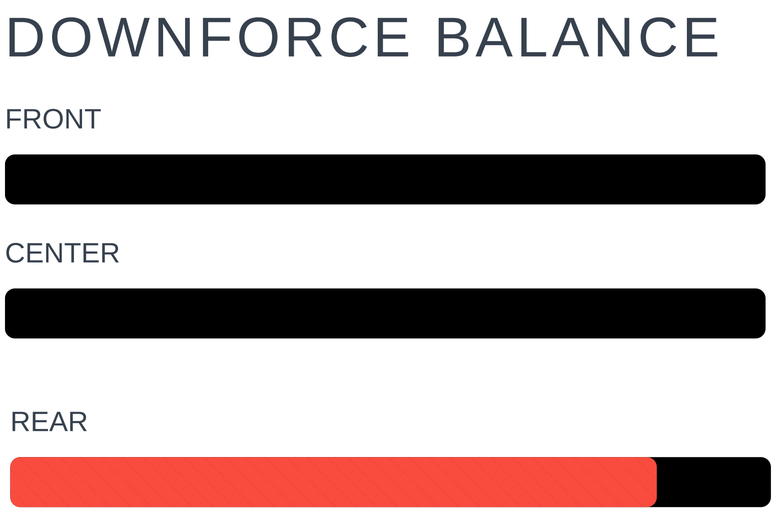
OVERVIEW

Spanning up to 71 inches over its optimized 2D airfoil shape, the APR Performance GTC-250 Adjustable Wing Swan Neck supplies maximum downforce in widebody sports and touring car applications. Swan Neck mounting maximizes effective airfoil surface area and minimizes flow separation.



The Downforce Balance graph (shown at the left) illustrates which areas of the vehicle this product affects.

There are three (3) areas: Front, Center, and Rear. The size of the red bar represents how much this product affects each particular area.

BENEFITS

- More downforce than the GT-250 standard pedestal version
- Angle adjustment holes allow for easy tuning of downforce
- Reinforced pre-preg carbon fiber withstands extreme loads

SPECIFICATIONS

Pattern

2x2 twill weave

Material

Pre-preg carbon fiber, 3K

Coating

UV-stable clear coat

Wing measurement

Custom span Up to 71", 10" chord

Hardware

Stainless-steel machine screws, washers, and nuts

Mounting

6061 billet aluminum brackets/pedestals (no mounting bases included), custom fabrication of chassis-mounts required (double-shear recommended)
Swan neck pedestal dimensions: 32" overall height x 13.5" overall width x 3/8" thickness
Standard swan neck pedestal-to-pedestal length: 23" (custom lengths can be accommodated up to 50")

FEATURES

The APR Performance GT-250 Adjustable Wing Swan Neck features a 2D airfoil shape that is designed to produce great downforce with minimal drag. Swan neck pedestals prevent downforce-robbing flow separation commonly found in standard bottom-mount pedestals. The swan neck design allows greater Angle-of-Attack (AOA) before stalling occurs, when compared to standard bottom-mount pedestal configurations.

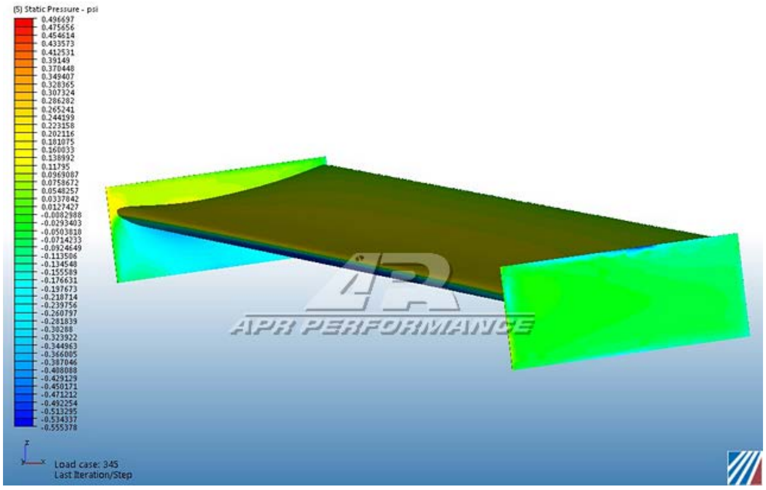
The GT Series airfoil is composed of lightweight and durable pre-preg carbon fiber composite materials for superior strength and low weight. For the swan neck application, the airfoils are internally reinforced differently from the non-swan neck airfoils.

Supporting the airfoils are 10mm "aircraft grade" 6061 billet aluminum swan neck pedestals that come in a flat black powder coat finish. Each swan neck pedestal is also "knife-edged" at the trailing edge, to minimize the amount of "dirty" air that reaches the airfoil.

* Note: Upper brackets shown in photos are raw aluminum (for illustration purposes only). All production units come powder-coated in black color (same as the pedestals).

