# User Guide

# Industrial Pumps & Pipes

## Warning :

These meshes are not grid drop in friendly.

These meshes were designed to allow the user the maximum flexibility while building their creations. In other words you can build just about any shape and length,and somewhat size of piping ,but you are going to need to adjust things to fit. These parts fit together while using the "V" key in move mode, by selecting the vertice you want to align to another part. This can be a bit fiddly and time consuming at times.

## General Information:

Most of the pipes are 5 m lengths which you can alter the length to suit your build. However this comes at the price of not being able to just drop in pre made mesh sizes, their is a few pre made mesh lengths included . But for the most part if you need say a 40m pipe you can just rescale a 5m one to 40m and add a couple of flange premades where you want the joints. You can of course make some premades if you find you need the same lengths/configurations.

The reason why pre made mesh sizes were not the main focus was :

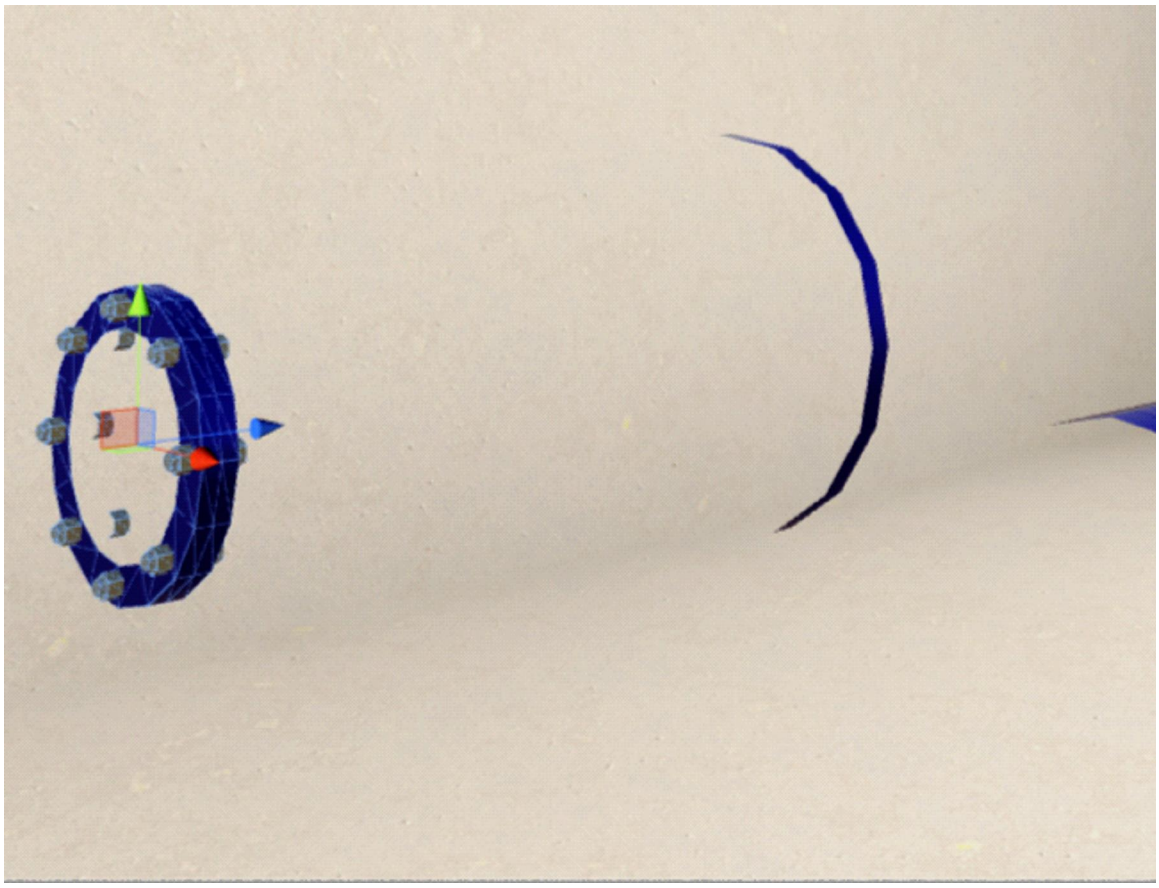
1. I dont know the size you would need, your room may be on a 10 m grid but inside of it may not be. Even if i had made .5,1,2,3,4meter etc .. pipes , you might need something like .3 of a meter to fit where you want to put something.

