

THE

CAGE GAGE

ROLL CAGE DESIGN MADE EASY!

USER MANUAL

Thank you for choosing the Cage Gage to help you with your next fabrication project!

The Cage Gage will speed up your design time, reduce your guess work, and help you reduce your scrap and waste. Designed to be durable, easy to use and CNC machined from 6061 aluminum, your Cage Gage will provide you with a lifetime of service.

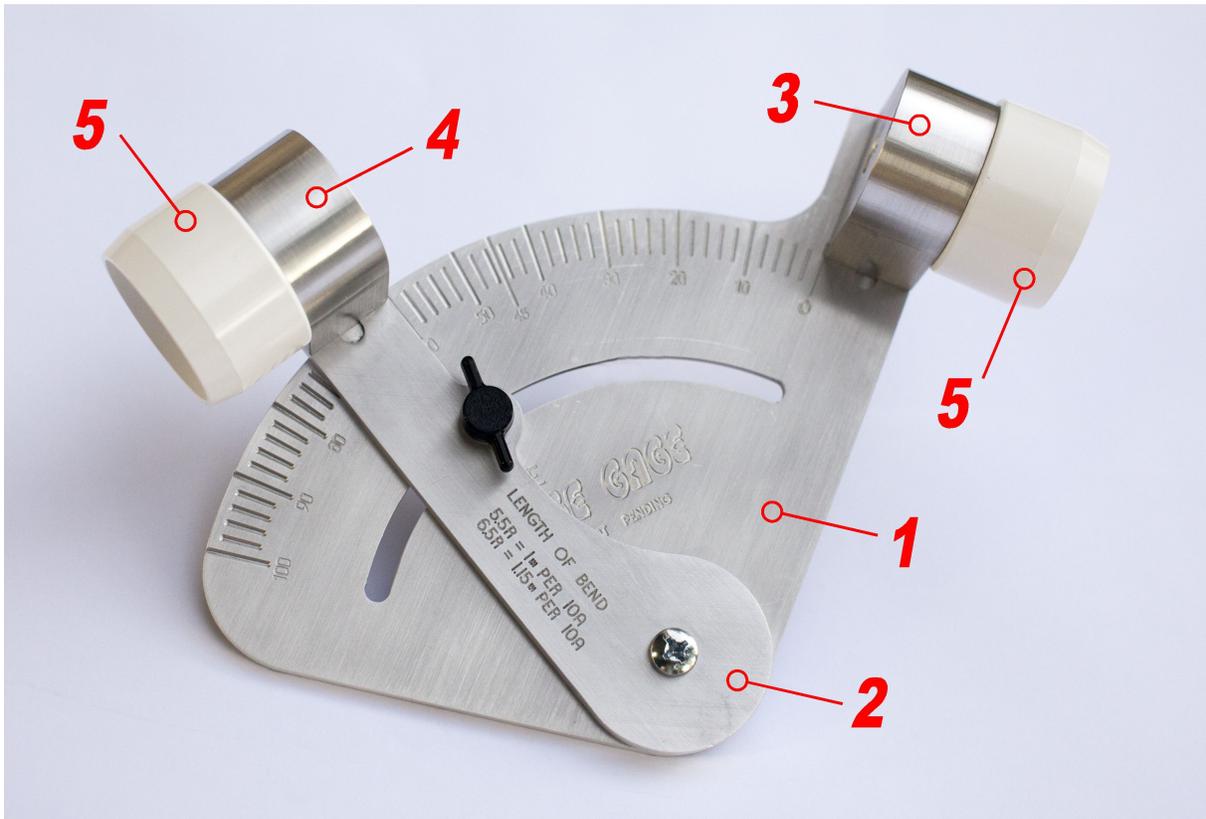


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Overview:

The Cage Gage is comprised of (5) main components (see fig.1):

- 1) Base Plate
- 2) Adjustable Arm (with length of bend cheat-sheet)
- 3) Base Plate Riser Block
- 4) Arm Riser Block
- 5) (2) PVC Cups



<fig.1>

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The Cage Gage is designed to be used with both 5-1/2" & 6-1/2" radius bends! (see fig.2 & fig.3)

