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Taylor's Theory Formulas

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List of 10 Taylor's Theory Formulas

Taylor's Theory

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

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

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

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


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

$$fx \quad y = (-1) \cdot \frac{\ln(R_v)}{\ln(R_l)}$$

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)


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



4) Taylor's Exponent of Depth of Cut [Open Calculator !\[\]\(4729e517bc6a7cd81c8025b9646574fb_img.jpg\)](#)

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

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

5) Taylor's Exponent of Feed [Open Calculator !\[\]\(e474458956c9a37fbf9586ddb60a7fa1_img.jpg\)](#)


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

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

6) Taylor's Intercept given Cutting Velocity and Tool Life [Open Calculator !\[\]\(4fe57c3593bf1b21d272ae7ac8dfaf77_img.jpg\)](#)

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

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

7) Taylor's Tool Life Exponent given Cutting Velocity and Tool Life [Open Calculator !\[\]\(2bae76de5ebbd5c4d7d47162f1673734_img.jpg\)](#)

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

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



8) Taylor's Tool Life Exponent using Cutting Velocity and Taylor's Tool Life [Open Calculator](#) 


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

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

9) Taylor's Tool Life given Cutting Velocity and Intercept [Open Calculator](#) 

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

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

10) Taylor's Tool Life given Cutting Velocity and Taylor's Intercept [Open Calculator](#) 

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

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







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*)
- **nⁱ_{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**, $\ln(\text{Number})$
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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