

Horsepower Calculation



BELT PULL AND HORSEPOWER CALCULATIONS

I. LIVE LOAD ON THE CONVEYOR:

- A. Horizontal Conveyor: Summation of total load being conveyed.
- B. Incline Conveyor: Live load on incline portion multiplied by the sine of the angle of incline. (See "Net Lift Chart").

II. BELT OR CHAIN WEIGHT:

- A. Belt Driven Conveyor: Belt weight from chart below multiplied by the width of the belt multiplied by the length of the conveyor for the weight of both the carrying belt and the return belt.

Type of Belt	Weight per Lineal Foot of Conveyor per Inch of Belt Width
3 Ply FS x FS	.1 Pound
3 Ply Ruff Top	.25 Pounds
3 Ply Neoprene	.125 Pounds

- B. Chain Driven Conveyor: Chain weight from chart below multiplied by conveyor length.

Conveyor Model	Chain Type	Weight per Lineal Foot of Conveyor
22CRR	#50	1.38 Pounds
251-267CRR	#50	3.0 Pounds
251-267CRR	#60	3.52 Pounds
Slat Conveyor	SR196	26.4 Pounds

- III. A. **Roller Weight:** See Chart below
- B. **Slat Weight:** 1.95 pounds per lineal foot of conveyor per inch of slat width.

IV. ADDITIONAL FACTORS:

- A. Feeder Beds: 10% of the live load on the feeder bed.
- B. Stopped product on running conveyor (case stop, traffic controller, etc.): 10% of the stopped product.
- C. Deflectors and Plows: 33% of the heaviest unit load.

V. COEFFICIENT OF FRICTION:

Slider Bed	.30
Belt on Roller	.05
Belt Driven Live Roller	.10
Chain Driven Live Roller	.075
Slat Conveyor	.15

Belt Pull Calculation: Summation of items I thru IV multiplied by item V.

$$\text{Belt Pull} = [(1A + II + III + IV) \times V] + 1B$$

VI. EFFECTIVE BELT PULL:

Belt pull from item V multiplied by 1.25 equals effective belt pull.

VII. DRIVE TRAIN EFFICIENCY FACTORS:

- A. Gear Reduction: 100 minus one half of the ratio of each step of reduction.

Example: Single Reduction 30: 1 Reduction
 $100 - 30/2 = 85\%$ efficient.

Double Reduction 800: 1 Reduction
 $100 - 40/2 - 20/2 = 70\%$ efficient.

- B. Chain Reduction: 95% efficient.

Horsepower Calculation: Effective belt pull times speed in feet per minute divided by 33,000 divided by the gear reduction efficiency factor divided by the chain reduction efficiency factor.

$$\text{Horsepower} = \frac{\text{Effective Belt Pull} \times \text{Speed in F.P.M.}}{33,000 \times (\text{VII.A}) \times .95}$$

ROLLER WEIGHT CHART

ROLLER DESCRIPTION			WEIGHT PER BETWEEN FRAME DIMENSION								
Cat. No.	Diameter	Gage	11"	15"	19"	21"	23"	27"	31"	33"	39"
190SR	1.9	16	2.2	2.7	3.3	3.6	3.8	4.4	4.9	5.2	6.1
20SR	2.0	12	3.4	4.5	5.6	6.1	6.6	7.7	8.8	9.4	11.0
199SR	1.9	9	3.4	4.5	5.6	6.1	6.6	7.7	8.8	9.4	11.0
254SR	2.5	14	3.0	3.9	4.8	5.3	5.7	6.6	7.5	8.0	9.3
251SR	2.5	11	5.6	7.1	8.5	8.9	9.3	11.5	12.9	13.6	15.7
267SR	2.63	7	6.7	8.7	10.8	11.8	12.8	14.9	16.9	17.9	21.0
350SR	3.5	.30"	14.9	19.6	24.3	26.7	29.0	33.7	38.4	40.8	47.8