OVERVIEW

Spanning 71 or 74 inches over its optimized 3D airfoil shape, the APR Performance GTC-500 Adjustable Wing supplies maximum downforce in widebody sports and touring car applications.

DOWNFORCE BALANCE

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

- Angle adjustment holes allow for easy tuning of downforce
- Reinforced pre-preg carbon fiber withstands extreme loads
- Interchangeable side plates help to further tune downforce levels

SPECIFICATIONS

Pattern

2x2 twill weave

Material

Pre-preg carbon fiber, 3K

Coating

UV-stable clear coat

Wing Span

70" w/ variable Angle-of-Attack (AOA) (center section vs outer section angle difference: 10 degrees)

Hardware

Stainless-steel machine screws, washers, and nuts

Mounting

6061 billet aluminum brackets/pedestals with application-specific bottom mounting bases

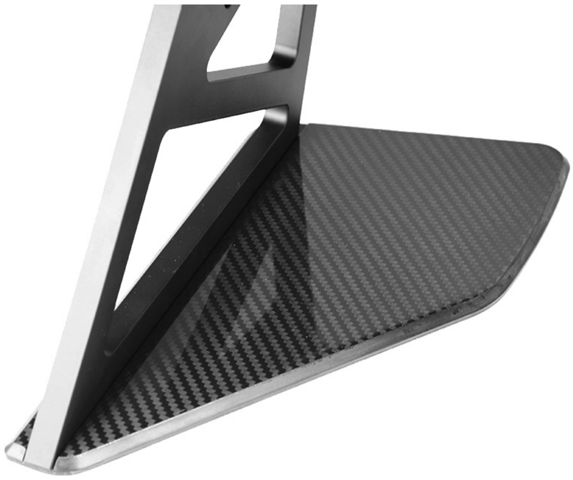
FEATURES

The APR Performance GTC-500 Adjustable Wing features a 3D airfoil shape that is designed to produce balanced downforce across its span on widebody sports and touring car applications.

Each GTC Series airfoil is composed of lightweight and durable pre-preg carbon fiber composite materials for superior strength and low weight.

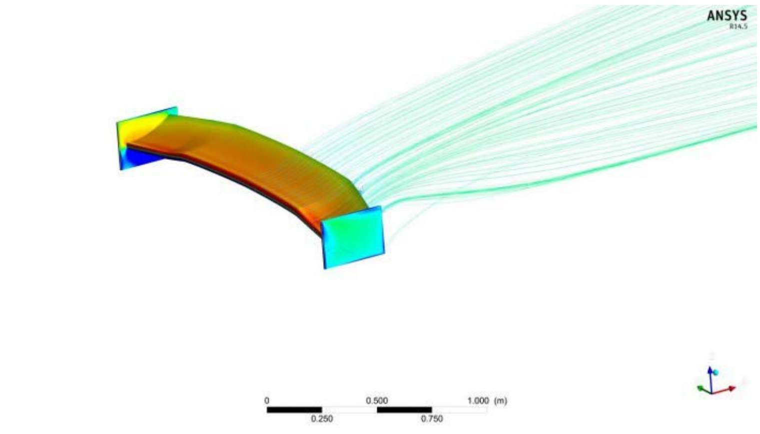
Aerodynamically-tuned side plates (aka end plates), included with every GTC Series Adjustable Wing, are critical components that help to ensure consistent airflow across the full span of the airfoil.

Supporting the airfoils are 10mm "aircraft grade" 6061 billet aluminum pedestals that come in a flat black powder coat finish.



Computational Fluid Dynamics (CFD)

Modeled in 3D and validated using Computational Fluid Dynamics (CFD), the APR Performance GTC-500 Adjustable Wing is designed to adapt to a variety of widebody sports and touring car applications.



CFD DATA FOR THE GTC-500 ADJUSTABLE WING

OVERVIEW

Contained herein are the data and results of the Computational Fluid Dynamics (CFD) analysis that was conducted on the GTC-500 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.