Computational Fluid Dynamics (CFD)

Modeled in 3D and validated using Computational Fluid Dynamics (CFD), the APR Performance GT-250 Adjustable Wing is designed to adapt to a variety of widebody sports and touring car applications.



CFD DATA FOR THE GT-250 ADJUSTABLE WING

OVERVIEW

Contained herein are the data and results of the Computational Fluid Dynamics (CFD) analysis that was conducted on the GT-250 airfoil. This data illustrates how the airfoil performs in different conditions by comparing Downforce vs. Angle-of-Attack (AOA) vs. Speed, and Drag vs. AOA vs. Speed. This data will provide insight with regards to how and how much the airfoil performs with respect to these conditions. To learn how to interpret and apply this type of CFD data, see sample analysis on the GTC-300 page.

APR WING CFD DATA **PROFILE: APR005 SINGLE ELEMENT** **2011.10.31**
All values are pound force (lbf) **updated: 2013.3.18**
Fz = Lift **Fx = Drag** **L/D = Lift/Drag ratio**
Positive Fz values are downforce

Prepared by: **AMB Aero**

AOA	Fz	Fx	L/D	Speed
0	43.79	3.63	7.26	80
0	104.46	14.11	7.40	120
0	190.15	26.62	7.14	160
5	71.81	9.81	7.32	80
5	166.15	22.22	7.48	120
5	300.13	39.62	7.57	160
5 + gurney	482.34	72.16	6.68	160
10	131.10	19.44	6.74	80
10	301.15	49.54	6.08	120
10	540.15	71.86	7.52	160
10 + gurney	705.75	109.96	6.42	160
16	171.39	32.44	5.28	80
16	379.78	71.12	5.34	120
16	675.16	126.43	5.34	160

Efficiency by AOA

	80 MPH	120 MPH	160 MPH
0 AOA	7.26	7.40	7.14
5 AOA	7.32	7.48	7.57
10 AOA	6.74	6.08	5.89
16 AOA	5.28	5.34	5.34

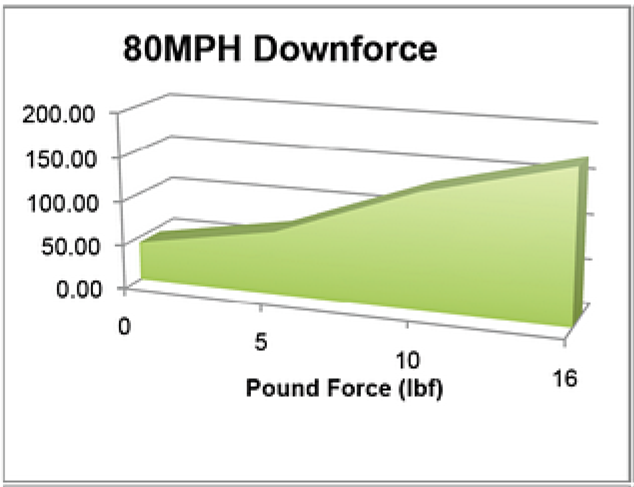
Downforce

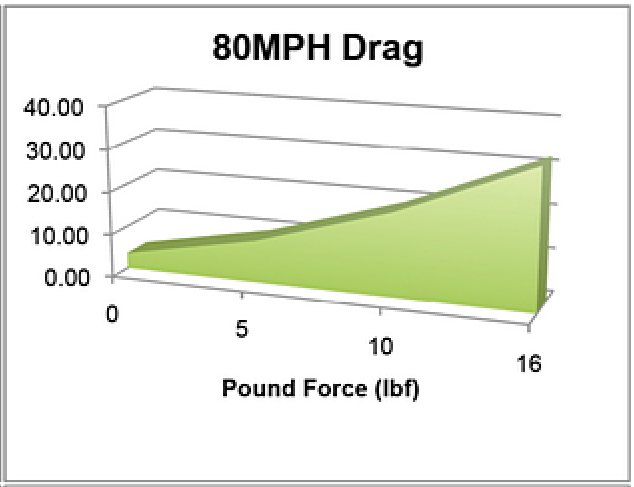
	80 MPH	120 MPH	160 MPH
0 AOA	43.79	104.46	190.15
5 AOA	71.81	166.15	300.13
10 AOA	131.10	301.15	540.15
16 AOA	171.39	379.78	675.16

