Auto Rotisserie Plans

Matt Kline – Owner
Red Wing Steel Works
1526 South Park St.
Red Wing, MN 55066
USA

Phone: 651-764-0925
Email: redwingsteelworks@yahoo.com
Website: http://redwingsteelworksplans.com

Auto Rotisserie Building Notes

I have built and used many different auto rotisseries. The exact replica of this one is among the best and cheapest to make. This is a “no frills” rotisserie, after all the trial and error building different features these seem to be the best.

The rotisserie is made up of 7 different main parts and many different pieces to make up the main parts. The main part names are as follows: End frame, Hanger bracket, Pivot point, Pivot arm, Mounting arms, Body mount bracket, And Body mount. I have made drawings of all the individual parts as well as the main parts.

All .75” nuts should be welded on at least 3 sides and that is if you are a good welder, if not they should be welded all the way around. It has been my experience that using smaller nuts not only dents the tube you are pressing against but over many uses of the rotisserie the nuts can become stripped out. Not to mention more warping during welding making them hard to use.

Many of the parts are designed with ease and usability in mind. For instance The body mounts and body mount brackets are optional. If you don’t think you need them for easy hook up for your car then don’t build them. Just drill the hole in the end of the mounting arms that I call out in the part drawings. The caster plates are obviously optional and only needed if you want to be able to move the rotisserie around. The caster plates are a for a standard 6” caster. If you are going to use a different size I would recommend getting the caster first and making the plates to fit your casters.

The gusset plates are more for added welding surface than they are for structural integrity (except for the pivot point gusset plate, it is for both reasons). If you want to make the gusset plates bigger that is fine, but I wouldn’t make them any smaller.

The space between the hanger bracket and the end frame is enough in case you wish to add a hydraulic jack to raise and lower the pivot point up and down the end frame vertical tube. I didn’t draw this option because there are so many different sizes and styles of hydraulic jacks out there I would never be able to guess which one you would be using. I never felt that a hydraulic jack was necessary unless you have ceiling clearance problems in your garage.

The .188” thickness is a standard tube size that not only makes the rotisserie heavy duty but also makes all the tubes slide inside one another quite nicely. I wouldn’t use lighter tube because of strength reasons as well as the amount of slop in between mating parts.

You will notice in the prints that I call out some weird hole sizes. I drill all my holes 1/32” bigger than the bolt I use to make life easier down the road. There is nothing wrong with making the holes exact size or 1/16” bigger. It all depends on what drill bits you already have. If I call for a .813” hole and you only have a 3/4” bit by all means use it instead of going out and buying a new bit. If you have a 7/8” bit, use it, you get the idea. If I call for a through hole that means all the way through the other side of the tube.

You will notice on some of the 4 view drawings that some of the views are out of proportion with the others. This is for clarity and to give you the biggest view possible for standard paper from your printer. Please note that drawings are not to scale, so don’t measure off the drawings. there is enough information on each part to build each part. If you have any problems figuring something out, just look at another print that has that part on it or a picture view. This rotisserie was drawn with common sense in mind, it is not rocket science. If there is something really important I made a note of it on the drawing or building notes page, otherwise it is no big deal.

Material list

End frames

2 - 72” x 2.5” x 2.5” x .188” square tube

2 - 50” x 2.5” x 2.5” x .188” square tube

2 - 18” x 2.5” x 2.5” x .188” square tube

4 - 17” x 2” x 2” x .188” square tube

2 - 4” x 4” x .25” flat

6 - 4.5” x 4” x .25” flat

Hanger brackets

2 - 60” x 2.5” x 2.5” x .188” square tube

2 - 31” x 2.5” x 2.5” x .188” square tube

4 - 4” x 4” x .25” flat

Pivot Points

2 - 16” x 3” x 3” x .188” square tube

2 - 10” x 3” schedule 80 black pipe

2 - 4” x 4” x .25” flat

Pivot arms

2 - 12” x 3” x 3” x.188” square tube

2 - 10.5” x 2.5” schedule 80 black pipe

Mounting arms

4 - 10” x 3” x 3” x .188” square tube

4 - 24” x 2” x 2” x .188” square tube

Body mount brackets

4 - 5” x 2.5” x 2.5” x .188” square tube

4 - 4” x 2” x 2” x .188” square tube

Body mounts

4 - 12” x 1.5” x 1.5” x .188” square tube

4 - 5” x 3” x .25” flat

Nuts & bolts

30 - .75” nuts

30 - .75” x 1.5” bolts

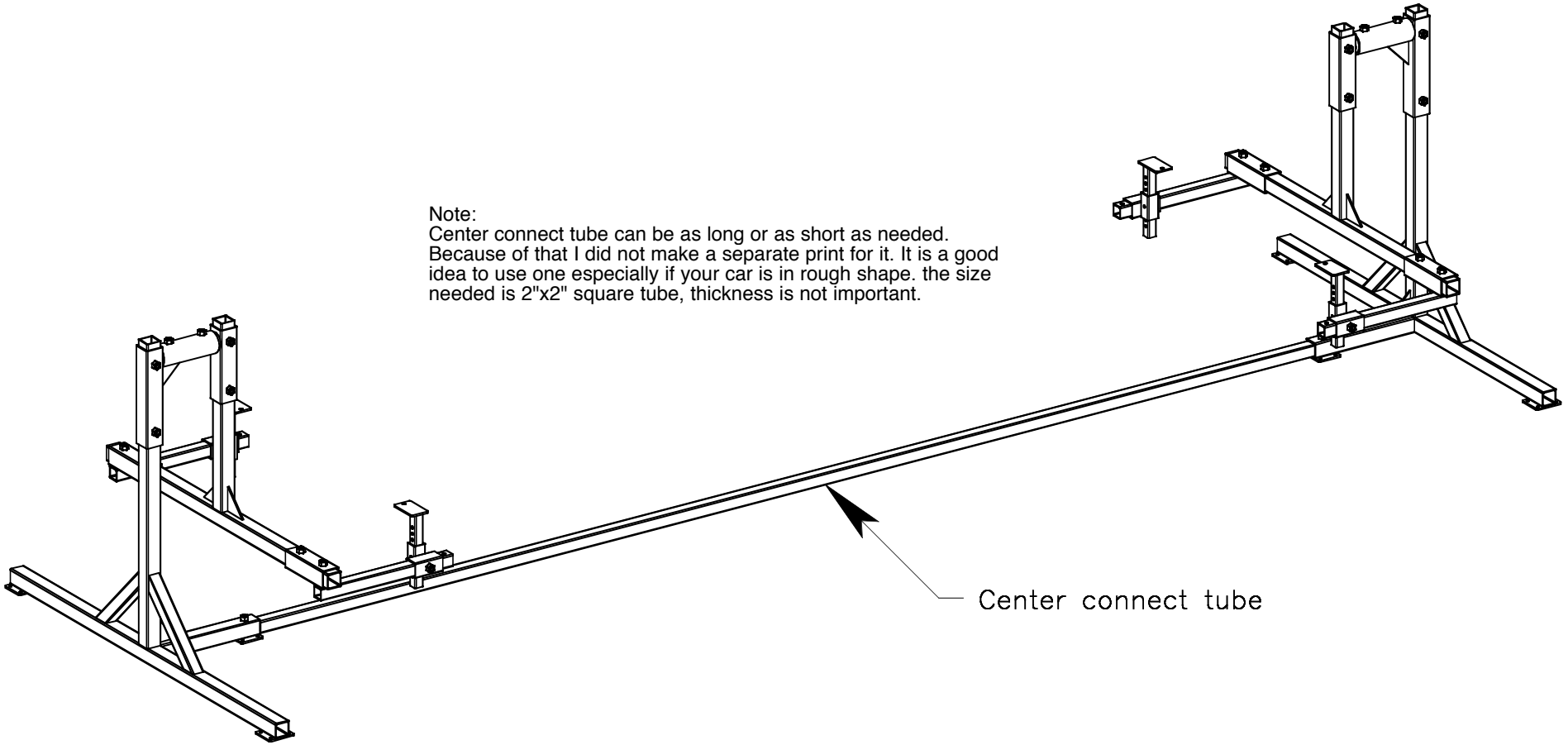
28 - .375” nuts

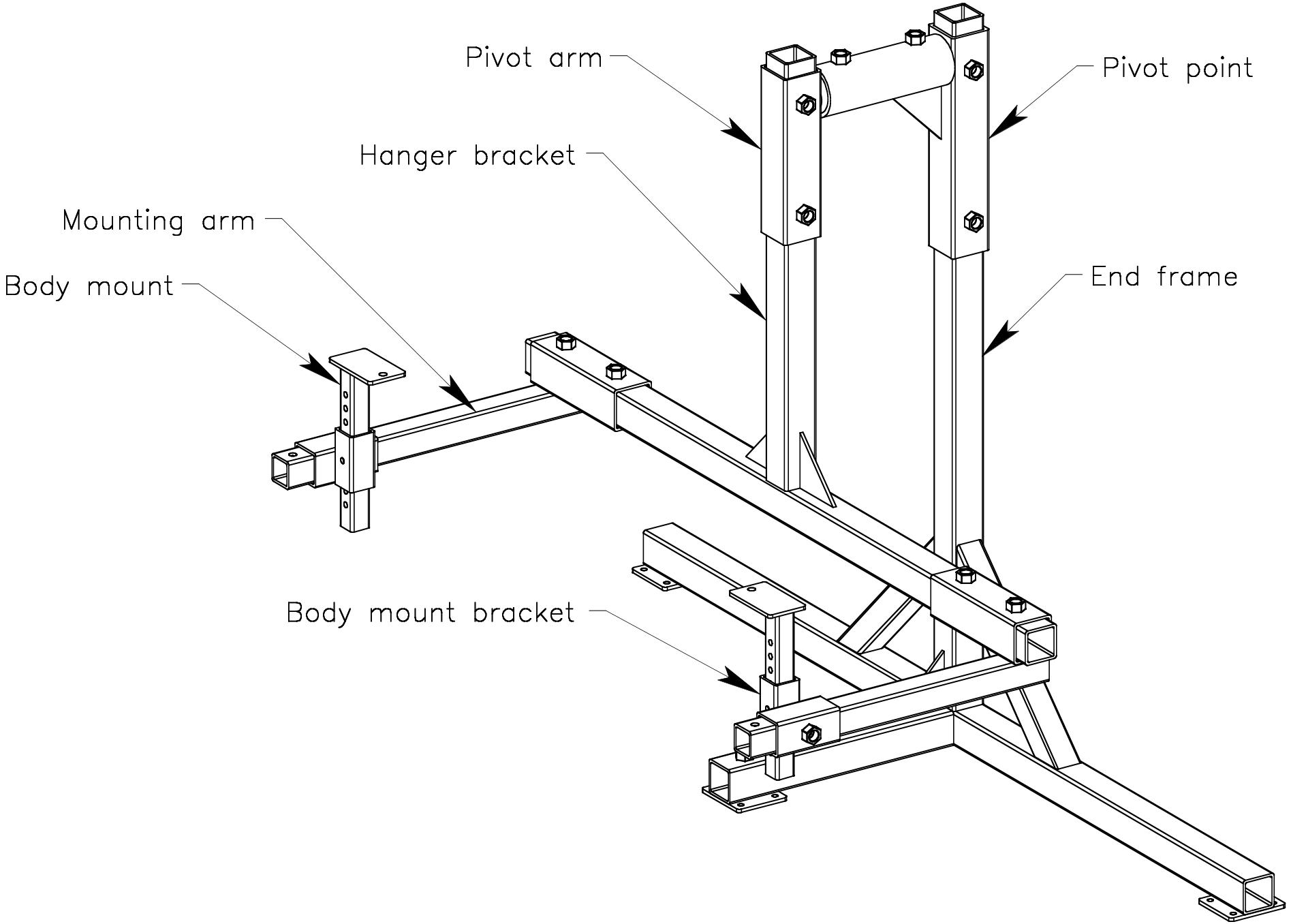
4 - .375” x 2.5” bolts

24 - .375” x 1” bolts (Casters)

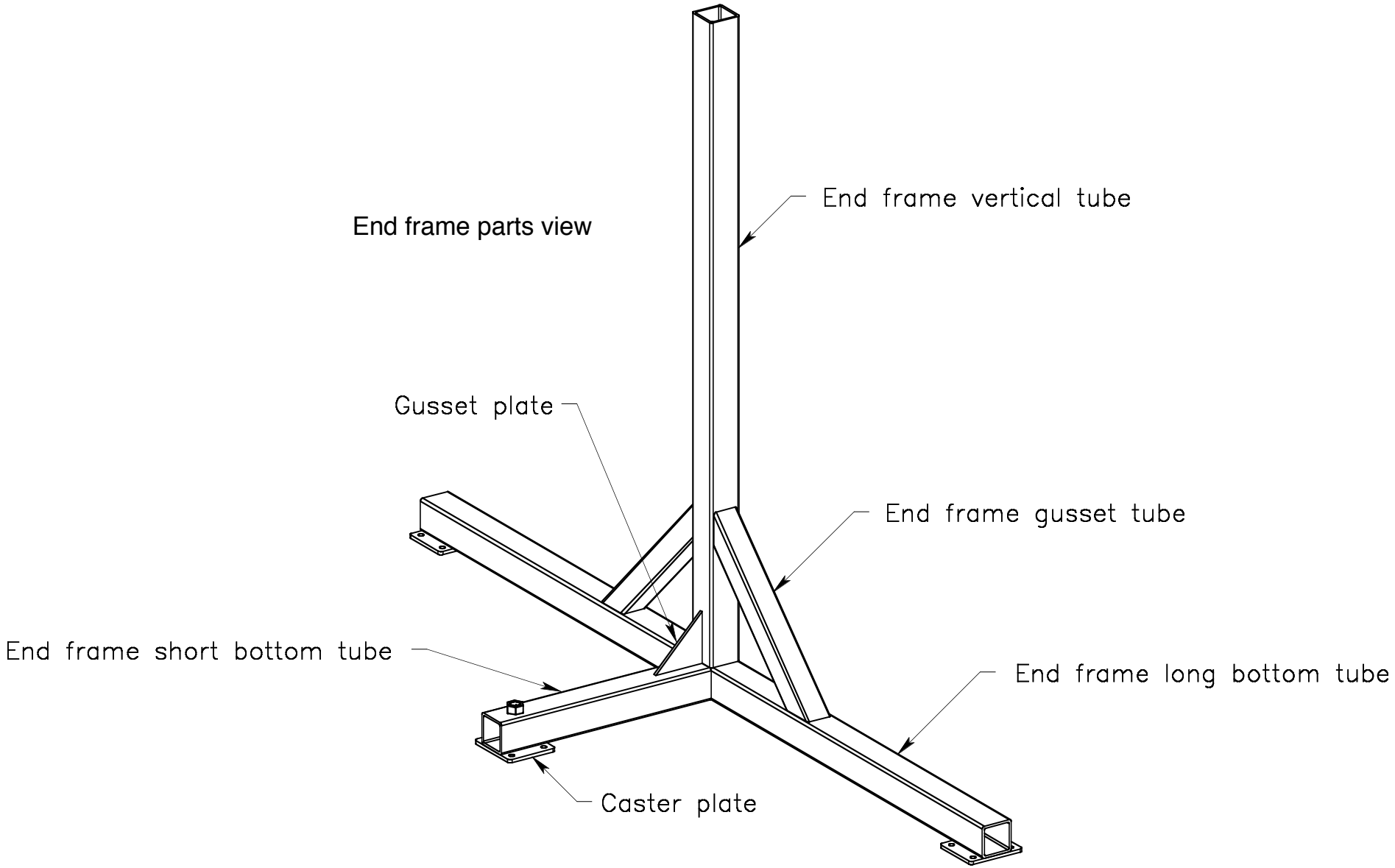
Top view	Picture view
Front view	Right side view
Part name & quantity (this is the way all the 4 view drawings are drawn)	

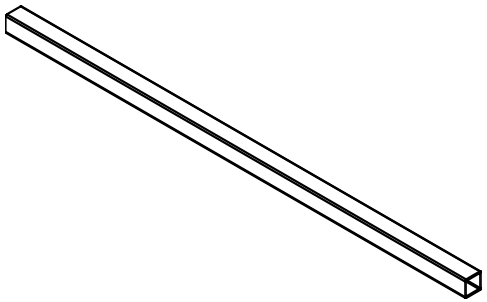
Note:
Center connect tube can be as long or as short as needed. Because of that I did not make a separate print for it. It is a good idea to use one especially if your car is in rough shape. the size needed is 2"x2" square tube, thickness is not important.

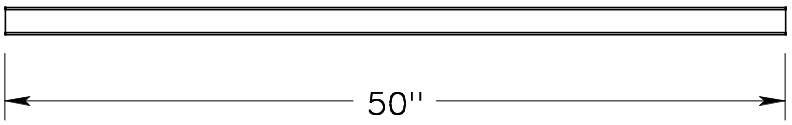


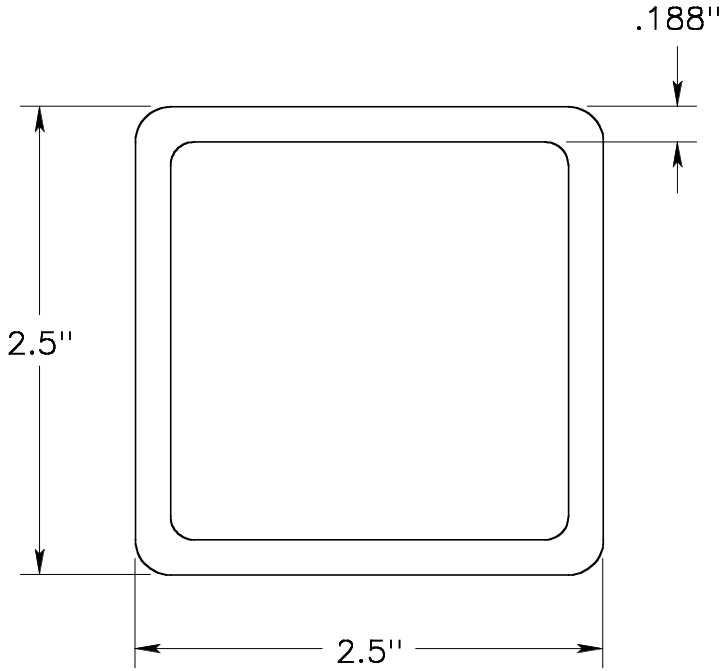

Pivot arm
Pivot point
Hanger bracket
Mounting arm
Body mount
End frame
Body mount bracket

End frame parts view

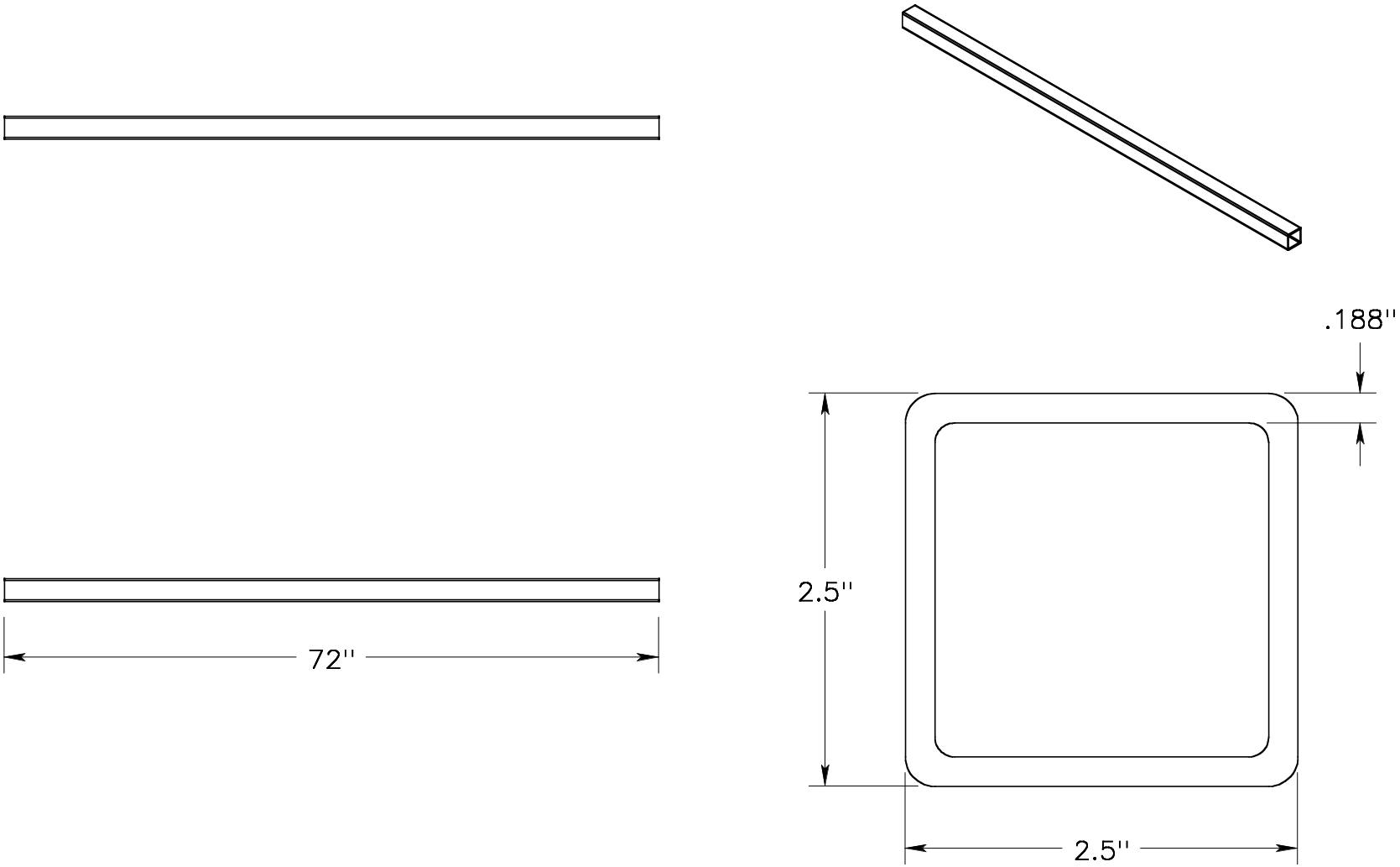




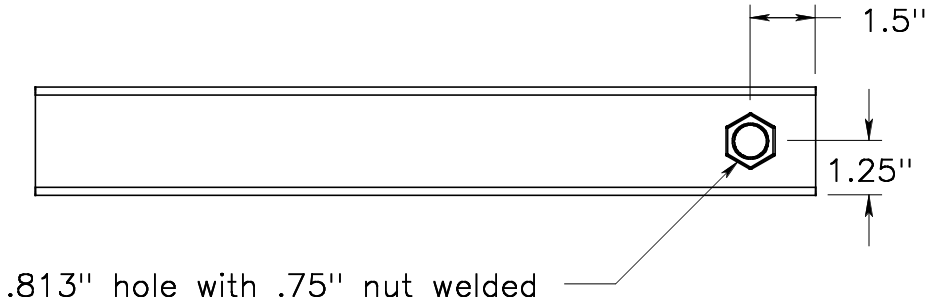


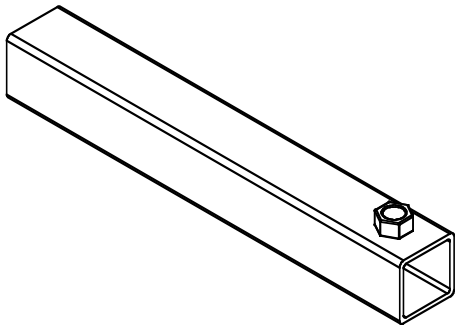


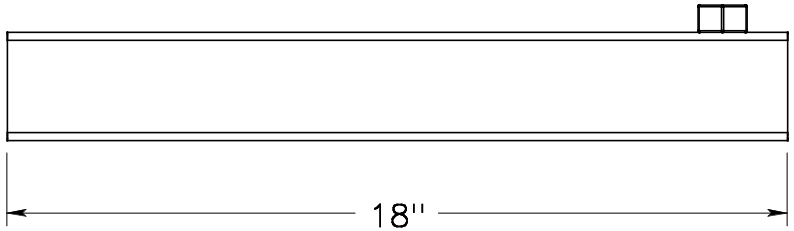
End frame vertical tube 4 views Quantity: 2

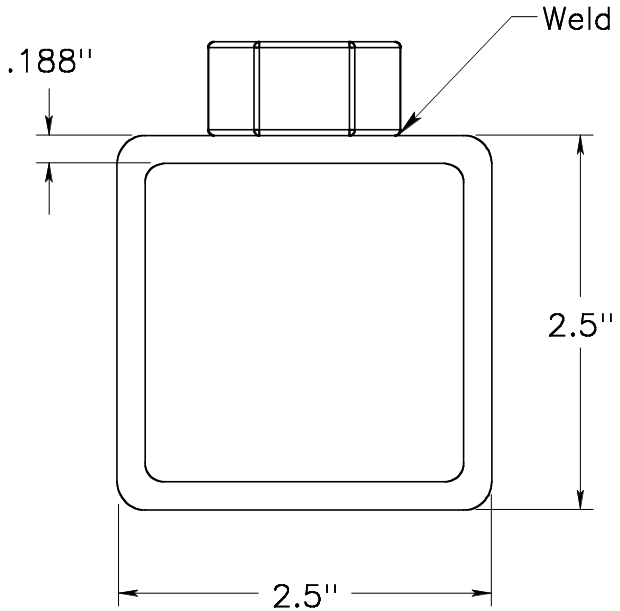


End frame long bottom tube 4 views Quantity: 2

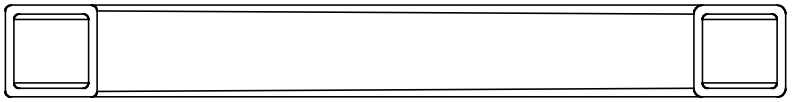


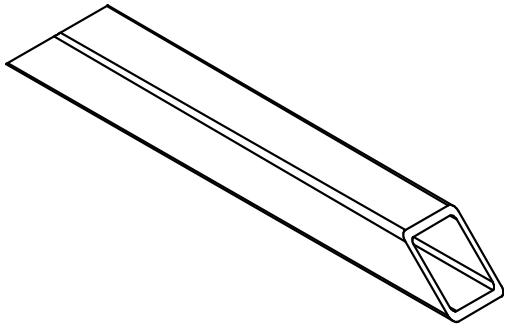


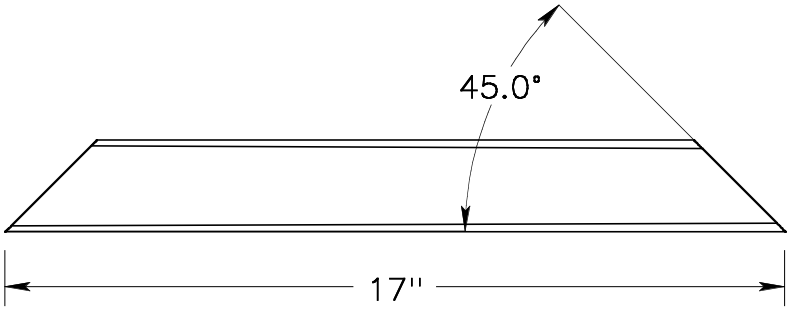


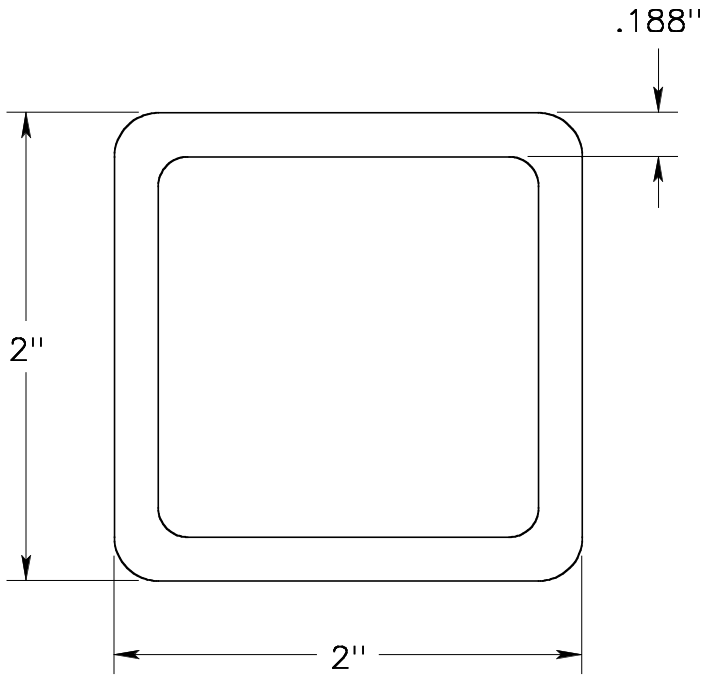


End frame short bottom tube 4 views Quantity: 2

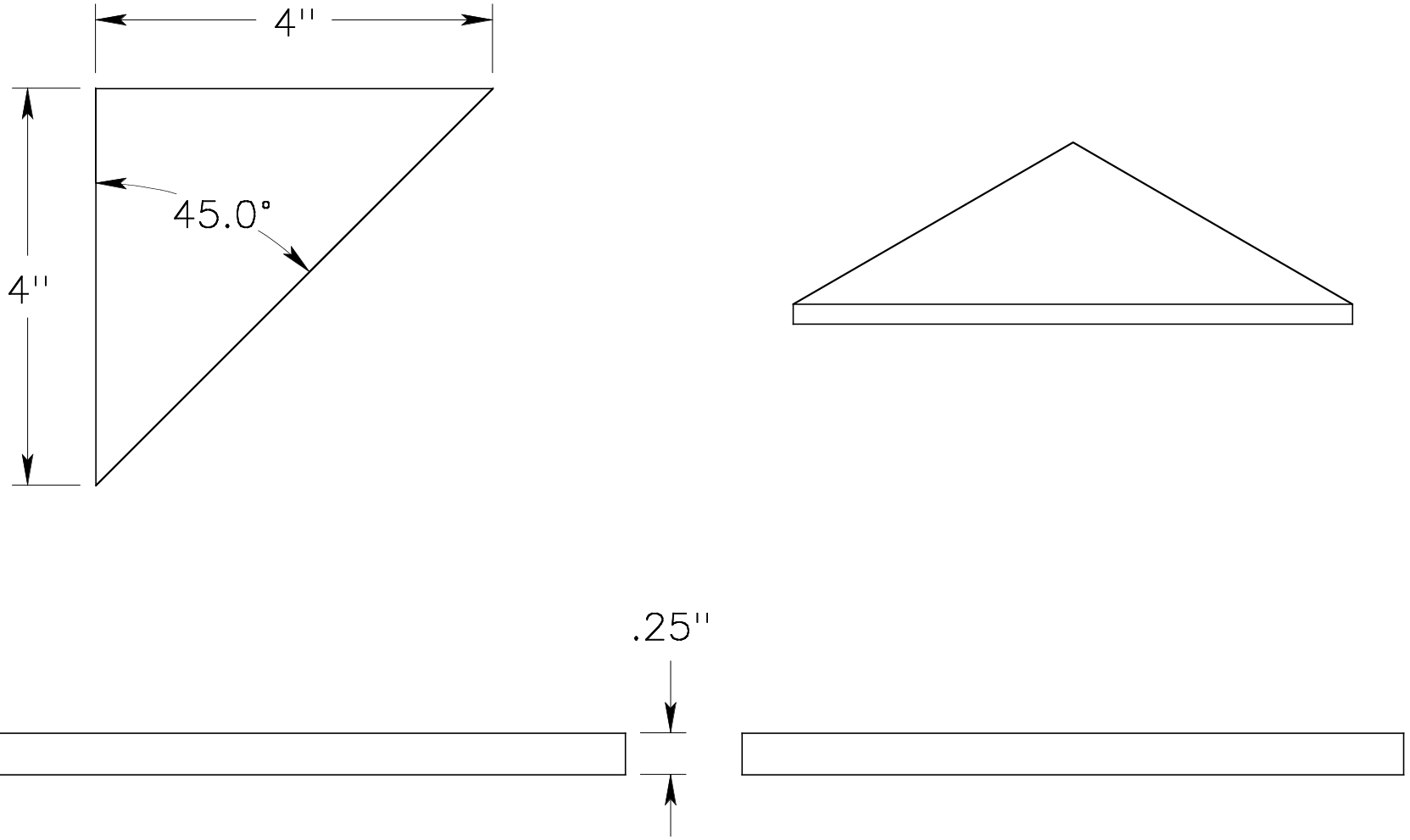




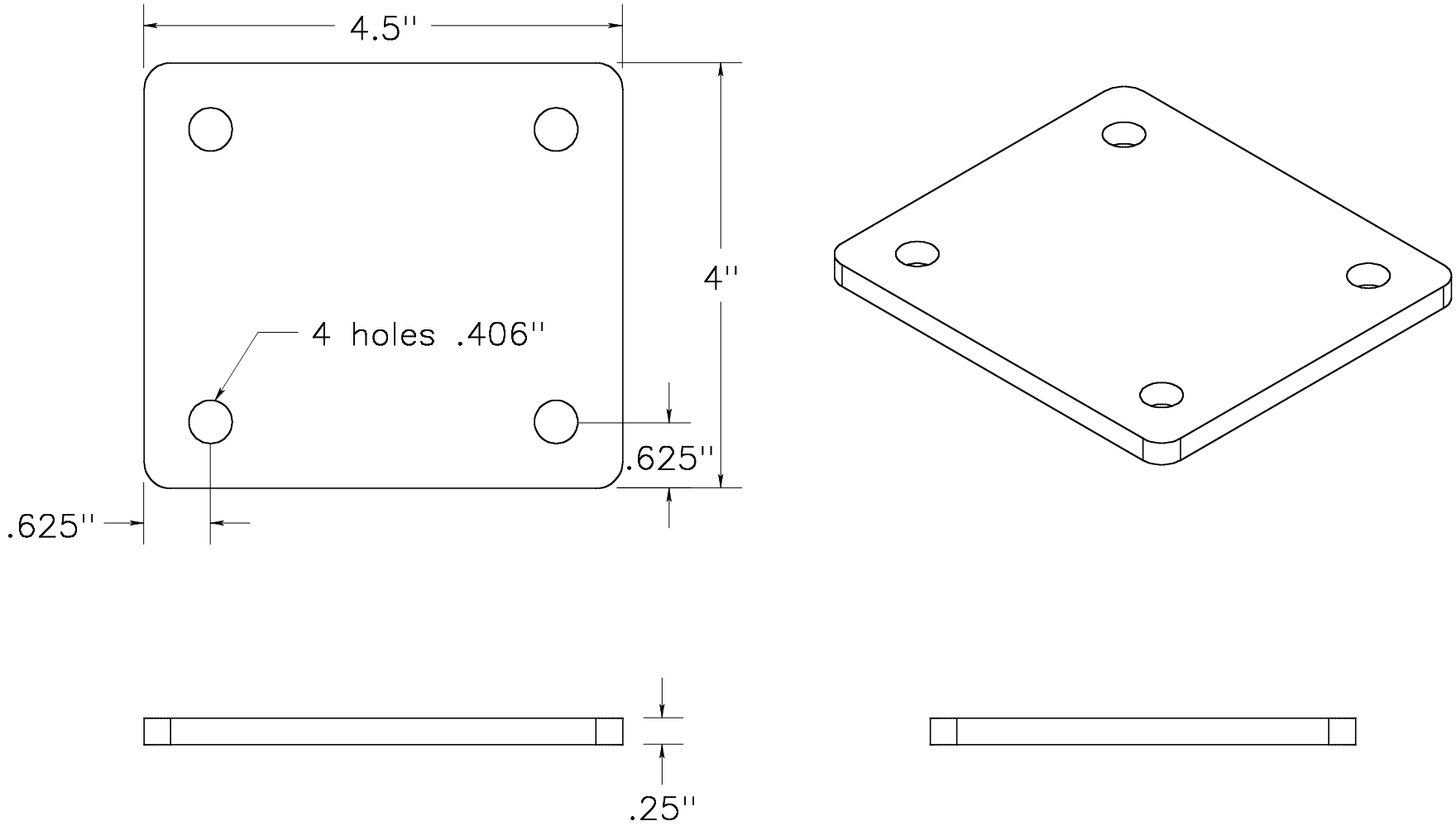




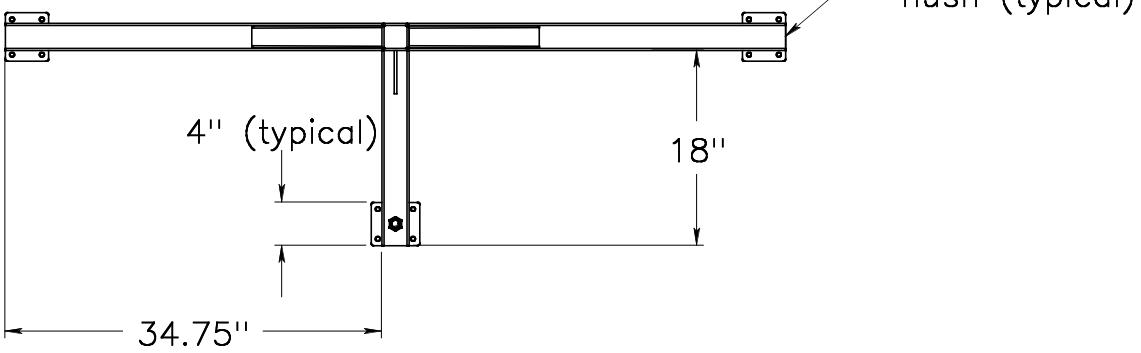
End frame gusset tube 4 views Quantity: 4

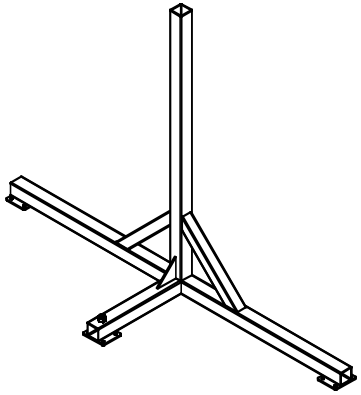


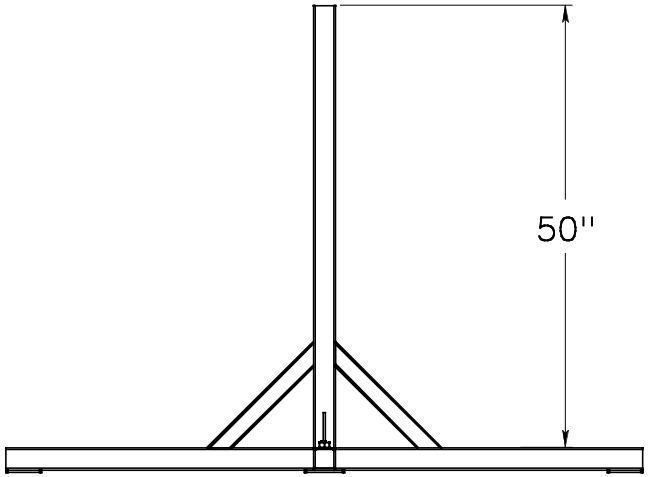
Gusset plate 4 views Quantity: 8



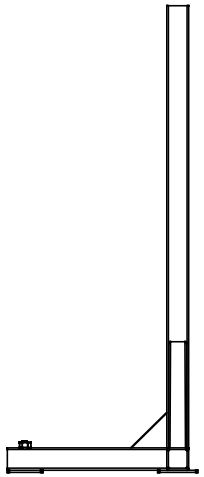
Caster plate 4 views Quantity: 6



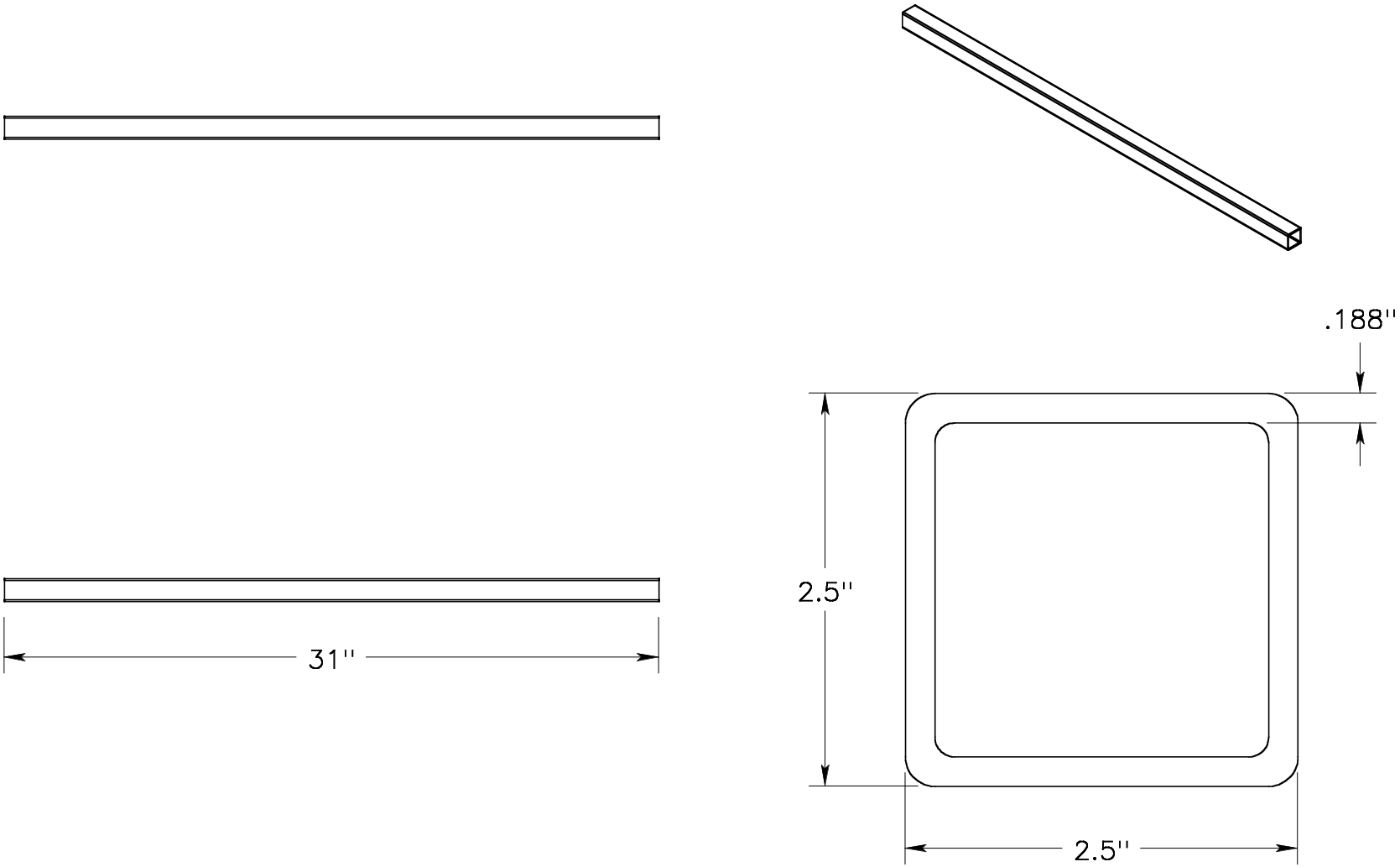




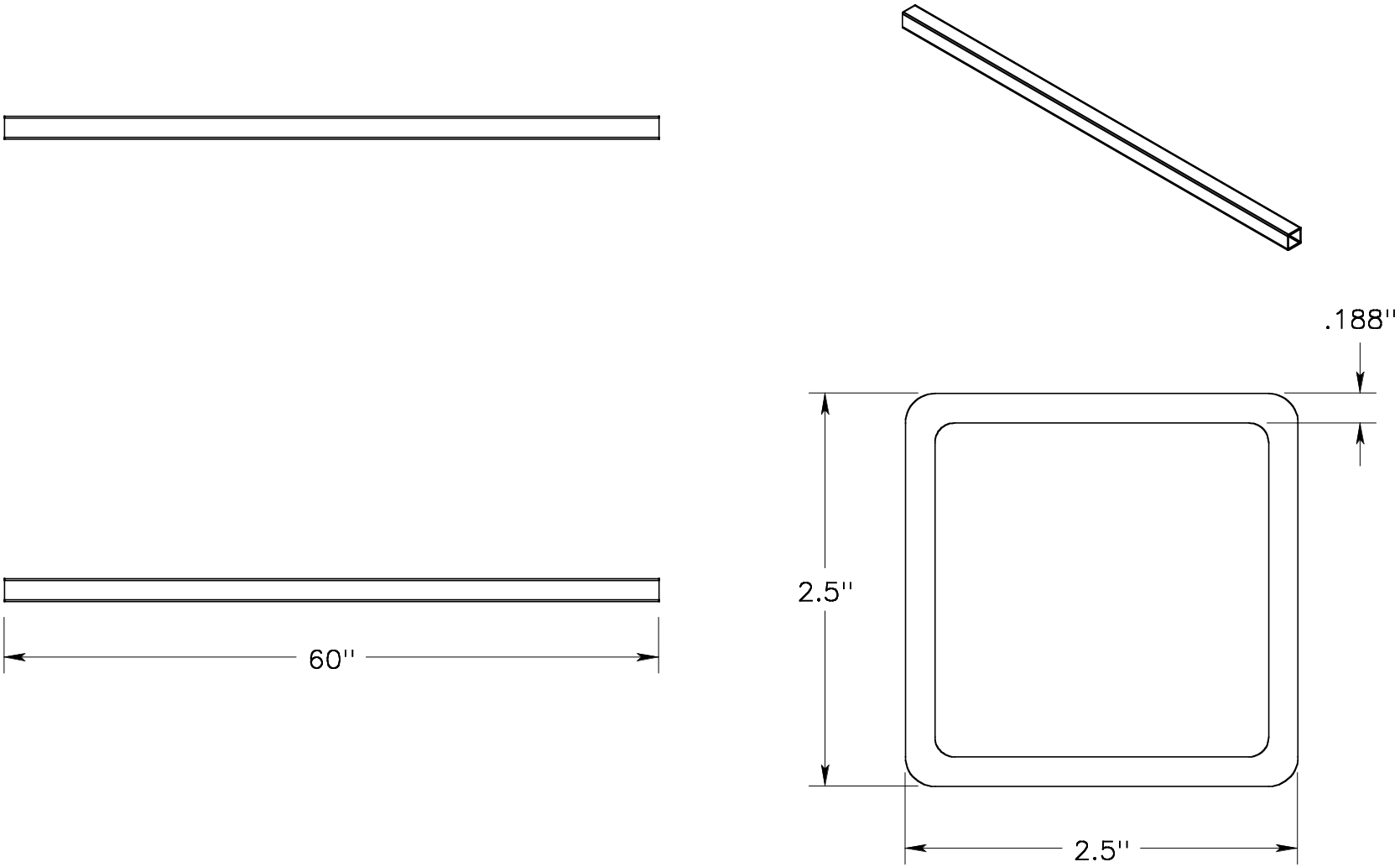
Note:
Everything gets welded all around, eccept for the caster plates. 2 sides will be enough for those.



