



calculatoratoz.com



unitsconverters.com

Turning Radius 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 19 Turning Radius Formulas

Turning Radius

1) Deceleration given Sight Distance

$$\text{fx } d = \frac{V_{\text{Turning Speed}}^2}{25.5 \cdot \text{SD}}$$

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

$$\text{ex } 32.67974\text{m}^2/\text{s} = \frac{(50\text{km}/\text{h})^2}{25.5 \cdot 3\text{m}}$$

2) Deflection Angle of Entrance Curve

$$\text{fx } D_1 = \frac{180 \cdot L_1}{\pi \cdot R_{\text{Taxiway}}}$$

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

$$\text{ex } 21.72915\text{rad} = \frac{180 \cdot 20.1\text{m}}{\pi \cdot 53\text{m}}$$

3) Deflection Angle of Entrance Curve given Deflection of Angle at Central Curve

$$\text{fx } D_1 = 35 - D_2$$

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

$$\text{ex } 21\text{rad} = 35 - 14\text{rad}$$



4) Deflection of Angle at Central Curve

$$fx \quad D_2 = 35 - D_1$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 14rad = 35 - 21rad$$

5) Deflection of Angle at Central Curve when Length of Central Curve is considered

$$fx \quad D_2 = \frac{180 \cdot L^2}{\pi \cdot R^2}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 14.09926rad = \frac{180 \cdot 25.1m}{\pi \cdot 102m}$$

6) Distance between Midway Points of Main Gears and Edge of Taxiway Pavements

 fx
[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$D_{Midway} = (0.5 \cdot T_{Width}) - \left(0.388 \cdot \frac{W^2}{R_{Taxiway}} \right)$$

$$ex \quad 17.78968m = (0.5 \cdot 45.1m) - \left(0.388 \cdot \frac{(25.5m)^2}{53m} \right)$$



7) Horonjeff Equation for Turning Radius of Taxiway

$$\text{fx } R_{\text{Taxiway}} = \frac{0.388 \cdot W^2}{(0.5 \cdot T_{\text{Width}}) - D_{\text{Midway}}}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$\text{ex } 52.89245\text{m} = \frac{0.388 \cdot (25.5\text{m})^2}{(0.5 \cdot 45.1\text{m}) - 17.78\text{m}}$$

8) Length of Central Curve

$$\text{fx } L_2 = \frac{\pi \cdot R_2 \cdot D_2}{180}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$\text{ex } 24.9233\text{m} = \frac{\pi \cdot 102\text{m} \cdot 14\text{rad}}{180}$$

9) Length of Entrance Curve when Deflection Angle of Entrance Curve is considered

$$\text{fx } L_1 = \frac{\pi \cdot D_1 \cdot R_{\text{Taxiway}}}{180}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$\text{ex } 19.42551\text{m} = \frac{\pi \cdot 21\text{rad} \cdot 53\text{m}}{180}$$

10) Radius of Central Curve given Length of Central Curve

$$\text{fx } R_2 = \frac{180 \cdot L_2}{\pi \cdot D_2}$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$\text{ex } 102.7231\text{m} = \frac{180 \cdot 25.1\text{m}}{\pi \cdot 14\text{rad}}$$



11) Radius of Curve when Velocity in Turn

[Open Calculator !\[\]\(bd1a142de767a21e5362c595f844a4ff_img.jpg\)](#)

$$fx \quad R_{\text{Taxiway}} = \left(\frac{V_{\text{Turning Speed}}}{4.1120} \right)^2$$

$$ex \quad 147.8542\text{m} = \left(\frac{50\text{km/h}}{4.1120} \right)^2$$

12) Radius of Entrance Curve when Deflection Angle of Entrance Curve is considered

[Open Calculator !\[\]\(830769b31eeeaca920791081939ff8ba_img.jpg\)](#)

$$fx \quad R_{\text{Taxiway}} = \frac{180 \cdot L_1}{\pi \cdot D_1}$$

$$ex \quad 54.84025\text{m} = \frac{180 \cdot 20.1\text{m}}{\pi \cdot 21\text{rad}}$$

13) Sight Distance

[Open Calculator !\[\]\(47734e4656765d20df4fdbd5b7aff048_img.jpg\)](#)

$$fx \quad SD = \frac{V_{\text{Turning Speed}}^2}{25.5 \cdot d}$$

$$ex \quad 3.007338\text{m} = \frac{(50\text{km/h})^2}{25.5 \cdot 32.6\text{m}^2/\text{s}}$$



