| Struts | | | | | | |
|---|---|---|---|---|---|---|
| Wing Strut | | Nose Strut | | Aft Gear Strut | | Spe |
| Diameter | 0.255 | Diameter | 0.212 | Diameter | 0.17 | 234.667 |
| Length | 7.439 | Length | 0.614 | Length | 2.42 | Air De |
| Horizontal Stabilizer Geometry | | | | | | 0.00237717 |
| Wingspan | | Wing Area | | Airfoil | Mean Chord | Tempe |
| 11.66 | ft | 39.798 | Ft^2 | NACA 0012 | 3.413207547 | 500.839 |
| Midsection Span | | Root Chord | | Aspect Ratio | | Pres |
| 0 | ft | 4.209 | ft | 3.41614151464898 | | 2116.23 |
| Tapered Chord Span | | Tapered End Chord | | dC/db | | Speed o |
| 5.83 | ft | 2.463 | ft | 0.29948542 | ft/ft | 1116.45 |
| Vertical Stabilizer Geometry | | | | | | |
| Wingspan | | Wing Area | | Airfoil | Mean Chord | |
| 4.97 | ft | 20.34 | Ft^2 | NACA 0012 | 4.092555332 | |
| Midsection Span | | Midsection Chord | | Aspect Ratio | | |
| 0 | ft | 6.347 | ft | 1.21440019665683 | | |
| Tapered Chord Span | | Tapered End Chord | | dC/db | | |
| 2.485 | ft | 2.228 | ft | 1.657545272 | ft/ft | |
| Wing Geometry | | | | | | |
| Wingspan | | Wing Area | | Airfoil | Mean Chord | |
| 36 | ft | 174 | Ft^2 | NACA 2412 | 4.833333333 | |
| Midsection Span | | Root Chord | | Aspect Ratio | | |
| 16.89 | ft | 5.484 | ft | 7.44827586206897 | | |
| Tapered Chord Span | | Tapered End Chord | | dC/db | | |
| 9.74 | ft | 3.378 | ft | 0.216221766 | ft/ft | |
| Fuselage Geometry | | | | | | |
| L_f | | d_f | | Fineness Ratio | | Height |
| 24.389 | ft | 4.7843982 | ft | 5.09761082229695 | | 4.77 |
| S_Wet (Wing, Constant Chord Section) | | | | | | |
| Span | | Sectional Area S_net | | Airfoil thickness | | |
| 6.471 | ft | 34.869 | ft | 0.12 | %t | |
| Root Chord | | Tip Chord | | lambda | | |
| 5.484 | ft | 5.484 | ft | 1 | ndim | |
| t_c_r | | t_c_t | | tau | | |
| 0.65808 | | 0.65808 | | 1 | ndim | |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | | |
| 1 | | 1.03 | | 143.66028 | Ft^2 | |
| S_Wet (Wing, Tapered Section) | | | | | | |
| Span | | Sectional Area S_net | | Airfoil thickness | | |
| 9.717 | ft | 43.937 | ft | 0.12 | %t | |
| Root Chord | | Tip Chord | | lambda | | |
| 5.484 | ft | 3.378 | ft | 0.615973742 | ndim | |
| t_c_r | | t_c_t | | tau | | |
| 0.65808 | | 0.40536 | | 1 | ndim | |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | | |
| 1 | | 1.03 | | 181.02044 | Ft^2 | |
| Total Area | | | | | | |
| Constant | | Tapered End Chord | | Fuselage Top | | To |
| 143.66028 | Ft^2 | 181.02044 | Ft^2 | 20.97 | Ft^2 | 324.68072 |

| Wing CD Calculation | | | | | |
|---|---|---|---|---|---|
| R_Nf | | R_wf | R_LS | cbar_w_exposed | |
| 35949334.99 | ndim | 1.04 | 1.08 | 4.868173956 | ft |
| R_Nw | | c_f | | C_D_0 | |
| 7175678.228 | ndim | 3.16E-03 | ndim | 0.007708423 | |
| Starting Coeff | | Int-Term | | S ratio | |
| 0.003546752 | | 1.164736 | ndim | 1.865981149 | |

