Turning (Cutting Time)

Cutting Time (External Turning Case 1: 1 Pass machining)

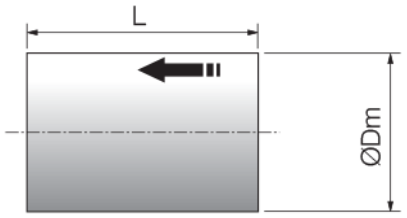
- At Constant Revoluation

$$T = \frac{60 \times L}{f \times n}$$

- At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times Dm}{1000 \times f \times Vc}$$

T : Cutting Time [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
Dm : Workpiece Diameter [mm]
Vc : Cutting Speed [m/min]



Cutting Time (External Turning Case 2: Multi-Pass machining)

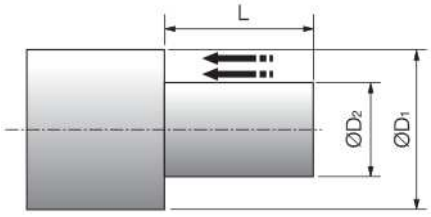
- At Constant Revoluation

$$T = \frac{60 \times L}{f \times n} \times N$$

- At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times (D_1 + D_2)}{2 \times 1000 \times f \times Vc} \times N$$

T : Cutting Time [second]
L : Cutting Length [mm]
ap : Depth Of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_2 : Min. Diameter of Workpiece [mm]
Vc : Cutting Speed [m/min]
N : Number of Passes = $(D_1 - D_2)/ap/2$ (if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Facing)

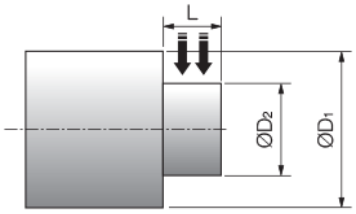
- At Constant Revoluation

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n} \times N$$

- At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2 \times D_1 - D_2)}{4000 \times f \times Vc} \times N$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
ap : Depth Of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_2 : Min. Diameter of Workpiece [mm]
Vc : Cutting Speed [m/min]
N : Number of Passes = $(D_1 - D_2)/ap/2$ (if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Grooving)

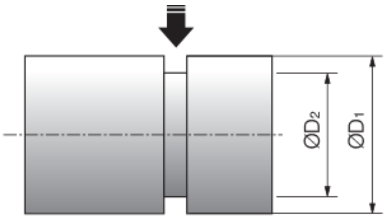
- At Constant Revoluation

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n} \times N$$

- At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4000 \times f \times Vc} \times N$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_2 : Min. Diameter of Workpiece [mm]
Vc : Cutting Speed [m/min]



Cutting Time (Cut-Off)

- At Constant Revoluation

$$T = \frac{60 \times D_1}{2 \times f \times n}$$

- At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_3) \times (D_1 - D_3)}{4000 \times f \times Vc}$$

$$T_3 = T_1 + \frac{60 \times D_3}{2 \times f \times N_{max}}$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
T_3 : Machining Time when reaching Max. Spindle Revolution [second]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
n_{max} : Max. Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_3 : Diameter when reaching Max. Spindle Revolution [mm]
Vc : Cutting Speed [m/min]