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Taylor's Theory Formulas

Calculators! Examples! Conversions!

List of 10 Taylor's Theory Formulas

Taylor's Theory

1) Depth of Cut for given Taylor's Tool Life, Cutting Velocity and Intercept

Open Calculator

fx $$d = \left(\frac{C}{V \cdot f^{a} \cdot L^{y}}\right)^{\frac{1}{b}}$$

ex $$0.015931\text{m} = \left(\frac{85.13059}{0.8333330\text{m/s} \cdot (0.70\text{mm/rev})^{0.2} \cdot (1.18\text{h})^{0.8466244}}\right)^{\frac{1}{0.24}}$$

2) Feed given Taylor's Tool Life, Cutting Velocity, and Intercept

Open Calculator

fx $$f = \left(\frac{C}{V \cdot (d^{b}) \cdot (L^{y})}\right)^{\frac{1}{a}}$$

ex $$0.89342\text{mm/rev} = \left(\frac{85.13059}{0.8333330\text{m/s} \cdot \left((0.013\text{m})^{0.24}\right) \cdot \left((1.18\text{h})^{0.8466244}\right)}\right)^{\frac{1}{0.2}}$$

3) Taylor's Exponent if Ratios of Cutting Velocities, Tool Lives are given in Two Machining Conditions

Open Calculator

fx $$y = (-1) \cdot \frac{\ln(R_{v})}{\ln(R_{l})}$$

ex $$0.840621 = (-1) \cdot \frac{\ln(48.00001)}{\ln(0.01)}$$

4) Taylor's Exponent of Depth of Cut

Open Calculator

fx $$b = \frac{\ln\left(\frac{C}{V \cdot (f^{a}) \cdot (L_{max}^{y})}\right)}{\ln(d)}$$

ex $$0.239999 = \frac{\ln\left(\frac{85.13059}{0.8333330\text{m/s} \cdot \left((0.70\text{mm/rev})^{0.2}\right) \cdot \left((4500\text{s})^{0.8466244}\right)}\right)}{\ln(0.013\text{m})}$$

5) Taylor's Exponent of Feed

Open Calculator

fx $$a = \frac{\ln\left(\frac{C}{V \cdot d^{b} \cdot L_{max}^{y}}\right)}{\ln(f)}$$

ex $$0.199999 = \frac{\ln\left(\frac{85.13059}{0.8333330\text{m/s} \cdot (0.013\text{m})^{0.24} \cdot (4500\text{s})^{0.8466244}}\right)}{\ln(0.70\text{mm/rev})}$$

6) Taylor's Intercept given Cutting Velocity and Tool Life

Open Calculator

fx $$C = V \cdot (L^{y}) \cdot (f^{a}) \cdot (d^{b})$$

ex $$81.07634 = 0.8333330\text{m/s} \cdot \left((1.18\text{h})^{0.8466244}\right) \cdot \left((0.70\text{mm/rev})^{0.2}\right) \cdot \left((0.013\text{m})^{0.24}\right)$$

7) Taylor's Tool Life Exponent given Cutting Velocity and Tool Life

Open Calculator

fx $$n'_{cut} = \frac{\ln\left(\frac{C}{V}\right)}{L}$$

ex $$0.001089 = \frac{\ln\left(\frac{85.13059}{0.8333330\text{m/s}}\right)}{1.18\text{h}}$$

8) Taylor's Tool Life Exponent using Cutting Velocity and Taylor's Tool Life

Open Calculator

$$y = \frac{\ln\left(\frac{C}{V \cdot (f^{a}) \cdot (d^{b})}\right)}{\ln(L)}$$

$$0.852465 = \frac{\ln\left(\frac{85.13059}{0.8333330\text{m/s} \cdot \left((0.70\text{mm/rev})^{0.2}\right) \cdot \left((0.013\text{m})^{0.24}\right)}\right)}{\ln(1.18\text{h})}$$

9) Taylor's Tool Life given Cutting Velocity and Intercept

Open Calculator

$$T_{tl} = \left(\frac{C}{V}\right)^{\frac{1}{y}}$$

$$236.1938\text{s} = \left(\frac{85.13059}{0.8333330\text{m/s}}\right)^{\frac{1}{0.8466244}}$$

10) Taylor's Tool Life given Cutting Velocity and Taylor's Intercept

Open Calculator

$$L = \left(\frac{C}{V \cdot (f^{a}) \cdot (d^{b})}\right)^{\frac{1}{y}}$$

$$1.250007\text{h} = \left(\frac{85.13059}{0.8333330\text{m/s} \cdot \left((0.70\text{mm/rev})^{0.2}\right) \cdot \left((0.013\text{m})^{0.24}\right)}\right)^{\frac{1}{0.8466244}}$$

Variables Used

- **a** Taylor's Exponent for Feed Rate in Taylors Theory
- **b** Taylor's Exponent for Depth of Cut
- **C** Taylor's Constant
- **d** Depth of Cut *(Meter)*
- **f** Feed Rate *(Millimeter Per Revolution)*
- **L** Tool Life in Taylors Theory *(Hour)*
- L_{max} Maximum Tool Life *(Second)*
- n'_{cut} Taylor's Tool Life Exponent in Taylors Theory
- R_l Ratio of Tool Lives
- R_v Ratio of Cutting Velocities
- T_{tl} Taylor's Tool Life *(Second)*
- **V** Cutting Velocity *(Meter per Second)*
- **y** Taylor Tool Life Exponent

Constants, Functions, Measurements used

- Function: **ln**, ln(Number)
  The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Hour (h), Second (s)
  Time Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Feed** in Millimeter Per Revolution (mm/rev)
  Feed Unit Conversion

Check other formula lists

- **Taylor's Theory Formulas**

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