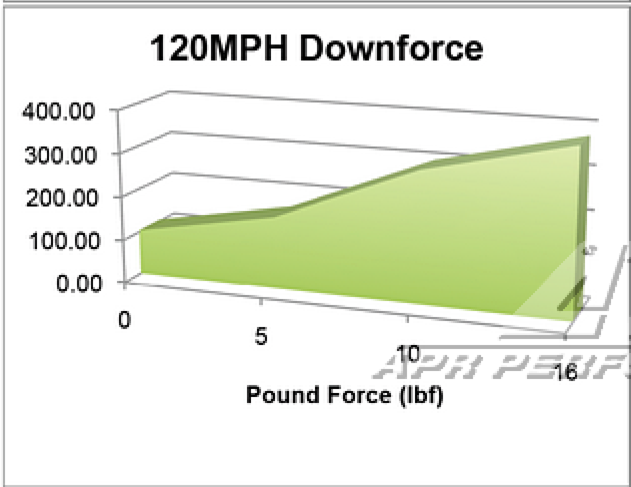
Drag

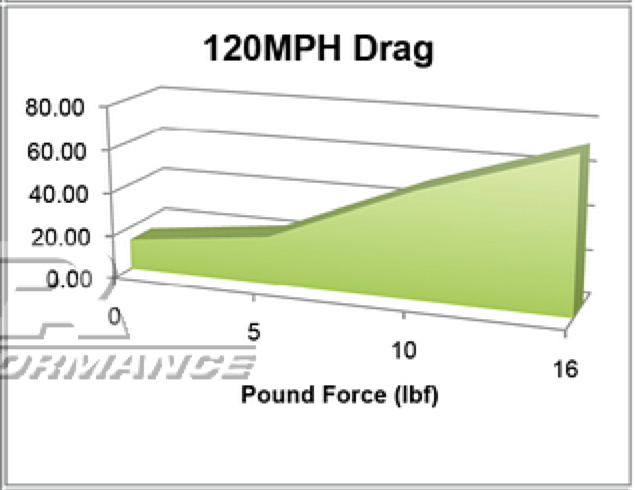
	80 MPH	120 MPH	160 MPH
0 AOA	3.63	14.11	26.62
5 AOA	9.81	22.22	39.62
10 AOA	19.44	49.54	71.86
16 AOA	32.44	71.12	126.43

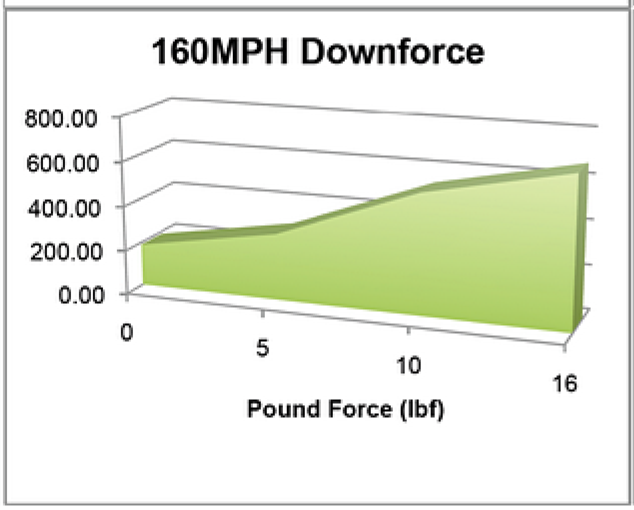
Wing forces

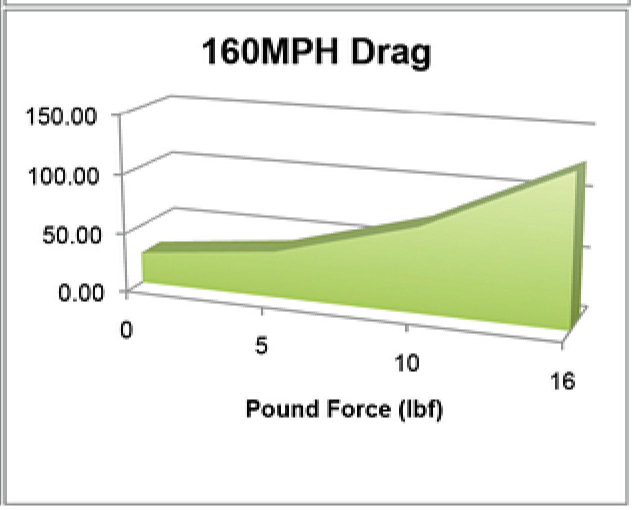

80MPH Downforce
200.00
150.00
100.00
50.00
0.00
0
5
10
16
Pound Force (lbf)

