckets, mounted at spaced intervals, are loaded by scooping up material from the boot or by feeding the material into them. Material is discharged by centrifugal action as the buckets pass over the head wheel. These elevators are made in several types and are suitable for many requirements.

**KWS 100** • Elevators of this type meet the service requirements of the majority of installations using centrifugal discharge elevators. The head shafts are fixed. The foot shaft takeups are of the screw type. Gravity takeups are available. Buckets are of malleable iron for use on chain or belt. Casings are of steel plate and angle construction. (Fabricated Steel Buckets are also available)

**KWS 200** • These elevators are similar to KWS 100 except that the head shafts are adjustable and the foot shafts are fixed to maintain the relation of buckets to the loading chute and curved bottom plate. They are preferred for handling food products, materials which tend to pack or build up in the bottom of the boot, and for materials having a considerable percentage of lumps.

**KWS 500** • These elevators are designed and engineered to conform with general practice in the handling of grain. Head and foot shafts are provided with anti-friction bearings. Takeups are of the screw type unless otherwise specified. Buckets are of steel and are mounted on a belt. Casings of steel are welded and dust tight. The curved hood is designed for proper discharge of the grain. The boot can be loaded from the front or back side or both. Venting of the head and boot sections is desirable to improve the pickup and discharge of materials. (Heavy Duty Polyethylene buckets or Fabricated Steel Buckets are also available)

## Positive discharge bucket elevators . . . . . PRICED UPON REQUEST

Elevators of this design operate successfully at low bucket speeds and are suitable for handling light, fluffy and fragile materials and those having a tendency to stick in the buckets. Buckets, mounted at spaced intervals, are loaded by scooping up material from the boot or by feeding the material into them. After passing over head wheels, the buckets are inverted over the discharge spout, thus providing a positive discharge of material.

**KWS 600** • This design conforms with the best practice for handling and discharging materials which are light, friable or sluggish. The head shafts are fixed. The foot shaft takeups are of the screw type. Gravity takeups are available. Buckets are of malleable iron mounted at intervals on double strands of chain. Casings are of steel plate and angle construction.

## Continuous bucket elevators . . . . . PRICED UPON REQUEST

Elevators of this design are made in a number of types for handling many bulk materials ranging from light to heavy and from fines to large lumps. Buckets are spaced continuously and loaded by direct feeding, except for KWS 800 elevator where material is scooped from the boot. Spillage between buckets is prevented by their close spacing. As buckets discharge, the material flows over the preceding bucket, whose front and projecting sides form a chute, to the discharge spout.

**KWS 700** • This elevator is the most frequently used of the continuous bucket design. The head shafts are fixed. The foot shaft takeups are of the screw type. Gravity takeups are available. Buckets are of steel and spaced continuously on a single strand of chain. Casings are of steel plate and angle construction. Material is fed to the buckets through a loading leg.

**KWS 800** • Elevators of this type are used for the handling of fine or crushed materials with lumps not exceeding 1/2 inch. These elevators are similar to KWS 700, except that head shafts are adjustable and foot shafts are fixed, to maintain the relation of buckets to the loading chute and curved bottom plate. Buckets are loaded by scooping up material from the boot. When modified by the addition of a loading leg and a correspondingly higher inlet spout, this type elevator can be used for handling lumpy materials.

**KWS 800L** • Identical to KWS 800, except with loading leg and stub inlet chute.

**KWS 1000** • This elevator is of the super-capacity type and used for handling friable, heavy or abrasive material ranging from fines to large lumps. The head shafts are fixed and the foot takeups are of the screw type. Gravity takeups are available. Continuous buckets are end-mounted between two strands of Class SS bushed roller chain. Material is fed to the buckets through a loading leg. Casings are of steel plate and angle construction. Inclined boots are recommended when handling sharp, wedge-shaped and shale-like materials.

**KWS 1100** • These elevators are similar in design to KWS 1000, except for greater capacities and centers. Head terminal machinery and driving equipment are carried on independent supports. The foot takeups are of the screw type. Gravity takeups are available.

