Important Belt Drive Formulas PDF



Formulas Examples with Units



Evaluate Formula 🦳

Evaluate Formula

1) Angle Made by Belt with Vertical Axis for Cross Belt Drive Formula



2) Angle Made by Belt with Vertical Axis for Open Belt Drive Formula

Formula	Example with Units
r ₁ - r ₂	$0.1309 \text{ md} = \frac{10 \text{ m} - 6 \text{ m}}{10 \text{ m}}$
$\alpha = \frac{1}{x}$	$30.55 \mathrm{m}$







12) Maximum Tension for Transmission of Maximum Power by Belt F	ormula 🕝
Formula $P_m = 3 \cdot T_c$ 12) Maximum Tonsion of Bolt Formula	Evaluate Formula 순
	Evaluate Formula
$P_{\rm m} = \sigma \cdot b \cdot t \qquad 750.036 \text{N} = 8.929 \text{N/mm}^2 \cdot 0.028 \text{m} \cdot 0.003 \text{m}$	
14) Normal Reaction between Belt and Sides of Groove Formul	a 🗗
FormulaExample with Units $R_n = \frac{R}{2 \cdot \sin\left(\frac{\beta}{2}\right)}$ $29.1737_N = \frac{15_N}{2 \cdot \sin\left(\frac{0.52_{rad}}{2}\right)}$	Evaluate Formula 付
15) Power Transmitted by Belt Formula 🕝	
FormulaExample with Units $P = (T_1 - T_2) \cdot v$ $0.038 kw = (22 N - 11 N) \cdot 3.450328 m/s$	Evaluate Formula 🕝
16) Relation between Pitch and Pitch Circle Diameter of Chain Drive F	Formula (7
Formula $d_{p} = P_{c} \cdot \csce\left(\frac{180 \cdot \frac{\pi}{180}}{t_{s}}\right)$ $0.4783 \text{ m} = 0.05 \text{ m} \cdot \csce\left(\frac{180 \cdot \frac{3.1416}{180}}{30}\right)$	
17) Torque Exerted on Driven Pulley Formula 🗂	
FormulaExample with Units $\tau = (T_1 - T_2) \cdot \frac{d_f}{2}$ $0.077 N^*m = (22N - 11N) \cdot \frac{0.014m}{2}$	Evaluate Formula 🕑
18) Torque Exerted on Driving Pulley Formula 👉	
FormulaExample with Units $\tau = (T_1 - T_2) \cdot \frac{d_d}{2}$ $0.077_{N^*m} = (22_N - 11_N) \cdot \frac{0.0140_m}{2}$	Evaluate Formula 👉
19) Total Percentage Slip in Belt Formula 闭	
FormulaExample $s = s_1 + s_2$ $0.7 = 0.5 + 0.2$	Evaluate Formula 🕝

20) Velocity for Transmission of Maximum Power by Belt Formula

Formula	Example with Units
$\mathbf{v} = \sqrt{\frac{\mathbf{P}_{m}}{3 \cdot m}}$	$3.4503 \text{m/s} = \sqrt{\frac{750 \text{N}}{3 \cdot 21 \text{kg}}}$

Variables used in list of Belt Drive Formulas above

- b Belt Width (Meter)
- d1 Diameter of Driver Pulley (Meter)
- d₂ Diameter of Follower Pulley (Meter)
- d_d Diameter of Driver (Meter)
- **d**f Diameter of Follower (Meter)
- d_p Pitch Circle Diameter of Gear (Meter)
- F_f Force of Friction (Newton)
- Length Measurement Belt Drive (Meter)
- L'b Total Length of Belt (Meter)
- L_f Length of Belt Over Follower (Meter)
- Lo Length of Belt Over Driver (Meter)
- **m** Mass of Belt Per Unit Length (Kilogram)
- N_d Speed of Driver (Revolution per Minute)
- N_f Speed of Follower (Revolution per Minute)
- P Power Transmitted (Kilowatt)
- P_c Pitch of Chain Drive (Meter)
- Pm Maximum Tension of Belt (Newton)
- **R** Total Reaction in Plane of Groove (Newton)
- r₁ Radius of Larger Pulley (Meter)
- r2 Radius of Smaller Pulley (Meter)
- R_n Normal Reaction Between Belt And Sides of Groove (Newton)
- S Total Percentage of Slip
- S1 Slip Between Driver And Belt
- S2 Slip Between Belt And Follower
- t Belt Thickness (Meter)
- T₁ Tension in Tight Side of Belt (Newton)
- T₂ Tension in Slack Side of Belt (Newton)
- T_c Centrifugal Tension of Belt (Newton)
- To Initial Tension of Belt (Newton)
- t_s Number of Teeth on Sprocket
- V Velocity of Belt (Meter per Second)

Constants, Functions, Measurements used in list of Belt Drive Formulas above

- constant(s): pi,
 3.14159265358979323846264338327950288
 Archimedes' constant
- Functions: cosec, cosec(Angle) The cosecant function is a trigonometric function that is the reciprocal of the sine function.
- Functions: sec, sec(Angle) Secant is a trigonometric function that is defined ratio of the hypotenuse to the shorter side adjacent to an acute angle (in a right-angled triangle); the reciprocal of a cosine.
- Functions: sin, sin(Angle) Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Functions: sqrt, sqrt(Number) A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: Length in Meter (m) Length Unit Conversion
- Measurement: Weight in Kilogram (kg) Weight Unit Conversion
- Measurement: Pressure in Newton per Square Millimeter (N/mm²) Pressure Unit Conversion
- Measurement: Speed in Meter per Second (m/s) Speed Unit Conversion
- Measurement: Power in Kilowatt (kW)
 Power Unit Conversion
- Measurement: Force in Newton (N) Force Unit Conversion
- Measurement: Angle in Radian (rad) Angle Unit Conversion
- Measurement: Frequency in Revolution per Minute (rev/min) Frequency Unit Conversion
- Measurement: Torque in Newton Meter (N*m) Torque Unit Conversion

- X Distance Between Centers of Two Pulleys (Meter)
- α Angle Made By Belt With Vertical Axis (Radian)
- β Angle of Groove (Radian)
- θ_c Angle of Contact (Radian)
- µb Coefficient of Friction b/w Belt & Sides of Groove
- σ Maximum Safe Stress (Newton per Square Millimeter)
- T Torque Exerted on Pulley (Newton Meter)



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- 🔀 Percentage of number 🕝
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Simple fraction

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