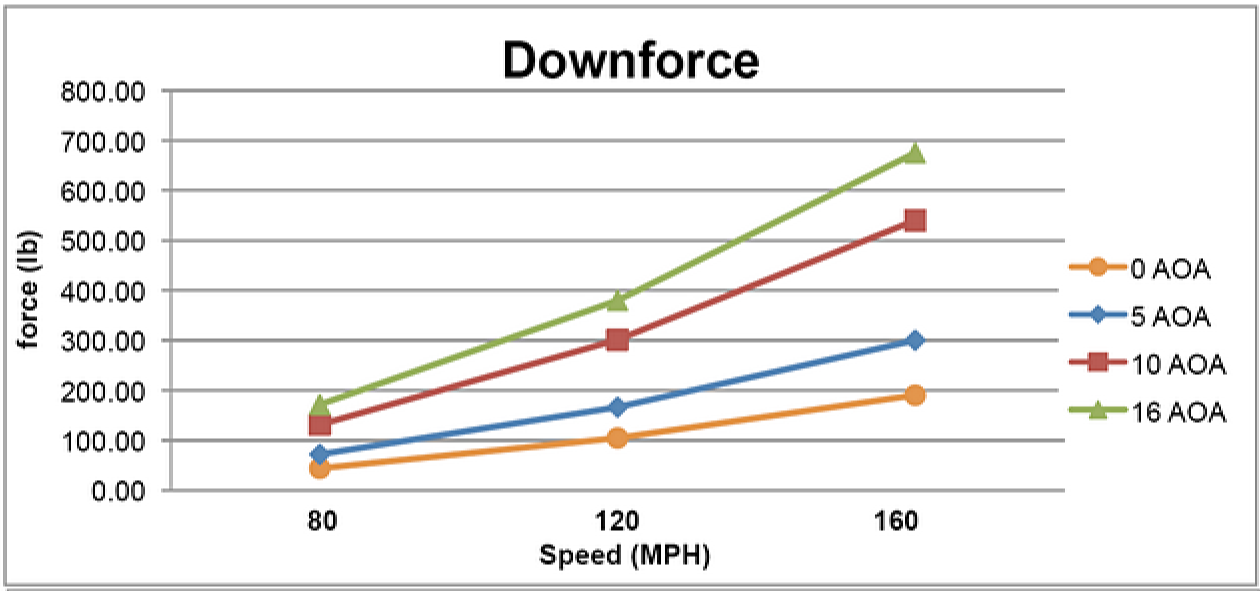

80MPH Drag
40.00
30.00
20.00
10.00
0.00
0
5
10
16
Pound Force (lbf)

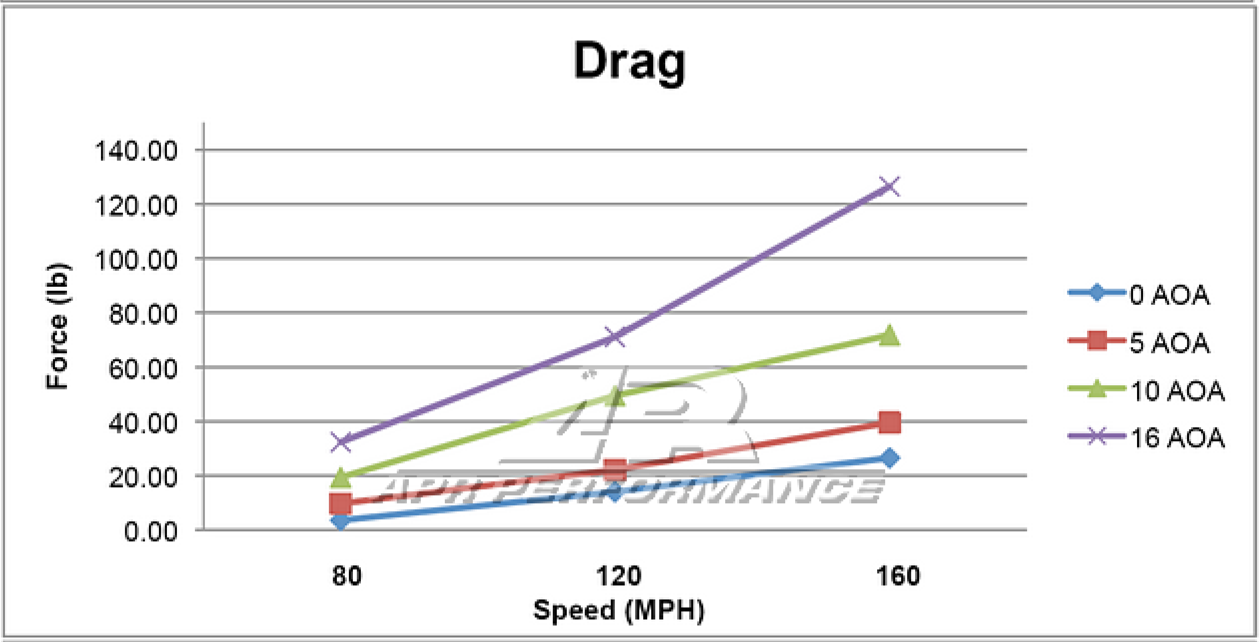

120MPH Downforce
400.00
300.00
200.00
100.00
0.00
0
5
10
16
Pound Force (lbf)