2. If i make the pipe mesh with the flange on the end when you scale it in the z axis , it changes the flange width size as well, which then does not match the rest of them.

3. Focusing on being able to stretch the pipes to any length , reduces polygons in your scene, and allows you to build to any size inside of your rooms. This does increase build time in your creation , but does allow a lot of flexibility.

Other parts like elbows, valves etc have a flange built onto them. Off hand i cant think of any parts you cannot rescale up or down in all 3 axis if you want smaller or larger parts. I did include a few double size and half size premades. The basic pipe in the package is .250m in diameter. I kept the colors plain so when resized you basicly cant tell , also you can recolor them easily if you choose,by changing the material. If you can use a mask in photoshop you should be able to do this easily. I included black,blue,yellow red materials already.

Some parts may look like they are missing faces/bad normals. This is intentional , some parts are built one sided to save you polygons and backface culling , these parts are intended to be mated with another part. IE:  Pipes are all hollow, flanges only have one side, bolts are missing faces where the flange normally will be.

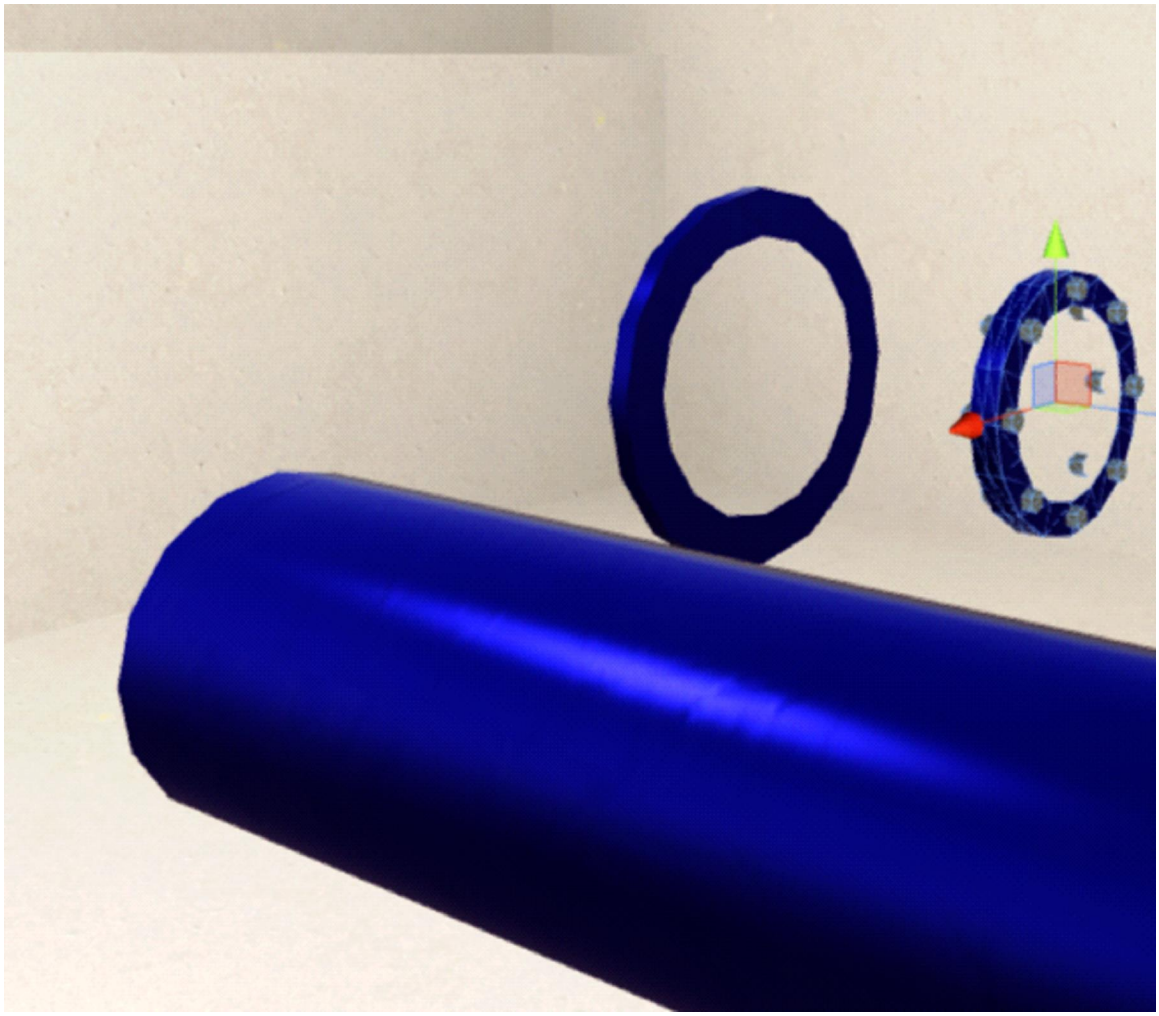


The pump is composed of several meshes, it can be a dual or single configuration , you can even leave off the base,control panel tank etc and just put it on the floor.  I made a few premade configurations i think people might use.

