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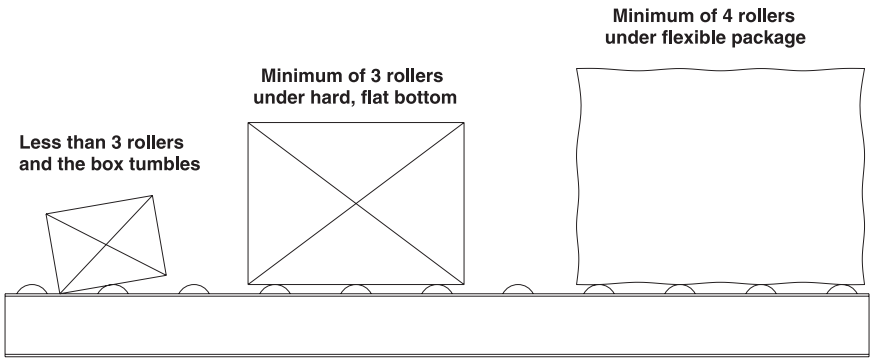
ROLLER CENTER SPACING

In order to convey your product smoothly and efficiently, it must be supported by a minimum of three rollers. To compute the center to center roller spacing required, divide the length of your package by 3. The dividend is your required spacing. For example, a package 24″ long, divided by 3, yields a dividend of 8. Therefore, the required spacing would be 8″ center to center. Flexible bottom packages require four or more supporting rollers per package.



GRADE SUGGESTIONS - DROP PER 10′-0″ SECTION

COMMODITY	WT. (lbs.)	PLAIN OR DUST PROOF BEARINGS	GREASE PACKED BEARINGS	COMMODITY	WT. (lbs.)	PLAIN OR DUST PROOF BEARINGS	GREASE PACKED BEARINGS
CARTONS	1-5	9″	-	WOOD CASES	20-50	5″	7-1/2″
	5-15	7-1/2″	-		50-100	4-1/2″	6-1/2″
	15-50	6″	9″		100-250	4″	5″
CRATES	20-50	5″	7-1/2″	TOTE PANS	50-100	4″	6-1/2″
	5-100	4-1/2″	6-1/2″		100-250	3-1/2″	5′
	100-250	4″	5″		250-500	3″	4-1/2″
MILK	EMPTY	6″	10″	BARRELS	EMPTY	5″	6-1/2″
CASES	FULL	5″	6″		FULL	4″	5″
BEVERAGE	EMPTY	6″	-	MILK CANS	EMPTY	6″	10″
CASES	FULL	5″	7-1/2″		FULL	4-1/2″	6″
LUMBER	STD. BOARD	5″	7-1/2″	BRICK	-	5″	6-1/2′

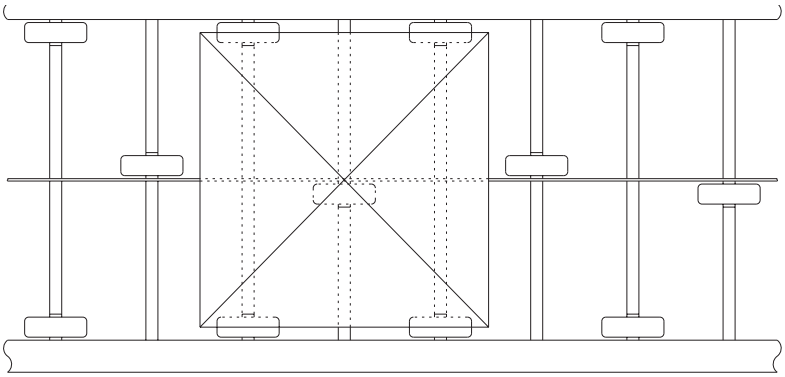
Grades recommended here are not exact and should be used only to estimate your requirements. Figures at left are intended for average conditions, using proper size rollers for materials handled. Additional grade may be required in some cases.

Starting a package from rest on level lines requires a push of approximately 3% of the total load. For heavy loads a pitch of 1/8″ per foot will reduce push required.