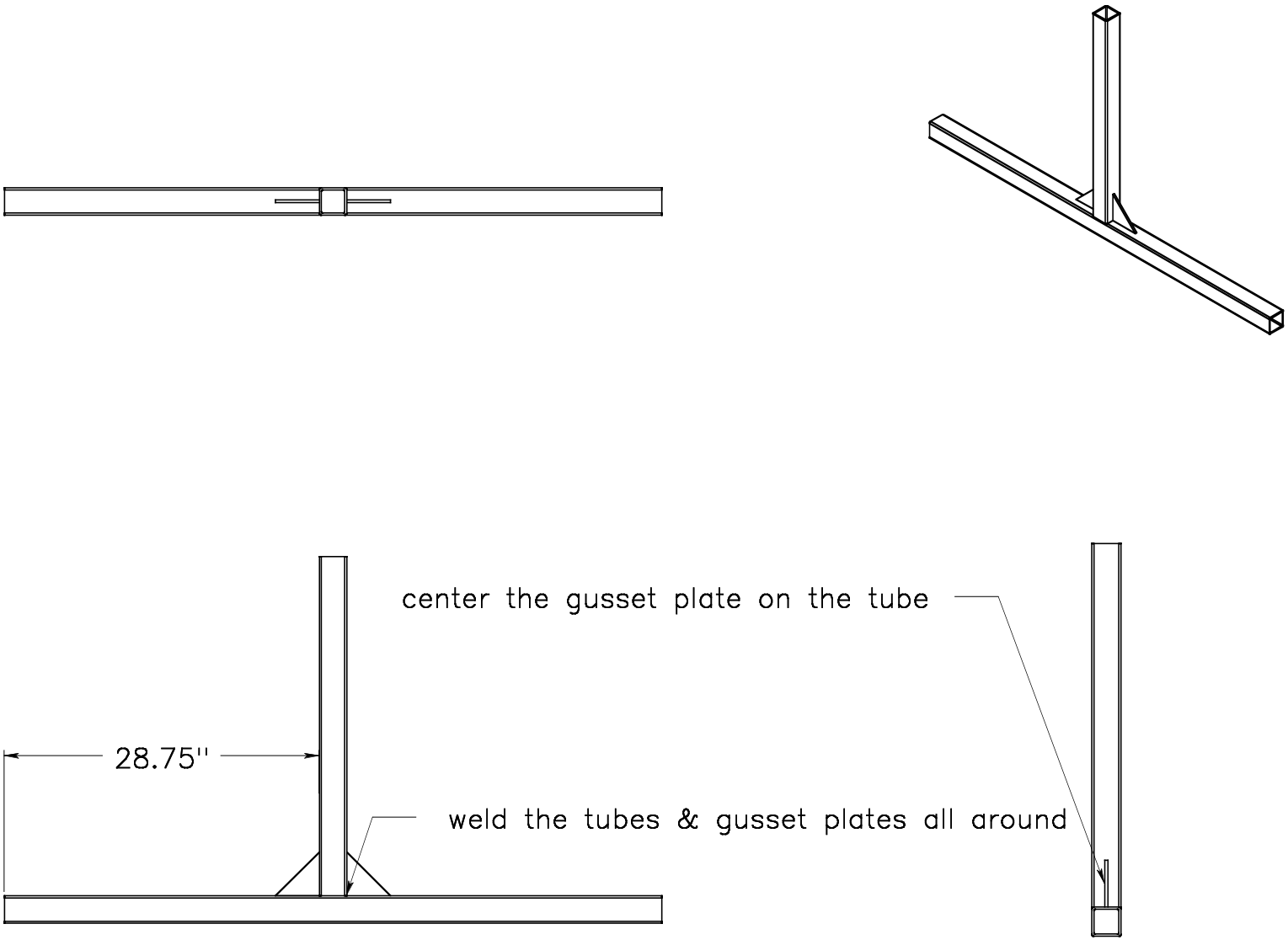
End frame 4 views Quantity: 2



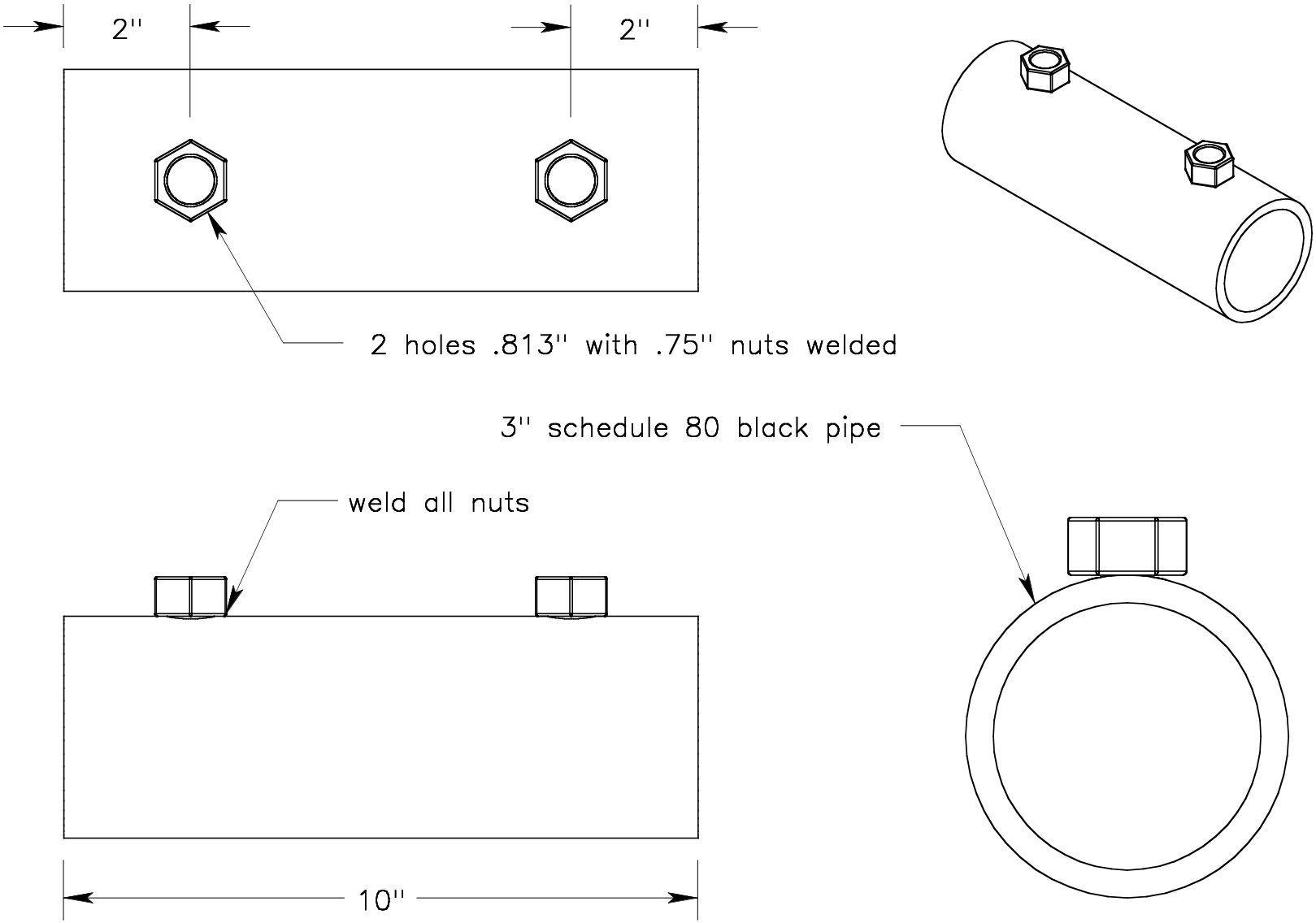
Hanger bracket vertical tube 4 views Quantity: 2



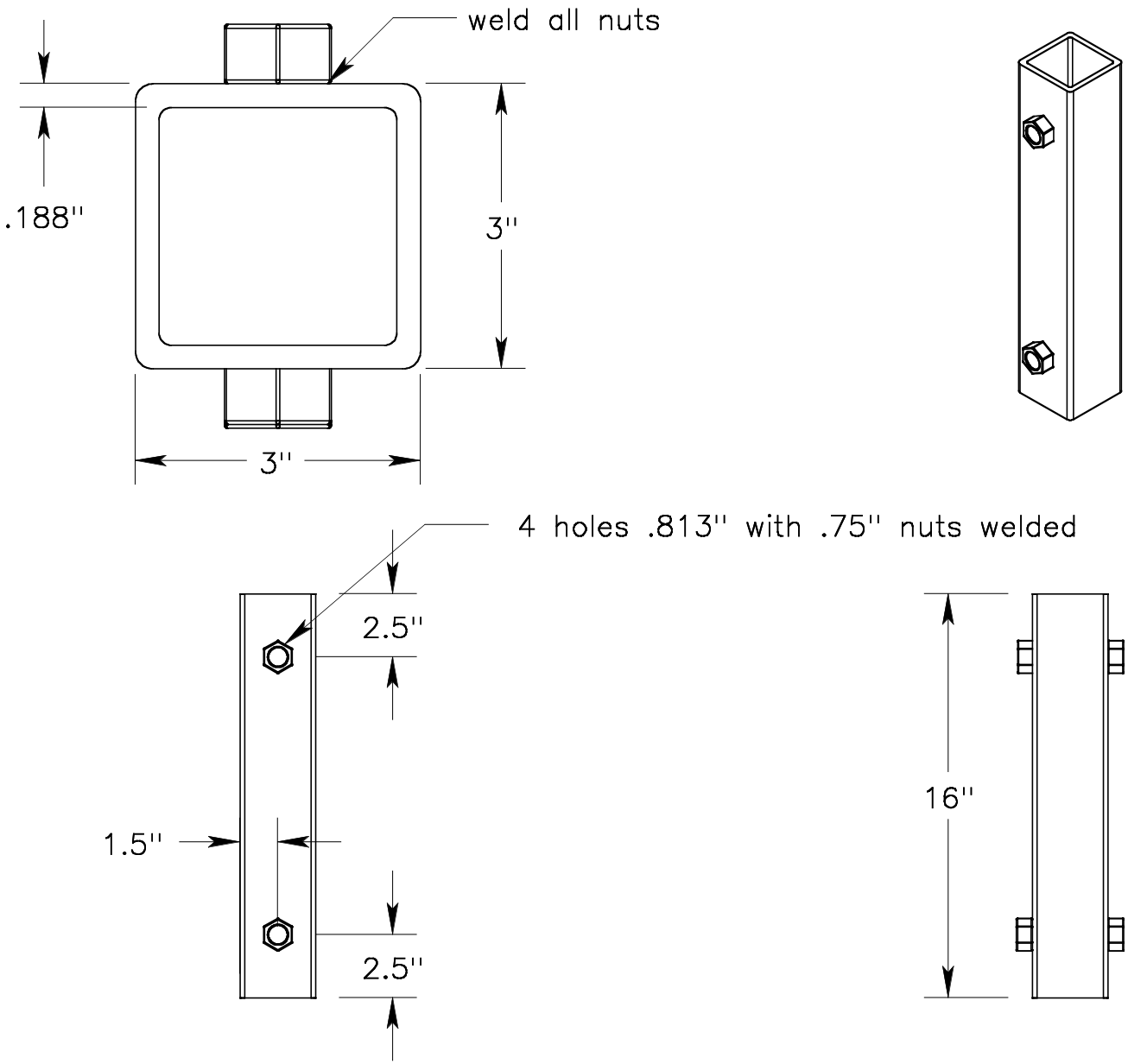
Hanger bracket horizontal tube 4 views Quantity: 2



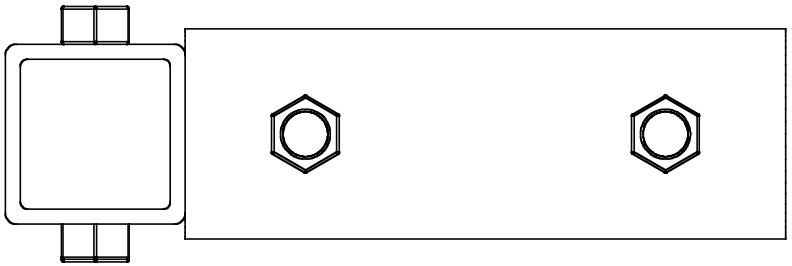
Hanger bracket 4 views Quantity: 2

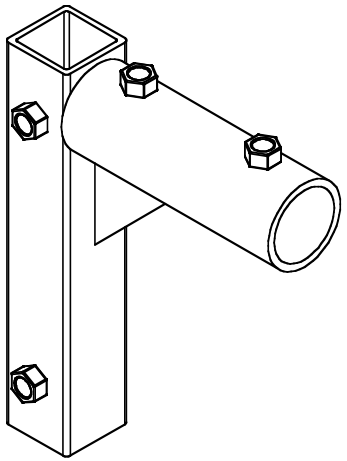


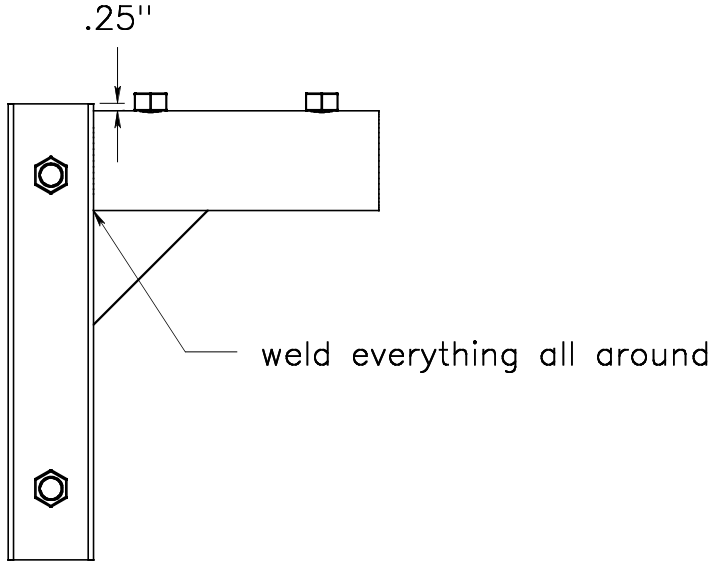
Pivot point pipe 4 views Quantity: 2



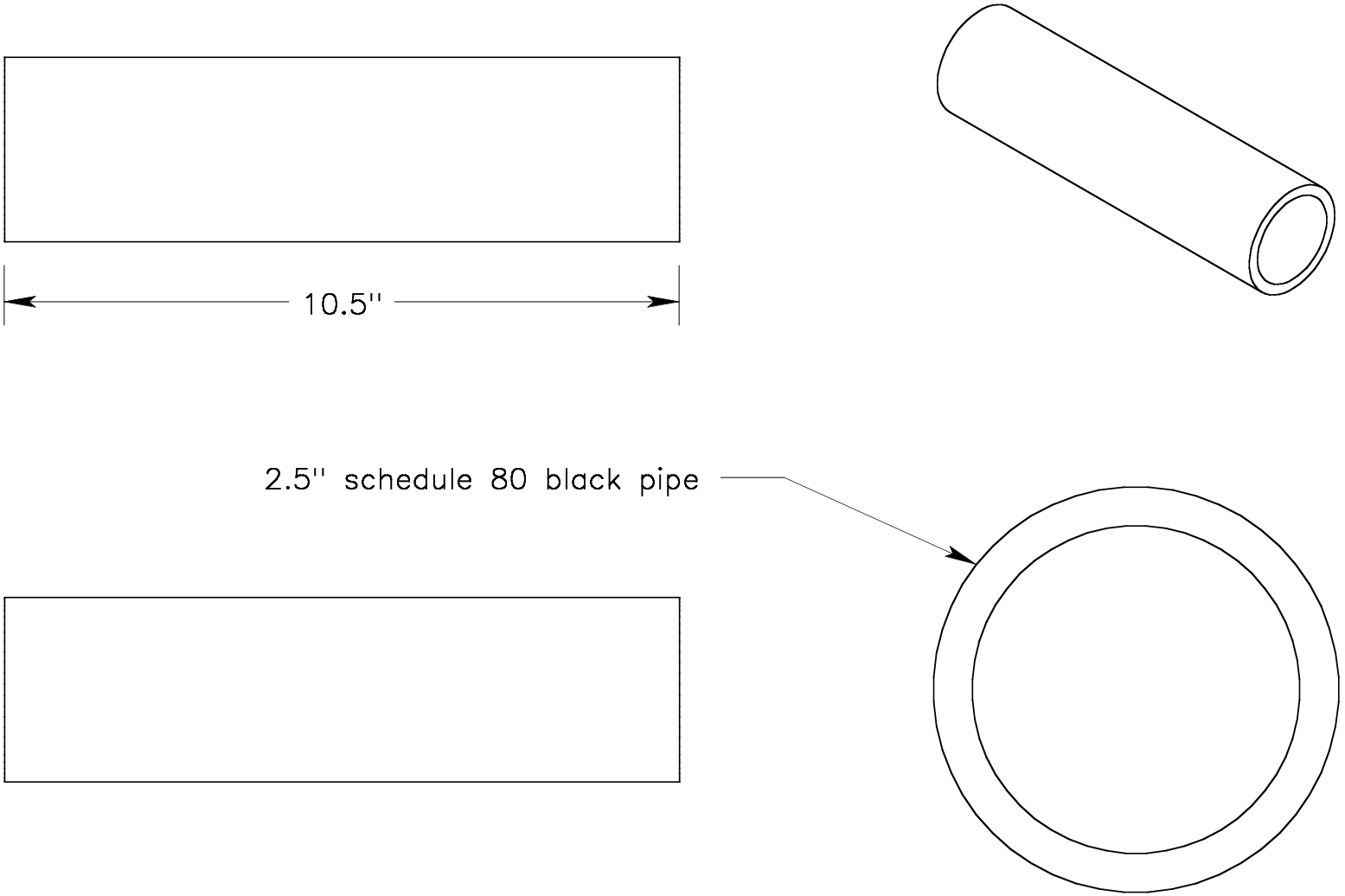
Pivot point tube 4 views Quantity: 2



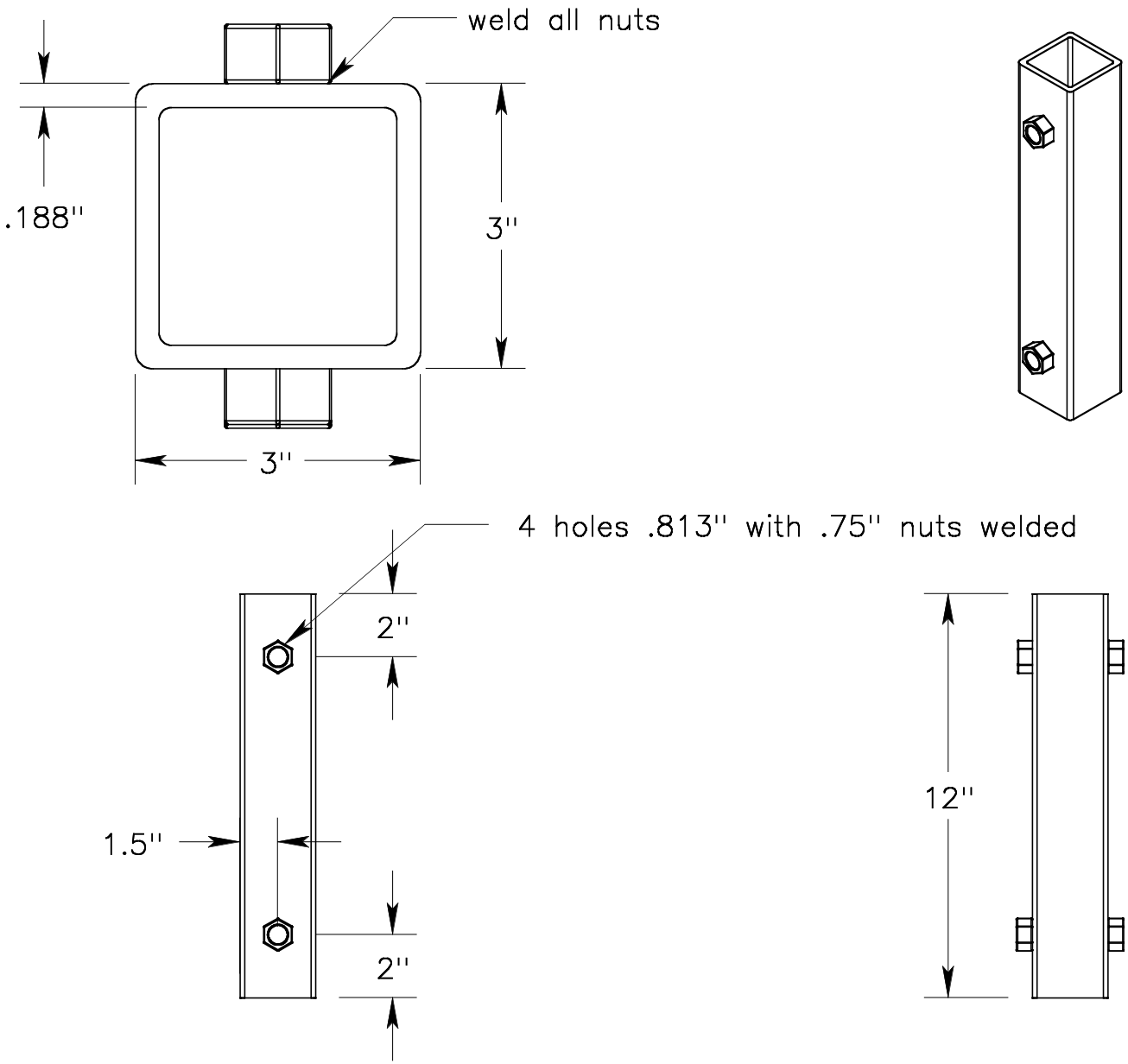




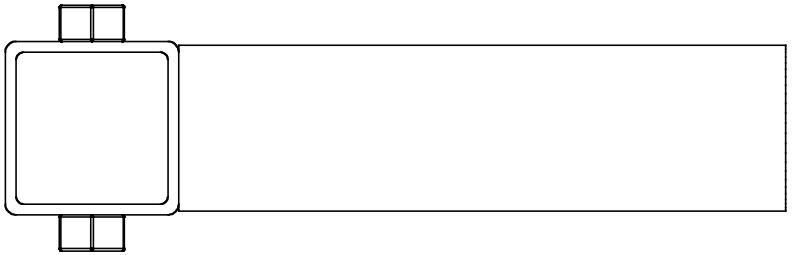
Pivot point 4 views Quantity: 2

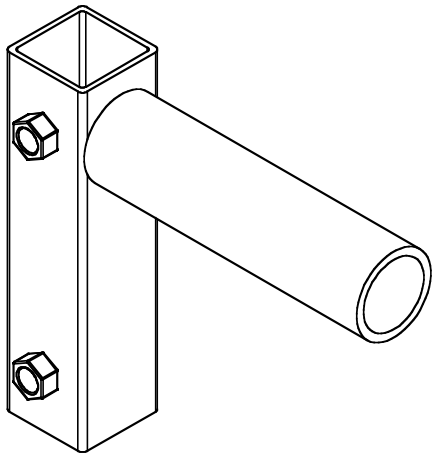


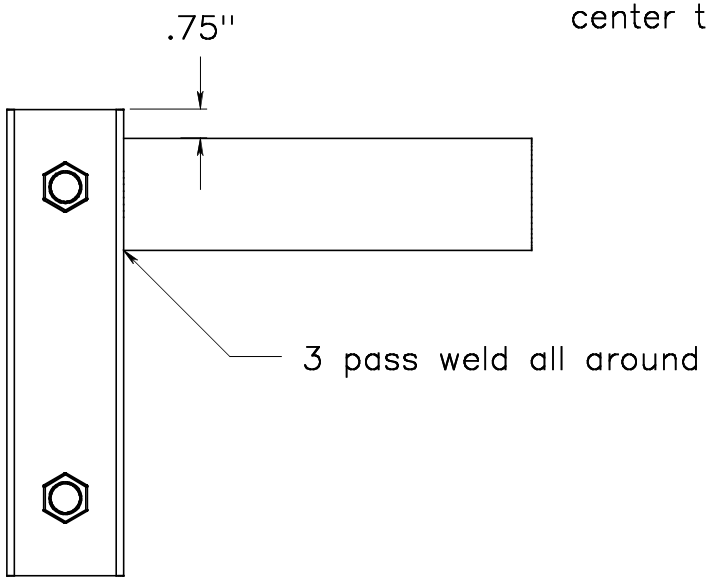
Pivot arm pipe 4 views Quantity: 2

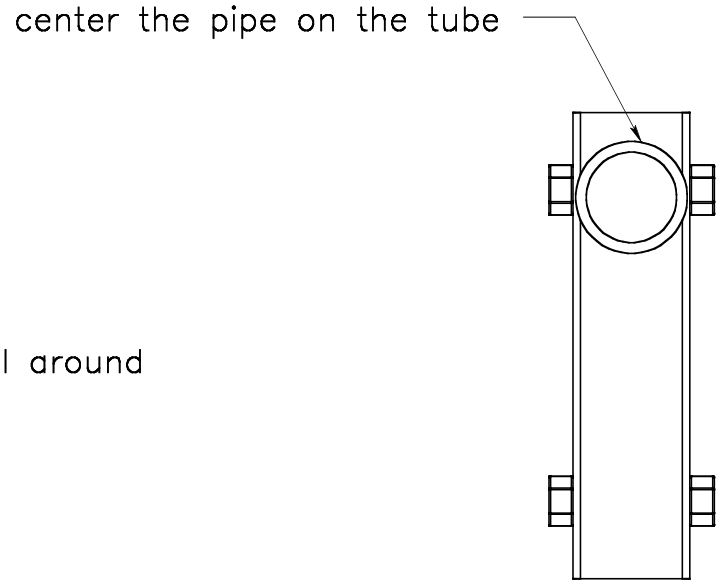


Pivot arm tube 4 views Quantity: 2

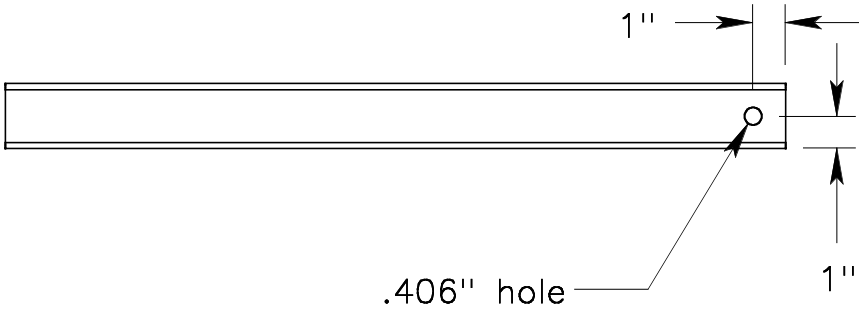


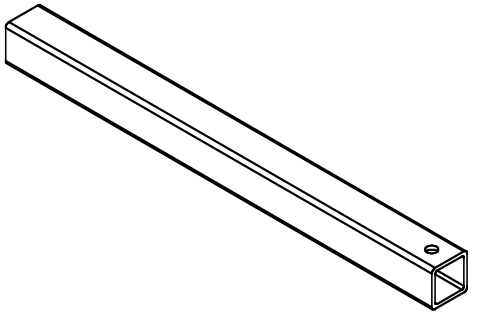


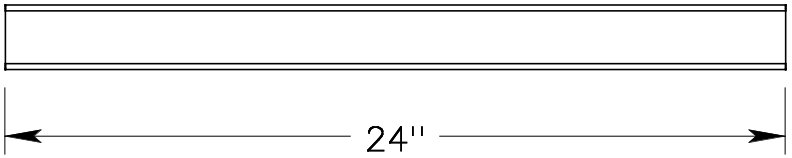


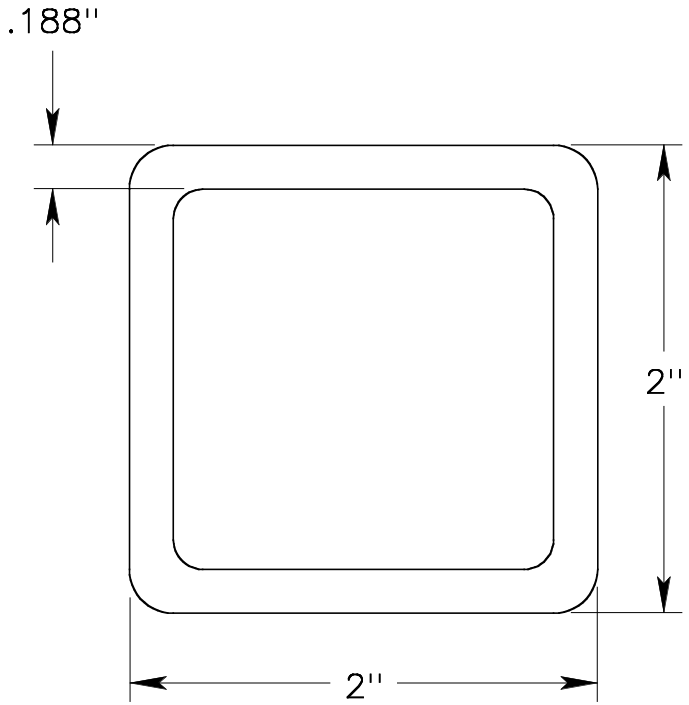


Pivot arm 4 views Quantity: 2

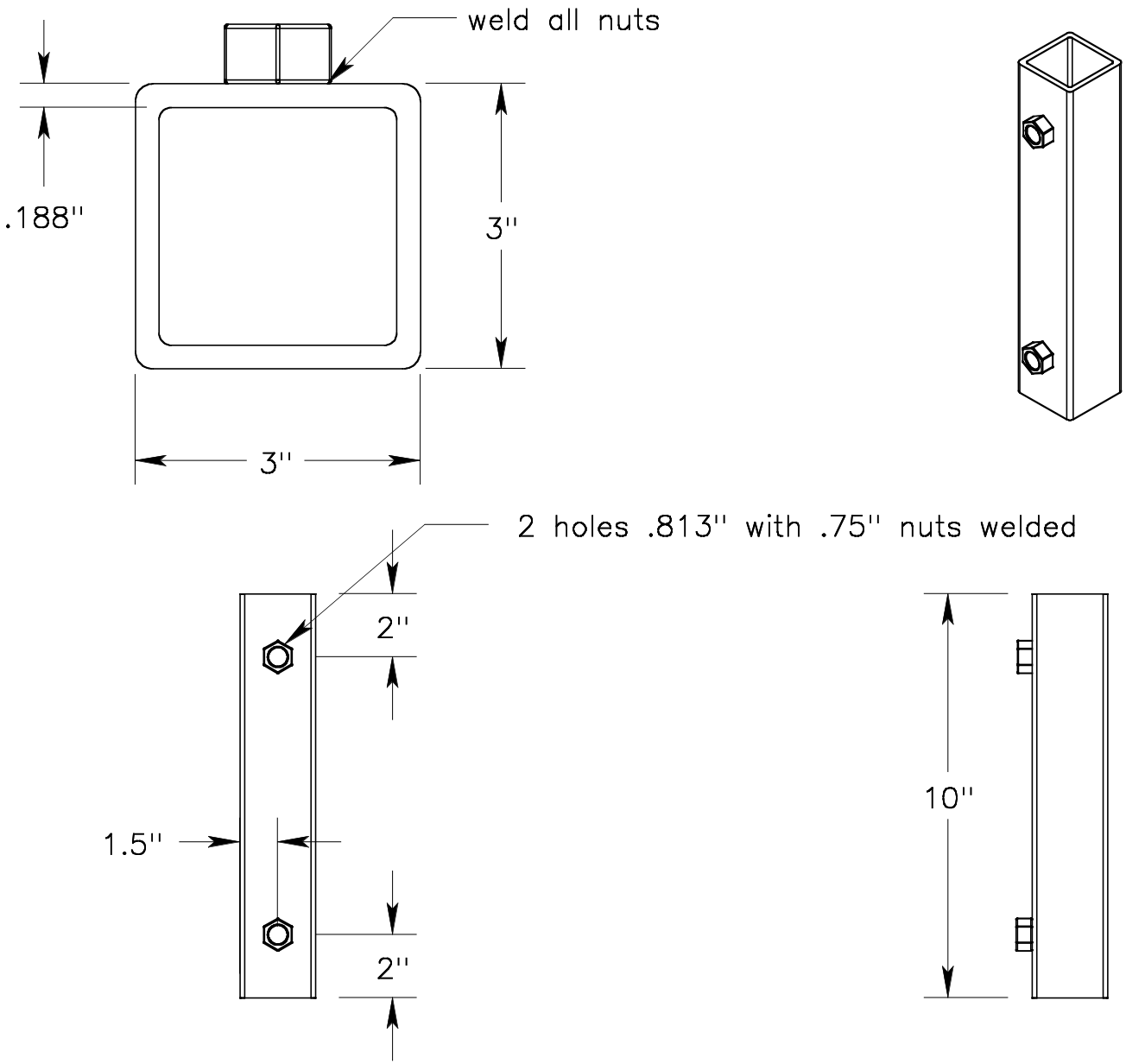




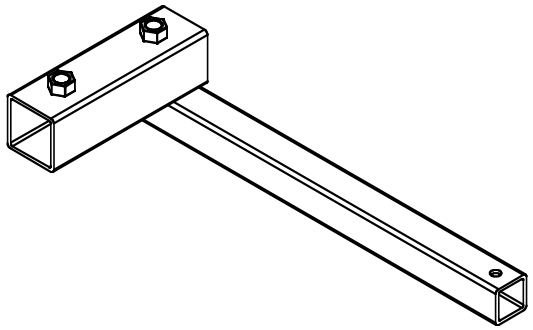


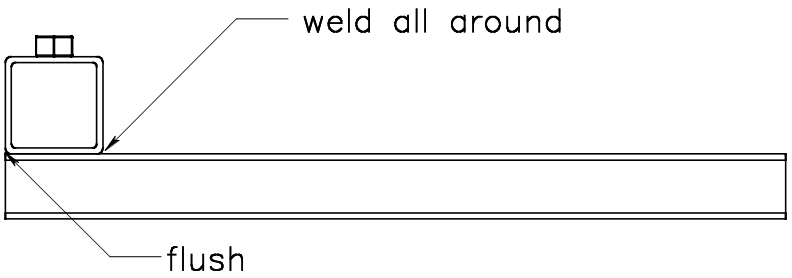


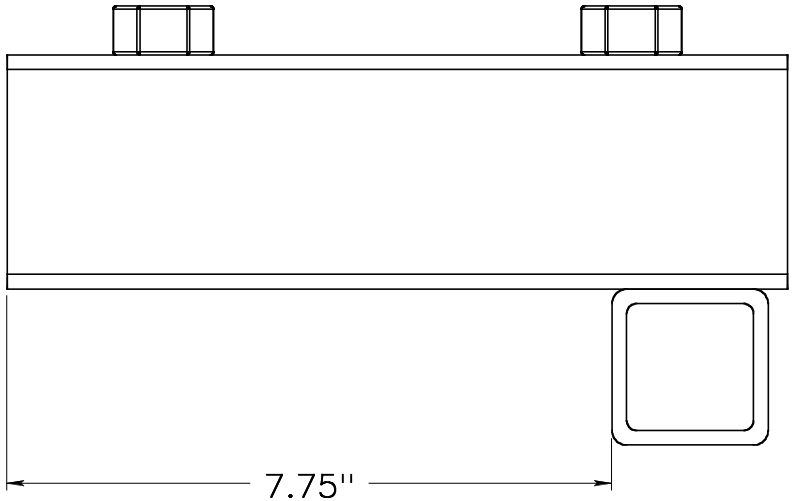
Mounting arm long tube 4 views Quantity: 4



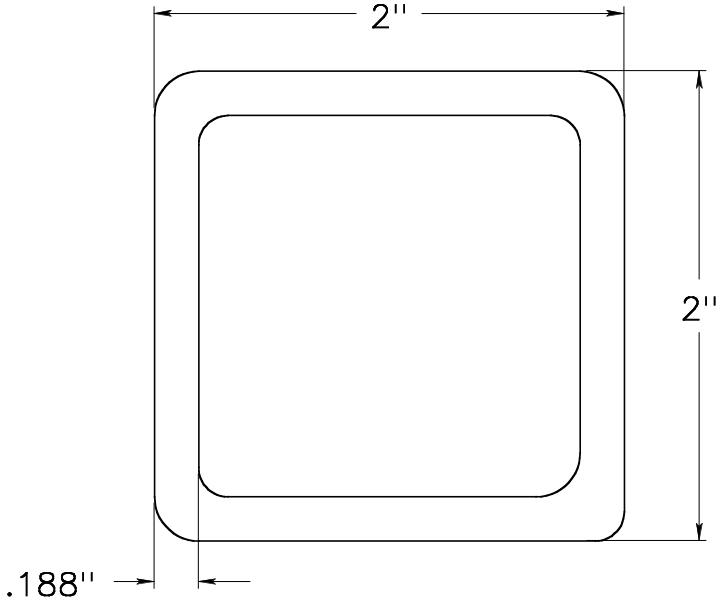
Mounting arm short tube 4 views Quantity: 4

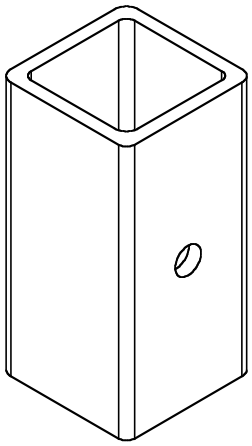


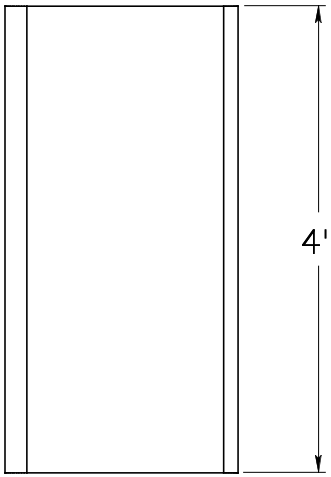


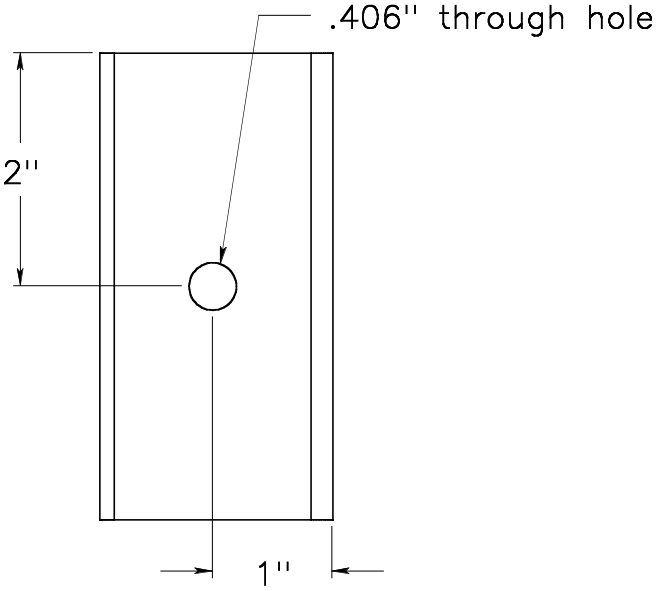


Mounting arms 4 views Quantity: 4 (2 right hand) (2 left hand)