| Component | C_D_0 | Area | C_D_i (if any) | f | source | Notes |
|---|---|---|---|---|---|---|
| Wing | 0.007708423 | 324.68072 | 0.004155756 | 1.341265547 | Roskam 5.8 | |
| Hor. Tail | 0.001911292 | 75.91512 | 0 | 0.332564851 | Roskam 5.8 | C_D_i ignored |
| Ver. Tail | 0.001219113 | 51.68334 | 0 | 0.212125716 | Roskam 5.8 | Treated as 0 li |
| Fuselage | 0.004965717 | 230.66816 | 0 | 0.864034712 | Roskam 5.19 | Torenbeek, st |
| Wing Struts | 0.5 | 3.79389 | 0 | 1.896945 | | |
| Pitot Tube | 1 | 0.02 | 0 | 0.02 | CD, area from | McCormick T4 |
| Subtotal | 0.02682147 | 174 | 0.004155756 | 4.666935825 | | |
| Interference Drag | | | | 0.466693583 | | 10% of subtot |
| Cooling Drag | | | | 0.513362941 | | 10% of total |
| Subtotal (W/O | 0.032453979 | | 0.004155756 | 5.646992349 | | |
| Aft Gear | 0.31 | 0.746 | 0 | 0.23126 | Torenbeek F-19 | |
| Nose Gear | 0.64 | 0.459 | 0 | 0.29376 | Torenbeek F-19 | |
| Total (Gear D | 0.035471335 | 174 | 0.004155756 | 6.172012349 | | |

| Flight Conditions/Aircraft Parameters | | | | | |
|---|---|---|---|---|---|
| eed | Altitude | | Standard Empty Weight | | |
| ft/s | 0 | ft | 1734 | lbs | |
| ensity | Viscosity | | Weight | | |
| slug/ft^3 | 3.78E-07 | | 3100 | lbs | |
| erature | Mach No | | | | |
| Rankine | 0.210190335 | M | | | |
| sure | Specific Ratio | R_air (Eng Toolbox) | | | |
| psf | 1.4 | 1717 | | | |
| f Sound | Span Efficiency Factor | | | | |
| ft/s | 0.84 | | | | |

| Induced Drag/Lift Calculation | | | | | |
|---|---|---|---|---|---|
| q_infty | | Aircraft Lift | | C_L_w | |
| 65.45371299 | | 3100 | lbs | 0.285803443 | ndim |
| C_D_i | | CL coeff | | | |
| 0.004155756 | ndim | 0.1598324515 | | | |

| Fuselage Drag | | | | | |
|---|---|---|---|---|---|
| Length of Nose | | Base Wetted Area | | Windsheild | |
| 5.346 | ft | 249.810163752 | | 5.16 | Ft^2 |
| Total Base S | | Wing Mounting Point | | Tail Mounting (1 Side) | |
| 256.5181638 | Ft^2 | 20.97 | Ft^2 | 0.743 | Ft^2 |
| Rudder Mounting | | Wing Strut Mounting | | Total Wetted Area S_Wet_f | |
| 2.834 | Ft^2 | 0.28 | Ft^2 | 230.6681638 | Ft^2 |
| R_wf | R_Nf | C_f | Fin. Rat. | C_D_0_f | |
| 1.04 | 35949334.99 | 2.46E-03 | 5.097610822 | 0.004965716735345 | |

| Width |
|---|
| 3.769 |

| S_Wet (Hor. Tail, Constant Chord Section) | | | | | |
|---|---|---|---|---|---|
| Span | | Sectional Area S_net | | Airfoil thickness | |
| 0 | ft | 0 | ft | 0.12 | %t |
| Root Chord | | Tip Chord | | lambda | |
| 4.209 | ft | 2.463 | ft | 0.585174626 | ndim |
| t_c_r | | t_c_t | | tau | |
| 0.50508 | | 0.29556 | | 1 | ndim |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | |
| 1 | | 1.03 | | 0 | Ft^2 |