The amount of drop required for 90° curves with 4′ inside radius is approximately the same as required per 10′ section.

WHEEL SPACING

Products to be conveyed on wheel conveyor should have a smooth and firm bottom to maximize conveyability. It is important to note that wheel conveyor should have a minimum of 5 wheels under smallest box size and a minimum of 3 axles under it at all times.



LINE SHAFT HORSEPOWER DATA

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GENERAL

Since many sections and accessories may be coupled to one drive, it is important that the motor be properly sized for each application.

Table I (at right) may be used as a general guide to selection of drive motor sizes for typical installations.

When powered accessories are added to straight sections, the maximum allowable length must be adjusted. Table II (below) lists the horsepower required for the various accessories.

Factors that are important to power requirements include the number of rollers per foot, the total length of straight sections, the number and type of powered accessories and the desired speed of the conveyor.

TABLE 1 - MAXIMUM ALLOWABLE STRAIGHT LENGTHS

HORSE-POWER	ROLLER CENTERS	30FPM	45FPM	60FPM	75FPM	90FPM	120FPM
1/3	3″	57	37	28	22	19	14
1/3	4″	75	50	37	30	25	19
1/3	6″	112	75	56	45	37	28
1/2	3″	84	56	42	34	28	20
1/2	4″	112	75	56	45	38	28
1/2	6″	168	112	84	67	56	42
3/4	3″	126	84	63	50	42	32
3/4	4″	168	112	84	67	56	42
3/4	6″	200	168	126	100	84	63
1	3″	-	112	84	67	56	42
1	4″	-	150	112	90	75	56
1	6″	-	200	168	135	112	84
1-1/2	3″	-	-	126	100	84	63
1-1/2	4″	-	-	168	135	112	84
1-1/2	6″	-	-	200	200	168	126
2	3″	-	-	-	135	112	84
2	4″	-	-	-	180	150	112
2	6″	-	-	-	200	200	168

NOTE: Drive cannot be located more than 75′ from either end on 3″ RC; 90′ from either end on 4″ RC; or 100′ from either end on 6″ RC.

796LS CAPACITY

The drive capacity accepted is 15 lbs. per roller. The type of package and/or material being conveyed may increase or decrease this capacity. Very hard, rigid, flat bottom containers increase roller capacity while soft, uneven surfaces will decrease it.

NOTE: Drive capacity for model 738LS is 10 lbs. per roller; 7.5 lbs. roller capacity for model 738LSC.

ROLLER CENTERS

The number of rollers required per package is dependent upon package weight, package length, drive capacity per roller, and type of surface. The package formulas (at right) should be used to determine the maximum allowable roller centers. Use the lesser of the two values rounded to the nearest standard roller centers. Finally, only use model 738LS for light duty applications where close roller centers are required.

PACKAGE WEIGHT FORMULA

+ Length of package (in inches)
÷ Weight of package
= Subtotal
x 15 # (Drive capacity of rollers; use 10 # for 738LS)
= Maximum Roller Centers

PACKAGE LENGTH FORMULA

+ Length of package (in inches)
÷ 3
= Maximum Roller Centers

TABLE II - HP REQUIREMENT FOR ACCESSORIES

POWERED ACCESORIES	30FPM	45FPM	60FPM	75FPM	90FPM	120FPM
30° CURVE	.03	.05	.06	.07	.09	.12
45° CURVE	.04	.07	.09	.11	.13	.17
60° CURVE	.06	.09	.12	.15	.18	.24
90° CURVE	.08	.12	.15	.19	.23	.30
Converging Spur	.13	.18	.26	.34	.40	.52
Diverging Spur	.16	.23	.32	.39	.46	.63
Powered Gate	.04	.05	.07	.09	.11	.15
Chain Cross Over	.02	.02	.02	.03	.04	.05

NOTE: When accessories are added to straight line shaft conveyor sections, the maximum allowable lengths shown in Table I must be adjusted. Use the adjustment formula at right to determine the adjusted maximum length.