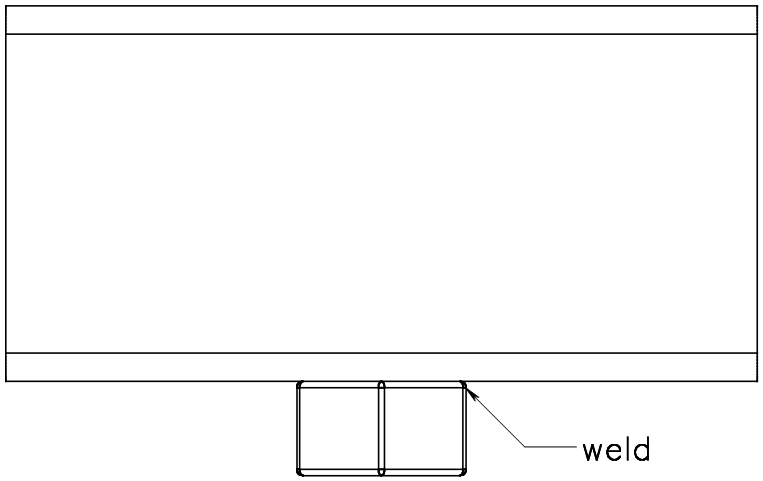


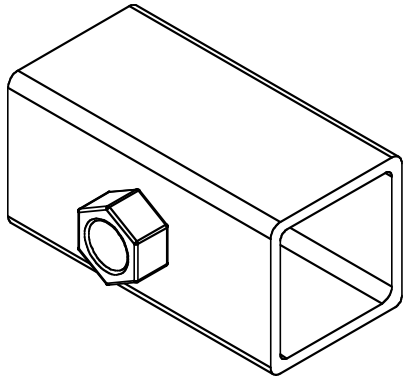


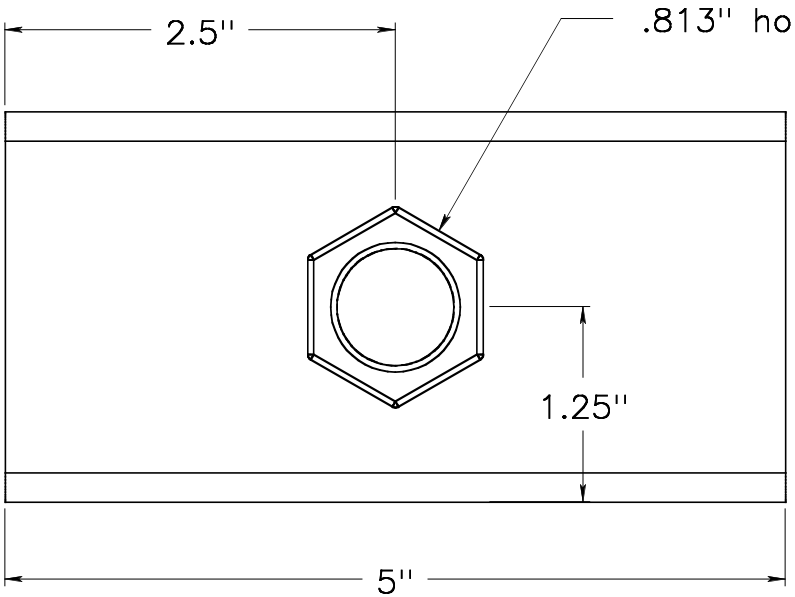


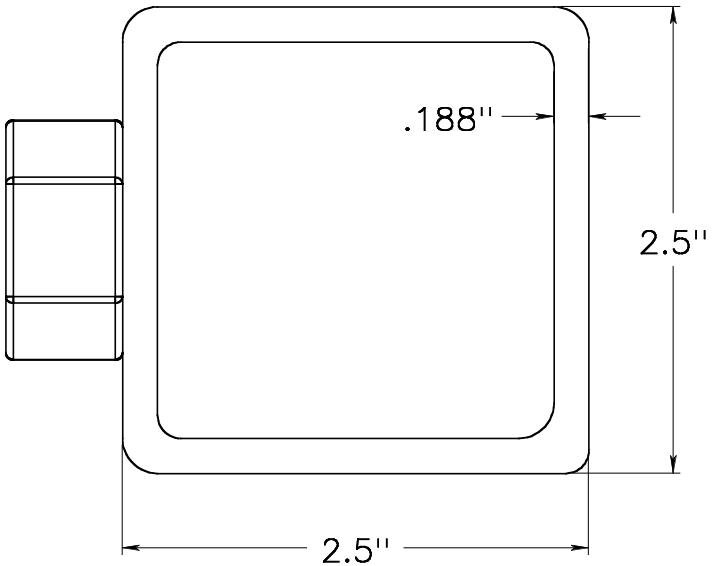


Body mount bracket vertical tube 4 views Quantity: 4

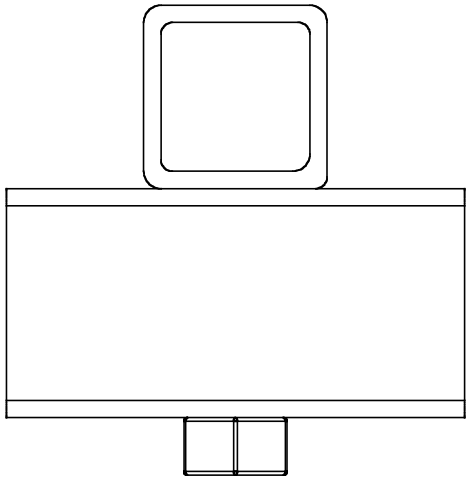


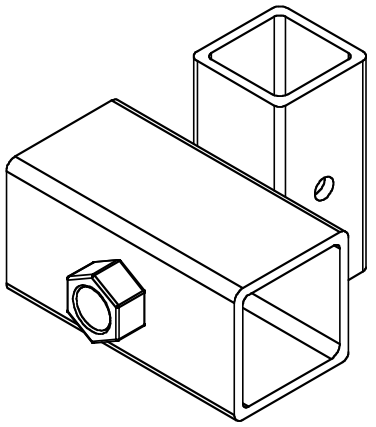


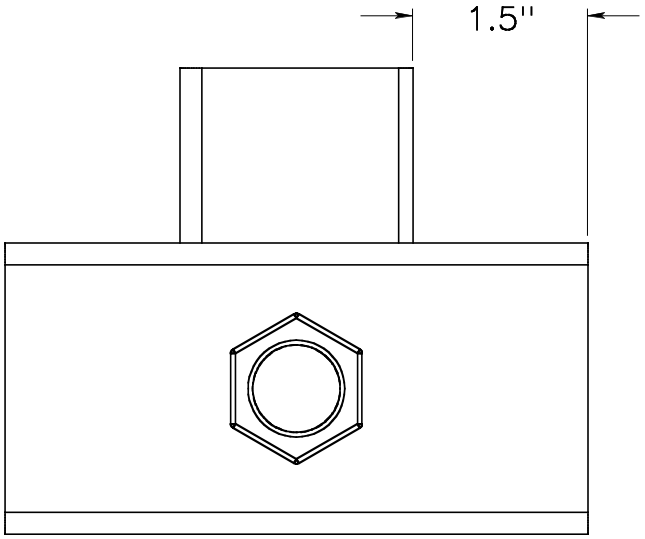


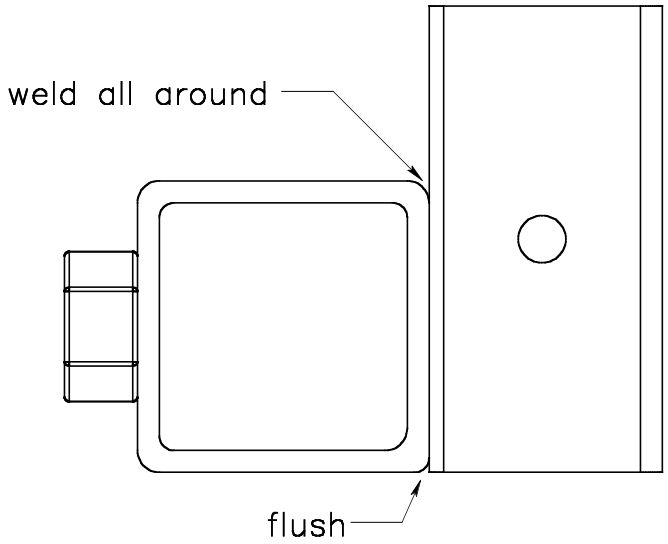


Body mount bracket horizontal tube 4 views Quantity: 4

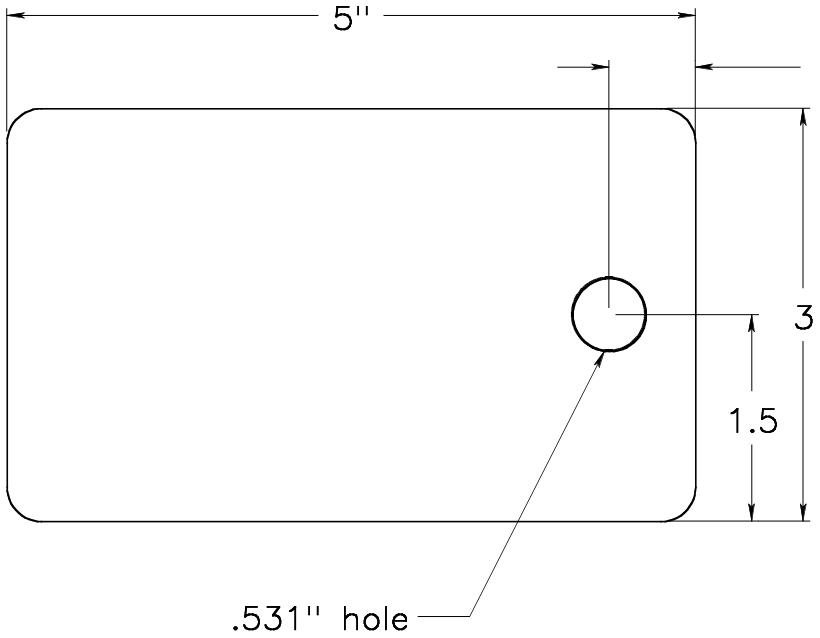


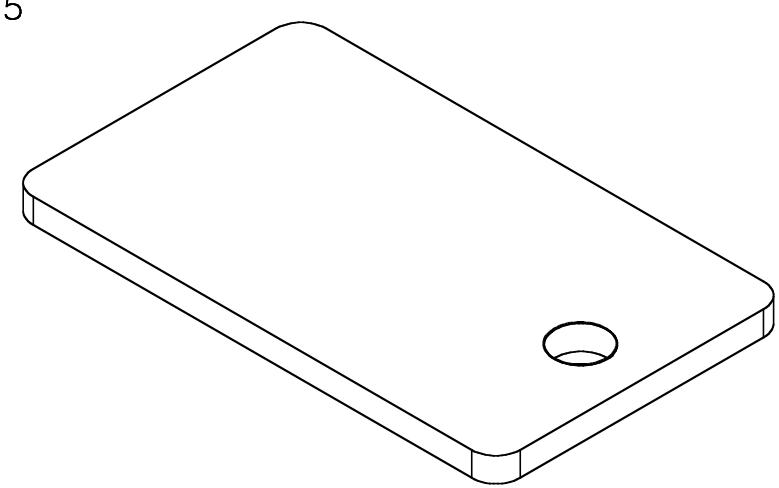


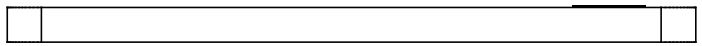


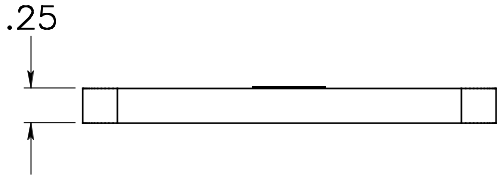


Body mount bracket 4 view Quantity: 4

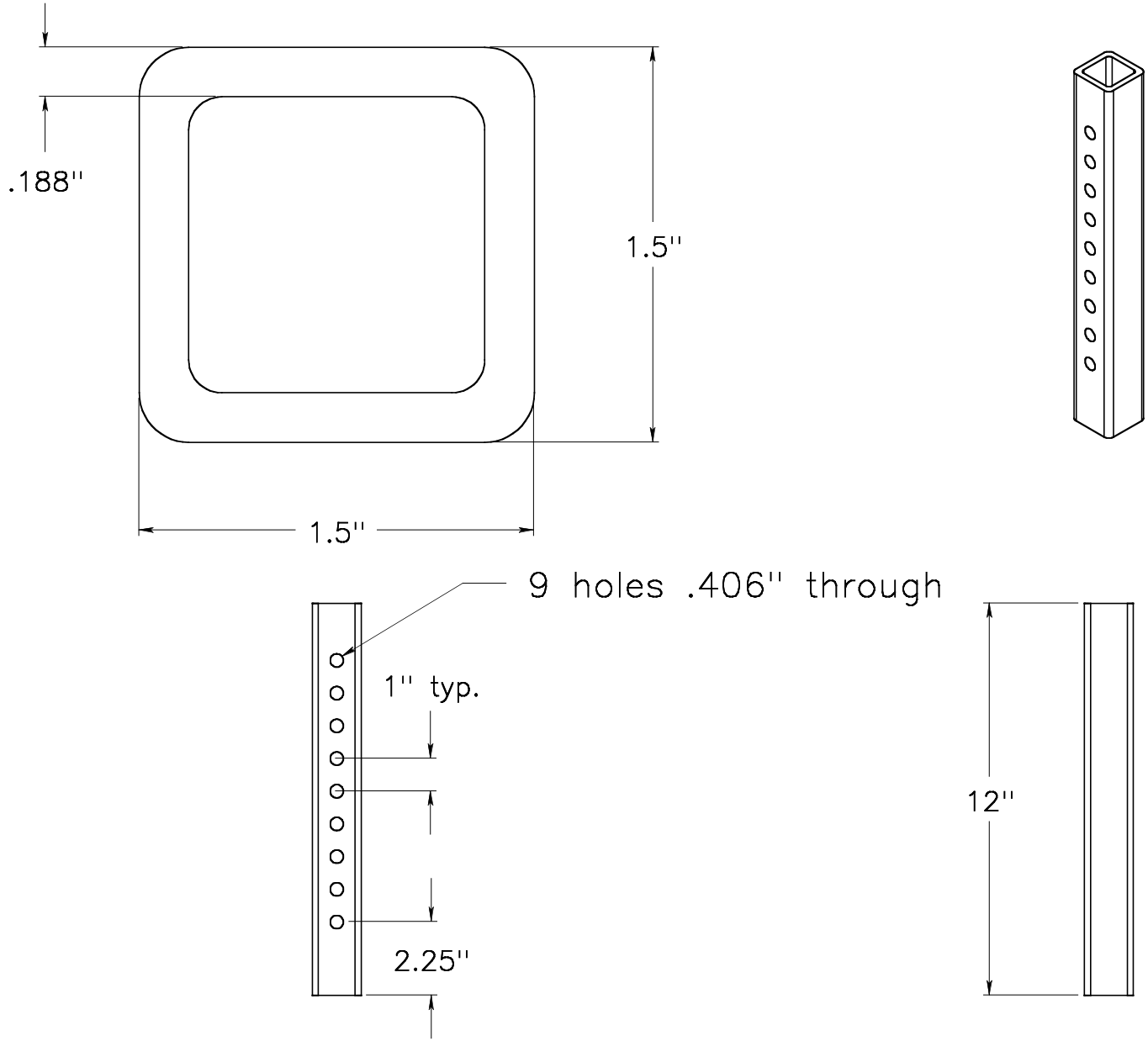




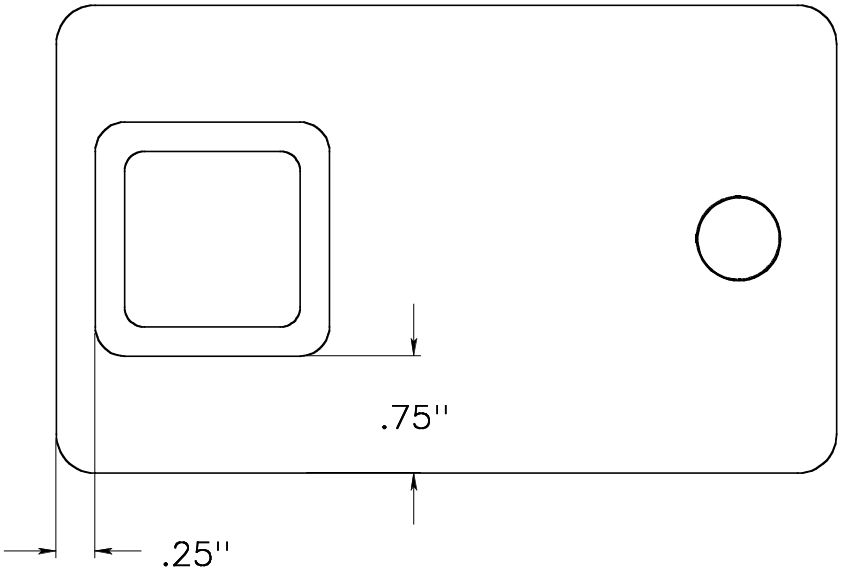


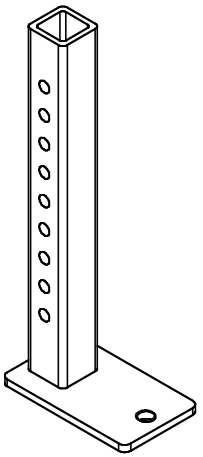


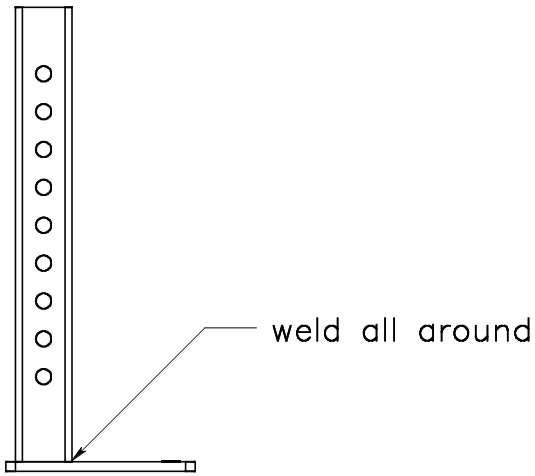
Body mount plate 4 views Quantity: 4

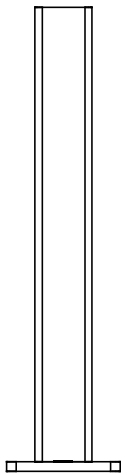


Body mount tube 4 views Quantity: 4





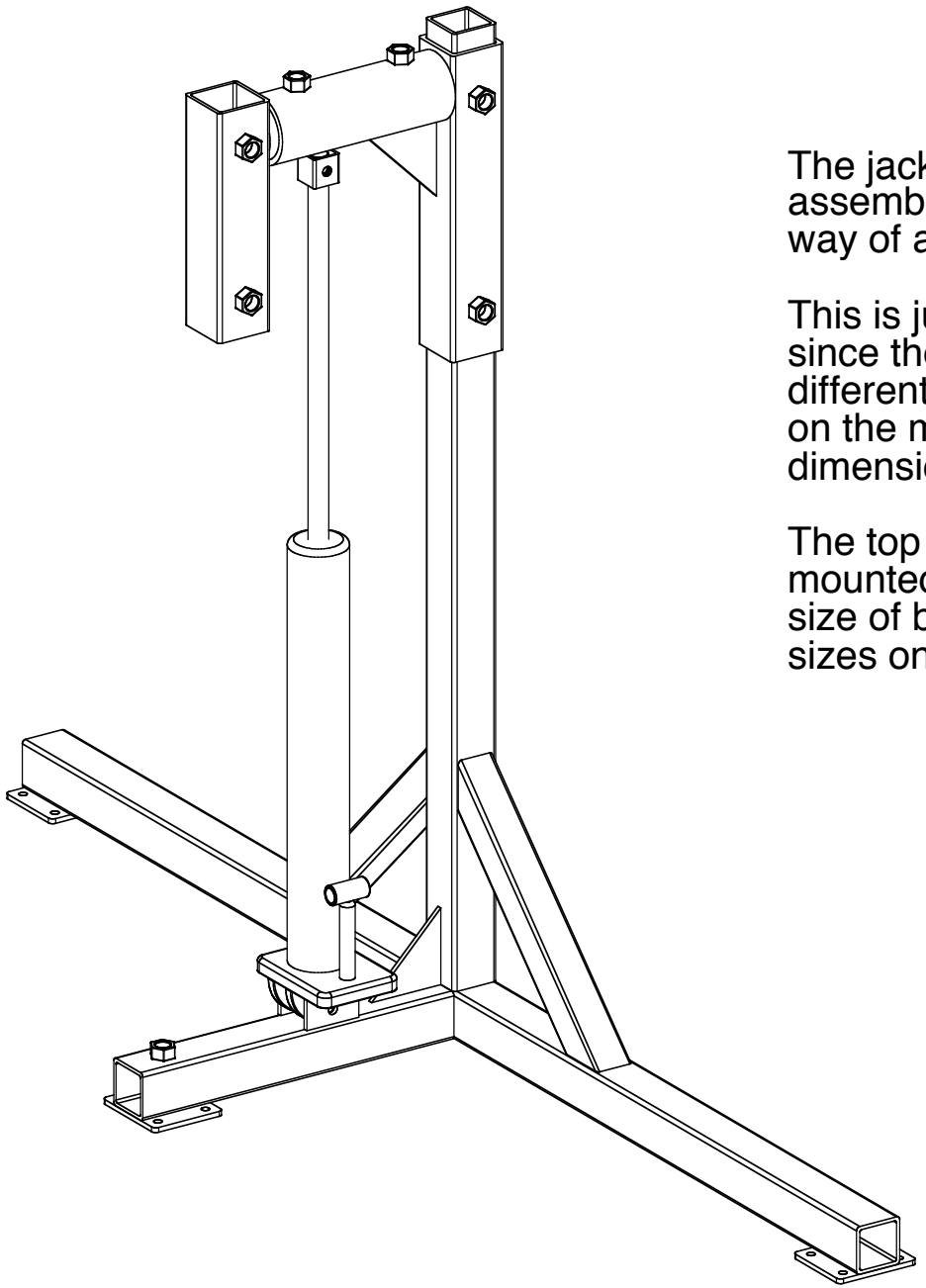




Body mount 4 views Quantity: 4

Note: This view is showing the optional hydraulic rams mounted to the end frame.

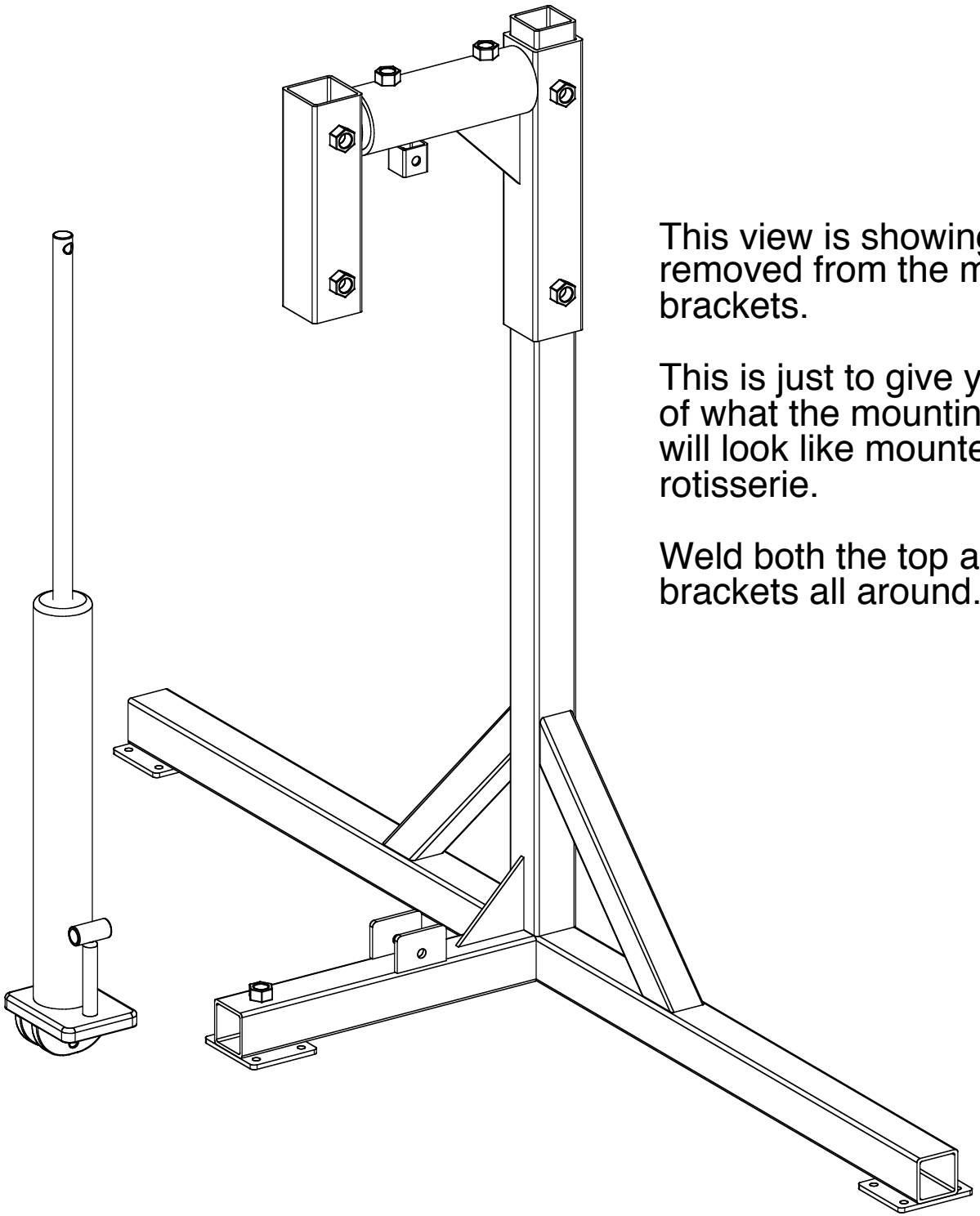
Some of the parts have been removed for clarity.



The jack will fit anywhere on the assembly as long as it is out of way of any moving parts.

This is just a visual reference since there are far too many different sizes and types of jacks on the market for me to give hard dimensions.

The top and bottom of the jack is mounted with standard bolts. The size of bolts depends on the hole sizes on your jacks.

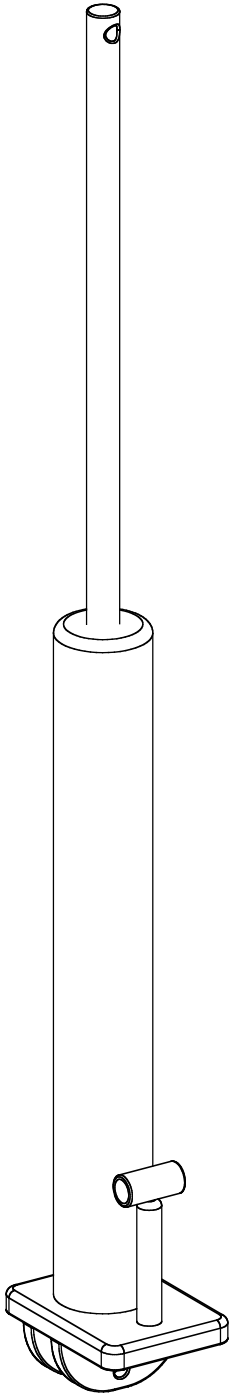


This view is showing the jack removed from the mounting brackets.

This is just to give you an idea of what the mounting brackets will look like mounted to the rotisserie.

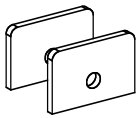
Weld both the top and bottom brackets all around.

The top bracket is simply a piece of square tube 1.5" x1.5" x.11ga. 1.5" long. The hole is .5" drilled completely through the tube.



The model of jack that I used was made by Torin. It is a 3 ton jack and the model # is T30306. It was purchased from Northern Tool.

At the time of this drawing it was still available. If you can't find one, any type of ram for an engine hoist will do the job.



The bottom brackets are plates that are 3" long x 2" high x .25" thick. The holes are .5" and were made to fit the jack for hole location.

Body Lift & Roller Plans

Matt Kline – Owner
Red Wing Steel Works
1526 South Park St.
Red Wing, MN 55066
USA

Phone: 651-764-0925
Email: redwingsteelworks@yahoo.com
Website: http://redwingsteelworksplans.com

Body Lift & Roller Building Notes

These building notes are put together as guidelines and are placed in no particular order of importance. I would suggest reading through them before starting the project. I would also recommend reading through the instruction manual as well. That will give you a better idea of the project and how it works as an end result.

The body lift & roller is made up of 8 different main parts and many different pieces to make up the main parts. The main part names are as follows: Legs, Main beams, Cross braces, Hoops, Hoop connectors, Hoop hook up, Body mount bracket, And Body mount. I have made drawings of all the individual parts as well as the main parts.

All nuts should be welded on at least 3 sides and that is if you are a good welder, if not they should be welded all the way around. It has been my experience that using smaller nuts not only dents the tube you are pressing against but over many uses of the rotisserie the nuts can become stripped out. Not to mention more warping during welding making them hard to use. A quick tip is after welding the nuts, run a tap through the threads after it cools down. This will make life a lot easier for using the unit in the future. Also, unless otherwise stated in the drawings, all nuts to be welded are 1/2”. Most of the parts have both through holes and pinch bolts to hold everything together. The through bolts are for safety and the pinch bolts are for taking the slop out of the mating parts. It is strongly recommended to use both.

The caster plates are a for a standard 6” caster. If you are going to use a different size I would recommend getting the caster first and making the plates to fit your casters.

The .188” thickness is a standard tube size that not only makes the body lift heavy duty but also makes all the tubes slide inside one another quite nicely. I wouldn’t use lighter tube because of strength reasons as well as the amount of slop in between mating parts.

You will notice in the prints that I call out some weird hole sizes. I drill all my holes 1/32” bigger than the bolt I use to make life easier down the road. There is nothing wrong with making the holes exact size or 1/16” bigger. It all depends on what drill bits you already have. If I call for a .813” hole and you only have a 3/4” bit by all means use it instead of going out and buying a new bit. If you have a 7/8” bit, use it, you get the idea. If I call for a through hole that means all the way through the other side of the tube.

You will notice on some of the 4 view drawings that some of the views are out of proportion with the others. This is for clarity and to give you the biggest view possible for standard paper from your printer. Please note that drawings are not to scale, so don’t measure off the drawings. there is enough information on each part to build each part. If you have any problems figuring something out, just look at another print that has that part on it or a picture view. This body lift & roller was drawn with common sense in mind, it is not rocket science. If there is something really important I made a note of it on the drawing or building notes page, otherwise it is no big deal.

You will see on the leg internal parts drawings that I use a couple of 3/4” brass flat washers per leg. This is to reduce friction from the nut turning against the top cap. I used to build the legs without them but I found using them really helps make lifting the unit up and down a lot easier. I would have used plastic washers but they will melt due to the heat from welding the nut on top and the steel flat washer underneath. Also it is a good idea not to sandwich all the washers too tightly against each other. Give them some clearance so everything will work smoothly after welding.

The hoops that are dimensioned on the prints will have an end result diameter of 8’4” tall. It all depends on how long the hoop sections and hoop section splice ends are. Here is the formula for figuring out what size you need with your garage ceiling clearance in mind.

Hoop section = 25” and hoop section splice end = 12.5” an end result of 8’ 4” diameter will occur.

(this is the way the prints were dimensioned)

Hoop section = 23” and hoop section splice end = 11.5” an end result of 7’ 6” diameter will occur.

Hoop section = 21” and hoop section splice end = 10.5” an end result of 7’ diameter will occur.

I hope this isn’t too confusing. The bottom line is: the smaller the hoop parts, the smaller the end diameter will be. The reason I went with 8’4” diameter for the plans is that you will never find a car too big to fit nicely in that size hoop. Conversely, I wouldn’t make my hoops any smaller than 7’ diameter or you will be pretty cramped even with the smallest cars.

You will notice on the plans for the legs I use 3/4” ACME threaded rod and nuts for the telescoping. This is a little harder to come by than regular threaded rod but I’ve tried the regular stuff and I ended up pulling my hair out trying to get it to work properly. Believe me there is a reason that machines with moving parts all use acme thread (lathes, milling machines) they can travel over and over again and the threads still work. Depending on how big of a town you live in you might have to order it. Just search for acme threaded rod on google to find a place to get it. I used to get mine from Williams Steel & Hardware in Minneapolis, MN. Most larger hardware stores will have it or at least order it for you.

In all of my pictures you will notice that the hoops were made of pipe instead of square tubing. This is because I used to build many of these things and it was a real time saver to have pipe rolled to the diameter I wanted and just cut it into quarter sections. Because of the expense in paying someone to roll your hoops, I chose to show it in sections of square tubing that can be welded together. If you have the equipment and/or the ability to roll pipe or tube that would be just fine, but I felt that most people wouldn’t even bother. I know I wouldn’t if I was only going to build one. The only reason I went with pipe instead of square tube was that, the cheapest company to do it could only roll pipe. The concept is the same no matter what material you use.

Let’s talk a minute about the fact that I did not dimension any hoop hook up procedures. All the parts needed are dimensioned. There are way too many variables involved for me to give hard dimensions on the hoop hook up procedure. The fact that I don’t

know your garage ceiling height, your car width, not to mention that if all of the hoop sections got cut even 1/4” shorter or longer will drastically change the over all dimensions, is why I did not dimension the procedure. If I did, someone would build all the parts without reading these building notes and then realize that it won’t work. It is a very simple process and it goes as follows:
Once the body lift is built and put together, raise the legs about 6” higher than their lowest position. (Make sure you have the casters installed). Also make sure the body lift is put together at least 7’ wide. (Around 7’ seems to be the best). Next, install the hoop hook up tube to the main beam short tubes sticking out. Then put the fully assembled hoop in front of the lift like the print shows on the hoop hook up instructions page (the hoop should be touching the ground). Once both sides of the hoop is touching the hoop hook up tubes you will want to tack weld them to the hoop. (Tack them in a couple spots so they won’t break off when you remove the hoop from the main beams). Once that is done you can put the hoops on a bench for welding and installing the gusset plate. You now know that once the car is on the body lift and you go to install the hoops, the legs will be able to be lowered all the way, so the hoop is on the ground, and the legs can be taken off. I hope this wasn’t too confusing. You might want to read this again due to my lack of writing ability. I won’t leave you high and dry, so here is my cell phone # Matt Kline 651-764-0925. I hope you won’t need to call, but just in case, there it is. You can also contact me anytime from my website www.redwingsteelworksplans.com. Another good reference for this is all the pictures on my website and the instruction manual.

Body Lift & Roller Material List

Main Beams

- 2 - 52” x 1.5” x 1.5” x .188” square tube
- 4 - 30” x 2” x 2” x .188” square tube
- 4 - 4” x 1.5” x 1.5” .188” square tube

Cross Braces

- 8 - 38” x 1.5” x 1.5” x 11ga. square tube
- 4 - 72” x 1” x 1” x 11ga. square tube
- 8 - 1.5” x 1.5” x .125” flat

Body Mounts

- 4 - 5” x 2.5” x 2.5” x .188” square tube
- 4 - 4” x 2” x 2” x .188” square tube
- 4 - 12” x 1.5” x 1.5” x .188” square tube
- 4 - 5” x 3” x .25” flat

Legs

- 4 - 19” x 2.5” x 2.5” x .188” square tube
- 4 - 18” x 2” x 2” x .188” square tube
- 8 - 4” x 1.5” x 1.5” x .188” square tube

8 - 2” x 2” x 2” x .188” square tube

8 - 2” x 2” x .125” flat

4 - 2” x 2” x .25” flat

4 - 4.5” x 4” x .25” flat

4 - 3” x 3” x .25” flat

Hoops

8 - 25” x 1.5 x 1.5 x 11ga. square tube

8 - 12.5” x 1.5” x 1.5” x 11ga. square tube

4 - 4” x 2” x 2” x .188” square tube

Hoop Connectors

8 - 12” x 1” x 1” x 11ga. square tube

8 - 2” x 2” x 2” x .188” square tube

8 - 2” x 2” x .125” flat

Hardware

48 - 1/2” nuts

12 - 1/2” x 3” bolts

36 - 1/2” x 1” bolts

20 - 1/2” lock washers

20 - 1/2” flat washers

12 - 3/8” x 3” bolts

12 - 3/8” nuts

12 - 3/8” lock washers

12 - 3/8” flat washers

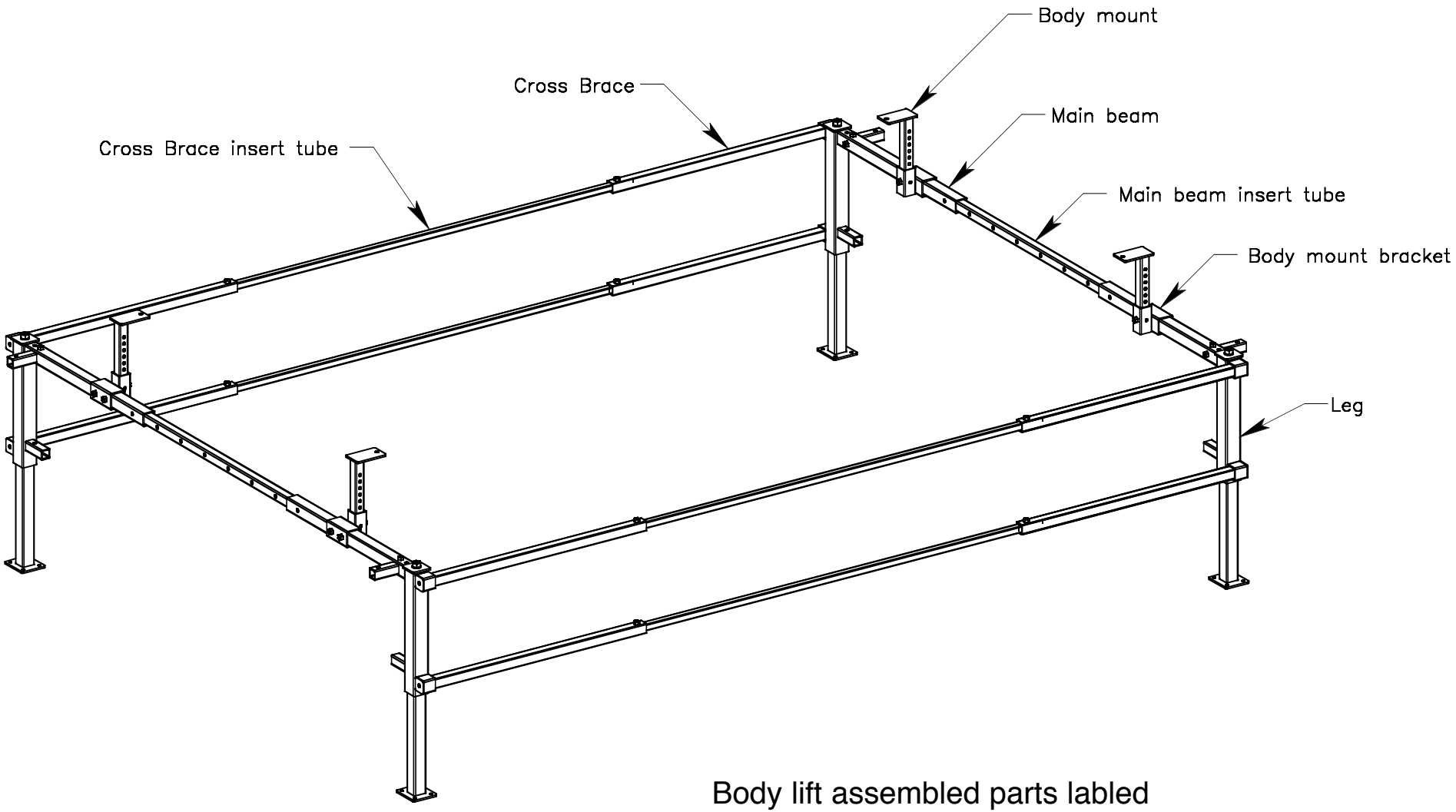
4 - 18” x 3/4” acme threaded rod

8 - 3/4” acme threaded nuts

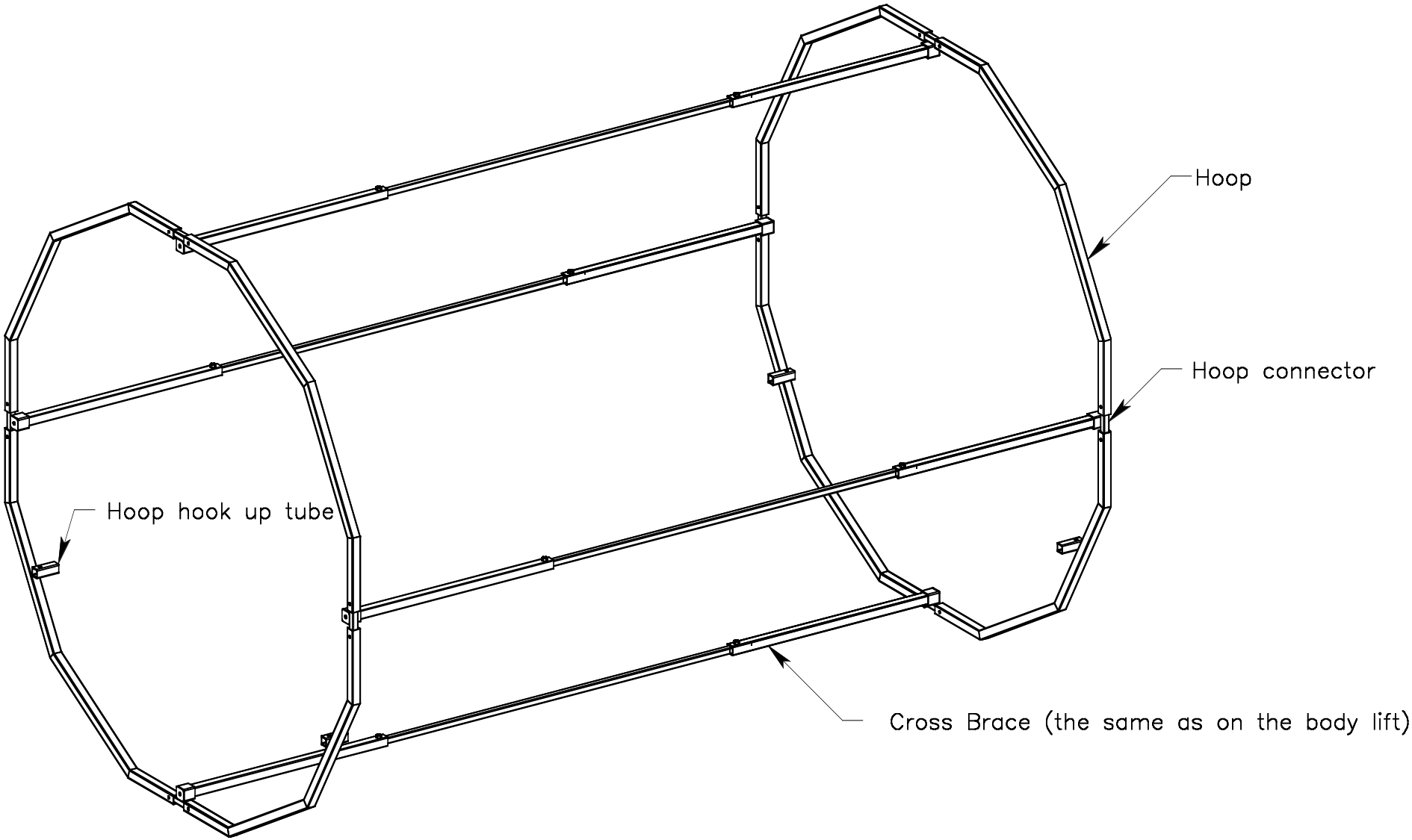
8 - 3/4” brass flat washers

4 - 3/4” flat washers

4 - 6” casters

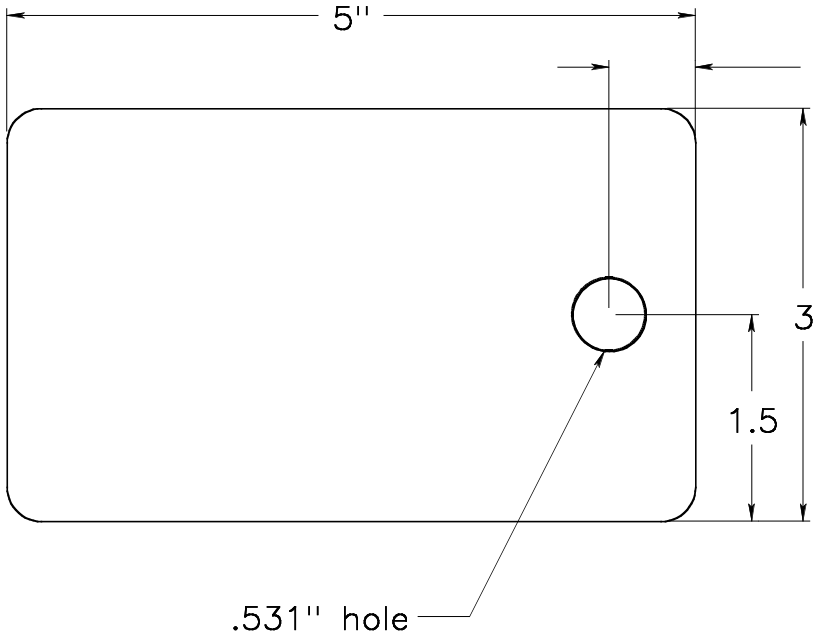


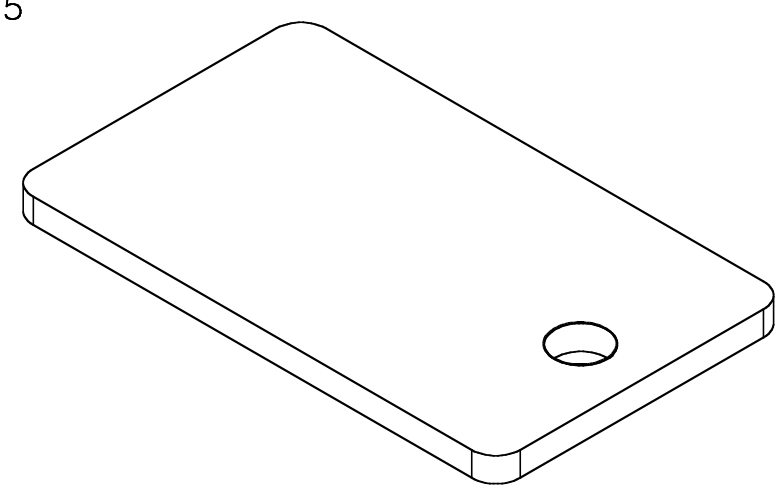
Body lift assembled parts labled

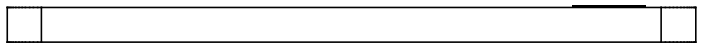


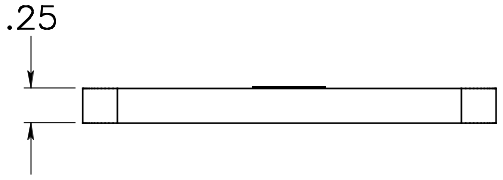
Hoop assembled parts labled

Top view	Picture view
Front view	Right side view
Part name & quantity (this is the way all the 4 view drawings are drawn)	

