

# How to Set Up Corvette IRS Rear Camber (basic do-at-home version)

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This tech paper will discuss how to do a basic rear camber verification/setup at home in your garage using simple hand tools.

This article is based on an article previously written by L. F. Getz, and provides further simplifications, explanations, technical corrections, and tips for the do-it-yourselfer.

## Overview

There are 2 adjustments possible on the 1963 and later Corvette Independent Rear Suspensions (IRS): Camber, and Toe. Both of these adjustments can be verified and corrected without the use of an "alignment machine," and can be successfully made at home in your garage or in your driveway provided the surface is relatively flat. Toe can be measured and set by simply using a tape measure on the front and the rear side of the tires, but camber is a little trickier.

## Tools and Equipment Required

As a minimum, you will need the following tools:

1. A 2-foot carpenter's level ("bubble level") that you're willing to cut down to size
2. 6" "machinist's scale" graduated in 1/32", hundreds of an inch, or millimeters
3. Small "C"-clamp
4. 2ea. 8" square pieces of 1/8" thick steel plate
5. 8ea. 1/4" diameter round steel rods 8" long
6. Calculator with "Sin" and "inv Sin" functions (optional – not required)

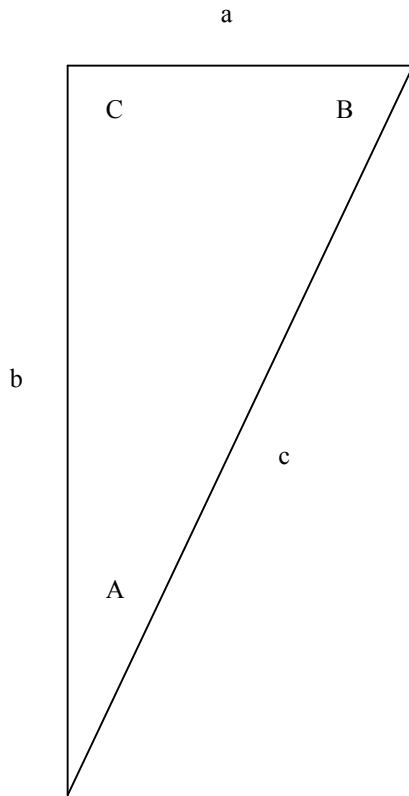
## Theory

Wheel "Camber" is a measurement of the "tilt" of the wheel from the vertical plane as seen from the front or the rear of the vehicle. If the top of the wheel tilts inward towards the vehicle centerline, the wheel is said to have "Negative Camber." If the wheel tilts outward at the top, the wheel has "Positive Camber." Performance vehicles will typically have a slight amount of negative camber (usually 1/2 degree to 1 degree) in order to promote optimum cornering characteristics, whereas drag racers will typically run "0" camber in order to produce the best tire-to-pavement contact area in a straight line.

By using some simple trigonometry, we can determine the wheel angle – or camber – using a carpenter's level to determine a vertical plane, and by measuring the distance that the top of the wheel is displaced from this plane.

Let's first review some basic "trig" so you can do all this yourself using a calculator. If you don't have a calculator, I have provided all the numbers and tables you will need to get the job done without a calculator.

Since we're going to be dealing with "right triangles" (a triangle where one of the angles is a 90-degree angle), we know that the "sine" (written "sin") of an angle is the length of the side opposite the angle divided by the hypotenuse (the longest side):



Angle "C" is 90 degrees

Side "c" is the Hypotenuse

Sine of angle "A" is length of "a" divided by length of "c"

To find angle "A," take the inverse Sin ( $\text{Sin}^{-1}$ ) of "a" divided by "c."