LINE SHAFT ADJUSTMENT FORMULA

Maximum HP (Table I)
- Total HP of accessories (Table II)
= Subtotal
÷ Maximum HP (Table I)
x Max. allowable straight length (Table I)
= Adjusted straight Length

TECHNICAL
CALCULATING HORSEPOWER

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FORMULAS

BELT CONVEYORS & BELT DRIVEN LIVE ROLLERS

+ Product (Total Live Load)*
+ Belt Weight**
+ Roller Weight (N/A on Slider Bed Belt Conv.)**
+ Drive Weight (250#)
= Subtotal
x Friction Factor (See Chart This Page)
x 1.25 (25% Contingency Factor)
= Effective Belt Pull
x Speed of Conveyor
÷ 33,000 Horsepower Factor
÷ .95 Chain Reductions
÷ .85 GRE / Reducer Losses
= Horsepower

CHAIN DRIVEN LIVE ROLLERS

+ Product (Total Live Load)*
+ Roller Weight**
+ Sprocket and Chain Weight (add 3 lbs./roller)**
+ Drive Weight (250#)
= Subtotal
x Friction Factor (See Chart This Page)
x 1.25 (25% Contingency Factor)
= Effective Chain Pull
x Speed of Conveyor
÷ 33,000 Horsepower Factor
÷ .95 Chain Reductions
÷ .85 GRE / Reducer Losses
= Horsepower

BELT CONVEYORS (INCLINE OR DECLINE)

+ Product (Total Live Load)
+ Belt Weight**
+ Roller Weight (N/A on Slider Bed Belt Conv.)**
+ Drive Weight (250#)
= Subtotal
x Friction Factor (See Chart This Page)
= Subtotal
+ (Actual Live Load on Incline Portion of Conv.
x Sine of Incline--See Chart This Page)
= Subtotal
x 1.25 (25% Contingency Factor)
= Effective Belt Pull
x Speed of Conveyor
÷ 33,000 Horsepower Factor
÷ .95 Chain Reductions
÷ .85 GRE / Reducer Losses
= Horsepower

SLAT AND CHAIN DRAG CONVEYORS

+ Product (Total Live Load)*
+ Slat and Chain Weight@
+ Drive Weight (100#)
= Subtotal
x Friction Factor (See Chart This Page)
x 1.25 (25% Contingency Factor)
= Effective Chain Pull
x Speed of Conveyor
÷ 33,000 Horsepower Factor
÷ .95 Chain Reductions
÷ .85 GRE / Reducer Losses
= Horsepower

FRICTION FACTOR	
MODEL	FRICTION FACTOR
Slider Bed Belt Conveyor	.30
Roller Bed Belt Conveyor	.05
Belt Driven Live Roller	.10
Chain Driven Live Roller	.06
Slat Conveyor	.20
Chain Drag Conveyor	.20

SINES	
DEGREE	SINE
5°	.08715
10°	.17365
11°	.19081
12°	.20791
13°	.22495
14°	.24192
15°	.25882
16°	.27364
17°	.29237
18°	.30902
19°	.32557
20°	.34202
21°	.35837
22°	.37461
23°	.39073
24°	.40674
25°	.42262
26°	.43837
27°	.45399
28°	.46947
29°	.48481
30°	.50000
35°	.57358
40°	.64279

***On zero pressure accumulators, only 1/2 of total live load should be used since only 1/2 of load should be in motion at any given time with conveyor design (does NOT apply to Smart Zone® models).**
****See weight charts opposite page.**
@See slat and chain weight chart opposite page (slat and chain weight applies only to slat conveyor).

When calculating horsepower, use charts at right to determine proper shaft and pulley diameter. This will ensure that the pulley and shaft selected will be of the proper size (diameter) to adequately handle the loading and effective belt pull on the unit.

In Table I, use the 180° arc of contact for end drives and 210° for center drives. Multiply the figure shown by the belt width to find the effective belt pull of a pulley.

