



Velocity Ratio Formulas

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List of 10 Velocity Ratio Formulas

Velocity Ratio

1) Peripheral Velocity of Driving Pulley

fx
$$V = \pi \cdot d_d \cdot N_d$$

2) Peripheral Velocity of Follower Pulley

fx
$$V = \pi \cdot d_{
m f} \cdot N_{
m f}$$

$$4.300003 \, \mathrm{m/s} = \pi \cdot 0.014 \, \mathrm{m} \cdot 5866 \, \mathrm{rev/min}$$

3) Velocity Ratio

$$\mathbf{f}$$
 $\mathbf{i} = rac{T_{
m d}}{T_{
m dr}}$

$$\boxed{0.78 = \frac{15.6}{20} }$$

4) Velocity Ratio of Belt Drive

$$i=rac{N_{
m f}}{N_{
m d}}$$

$$0.785695 = rac{5866 {
m rev/min}}{7466 {
m rev/min}}$$





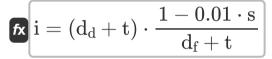
5) Velocity Ratio of Belt given Creep of Belt

 \mathbf{f} \mathbf{z} \mathbf{z}

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 $\boxed{ \text{ex} } 0.785761 = \frac{0.011 \text{m} \cdot \left(10000 \text{N/m}^2 + \sqrt{8 \text{N/m}^2}\right)}{0.014 \text{m} \cdot \left(10000 \text{N/m}^2 + \sqrt{5 \text{N/m}^2}\right)}$

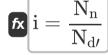
6) Velocity Ratio of Belt given Total Percentage Slip



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 $oxed{ex} 0.783935 = (0.011 \mathrm{m} + 9 \mathrm{E^-5m}) \cdot rac{1 - 0.01 \cdot 0.4}{0.014 \mathrm{m} + 9 \mathrm{E^-5m}}$

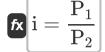
7) Velocity Ratio of Compound Belt Drive



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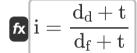
8) Velocity Ratio of Compound Belt Drive given Product of Diameter of Driven



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 $\boxed{ 0.78 = \frac{46.8}{60} }$

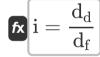
9) Velocity Ratio of Simple Belt Drive when Thickness Considered



Open Calculator

ex $0.787083 = \frac{0.011 \text{m} + 9\text{E}^-5\text{m}}{0.014 \text{m} + 9\text{E}^-5\text{m}}$

10) Velocity Ratio of Simple Belt Drive when Thickness Not Considered



Open Calculator

$$\boxed{\textbf{ex}} 0.785714 = \frac{0.011 \text{m}}{0.014 \text{m}}$$



Variables Used

- d_d Diameter of Driver (Meter)
- d_f Diameter of Follower (Meter)
- E Young's Modulus of Belt (Newton per Square Meter)
- i Velocity Ratio
- N_d Speed of Driver (Revolution per Minute)
- N_{d'} Speed of First Driver (Revolution per Minute)
- N_f Speed of Follower (Revolution per Minute)
- **N**_n Speed of Last Driven Pulley (Revolution per Minute)
- P₁ Product of Diameters of Drivers
- P₂ Product of Diameters of Drivens
- S Total Percentage of Slip
- **t** Belt Thickness (Meter)
- T_d Number of Teeth on Driven
- T_{dr} Number of Teeth on Driver
- **V** Peripheral Velocity of Pulley (Meter per Second)
- σ₁ Stress in Tight Side of Belt (Newton per Square Meter)
- σ₂ Stress in Slack Side of Belt (Newton per Square Meter)





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288
 Archimedes' constant
- Function: 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: Pressure in Newton per Square Meter (N/m²)
 Pressure Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Frequency in Revolution per Minute (rev/min)
 Frequency Unit Conversion





Check other formula lists

- Belt Drive Formulas
- Velocity Ratio Formulas

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