

DIY (Do It Yourself) POOL COVER REEL

BUILD YOUR OWN HEAVY DUTY POOL COVER REEL FOR ABOUT \$125 IN MATERIALS

PORTABLE, DURABLE, LIGHT WEIGHT, INEXPENSIVE

HOLDS UP TO (approximately) 600 SQUARE FEET OF SOLAR POOL COVER (more with modifications).



This guide was written for someone with very basic fabrication skills. You do not need to be an expert at working with any of the tools or materials in this guide. You just need to have a fundamental ability to follow simple directions. More importantly, you should be someone who enjoys building things themselves. Very light duty reels are available for about the same price as the materials used to build this one. There are similar quality/strength reels available for two or three times the materials cost of this one.

NOTE: The order of assembly of components as listed in these plans is not critical. However, the assembly order has been arranged for maximum simplicity and the avoidance of mistakes.

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Index

2

Page 1	Cover DIY (Do It Yourself) POOL COVER REEL
Page 2	Index
	PART I TOOLS AND MATERIALS
Page 3	Sizing: Pool, Pool Cover and Pool Cover Reel
Page 4	Tool List
Page 5	Materials List page 1
Page 6	Materials List page 2
Page 7	Materials Receipts
	PART II MODIFICATION OF MATERIALS AND TIPS
Page 8	Names for Various Components of Reel
Page 9	Cutting Tubing: List of Cuts, How to Get a Straight Cut
Page 10	Cutting Tubing: How to Get a Straight Cut
Page 11	Cutting Tubing: Pre-assembly Cuts
Page 12	Drilling Holes: Axle Holes
Page 13	Drilling Holes: Crank Pass-Through Holes
Page 14	Drilling Holes: Crank Pass-Through Holes
Page 15	Dry-Fitting Pieces
Page 16	Marking for Assembly—Alignment Lines, Joint ID
Page 17	Marking for Assembly—Depth Lines
Page 18	PVC Primer and Cement
	PART III BASE, AXLE, INVERTED V ASSEMBLIES
Page 19	Assembling the Base Lengths
Page 20	What to Do if I Make a Mistake
Page 21	Installing the Axle
Page 22	Checking for “Square”
Page 23	Installing Uprights and Legs
Page 24	Assembling Inverted V Uprights – how to align
Page 25	Installing Inverted V Uprights onto Base Lengths
Page 26	Installing Lift Handle on Ends of Base Lengths
Page 27	Installing Lift Handle on Ends of Base Lengths
Page 28	Tightening Axle Nuts, Finishing Axle
Page 29	Finishing Axle
	PART IV CRANK ASSEMBLY
Page 30	Assembling the Tie-off Tees
Page 31	Measuring for Crank Length
Page 32	Measuring for Crank Length
Page 33	Assembling the Main Crank Assembly
Page 34	Checking Fitment of Crank and Pass Through Pipes
Page 35	Checking the Length of the Pass Through Pipes
Page 36	Installing Second Pass Through Pipe
Page 37	Finishing Non-Handle End
Page 38	Assembling and Installing Crank Handle Arm
Page 39	Assembling and Installing Spinning Handle Grip
	PART V MODIFICATION OF COVER
Page 40	Installing Grommets in Cover
Page 41	Installing Draw Rope into Grommets
Page 42	Folding Cover and Positioning Reel
Page 43	Rolling up Cover
Page 44	Storing Reel and Cover
Page 45	Contact and Additional Information, End

Sizing: Pool, Pool Cover and Pool Cover Reel

3

The pool we will use for our sizing example is of the “figure 8” style. The asymmetrical shape of this pool makes it challenging to fit a cover. Many of the covers available are actually just strips of 6 foot wide material joined together at the edges until the desired width is achieved. Length is virtually unlimited. Even though the pool in our example is only 32 feet long at the longest point and 15 feet wide at the widest point, we had to buy a 40 foot by 18 foot cover in order to completely cover the surface of the water. We also left an additional 12 inches of cover around the entire perimeter of what was needed to allow for cover shrinkage/aging and so it would fit tight against the sides and catch more of the debris that blows in.



In this case, if we were to construct a reel that would roll up the cover in a single layer (without folding it), that reel would be a ridiculous and unnecessary width. It would also be difficult to move around once it was rolled up. The obvious solution is: Fold the cover onto itself at the 6 foot seams before rolling it up.