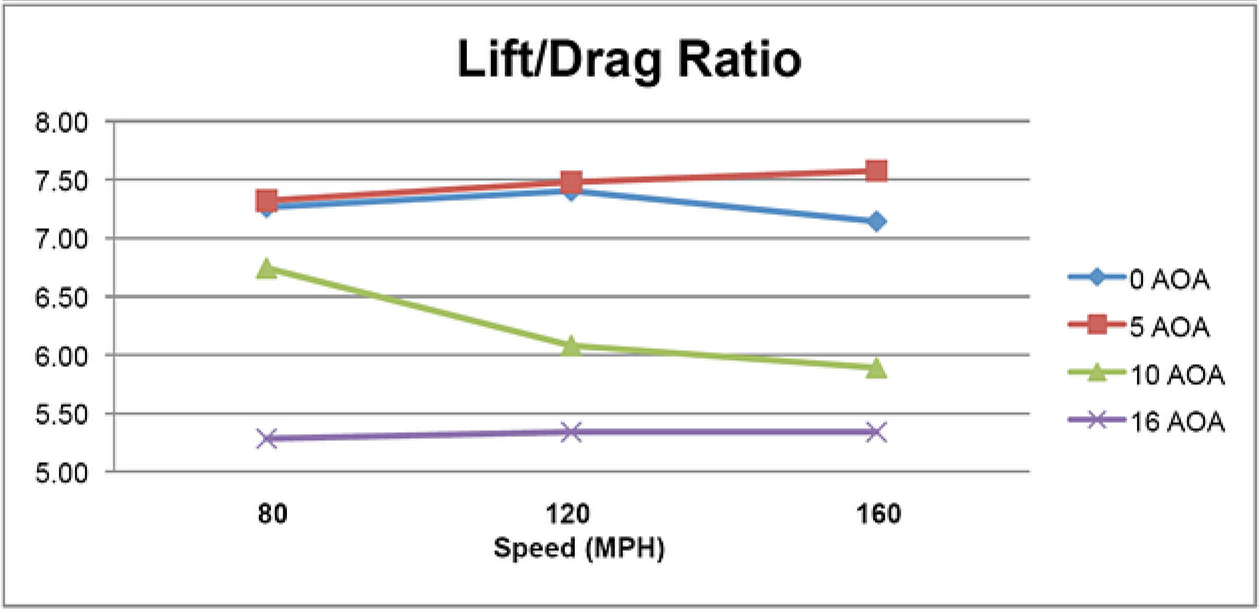

120MPH Drag
80.00
60.00
40.00
20.00
0.00
0
5
10
16
Pound Force (lbf)

