calculatoratoz.com

unitsconverters.com

Geometry of Turning Process Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 10 Geometry of Turning Process Formulas

Geometry of Turning Process

1) Back Rake Angle for Orthogonal Cutting

Open Calculator

fx $\alpha_b = a\tan(\tan(\alpha_s)\cdot\tan(\Psi_s))$

ex $33.34737^\circ = a\tan(\tan(10^\circ)\cdot\tan(75^\circ))$

2) Cutting Speed

Open Calculator

fx $V_{cutting} = \pi\cdot d\cdot N$

ex $0.032463\text{m/s} = \pi\cdot 31\text{mm}\cdot 20\text{r/ min}$

3) Feed Force

Open Calculator

fx $F_f = P_{axial}\cdot\cos(\Psi_s)$

ex $388.2286\text{N} = 1500\text{N}\cdot\cos(75^\circ)$

4) Initial Diameter of Job in Turning

Open Calculator

fx $d = \frac{V_{cutting}}{\pi\cdot N}$

ex $63693.81\text{mm} = \frac{66.7\text{m/s}}{\pi\cdot 20\text{r/ min}}$

5) Machine Feed

Open Calculator

$$f = \frac{t_1}{\cos(\Psi_s)}$$

$$4.636444\text{mm/1} = \frac{1.20\text{mm}}{\cos(75^\circ)}$$

6) Number of Jobs Revolution per Unit Time

Open Calculator

$$N = \frac{V_{cutting}}{\pi \cdot d}$$

$$41092.78\text{r/ min} = \frac{66.7\text{m/s}}{\pi \cdot 31\text{mm}}$$

7) Radial Force

Open Calculator

$$F_B = P_{axial} \cdot \sin(\Psi_s)$$

$$1448.889\text{N} = 1500\text{N} \cdot \sin(75^\circ)$$

8) Side Cutting Edge Angle for Orthogonal Cutting

Open Calculator

$$\Psi_s = a\cos\left(\frac{d_{cut}}{\omega}\right)$$

$$89.62757^\circ = a\cos\left(\frac{13\text{mm}}{2\text{rad/s}}\right)$$

9) Side Rake Angle for Orthogonal Cutting

Open Calculator

$$\alpha_s = a\tan\left(\frac{\tan(\alpha_b)\cdot\cos(\Psi_s)}{\sin(\Psi_s)}\right)$$

$$33.55224^\circ = a\tan\left(\frac{\tan(68^\circ)\cdot\cos(75^\circ)}{\sin(75^\circ)}\right)$$

10) Uncut Chip Thickness

Open Calculator

$$t_1 = F_{cutter}\cdot\cos(\Psi_s)$$

$$3.105829\text{mm} = 12\text{mm}\cdot\cos(75^\circ)$$

Variables Used

- **d** Diameter of Rod *(Millimeter)*
- **d_{cut}** Depth of Cut *(Millimeter)*
- **f** Feed Rate *(Millimeter Per Revolution)*
- **F_B** Corresponding Radial Force Required at Each Ball *(Newton)*
- **F_{cutter}** Feed *(Millimeter)*
- **F_f** Feed Force *(Newton)*
- **N** Number of Jobs Revolutions *(Revolution per Minute)*
- **P_{axial}** Axial Thrust *(Newton)*
- **t_1** Uncut Chip Thickness *(Millimeter)*
- **$V_{cutting}$** Cutting Speed *(Meter per Second)*
- **α_b** Back Rake Angle *(Degree)*
- **α_s** Side Rake Angle *(Degree)*
- **Ψ_s** Side Cutting Edge Angle *(Degree)*
- **ω** Angular Velocity *(Radian per Second)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **acos**, acos(Number)
  Inverse trigonometric cosine function
- Function: **atan**, atan(Number)
  Inverse trigonometric tangent function
- Function: **cos**, cos(Angle)
  Trigonometric cosine function
- Function: **sin**, sin(Angle)
  Trigonometric sine function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Frequency** in Revolution per Minute (r/min)
  Frequency Unit Conversion
- Measurement: **Angular Velocity** in Radian per Second (rad/s)
  Angular Velocity Unit Conversion
- Measurement: **Feed** in Millimeter Per Revolution (mm/1)
  Feed Unit Conversion

Check other formula lists

- **Geometry of Turning Process Formulas**
- **Merchant Force Circle (Mechanics of Orthogonal metal cutting) Formulas**
- **Metal Cutting and Tools Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

5/17/2023 | 7:19:28 AM UTC

Please leave your feedback here...