| S_Wet (Hor. Tail, Tapered Section) | | | | | |
|---|---|---|---|---|---|
| Span | | Sectional Area S_net | | Airfoil thickness | |
| 5.83 | ft | 18.426 | ft | 0.12 | %t |
| Root Chord | | Tip Chord | | lambda | |
| 4.209 | ft | 2.463 | ft | 0.585174626 | ndim |
| t_c_r | | t_c_t | | tau | |
| 0.50508 | | 0.29556 | | 1 | ndim |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | |
| 1 | | 1.03 | | 75.91512 | Ft^2 |

| Total Area | | | | | |
|---|---|---|---|---|---|
| tal | Constant | | Tapered End Chord | | Fuselage Top | |
| Ft^2 | 0 | Ft^2 | 75.91512 | Ft^2 | 0 | Ft^2 |

| Hor. Tail CD Calculation | | | | | |
|---|---|---|---|---|---|
| R_Nf | | R_wf | R_LS | cbar_w_exposed | |
| 35949334.99 | ndim | 1.04 | 1.08 | 3.413207547 | ft |
| R_Nw | | c_f | | C_D_0 | |
| 5031060.785 | ndim | 3.35E-03 | ndim | 0.001911292 | |
| Starting Coeff | | Int-Term | | S ratio | |
| 0.003761149 | | 1.164736 | ndim | 0.436293793 | |
| S_Wet (Ver. Tail, Large Chord Section) | | | | | |
| Span | | Sectional Area S_net | | Airfoil thickness | |
| 0.877 | ft | 6.663 | ft | 0.12 | %t |
| Root Chord | | Tip Chord | | lambda | |
| 9.357 | ft | 4.886 | ft | 0.522175911 | ndim |
| t_c_r | | t_c_t | | tau | |
| 1.12284 | | 0.58632 | | 1 | ndim |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | |
| 1 | | 1.03 | | 13.72578 | Ft^2 |
| S_Wet (Ver. Tail, Small Chord Section) | | | | | |
| Span | | Sectional Area S_net | | Airfoil thickness | |
| 4.076 | ft | 18.426 | ft | 0.12 | %t |
| Root Chord | | Tip Chord | | lambda | |
| 4.886 | ft | 2.433 | ft | 0.497953336 | ndim |
| t_c_r | | t_c_t | | tau | |
| 0.58632 | | 0.29196 | | 1 | ndim |
| Sub-term 1 | | Sub-term 2 | | Wetted Area | |
| 1 | | 1.03 | | 37.95756 | Ft^2 |
| Total Area | | | | | |
| Constant | | Tapered End Chord | | Fuselage Top | |
| 13.72578 | Ft^2 | 37.95756 | Ft^2 | 0 | Ft^2 |
| Ver. Tail CD Calculation | | | | | |
| R_Nf | | R_wf | R_LS | cbar_w_exposed | |
| 35949334.99 | ndim | 1.04 | 1.08 | 5.0654149 | ft |
| R_Nw | | c_f | | C_D_0 | |
| 7466410.967 | ndim | 3.14E-03 | ndim | 0.001219113 | |
| Starting Coeff | | Int-Term | | S ratio | |
| 0.003523832 | | 1.164736 | ndim | 0.29703069 | |

| Component | Re | C_D | S |
|---|---|---|---|
| Wing Strut | 375869.4666 | 0.5 | 3.79389 |
| Nose Strut | 312487.5566 | 0.7 | 0.130168 |
| Aft Strut | 250579.6444 | 0.9 | 0.4114 |
| Nose Wheel | | | |
| Aft Wheel | | | |

| |
|---|
| Total |
| 75.91512 Ft^2 |

| |
|---|
| Total |
| 51.68334 Ft^2 |