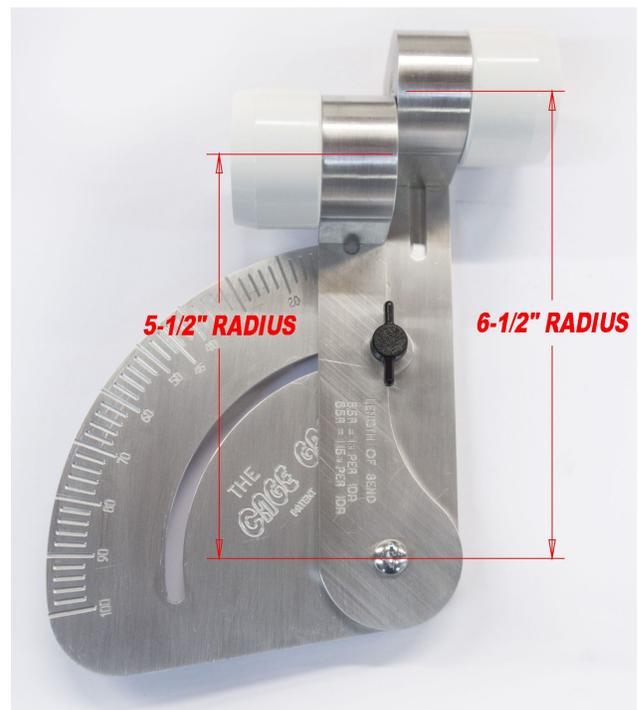
Switching the Cage Gage from one radius to the other is achieved by loosening the 1/4" flat head screw and rotating the riser blocks 180° in their respective locations.

NOTE: The riser blocks are matched to their respective component and are not intended to be swapped. The base plate riser block is 3/16" taller than the adjustable arm riser block to keep the center-lines of the PVC cups at the same height.

After rotating the riser blocks 180°, the PVC cups must then be rotated to the other side of the risers so they are orientated correctly for use.



<fig.2>



<fig.3>

Using the Cage Gage:

The Cage Gage is very simple to use. Loosening & tightening the thumb screw on the adjustable arm allows you to set the desired angle.

The Cage Gage is intended to be used with 1-1/4" PVC pipe, which will be a light press-fit into the inside diameter of the PVC cups located on the riser blocks on the adjustable arm and base plate.

Despite how it is identified, 1-1/4" PVC pipe actually measures 1.660 outside diameter, making it a great choice for modeling both 1-1/2" and 1-3/4" diameter roll cage tubing.

Included with your Cage Gage are (2) 10" long PVC tubes. For modeling sections of cage with longer straights, purchasing a 10-foot length of 1-1/4" PVC tube from your local hardware store or plumbing supplier should be enough PVC for an entire cage build.

NOTE: All PVC tubing is controlled to the outside diameter, no matter the "schedule" thickness. For cost purposes, we suggest using "SDR 26" which is a thinner wall PVC, making it lighter and less expensive than Schedule 40. As of this writing, we purchase 1-1/4" SDR 26 at Lowe's for under \$7 for a 10-foot length.

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The length of bend calculator engraved on the arm is to help you determine how much “straight” material you need to make a bend. It is shown in 10° increments, so if you are making a 25° bend you'd need to multiply by 2.5 ($25 / 10 = 2.5$). If you were making a 58° bend, you'd multiply the number by 5.8 ($58 / 10 = 5.8$) to figure out the length of material needed. We erred on the side of caution with the calculation number by rounding up. For example, the length of bend for a 5-1/2” radius is ($5.5 \times 2 \times \pi = 34.557$ ” length for 360°, divide by 36 for a 10° section = .960”, we rounded up to 1”)

The Cage Gage can be used in a couple of different ways:

- It can be used simply as an angle finder
- It can be used to replicate sections of roll cage to test fit-up, test different bar positioning scenarios, and as an accurate template to use when bending your cage tubing.