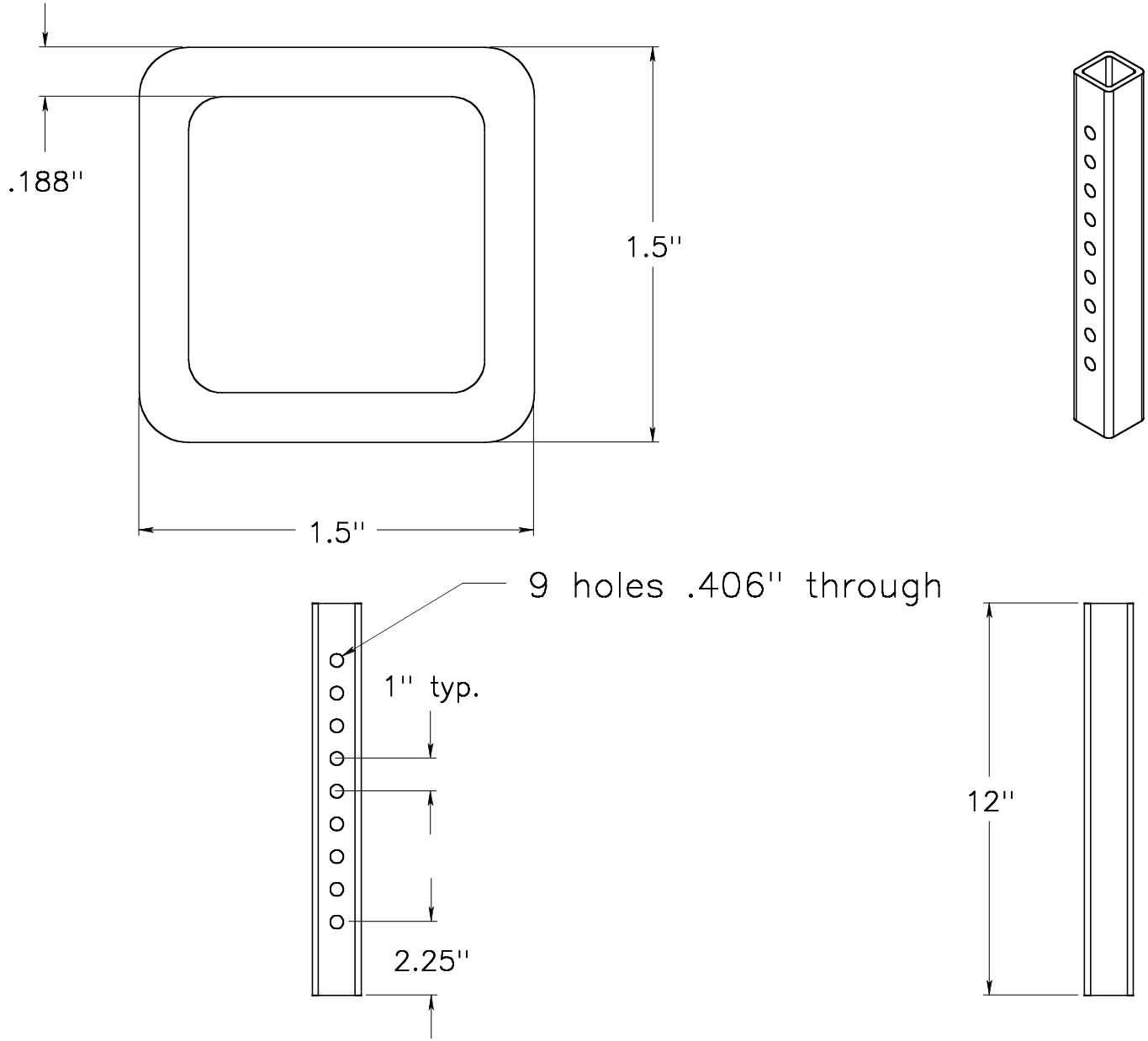




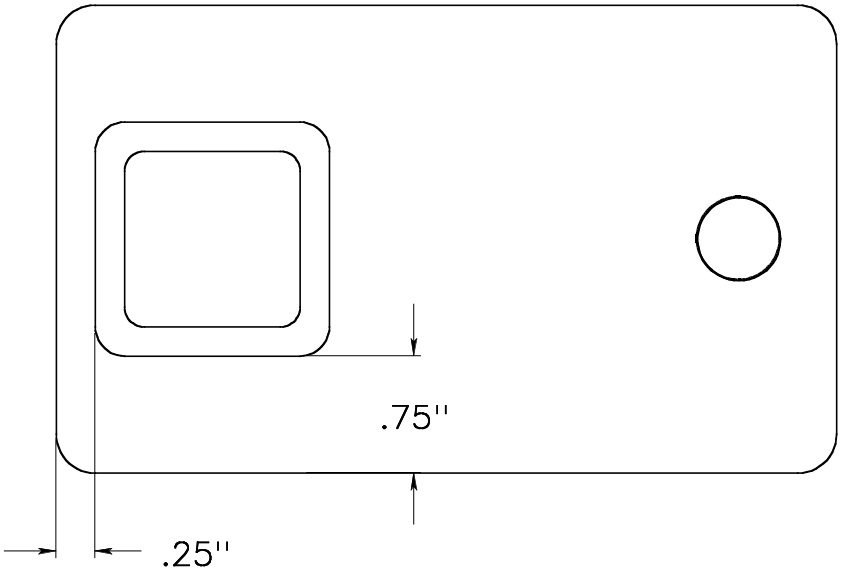


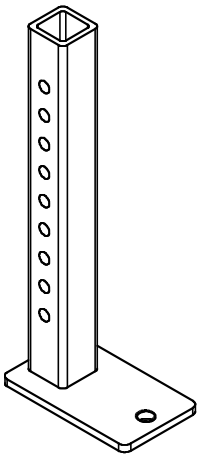


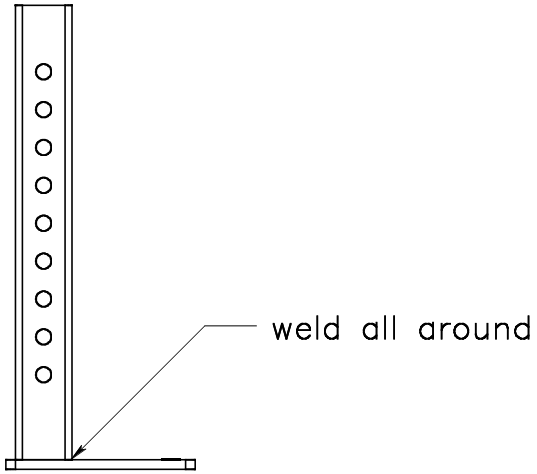
Body mount plate 4 views Quantity: 4

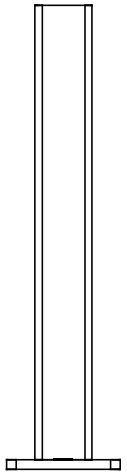


Body mount tube 4 views Quantity: 4

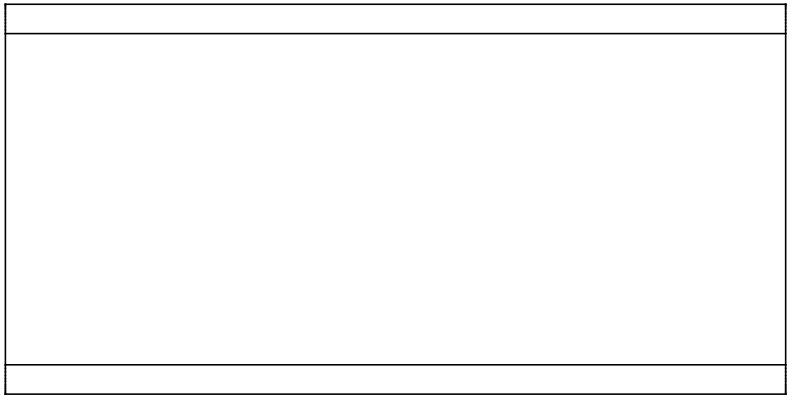


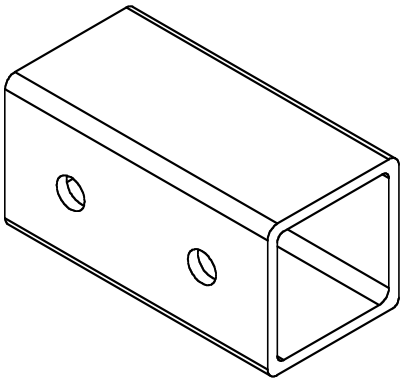


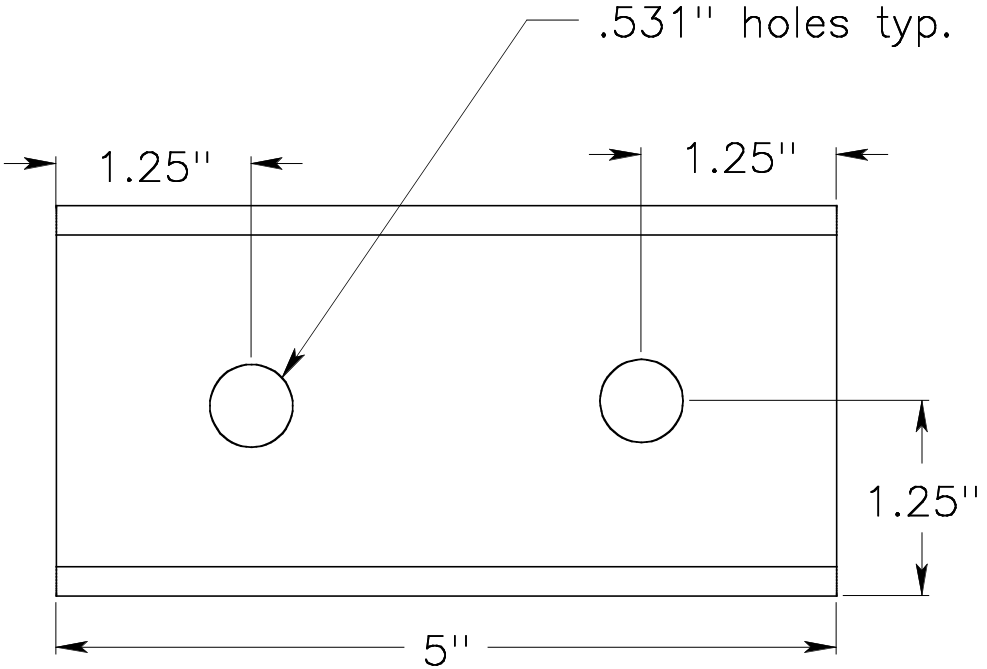


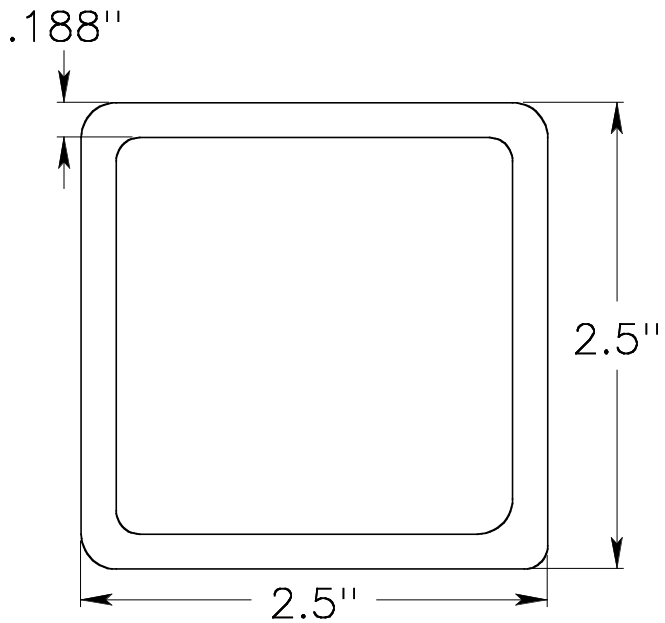


Body mount assembly 4 views Quantity: 4

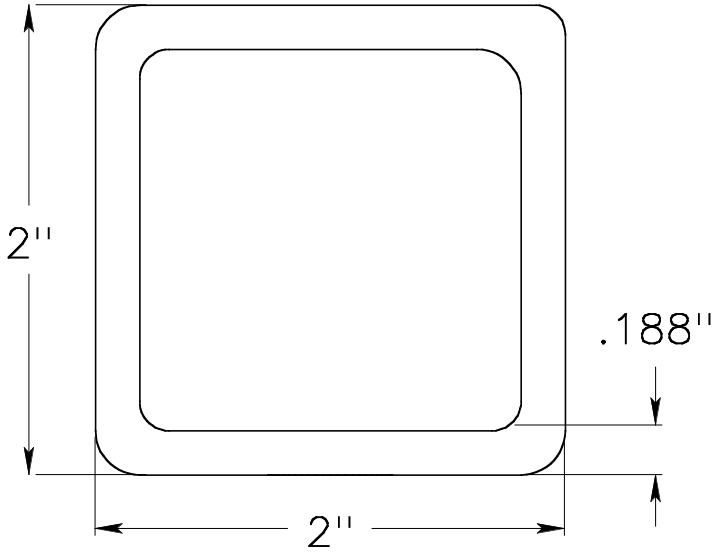


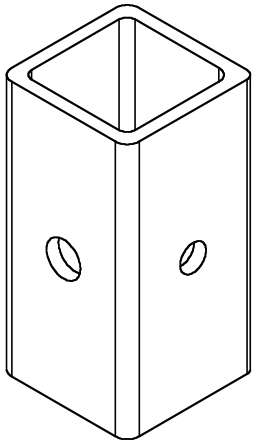


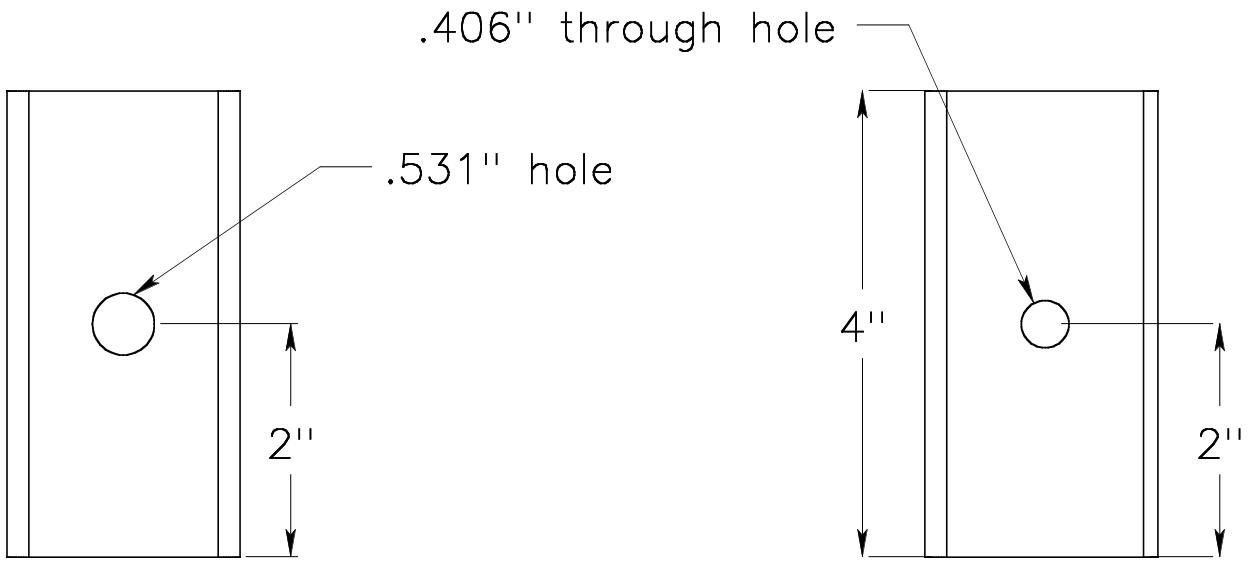




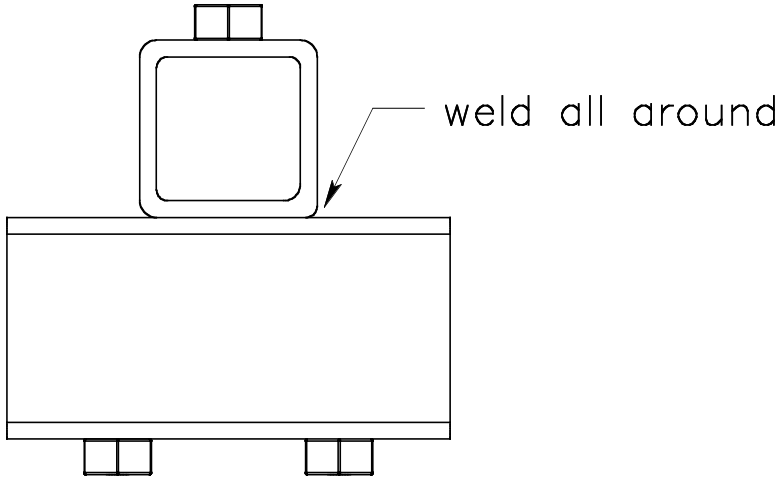
Body mount bracket horizontal tube 4 views Quantity: 4

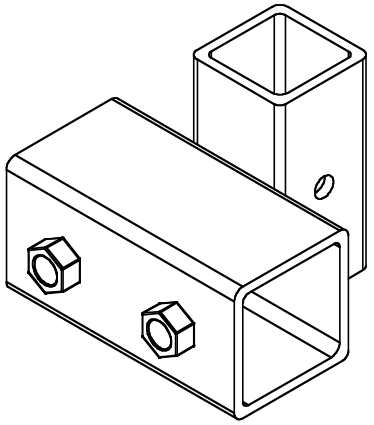


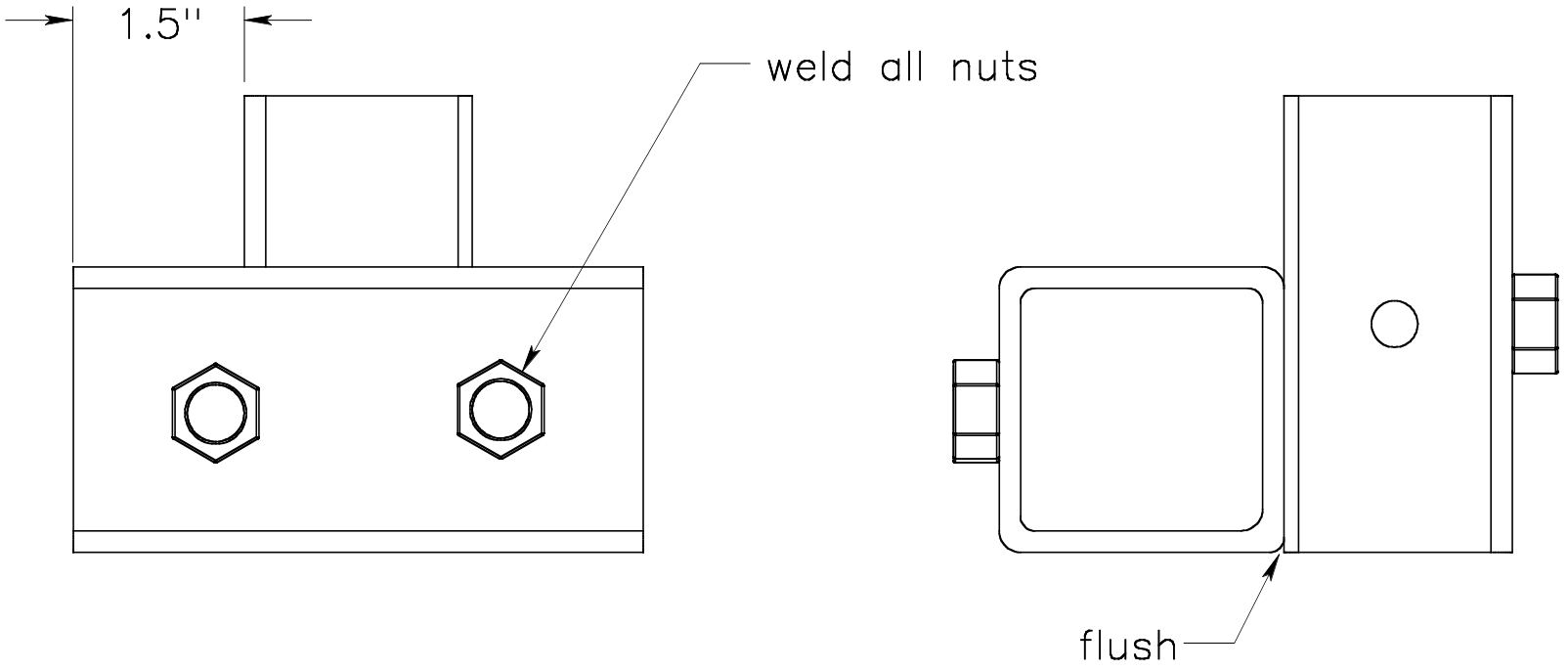




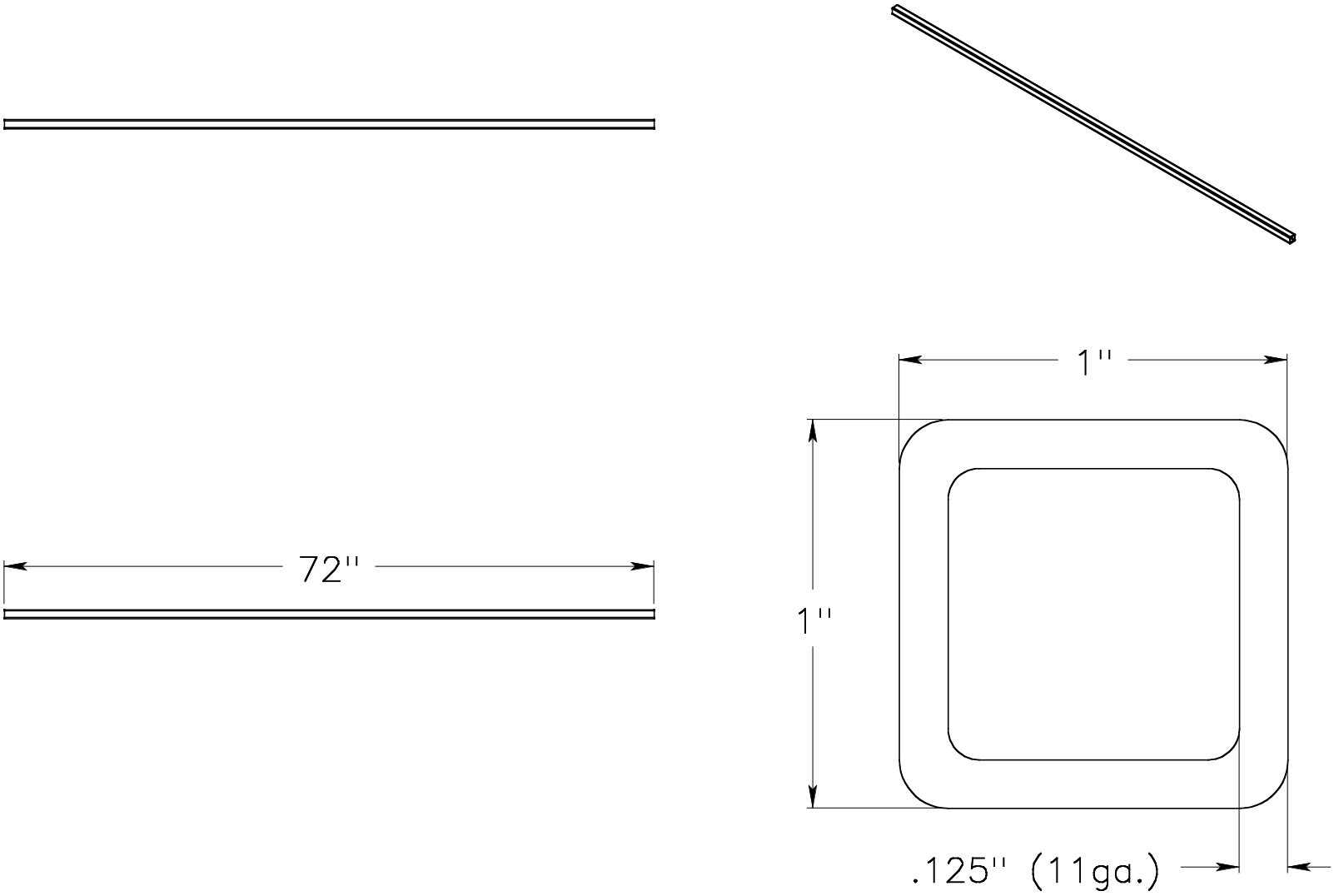
Body mount bracket vertical tube 4 views Quantity: 4



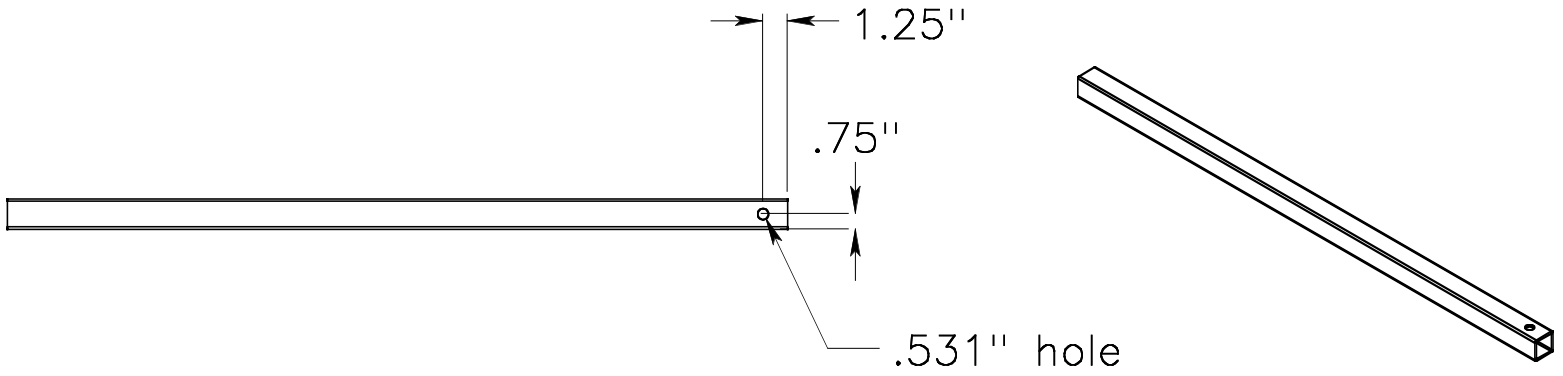


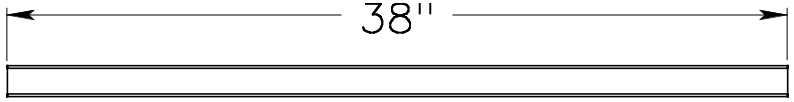


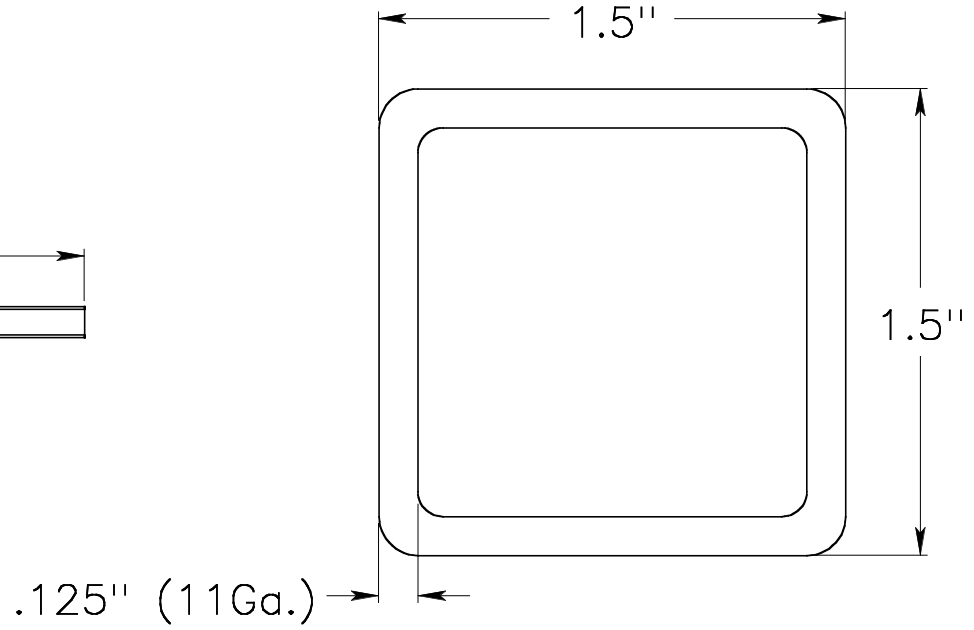
Body mount bracket assembly 4 views Quantity: 4



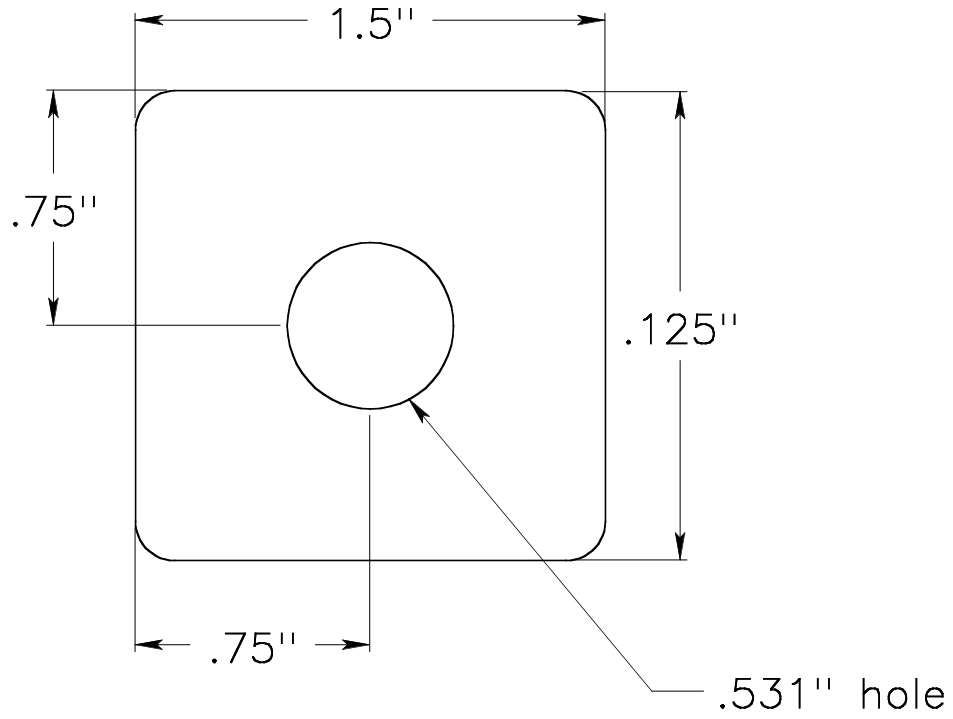
Cross brace insert tube 4 views Quantity: 4

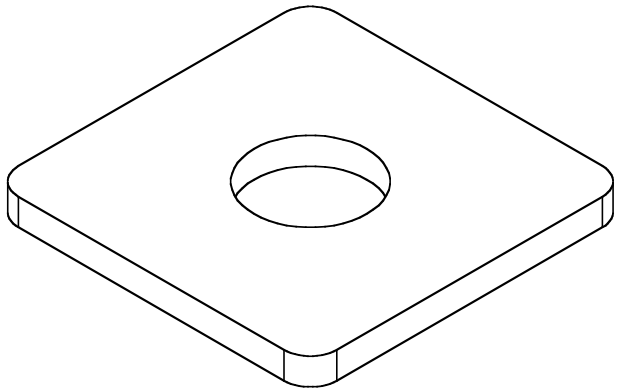


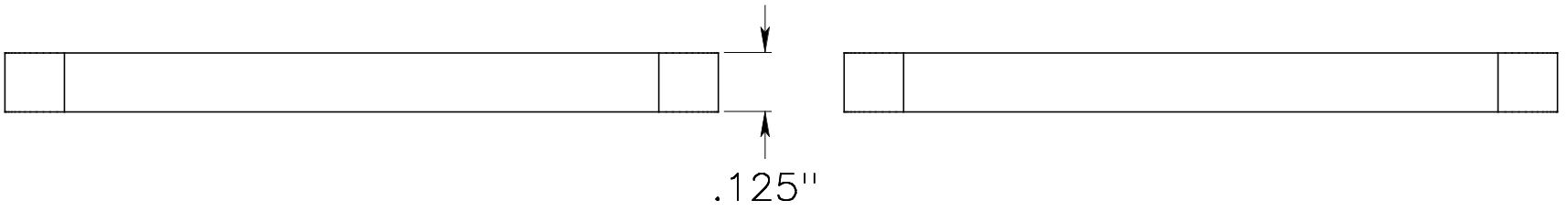




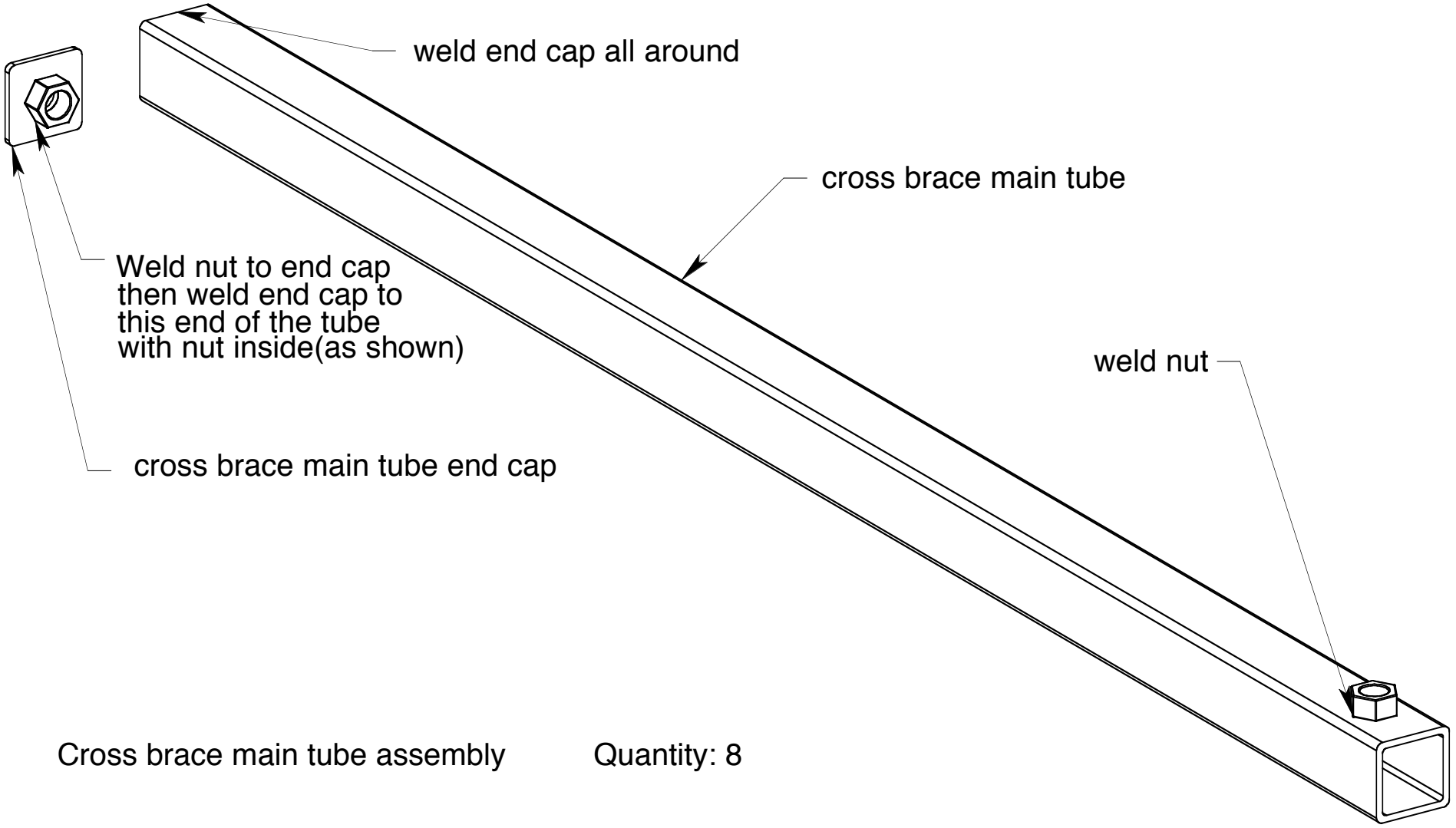
Cross brace main tube 4 views Quantity: 8



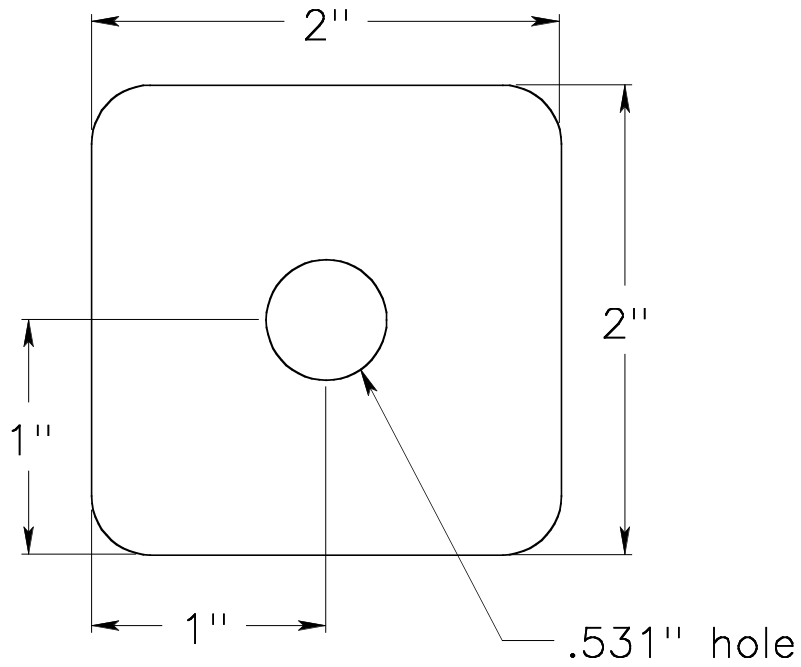


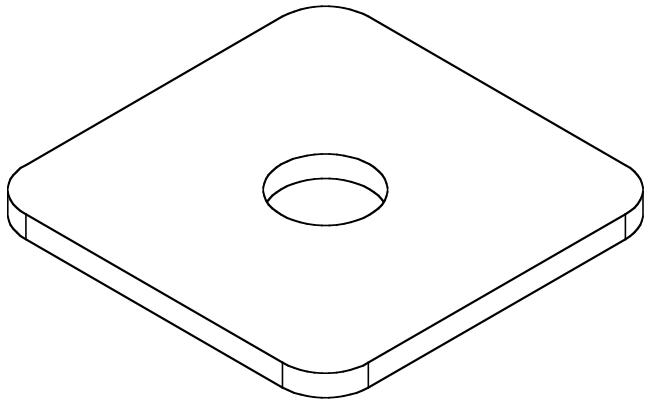


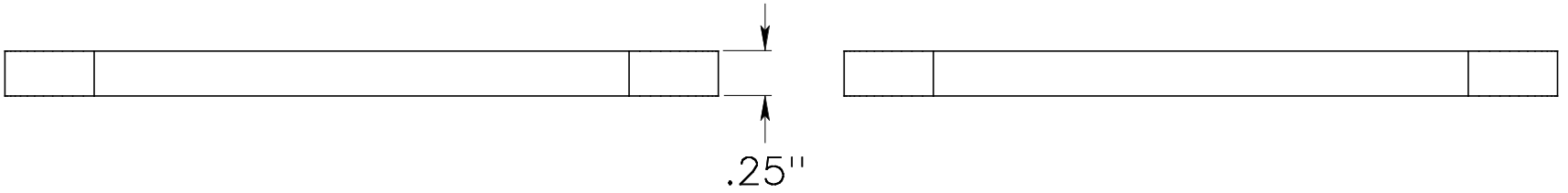
Cross brace main tube end cap 4 views Quantity: 8



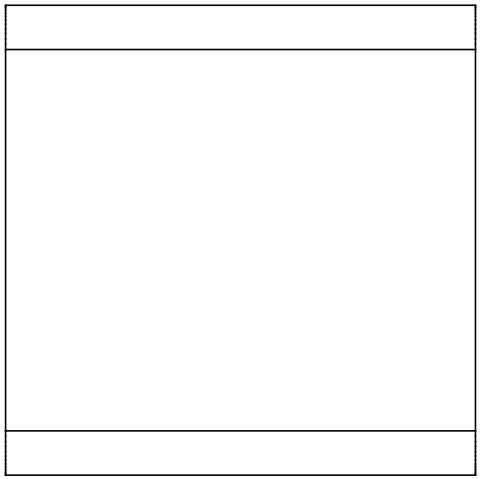
Cross brace main tube assembly Quantity: 8