By folding the cover at the seams we now only need a reel wide enough to accommodate a 6 foot wide cover that is two or three times thicker than a standard cover. That is why the instructions that follow are for the construction of a 6 foot reel. This reel easily accommodates the (approximately) 400 square feet of cover material. If you have a rectangular pool, determining the square footage is obviously much easier – Length times Width.



What to do if you want a different size. “What if my pool is considerably larger?” In the photo to the right, you can see that the entire (approximate) 400 square foot cover only uses about 1/2 of the space on this reel. The amount of cover that can be stored increases as the distance from the crank increases. So, theoretically, you could fit close to 1200 square feet of cover on this reel. However, the weight of the cover would become an issue. If you are going to try use this reel design for much more than 600 square feet of cover I suggest switching from schedule 40 PVC to schedule 80 PVC. (Particularly the shaft portion of the crank and 90 degree elbows through which the crank passes.) This will increase your costs slightly.



Tool list

The tools you will need for this project are as follows:

Hacksaw: If you don't have one, buy a decent one. Skip the \$10 one and spend \$15 to \$25. The cheap ones are much too frustrating and cut crooked unless you are very patient.

Tape measure: 10 foot (or longer)



Hacksaw blades: fine to medium



Black marker: medium tip



12" piece of card stock – junk mail



File – fine to medium – combo round and flat. If you don't have one, the Kobalt 4 in 1 is a good inexpensive choice. Item #: 294692, Model #: SF681273

Electric drill



Drill bit: Any bit between 1/2 inch and 5/8 inch will work as long as it fits in your drill chuck

2" hole saw: The one I used was the Lenox 2" Carbide Grit Holesaw: Item # 239657, Model #: 12153

Two 3/4" open end wrenches or equivalent



Rubber Mallet



Rags



Flat cement area, like a garage floor, to lay out pieces and align joints



Optional/Additional Tools needed to install pull ropes in cover

Small piece of 2x4 to use as an anvil

Knife



Hammer

Materials List page 1

(4) Charlotte Pipe 2" x 10' PVC Schedule 40 Pipe
Item #: 23832 Model #: PVC 07200 0600
In Store price \$7.01 Each



(1) Charlotte Pipe 1.5" x 10' PVC Schedule 40 Pipe
Item #: 23830 Model #:
In Store price \$5.26 Each



(1) Charlotte Pipe 3/4" x 2' Schedule 40 Pipe
Item #: 351144 Model #: PVC 04007 0200
In Store price \$1.18

(2) Lasco 2" x 2" x 3/4" Slip x Slip x Slip Schedule 40 PVC Tee
Item #: 317748 Model # 401248RMC
In Store price \$1.78 Each



(2) Lasco 2" PVC Pressure Sch 40 Tee
Item #: 23908 Model #: 401020RMC
In Store price \$2.45 Each



(2) Lasco 2" Schedule 40 Cap
Item #: 23900 Model #: 447020RMC
In Store price \$1.27 Each



(2) Lasco 3/4" Sch40 Tee
Item #: 23874 Model #: 401007RMC
In Store price \$0.31 Each



(2) Lasco 2" PVC Pressure Schedule 40 Cross Tee
Item #: 49505 Model #: 420020RMC
In Store price \$4.50 Each



(4) Lasco 2" SCH40 45 degree Elbow
Item #: 23895 Model #: 417020RMC
In Store price \$1.84 Each



(6) Lasco 2 Elbow
Item #: 23910 Model #: 406020RMC
In Store price \$1.98 Each



(6) Lasco 2" x 1.5" Bushing
Item #: 23922 Model #: 437251RMC
In Store price \$1.44 Each



Materials List page 2

(1) Oatey 8 Oz. Handi Pack
Item #: 150887 Model #: 30244
In Store price \$7.48 for set



(1) Project Pak 25-Count 1/2" - 13
Zinc Plated Standard SAE Hex Nuts
Item #: 43647 Model #: HN122P
In Store price \$4.74 for pack of 25
[Note: You will only need 12 of these Hex Nuts]



(1) Project Pak 25-Count 1/2" Zinc-plated Flat Washers
Item #: 43812 Model #: 492011
In Store price \$4.73 for pack of 25
[Note: You will only need 8 of these washers]



(1) PreciseFit 2-Pack 8" Mower Wheel
Item #: 303116 Model #: 303116
In Store price \$11.98 for one pair of wheels



(1) Steelworks 1/2" - 13 - 3' All Thread Plated
Item #: 69889 Model #: 11027
In Store price \$4.56



Additional optional materials for cover

(1) Bostitch 15-Pack Metal Grommet Kit
Item #: 309772 Model #: BFG250K
In Store price \$6.28



