LOWE Industries

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15” Wings on 15 1/4” mounting centers

NACA profile BE153-155 * Cord thickness of 2 5/8” Add $100.00 for polished aluminum
Mounting brackets are .240” thick - And are on 15.25” on center apart
Mount holes are 3/8” * Back brace holes are 5/16”

15”x36” PN 63790-15361 $1400.00
15”x40” PN 63790-15401 $1425.00
15”x44” PN 63790-15441 $1450.00
15”x48” PN 63790-15481 $1475.00
15”x52” PN 63790-15521 $1475.00
15”x56” PN 63790-15561 $1500.00
15”x60” PN 63790-15601 $1550.00
15”x62” PN 63790-15621 $1600.00
15”x64” PN 63790-15641 $1650.00
15”x66” PN 63790-15661 $1700.00
15”x68” PN 63790-15681 $1750.00
15”x70” PN 63790-15701 $1800.00

This rear wing downforce/drag data is calculated on a KLRC single element 40” x 15” wing using a NACA profile BE135-155 with a 2 5/8 cord in 29.92bp, 30c and a “clean air” environment and correct spill plates.

Attack angle		**50 MPH**	**100 MPH**	**150 MPH**	**200 MPH**	**250 MPH**
Zero	Downforce Drag	13.5 lbs 0.1 lbs	60.7 lbs 0.4 lbs	136.75 lbs 1.5 lbs	243.4 lbs 2.4 lbs	345.6 lbs 3.9 lbs
2 degrees	Downforce Drag	16.0 lbs 0.2 lbs	70.6 lbs 0.4 lbs	159.0 lbs 1.7 lbs	283.0 lbs 2.8 lbs	401.8 lbs 4.0 lbs
4 degrees	Downforce Drag	19.13 lbs 0.2 lbs	82.1 lbs 0.8 lbs	184.9 lbs 1.9 lbs	329.1 lbs 3.2 lbs	467.3 lbs 4.5 lbs
6 degrees	Downforce Drag	22.8 lbs 0.3 lbs	95.5 lbs 0.8 lbs	215.0 lbs 2.1 lbs	382.7 lbs 3.6 lbs	543.4 lbs 5.0 lbs
8 degrees	Downforce Degrees	27.8 lbs 0.3 lbs	111.3 lbs 1.0 lbs	250.4 lbs 2.3 lbs	445.1 lbs 4.1 lbs	640.8 lbs 6.0 lbs
10 degrees	Downforce Degrees	32.4 lbs 0.4 lbs	129.5 lbs 1.2 lbs	291.3 lbs 2.7 lbs	517.9 lbs 4.9 lbs	734.1 lbs 7.0 lbs

A 36” wing is 4” narrower and thus is 9% narrower than the 40” wing in the chart above so reduce the calculations above by 9%.
A 48” wing is 8” wider thus is 20% wider than the 40” wing in the chart above so calculate an additional 20% into the factors above.
Adding a 1/2" NACA lip to the rear of the wing and pointing vertically will double the downforce but does not double the drag.

KLRC 15” Wing Information

The shape of a KLRC wing has been selected from years of testing using standard NACA designs. The NACA number for the KLRC wing is BE135-155 with a cord thickness of 2 5/8”. In exchange minimal aerodynamic drag this wing will create maximum down force for you. A good wing design gives you the best ratio of drag to down force ratio. A close look at our wing design will show you the slight depression in the top leading up to the upswept rear tip. The top of the wing from the front back to the rear tip is 3.9cm while the bottom is 4.2cm. If two molecules of air were standing next to each other when the wing comes by one molecule has to go over the top and the other has to go under the wing. The one that goes under tries to meet his brother molecule of air at the end of the wing. Because the one that has to go under has further to go the molecules are slightly pulled apart and this action creates the vacuum that pulls the wing down on a racecar and up on an airplane.