There are a few things to consider when laying out a section of roll cage to make your build process as easy as possible:

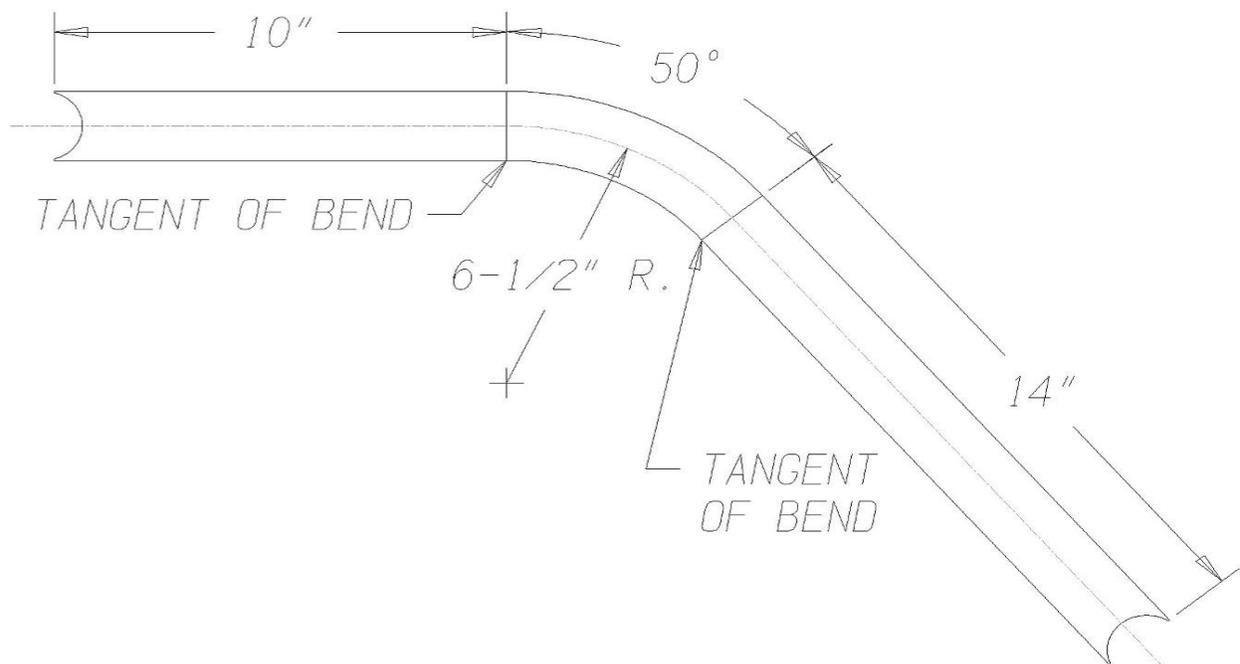
- Make sure you have the Cage Gage set up to match the bend radius of your bending die
- Make sure you take accurate measurements
- Make sure you account for extra material for the notches when you take measurements
- Make sure you “know” your bender

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Let's make a bend:

We have our Cage Gage set for a 6-1/2" bend radius and we determine we need a tube with a 10" leg & a 14" leg (including the notches), with a 50° bend section (see fig.4).

I find it easier to have a big note pad handy and sketch out what I am trying to make and then "fill in the blanks" with the angles and leg lengths I need, similar to fig.4.



<fig.4>

The bend tangents are very important! This is the point where the bend starts and stops. We will refer to the bend tangents multiple times. Also worth noting, the bend radius is usually referenced to the center-line of the material.

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Let's calculate how much material is needed to make this section of tubing. Using the engraved cheat-sheet on the arm of the Cage Gage, we see that for a 6-1/2" radius, we need 1.15" of material per 10° of bend angle.

$$1.15 \times 5 = 5.75'' \text{ mat'l for the bend} + 10 \text{ leg}'' + 14'' \text{ leg} = 29.75 \text{ or } 29\text{-}3/4'' \text{ long}$$

There is no shame in rounding up to 30" or even 31". Better to notch twice than come up short due to a measurement error!

This is where “knowing your bender” is very critical! You can make the most accurate templates possible, but if you can't duplicate them with your bender, you will get frustrated!

Every bender is slightly different. A 6-1/2" radius on brand A might yield an ever so slightly different result than brand B. The best thing to do is this: perform a 90° test bend with equal leg lengths and calculate the length of material needed, similar to the calculations we made in the above example. **Use a permanent marker to mark the bend tangents where your bends should start & stop on the straight tube before performing your test bend.**

This will tell you two things:

- Are the length of bend calculations close to what you are experiencing with your bender?
- Do you really know where your bend is starting & stopping in your bender?