(1) Blue Hawk 1/4" x 100' Braided Poly Rope
Item #: 349241 Model #: MFP4100
In Store price \$8.97

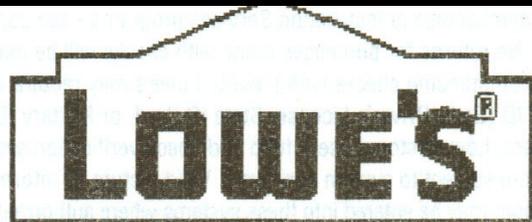


Materials Receipts



PVC

23832 2INX10FT PVC S40PIPE SLD	28.04
4 @ 7.01	
23830 1 1/2INX10FT PVC S40PIPE	5.26
351144 3/4" X 2FT SCH 40 PIPE	1.18
317748 2 X 3/4 TEE SCH 40	3.56
2 @ 1.78	
23908 2" SCH40 TEE 401020	4.90
2 @ 2.45	
23900 2" SCH40 CAP 447020	2.54
2 @ 1.27	
23874 3/4" SCH40 TEE 401007	0.62
2 @ 0.31	
49505 2" SCH40 CROSS 420020	9.00
2 @ 4.50	
23895 2" SCH40 45DEG ELBOW 4170	7.36
4 @ 1.84	
23910 2" SCH40 ELBOW 406020	11.88
6 @ 1.98	
23922 2" X 1 1/2" SCH40 BUSHING	8.64
6 @ 1.44	
SUBTOTAL:	82.98
TAX:	6.72
INVOICE 15418 TOTAL:	89.70
DEBIT:	89.70



MISC

150887 8 OZ HANDIPAK	7.48
43647 1/2" HEX NUT ZINC COARSE	4.74
43812 1/2" FLAT WASHER ZINC (25	4.73
303116 8"X1.75" WHEEL - 2 PACK	11.98
69889 1/2"-13-3' ALL THREAD PLA	4.56
309772 BOSTITCH GROMMIT KIT 1/2"	6.28
SUBTOTAL:	39.77
TAX:	3.22
INVOICE 13319 TOTAL:	42.99
DEBIT:	42.99

349241 1/4"X100'DB POLY RPE CRTE	8.97
SUBTOTAL:	8.97
TAX:	0.73
INVOICE 18650 TOTAL:	9.70
DEBIT:	9.70

Pool Reel Components	\$116.47
Pool Cover Modification	\$15.25
Tax	\$10.67
Total	\$142.39

Names for Various Components of Reel

These names are arbitrary but it will make it easier for you the reader if I identify with pictures what I am referencing with text.

