1. FORMULAE

Tentative belt length

1.57 (D + d) + (tentative centre distance x 2)

where: D = diameter of large pulley
d = diameter of small pulley

Pitch length

$$L_p = 2C + 1.57\,(D + d) + \frac{(D - d)^2}{4C}$$

where: L_p = belt length
D = diameter of large pulley
d = diameter of small pulley
C = centre distance

or

$$L_p = 2C \cos Ø + \frac{\pi\,(D + d)}{2} + \frac{\pi\,Ø\,(D - d)}{180}$$

where: L_p = pitch length of belt
C = centre distance
D = pitch diameter of large pulley
d = pitch diameter of small pulley
$Ø = \sin^{-1}\frac{(D - d)}{2C}$ distance

Approximate centre distance

$$C = \frac{K + \sqrt{K^2 - 32(D - d)^2}}{16}$$

where: $K = 4L_p - 6.28\,(D + d)$

Teeth in mesh (T.I.M.)

$$\left[0.5 - \left(\frac{D - d}{6C}\right)\right] Ng$$

where: D = pitch circle diameter of large pulley (mm)
d = pitch circle diameter of small pulley (mm)
C = centre distance between shafts (mm)
Ng = number of grooves in small pulley

Static tension

$$T_{st} = 425\frac{P}{v} + mv^2$$

where T_{st} = static tension (N)
P = power (kW)
v = belt speed (m/s)
m = belt unit mass per meter length (kg/m); value in table 4

Min. deflection force

$$\text{Min.} = \frac{T_{st} + \left(\frac{S}{L}\right) Y}{25}, \text{(N)}$$

where: T_{st} = static tension (N)
S = span length (mm)
L = belt pitch length (mm)
Y = constant from table 4

Pitch diameter

$$\text{Pitch diameter} = \frac{\text{N° of grooves x pitch}}{\pi}$$

Outside diameter

Outside diameter = Pitch diameter - (2 x PLD)

2. UNITS OF MEASUREMENT

kW	=	kilowatts
Nm	=	newton metre
N	=	newton
J	=	joule
s	=	second
mm	=	millimetre
m/s	=	metre/second
kg	=	kilogramme
g/m	=	gramme/metre

3. ABBREVIATION TABLE

D	=	diameter of large pulley
d	=	diameter of small pulley
L_p	=	pitch length
C	=	centre distance
T.I.M.	=	teeth in mesh
Ng	=	number of grooves in small pulley
T_{st}	=	static tension (N)
P	=	power (kW)
PLD	=	Pitch Line Differential
v	=	belt speed (m/s)
S	=	span length (mm)
L	=	belt length (mm)

4. CONVERSION TABLE

1 lbf	=	0.454 kgf
1 lbf	=	4.448 N
1 kgf	=	9.807 N
1 lbf in	=	0.113 Nm
1 ft	=	0.3048 m
1 in	=	25.4 mm
1 ft^2	=	0.093 m^2
1 in^2	=	645.16 mm^2
1 ft^3	=	0.028 m^3
1 in^3	=	16.387 mm^3
1 oz	=	28.35 g
1 lb	=	0.454 kg
1 lmp. ton	=	1.016 tonne
1 lmp. gal	=	4.546 litres
1 lmp. pint	=	0.568 litre
1 radian	=	57.296 degrees
1 degree	=	0.0175 radian
1 horsepower	=	0.746 kW