CFD DATA (TABLES)

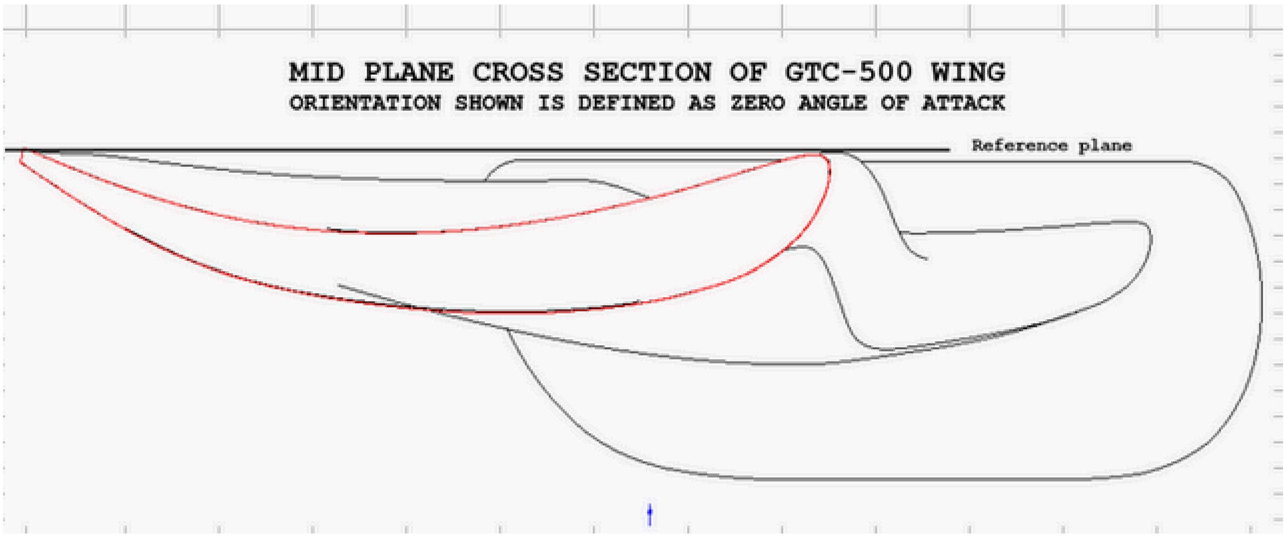
The following table shows the actual data that were collected from the CFD analysis. The numbers in the table are represented in Pounds.

APR WING CFD DATA PROFILE: APR008 UPDATED GTC500 2014.7.1
All values are pound force (lbf)
Fz = Lift Fx = Drag L/D = Lift/Drag ratio
Positive Fz values are downforce

Prepared by: AMB Aero

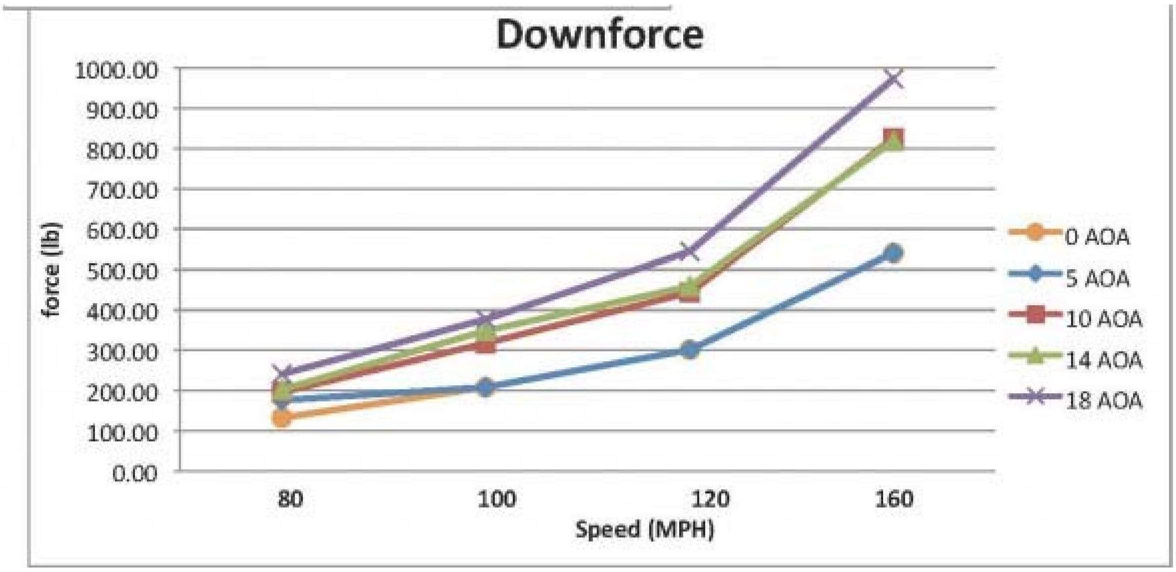
AOA	Fz	Fx	L/D	Speed
0	132.44	14.88	8.90	80
0	208.07	23.45	8.87	100
0	301.29	34.10	8.84	120
0	540.71	62.11	8.71	160
5	176.15	21.69	8.12	80
5	208.17	23.45	8.88	100
5	301.41	34.11	8.84	120
5	541.03	61.23	8.84	160
10	195.79	28.87	6.78	80
10	317.70	43.46	7.31	100
10	443.65	66.00	6.72	120
10	825.05	115.02	7.17	160
14	202.93	31.40	6.46	80
14	348.38	53.67	6.49	100
14	459.24	71.70	6.41	120
14	818.94	129.75	6.31	160
18	240.79	42.89	5.61	80
18	377.22	67.47	5.59	100
18	544.76	97.94	5.56	120
18	973.43	177.54	5.48	160

