Application Formulas

Belt Length		
To determine the belt length to use for a drive when the center distance and wheel diameters are known:	C = Center Distance D = Large Wheel Diameter d = Small Wheel Diameter	Belt Length = $2C + 1.57(D + d) + \frac{(D - d)^2}{4C}$
Belt Speed		
		FPM = Diameter (Inches) x RPM x .262
Center Distance		
To determine the actual center distance (C) on which a given drive will operate:	L = Belt Length D = Large Wheel Diameter d = Small Wheel Diameter	A = L – 1.57 (D + d)

Factor h – from the following chart

D - d A	h	D - d A	h	D - d A	h	D - d A	h
0.00	0.00	0.16	0.08	0.30	0.16	0.43	0.24
0.02	0.01	0.18	0.09	0.32	0.17	0.44	0.25
0.04	0.02	0.20	0.10	.034	0.18	0.46	0.26
0.06	0.03	0.21	0.11	.035	0.19	0.47	0.27
0.08	0.04	0.23	0.12	0.37	0.20	0.48	0.28
0.10	0.05	0.25	0.13	0.39	0.21	0.50	0.29
0.12	0.06	0.27	0.14	0.40	0.22	0.51	0.29
0.14	0.07	0.29	0.15	0.41	0.23		

		$C = \frac{[A - h(D - d)]}{2}$
Force (W) Lbs.		
	Horsepower (HP) and Velocity (V) Feet Per Minute	$W = \frac{33{,}000 \times HP}{V}$
Horsepower		
Horsepower (HP) is the rate of doing work. One HP is equal to raising 33,000 lbs. one foot in one min.	Force (W) lbs and Velocity (V) Feet per Minute	$HP = \frac{W \times V}{33{,}000}$
	Torque (T) lb-in and Revolutions Per Minute (RPM)	$HP = \frac{T \times RPM}{63{,}025}$
	Torque (T) lb-ft and Revolutions Per Minute (RPM)	$HP = \frac{T \times RPM}{5{,}252}$
Kilowatts to HP		
		HP = Kilowatts x 1.341
Pitch Diameter (D) of Gear or Sprocket		
	Velocity (V) Feet Per Minute and Revolutions Per Minute (RPM)	$D = \frac{V}{.2618 \times RPM}$
Revolutions Per Minute		
	Velocity (V) Feet Per Minute and Pitch Diameter (D) or Gear or Sprocket – Inches	$RPM = \frac{FPM}{.262 \times D}$
	Horsepower (HP) and Torque (T) lb-in	$RPM = \frac{63{,}025 \times HP}{T}$
Torque		
	Torque (T) is a turning movement or twisting effort.	$T\ (lb\text{-}in) = \frac{63{,}025 \times HP}{RPM}$
		$T\ (lb\text{-}ft) = \frac{5{,}252 \times HP}{RPM}$
	Horsepower (HP) and Revolutions Per Minute (RPM) T (lb-in) = Force (lb) x Lever Arm (in) T (lb-ft) = Force (lb) x Lever Arm (ft) T (lb-ft) = Nm x .7376	
Velocity (V) Feet Per Minute		
	Pitch Diameter (D) of Gear or Sprocket – Inches and Revolutions Per Minute (RPM)	V = .2618 x D x RPM