**KWS 1400** • This elevator is designed primarily for cement mill service, but is suited for many other similar abrasive service applications. Their design and rugged construction makes them ideally suited for handling cement, clinker, crushed stone, bauxite, feldspar, gravel, gypsum, roofing granules, sand, shale, etc. They are available in a full range of sizes extending to the very high capacities and lifts.

# K.W.S. HI-CAPACITY CENTRIFUGAL DISCHARGE BUCKET ELEVATOR

Designed with quality components to meet industry's need for maximum efficiency and dependable service. Designed for various operations . . . from grain elevators to manufacturing . . . to processing plants. A leader in the handling of free flowing, fine and loose material with some small to medium size lumps.

Standard components consisting of:

12 gauge head section with 14 gauge split removable hood, ¼" thick discharge spout with adjustable throat and inspection port, head shaft C-1045 steel, pillow Block roller bearings with split housing, split gland seals with graphite packing K.W.S. heavy duty drum pulley.

10 gauge boot section with curved bottom plate and two removable panels and two clean out doors, ¼" thick inlet hopper with flange, boot shaft C-1045 steel, K.W.S. heavy duty ball bearing take-up, split gland seals with graphite packing, K.W.S. heavy duty wing pulley.

12 gauge intermediate sections with ¾" thick flange angles and vertical angles (outside at each corner), first intermediate section to have one access door and one removable panel, gasket to be ¼" thick closed cell black neoprene sponge, all assembly bolts to be zinc plated.

Head section and boot section will be shop assembled, (complete elevator not assembled).

Belting—PVC—polyester polyvinyl chloride.

Buckets—"Heavy Duty" Polyethylene style CC-HD. (-60 degrees F to +225 degrees F)

## Elevator specifications

KWS HI-CAPACITY CENTRIFUGAL DISCHARGE BUCKET ELEVATOR		CAPACITY CUBIC FEET PER HOUR		BELTING POLYESTER POLYVINYL CHLORIDE -PVC-	BELT SPEED FEET PER MINUTE		PULLEY DIA.		CASING SIZE INSIDE IN INCHES (NOMINAL)
MODEL	BUCKET CTRS.	HIGH SPEED MAX. 60 PCF	LOW SPEED MAX. 100 PCF		HIGH SPEED	LOW SPEED	HEAD DRUM	BOOT WING	
141HC	6x4 @ 6"	1080	607	PV-225	400	225	20	14	11¾x35
142HC	8x5 @ 7"	2216	1246	PV-225	400	225	20	14	13¾x39
143HC	9x6 @ 8"	3445	2020	PV-225	440	258	22	16	15¾x42
144HC	10x6 @ 8"	3831	2246	PV-350	440	258	22	16	15¾x42
145HC	11x7 @ 9"	5082	2980	PV-350	440	258	24	18	17¾x48
146HC	12x7 @ 9"	5582	3273	PV-350	440	258	24	18	17¾x48
147HC	12x8 @ 10"	8702	5085	PV-470	510	298	30	24	17¾x54
148HC	14x7 @ 9"	6504	3810	PV-470	440	258	24	18	19¾x48
149HC	14x8 @ 10"	9941	5809	PV-470	510	298	30	24	19¾x54
150HC	16x8 @ 10"	13528	8293	PV-470	584	358	36	24	22¾x60
151HC	18x8 @ 10"	14979	9182	PV-470	584	358	36	24	24¾x60

**KWS MANUFACTURING COMPANY, LTD.**  
**GENERAL TERMS AND CONDITIONS**  
**Form #TC0603-9**

**TERMS OF PAYMENT:** All invoices are due and payable in Johnson County, TX. To customers having established credit with KWS, terms are 1/2% discount if paid in full within ten (10) days of the date of invoice and otherwise all credit sales are due in full within thirty (30) days from the date of invoice, unless otherwise agreed in writing. No discount is allowed for earlier payment unless authorized by KWS in writing. Purchasers without a credit rating will avoid delay by furnishing satisfactory references or by instructing KWS to bill in advance or to ship with sight draft attached to bill of lading. Accounts past due shall accrue interest at the highest lawful rate allowed by applicable law.