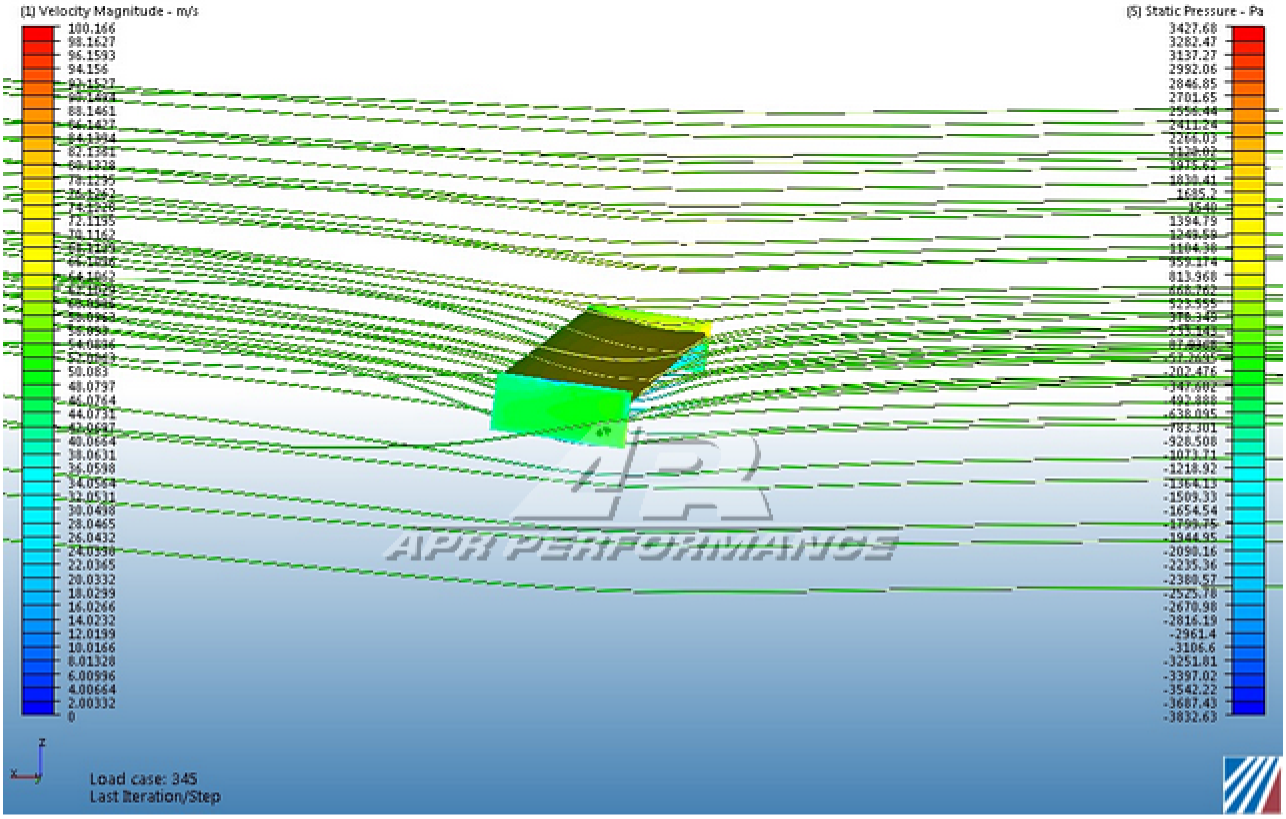

160MPH Downforce
800.00
600.00
400.00
200.00
0.00
0
5
10
16
Pound Force (lbf)

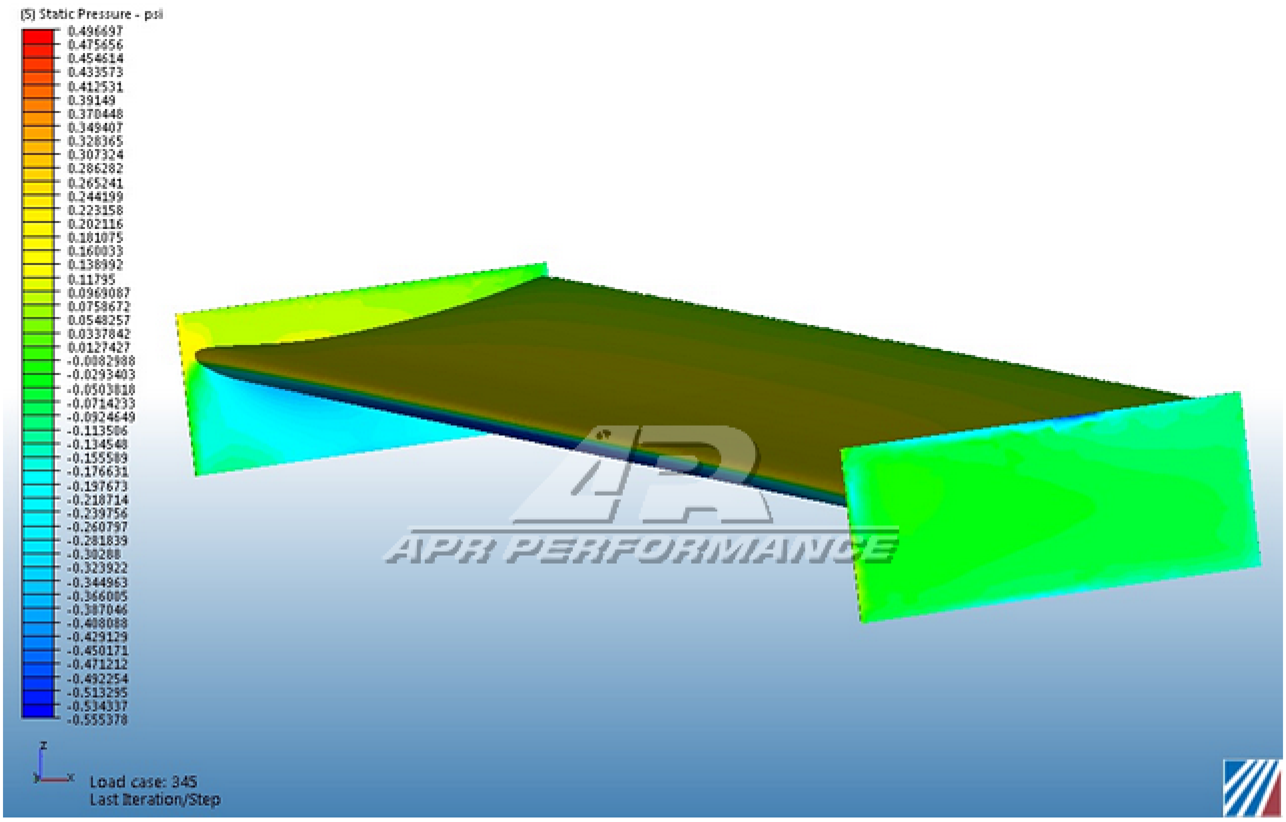

160MPH Drag
150.00
100.00
50.00
0.00
0
5
10
16
Pound Force (lbf)