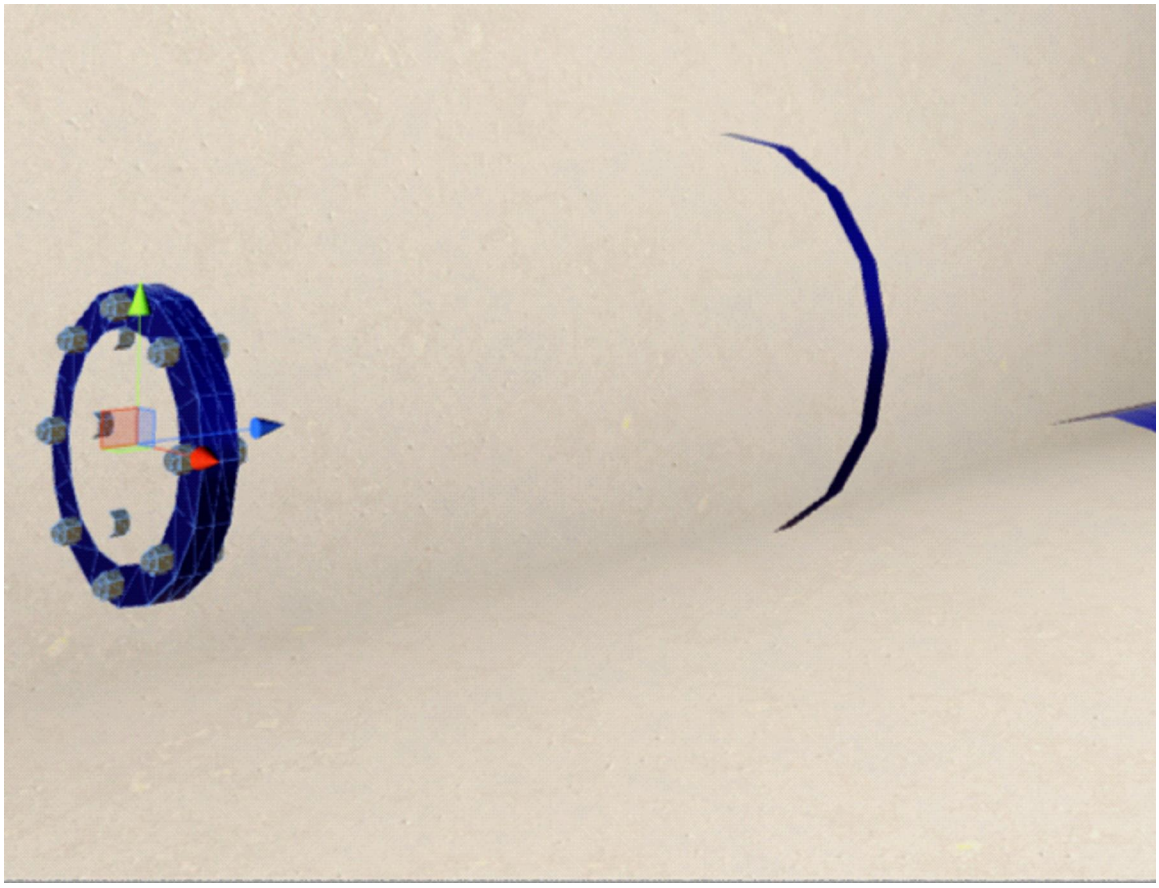
# Assembly Basics:

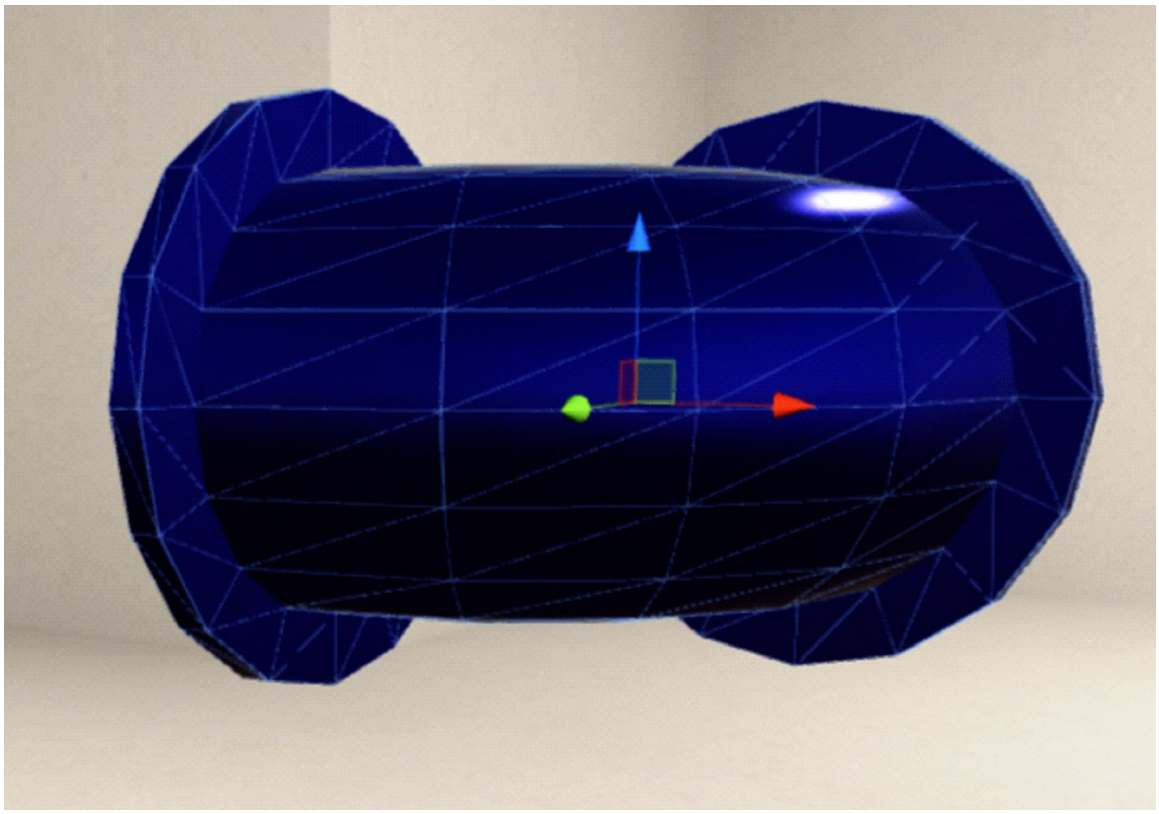
The pipes and pipe parts are built with 16 sides.  There is always a vertice @ 12, 3, 6, 9 oclock positions if the part is not rotated out of a 0, 90,180, 270 degree position.  You can use any of the sides for algnment , I generally found an overhead view or side view to be best and used the vertice @ 12oclock position. .