The following image illustrates where and how the AOA is referenced. At 0 degrees AOA, the reference plane is parallel to the direction of the free air stream (the stream would travel from right-to-left in this image). This reference plane can be simulated by placing a ruler across the top of the center section of an actual airfoil.

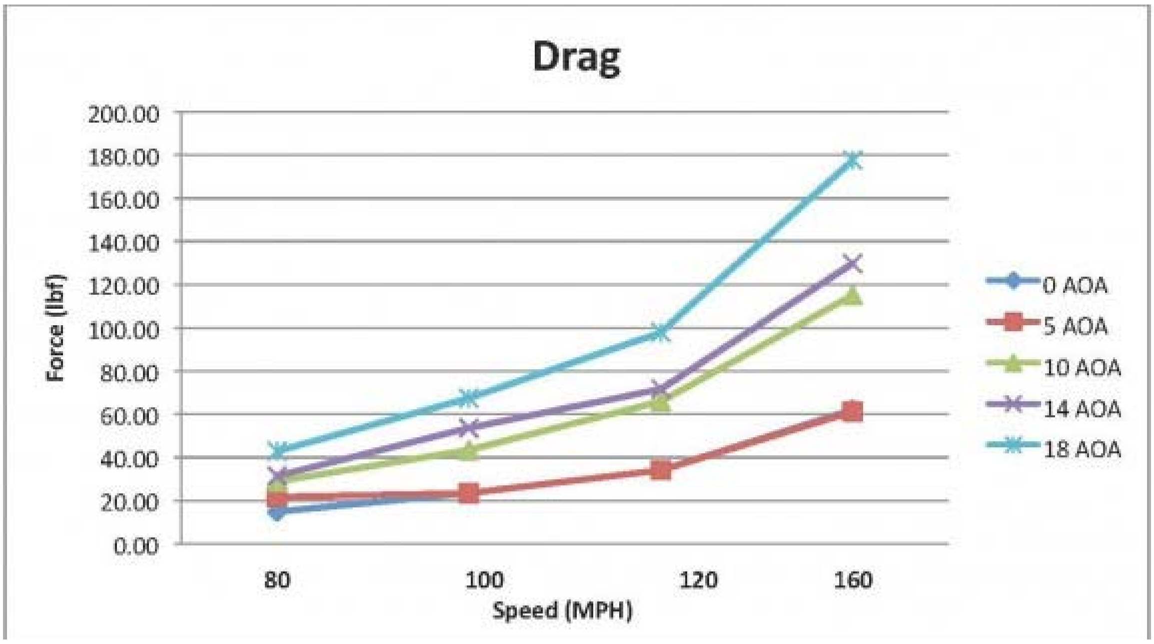


CFD DATA (GRAPHS)