**Example to find angle "A":**

"a" is 1/8" (.125")

"c" is 15.5"

$.125/15.5 = .0080645161$

$\text{Sin}^{-1}(.0080645161) = .462$  degrees

What we're going to do, then, is to use our carpenter's level to establish the vertical plane shown as side "b." The lower edge of our level will rest against the lowest part of the wheel on the wheel bead surface (without getting into the radius that flips out to the outer edge of the wheel). This establishes the bottom "point" of the triangle. Side "a" will be established by a machinist's scale clamped to the top side of the level and touching the top part of the wheel bead surface. Surface "c" is the side of the wheel from lower bead surface to the upper. For a 14" wheel, "c" is 14.5". For a 15" wheel, "c" is 15.5", and it's 16.5" for a 16" wheel.

## Procedure

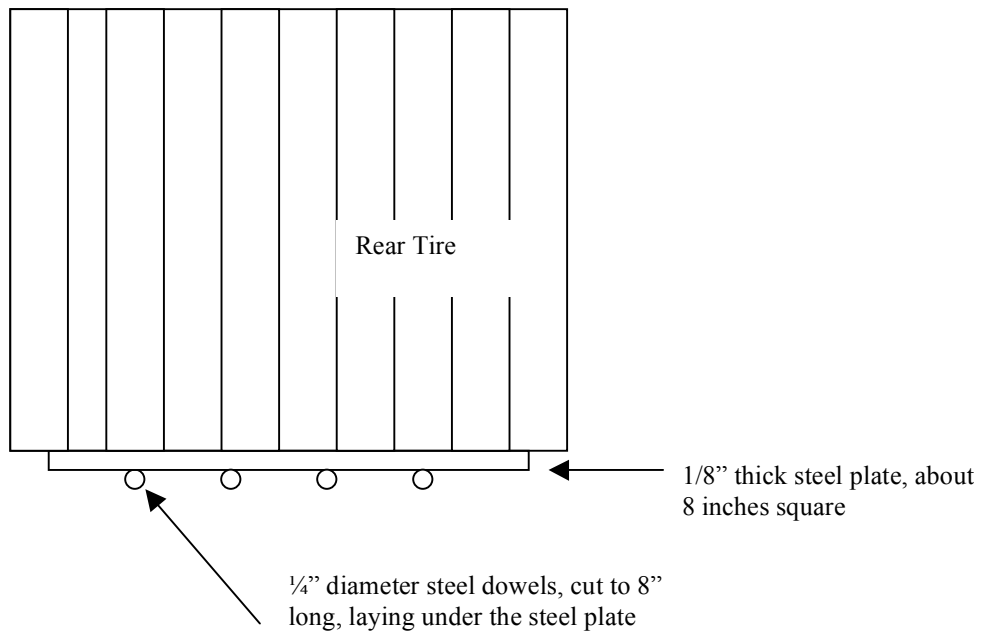
### 1. Verify your Wheels

We will be taking measurements from the outside surface of the wheel "bead" area. It is quite common for used factory wheels to have some "curb damage" in this area. If your wheels are bent, it will not be possible to take accurate measurements. Before proceeding, raise the back of your car off the ground and let the engine idle in gear so the wheels rotate slowly. Observe the wheels for "wobble." If your wheels wobble more than 1/16" it will be very difficult to take meaningful measurements.

**2. Fabricate a set of Slide Plates** *(Required only if the camber is to be adjusted – not needed if you are just checking the camber. If just checking the camber, drive the car in and out of the driveway to make sure the rear end is at its normal height and state of "settling.")*