Once the proper pulley diameter is known, the diameter of the shaft must be determined. Table II specifies effective belt pull ratings for various diameter shafts at selected pulley face width.

TABLE 1 - ARC OF CONTACT		
Pulley Dia.	180° End Drive	210° Center Drive
8″	85# PIW BELT	60# PIW BELT
12″	125# PIW BELT	90# PIW BELT
18″	230# PIW BELT	170# BELT
24″	345# PIW BELT	250# PIW BELT

TABLE II - SHAFT DIAMETER					
Pulley Face Width	Shaft Dia. 1-3/16″	Shaft Dia. 1-7/16″	Shaft Dia. 1-15/16″	Shaft Dia. 2-7/16″	Shaft Dia. 2-15/16″
12″	1000	1500	3700	6300	10600
14″	920	1500	3700	6300	10600
18″	670	1200	3700	6300	10600
20″	590	1100	3500	6300	10600
22″	530	950	3100	6300	10600
26″	440	790	2600	5600	10600
32″	350	620	2100	4400	9100
38″	290	510	1700	3700	7500
44″	240	440	1400	3100	6400
51″	210	370	1200	2700	5500
57″	180	330	1100	2400	4900

MISCELLANEOUS WEIGHTS

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ROLLER-MODEL	7"BF WTS. (lbs.)	9"BF WTS. (lbs.)	11"BF WTS. (lbs.)	13"BF WTS. (lbs.)	15"BF WTS. (lbs.)	17"BF WTS. (lbs.)	19"BF WTS. (lbs.)	21"BF WTS. (lbs.)	23"BF WTS. (lbs.)	25"BF WTS. (lbs.)	27"BF WTS. (lbs.)	31"BF WTS. (lbs.)	33"BF WTS. (lbs.)	35"BF WTS. (lbs.)	37"BF WTS. (lbs.)	39"BF WTS. (lbs.)	43"BF WTS. (lbs.)	45"BF WTS. (lbs.)	47"BF WTS. (lbs.)	51"BF WTS. (lbs.)
196S	1.6	1.9	2.2	2.5	2.7	2.9	3.3	3.6	3.8	4.1	4.4	4.9	5.2	5.5	5.8	6.1	6.7	7.0	7.3	7.8
196G	1.6	1.9	2.3	2.6	2.8	3.0	3.4	3.7	3.9	4.3	4.6	5.1	5.4	5.7	6.0	6.3	7.0	7.3	7.6	8.1
192S	2.3	2.8	3.4	3.8	4.5	5.2	5.6	6.0	6.6	7.2	7.7	8.8	9.4	9.9	10.65	11.0	12.1	12.7	13.2	14.3
199S	2.6	3.3	4.0	4.5	5.3	6.1	6.6	7.1	7.8	8.5	9.2	10.5	11.2	11.8	12.6	13.1	14.5	15.2	15.8	17.1
254S	2.1	2.5	3.0	3.4	3.9	4.4	4.8	5.2	5.8	6.2	6.6	7.5	8.4	9.3	9.8	10.2	11.3	11.8	12.3	13.3
254T	2.0	2.4	2.8	3.2	3.7	4.1	4.5	4.9	5.4	5.8	6.2	7.0	7.5	7.9	8.3	8.7	9.6	10.0	10.4	11.3
251S	4.2	4.9	5.6	6.4	7.1	7.8	8.5	9.2	9.9	10.7	11.4	12.8	13.5	14.3	15.0	15.7	17.1	17.9	18.6	20.0
297S	4.6	5.6	6.7	7.6	8.7	9.8	10.8	11.8	12.3	13.8	15.3	16.9	17.9	19.0	20.0	21.0	23.0	24.1	25.1	27.2
3509S	6.5	7.7	8.8	9.9	11.0	12.1	13.3	14.4	15.6	16.7	17.8	20.1	21.2	22.3	23.5	24.6	26.9	28.0	29.1	31.4
3530S	11.2	13.5	15.9	18.3	20.6	23.0	25.3	27.6	30.0	32.3	34.7	39.4	41.8	44.1	46.4	48.8	53.5	55.9	58.2	62.8