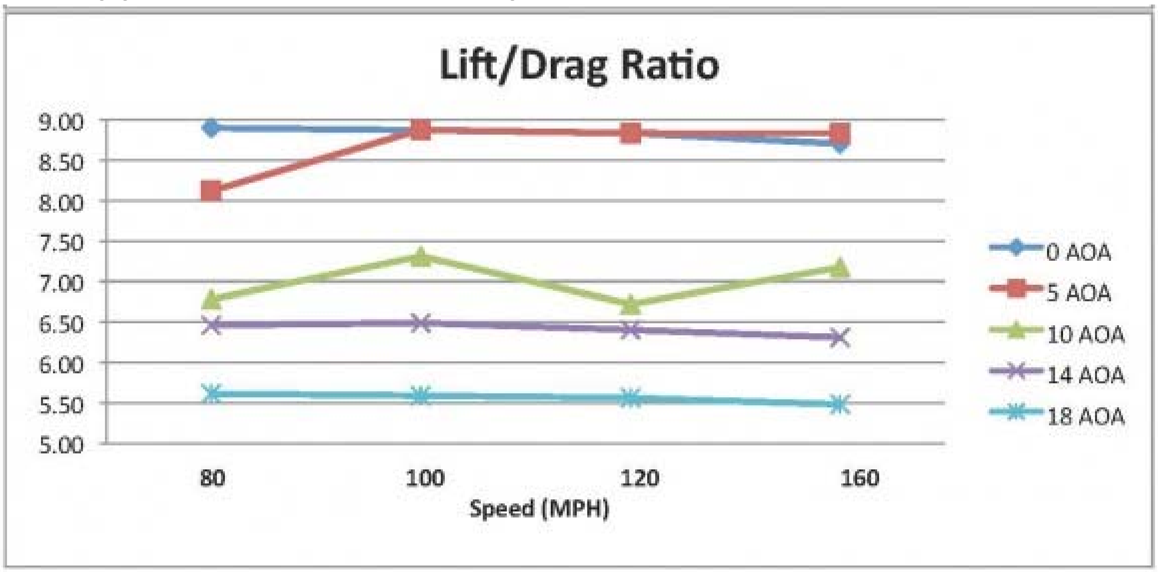
The following graph illustrates the effects that air speed and AOA have on downforce only. The higher the air speed and AOA are, the higher the resultant downforce is.



The following graph illustrates the effects that air speed and AOA have on drag only. The higher the air speed and AOA are, the higher the resultant drag is.