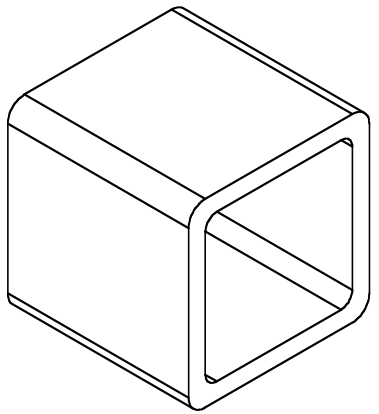


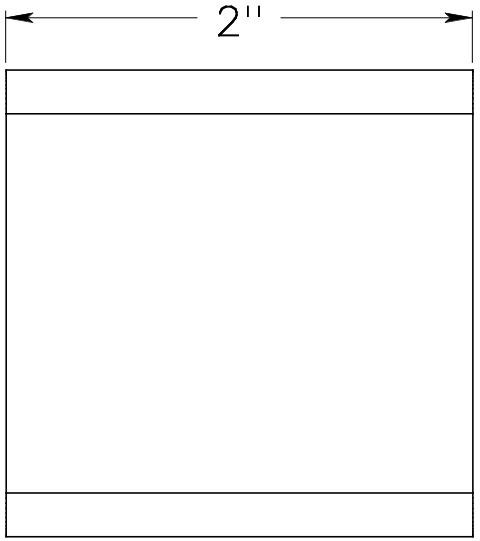


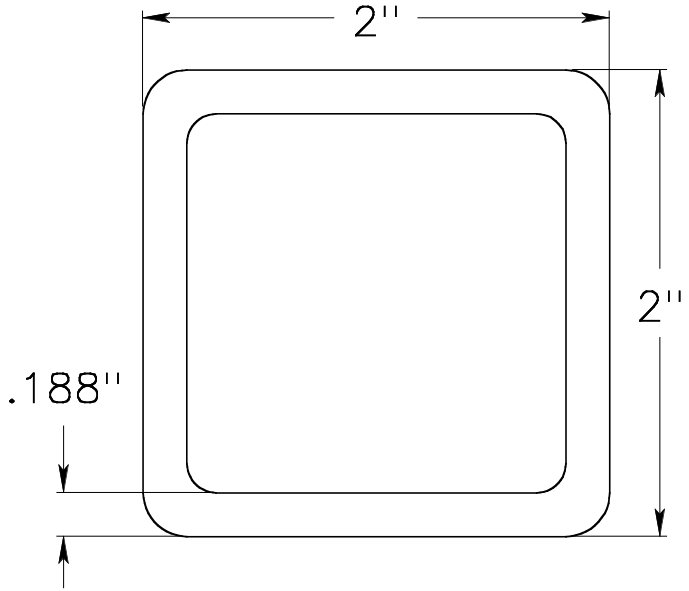


Cross brace receiver tube end cap 4 views Quantity: 16

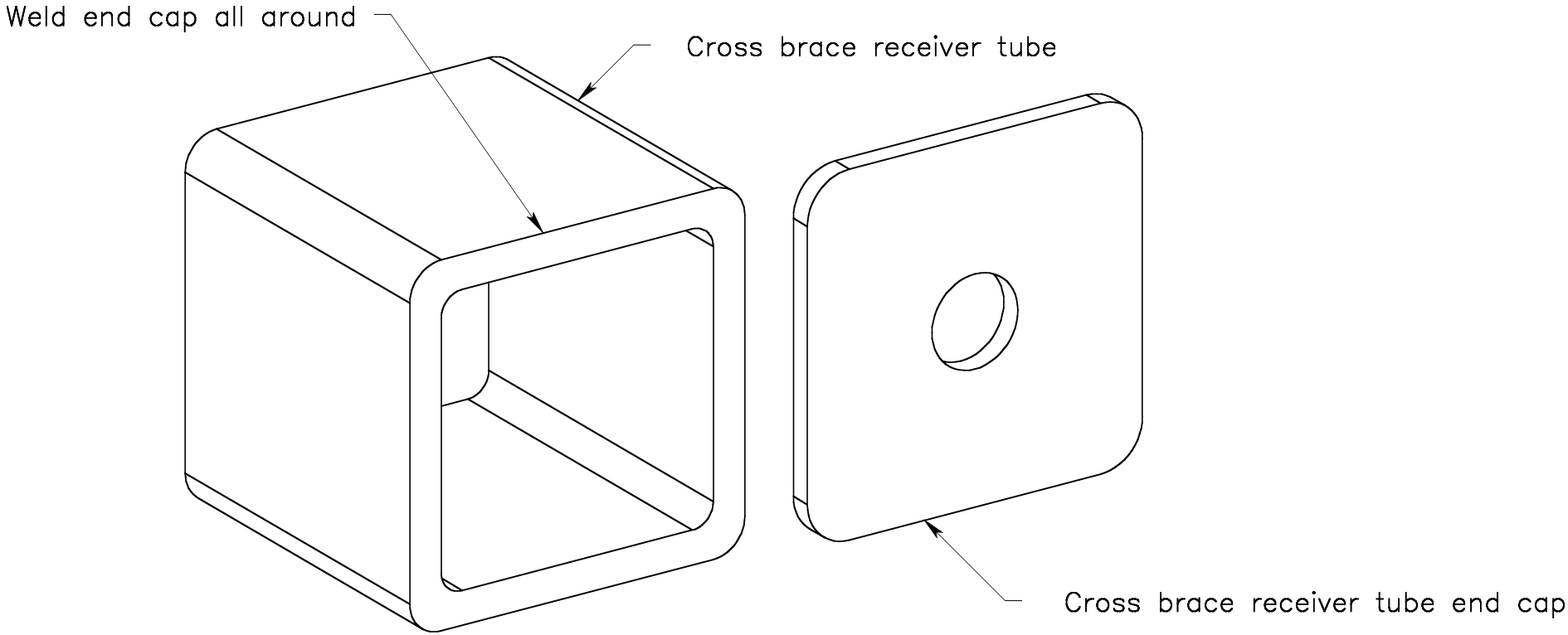




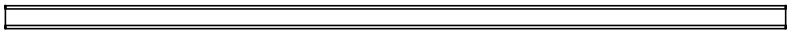


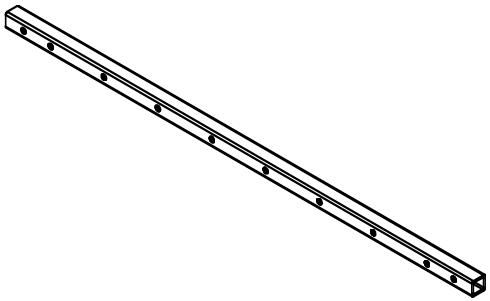


Cross brace receiver tube 4 views Quantity: 16

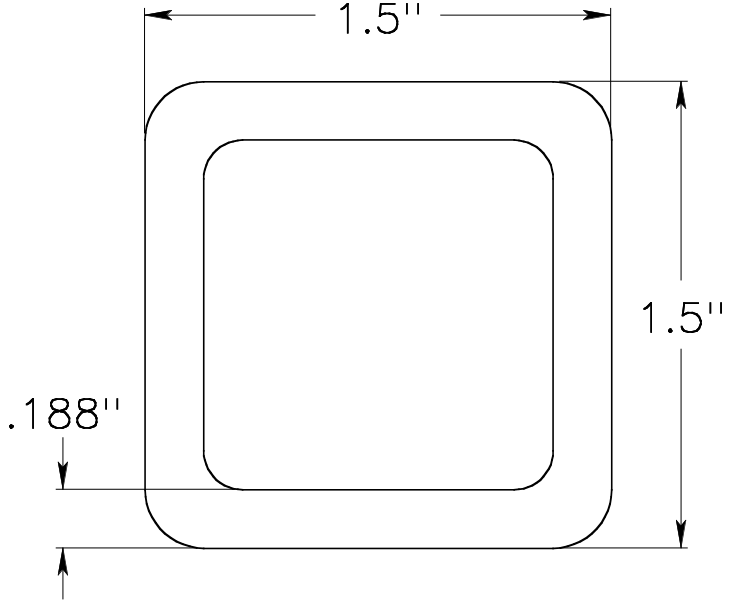


Cross brace receiver assembly Quantity 16

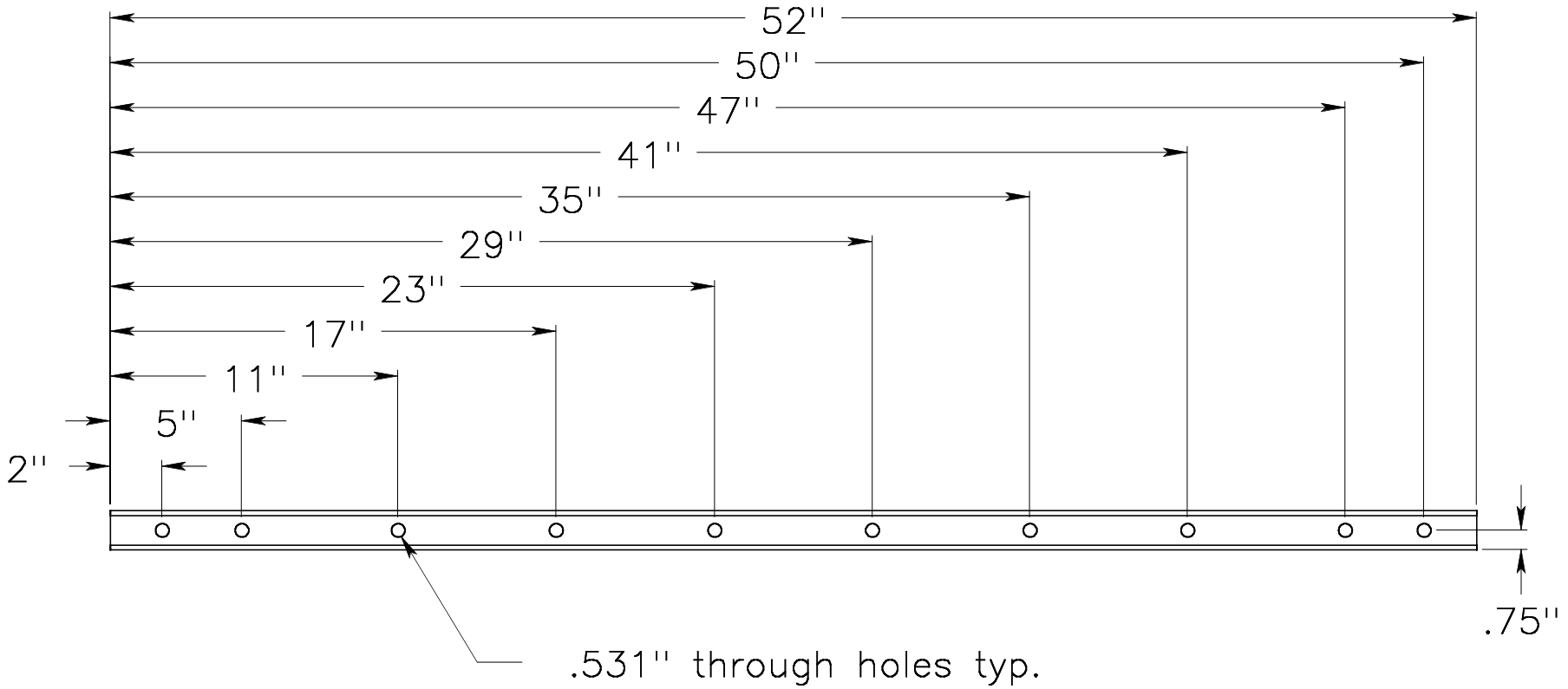




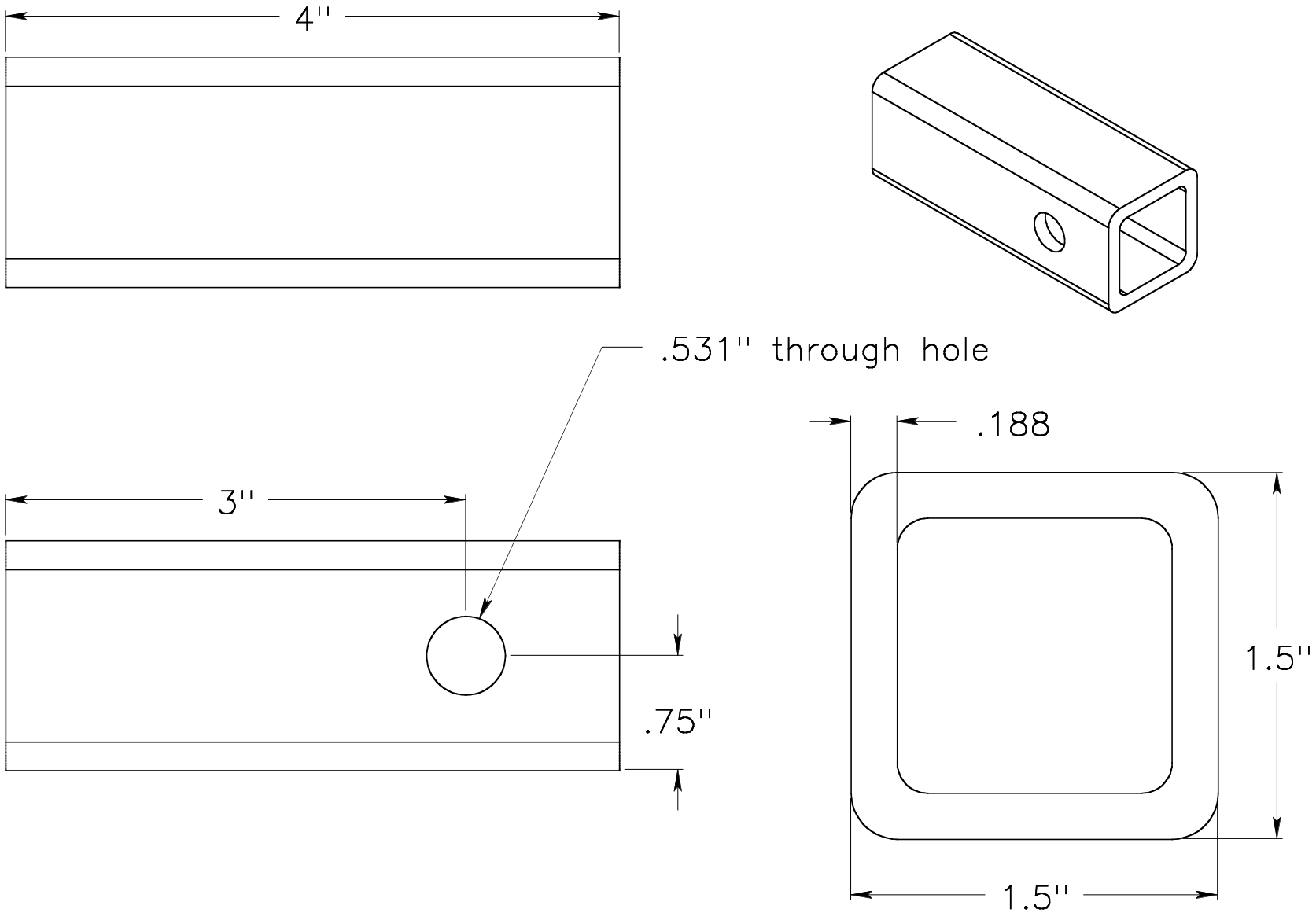
Note: hole dimensions are found on another page called: main beam insert tube hole layout.



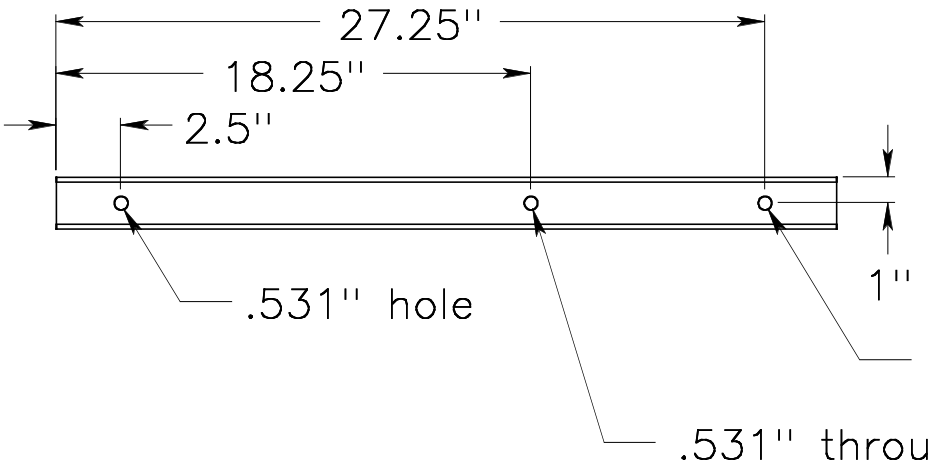
Main beam insert tube 4 views Quantity: 2

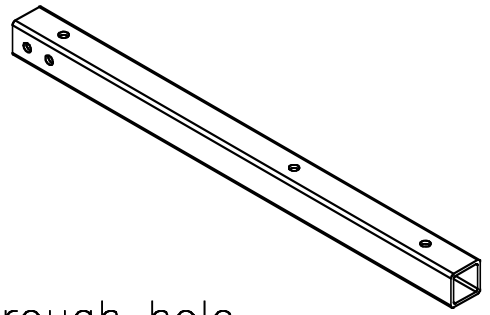


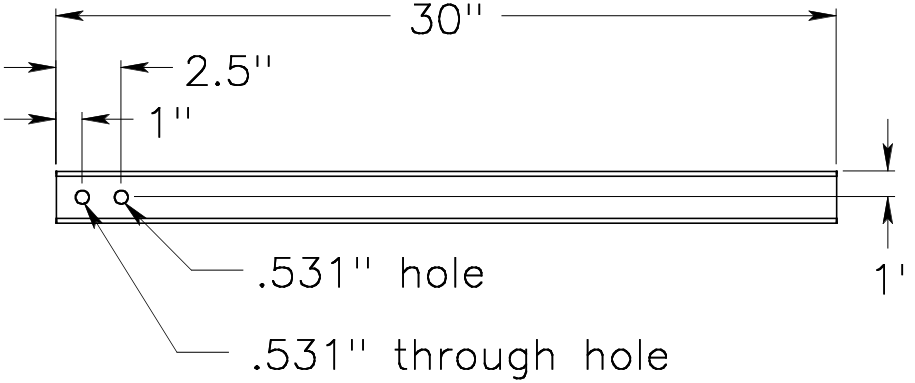
Main beam insert tube hole layout

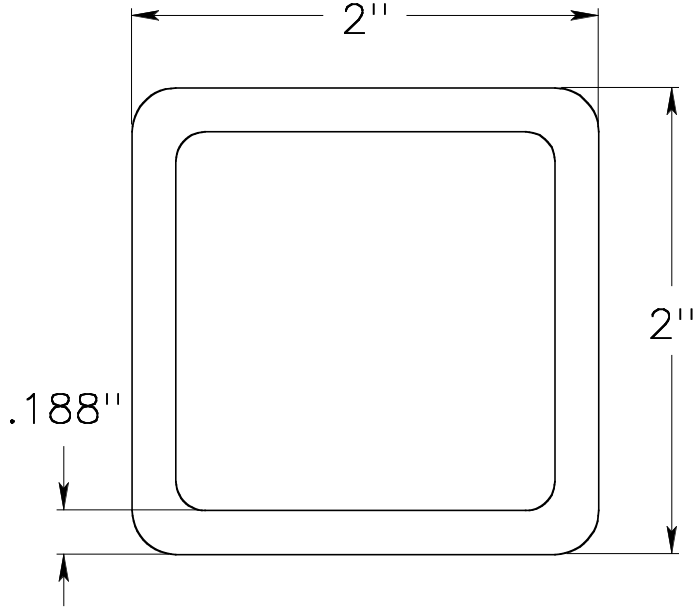


Main beam short tube 4 views Quantity: 4

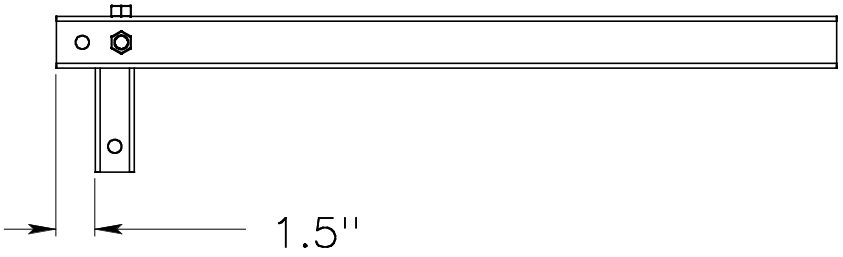


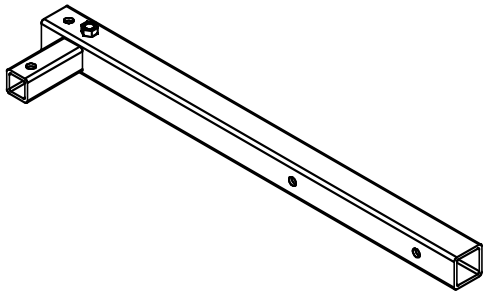


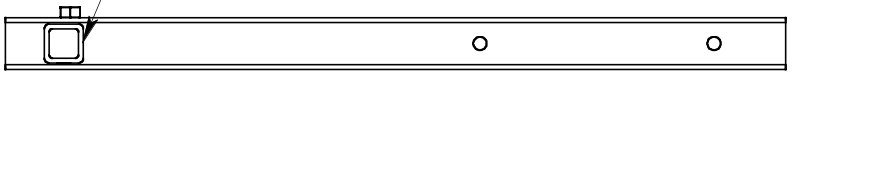


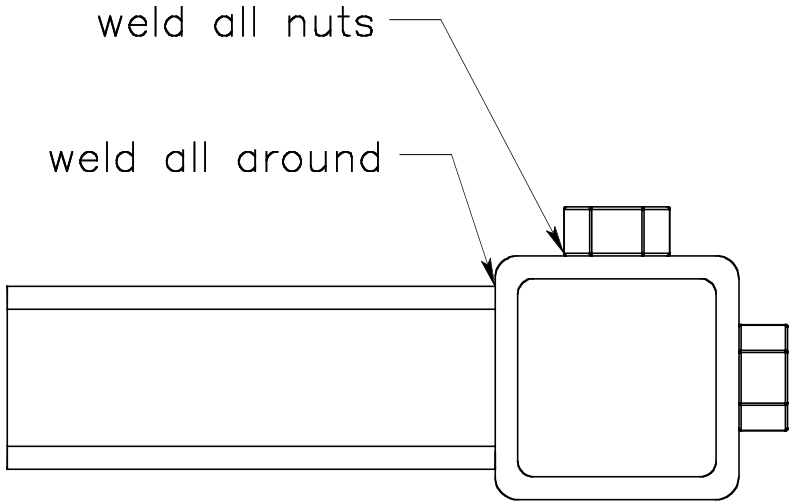


Main beam tube 4 views Quantity: 2 right hand 2 left hand

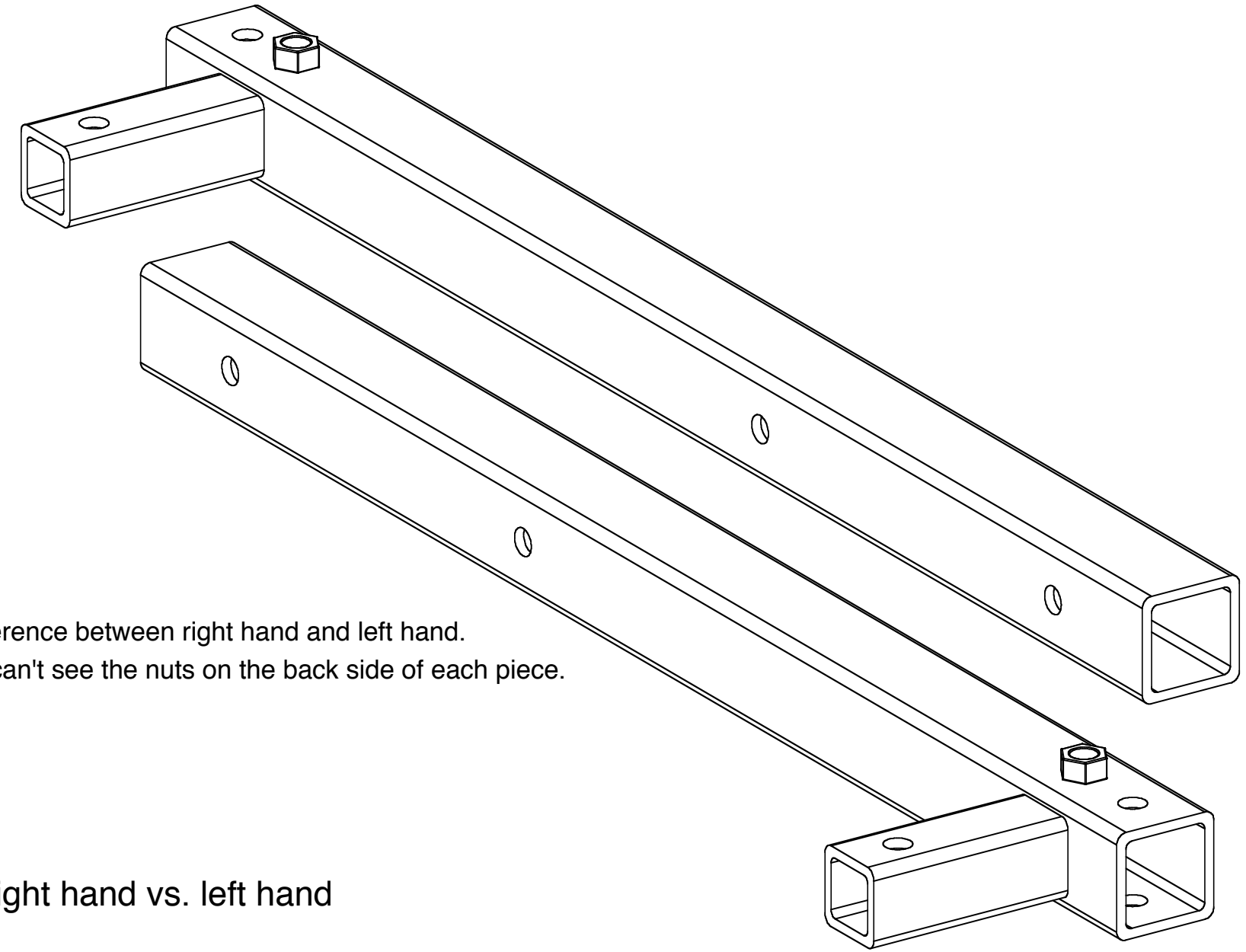






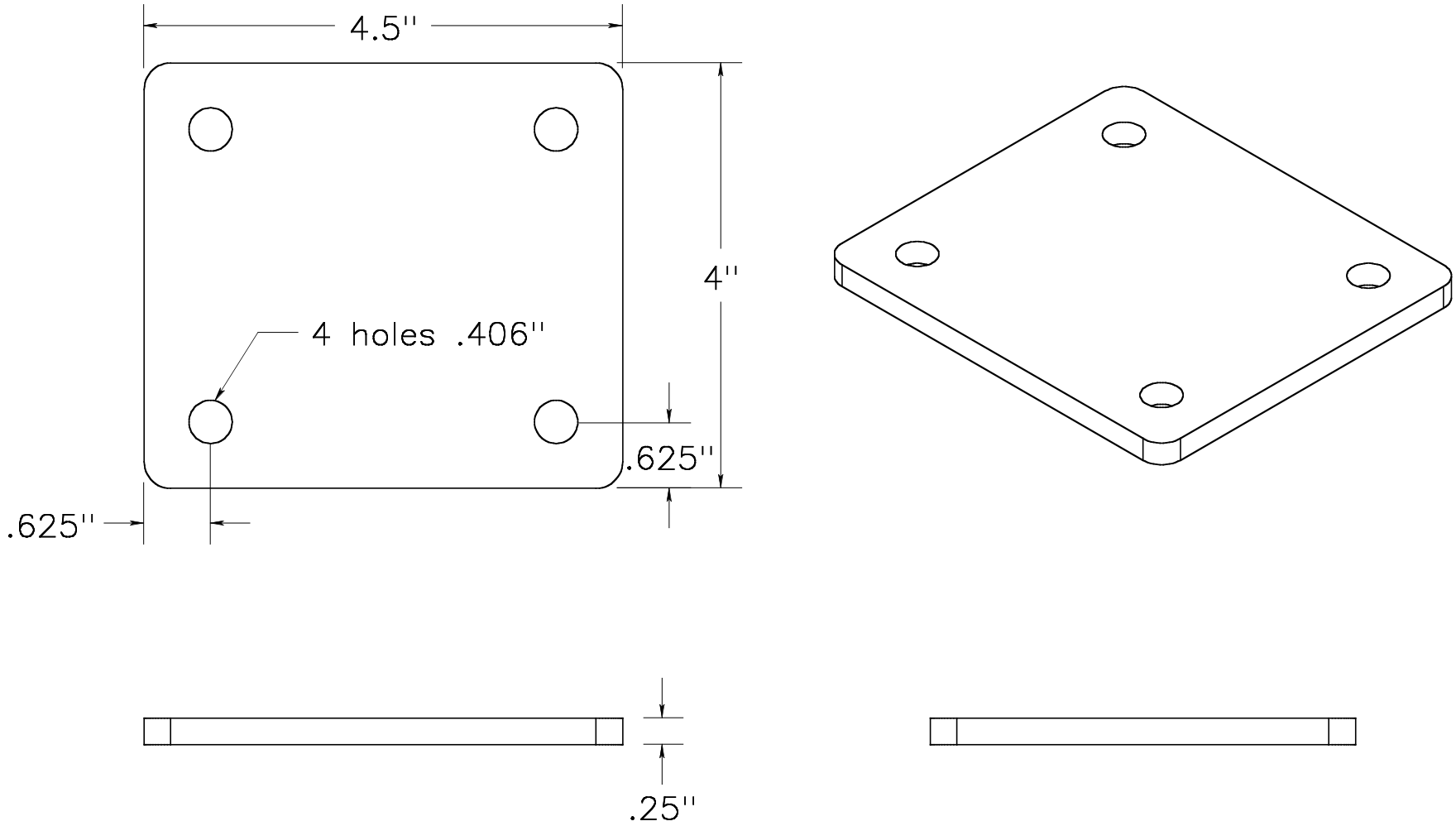


Main beam assembly 4 views Quantity: 2 right hand 2 left hand

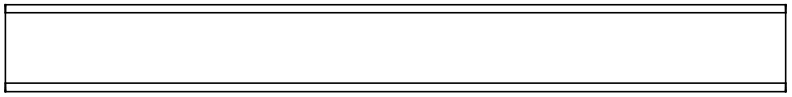


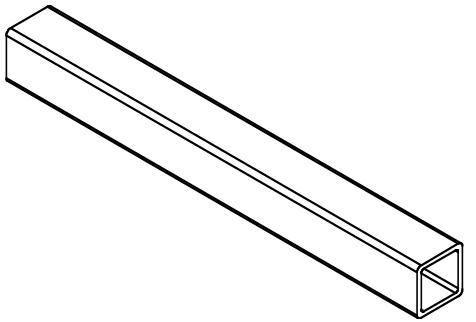
This is the difference between right hand and left hand.
Note that you can't see the nuts on the back side of each piece.

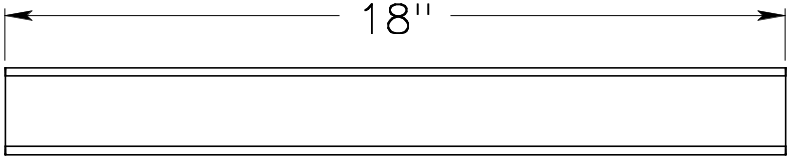
Main beam right hand vs. left hand

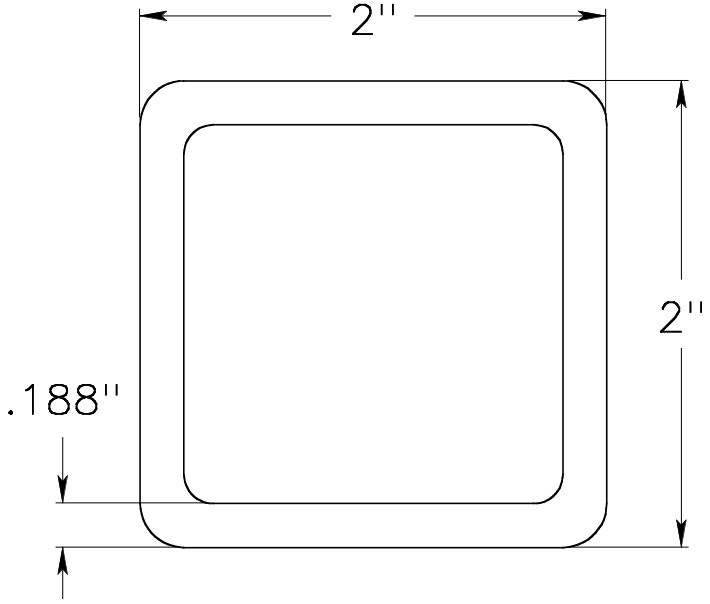


Caster plate 4 views Quantity: 4

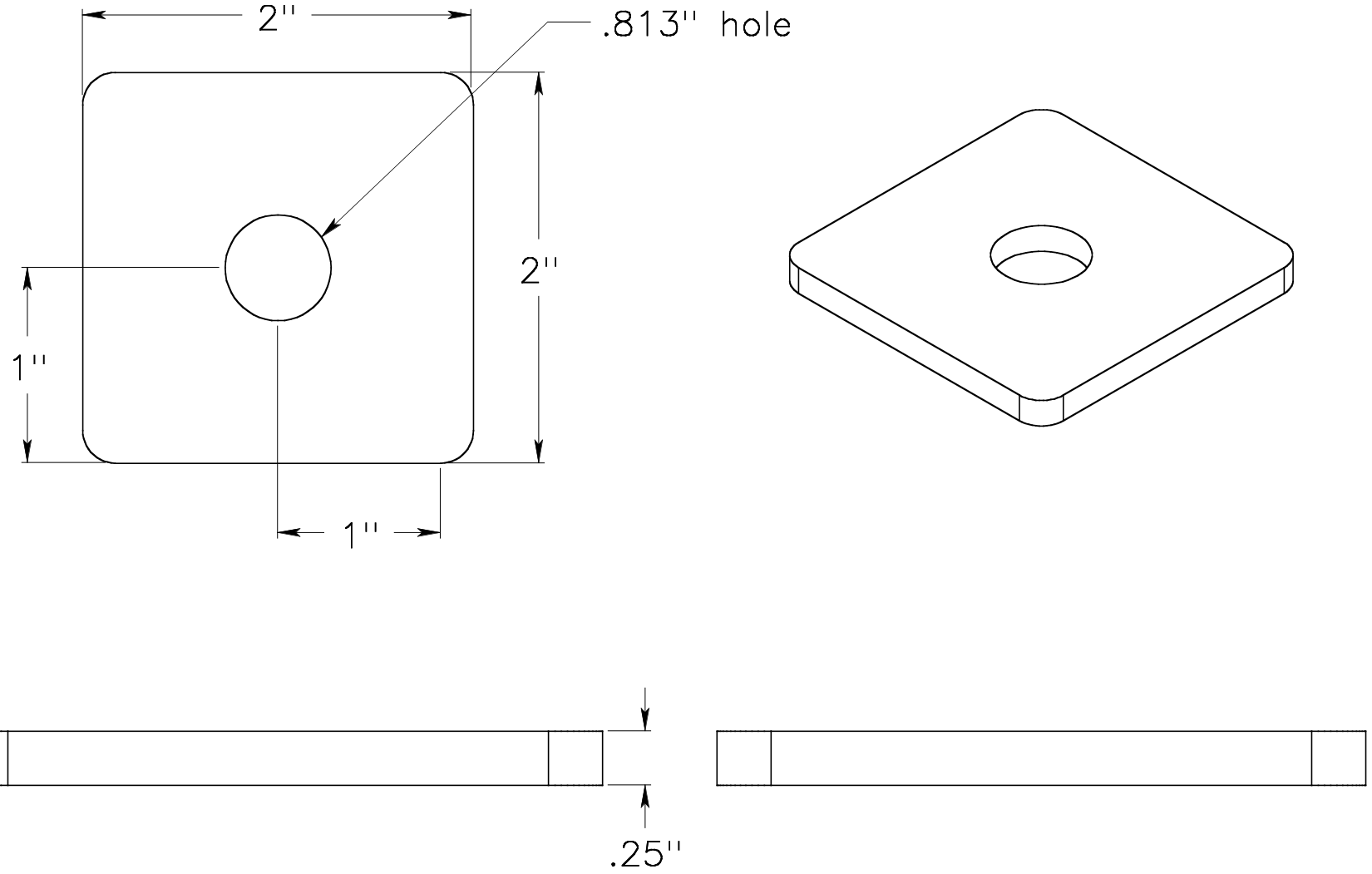




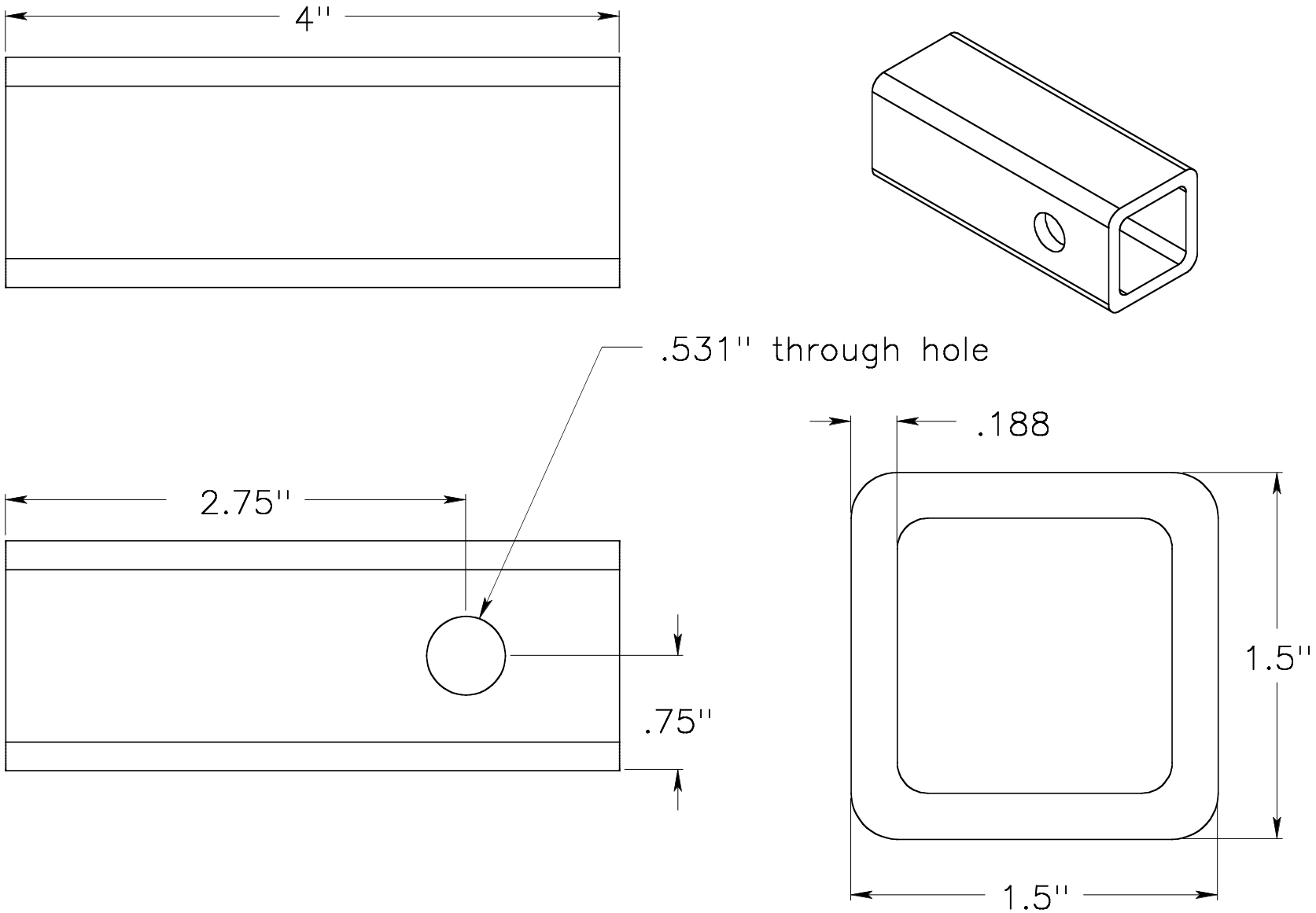




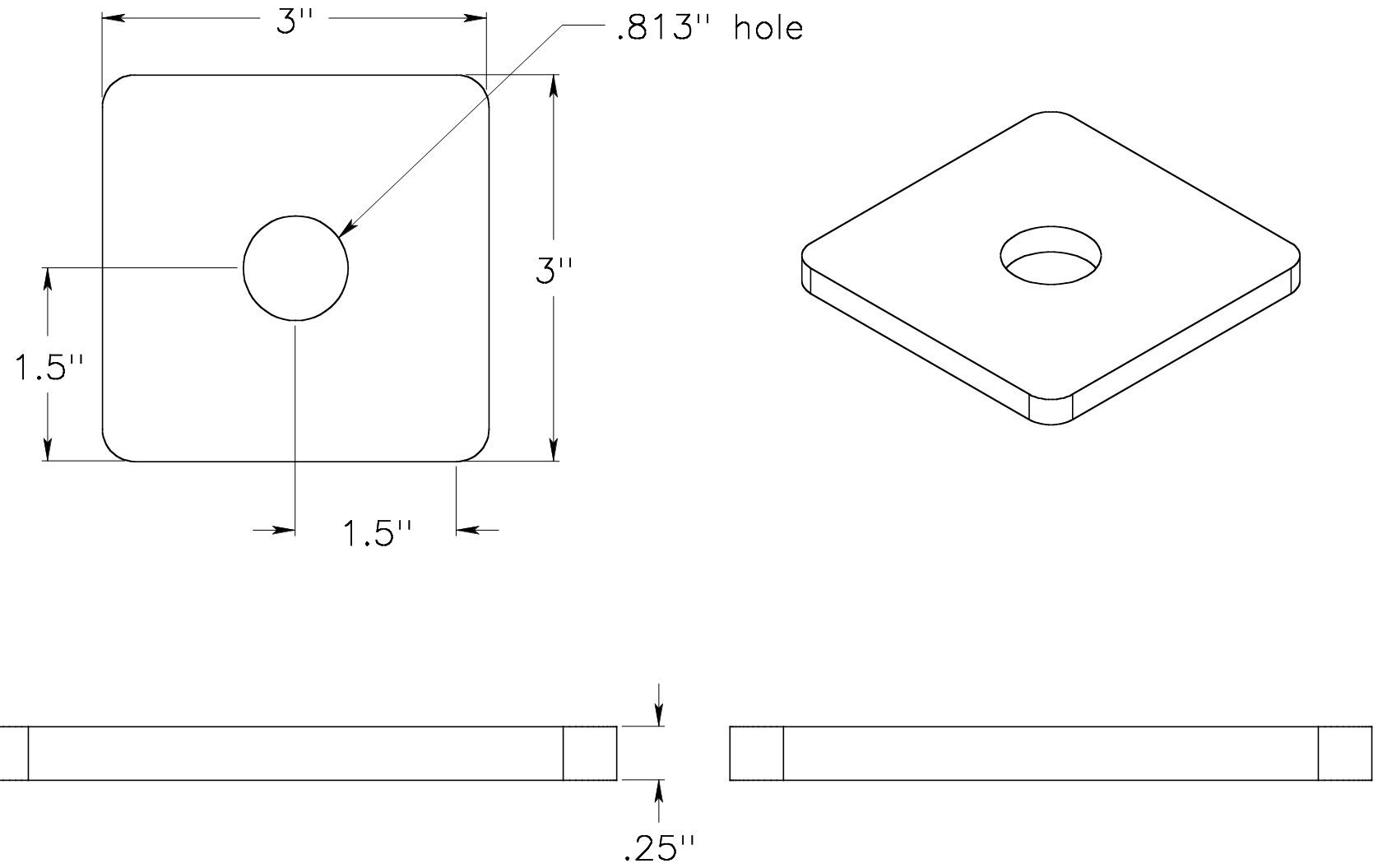
Leg bottom tube 4 views Quantity: 4



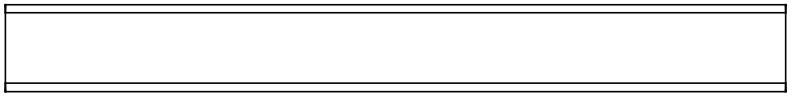
Leg bottom tube end cap 4 views Quantity: 4

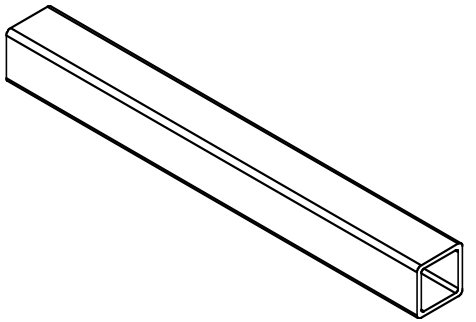


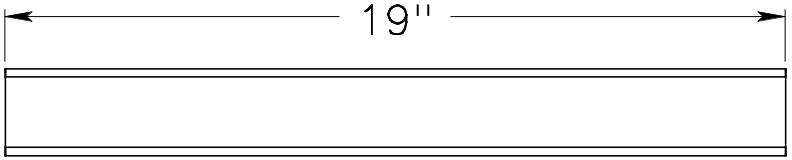
Leg main beam connector tube 4 views Quantity: 8