LIGHT DUTY ROLLER WEIGHTS			
ROLLER MODEL	10" BF WTS. (lbs.)	16" BF WTS. (lbs.	22" BF WTS. (lbs.
138G	1.0	1.5	2.0
138A	0.9	1.3	1.8

SLAT & CHAIN WEIGHTS PER FT. OF CONVEYOR					
SLAT WIDTH	25" WT. (lbs.)	31" WT. (lbs.)	37" WT. (lbs.)	43" WT. (lbs.)	49" WT. (lbs.)
7 GA HRS	71	82	96	104	115

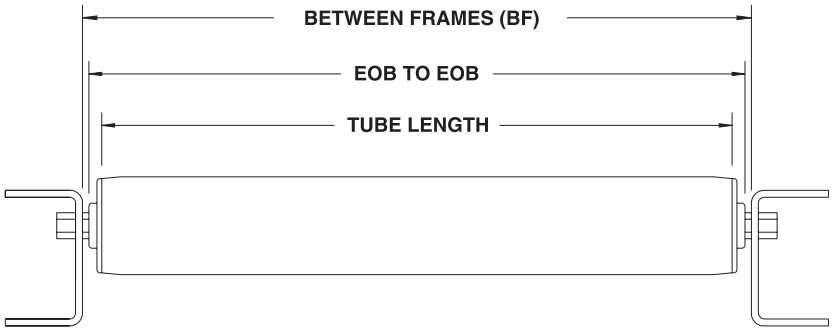
CHAIN WEIGHTS (lbs.) PER FT. OF CONVEYOR			
CHAIN SIZE	CONVEYOR SPEED	CHAIN WT./FT.	LOAD RATING
NO. 40	25 FPM	.41	443
NO. 40	50 FPM	.41	432
NO. 50	25 FPM	.68	690
NO. 50	50 FPM	.68	675
NO. 60	25 FPM	.96	995
NO. 60	50 FPM	.96	970
NO. 80	25 FPM	1.7	1770
NO. 80	50 FPM	1.7	1730
NO. 100	25 FPM	2.7	2760
NO. 100	50 FPM	2.7	2690

BELTING WEIGHTS										
BELTING TYPE	BELTING SURFACE	2-1/4" BELT WIDTH	6" BELT WIDTH	12" BELT WIDTH	18" BELT WIDTH	24" BELT WIDTH	30" BELT WIDTH	36" BELT WIDTH	42" BELT WIDTH	48" BELT WIDTH
PVC-120	C x FS	-	.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08
PVC-120	FS x FS	-	.24	.48	.72	.96	1.20	1.44	1.68	1.92
PVC	RUFF-TOP	-	.45	.90	1.35	1.80	2.25	2.70	3.15	3.60
PVC-150	C x FS	.241	-	-	-	-	-	-	-	-

ROLLER LENGTH

DETERMINING ROLLER LENGTH

The best method for ordering additional or replacement rollers is to always specify the between frames dimension (BF). This will ensure a proper fit for rollers and conveyor frames. If the end-user does not know what the BF dimension is, simply have this person measure between the frames of the specified unit. However, there are times when getting a between frames dimension is difficult. In this instance, it is very important to use the proper terminology to select a roller size. The only dimension acceptable in determining roller length when the BF is not known, is the "end-of-bearing" measurement. The importance here cannot be overstated. Since conveyor/roller manufacturers vary the length of the roller tube in relation to the manner in which the bearing is inserted-and depending on the individual bearing being used-countless dimensions are possible. For example, one manufacturer may use an 18-1/2" long tube in production of its 19" BF roller. Another may be using a different bearing or possibly a different method of installing the bearing and cut its tube to a length of 18-1/4". This 1/4" difference is enough--believe it or not--to be the culprit of serious problems--at exactly the time the end-user receives a shipment of non-returnable rollers the wrong length! See illustration above.