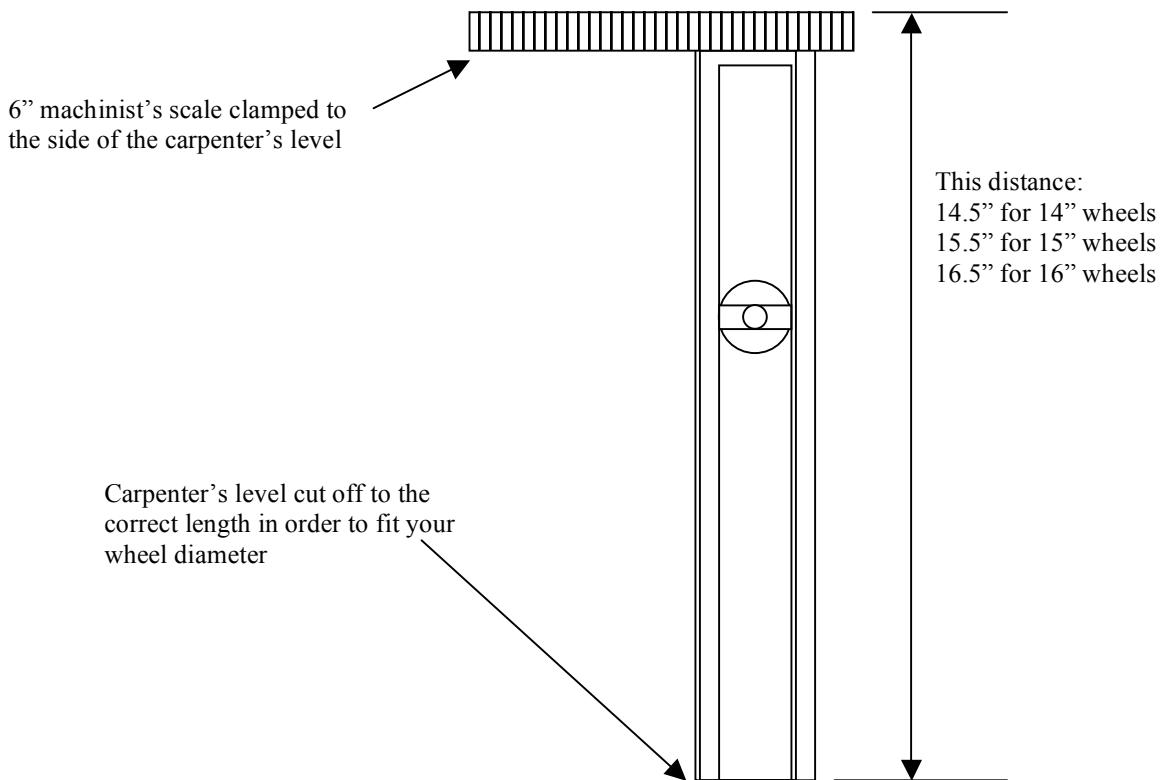
In order to obtain accurate readings, and in order to get instant results when adjusting the camber, the rear tires must be able to slide inward and outward from the vehicle centerline with the full weight of the vehicle on the tires. Alignment shops use special slide plates under the tires to allow this. You must fabricate a set as well.

To do this, obtain 2 pieces of 1/8" thick steel plate. Cut 8 pieces of 1/4" diameter round steel rod to the same 8" length. Lay 4 pieces of the round rod under each plate, equally spaced, with the rods running parallel to your vehicle centerline. Place these crude roller plates under each rear tire and give the vehicle a few "bounces" to allow the plates to roll around and settle the suspension.