A fuel car wing and an alcohol car wing must be very different. A fuel car can pull a wing with a lot of drag and they need massive amounts of down force at speed. A methanol car (alcohol) is quite different. The wing needs to work but create an absolute minimum amount of drag. How methanol and fuel respond at the 1000’ mark on the racetrack is quite different and because of that the wing needs are quite different.

The KLRC wing is designed to give the best performance from 180 mph up to 275 mph. Under that speed or over that speed a slightly different wing design will give you a better drag to down force ratio. Usually cars running less than 180 mph do not use or need a wing and over 275 mph a different wing profile design is needed. All of our wings are rated in down force at 200 mph. Our wings have a “sweet spot” of high efficiency between 200 mph and 250 mph in that range no wing profile will give you a better drag to down force ratio. If you have a close look at the end of our wing with the spill plate removed you will see the billet spar. This spar is CNC milled to a specific profile. The form tool we use to make the formed spars uses the same program to duplicate the billet spar profile. A close look will reveal to you the top of the wing is not flat and the relationship between the concave top of the wing and the vacuum side of the wing. The relationship between the top to bottom skin ratio is one factor in the wings efficiency. You will notice the concave area in the top of the wing allows the air to speed up over the top of the wing. Therefore not only does the air have to further (top to bottom skin ratio) when it travels underneath the wing, but the top air is moving faster when it rejoins the air behind the wing. This also increases the power of the wing.

You probably have noticed that when you are sitting in an airliner before takeoff the pilot moves the back edge of the wing back and down to increase the lift at low take off speed. When the airliner lifts off the ground and starts to pick up speed the pilot will tuck the back edge of the wing, back up into place. This creates two different wing shapes for the pilot to use. The airliner cruses at the speed that uses the least amount of fuel (most efficient ratio of drag to lift) because that is the speed the shape the wings were made to be efficient. Your racecar is no different you too have to have a wing shape that gives you the best ratio of aerodynamic drag to down force.

In drag racing the rules state you cannot have wings that can be adjusted during the race. This prevents the racer from having a low speed wing and a high-speed wing on the car at the same time. One of the options we have on our wings is a wing that will react different from one speed to another. It still falls within the rules but gives you the best of a low speed wing and a high-speed wing. We do not build this feature into all of our wings as it is done only on request. Some applications do not see the benefit of the option so we do not incorporate this feature in all wings.

If you notice some racers using other brands of wings have to run very high “attack angles” on their wings to get the down force they need. The result of the excessive “attack angle” the racer gets the down force needed but the drag coefficient is very high which will result in a loss of performance. I have seen situations where the KLRC wing is on a TAD car set at 2 degrees and another brand of wing will not only be larger but also have the “attack angle” jacked all the way up to 15 degrees. With that much “attack angle” you might as well have a piece of plywood up there acting just like an air brake. Obviously their wing is not working as well as ours is.

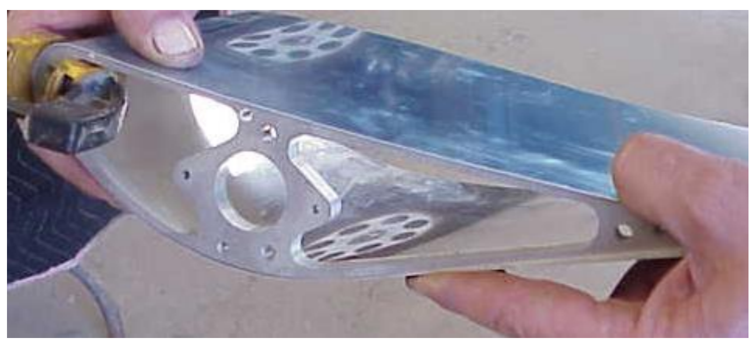
The KLRC wing is designed to operate with an “attack angle” of zero. This gives the absolute best drag to down force ratio for this wing profile. As you increase the “attack angle” of the wing by lengthening the rear adjuster bars you change the drag to down force ratio. At first the drag to down force ratio changes very little and we recommend not setting the “attack angle” at more than 10 degrees. After 10 degrees of “attack angle” the ratio can get excessive and other solutions are recommended. If you still need more down force there are two solutions. The first and easiest to try is adding a NACA lip to the back of the wing to stick straight up at 90 degrees to the wind direction. This lip should not be taller than ½”. Take a 1” wide strip of aluminum the length of the width of the wing and bend it in the middle so that half of the strip attaches with small screws to the back edge of the wing and the other half stick straight up at 90 degrees to the wind passing over the wing. This has the effect of doubling the down force of the wing with out doubling the aerodynamic drag. The other and better solution is to get a wing that is slightly longer to create more down force with out adding all the extra drag. Our standard wings come in lengths of 36”, 40” 47”, and 52” with specials width units available as well.

