

Wing Design

Design Parameters

M	0.04	
S	4	ft ²
A	7.0	
Λ_{LE}	0	deg
t/c	0.12	
λ	1.00	
W c-start	5	lb/ft ²
W c-end	5	lb/ft ²
q c-start	2.29	lb/ft ²
q c-end	2.29	lb/ft ²
Cl c-start	0.53	
Cl c-end	0.53	

Airfoil Data

Name	Clark Y	
$C_{l_{max}}$	1.5	
Cl_{α}	0.1	1/deg
a.c.	0.253	c
α_{crit}	-4	deg
Cd0	0.01	
r_{θ}	0.0024	c
Cl_{minD}	0.1-0.4	
(t/c)max	0.12	c

Air Properties

Cruise Alt.	300	ft
V	44.12	f/s
ρ	0.0758741	lbm/ft ³
q	2.2933098	lb/ft ²
μ	0.0000107	lbm/(f-s)
v (cruise)	0.000141	f ² /s

Calculations

b	5.5	ft
M_{eff}	0.04	
C_l	0.8	
C_l	0.8	
m.a.c.	0.8	ft
β	1.00	
$C_{L\alpha}$	0.083	1/deg
$C_{L\alpha}$	0.33	
α_{trim}	2.4	deg
C_{Ltrim}	0.527	
k	0.0568411	
C_D	0.022	
L/D	23.46	

Sweep Angles

	x/c	$\Lambda_{x/c}$ (deg)
LE	0.00	0.0
1/4C	0.25	0.0
a.c	0.25	0.0
(t/c)max	0.12	0.0
TE	1.00	0.0

Viscous Drag

V eff	44.1192	f/s
q eff	2.2933098	lb/ft ²
Re_mac	2.48E+05	
sqrt(Re)	498.032	
Cf	2.67E-03	
S_wet	8.97336	ft ²
F	1.2282617	
Q	1	
C_{D0}	0.0066793	

Total Drag **0.2267287** lbf

Plotting:

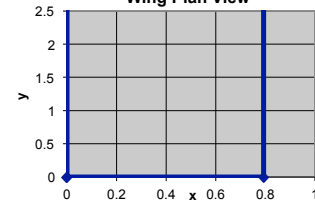
Spanwise View

x	y
0	0
0.8	0
0.792825	2.7748874
0	2.7748874
0	0

Lift Curves

α	Cl	α	CL
-4	0	-4	0
11	1.5	11	1.2414967

Wing Plan View



Lift versus alpha

