calculatoratoz.com

unitsconverters.com

Aerodynamic Parameters 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 11 Aerodynamic Parameters Formulas

Aerodynamic Parameters

1) Sideslip Angle for Aircraft

Open Calculator

fx $\beta = \alpha_v - \sigma$

ex $0.05\text{rad} = 0.117\text{rad} - 0.067\text{rad}$

2) Sideslip Angle for given Moment Produced by Vertical Tail

Open Calculator

fx $\beta = \left(\frac{N_v}{l_v \cdot C_v \cdot Q_v \cdot S_v} \right) - \sigma$

ex $0.049883\text{rad} = \left(\frac{5.4\text{N*m}}{1.2\text{m} \cdot 0.7\text{rad}^{-1} \cdot 11\text{Pa} \cdot 5\text{m}^2} \right) - 0.067\text{rad}$

3) SideSlip Angle for given Yawing Moment Coefficient

Open Calculator

fx $\beta = \left(\frac{C_n}{l_v \cdot S_v \cdot Q_v \cdot \frac{C_v}{S \cdot b \cdot Q_w}} \right) - \sigma$

ex $0.04984\text{rad} = \left(\frac{1.4}{1.2\text{m} \cdot 5\text{m}^2 \cdot 11\text{Pa} \cdot \frac{0.7\text{rad}^{-1}}{5.08\text{m}^2 \cdot 1.15\text{m} \cdot 0.66\text{Pa}}} \right) - 0.067\text{rad}$

4) Sideslip Angle given Yawing Moment Coefficient and Tail Efficiency

Open Calculator

fx $$\beta = \left(\frac{C_n}{V_v \cdot \eta_v \cdot C_v} \right) - \sigma$$

ex $$0.050694\text{rad} = \left(\frac{1.4}{1.02 \cdot 16.66 \cdot 0.7\text{rad}^{-1}} \right) - 0.067\text{rad}$$

5) Sidewash angle

Open Calculator

fx $$\sigma = \alpha_v - \beta$$

ex $$0.067\text{rad} = 0.117\text{rad} - 0.05\text{rad}$$

6) Sidewash Angle for given Moment Produced by Vertical Tail

Open Calculator

fx $$\sigma = \left(\frac{N_v}{l_v \cdot C_v \cdot Q_v \cdot S_v} \right) - \beta$$

ex $$0.066883\text{rad} = \left(\frac{5.4\text{N*m}}{1.2\text{m} \cdot 0.7\text{rad}^{-1} \cdot 11\text{Pa} \cdot 5\text{m}^2} \right) - 0.05\text{rad}$$

7) Sidewash Angle for given Yawing Moment Coefficient

Open Calculator

fx $$\sigma = \left(\frac{C_n}{V_v \cdot \eta_v \cdot C_v} \right) - \beta$$

ex $$0.067694\text{rad} = \left(\frac{1.4}{1.02 \cdot 16.66 \cdot 0.7\text{rad}^{-1}} \right) - 0.05\text{rad}$$

8) Sidewash Angle given Yawing Moment Coefficient using Wingspan

Open Calculator

$$\sigma = \left(C_n \cdot S \cdot b \cdot \frac{Q_w}{l_v \cdot S_v \cdot Q_v \cdot C_v} \right) - \beta$$

ex

$$0.06684\text{rad} = \left(1.4 \cdot 5.08\text{m}^2 \cdot 1.15\text{m} \cdot \frac{0.66\text{Pa}}{1.2\text{m} \cdot 5\text{m}^2 \cdot 11\text{Pa} \cdot 0.7\text{rad}^{-1}} \right) - 0.05\text{rad}$$

9) Yawing Moment Coefficient for given Vertical Tail Lift Curve Slope

Open Calculator

$$C_n = l_v \cdot S_v \cdot Q_v \cdot C_v \cdot \frac{\beta + \sigma}{S \cdot b \cdot Q_w}$$

ex

$$1.401917 = 1.2\text{m} \cdot 5\text{m}^2 \cdot 11\text{Pa} \cdot 0.7\text{rad}^{-1} \cdot \frac{0.05\text{rad} + 0.067\text{rad}}{5.08\text{m}^2 \cdot 1.15\text{m} \cdot 0.66\text{Pa}}$$

10) Yawing Moment Coefficient for given Vertical Tail Volume Ratio

Open Calculator

$$C_n = V_v \cdot \eta_v \cdot C_v \cdot (\beta + \sigma)$$

ex

$$1.391743 = 1.02 \cdot 16.66 \cdot 0.7\text{rad}^{-1} \cdot (0.05\text{rad} + 0.067\text{rad})$$

11) Yawing Moment Coefficient using Wingspan

Open Calculator

$$C_n = \frac{N_v}{Q_w \cdot S \cdot b}$$

ex

$$1.400517 = \frac{5.4\text{N*m}}{0.66\text{Pa} \cdot 5.08\text{m}^2 \cdot 1.15\text{m}}$$

Variables Used

- **b** Wingspan *(Meter)*
- **C_n** Yawing Moment Coefficient
- **C_v** Vertical Tail Lift Curve Slope *(1 per Radian)*
- **N_v** Vertical Tail Moment *(Newton Meter)*
- **Q_v** Vertical Tail Dynamic Pressure *(Pascal)*
- **Q_w** Wing Dynamic Pressure *(Pascal)*
- **S** Reference Area *(Square Meter)*
- **S_v** Vertical Tail Area *(Square Meter)*
- **V_v** Vertical Tail Volume Ratio
- **α_v** Vertical Tail Angle of Attack *(Radian)*
- **β** Sideslip Angle *(Radian)*
- **η_v** Vertical Tail Efficiency
- **σ** Sidewash Angle *(Radian)*
- **l_v** Vertical Tail Moment Arm *(Meter)*

Constants, Functions, Measurements used

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Pressure** in Pascal (Pa)
  Pressure Unit Conversion
- Measurement: **Angle** in Radian (rad)
  Angle Unit Conversion
- Measurement: **Moment of Force** in Newton Meter (N*m)
  Moment of Force Unit Conversion
- Measurement: **Reciprocal Angle** in 1 per Radian (rad^{-1})
  Reciprocal Angle Unit Conversion

Check other formula lists

- **Aerodynamic Parameters Formulas**
- **Vertical Tail Contribution Formulas**
- **Wing-Tail Interaction Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

6/25/2024 | 6:06:46 AM UTC

Please leave your feedback here...