BESTORQ®

Formulas

To Find	Formulas	Symbols
For All Formulas:	D - Large Sheave Diameter d - Small Sheave Diameter L - Belt Length T - Torque	RPM - Revolutions per Minute C - Sheave Center Distance Hp - Horsepower S - Belt Speed (Feet Per Minute)
Precise Belt Length	$L = 2C\cos\theta + \frac{\pi(D+d)}{2} + \frac{\pi\theta(D-d)}{180}$	L – Belt Length θ - $\sin^{-1}\left(\frac{D-d}{2C}\right)$ (Degrees, °)
Approximate Belt Length	$L = 2C + 1.57(D+d) + \frac{(D-d)^2}{4C}$	L - Belt Length
Center Distance	$C = \left(b + \sqrt[2]{b^2 - 32(D-d)^2}\right)/16$ $C = A + \sqrt{A^2 - B}$	b = $4L - 6.28(D+d)$ A = $\left(L/4\right) - .3925(D+d)$ B = $(D-d)^2/8$
Span Length	$P = C\left(1 - .125\left[\frac{D-d}{C}\right]^2\right)$	P - Span Length
Arc of Contact (Degrees, Approximate)	$Arc = 180° - \frac{60(D-d)}{C}$	Arc - Contact Angle (Degrees)
Arc of Contact (Radians)	$Arc = \pi - 2\sin^{-1}\left(\frac{D-d}{2C}\right)$	Arc - Contact Angle (Radians)
Power (Hp)	$Hp = \frac{T_e S}{33{,}000}$ $Hp = T\ (in-lb) \times \frac{RPM}{63{,}025}$ $Hp = T\ (ft-lb) \times \frac{RPM}{5{,}252}$ $Hp = Kw \times 1.341$	T_e - Effective Tension (lbs) Kw - Kilowatt
Torque	$T\ (in-lb) = \frac{63{,}025 \times hp}{RPM}$ $T\ (ft-lb) = \frac{5{,}252 \times hp}{RPM}$ $T\ (in-lb) = \frac{T_e \times 2}{d}$	RPM - Revolutions per Minute T_e - Effective Tension (lbs)
Belt Speed	$S = \frac{R \times \pi \times RPM}{6}$ $S = R \times .5236 \times RPM$	R - Pulley Radius (inches)
Effective Tension	$T_e = \frac{2 \times T(in-lb)}{d}$ $T_e = \frac{2 \times T(in-lb)}{d}$ $T_e = T_1 - T_2$	T_e - Effective Tension T_1 - Tight Side Tension T_2 - Slack Side Tension
Tension Ratio	$\frac{T_1}{T_2} = \frac{1}{1-(.8 \times C_q)} = e^{k\Theta}$	T_1 - Tight Side Tension T_2 - Slack Side Tension C_q - Arc of Contact Correction Factor k - V-Belt Design Constant (0.5123) e - Base of Natural Logarithm (2.71828) Θ - Arc of Contact (°)
Tight Side Tension	$T_1 = \frac{41{,}250 \times hp}{C_q \times S}$	T_1 - Tight Side Tension (lbs) C_q - Arc of Contact Correction Factor
Slack Side Tension	$T_1 = \frac{33{,}000 \times (1.25 - C_q) \times hp}{C_q \times S}$	T_2 - Slack Side Tension (lbs) C_q - Arc of Contact Correction Factor
Belt Flex Frequency	$f_B = \frac{10^3 \times S \times k}{L}$	f_b - Belt Flex Frequency k - Number of Pulleys