CRANK PASS-THROUGH FITTING
CRANK PASS-THROUGH PIPE

TIE-OFF TEE

AXLE

MAIN CRANK ASSEMBLY

CRANK HANDLE ARM

BASE LENGTHS

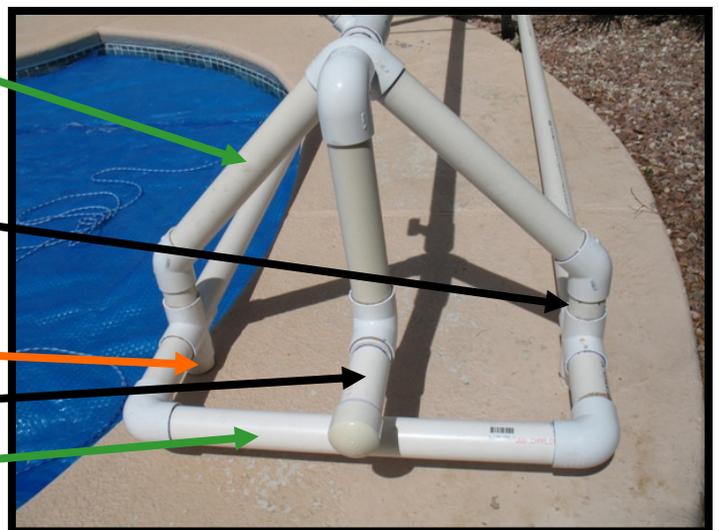
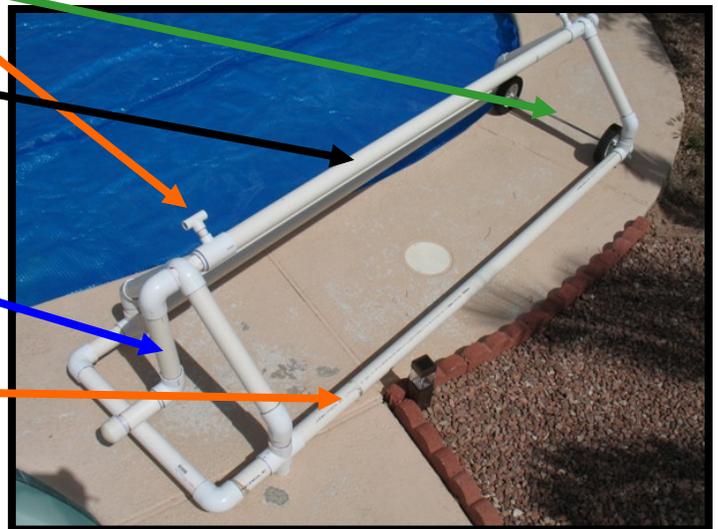
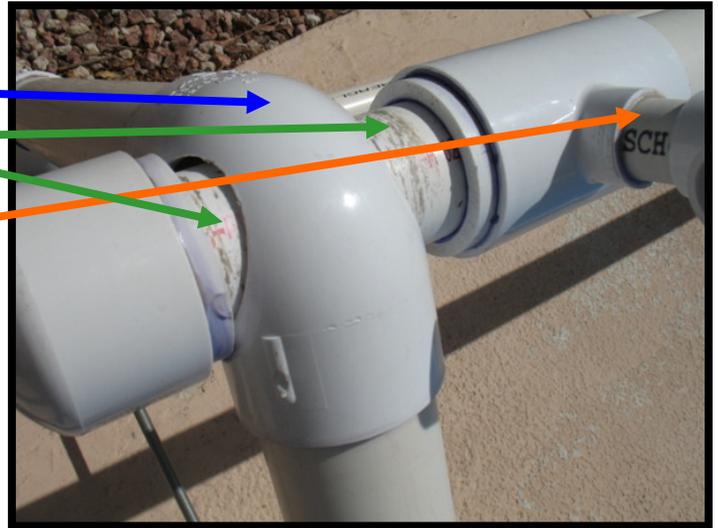
INVERTED V UPRIGHTS

UPRIGHTS

LEG

SPINNING HANDLE GRIP

LIFT HANDLE



Cutting Tubing: List of Cuts, How to Get a Straight Cut 9

If you, or a friend, has a band-saw (or even a Sawzall), you can make short work of the pipe cutting and cut all but two pieces prior to beginning assembly. The length of the last two 2" diameter pieces will vary slightly with each reel so you will need to wait until you reach a certain stage of completion before measuring for them.

You can purchase a fancy blade type PVC cutter if you choose. (I do not recommend using a ratcheting blade type cutter on sizes larger than 1 1/4 inch diameter.) The quality ones (\$80 and up) make very nice cuts quickly. The cheap ones crush the pipe (**do not buy a cheap one!**) Even the cheap ones are a bit expensive relative to the cost of this project so I have included a few tips for cutting PVC with a standard hand hacksaw. I have included a list (below) of all the lengths you will need. You may even get a helpful hardware store person to cut them for you.

Cuts—NOTE: THE EXACT LENGTH OF THESE CUTS IS NOT THE MOST IMPORTANT FACTOR. MORE IMPORTANT IS THAT PIECES RELATED TO ONE ANOTHER ARE OF EQUAL LENGTH. MEASURE AFTER YOU CUT AS WELL.

2 INCH PVC

10 foot Piece # one – One 84" Piece, cut remaining 3' in half

10 foot Piece # two – One 84" Piece, cut remaining 3' in half

10 foot Piece # three – 4.5", 4.5", 4.5", 4.5", 2.5", 2.5", 12", 12", 12", 4"

10 foot Piece # four – To be measured – Main Crank Assembly (approx 77") and Lift Handle (approx 26").

1.5 INCH PVC

Piece 1: 7", Piece 2: 7", Piece 3: 7" (pieces 2 and 3 may need to be trimmed down)

3/4 INCH PVC

Piece 1: 2.5", Piece 2: 2.5"

Measure everything twice – "measure twice, cut once".

First off you want the cut to be flat.

It should be perpendicular to the pipe.

First measure and mark a section of pipe you want to cut.