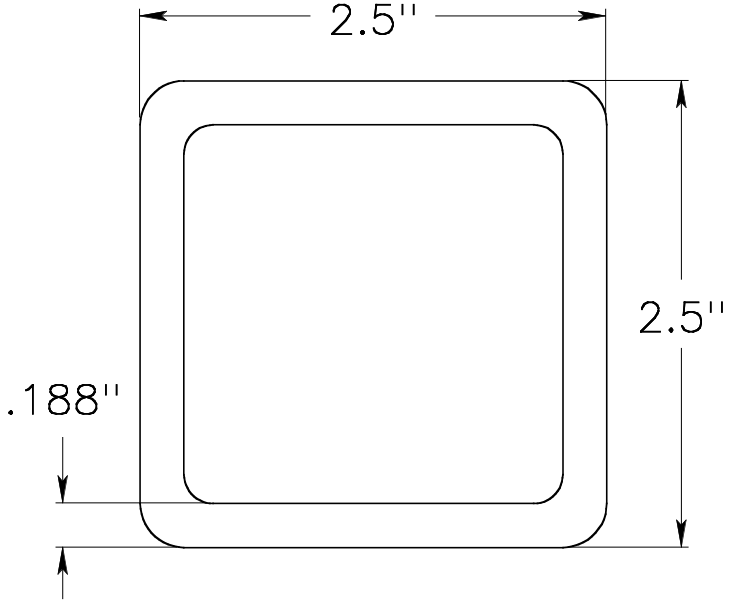


Leg top tube end cap 4 views Quantity: 4

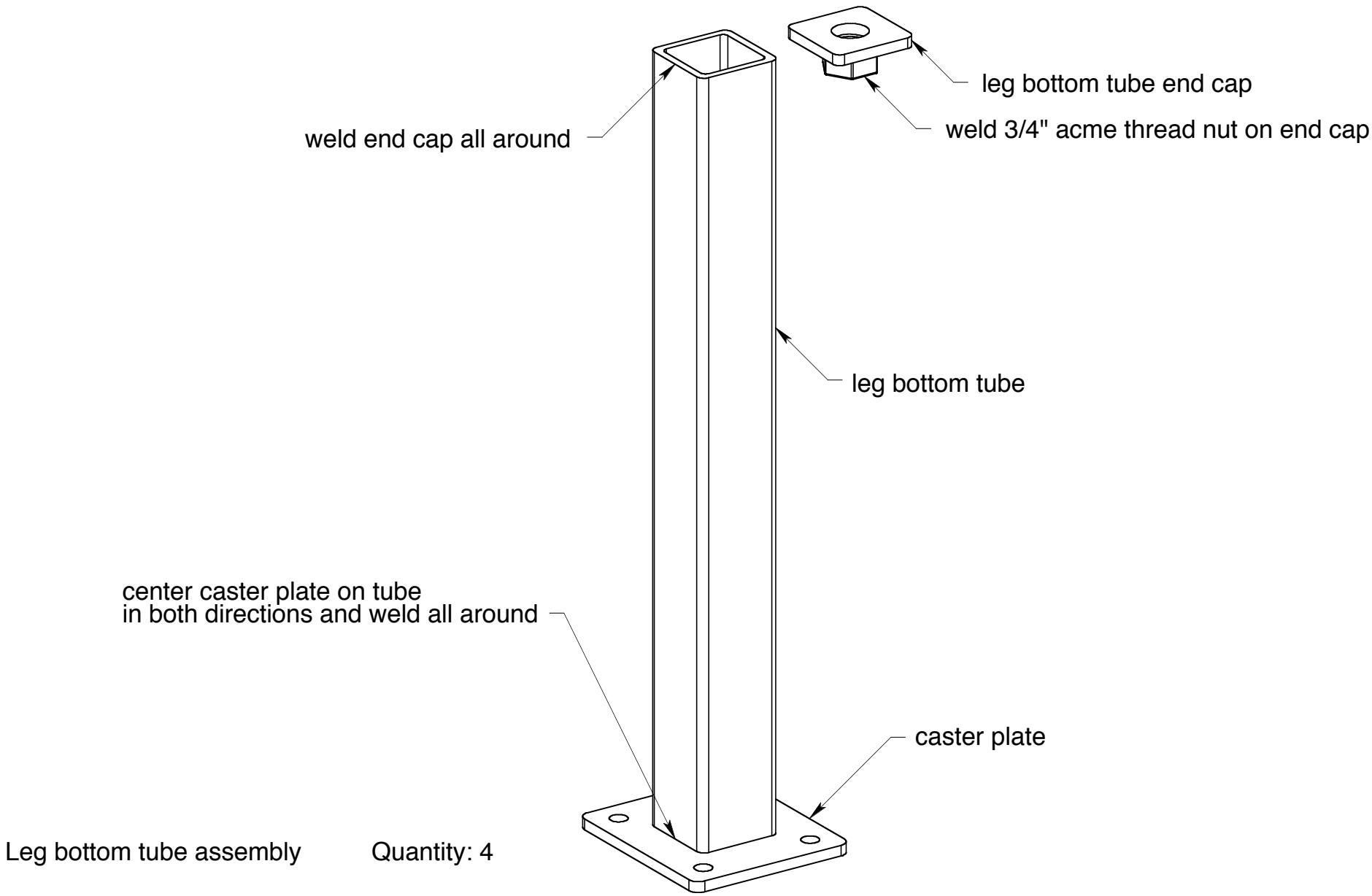




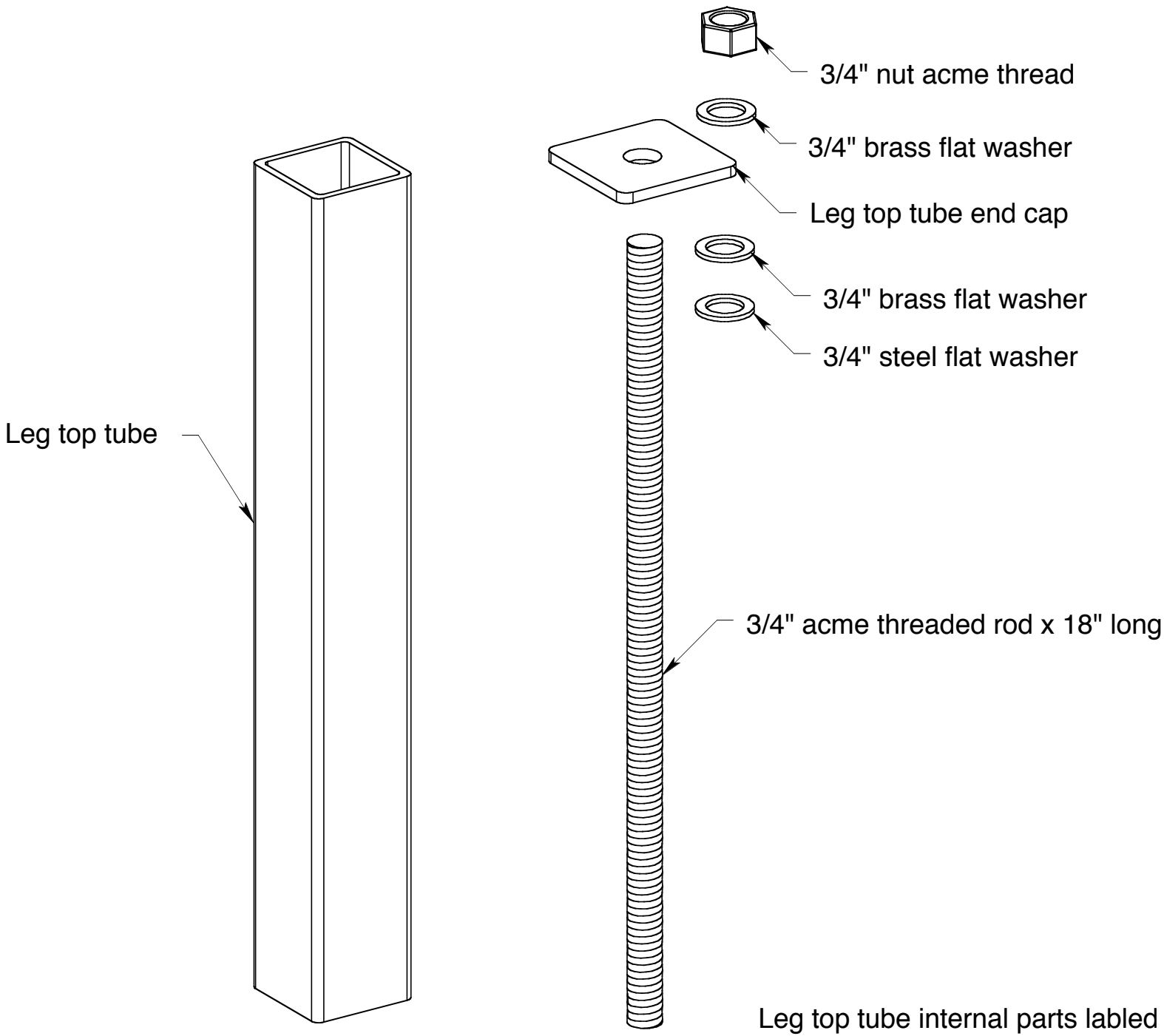




Leg top tube 4 views Quantity: 4

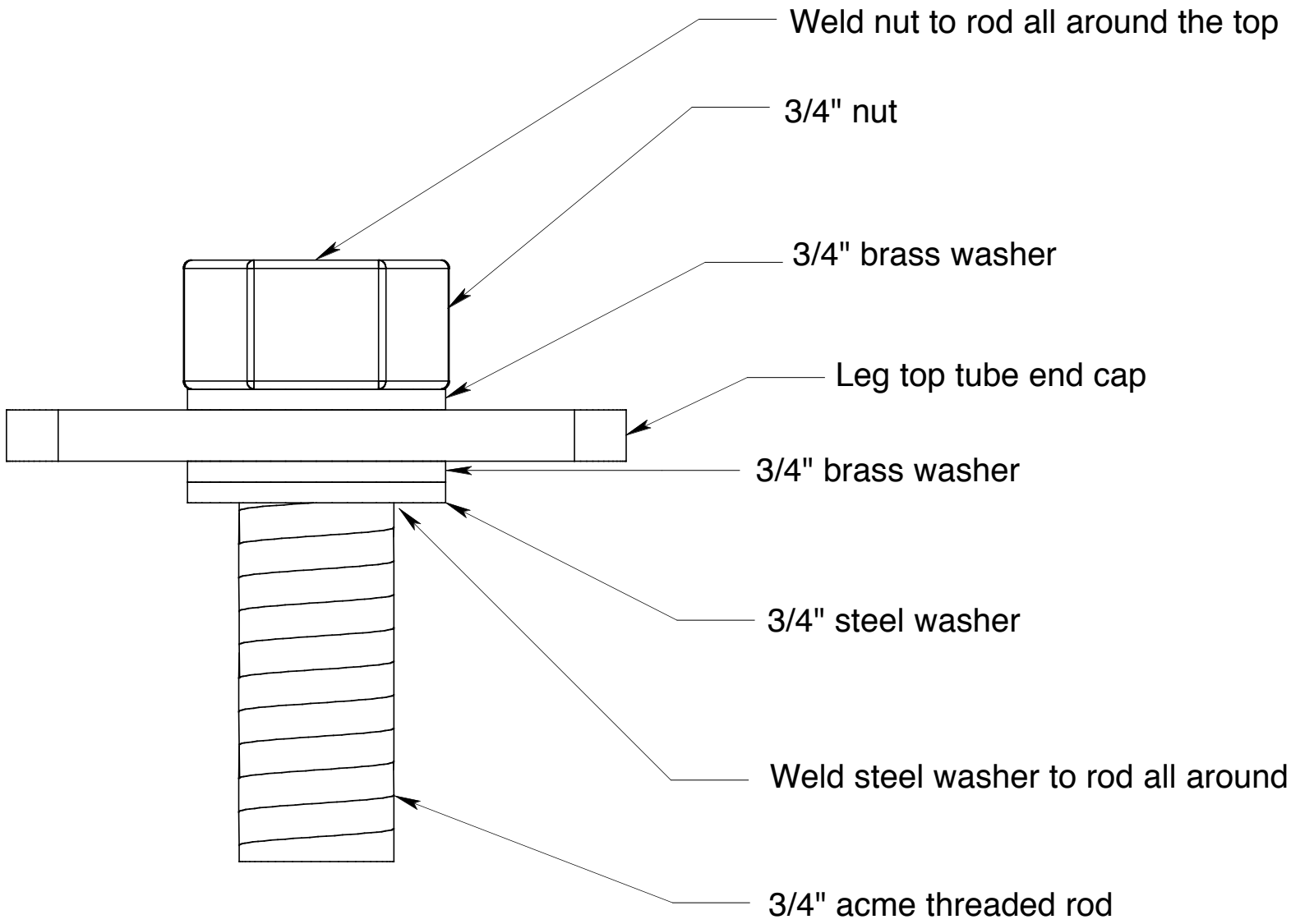


Leg bottom tube assembly Quantity: 4

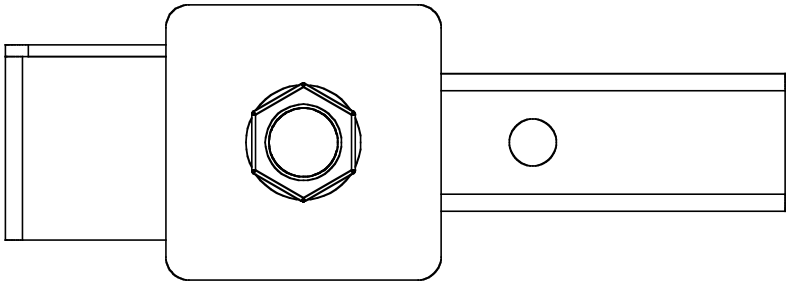


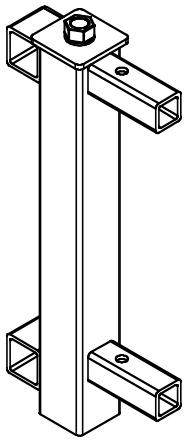
Leg top tube internal parts labled

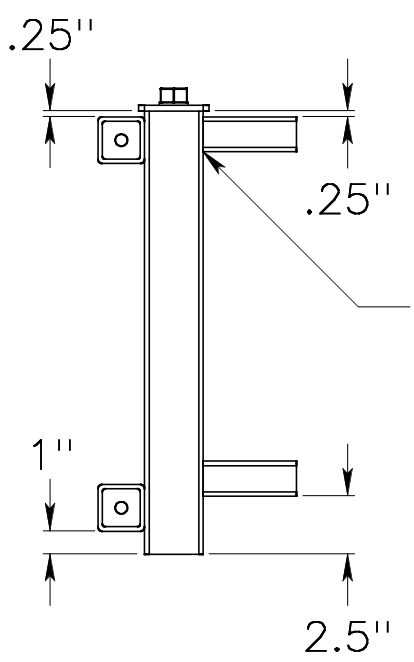
Quantity: 4

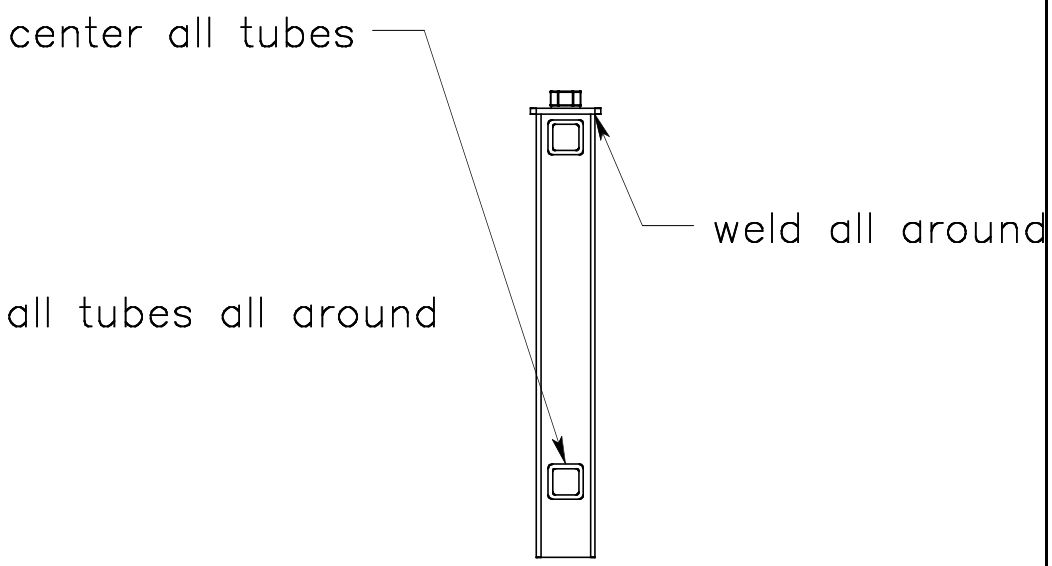


Leg top tube internal parts assembly blown up view







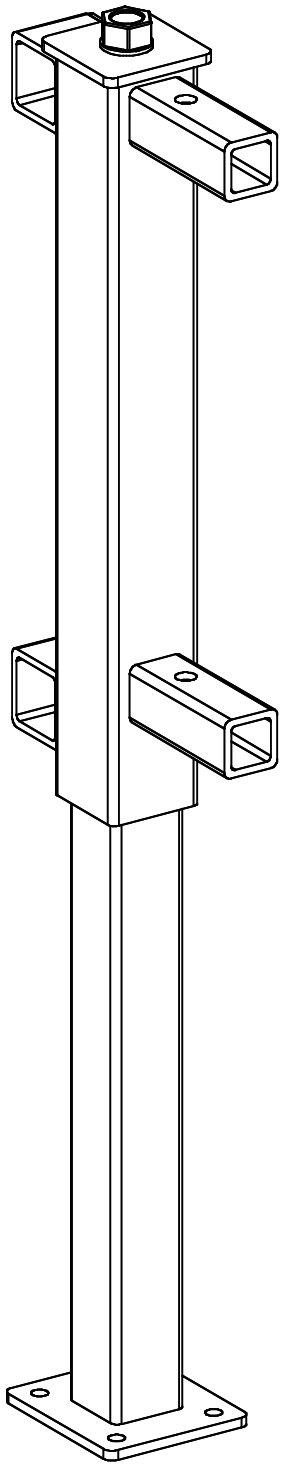


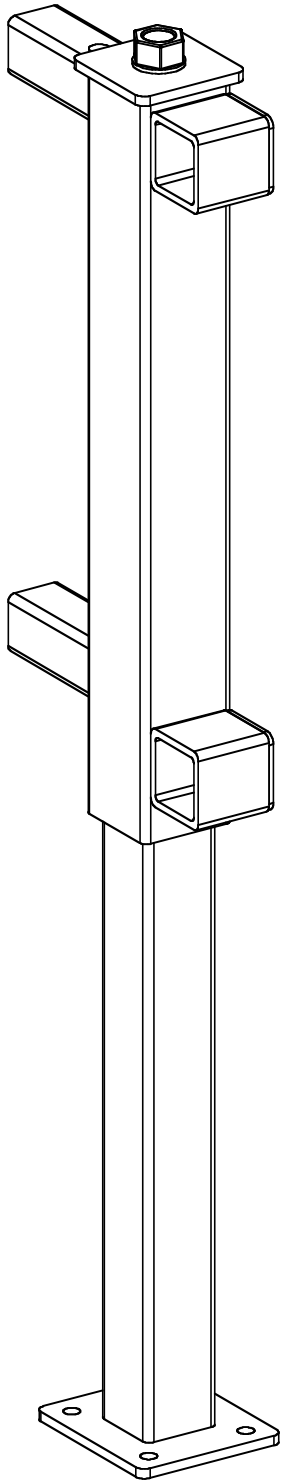
Leg top tube assembly 4 views

Quantity: 2 right hand 2 left hand

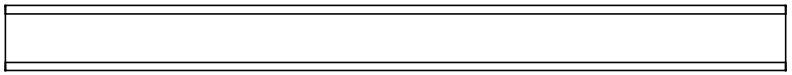
Note: the difference from right hand to left hand
is the cross brace receiver tubes face the opposite
direction

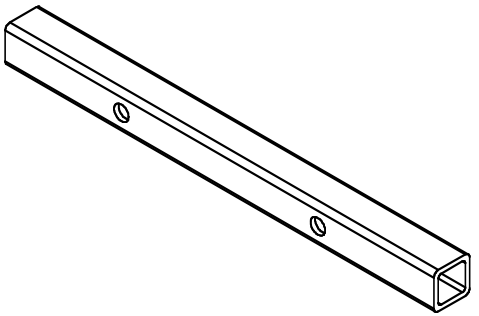
In order to put the top half and the bottom half together
just thread the rod in the hole of the bottom tube end cap
you will be doing this blind but it will work, especially with an
impact wrench.

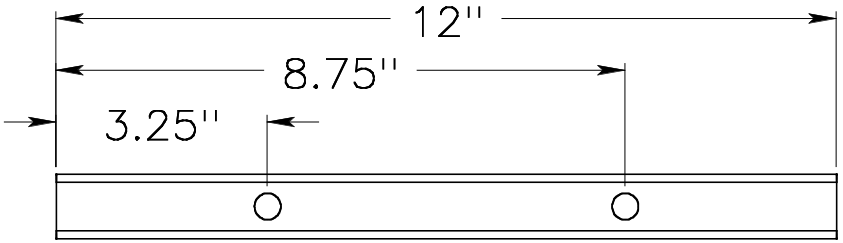


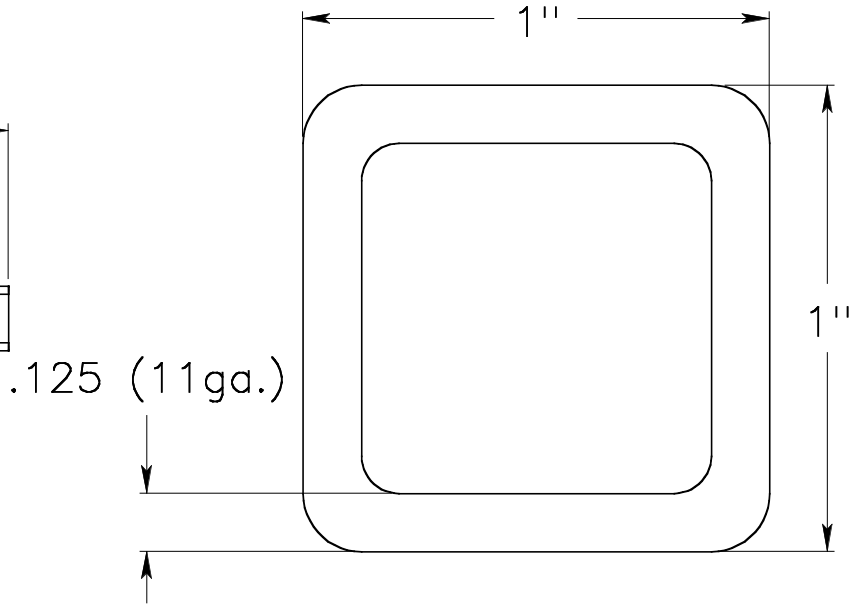


Leg right hand vs. left hand

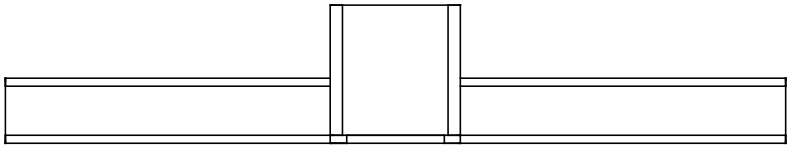


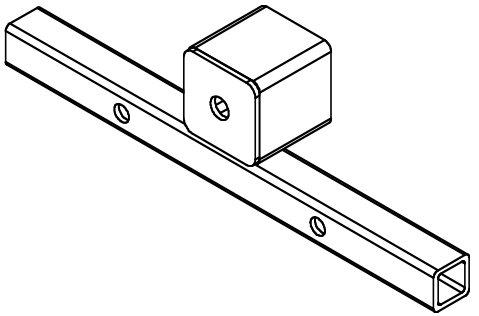


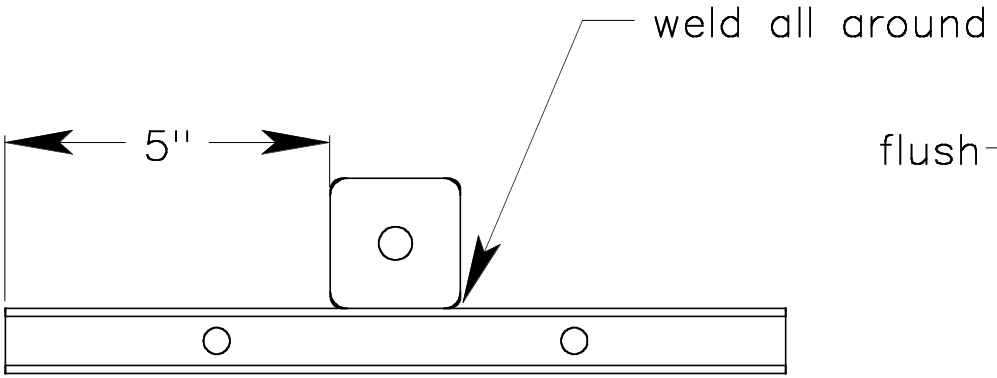


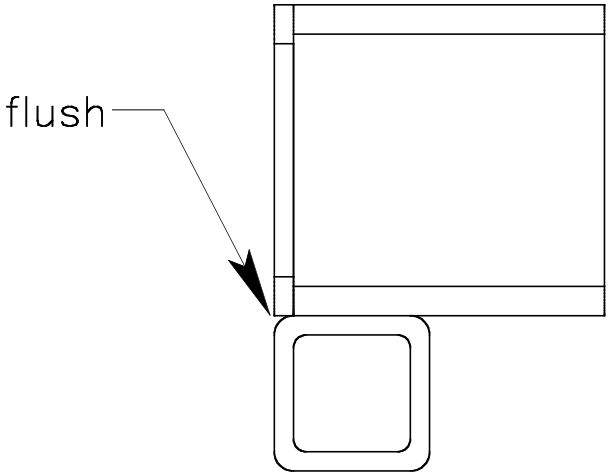


Hoop connector tube 4 views Quantity: 8

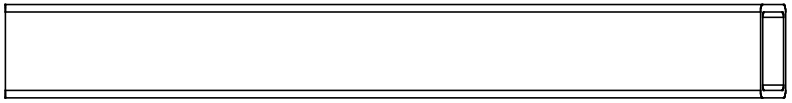


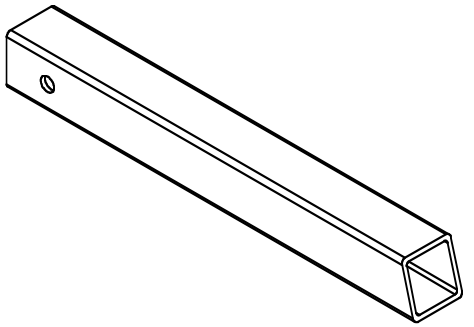


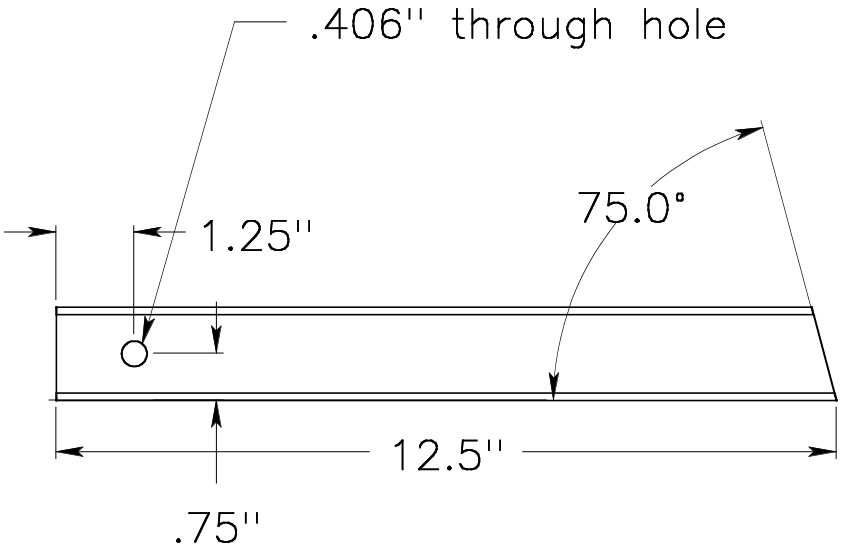


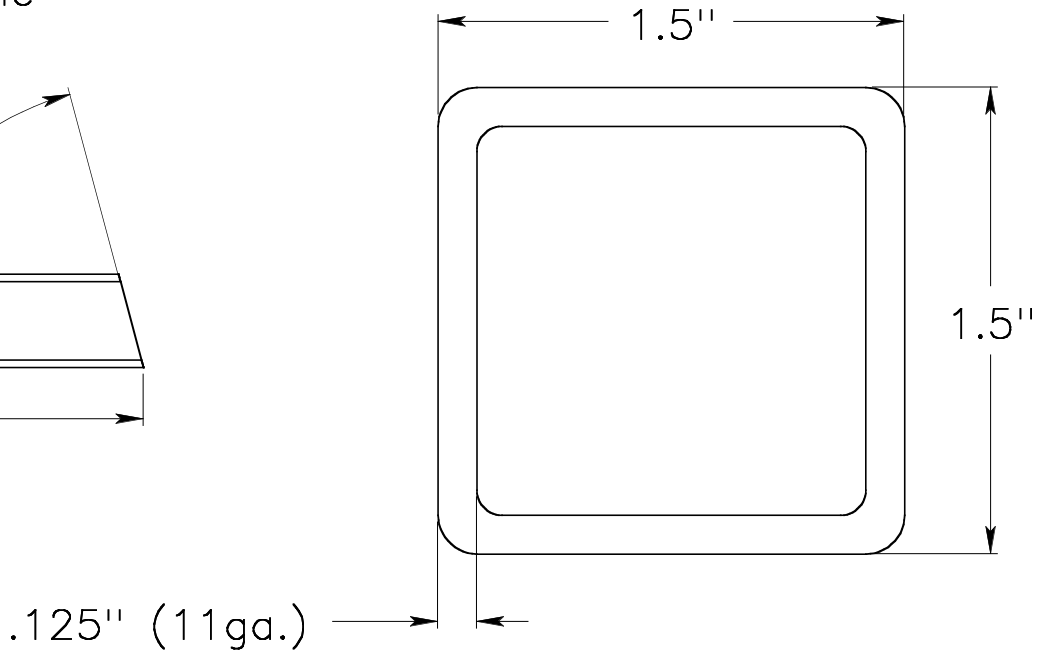


Hoop connector assembly 4 views Quantity: 8

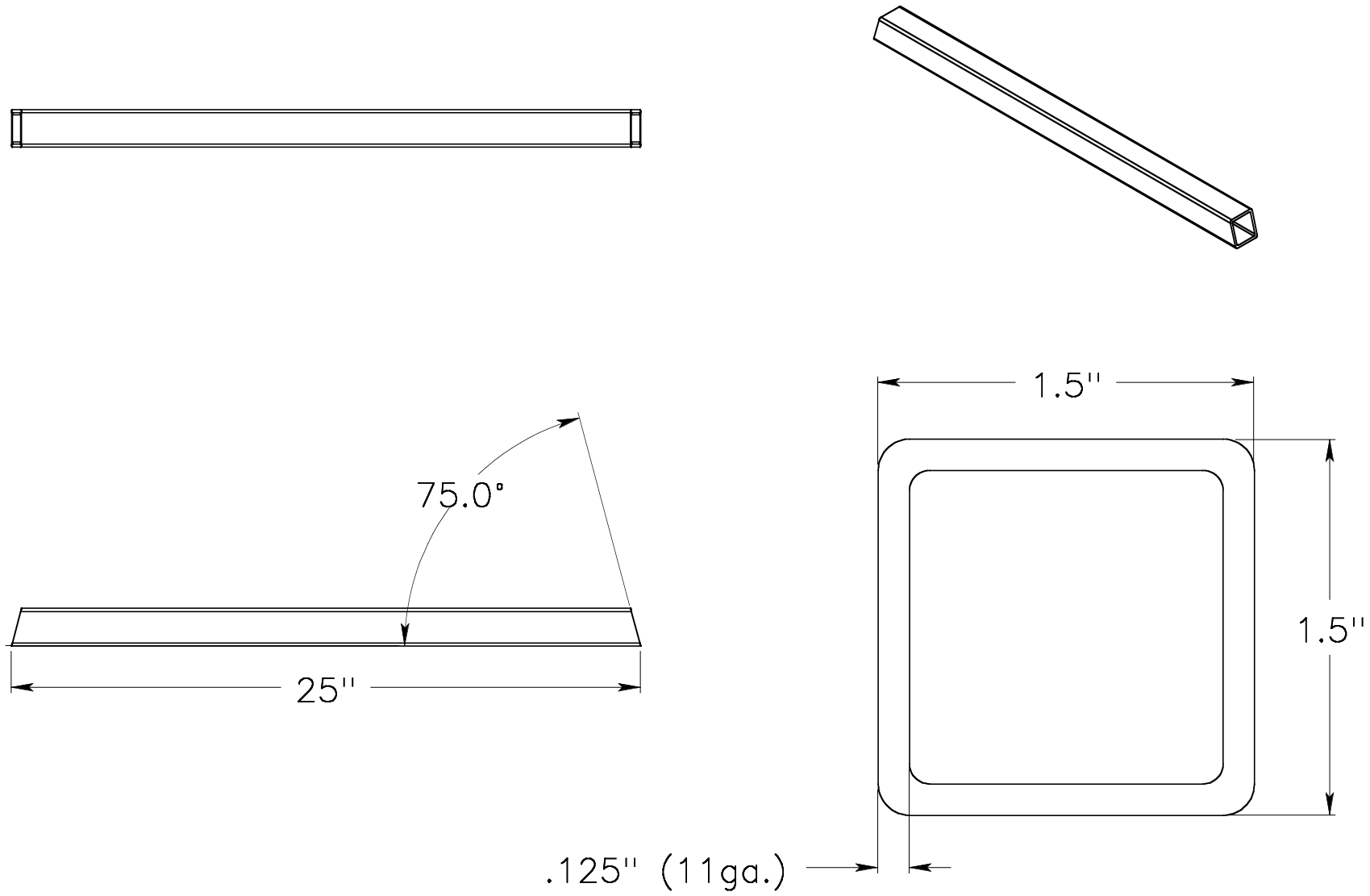




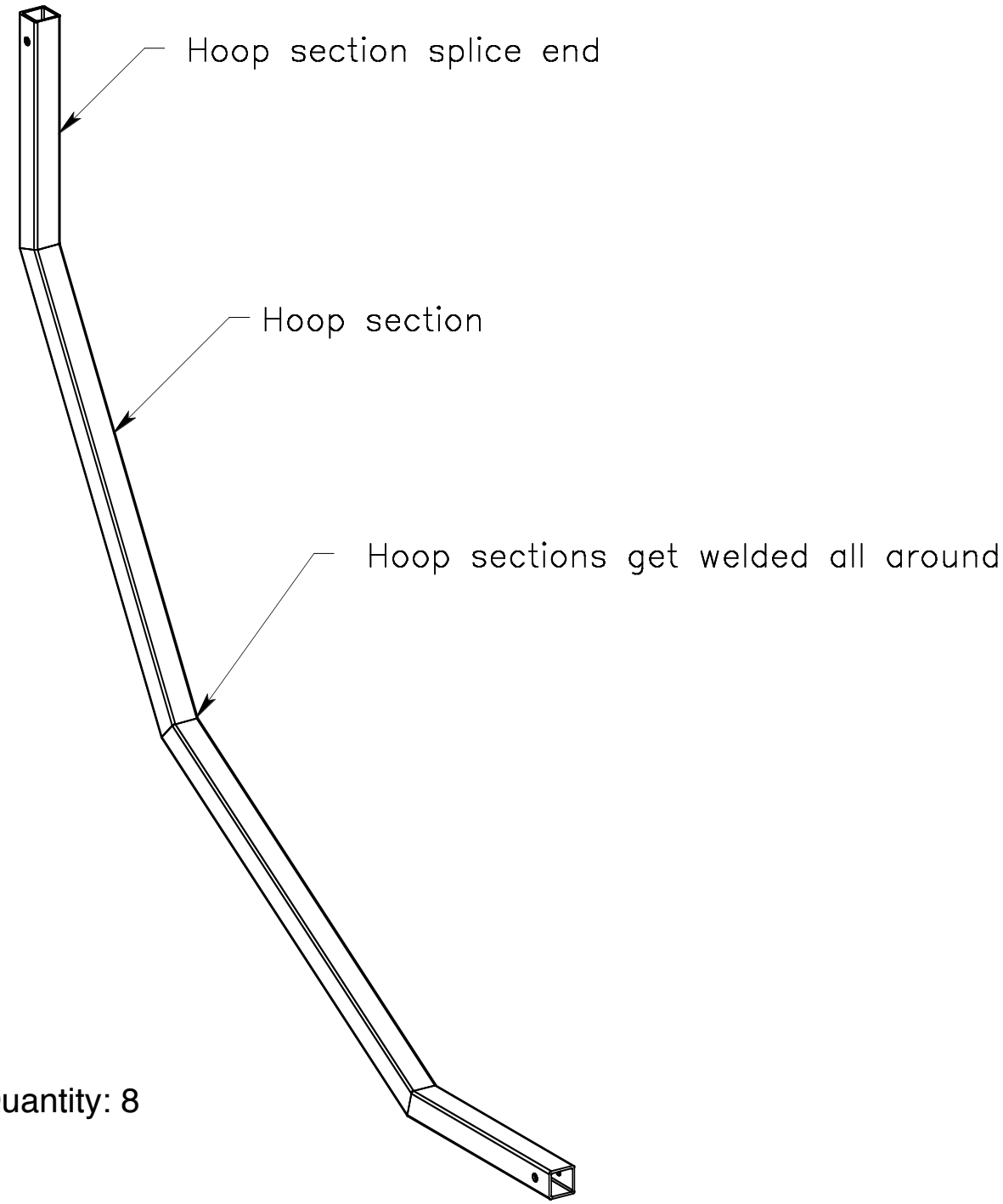




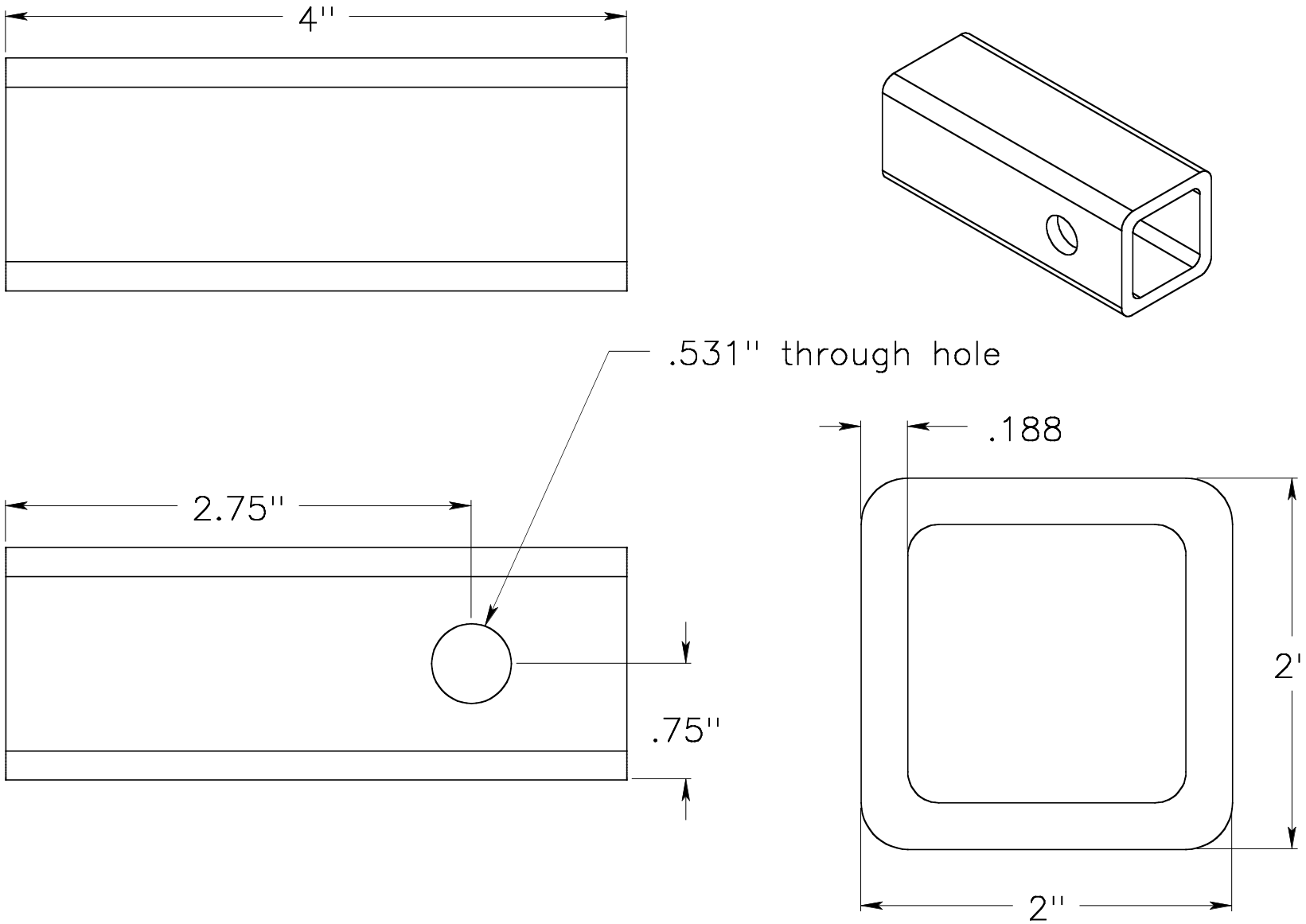
Hoop section splice end 4 views Quantity: 8