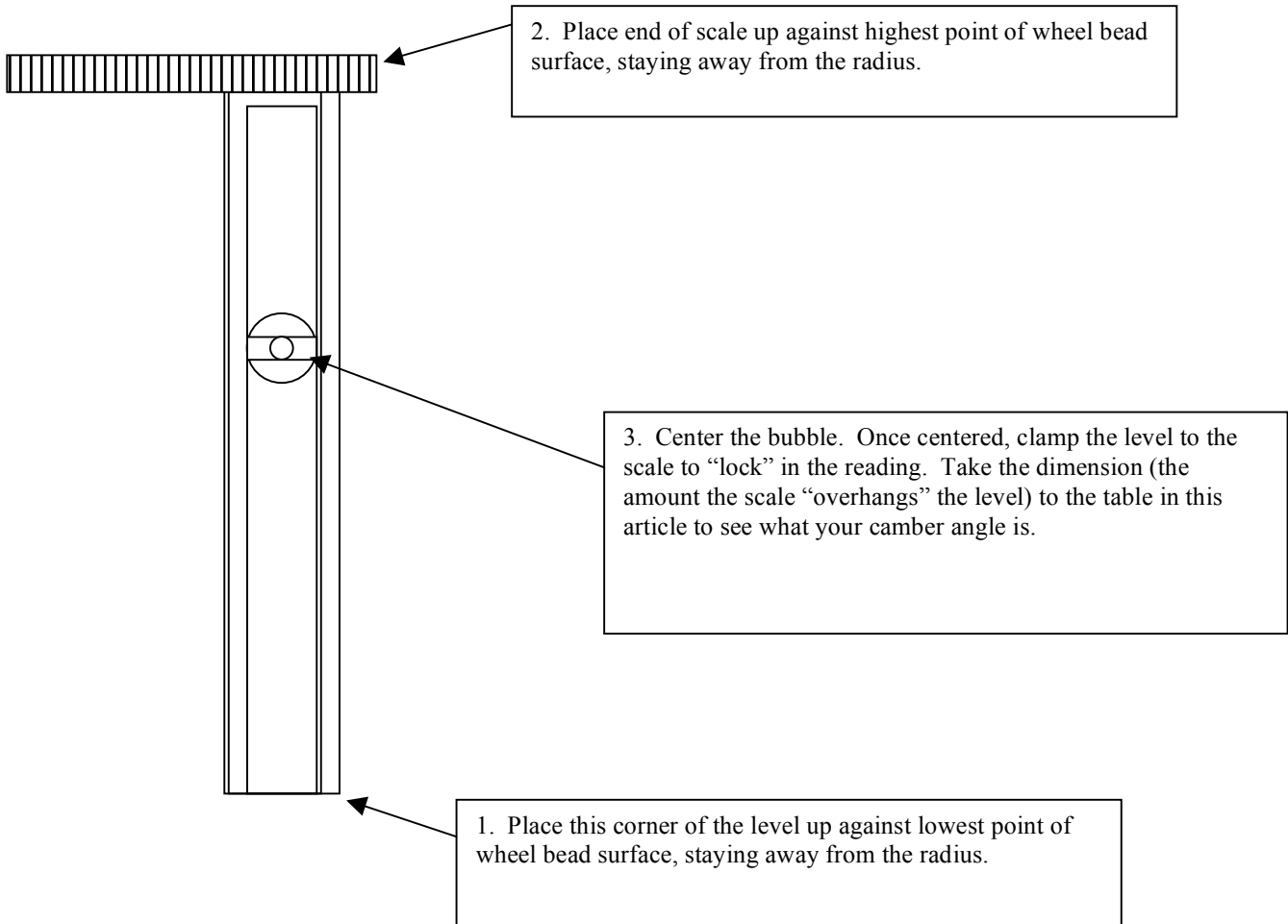
### 3. Cut your level to length

In order to accurately measure from the top to the lower bead areas, your level must be trimmed to length to fit the wheels you are using:



#### 4. Take your measurements

Place the lower edge of the level into the wheel up against the outer surface of the “bead” surface, avoiding the outer radius of the wheel. Loosely clamp the 6” scale to the side of the level at the top of the level, establishing the dimension shown in the previous sketch. While holding the lower corner of the level firmly against the wheel, slide the scale into contact with the upper area of the wheel while keeping the “bubble” in the middle. When the bubble is centered with the scale in firm contact with the wheel, you have your measurement. Snug down the clamp, remove the “assembly,” and read the measurement on the scale.



You can now use your measurements and “trig” out your own data using a calculator, or you can simply go to the tables below to get the results. I have provided you with tables for 14”, 15” and 16” wheels. The tables on the left are the “A” tables. The tables on the right are the “B” tables. Use them as follows:

If you take a measurement and want to know what your camber is, use the “A” tables. Measure in fractions of an inch or millimeters. Find the measurement in the far left column and see what your camber is.

If you want a specific camber angle, go to Table “B.” Find the angle you want, and then see what your measurement needs to be. You can take this measurement and “pre-set” your scale, clamping it to your level at that measurement. Using an assistant to hold the scale/level assembly against the side of the wheel, you can then get under the car and adjust the camber until the “bubble” is centered in the level. Your camber angle is now as you pre-set it.