CURVES AND SPURS

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GENERAL

STRAIGHT FACE ROLLERS are recommended where packages of uniform size are conveyed and rubbing against guards is not objectionable.

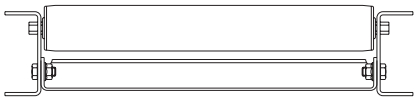
DIFFERENTIAL ROLLERS offer reduced package swerve. Package travels more easily. Guard rails should be used.

TAPERED ROLLERS are recommended above all others because of their improved carrying surface. They hold the package in relatively the same position through the entire curve.

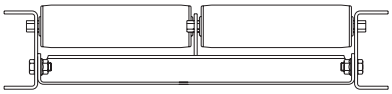
NOTE: Orientation of product may be affected because of straight rollers in curve. If orientation of product must be maintained, a tapered roller curve should be used. Consult factory.

TAPERED ROLLERS

STRAIGHT FACE ROLLER



DIFFERENTIAL ROLLERS



PACKAGE LENGTH	PACKGE WIDTH 4"	PACKGE WIDTH 8"	PACKGE WIDTH 12"	PACKGE WIDTH 16"	PACKGE WIDTH 20"	PACKGE WIDTH 24"	PACKGE WIDTH 28"	PACKGE WIDTH 32"	PACKGE WIDTH 36"
4"	6	10	14	18	22	26	30	34	38
8"	6	10	14	18	22	26	30	34	38
12"	7	10	14	18	22	26	30	34	38
16"	8	11	15	19	22	26	30	34	38
20"	9	12	15	19	23	27	30	34	38
24"	10	12	16	20	23	27	31	34	38
28"	11	13	17	20	24	28	31	35	39
32"	-	14	18	21	25	29	31	35	39
36"	-	-	-	-	-	-	32	36	40
40"	-	-	-	-	-	-	32	36	40
44"	-	-	-	-	-	-	33	37	41
48"	-	-	-	-	-	-	33	37	41
52"	-	-	-	-	-	-	34	38	42

To determine width needed, use formula shown below, or convenient table at left.

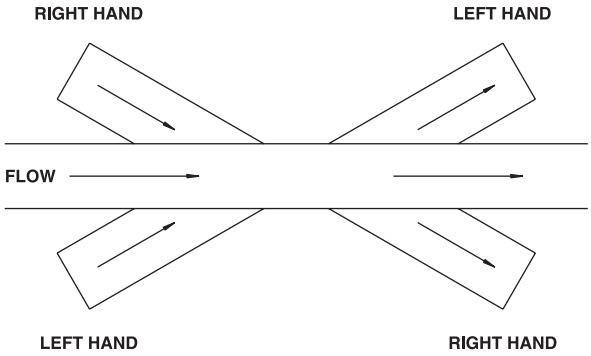
CURVE WIDTH FORMULA

+ (Inside Radius + Package Width)²
+ (Package Length ÷ 2)²
= Subtotal
√ Subtotal
- Inside Radius
+ 2"
= Width in Curve (BF)

NOTE: Length of package must not exceed length of inside radius.

DETERMINING HAND OF SPUR

When placing an order for any spur, hand of spur must be determined and specified. The drawing at right illustrates both left hand and right hand spurs. It is acceptable to converge at either 30° or 45°. However, on diverging spurs, it is most desirable to divert at 30°.