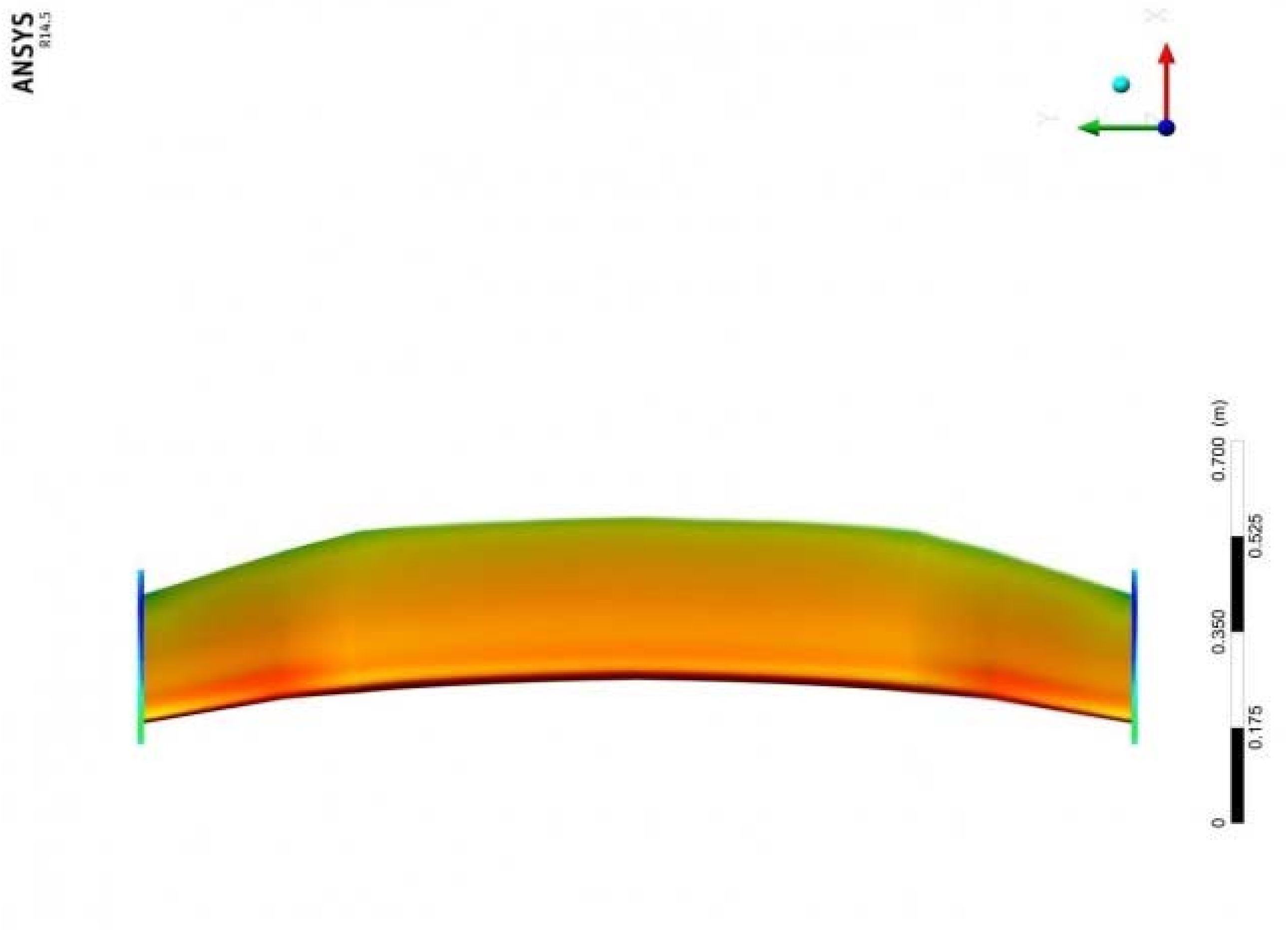


The following graph illustrates the lift and Drag Coefficient Ratio.