Wing mounting and location will effect the wing performance. The wing must run in “clean” air, as turbulence across the surface of the wing will reduce the performance of the wing. Often raising the wing so it has a clean shot at the air will improve the performance as much as 50%. On sedan cars when the wing is mounted directly behind the cabin of the car the performance can drop off as much as 80% since so much of the air is going over the top of the wing. You must remember it is the air going under the wing that makes the wing perform. A device that attaches to the back of the car and does not allow the air to pass under the device is not called a wing but a “spoiler” and as such the result will be drastically different. For a rear wing to have a decent shot at good performance the wing must be mounted at least 30” taller than anything else on the car. This will ensure the wing has clean air to operate in. In some applications the wing can be lowered as long as the wing can see clean non turbulent air.

Front wings are another story. Often it is up for discussion as to whether a front wing is needed or not. All too often a wing is installed (on the front or back) because the owner wants one because it looks good. That is ok just as long as you know that there is often little or no benefit and more often than not a performance loss because of the unnecessary wind resistance. Since most wings (even well designed ones) do not start to produce any significant drag until the air speed exceeds something around 170 mph. As a racer you have to ask yourself “How much time does my race car spend at speeds exceeding the starting point of the wings performance envelope”. And will the wing solve a problem that I have at that point. When you consider the different performance parameters of methanol and nitro you will see that the nitro car can use and needs a front wing while a methanol car probably does not. I have built alcohol cars with and without front wings according to the customer’s desires but have never used a front wing on my alcohol car. Now this is all based upon the assumption that the front wings on an alcohol car actually do anything. Remember that it is the bottom side of the wing that does the work. Also remember that the spill plate makes the wing more efficient and a bad spill plate does not protect the "sweet spot" on the bottom of the wing. Also not that most of the front wings used by nitro racers are mounted much higher than the alcohol front wings. This is because the front wings on the nitro cars have to perform. When you consider the 3" ground rule for the front of the car the low mounted front wings on most alcohol cars have a spill plate that is cut very short. This to allow the 3" ground clearance rule. In doing this the spill plate does not protect the "sweet spot" on the bottom of the wing. That coupled with the fact the front wings are usually very short as they are attached to the side of the nose (not the top) the wing does not have a real chance of ever producing any effect other than a bit of wind resistance. Therefore if the front wings on an alcohol car are not working then why have them on the car in the first place – other than looks. Lets face it the front wing is meant to keep the front wheels on the ground. In a fuel car the power band is such that the car does have the ability to lift the nose at 800-foot mark while an alcohol car does not have that power band. Conclusion – nitro cars need a correctly designed and mounted front wing while alcohol cars do not.

Before we start building the wing we need to establish what the names of the components are. The wing is constructed of several parts from the billet spars, the formed spars both left and right, the mounting plates and the beam, beam flanges, the skin and the spill plates. Below are pictures of each of them and a description of their part in the wing.
The skin and the spill plates are the parts of the wing that everyone sees and as such these parts are almost self-explanatory. The skin covers the wing skeleton consisting of the beam, the different spars and the mounting plates.