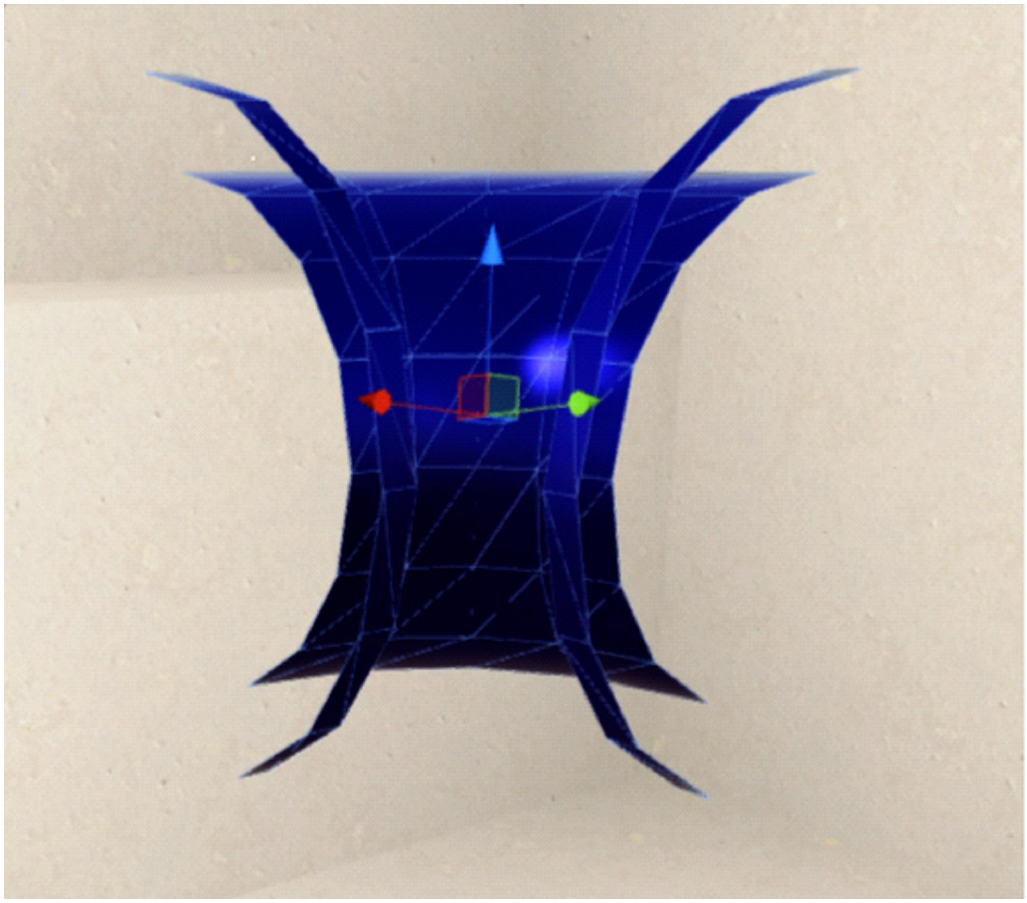
Basic parts are the pipe and a flange. Here is a pipe , half flange and a fully assembled premade flange , on the pipe you can use a full flange for a joint, elbows already have half a flange.



Here you can see the effect of the non exisitant faces.