**LIMITED WARRANTY:** KWS warrants all equipment manufactured by KWS to be free from defects in material and manufacture at the time of shipment for a period of one (1) year from the date of shipment. KWS will furnish without charge, but will not install, replacements for such parts as we find to have been defective. Unless otherwise stated in quotation, this limited warranty is based on operation of the equipment for a period not exceeding eight hours per day. KWS MAKES NO OTHER WARRANTY OF ANY KIND AND HEREBY DISCLAIMS ALL WARRANTIES EXCEPT THE LIMITED WARRANTY HEREBY STATED, BOTH EXPRESS AND IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All warranty claims must be submitted within ten (10) days of discovery of defects or shall be deemed waived. No representative of our company has any authority waive, alter, vary or add to the terms hereof without prior approval in writing. This limited warranty applies only to equipment which is subjected to normal use and service. This limited warranty shall not apply to any equipment which as been subjected to misuse, neglect or accident, or has been altered or tampered with, or if corrective work has been done thereon without our specific written consent, no allowances will be made for such corrective work done without such consent. Improper lubrication, deterioration by chemical action, and wear caused by the presence of abrasive materials, do not constitute defects. KWS shall not be responsible for work done, apparatus furnished, or repairs made by others. Equipment manufactured by others, and included in our proposal is not warranted in any way by KWS but carries only the manufacturer's warranty, if any.

**LIMITATIONS OF LIABILITY:** It is expressly understood that KWS's liability is limited to the furnishing of replacement parts. KWS SHALL NOT BE LIABLE, UPON WARRANTIES OR OTHERWISE, FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES FOR ANY DAMAGES ARISING FROM THE USE OF EQUIPMENT. Thus, KWS is not liable for any other expense, loss or damage including, but not limited to, loss of profits, production, increased cost of operation of spoilage arising in connection with the sale or use of, or inability to use our equipment or products for any reason, except as herein provided.

**TEXAS LAW TO APPLY, JURISDICTION AND VENUE:** It is expressly understood that this sale of products or equipment was negotiated, executed, consummated and is otherwise performable in Johnson county, Texas, and shall be governed, construed and interpreted as to validity, enforcement and in all other respects in accordance with the laws of the State of Texas, and the laws of the United States of America, as applicable. KWS has its principal place of business in Johnson County, Texas, which county shall be the proper place of venue to enforce payment or performance. Purchasers irrevocably agree that any legal proceeding arising out of or in connection with this sale shall be brought in the state courts of Johnson County, Texas, or the United States District Court for the judicial district in which Johnson County is located.

**PROMISE OF DELIVERY:** Promise of delivery represents only our best estimate of the time required to complete the work and ship the material from our plant. All orders are accepted with the understanding that shipping dates are approximate and subject to change because of factory conditions, fires, strikes, material shortages, civil or military authority, mandatory priority and/or other causes beyond our knowledge or control.

**CANCELLATION:** Orders entered on our books are not subject to cancellation and no cancellations will be accepted except upon terms that will INDEMNIFY us against loss. Cancellation charges as published will be invoiced.

**RETURNED GOODS:** No material will be accepted for credit unless such return is first authorized in writing by us. All prices are predicated on sale of material as merchandise only. Additional charges may be assessed for any special services or markings, special boxing, cartage, transfer, overtime (when authorized by purchaser), financing, or other abnormal requirements.

**MINIMUM CHARGE:** Minimum charge on any invoice will be \$35.00 net plus applicable parcel post, express or freight charges.

**CONTRACTS:** All prices are made F.O.B. Burleson, Texas, unless otherwise indicated. Our responsibility ceases when delivery has been made to the transportation company. If there are shortages or evidence of damage, insist on the transportation agent making notations on the shipping documents before signing receipt. Claims should be made immediately and we will cooperate with customers when desired in obtaining adjustments from the transportation company. All contracts are made and accepted at Burleson, Texas, and are not valid until acknowledged from the company's main office. It is the company's intent and purpose to surrender title to this material when final payment is made. Possession may be given before final payment is due, and to protect us against default in payment or in the event of an execution or attachment is levied on your property, it is hereby expressly agreed:

A-The title and right of possession to this material shall remain with us until full and final payment is made; B-No part of this material shall be considered a fixture or incorporated into the realty by virtue of its attachment to real estate and any part may be separated from such real estate for the purpose of re-possession by us or by our agents in the event of a default by purchaser; C-We shall have the right to elect a claim of mechanic's lien against the property upon which this material is situated and waive our rights to re-possess under Paragraphs A and B above any time before expiration of the time fixed by law for filing a mechanic's lien; D-Acceptance or acknowledgement of any order, quotation or contract is with the express understanding that a "no lien agreement" has not been filed.