Billet wing spar ---------------------------------



Formed wing spar (left) ----------------
As viewed from the mounting bracket side – the punched and radii holes makes the unit lighter but stronger …….

Formed wing spar (right) ---------------
Just like the left formed wing spar but the flange thrown the other way.

Mounting plate -------------------------------------
Shown as product comes off the milling machine. This part has to have the main mounting holes drilled to 3/8" before the wing skeleton is assembled. This plate is sandwiched between the left hand and right-hand formed spars.

Beam --------------------------------------
Beam is a 1 ¼" outside diameter tube of chrom-moly or aluminum. Shown here installed in the skeleton and lying in the skin.

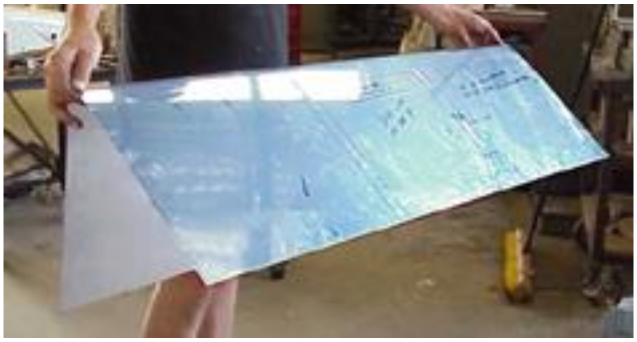
Beam flanges --

Beam flange shown against formed flange.

Beam flange shown against billet flange.

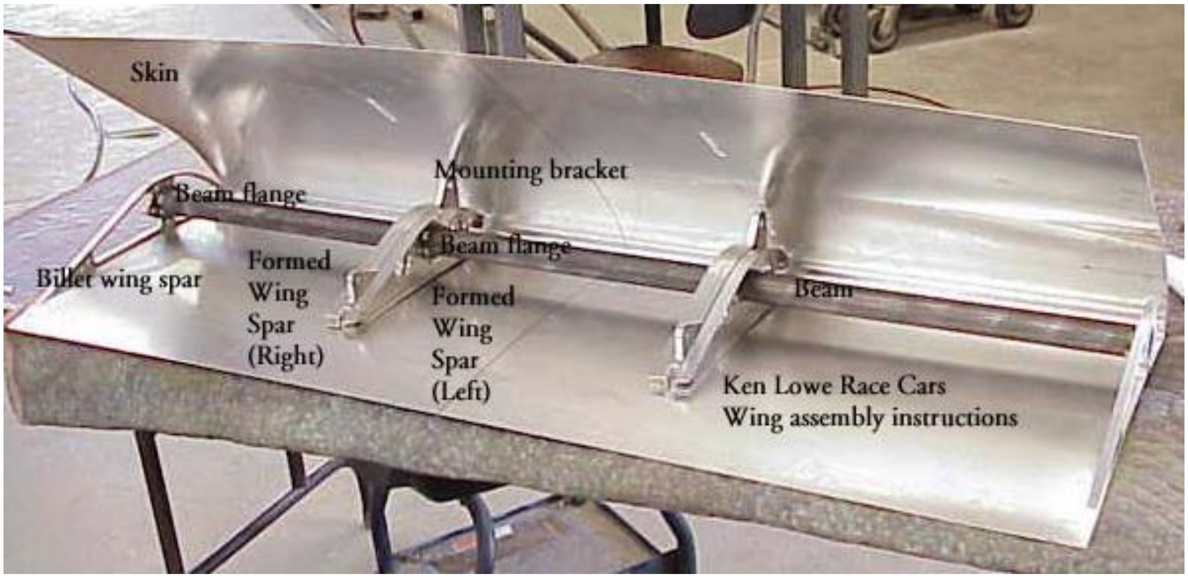
Beam flange shown in steel and aluminum. 1 ¼" inside diameter hole with 3/16" bolt holes.