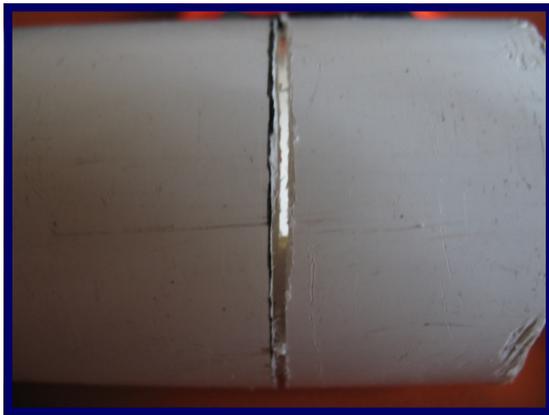
Then take the junk-mail card stock and wrap it around the pipe at the point you marked.

Line it up on itself and trace a line around the pipe with the marker. This will give you a nice perfect guide for your hacksaw.



Cutting Tubing: How to Get Straight Cut

Next, cut part way into the pipe surface all the way around the pipe following your marker line. This helps guide the saw blade by providing a groove for it to follow.



Then continue cutting and rotating the pipe as you go. If you try to cut straight through the pipe from top to bottom without rotating, the blade has a tendency to stray off track. Also, by always finishing your cuts on the inside portion of the pipe, you reduce the chances of the “tooth” or “fang” that can appear when the two pieces of the pipe finally separate.

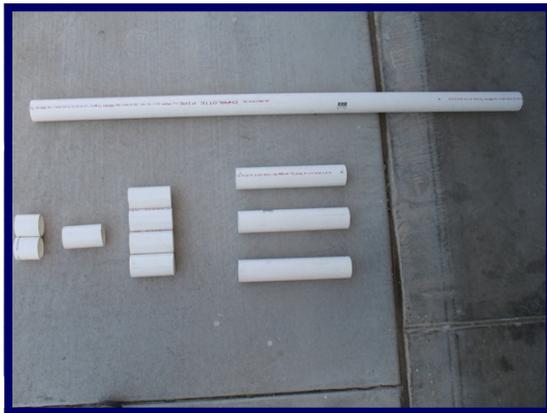
Once fully cut, rub down the cut with a rag. This will remove most of the debris. Then use your combo-file to clean up the edges completely.



When you are finished with a cut, this is what it should look like.

Cutting Tubing: Pre-assembly Cuts

First we will cut the 7' Base Lengths from two of the 10' sections of 2" diameter pipe. Then cut the remaining 3' sections from these pipes in half. Find the exact center before cutting the 3' sections in half. Some of the 10' pipes are not exactly 10'. Measure all four pieces to make sure they are of equal length. If they are not, trim them to match.



Next, from the 3rd 10' section of 2" diameter pipe, cut the following:

- 4.5", 4.5", 4.5", 4.5", (Uprights)
- 2.5", 2.5", (Legs)
- 12", 12", (Lift Handle Extensions)
- 12", (Crank Handle)
- 4". (Spinning Grip)

From the 1.5 inch diameter pipe cut:
7", 7" (Crank Pass-Throughs)
7" (Crank Handle)



From the 3/4 inch diameter pipe cut:

2.5", 2.5" (Tie-Off Tees)



This is all the pre-cutting that should be done. The measurements for the last couple of pieces should be taken from the partially completed reel.

Drilling Holes: Axle Holes

12

Both 2" Tees will need holes drilled through them for the Axle to pass through. Finding the center of the Tees is easy. There are two casting creases that point directly to the center of the fitting.



After finding the center of both sides of both fittings, drill through each side from the outside in. Don't try to drill straight through the fitting all the way out the other side. The bit will drift off the mark. Once through one side, stop, turn the fitting over and drill through the other side.

Test fit the Axle in the fitting to make sure it slides freely. If you have to force the Axle through, "hog" out the hole slightly with the drill bit and try again.

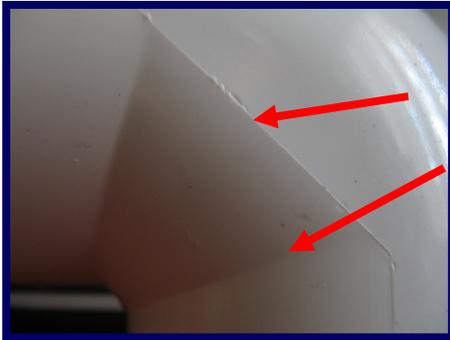


Once you have drilled all the way through both fittings, test fit both of them on the Axle and set them on a level surface. If the Axle moves freely through both fittings at the same time and the fittings remain flat, you improve the chances that the holes will be aligned once the reel is complete.