WHEEL CONVEYORS AND PATTERNS

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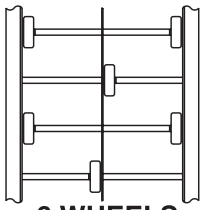
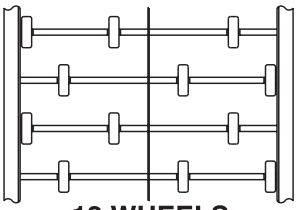
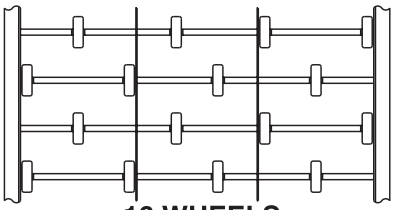
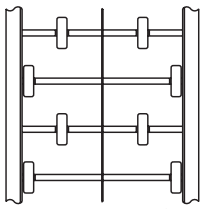
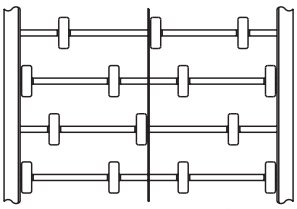
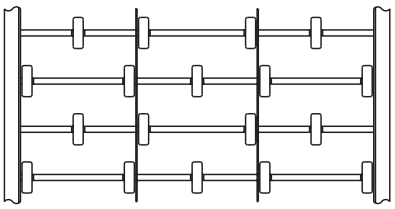
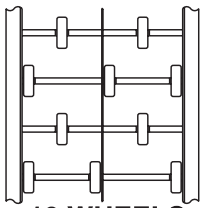
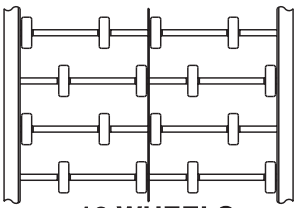
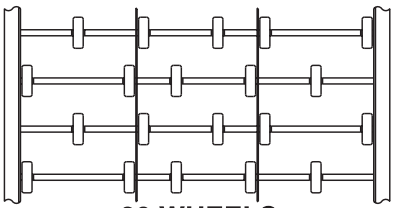
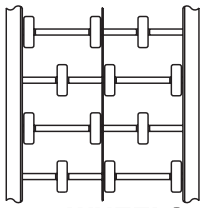
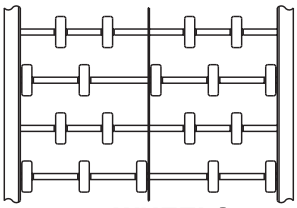
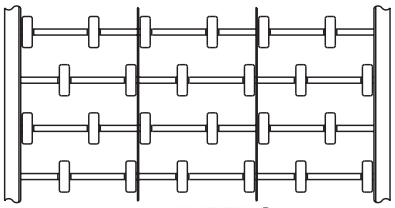
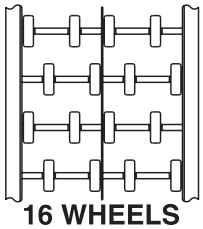
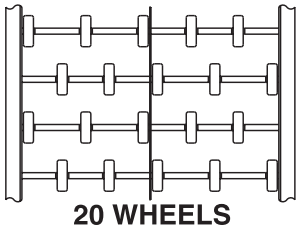
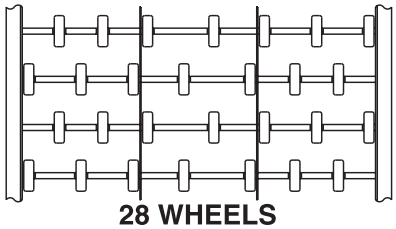
GENERAL

Gravity wheel conveyors are best suited for light duty applications. The key criteria is that the load bottom surface is flat, rigid and smooth. Soft bottom packages are not recommended since wheels may indent soft bottom containers, thus curtailing product movement. Also, consideration must be given to the **construction** of the bottom surface of the product container. A wooden crate, for example, may hang on individual wheels and not start from its stopped position.

When calculating minimum wheel spacing required, the wheel patterns below may be used to determine minimum wheel spacing. Wheel axles are spaced on 3″ centers.

12" OAW	18" OAW	24" OAW
 6 WHEELS	 12 WHEELS	 16 WHEELS
 8 WHEELS	 14 WHEELS	 18 WHEELS
 10 WHEELS	 16 WHEELS	 20 WHEELS
 12 WHEELS	 18 WHEELS	 24 WHEELS
 16 WHEELS	 20 WHEELS	 28 WHEELS