Important Taylor's Theory Formulas PDF

Formulas
Examples
with Units

List of 10
Important Taylor's Theory Formulas

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

Evaluate Formula

Formula

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

Example with Units

$$0.0159\,\text{m} = \left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot 0.70\,\text{mm/rev}^{0.2} \cdot 1.18\,\text{h}^{0.8466244}} \right)^{\frac{1}{0.24}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$0.8934\,\text{mm/rev} = \left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot \left(0.013\,\text{m}^{0.24} \right) \cdot \left(1.18\,\text{h}^{0.8466244} \right)} \right)^{\frac{1}{0.2}}$$

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

Evaluate Formula

Formula

$$y = (-1) \cdot \frac{\ln\left(R_v \right)}{\ln\left(R_l \right)}$$

Example

$$0.8406 = (-1) \cdot \frac{\ln(48.00001)}{\ln(0.01)}$$

4) Taylor's Exponent of Depth of Cut Formula

Evaluate Formula

Formula

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

Example with Units

$$0.24 = \frac{\ln\left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot \left(0.70\,\text{mm/rev}^{0.2}\right) \cdot \left(4500\,\text{s}^{0.8466244}\right)}\right)}{\ln\left(0.013\,\text{m}\right)}$$

5) Taylor's Exponent of Feed Formula

Evaluate Formula

Formula

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

Example with Units

$$0.2 = \frac{\ln\left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot 0.013\,\text{m}^{0.24} \cdot 4500\,\text{s}^{0.8466244}}\right)}{\ln\left(0.70\,\text{mm/rev}\right)}$$

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

Evaluate Formula

Formula

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

Example with Units

$$81.0763 = 0.8333330\,\text{m/s} \cdot \left(1.18\,\text{h}^{0.8466244}\right) \cdot \left(0.70\,\text{mm/rev}^{0.2}\right) \cdot \left(0.013\,\text{m}^{0.24}\right)$$

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

Evaluate Formula

Formula

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

Example with Units

$$0.0011 = \frac{\ln\left(\frac{85.13059}{0.8333330\,\text{m/s}}\right)}{1.18\,\text{h}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$0.8525 = \frac{\ln\left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot \left(0.70\,\text{mm/rev}^{0.2}\right) \cdot \left(0.013\,\text{m}^{0.24}\right)}\right)}{\ln\left(1.18\,\text{h}\right)}$$

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

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate Formula

Formula

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

Example with Units

$$1.25\,\text{h} = \left(\frac{85.13059}{0.8333330\,\text{m/s} \cdot \left(0.70\,\text{mm/rev}^{0.2} \right) \cdot \left(0.013\,\text{m}^{0.24} \right)} \right)^{\frac{1}{0.8466244}}$$

Variables used in list of Taylor's Theory Formulas above

- **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 in list of Taylor's Theory Formulas above

- Functions: **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

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