Drilling Holes: Crank Pass-Through Holes

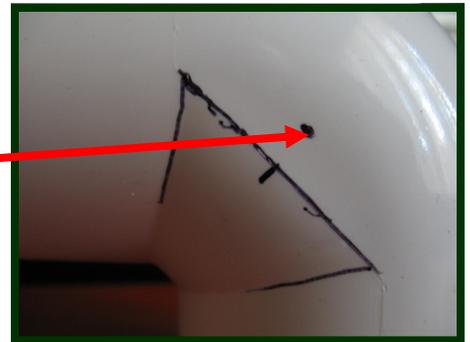
13

The Crank Pass-Through fittings consist of two 90 degree elbows that have been drilled with the 2" hole saw. To get the Pass-Through holes properly located on the Pass-Through fittings, it is necessary to find the center of the fitting.



In this photo you can clearly see the straight casting line and the slightly curved casting creases.

Trace out these lines and creases. Find the center of the casting line between the two curved casting creases. Measure up from this point 1/4 Inch. This is the spot where you want the center of your hole saw to be when you start drilling.



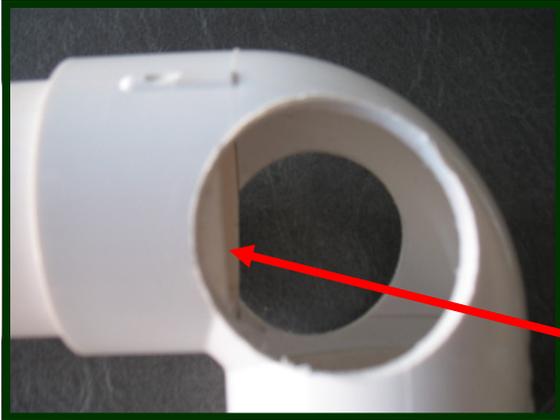
To control the fitting while drilling, it helps to Dry-fit a piece of pipe into it or clamp it in a vice.

When you have finished drilling through one side of the fitting, turn it over and drill the second hole from the outside in. Do not try to drill straight through the fitting. The hole saw will drift off center. Also, you will need to remove the waste part of the fitting from the hole saw.



Drilling Holes: Crank Pass-Through Holes

14



You may notice that the pipe will extend slightly into the Pass-Through opening. This is not a problem. Once the Inverted V Uprights are assembled, you can trim this out with the hole saw.

When you have finished one of the fittings, test fit a section of 1.5 inch PVC pipe into the Pass-Through fitting. If it turns freely you are good to go.



Repeat the entire process on the second fitting. Then test fit a section of 1.5" PVC pipe through both fittings at the same time. If the fittings sit flat on a surface and the pipe turns freely through both, you improve your chances of the fittings aligning well on the fully assembled reel. If the pipe does not turn freely, clean up the fittings with your file or consider drilling another fitting.

If you end up with a fitting that looks like this, throw it away and buy another. The fittings are cheap. Don't sweat it if you ruin a few of them.



Dry-Fitting Pieces

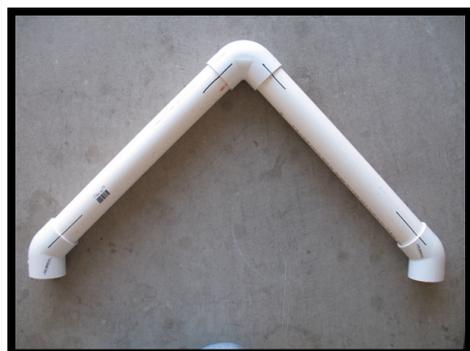
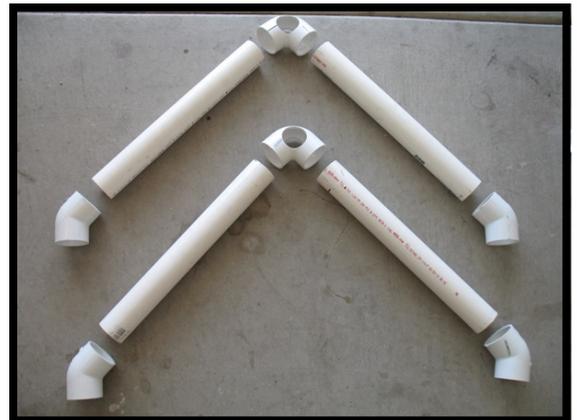
It is important that certain fittings line up with one another. The fittings at opposite ends of the Base Lengths must align with one another. The three fittings of the Inverted V Uprights must align with one another. The Crank Handle fittings should align with one another. The Tie-Off Tees should align with one another. And the two elbows of the Lift Handle should align with one another. A flat garage floor and a marker are all you need to achieve sufficient alignment of fittings.