**SPECIAL TAXES:** Any federal, state or city sales tax or other manufacturers' or processors' tax, if any when assessed, will be added to our invoice.

**CLAIMS:** Claims for errors or shortages existing prior to our delivery of the equipment to the carrier will be considered only when made to use immediately after receipt of shipment.

**SAFETY DEVICES:** We will supply only such safety devices as are specified in this order. Any additional safety measures or devices which may be required by law, or which you wish to add, are to be furnished by you or, at your written request, they will be furnished by us as additional cost to you.

**PAINTING:** As a protective measure, we will apply before shipment one coat of our standard shop paint to all outside accessible unfinished surfaces, and a protective coat to all machine-finished surfaces, or equal.

# ELEVATOR BUCKETS



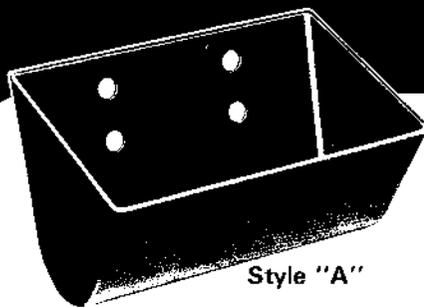
## Welded Steel Construction *For Chains or Belts*

What's so special about KWS MANUFACTURING ?

Take a look. KWS is setting the standard of excellence for the material handling industry. From a complete system to a replacement part - KWS delivers. You expect that standard of excellence from KWS MANUFACTURING. We demand it.

## **KWS MANUFACTURING CO., LTD**

## ELEVATOR BUCKETS



Style "A"



Style "AA"  
(with reinforcing strip)

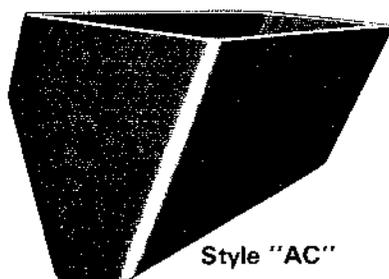


SALEM

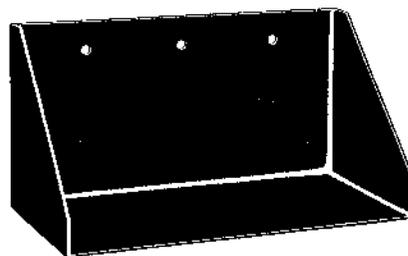
STYLE A FABRICATED STEEL ELEVATOR BUCKETS, are commonly used for elevators handling cement, chemicals, coal, sand, gravel, stone, pulp, phosphate and similar materials. Ends are parallel and perpendicular to back of bucket.

STYLE AA FABRICATED STEEL ELEVATOR BUCKETS, are similar to the Style A, with reinforcing lip along the front edge and around the front corners, giving the buckets greater resistance to distortion when scooping up heavy or gritty materials. Ends are parallel and perpendicular to back of bucket.

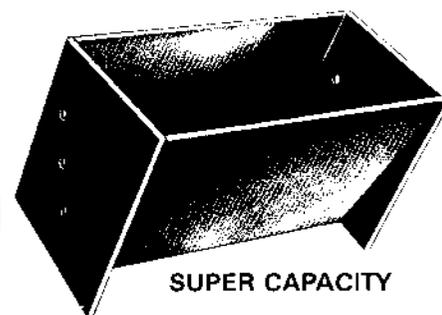
SALEM FABRICATED STEEL ELEVATOR BUCKETS, are used for handling granular or powdered, free-flowing materials. They are formed to a shape which insures proper filling and free and clean discharge. Ends are parallel and perpendicular to back of bucket.