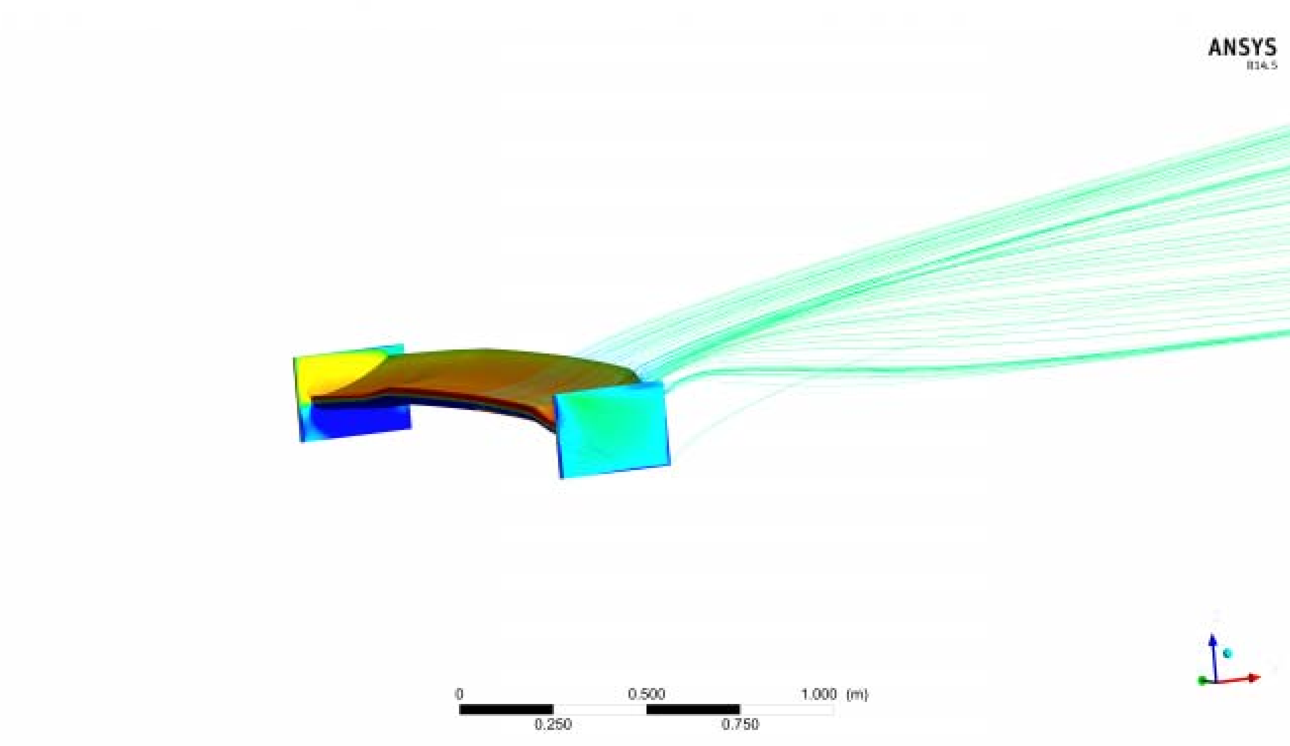


CFD DATA (RENDERED IMAGES)

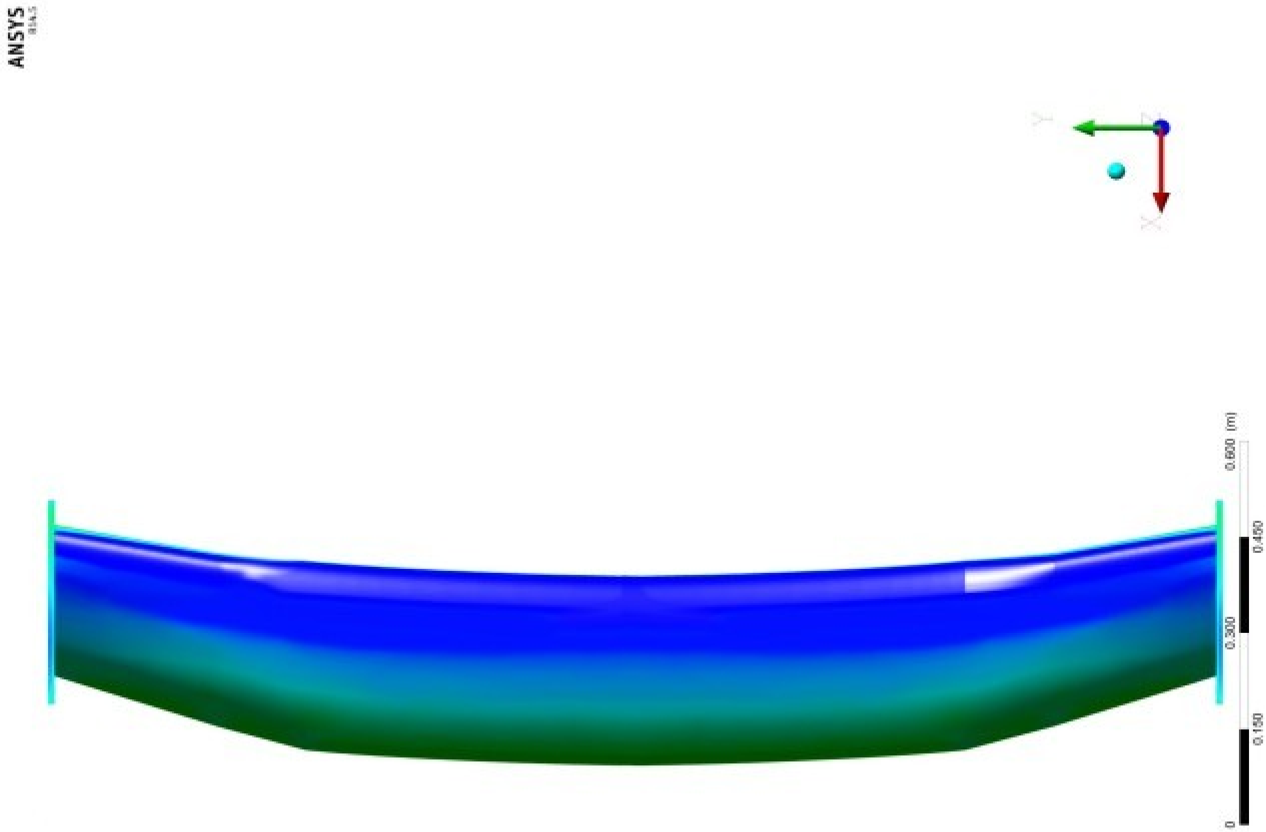
The following image illustrates the pressure distributions across the surfaces of the airfoil.