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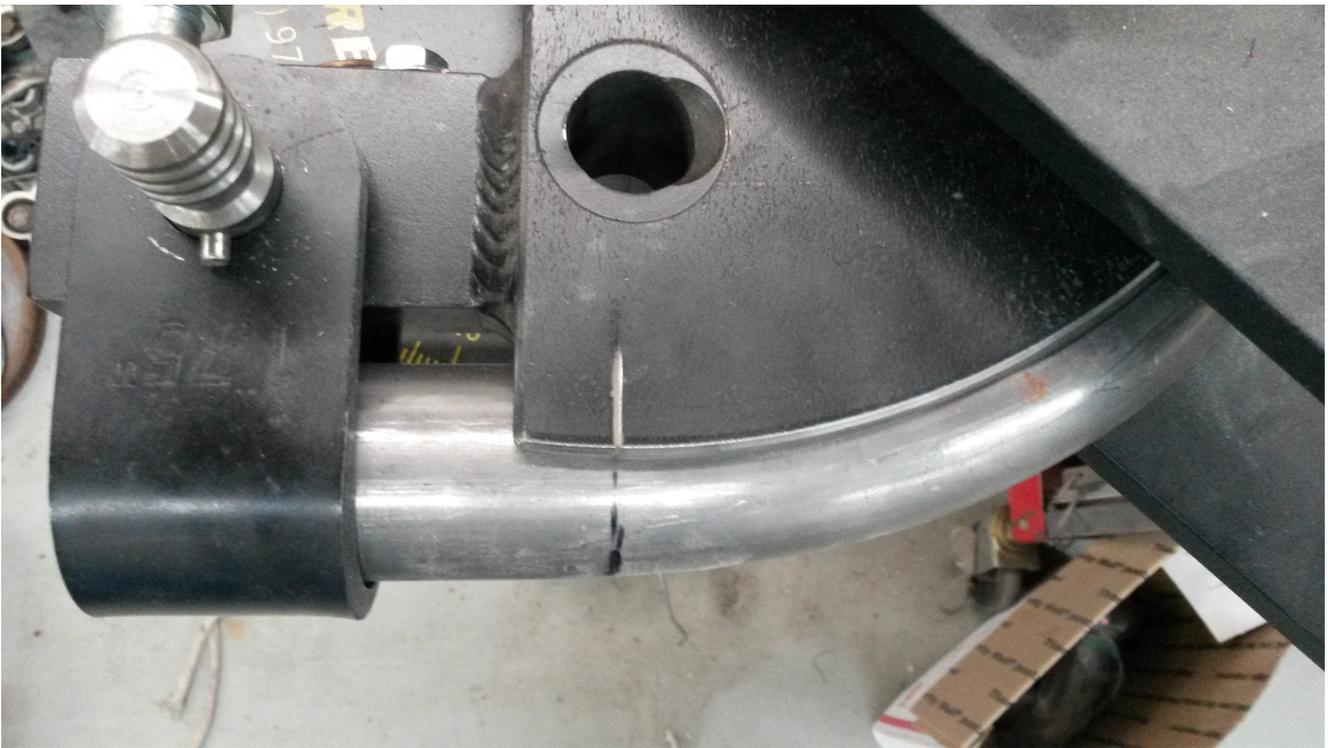
Using a carpenters square and a flat surface, stand your test bend up, this will allow you to measure both sides of your 90° bend to compare each leg length. They should be equal in length (see fig.5).



<fig.5>

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If one leg is longer than the other, then you are not starting your bend (where you marked on the tube) at the theoretical tangent of the die in your tube bender. After performing a successful test bend in our bender, we made a notch on our die to make sure we start the bend at the same place every time (see fig.6).



<fig.6>

If the leg lengths are equal to each other, but longer (or shorter) than planned, then you can subtract (or add) to your length of bend calculation. Again, it is better to error on the side of caution and end up a 1/4" long than a 1/4" short!

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Be sure to visit our website and our Facebook page and check out the pictures and YouTube videos where we cover building specific roll cage components using both a single Cage Gage and two Cage Gages!

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