Do-It-Yourself Alignment

Measuring Camber

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Obviously, if you have a camber gauge, simply hold against the wheel/tire and measure. If you are measuring against the tire, move away from centerline enough so that the "bulge" (where tire meets the ground) does not effect measurement.

If you don't have a camber gauge, simply use a level (3' is good) and a tape measure or ruler. Again, move level away from bulge, halfway from center-of-rim to rim-edge works fine on most cars.

Hold the top (for neg camber) or bottom away from the tire to get the level "level". Measure the distance you pulled away from tire. For a Corvette with 18" wheels, every 1" of lean is approx 3.0 deg, or 1/8" is approx 0.375 deg.

You'll never get camber "exactly" like you want it, so shoot to get within 1/8" or less, and you'll be close to ¼ deg within the desired range. This is still much more accurate than your local alignment shop is likely to get.

Measuring Castor

These measurements are based on the C5/C6 steering ratio of 16:1. While you can get "relative" castor of any vehicle, the "multiplication factor" for absolute Castor is only for cars with 16:1 steering ratio.

1. Start car, as you'll need power steering.
2. Turn wheel exactly ½ turn to the right
3. measure camber of each wheel, marking left and right (be sure to make note of positive and negative camber)
4. Turn wheel 1 full turn back to the left, or ½ turn left of center
5. measure camber of each wheel, again making not of positive/negative.
6. Subtract total camber change on each side
7. Multiply the camber change by 2.62 for total castor on that side.

Example: When turned to the right, your left wheel might read –2.0 camber. When you do the full turn left, the same wheel might read +2.0 camber. The camber change would be 4.0 degrees (+2.0 – (-2.0)). SO, the total castor on the left wheel would be 4 x 2.62, or 10.48.

The advantages to more castor are (1) self centering of steering wheel (2) increased steering feel (3) more dynamic camber in the turns. While absolute castor is of some importance, getting the castor nearly equal side-to-side is important to reduce steering "pull"

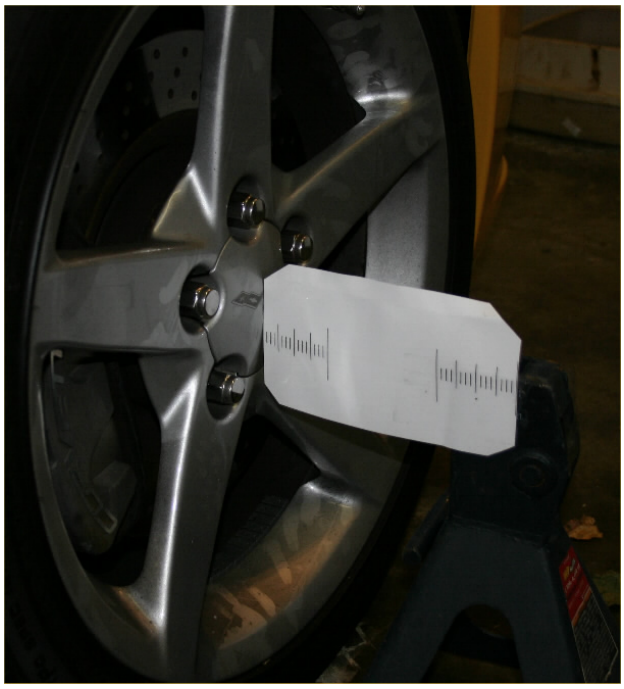
these measurements are based on a sin approximation, and should be quite accurate. However, I'm relying on the steering ratio to be correct AND the user to make repeatable measurements. If you are aligning your street car and about to buy an expensive set of tires, you might want to consider visiting an alignment shop

Thrust Angle

I finally came up with a very accurate, repeatable way to check your thrust angle. Assuming you make even changes to each side of your rear suspension, it shouldn't change, but this is a way to verify.

First, you will need a couple of things. 1. A laser level. Mine cost under $30 at Lowes. You want it long enough to get a nice spread on your wheel/tire, as it needs to be absolutely parallel to your rear wheel when measuring. 2. A guide to measure the front displacement. I made a sheet on stiff paper with 1/8" markings, then taped it to a jack stand. A piece of cardboard with sharpie markings would work just fine. You'll need marks front and rear, so you can do the other side of the car.

1. Set you guide against the center of front wheel. It should just "touch" the wheel, but not press hard enough to bend your guide



2 Hold laser level against rear wheel. Depending on how wide your body work is, you can either hold it against the rim seat, the rim lip, or the tire itself. You MUST PUT IT IN EXACTLY THE SAME PLACE WHEN YOU DO THE OTHER SIDE OF THE CAR.

3. Read your guide to see the offset between the front and rear.

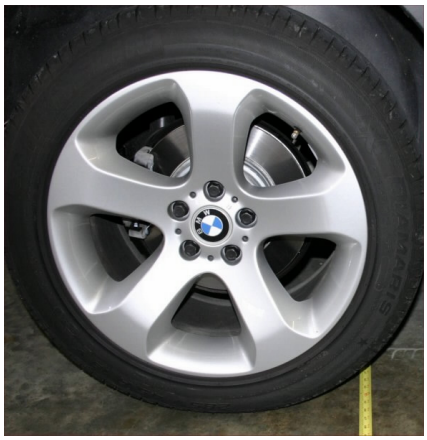
4. Repeat on other side of car. Difference between the two measurements is your thrust runout. If you can get it within 1/8" (less than 0.1 deg), your are in great shape. Remember, you aren't measuring track width or anything, just need a RELATIVE differential between your front and rear offsets. You MUST place your tools and make your measurements exactly the same on both sides.

****you can reverse this procedure, measure front to rear, to get your steering wheel straight****

Measuring Toe

Toe is measure by measuring the difference in track between the front of your tires, and the rear of the same tires. You can use toe-plates, but I fine a straight edge and a tape measure works just fine. My method is great for the solo mechanic.

1. I measure my "difference" where the rim and tire meet. It is far enough away from the tire "bulge" but not so far out that you are on the face of the tire. See location of ruler in picture below. Slide tape under car, and ensure it is in this position on both sides of car.



2. Once tape is under vehicle, hold straight edge firmly against the tire and pull tape firmly against it. The tape should sit firmly on the ground, and should hold its' position when you remove the straight edge.

2. Go to the other side of the vehicle. Hold straight edge in exactly the same position (where tire and rim meet), and slide the straight edge down against the tape measure. Read where the two touch, on the shorter side of the tape. In this example, it is 67 ¾"

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4. Repeat steps 1-3 on the back of the same 2 wheels. Measure that distance and simply calculate the difference. For instance, if the front of the tire measure 67 ¾" and the rear measure 68 ¼", then your tires would be toed-in ½" TOTAL.

***A few pointers.**

1. If you change camber on one wheel only, ONLY adjust the toe on that wheel. That way you don't have to worry about screwing up the thrust angle or steering wheel angle.

2. On the Corvette C5/C6, the toe adjuster is in front of the front wheels, and behind the rear wheels. Therefore, tightening the fronts "toes-in" and tightening the rears "toes-out".

Roll and bounce vehicle between all alignment changes and measurements. Check toe only after rolling forward, as measurement can be slightly different in rear vs. forward travel. If you have a habit of driving backward, I guess you could measure after rolling backward. Since most home alignment people have to jack their car to make changes, bouncing ensures you get an accurate measurement. Both toe and camber change when you raise your car due to "bump-steer"