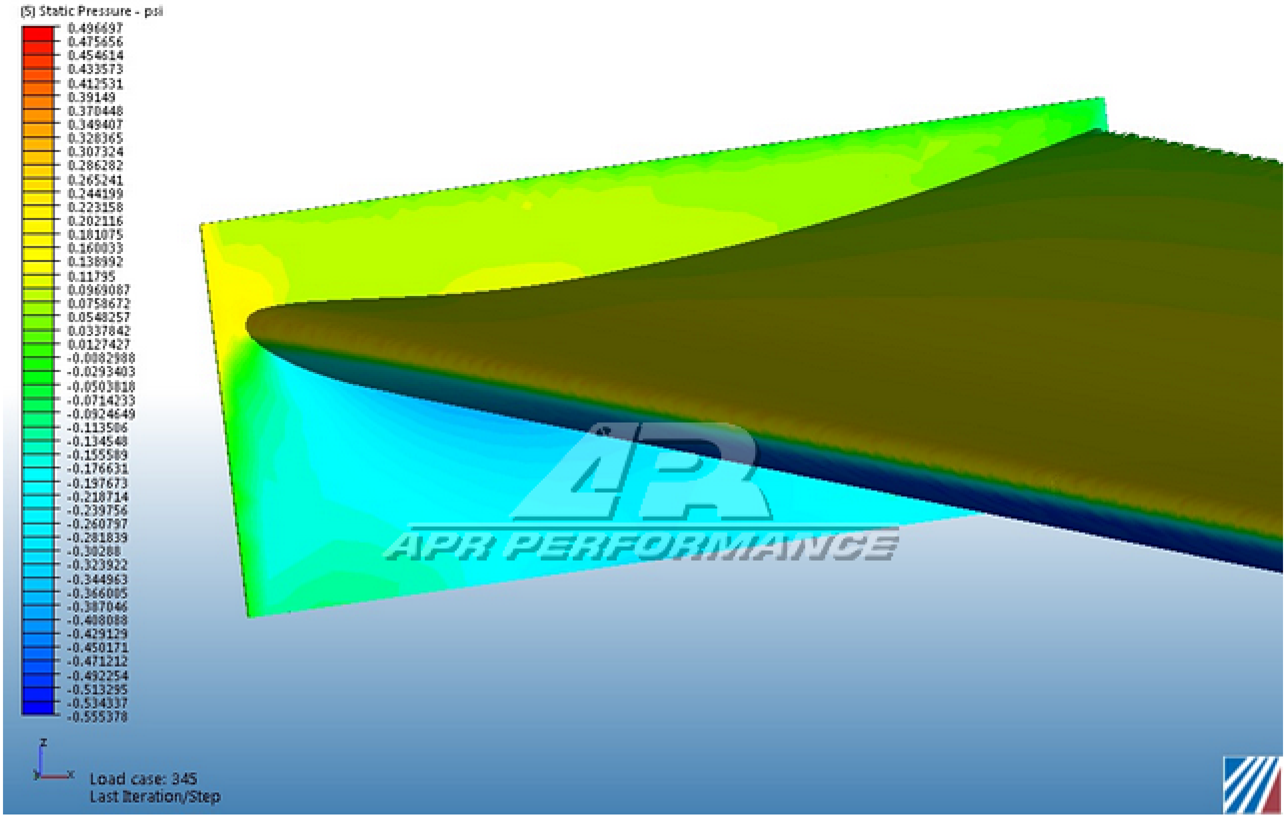

Downforce
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
force (lb)
80
120
160
Speed (MPH)
0 AOA
5 AOA
10 AOA
16 AOA