Style "AC"



Style "C" (square heel)



SUPER CAPACITY

STYLE AC FABRICATED STEEL ELEVATOR BUCKETS, are designed to provide fast thorough discharge of cement, lime and other dry, fluffy materials. Vent holes in the bottom of each bucket release trapped air in filling and allow material to empty from bucket quickly and completely on discharge.

STYLE C FABRICATED STEEL ELEVATOR BUCKETS, are designed for handling clay, sugar, salt, finely pulverized ores, wet grain, and such other materials as would stick or pack in other styles of buckets. Ends are parallel and perpendicular to back of bucket.

SUPER CAPACITY BUCKETS, are of the continuous type, extend back of the pitch line of the chain and result in a much greater carrying capacity for each bucket than can be obtained with the regular continuous buckets. These buckets are mounted between two strands of chain. They are three piece construction, securely welded both inside and outside to assure long life and dependability.

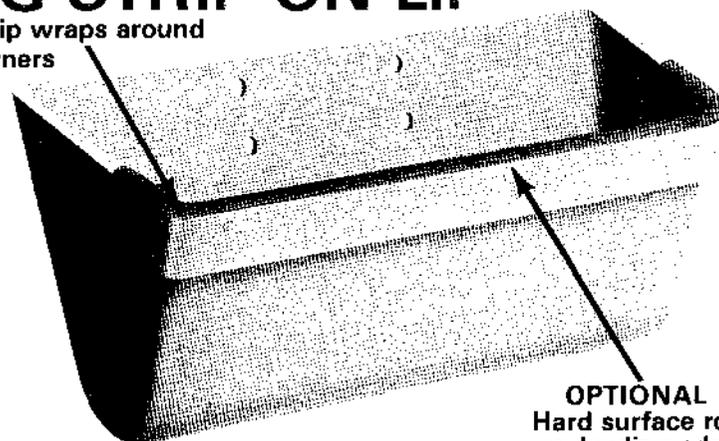
**PRICED UPON REQUEST**

## REINFORCING STRIP ON LIP

- Reinforcing strips securely welded to front lip of buckets.
- Furnished with or without hard surfacing rod on leading edge. (OPTIONAL)
- Reinforcing strips on Salem & Style "A" type buckets will be approximately six (6) inches longer than buckets to wrap around & protect front corners.
- Reinforcing strips on continuous type buckets will be furnished on inside or outside of lip to customers specs.
- Reinforcing strips of abrasive resistant steel or other alloys will be quoted promptly on request.

**PRICED UPON REQUEST**

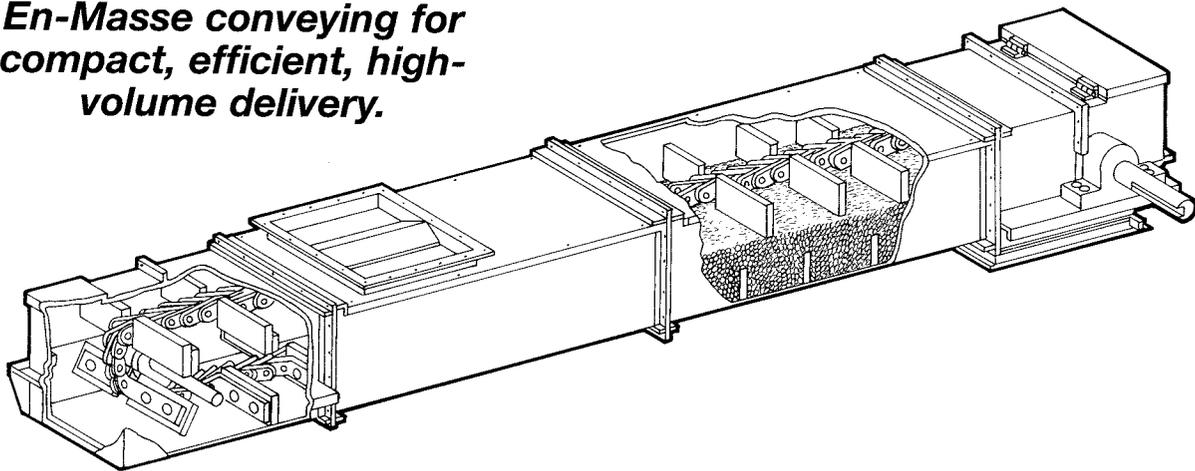
Strip wraps around corners



OPTIONAL  
Hard surface rod  
on leading edge

# DRAG- MASTER CONVEYORS

*En-Masse conveying for compact, efficient, high-volume delivery.*



The compact En-Masse is an efficient, high-performance alternative to conventional means of material handling.