The following image illustrates both the pressure distribution and streamlines associated with the airfoil.



The following image illustrates both the pressure distribution on the underside of the airfoil


ANSYS
0
0.150
0.300
0.450
0.600 (m)

Gurney Flaps

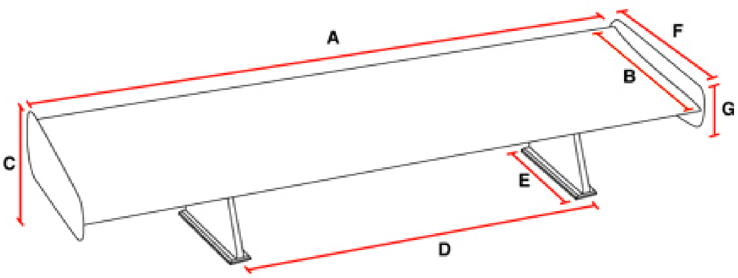
Gurney flaps are available for all APR Performance
GTC Series (200/300/500) wings. These are super lightweight, made using pre-preg carbon fiber processes, and conform perfectly to the contours of the GTC series 3D airfoils. They are easily attached using the included double-sided tape.

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.

Wing Dimensions

Measurements for the GTC-500 Adjustable Wing are shown in the table below. Pedestal-to-pedestal distances are indicated for standard applications. Custom pedestal-to-pedestal distances can be accommodated for custom applications.



WING DIMENSIONS TABLE

	A	B	C	D	E	F	G
GTC-500 Universal	71"	#	13.5"	47"	7.25"	12"	5"
Acura NSX 1990-2005	71"	#	10.5"	OEM	13.0"	12"	5"
Audi R8 2006-Up	71"	#	10.5"	43.75"	7"	12"	5"
Cadillac CTS-V Coupe 2009-Up	71"	#	10.5"	44.5"	7"	12"	5"
Cadillac CTS-V Sedan 2009-Up	71"	#	10.5"	34"	9"	12"	5"
Chevrolet Corvette C6 2005-Up	71"	#	10.5"	56"	9.0"	12"	5"
Dodge Viper Convertible 2003-Up	71"	#	10.5"	26.5"	9.0"	12"	5"
Dodge Viper Coupe 2006-Up	71"	#	10.5"	30.5"	9.0"	12"	5"
Ford Mustang S197 2005-Up	71"	#	10.5"	49"	9.0"	12"	5"
Mazda RX-7 1993-1997	71"	#	13.5"	47"	7.25"	12"	5"
Mitsubishi Evolution 8 / 9 2003-2007	71"	#	13.5"	OEM	9.0"	12"	5"
Nissan GT-R R35 2009-Up	71"	#	10.5"	42"	9.0"	12"	5"
Subaru Impreza WRX/STI 2002-2007	71"	#	13.5"	48"	7.25"	12"	5"
Toyota Supra 1994-1997	71"	#	15"	OEM	**	12"	5"

Special Notes:
#Variable cord length (12.75" Inner/9" Outer). **Fiberglass Mounting Base Included.