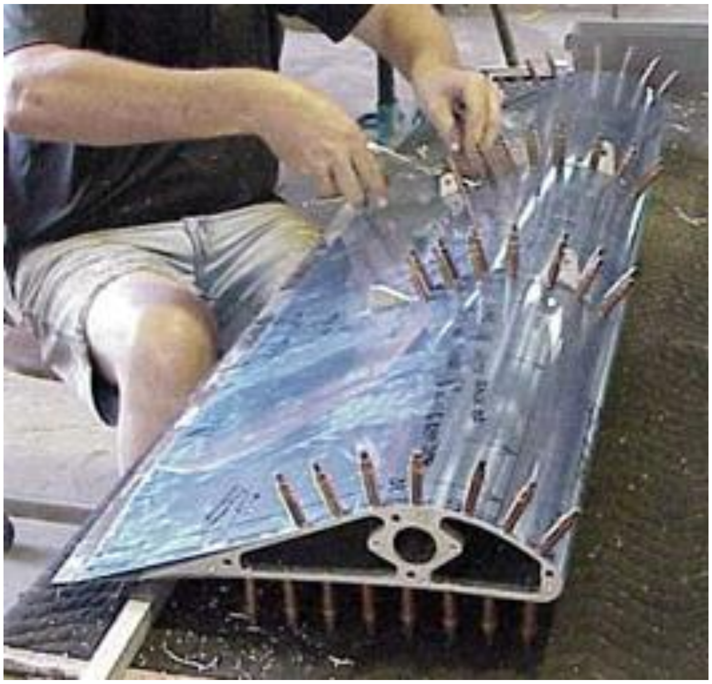
Skin ---
Skin material is standard 0.8mm thick or polished 0.5mm with plastic coating (shown).



Spill plates --
Spill plates are made from 2mm 5005 aluminum. CNC drilled and milled. Their function is to make the wing more effective by reducing air "spill" down to the low-pressure side from the top of the wing.

Skeleton ---
The skeleton of the wing is the assembly of the internal hardware of the wing. This consists of the beam; beam flanges, formed and billet spars and the wing mounting plates.
This shows the assembled skeleton ready to install in the cut, slotted and rolled skin.





Spill plates instructions -------------------------------
The spill plates are the caps that cover the ends of the wing. There are a lot of racers who think they are nothing more than a convent place to put the drivers number. Although they are good for that their use is a lot more important than that. An incorrectly designed spill plate will reduce the effectiveness of the wing as much as 50% depending upon the length of the wing. The shorter the wing the more a bad spill plate hurts the performance of the wing. The purpose of the spill plate is to keep the air from "spilling" over from the high-pressure side to the low-pressure side. On a racecar the wing creates a low-pressure area under the wing to use the vacuum to load the wing in a downward position just the opposite from an airplane wing. Allowing the air to be draw from the top of the wing to the bottom of the wing reduces the effectiveness of the wing. The shape of the KLRC spill plate is not based upon looks as it is function. The idea is to keep the pocket of low-pressure air on the bottom protected from the high-pressure air on the top. If the top air can dilute the bottom air then the wing becomes less effective. On our spill plates the top edge is made parallel to the neutral angle of the wing. In other words if the top edge is at zero degrees then the wing is set at neutral. This gives the absolute best drag to down force ratio for this wing profile. As you increase the "attack angle" of the wing by lengthening the rear adjuster bars you change the drag to down force ratio. At first the drag to down force ratio changes very little and we recommend not setting the "attack angle" at more than 10 degrees. After 10 degrees of "attack angle" the ratio can get excessive and other solutions are recommended. If you still need more down force there are two solutions. The first and easiest to try is adding a NACA lip to the back of the wing. The other and better solution is to get a wing that is slightly longer to create more down force with out adding all the extra drag. Our standard wings come in lengths of 36", 40" 47", and 52" with specials units available as well.