“Dry-fitting” is the process of partially assembling fittings and pipe without primer or adhesive. When you dry-fit a fitting onto a pipe, the pipe will usually not slide all the way into the fitting. This is not a problem. Once you apply primer and cement, the cement acts a lubricant and with little effort the two pieces will “seat” fully.

We will be dry-fitting pieces so as to align them with one another. This will make later assembly MUCH easier. As an example, I will use one of the inverted V up-rights assemblies. You can assemble these now or just read through the process. Instructions for assembly of these appear again later in the document.

First, lay out the components of the piece you are assembling.

In this case, the Inverted V Upright consists of two 45 degree fittings, two sections of 2” PVC pipe and a modified 90 degree elbow.



Dry-fit the five components together. You don't have to force them together. Just slide them together enough to form the general shape of the end component.

Marking for Assembly—Alignment Lines, Joint ID.

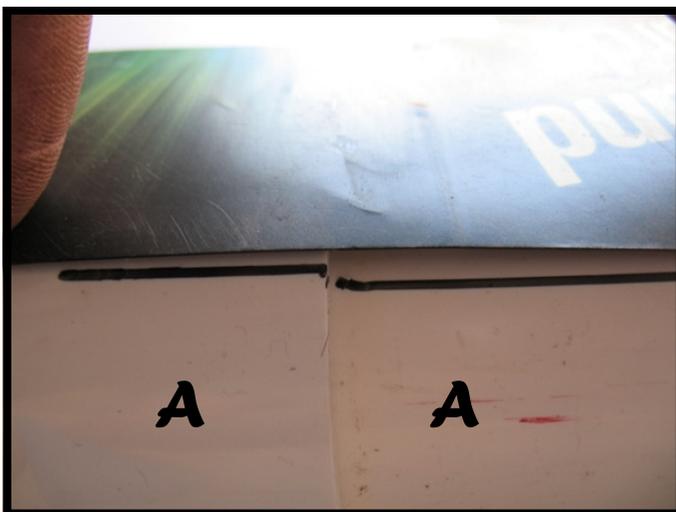
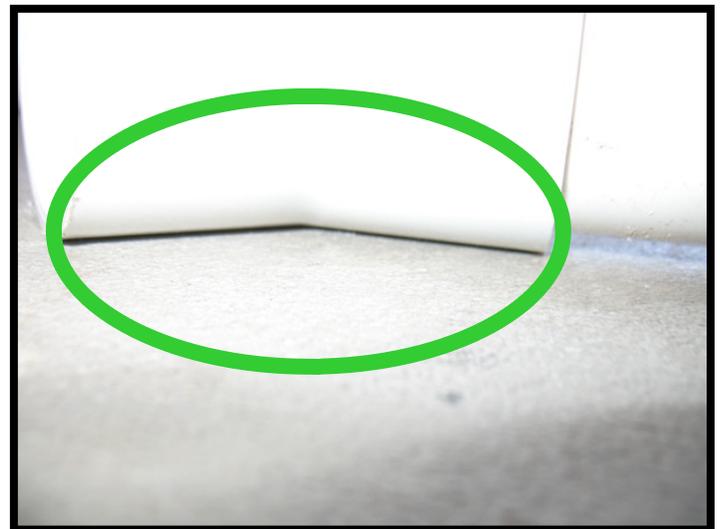
16

The entire purpose of this step is to align the fittings and mark that alignment for reference when doing the final assembly with primer and cement. Lay the dry-fit assembly on your flat floor or surface and look closely at how the fittings touch it. What you don't want is any of the following circled in red:



You don't want any gaps between the fittings and the flat surface. Turn the fittings until you get all of them to lie flat at the same time.

When all the fittings look like this, you have the fittings aligned, rock the assembly back and forth to make certain the fittings all touch the flat surface as shown in the photo to the right.