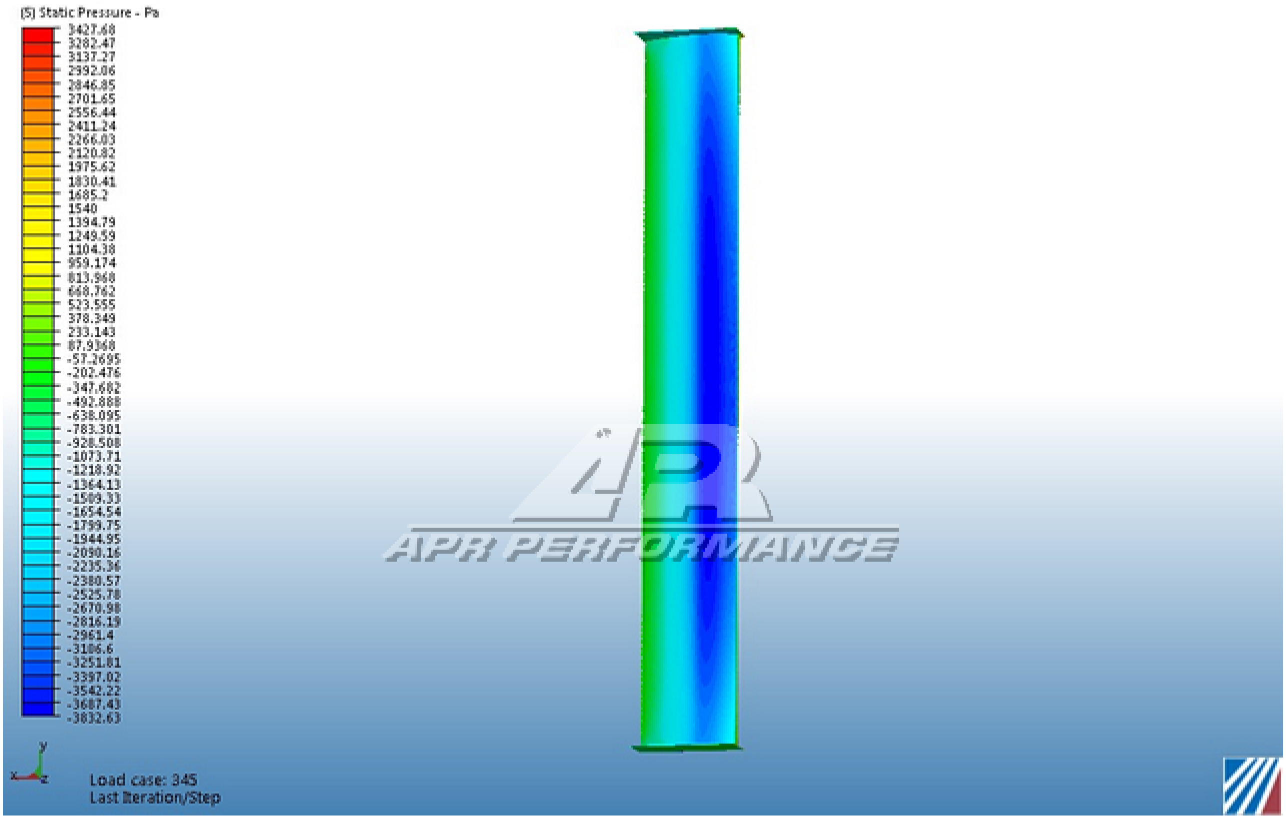

Drag
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Force (lb)
80
120
160
Speed (MPH)
0 AOA
5 AOA
10 AOA
16 AOA
APR PERFORMANCE


Lift/Drag Ratio
8.00
7.50
7.00
6.50
6.00
5.50
5.00
80
120
160
Speed (MPH)
0 AOA
5 AOA
10 AOA
16 AOA


(1) Velocity Magnitude - m/s
100.166
0
(S) Static Pressure - Pa
3427.68
-3832.63
APR PERFORMANCE
Load case: 345
Last Iteration/Step


(S) Static Pressure - psi
0.496697
-0.555378
APR PERFORMANCE
Load case: 345
Last Iteration/Step


(S) Static Pressure - psi
0.496697
0.475656
0.454614
0.433573
0.412531
0.39149
0.370448
0.349407
0.328365
0.307324
0.286282
0.265241
0.244199
0.223158
0.202116
0.181075
0.160033
0.138992
0.11795
0.0969087
0.0758672
0.0548257
0.0337842
0.0127427
-0.0082988
-0.0293403
-0.0503818
-0.0714233
-0.0924649
-0.113506
-0.134548
-0.155589
-0.176631
-0.197673
-0.218714
-0.239756
-0.260797
-0.281839
-0.30288
-0.323922
-0.344963
-0.366005
-0.387046
-0.408088
-0.429129
-0.450171
-0.471212
-0.492254
-0.513295
-0.534337
-0.555378
Load case: 345
Last Iteration/Step
APR PERFORMANCE


(S) Static Pressure - Pa
3427.68
3282.47
3137.27
2992.06
2846.85
2701.65
2556.44
2411.24
2266.03
2120.82
1975.62
1830.41
1685.2
1540
1394.79
1249.59
1104.38
959.174
813.968
668.762
523.555
378.349
233.143
87.9368
-57.2695
-202.476
-347.682
-492.888
-638.095
-783.301
-928.508
-1073.71
-1218.92
-1364.13
-1509.33
-1654.54
-1799.75
-1944.95
-2090.16
-2235.36
-2380.57
-2525.78
-2670.98
-2816.19
-2961.4
-3106.6
-3251.81
-3397.02
-3542.22
-3687.43
-3832.63
Load case: 345
Last Iteration/Step
APR PERFORMANCE

Gurney Flaps

Gurney flaps are included with every APR Performance GT-250 Adjustable Wing. These are super lightweight, made using pre-preg carbon fiber processes, and pre-attached using double-sided tape.

HISTORY OF THE GURNEY FLAP

The Gurney flap (a.k.a. wickerbill) is an aerodynamic device that was originally pioneered and developed in the 1970s by a racing driver named Dan Gurney. Unbeknownst to his competition, this device was used to increase downforce while minimizing increase in drag. He found that not only did this device increase the lift/drag (L/D) ratios, it also increased the stalling angles (so he could operate the airfoils at greater pitch angles). It took a few years for everyone else to catch on to its purpose, and now, the Gurney flap (or similar device) can be seen in race cars and even airplanes all over the world.