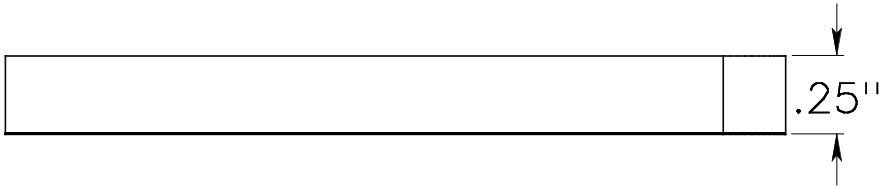
Hoop section 4 views Quantity: 8

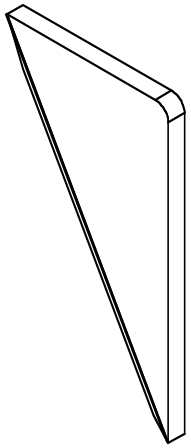


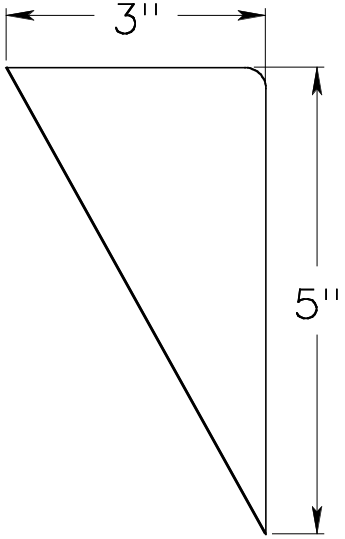
Hoop assembly Quantity: 8



Hoop hook up tube 4 views Quantity: 4



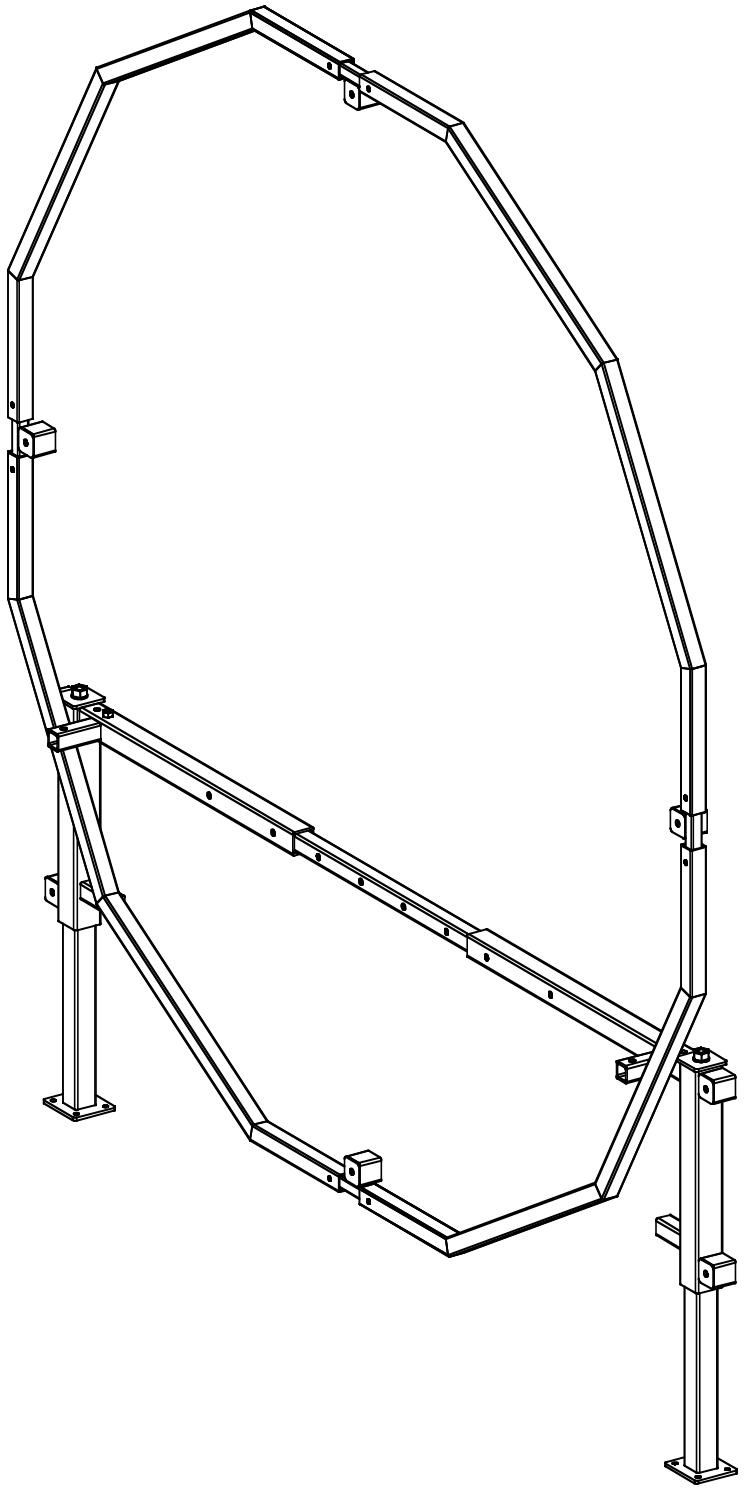




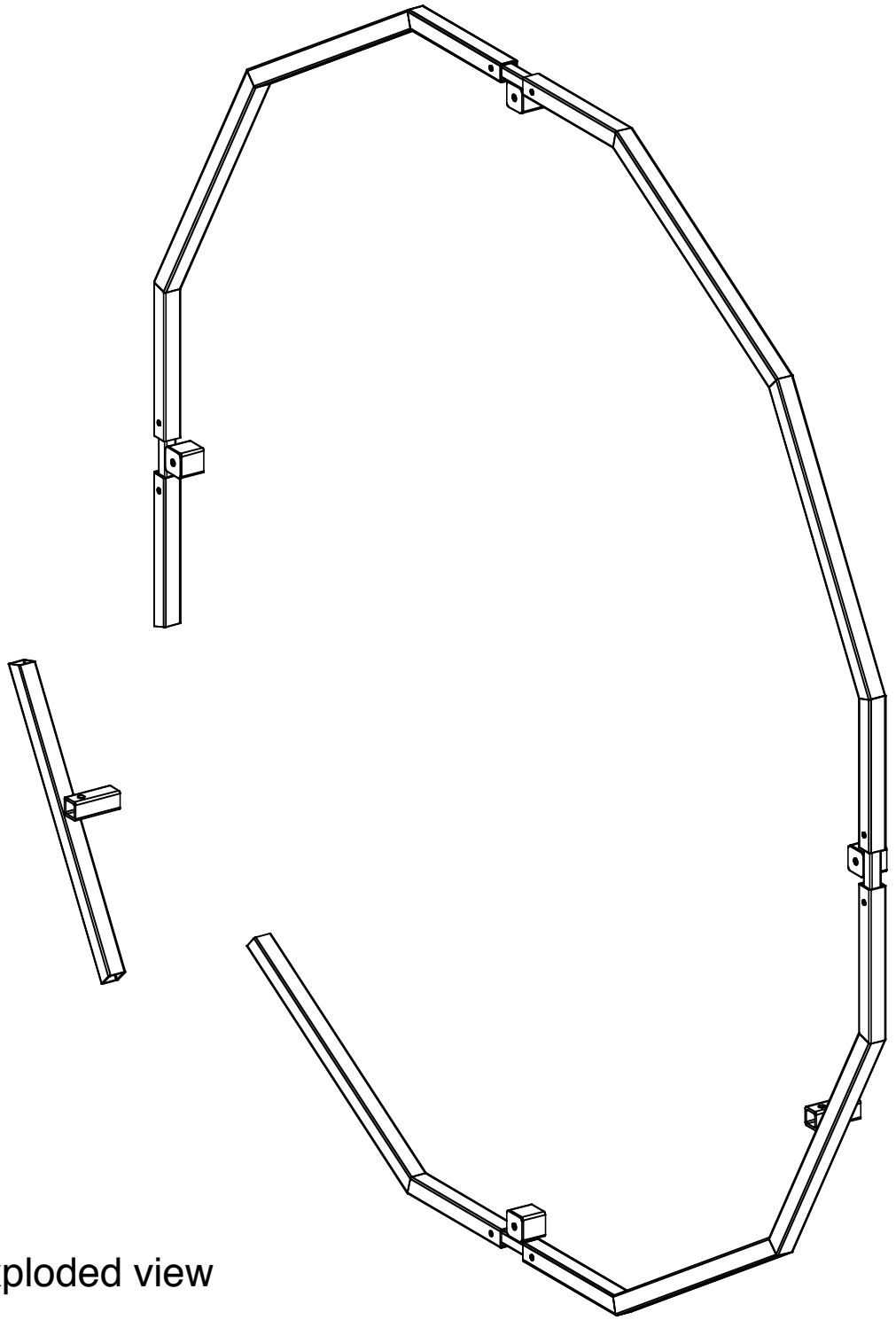
Hoop hook up gusset plate Quantity: 4

This is just a pictorial view to get an idea of how to hook up the hoops to the main beams.

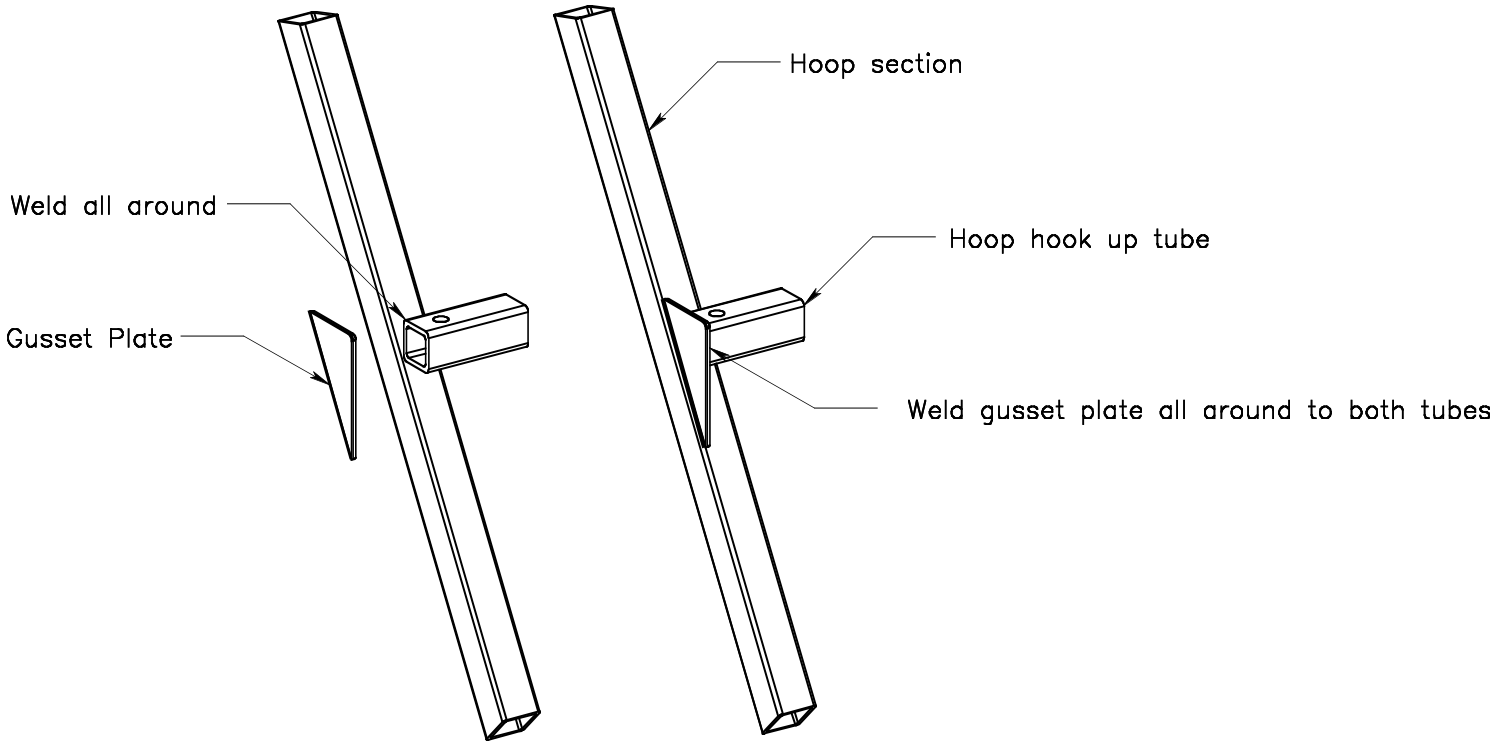
See the building notes for all instructions.



Hoop hook up instruction



Hoop hook up instruction exploded view



Hoop hook up instruction blown up view before and after

Utility Trailer Plans

Matt Kline – Owner
Red Wing Steel Works
1526 South Park St.
Red Wing, MN 55066
USA

Phone: 651-764-0925
Email: redwingsteelworks@yahoo.com
Website: http://redwingsteelworksplans.com

Utility Trailer 5’ x 8’ Building Notes

This is a standard utility trailer model that is currently on the market (at least in Minnesota). The price tag seems to average around $900 - $1100. There is no doubt that you can build the same thing much cheaper.

These building notes are put together as guidelines and are placed in no particular order of importance. I would suggest reading through them before starting the project. That will give you a better idea of the project and how it works as an end result. If you deviate from the dimensions it's no big deal. The design works with many different sizes of trailers. You will just need to make some adjustments along the way.

You will notice on some of the 4 view drawings that some of the views are out of proportion with the others. This is for clarity and to give you the biggest view possible for standard paper from your printer. Please note that drawings are not to scale, so don’t measure off the drawings. there is enough information on each part to build each part. If you have any problems figuring something out, just look at another print that has that part on it or a picture view. This utility trailer was drawn with common sense in mind, it is not rocket science. If there is something really important I made a note of it on the drawing or building notes page, otherwise it is no big deal.

One thing I would like to talk about are the fenders. I have come to the conclusion that you really can’t build a good set of fenders as cheap as you can buy pre made fenders. I hate to say it because I’m the type of guy that like to build as much stuff as possible. It would also be very time consuming to try to match the better look you will get with pre made fenders. I added fenders in the plans just in case someone wanted to build their own anyway. If you plan on using a different size tire you should check to make sure it will fit. You also want to allow for suspension travel.

Another thing you need to figure out before you start is what axle will you be using. The plans were designed for a 3500 pound axle (no brakes) with 58" spring centers. That will be the size used for the 60" wide frame dimensions. I know what your thinking, why would I need that heavy of an axle for a utility trailer? The answer is simply, the 2000 pound axles are almost just as expensive and I always tend to overbuild just about everything. I don't know too many people that wouldn't want a heavier duty trailer for almost the same amount of money as a lighter one. If you decide to sell it someday I'm sure the potential buyer wouldn't mind it either. Wouldn't it be nice to not worry about overloading it? If you don't like the idea of leaf springs you can also use a torsion axle for this trailer. I made some notes on the frame assembly plans for cross member locations for either axle. A good rule of thumb for axle location is: 60% of the trailer frame should be in front of the axle and 40% of the trailer frame should be behind the axle. When you order your axle be sure to get the mounting hardware for mounting the leaf springs.

The tires the trailer was designed around are 205/75-D14. This is a really common tire size for that type of axle.

The tail light brackets should be able to accommodate any tail lights you would use for this type of trailer. I did not include any wiring diagrams on the plans. If you do a quick Google search you will find more information than you will know what to do with.

The trailer deck can be plywood, lumber, steel, or expanded metal (mesh). The sides can be the same or left open. The same goes for the ramp.

The welds that secure the tongue to the trailer frame are what I would consider to be critical welds. Please make sure you are up to the task, since I might be following you on the highway someday:)

Use the proper trailer coupler to make sure you have enough capacity for the loads you will be hauling. A standard 2" coupler should be fine. Just make sure that it will fit around a 2x2 square

tube. Also make sure to mount it according to the coupler manufacturers instructions.

Safety chains are a good idea and may even be the law in your state. Be sure to check the regulations for where you live. Just mount them to the tongue hitch right behind the coupler. You can bolt them or weld them.

If you decide to make the ramp a little heavier, you will need to make adjustments to your material list as well as your cut list.

By using these plans to build your trailer you assume responsibilty to follow all trailer rules and regulations for your area. These plans are only guidelines for the construction of the trailer and are not meant to cover all the possible rules and regulations that need to be followed.

Utility Trailer 8’x5’ Total Material List

13’8” x 2” x 2” x 3/16” square tube

51’ x 2” x 2” x 3/16” angle iron

63’ x 2” x 2” x 1/8” angle iron

5’ x 3/4” solid rod

1’ x 1/2” solid rod

2’8” x 3/4” schedule 40 black pipe

7’2” x 10” flat sheet (optional fenders)

Utility Trailer 5’ x 8’ Cut List

Frame

6 - 60”x2x2x3/16 angle iron (frame cross member)

1 - 60”x2x2x3/16 angle iron w/45 degree cuts (front frame rail)

2 - 96”x2x2x3/16 angle iron (side frame rail)

Hitch

2 - 52”x2x2x3/16 square tube (tongue hitch gusset tube)

1 - 60”x2x2x3/16 square tube (tongue hitch)

Top Rail

1 - 63.75”x2x2x1/8 angle iron (front top rail)

2 - 98”x2x2x1/8 angle iron (side top rail)

11 - 12”x2x2x1/8 angle iron (top rail support bracket)

2 - 8”x2x2x1/8 angle iron (tail light bracket)

Ramp

6 - 58”x2x2x1/8 angle iron (ramp parts) *use 3/16 thick if you need a heavy duty ramp

4 - 8”x3/4 schedule 40 black pipe (ramp hinge bushing)

1 - 60”x3/4 solid rod (ramp hinge pin)

4 - 3”x1/2 solid rod (ramp latch pin)

Fenders (optional)

2 - 16”x10x1/8 flat sheet (top sheet)

4 - 13.5”x10x1/8 flat sheet (vertical sheet)

*Don’t forget about the trailer deck and ramp deck when you order your material.

Top view

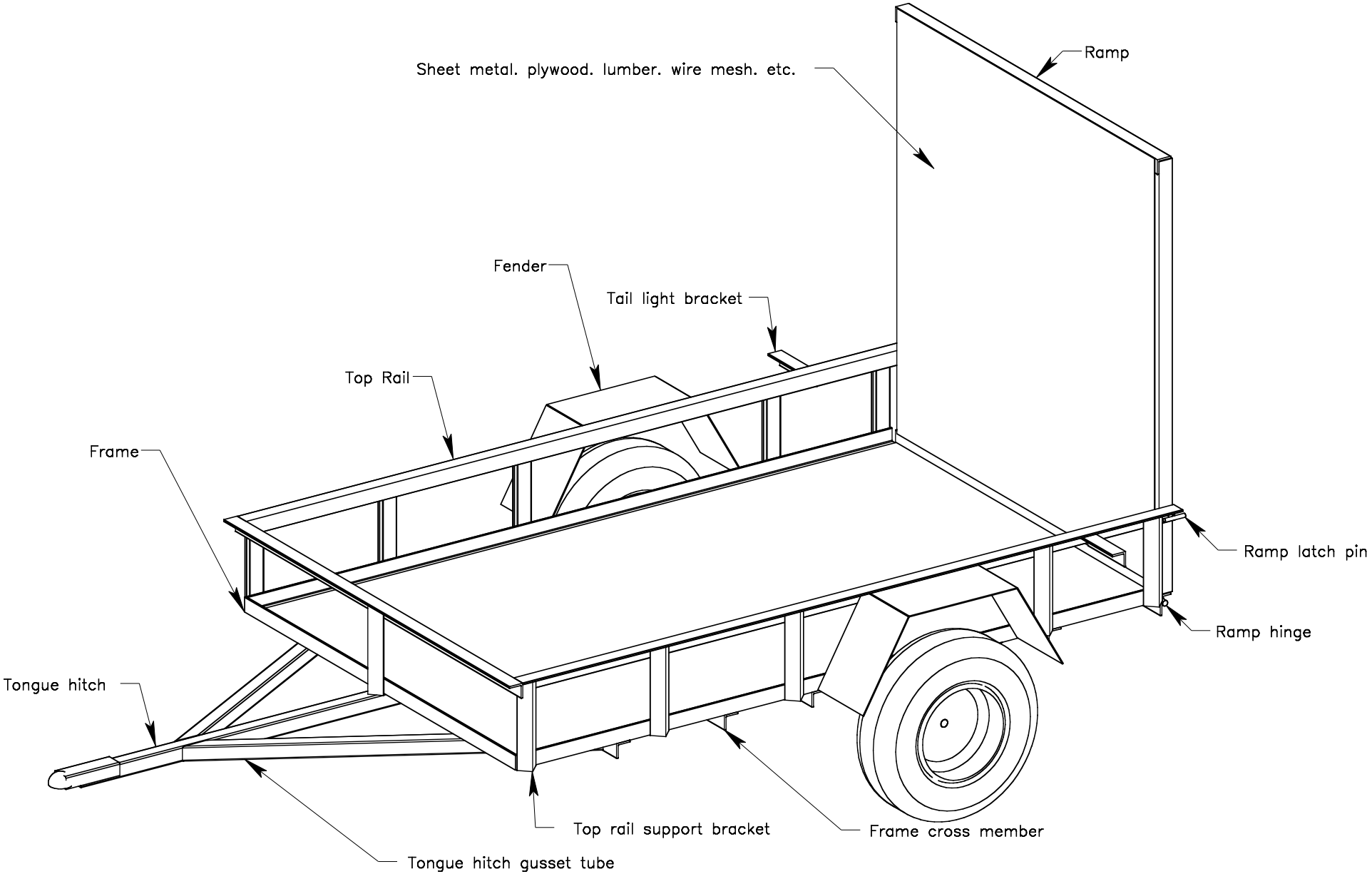
Picture view

Note: this is not a drawing it is like a map legend

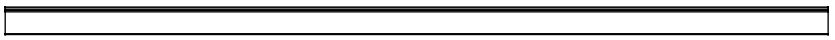
Front view

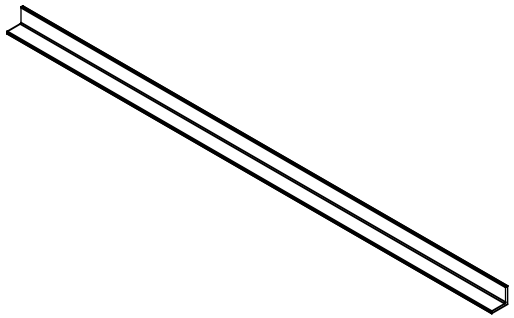
Right side view

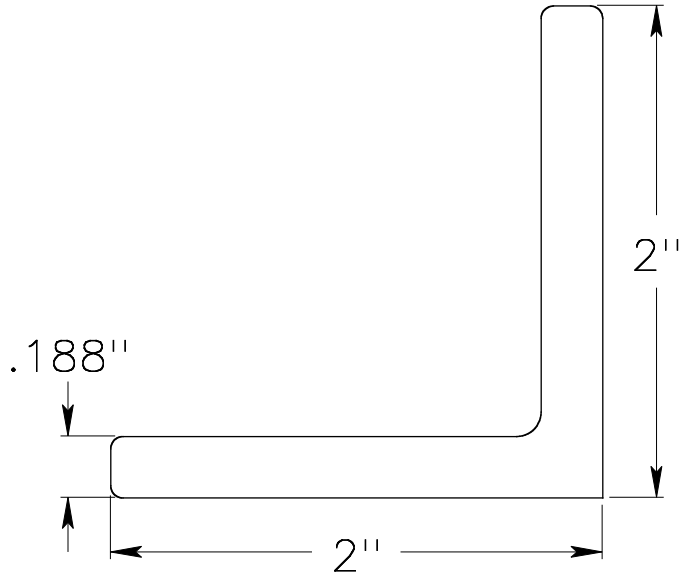
Part name & quantity (this is the way all the 4 view drawings are drawn)



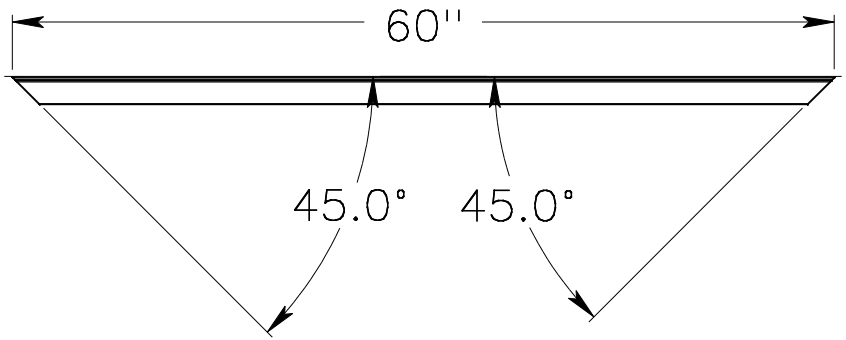
Utility trailer parts labled

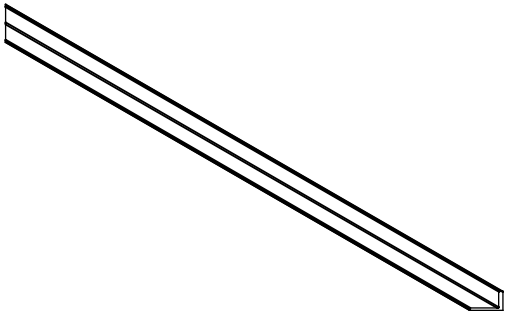


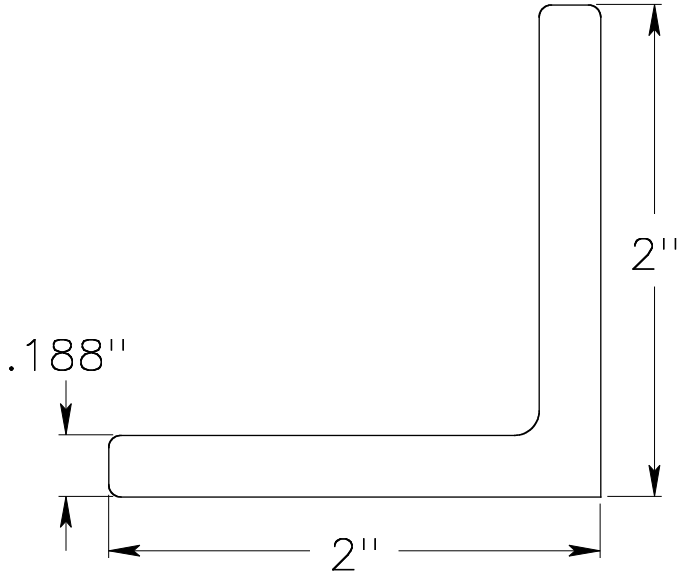




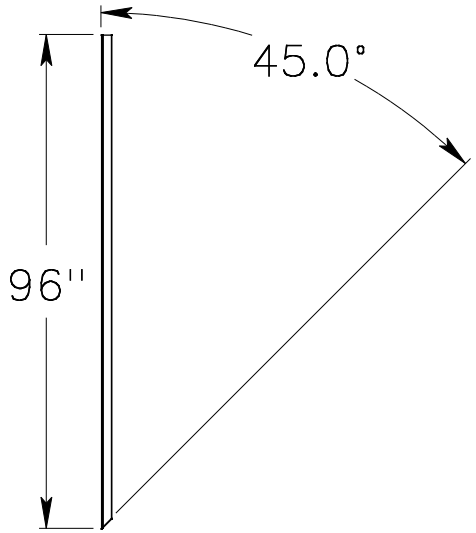
Frame cross member Quantity: 6

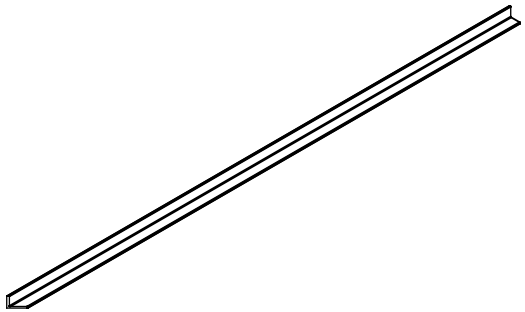


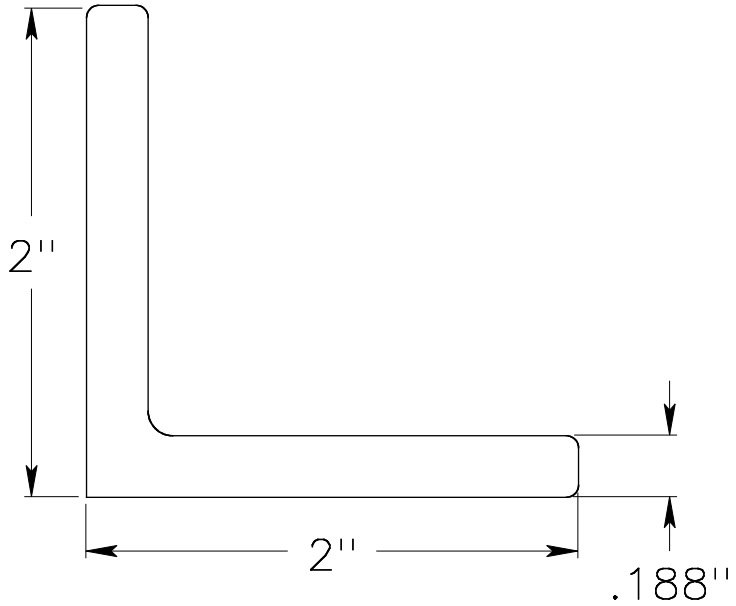


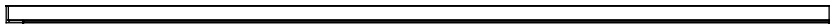


Front frame rail Quantity: 1



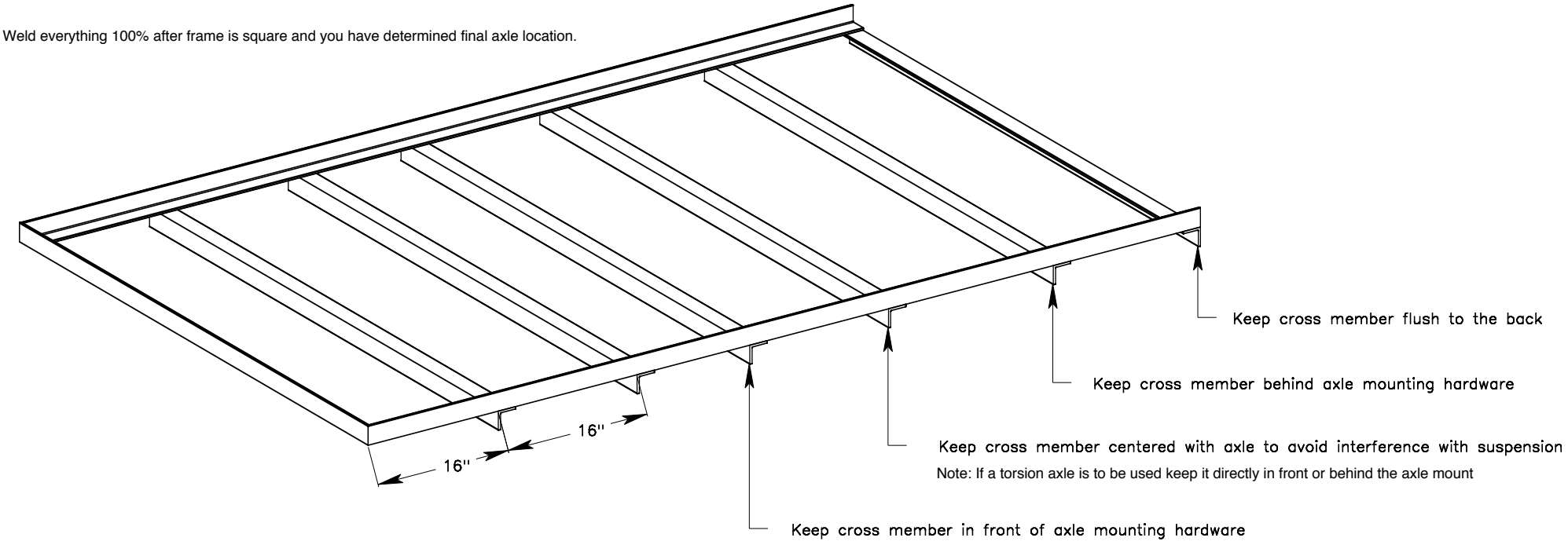




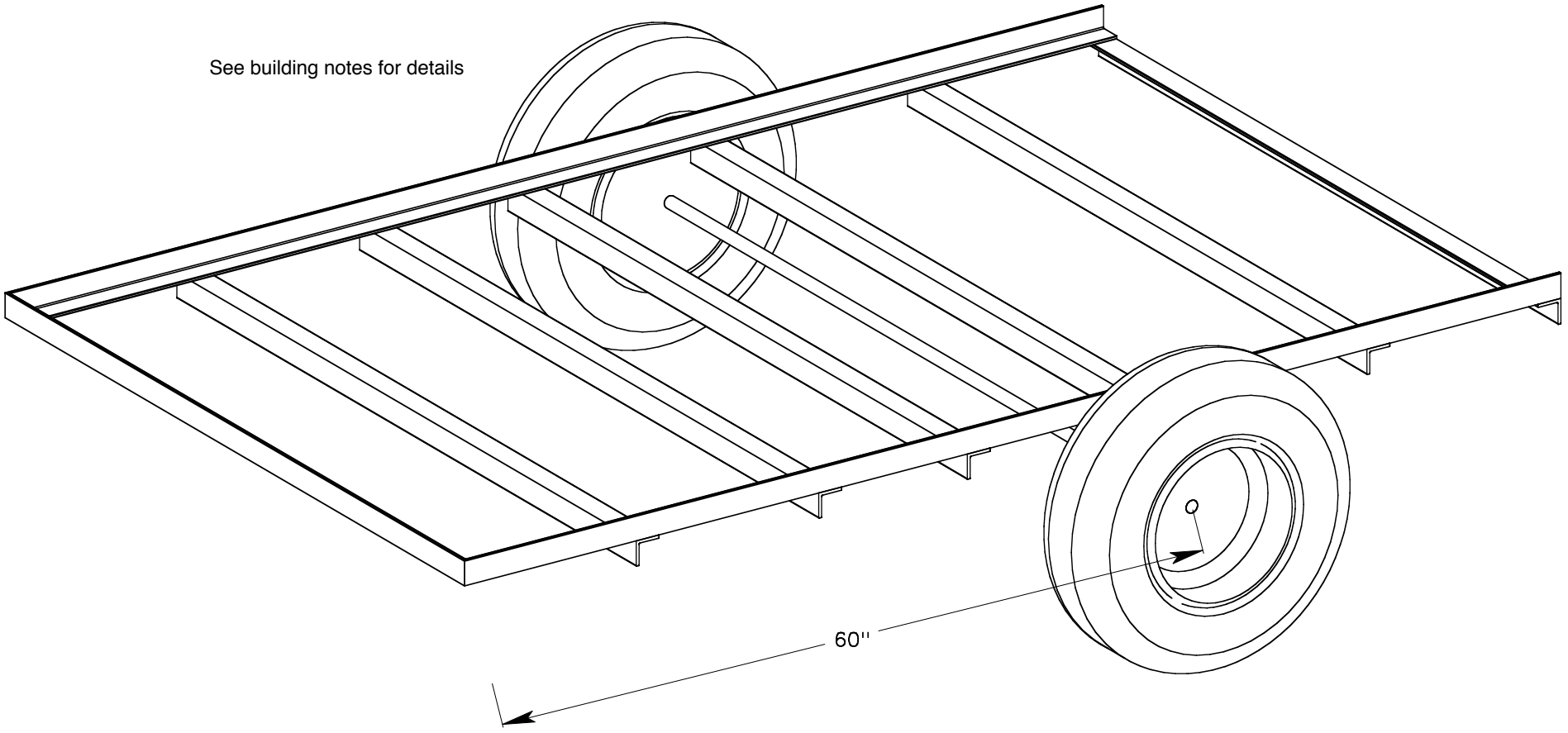


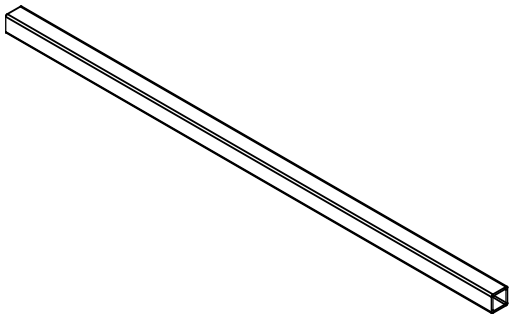
Side frame rail Quantity: 2 (1 right hand 1 left hand)

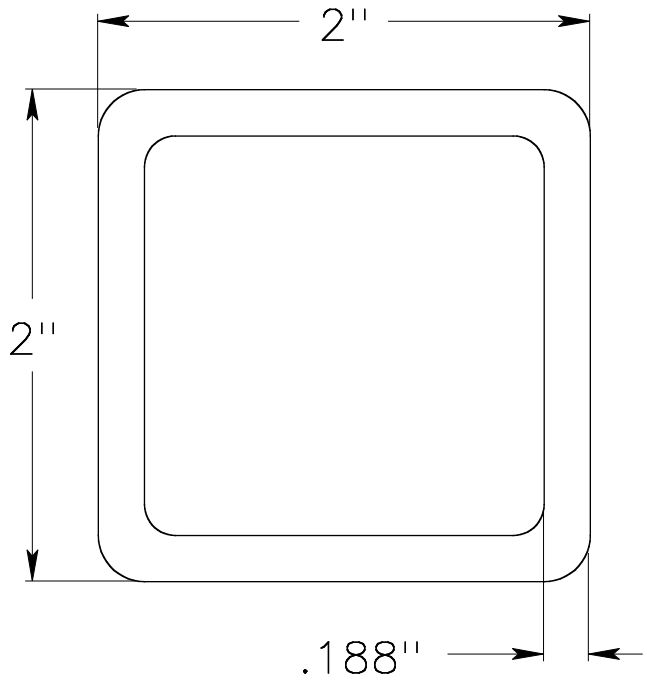
Weld everything 100% after frame is square and you have determined final axle location.



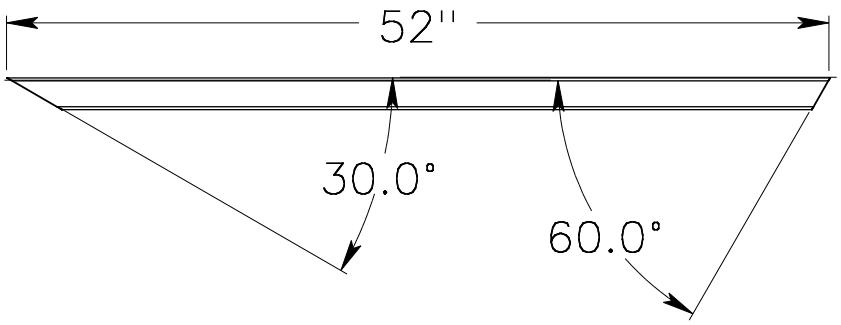
Frame assembly

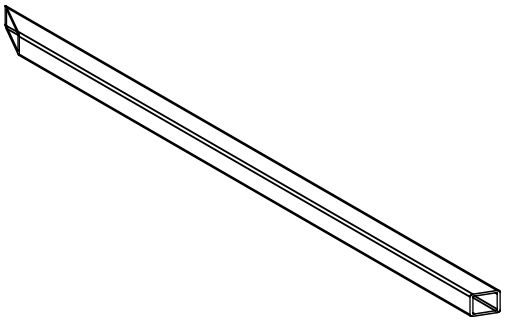

See building notes for details
60''
Axle location

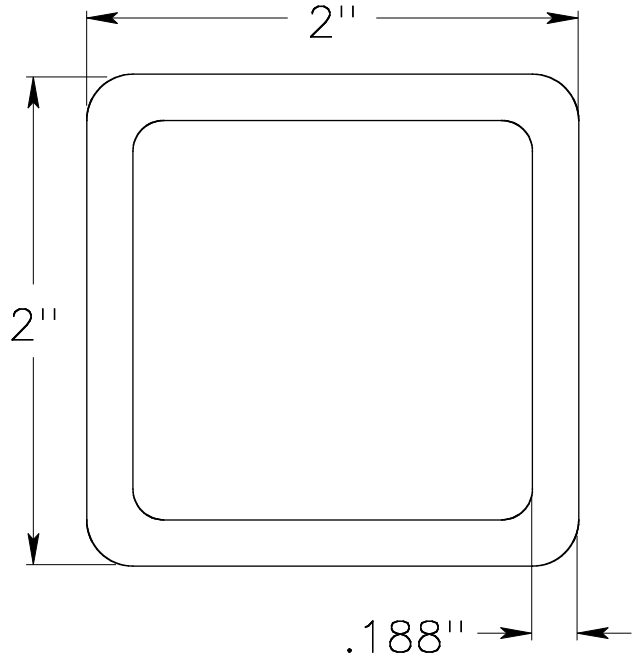




Tongue hitch Quantity: 1



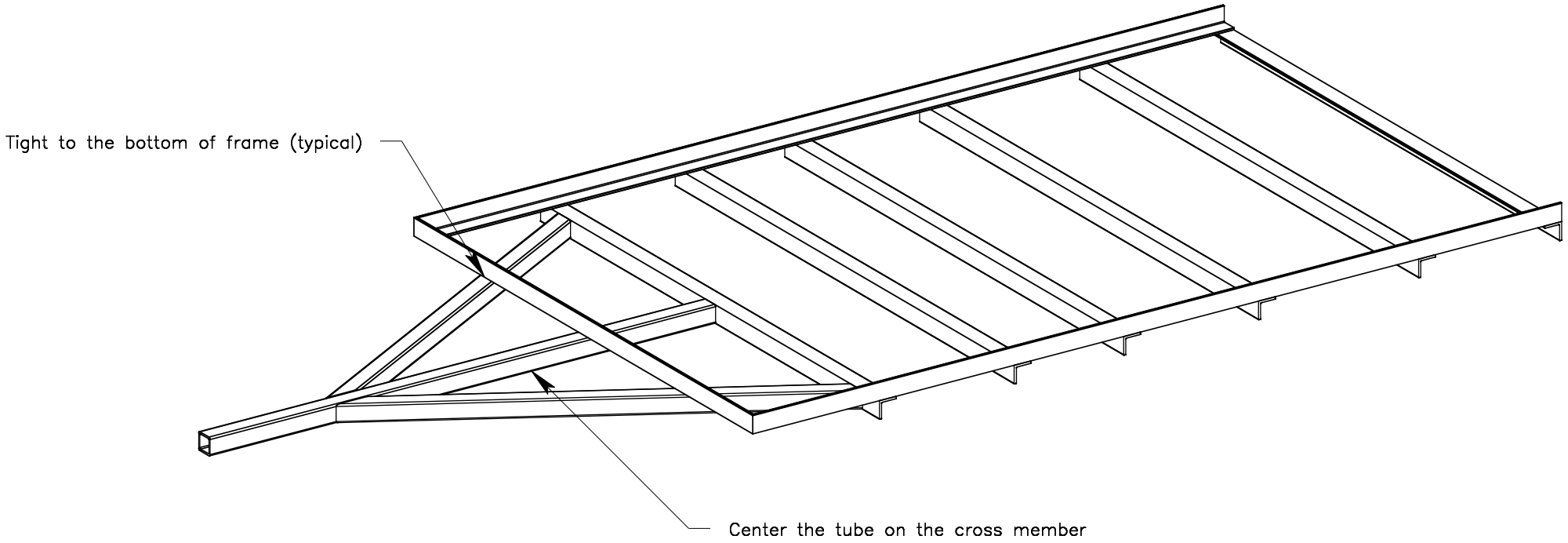




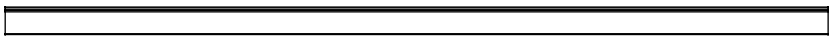
Tongue hitch gusset tube Quantity: 2

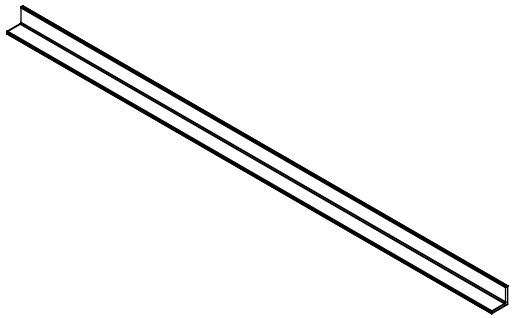
Weld all parts 100% after squaring everything up.

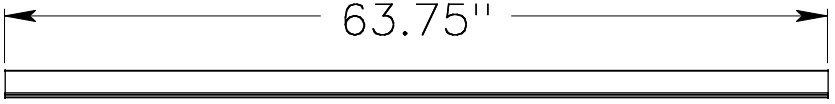
Note: These are all important welds to make sure the trailer stays attached to your vehicle.