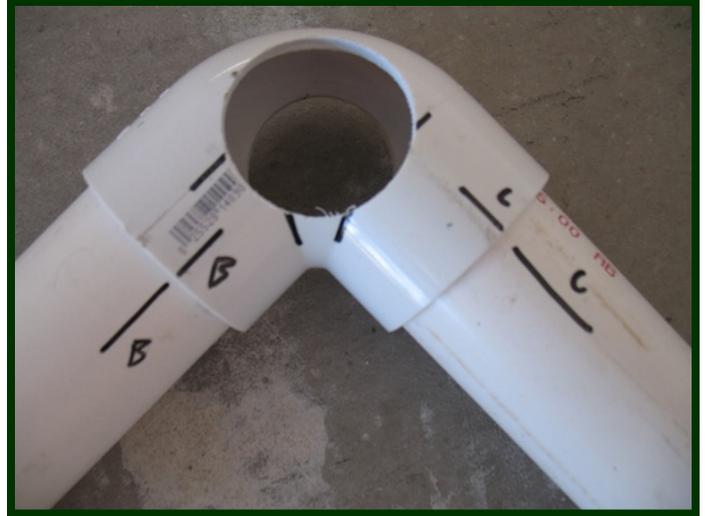


Once you have all the fittings aligned, use your marker and card stock to make a line that runs from the fitting onto the pipe. Then give the connection an identification label such as "A", "B", "C" so there will be no confusion when you start gluing things together permanently. Mark your "A" on both the fitting and the pipe.

Marking for Assembly—Depth Lines

17

Once you have marked all fitting and pipe joints/connections with an alignment line and a letter designation, take the assembly apart and make a fitting depth line on the pipe. This depth line will tell you when you have fully seated the connection.



First measure the depth of the fitting. Inside the fitting you will see a small ridge that will stop the pipe when it is fully installed. On the 2" diameter fittings I am using in this example, the depth is 1 and 3/8 inches.

When you make your depth line on the pipe, do so adjacent to the alignment line. That way when you are doing the final assembly with primer and cement you only have to look one place to see if both the alignment and depth are correct.

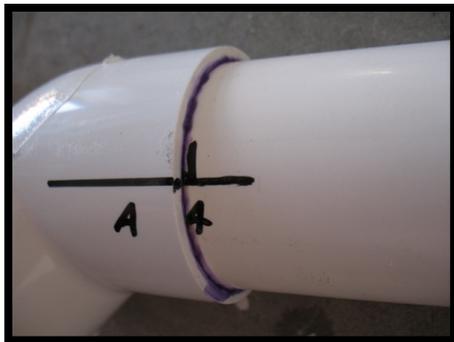
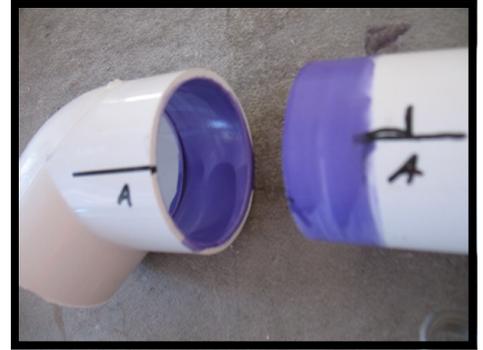


PVC Primer and Cement

18

If you have never worked with PVC primer and cement before, it is quite simple. All you do is swab the inside of the fitting and the end of the pipe with primer. Then swab the inside of the fitting and end of the pipe with cement and stick them together.

NOTE: ONCE THE CEMENT IS APPLIED, YOU ONLY HAVE ABOUT 15 SECONDS TO DO THIS.



Once the cement is applied, join the two pieces by twisting them as you push them together. Line up your alignment lines on the fitting and pipe and check the depth mark to see that you have them pushed all the way together.

Then place the assembly back on your level surface and give one last check to



see that the fittings line up with one another. You still have a few seconds to move the fittings slightly before the cement sets up. **If things look good, hold pressure on the fittings for a few seconds to prevent “rebound” - the tendency for the glue to push the pieces apart while it is setting up.** Since these bonds are not for the retention of a liquid, it is not imperative that the pieces be absolutely all the way seated together but they have to be close for the joint to have integrity. Also, by fully seating all the joints you improve the chances that your reel will be “squared up” and assembly will be easier. Do all of this quickly. Once bonded, they are stuck for good. If something is wrong, you have to start over on that piece. Fortunately PVC is quite inexpensive to replace if something doesn't work out as planned.

ALSO NOTE: The primer stains everything. It is supposed to. Part of the purpose of the colored primer is to serve as an indicator that the joint has been cemented. When a plumbing inspector sees the primer, he can be reasonably certain the joint was cemented. If stains are a concern, lay out a liberal supply of rags and work carefully.

NOTE: IF YOU HAVE NEVER WORKED WITH PVC PRIMER AND CEMENT, YOU MAY WANT TO PRACTICE BY COMPLETING PAGE 30 FIRST.