# 14" Wheel

Units of measure: Camber is in degrees. Measurements are in inches and millimeters as noted.

Table "A"

If You Measure		Camber is:
(Inches)	(mm)	
0	0.00	0.00
1/32	0.79	-0.12
1/16	1.59	-0.25
3/32	2.38	-0.37
1/8	3.18	-0.49
5/32	3.97	-0.62
3/16	4.76	-0.74
7/32	5.56	-0.86
1/4	6.35	-0.99
9/32	7.14	-1.11

Table "B"

Desired Camber	(Inches)		(mm)
	(Inches)	(mm)	(mm)
-0.125 (-1/8)	0.032		0.81
-0.250 (-1/4)	0.063		1.60
-0.375 (-3/8)	0.095		2.41
-0.500 (-1/2)	0.127		3.23
-0.625 (-5/8)	0.158		4.01
-0.750 (-3/4)	0.190		4.83
-0.875 (-7/8)	0.221		5.61
-1.000 (-1)	0.253		6.43

# 15" Wheel

If You Measure		Camber is:
(Inches)	(mm)	
0	0.00	0.00
1/32	0.79	-0.12
1/16	1.59	-0.23
3/32	2.38	-0.35
1/8	3.18	-0.46
5/32	3.97	-0.58
3/16	4.76	-0.69
7/32	5.56	-0.81
1/4	6.35	-0.92
9/32	7.14	-1.04

Desired Camber	(Inches)		(mm)
	(Inches)	(mm)	(mm)
-0.125 (-1/8)	0.034		0.86
-0.250 (-1/4)	0.068		1.72
-0.375 (-3/8)	0.101		2.58
-0.500 (-1/2)	0.135		3.44
-0.625 (-5/8)	0.169		4.29
-0.750 (-3/4)	0.203		5.15
-0.875 (-7/8)	0.237		6.01
-1.000 (-1)	0.271		6.87

# 16" Wheel

If You Measure		Camber is:
(Inches)	(mm)	
0	0.00	0.00
1/32	0.79	-0.11
1/16	1.59	-0.22
3/32	2.38	-0.33
1/8	3.18	-0.43
5/32	3.97	-0.54
3/16	4.76	-0.65
7/32	5.56	-0.76

Desired Camber	(Inches)		(mm)
	(Inches)	(mm)	(mm)
-0.125 (-1/8)	0.036		0.91
-0.250 (-1/4)	0.072		1.83
-0.375 (-3/8)	0.108		2.74
-0.500 (-1/2)	0.144		3.66
-0.625 (-5/8)	0.180		4.57
-0.750 (-3/4)	0.216		5.49
-0.875 (-7/8)	0.252		6.40
-1.000 (-1)	0.288		7.31

1/4	6.35	-0.87
9/32	7.14	-0.98

## 17" Wheel

If You Measure		Camber is:
(Inches)	(mm)	
0	0.00	0.00
1/32	0.79	-0.10
1/16	1.59	-0.20
3/32	2.38	-0.31
1/8	3.18	-0.41
5/32	3.97	-0.51
3/16	4.76	-0.61
7/32	5.56	-0.72
1/4	6.35	-0.82
9/32	7.14	-0.92

Desired Camber	Camber		
	(Inches)	(mm)	
-0.125	(-1/8)	0.038	0.97
-0.250	(-1/4)	0.076	1.94
-0.375	(-3/8)	0.115	2.91
-0.500	(-1/2)	0.153	3.88
-0.625	(-5/8)	0.191	4.85
-0.750	(-3/4)	0.229	5.82
-0.875	(-7/8)	0.267	6.79
-1.000	(-1)	0.305	7.76

### Questions, Comments & Technical Assistance

If you have questions or comments regarding this article, or if you notice any errors that need to be corrected (which is quite possible since I'm writing this from memory...), please feel free to drop me an e-mail. Also, if you need any technical assistance or advice regarding this process, or other maintenance issues, feel free to contact me:

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