

Conveyor Application Formulas

Today many of these formulas are incorporated in available software that allows for the immediate analysis and generates a complete list of components either for a new conveyor or for problem resolution on existing conveyor systems. The following formulas may be helpful for quick analysis of limited applications. If additional advice is needed please contact Douglas Manufacturing with your specific need or problem.

TO OBTAIN	HAVING	FORMULA
Belt Speed in Feet per Minute	Diameter (D) of Pulley in Inches & Rev. per Min. (RPM)	$S = .2618 \times D \times \text{RPM}$
Shaft Speed in Rev. per Min. (RPM)	Velocity (S) in Ft. per Min. & Diameter (D) of Pulley in Inches	$\text{RPM} = \frac{S}{.2618 \times D}$
Diameter (D) of Pulley in Inches	Velocity (S) in Ft. per Min. & Rev. per Min. (RPM)	$D = \frac{S}{.2618 \times \text{RPM}}$
Torque (T) in Inch Lbs.	Force (W) in Lbs. & Radius (R) in Inches	$T = W \times R$
Horsepower (HP)	Force (W) in Lbs. & Velocity (S) Ft. per Min.	$\text{HP} = \frac{W \times S}{33,000}$
Horsepower (HP)	Torque (T) in Inch Lbs. & Rev. per Min. (RPM)	$\text{HP} = \frac{T \times \text{RPM}}{63,025}$
Torque (T) in-lbs	Horsepower (HP) & Rev. per Min. (RPM)	$T = \frac{63,025 \times \text{HP}}{\text{RPM}}$
Force (W) lbs.	Horsepower (HP) & Velocity (S) Ft. per Min.	$W = \frac{33,000 \times \text{HP}}{S}$
Rev. per Min. (RPM)	Horsepower (HP) & Torque (T) in Inch Lbs.	$\text{RPM} = \frac{63,025 \times \text{HP}}{T}$

Figuring belt length : "Use common inch or foot dimensions"

When pulleys are same diameter "D₁" head, "D₂" tail :

$$\text{Length} = "D" \times 3.1416 + 2 (C_1 - C_2)$$

When pulleys are different size:

$$\text{Length} = \frac{("D_1" \times 3.1416) + ("D_2" \times 3.1416)}{2} + 2 (C_1 - C_2)$$

Bushel Per Hour (BPH) Conversion:

$$\text{___ ft}^3 = \frac{\text{BPH}}{1.25} \quad \text{BPH} = \text{___ ft}^3 \times 1.25$$