Because it conveys a high volume of material, yet requires much smaller amounts of space, the En-Masse is an ideal solution for congested areas where several units are discharging in the same location.

Material is moved as a large "solid" mass with no internal turbulence, at low speeds, using 85% of the trough for material. The resulting high capacity and lack of turbu-

lence allows the En-Masse to handle almost all types of bulk materials, including fragile types many other conveyors cannot handle well.

This high-performer uses  $\frac{2}{3}$  the horsepower of an equivalent, conventional unit. It is weather- and dust-free, and can be self-cleaning, depending on materials.

*Talk to our sales engineers about ways the En-Masse can be the compact solution to your materials delivery problems.*

What's so special about KWS MANUFACTURING COMPANY, LTD.  
Take a look. KWS is setting the standard of excellence for the material handling industry. From a complete system to a replacement part - KWS delivers. You expect that standard of excellence from KWS MANUFACTURING COMPANY, LTD. We demand it.

## **KWS MANUFACTURING COMPANY, LTD.**

# KWS MANUFACTURING COMPANY, LTD.

## SAFETY INSTRUCTIONS

### MINIMUM GENERAL PROVISIONS

It is the responsibility of the contractor, installer, owner and user to install, maintain and operate the conveyor and/or elevator components and conveyor assemblies manufactured and supplied by KWS Manufacturing Company, Ltd. 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 Safety Codes as currently in effect.

In order to avoid an unsafe or hazardous condition, the assemblies or parts must be installed with the following **MINIMUM** provisions:

1. Conveyors and/or elevators shall not be operated unless the conveyor and/or elevator housing completely encloses the conveyor's and/or elevator's moving elements; and power transmission guards are in place. Conveyor and/or elevator inlets and discharge openings are designed to connect to other equipment or machinery so that the flow of material into and out of the conveyor and/or elevator is completely enclosed. If the conveyor and/or elevator is to be opened for inspection, cleaning or observation, the motor driving the conveyor and/or 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 conveyor and/or elevator housing has been closed and all other guards are in place. A formalized Lockout/Tagout procedure must be followed when a conveyor and/or elevator are stopped for maintenance or repairs and before conveyor and/or elevator guards are removed. All safety devices, covers, and guards should be replaced before restarting equipment for operation and eliminating the Lockout/Tagout.
2. If the conveyor and/or elevator must have an open housing as a condition of its use and application, the entire conveyor and/or elevator is then to be guarded by a railing or fence.
3. Feed openings for shovels, front-end loaders, or other manual or mechanical equipment shall be constructed in such a way that the conveyor and/or elevator opening are covered by grating. If the nature of the product is such that grating cannot be used, then the exposed section of the conveyor and/or elevator is to be guarded by a railing, or fence, and there shall be warning signs posted.
4. DO NOT walk on conveyor and/or elevator covers, grating, or power transmission guards.
5. DO NOT poke or prod material in the conveyor and/or elevator with a bar or stick.
6. DO NOT place hands or feet in any conveyor and/or elevator openings.
7. DO NOT overload conveyor and/or elevator or use it for anything but its intended use.
8. Practice good housekeeping.

### HAZARDOUS OPERATION

Standard conveyors and/or elevators are not equipped to operate under conditions, which may be hazardous, nor with hazardous materials. The manufacturer should be consulted if there is an indication that a hazardous condition or material is involved. Several situations may create these conditions. A few of the more common follow:

1. Hazardous Condition - Where product is under pressure or vacuum, or the trough is provided with jackets for heating or cooling; special precautions are required. Standard components are not designed for this service.
2. Hazardous Materials - they may be explosive, flammable, toxic, noxious, etc. Special provisions for safety are required. DO NOT use standard components.
3. Handling Food Stuffs - Conveyors and/or elevators to handle foodstuffs are subject to special codes for materials, construction, location and accessibility. Investigation before ordering conveyors and/or elevators is required. KWS Manufacturing Company, Ltd. is capable of providing you with help in this area. Special precautions should be taken for protection of personnel against contact with moving parts when utilizing quick clean out features in sanitary conveyors and/or elevators.