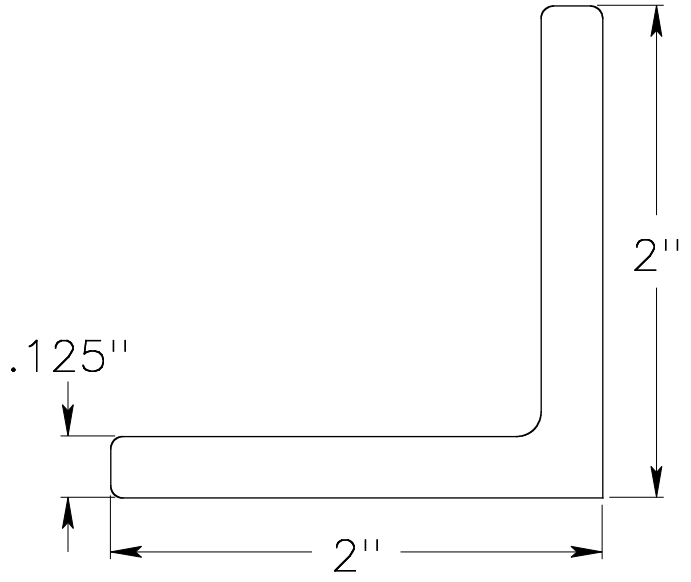


Tongue assembly

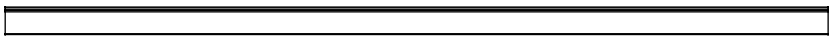


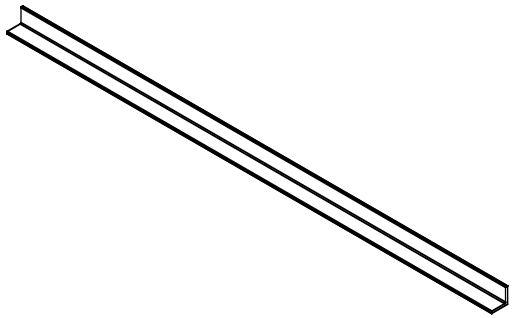


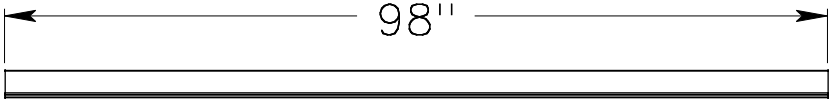


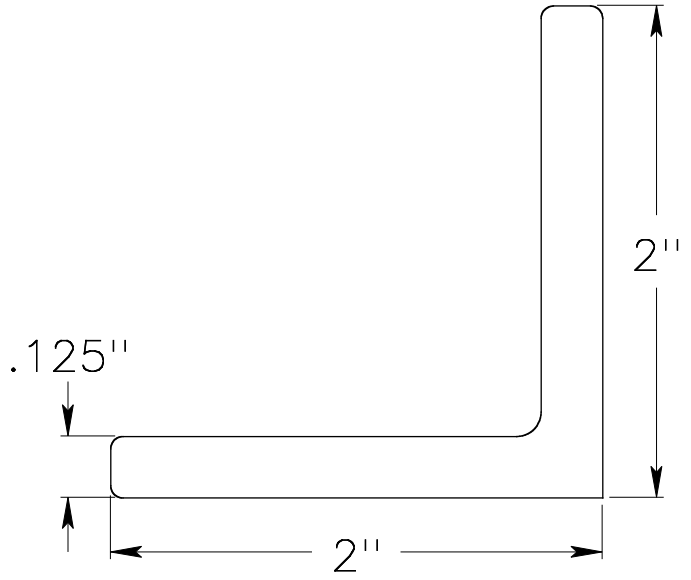


Front top rail Quantity: 1

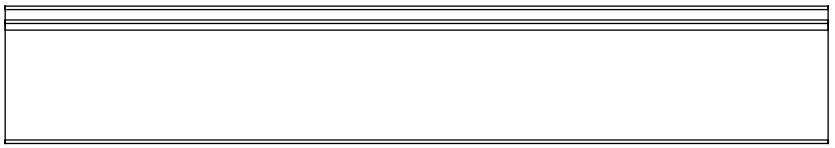


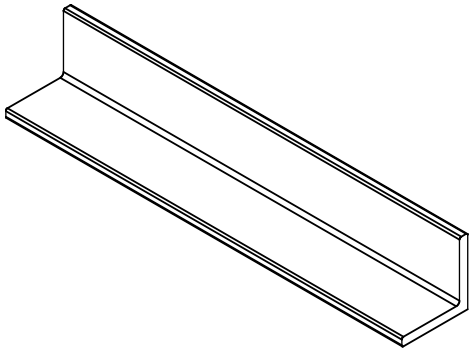


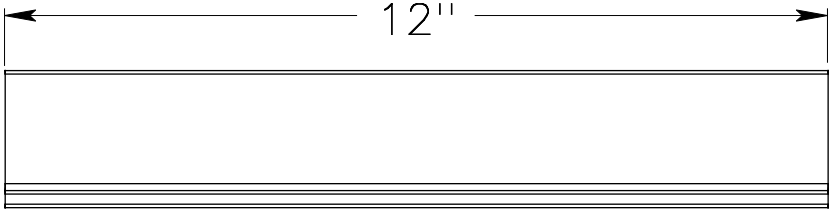


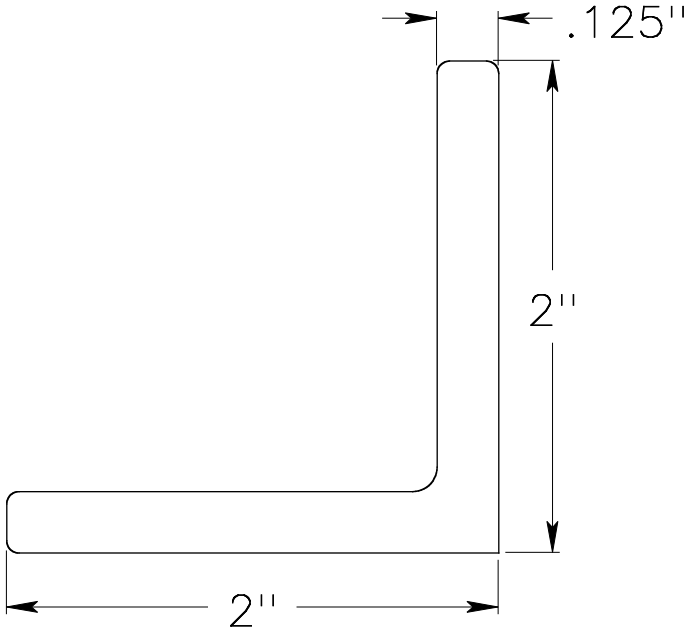


Side top rail Quantity: 2

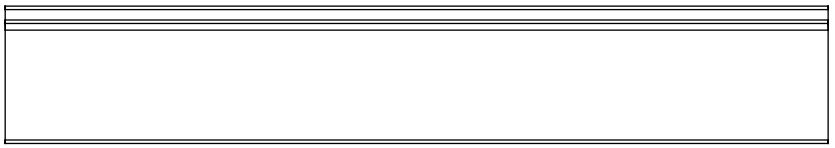


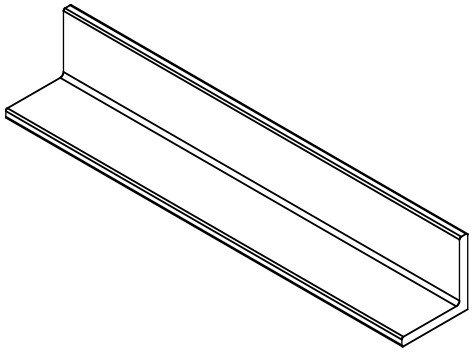


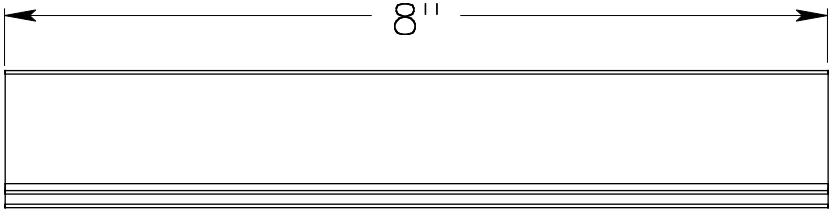


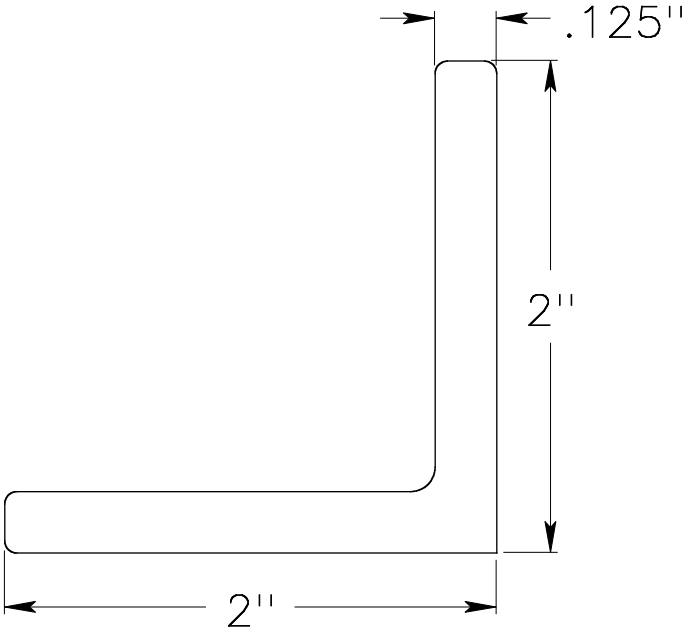


Top rail support bracket Quantity: 11

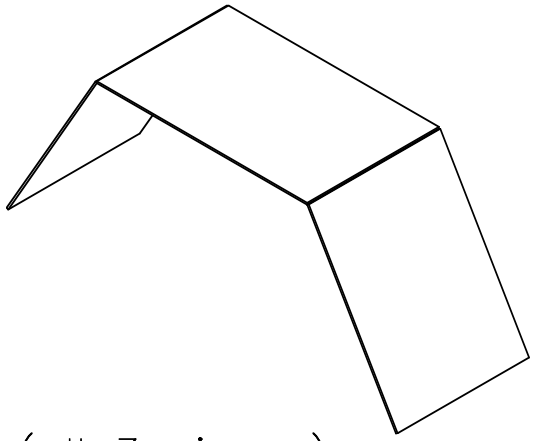




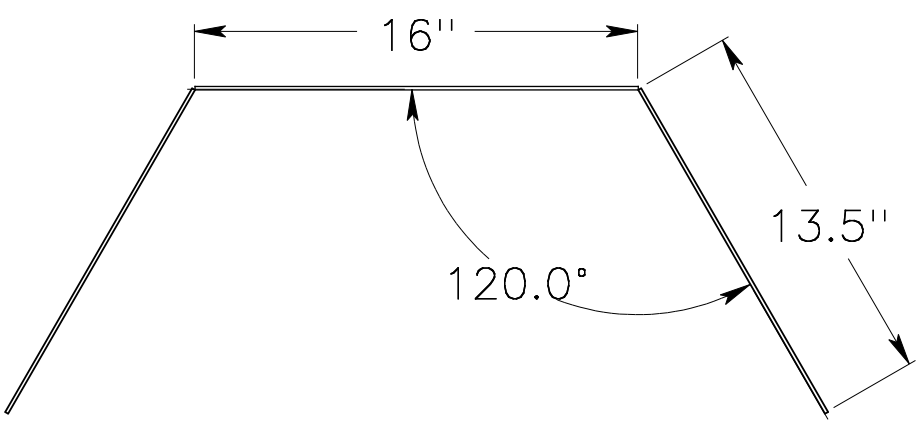


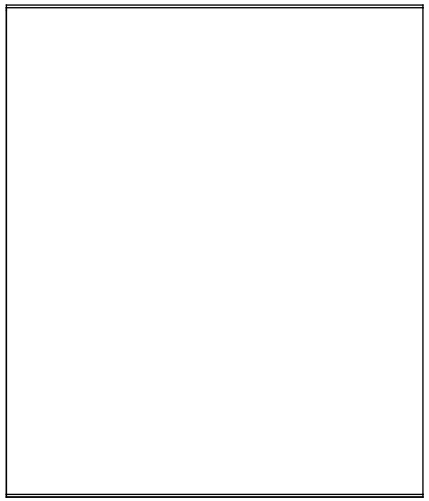


Tail light bracket Quantity: 2



.125'' flat sheet (all 3 pieces)



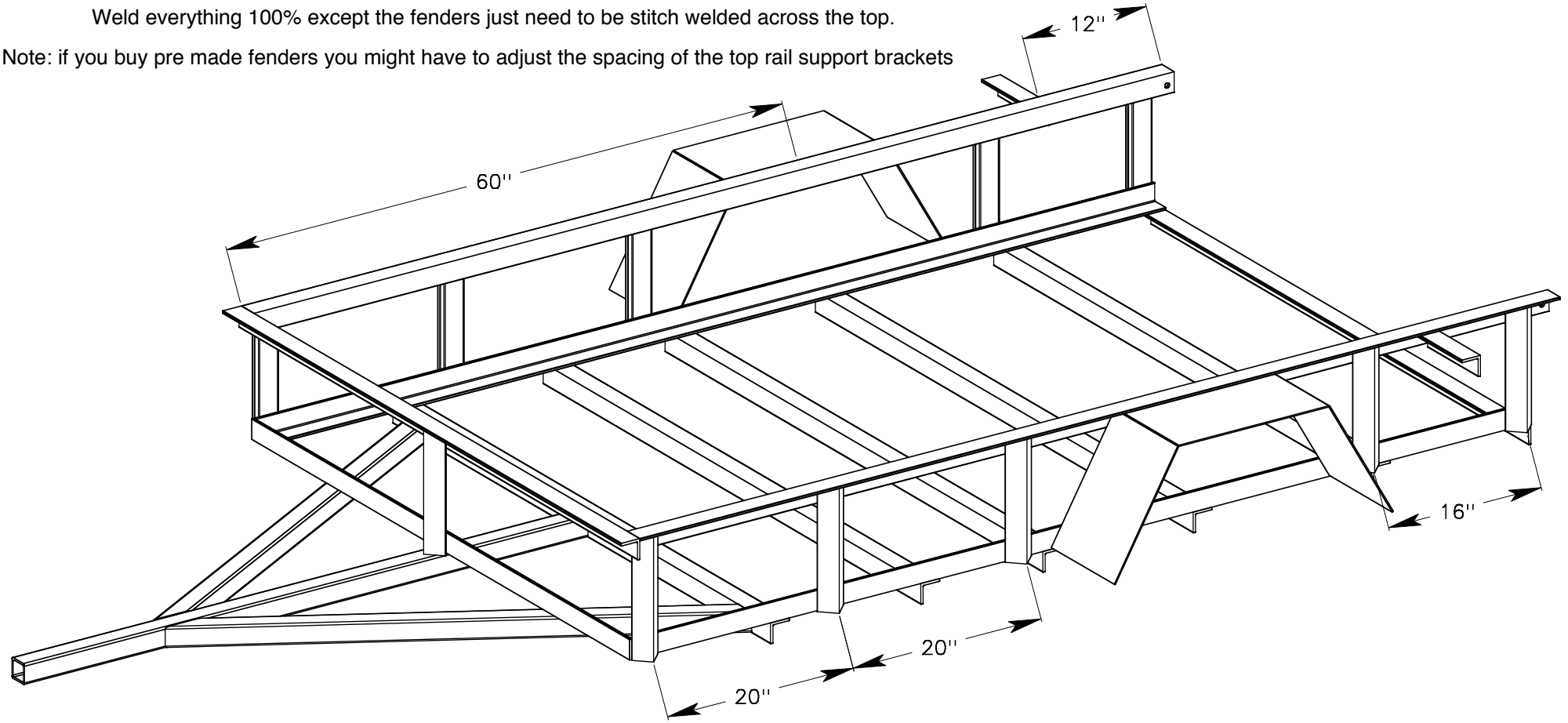


See building notes before making fenders due to many different variables.

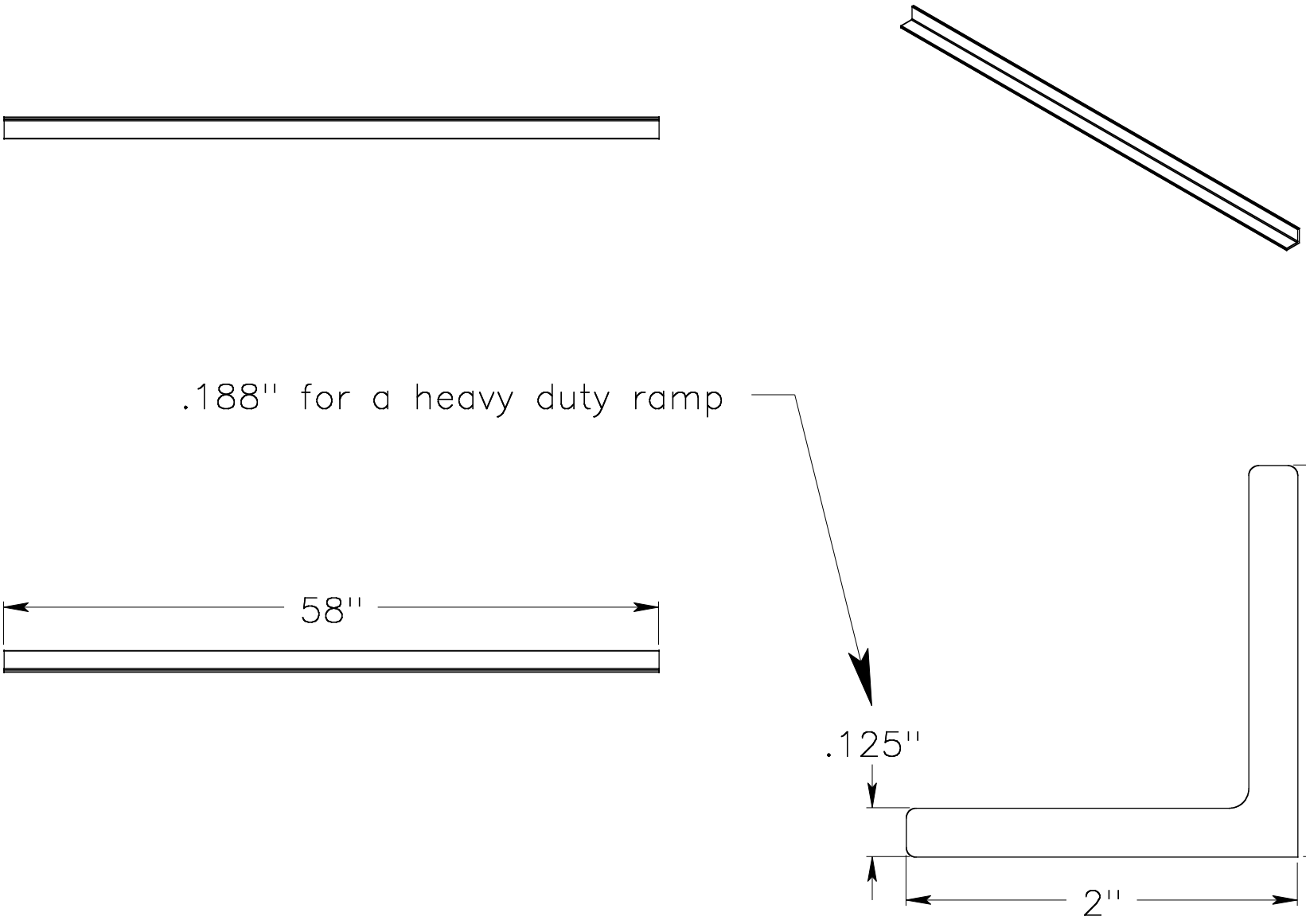
Fender Quantity: 2

Weld everything 100% except the fenders just need to be stitch welded across the top.

Note: if you buy pre made fenders you might have to adjust the spacing of the top rail support brackets

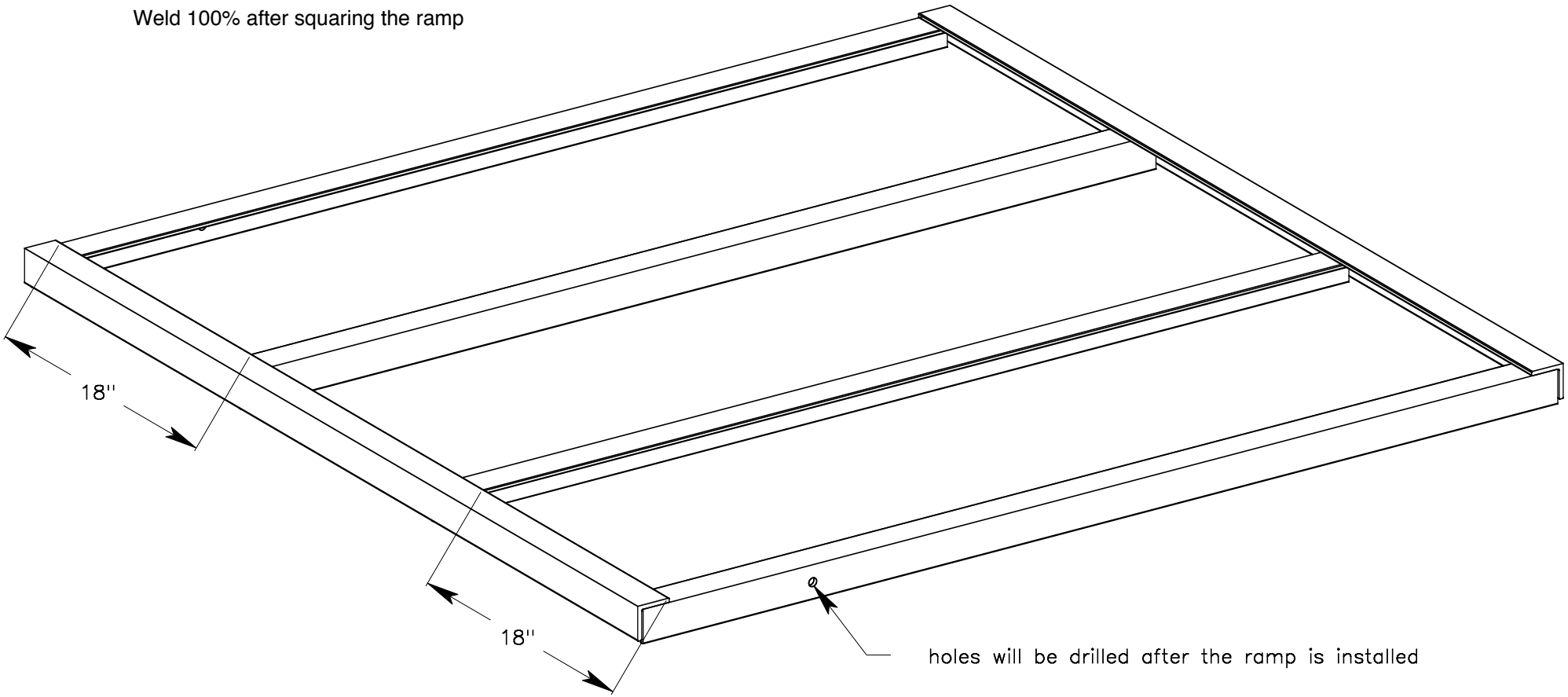


Top rail assembly

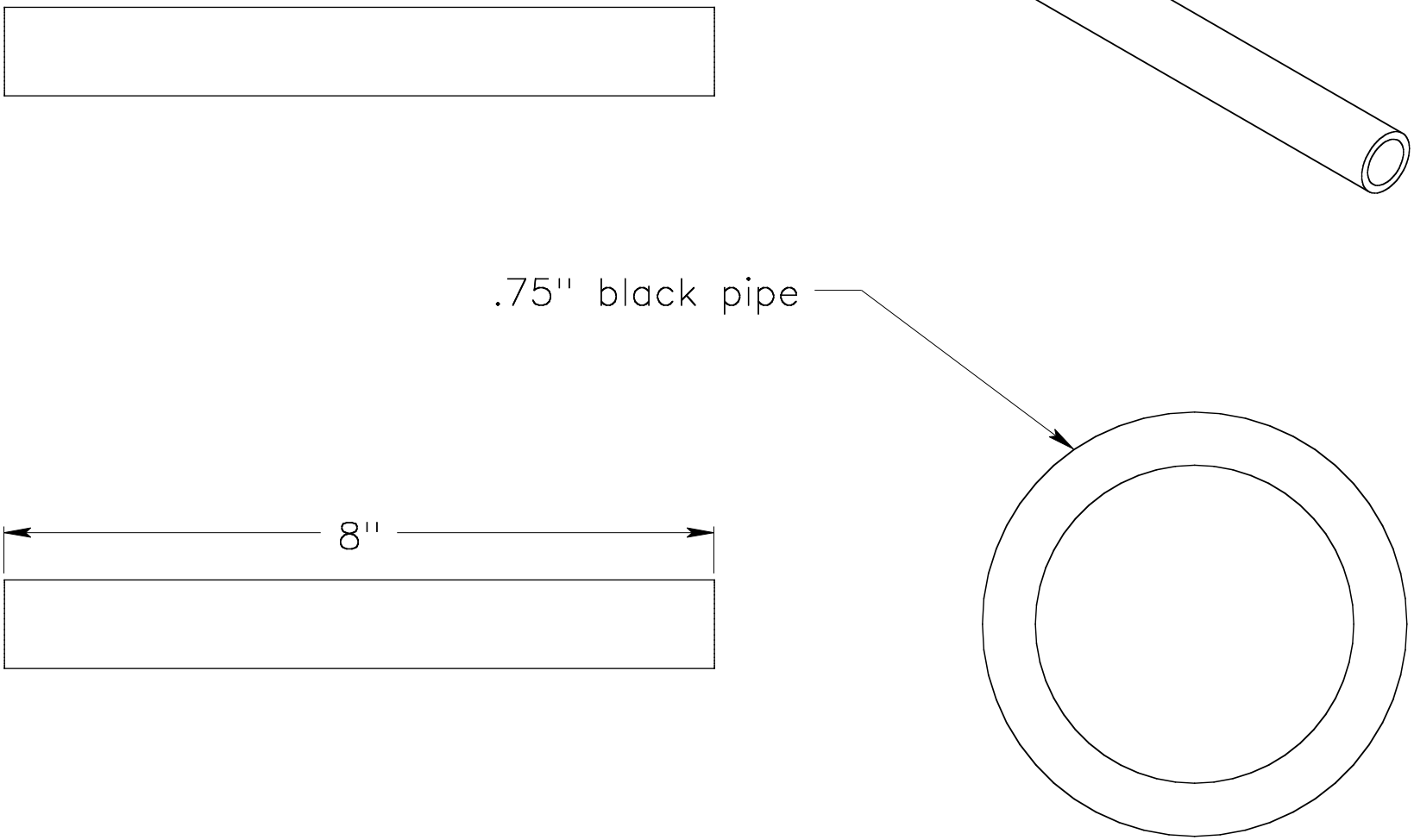


Ramp parts (all 6 ramp angle irons are the same) Quantity: 6

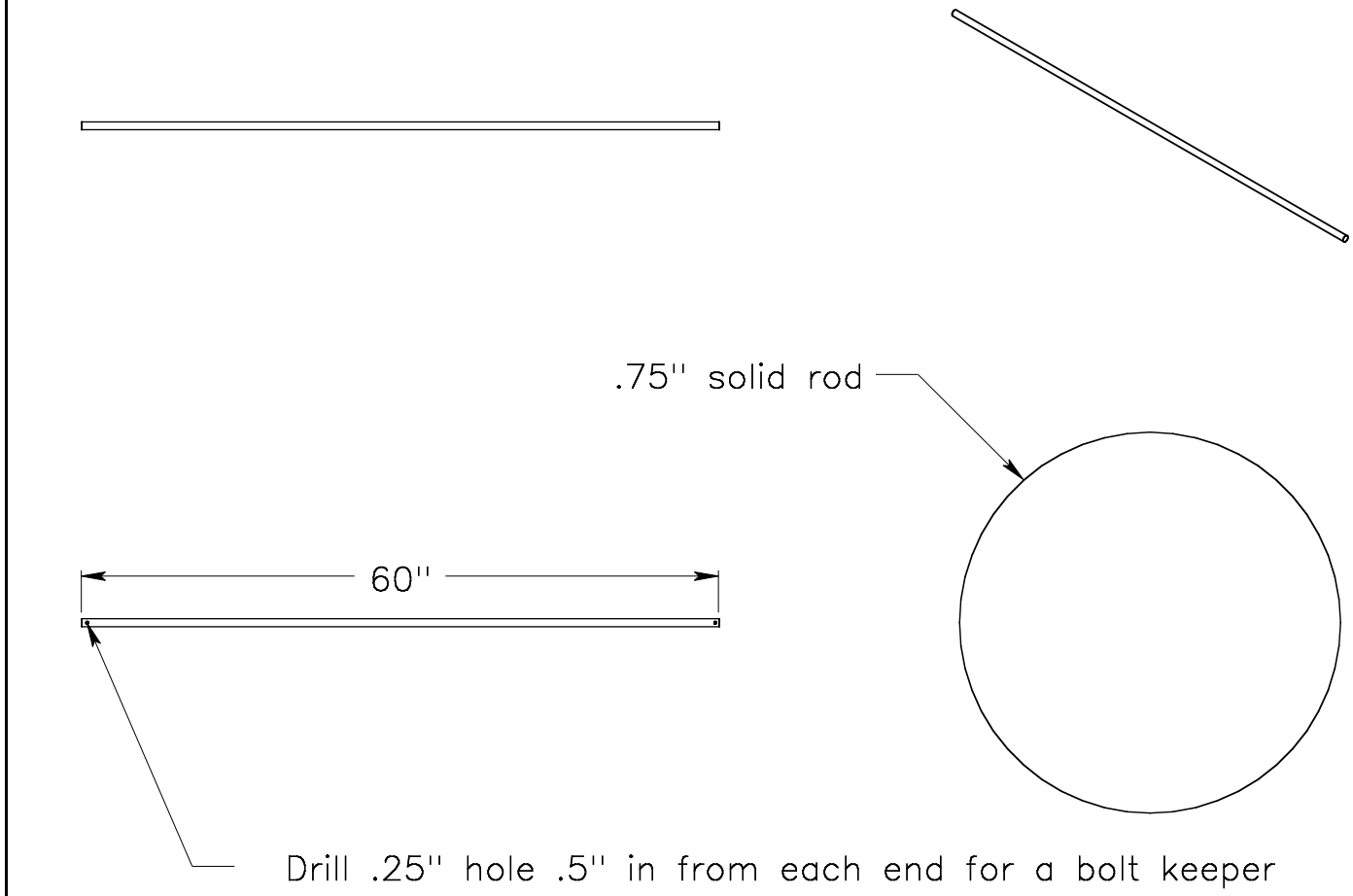
Weld 100% after squaring the ramp



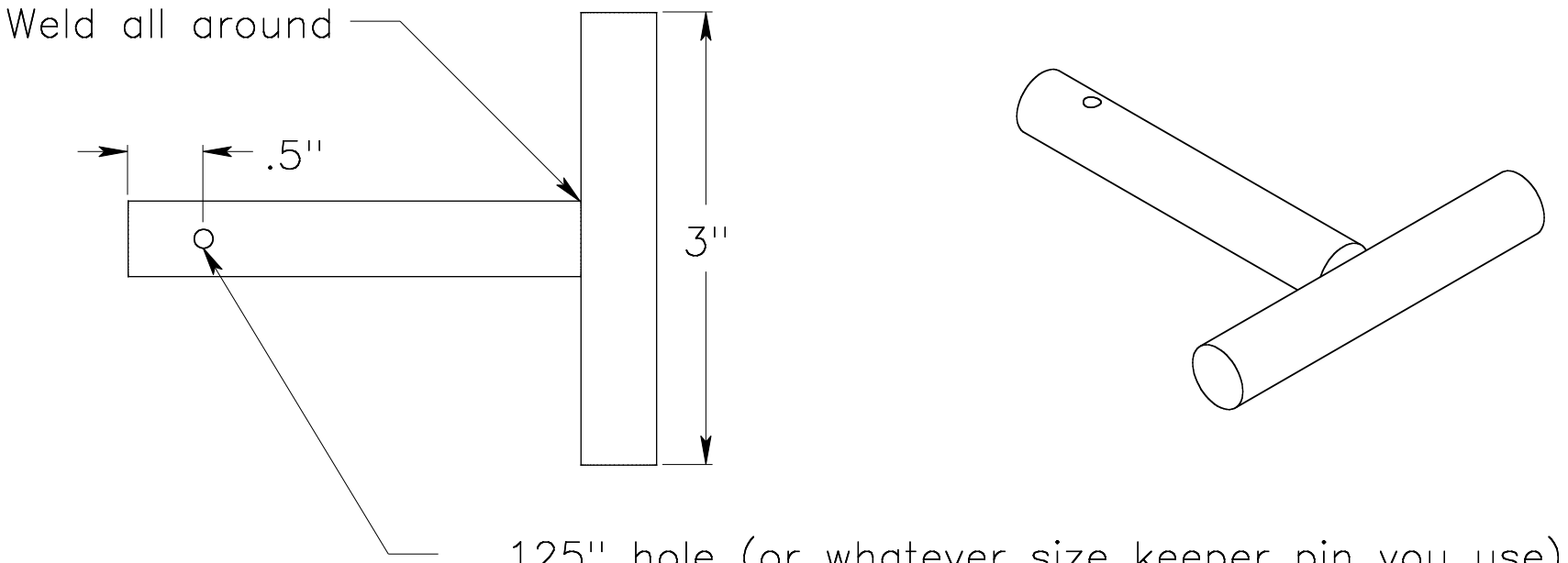
Ramp assembly

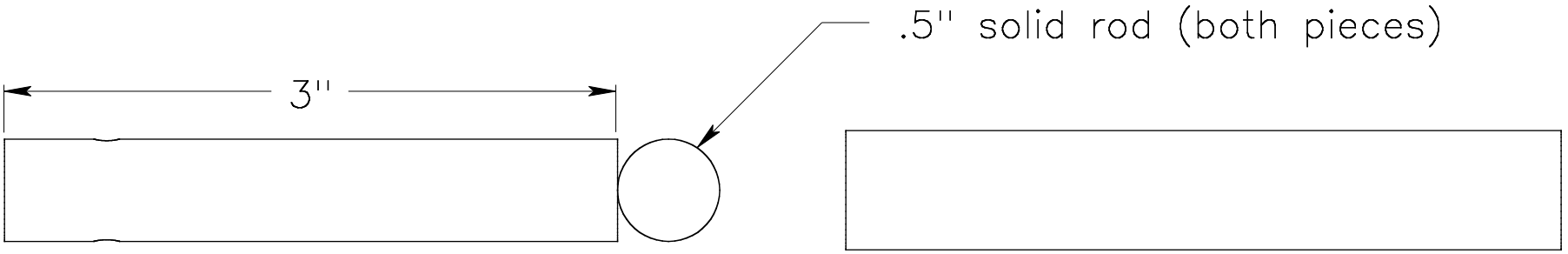


Ramp hinge bushing Quantity: 4

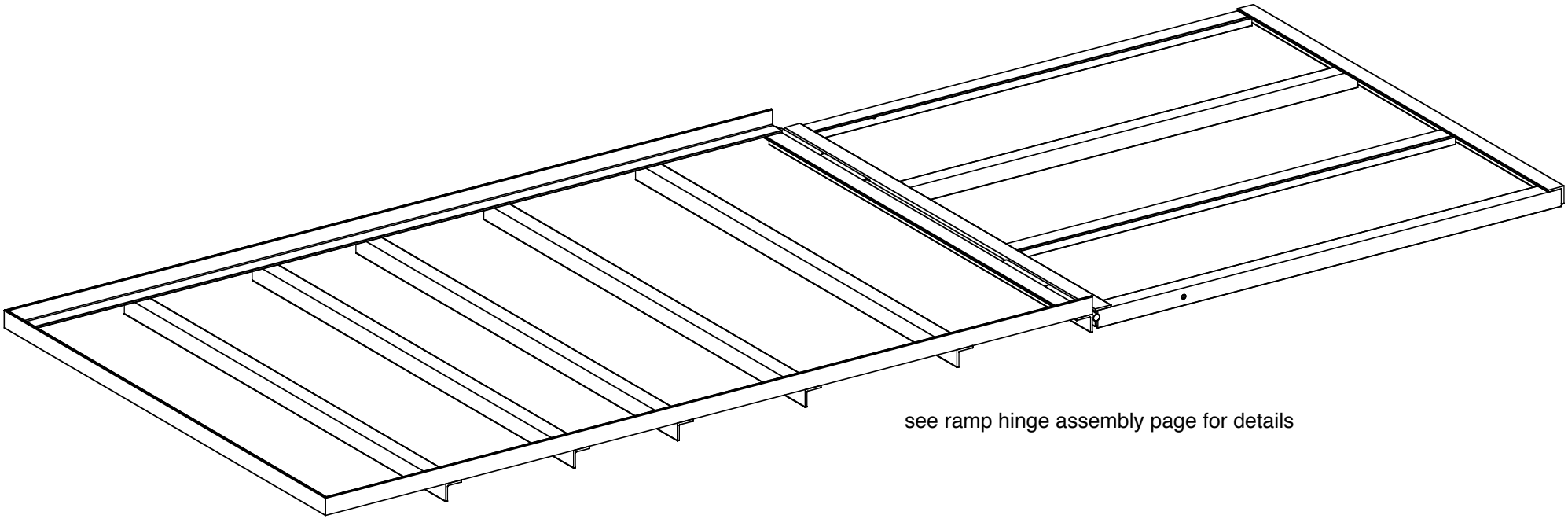


Ramp hinge pin Quantity: 1





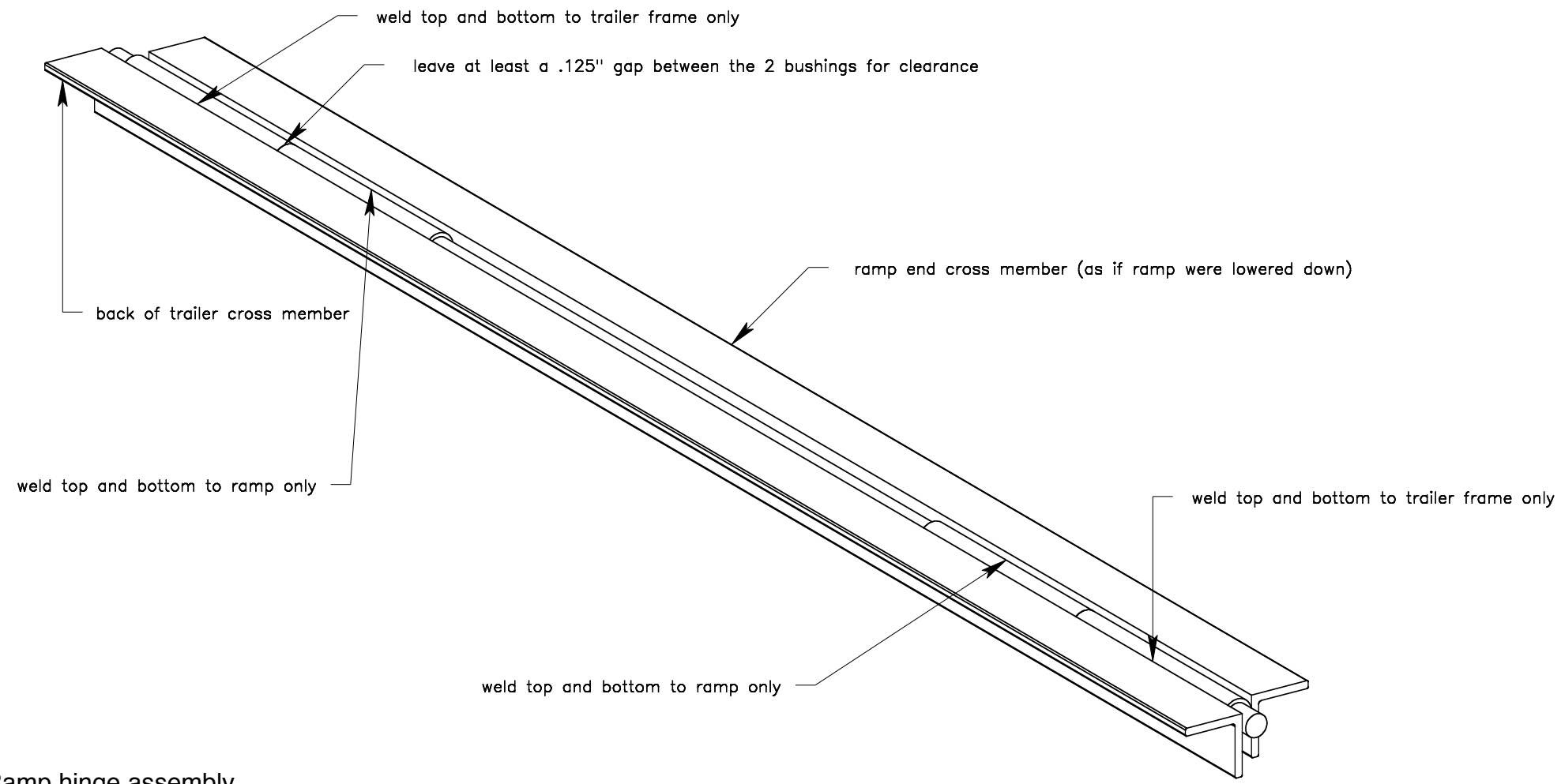
Ramp latch pin Quantity: 2



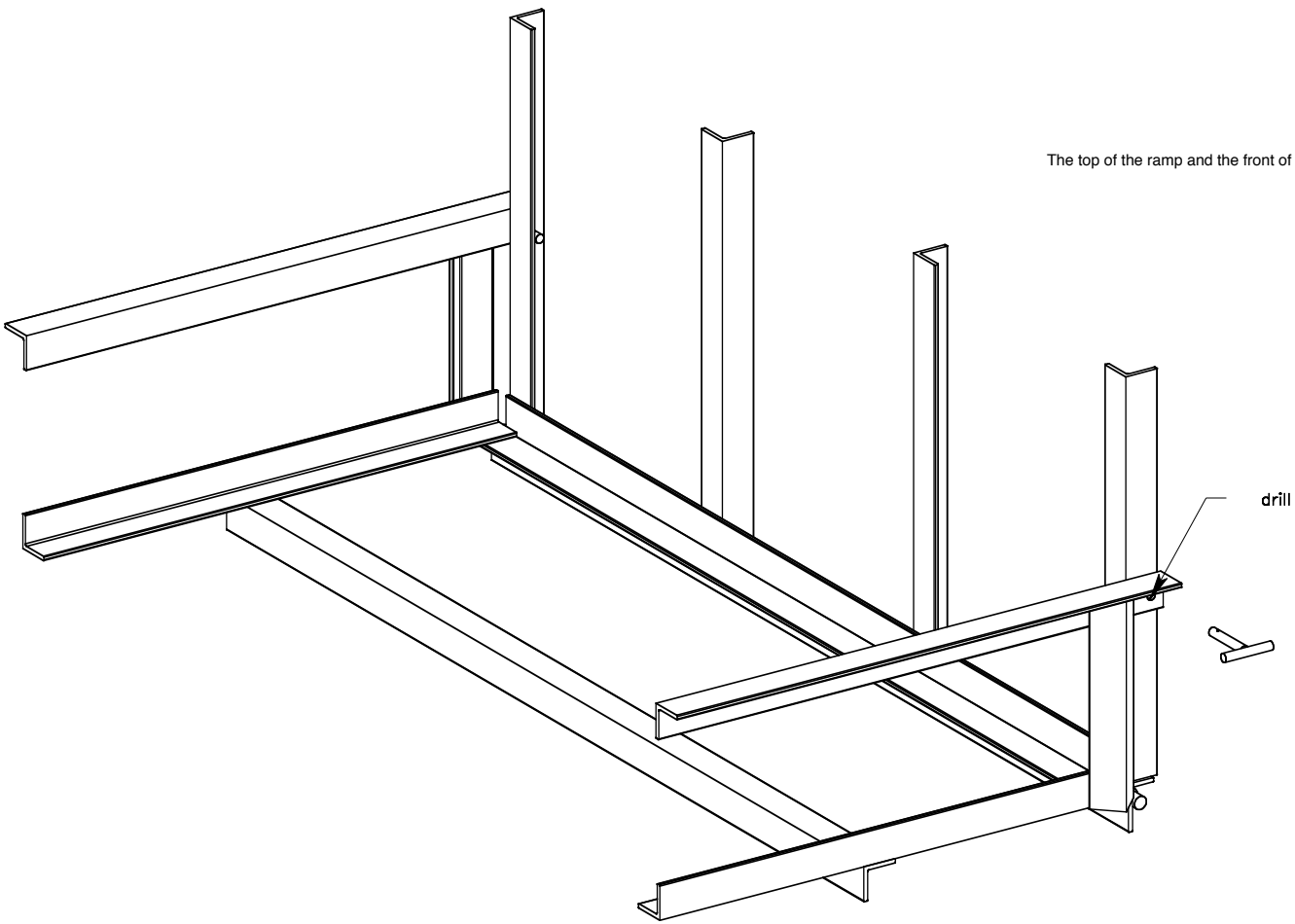
see ramp hinge assembly page for details

Ramp hinge assembly full view

Try not to weld the hinge pin or you won't be able to take the ramp off.



Ramp hinge assembly



Ramp latch view