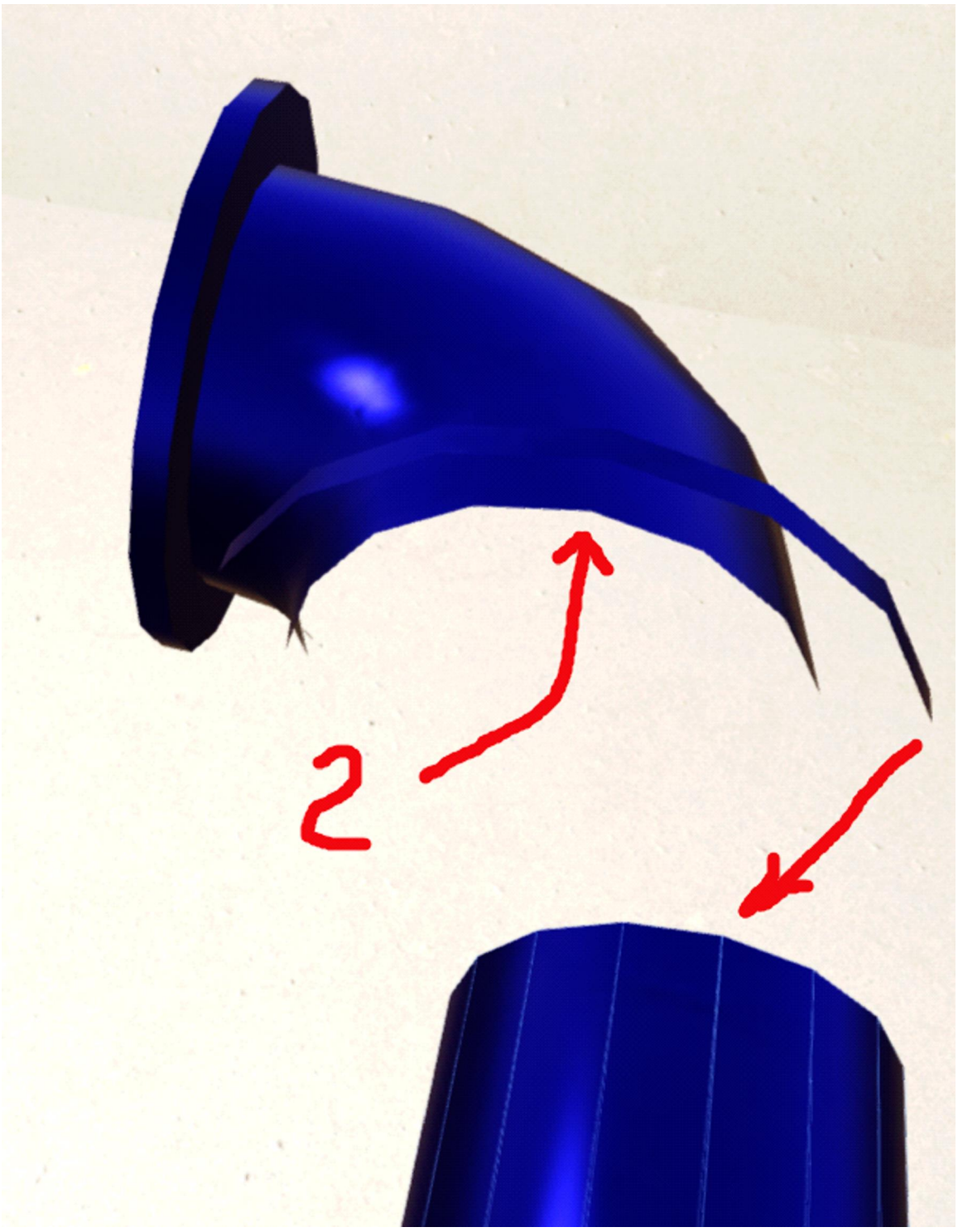






So what needs to be done is to align the pipe to  the elbow , works the other way too.