### ELECTRICAL

Conveyor and/or elevator manufacturers generally do not provide electrical equipment to control the conveyors or elevators. Many kinds of electrical interlocking of conveyors and/or elevators and conveyor and/or elevator systems are available; such that if one conveyor and/or elevator in the system or process is stopped, other equipment feeding it or following it can be automatically stopped. The purchaser must use electrical equipment conforming to the National Electric Code, the National Electric Safety Code and other local or national codes.

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary and mandatory ingredients for a safe working place. It is the responsibility of the contractor, installer, and owner/user to supplement the materials and services furnished by KWS Manufacturing Company, Ltd. with necessary items to make the conveyor and/or elevator installation comply with all laws and codes.

Consideration should be given to some or all of the following electrical devices, and to any others that may be appropriate. All devices, such as those listed below, may enhance the safety and/or overall performance of the equipment in certain situations. Consideration must be given to their use as a secondary safety device as they may present a false sense of security to the operator and/or personnel around the equipment. In no case are they intended to replace or reduce the importance of the Lockout/Tagout procedures required by law as the primary safety precautions. In addition, consideration must be given to the feasibility and usefulness of secondary safety devices in each specific working environment.

1. Overload protection devices such as shear pins, torque limiters, etc. to shut off power whenever operation of conveyor and/or elevator is stopped as a result of excessive material, foreign objects, excessively large lumps, etc.
2. No speed protection devices such as zero speed switches to shut off power in the event of any incident that may cause conveyor and/or elevator to cease operating.
3. Safety shut out switch with power lockout provisions at the conveyor drive.
4. Emergency stop switches readily accessible wherever required.
5. Electrical interlocking power lockout provisions to shut down feeding conveyor and/or elevator whenever receiving conveyor and/or elevator stops.
6. Electrical devices to warn personnel of startup of conveyor and/or elevator, especially if started from remote location.
7. Special enclosures for motors and controls for hazardous atmospheric conditions.
8. Electrical interlocking switches to shut down conveyor and/or elevator are NOT recommended for covers, inspection doors, personnel repair opening with covers, etc. due to the false sense of security these devices give operators and maintenance personnel.

### SAFETY LABELS

One or more safety decals (several samples illustrated on the following page) are attached to all conveyor and/or elevator housings, gates, guards, etc. For complete details of decal to use and its location on the equipment, refer to Conveyor Equipment Manufacturers Association (C.E.M.A.) at [www.cemanet.org](http://www.cemanet.org).

**! WARNING**



CVS930011

Exposed screw and moving parts can cause severe injury

**LOCK OUT POWER** before removing cover or servicing

**! WARNING**



CHS93001

Exposed moving parts can cause severe injury

**LOCK OUT POWER** before removing guard

**! WARNING**



CVS930012

Exposed buckets and moving parts can cause severe injury

**LOCK OUT POWER** before removing cover or servicing

**! DANGER**



CHS950017

Moving parts will cause severe injury

**KEEP AWAY**



CHR000025

**! WARNING**

Guard Removed

Risk of severe injury

**DO NOT OPERATE** Without guard



CHR930002

**! WARNING**

Equipment starts automatically - can cause severe injury

**KEEP AWAY**



CHS930011

**! WARNING**

Exposed screw and moving parts can cause severe injury

**LOCK OUT POWER** before removing cover or servicing

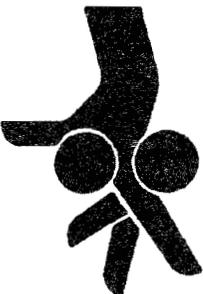


CHS990026

**! WARNING**

Walking or Standing on Conveyor Covers or Gratings can cause Serious Injury or Death

**STAY OFF**



CHR931005

**! WARNING**

Moving equipment can cause severe injury

**KEEP AWAY**

**KWS MANUFACTURING COMPANY, LTD.**

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