14) Taxiway Width given Turning Radius [Open Calculator !\[\]\(eafc244b53721dd1ec133f0772f70fc7_img.jpg\)](#)

$$\text{fx } T_{\text{Width}} = \frac{\left(\frac{0.388 \cdot W^2}{R_{\text{Taxiway}}} \right) + D_{\text{Midway}}}{0.5}$$

$$\text{ex } 45.08064\text{m} = \frac{\left(\frac{0.388 \cdot (25.5\text{m})^2}{53\text{m}} \right) + 17.78\text{m}}{0.5}$$

15) Turning Radius [Open Calculator !\[\]\(10f8862fc183b400327470ea85afe9ae_img.jpg\)](#)

$$\text{fx } R_{\text{Taxiway}} = \frac{V_{\text{Turning Speed}}^2}{125 \cdot \mu_{\text{Friction}}}$$

$$\text{ex } 7.716049\text{m} = \frac{(50\text{km/h})^2}{125 \cdot 0.2}$$

16) Turning Speed of Aircraft given Radius of Curve [Open Calculator !\[\]\(35dc653d59570f8f891c312eeece91a2_img.jpg\)](#)

$$\text{fx } V_{\text{Turning Speed}} = \sqrt{R_{\text{Taxiway}} \cdot \mu_{\text{Friction}} \cdot 125}$$

$$\text{ex } 36.40055\text{km/h} = \sqrt{53\text{m} \cdot 0.2 \cdot 125}$$

17) Turning Speed of Aircraft given Sight Distance [Open Calculator !\[\]\(b538fe54c1f3a7343e37e85cc2d00497_img.jpg\)](#)

$$\text{fx } V_{\text{Turning Speed}} = \sqrt{25.5 \cdot d \cdot \text{SD}}$$

$$\text{ex } 49.93896\text{km/h} = \sqrt{25.5 \cdot 32.6\text{m}^2/\text{s} \cdot 3\text{m}}$$




18) Velocity in Turn 

$$fx \quad V_{\text{Turning Speed}} = 4.1120 \cdot R_{\text{Taxiway}}^{0.5}$$

[Open Calculator !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5_img.jpg\)](#)

$$ex \quad 107.7689 \text{ km/h} = 4.1120 \cdot (53 \text{ m})^{0.5}$$

19) Wheelbase given Turning Radius 

fx

[Open Calculator !\[\]\(2b376d1a92330ab09dad2665d2f89bf5_img.jpg\)](#)

$$W = \sqrt{\frac{(R_{\text{Taxiway}} \cdot (0.5 \cdot T_{\text{Width}})) - D_{\text{Midway}}}{0.388}}$$

$$ex \quad 55.08592 \text{ m} = \sqrt{\frac{(53 \text{ m} \cdot (0.5 \cdot 45.1 \text{ m})) - 17.78 \text{ m}}{0.388}}$$







Variables Used

- **d** Deceleration (Square Meter per Second)
- **D₁** Deflection Angle of Entrance Curve (Radian)
- **D₂** Deflection Angle of Central Curve (Radian)
- **D_{Midway}** Distance between Midway Points (Meter)
- **L₁** Length of Entrance Curve (Meter)
- **L₂** Length of Central Curve (Meter)
- **R_{Taxiway}** Radius of Curve for Taxiway (Meter)
- **R₂** Radius of Central Curve (Meter)
- **SD** Sight Distance (Meter)
- **T_{Width}** Taxiway Width (Meter)
- **V_{Turning Speed}** Turning Speed of Aircraft (Kilometer per Hour)
- **W** Wheelbase (Meter)
- **μ_{Friction}** Coefficient of Friction



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Function:** **sqrt**, sqrt(Number)
Square root function
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Speed** in Kilometer per Hour (km/h)
Speed Unit Conversion 
- **Measurement:** **Angle** in Radian (rad)
Angle Unit Conversion 
- **Measurement:** **Kinematic Viscosity** in Square Meter per Second (m^2/s)
Kinematic Viscosity Unit Conversion 



Check other formula lists

- [Taxiway Design Formulas](#) 
- [Turning Radius Formulas](#) 

Feel free to SHARE this document with your friends!

PDF Available in

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)

1/19/2024 | 4:37:42 PM UTC

[Please leave your feedback here...](#)