1. In Move mode press the "V" key and select the top most pipe vertice on the end of the pipe. Once you have it selected, keep holding "V" and drag it to the corresponding point on the elbow . For an elbow this will be an inside ring of vertices where the flange is.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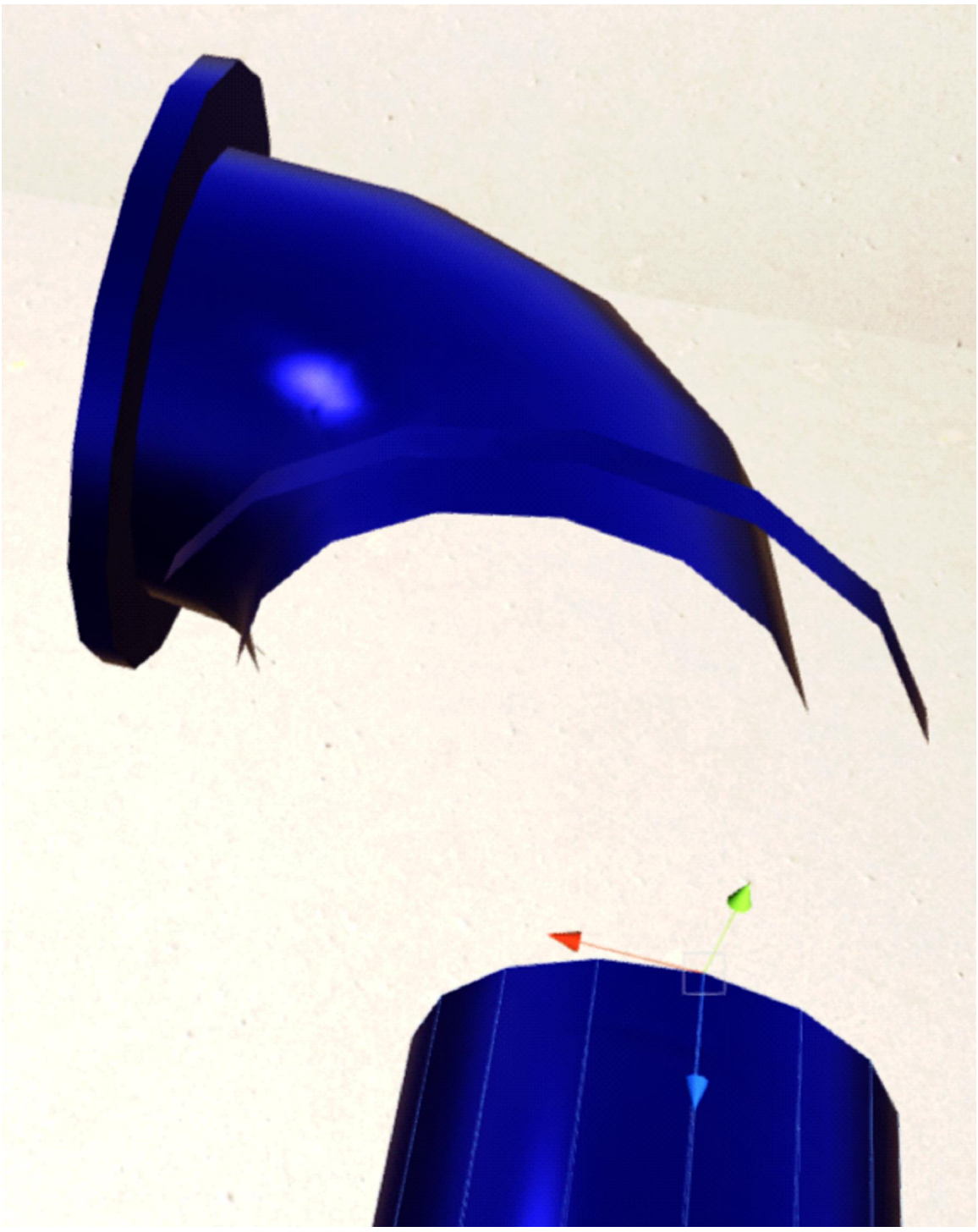
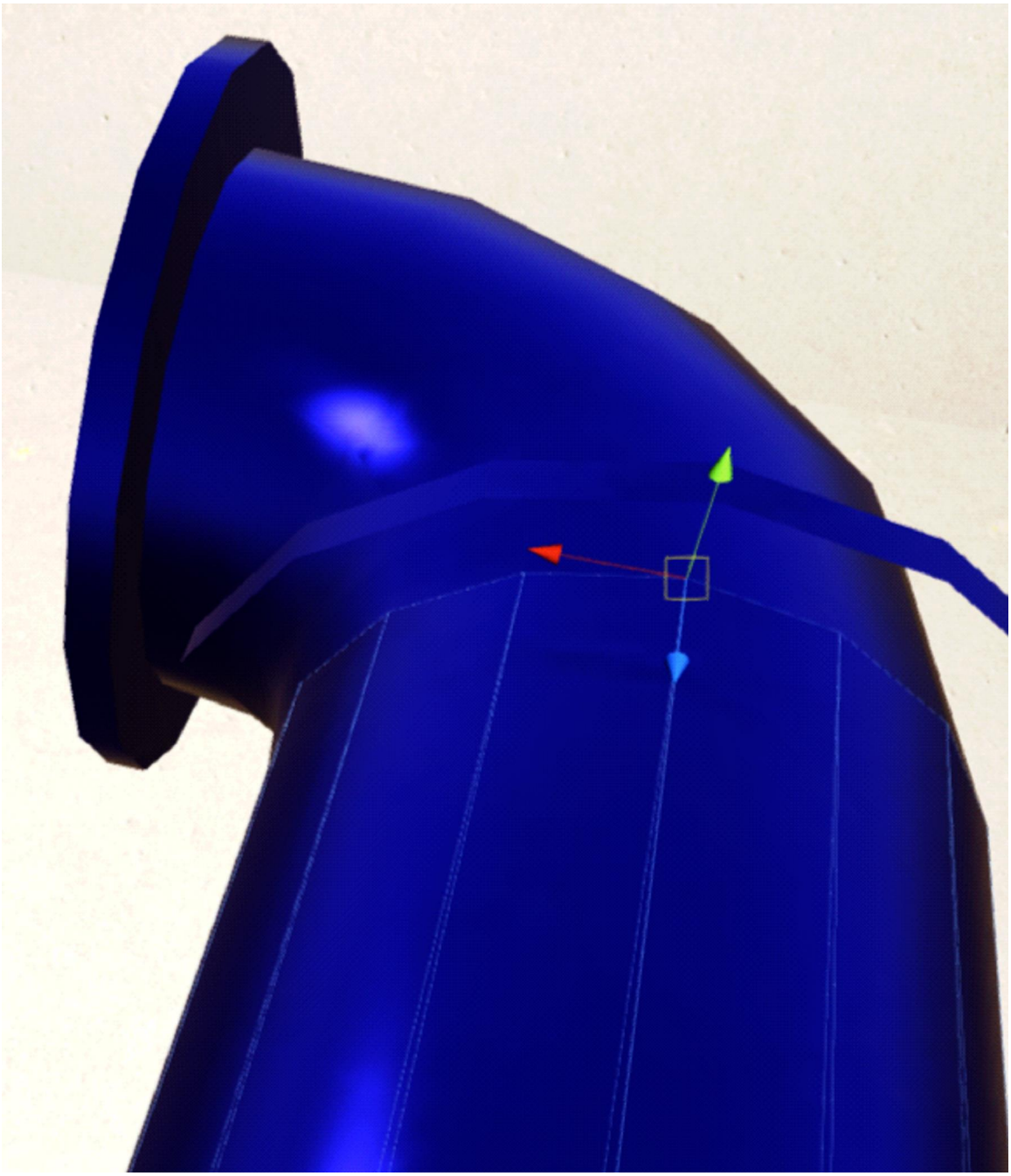
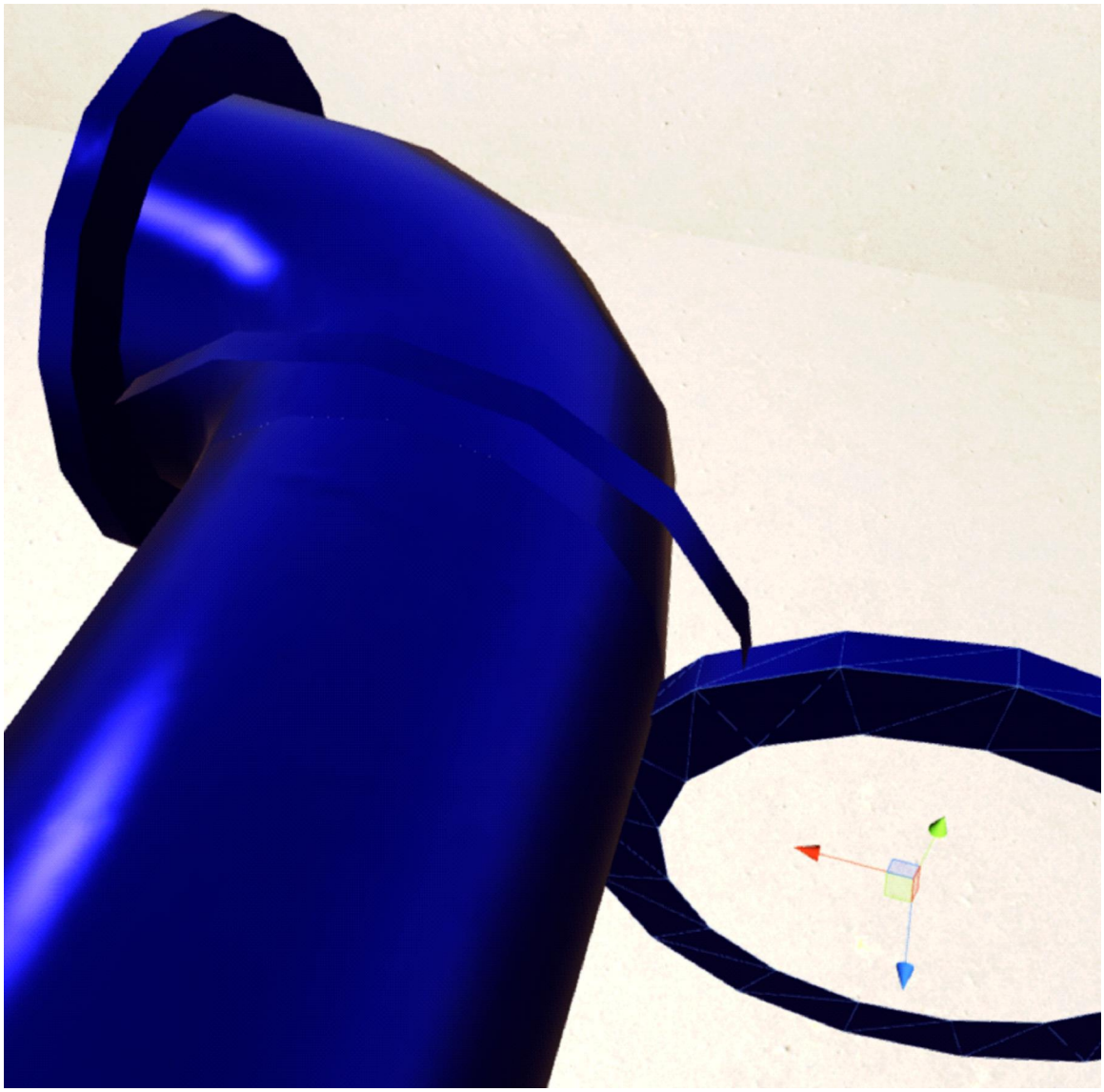
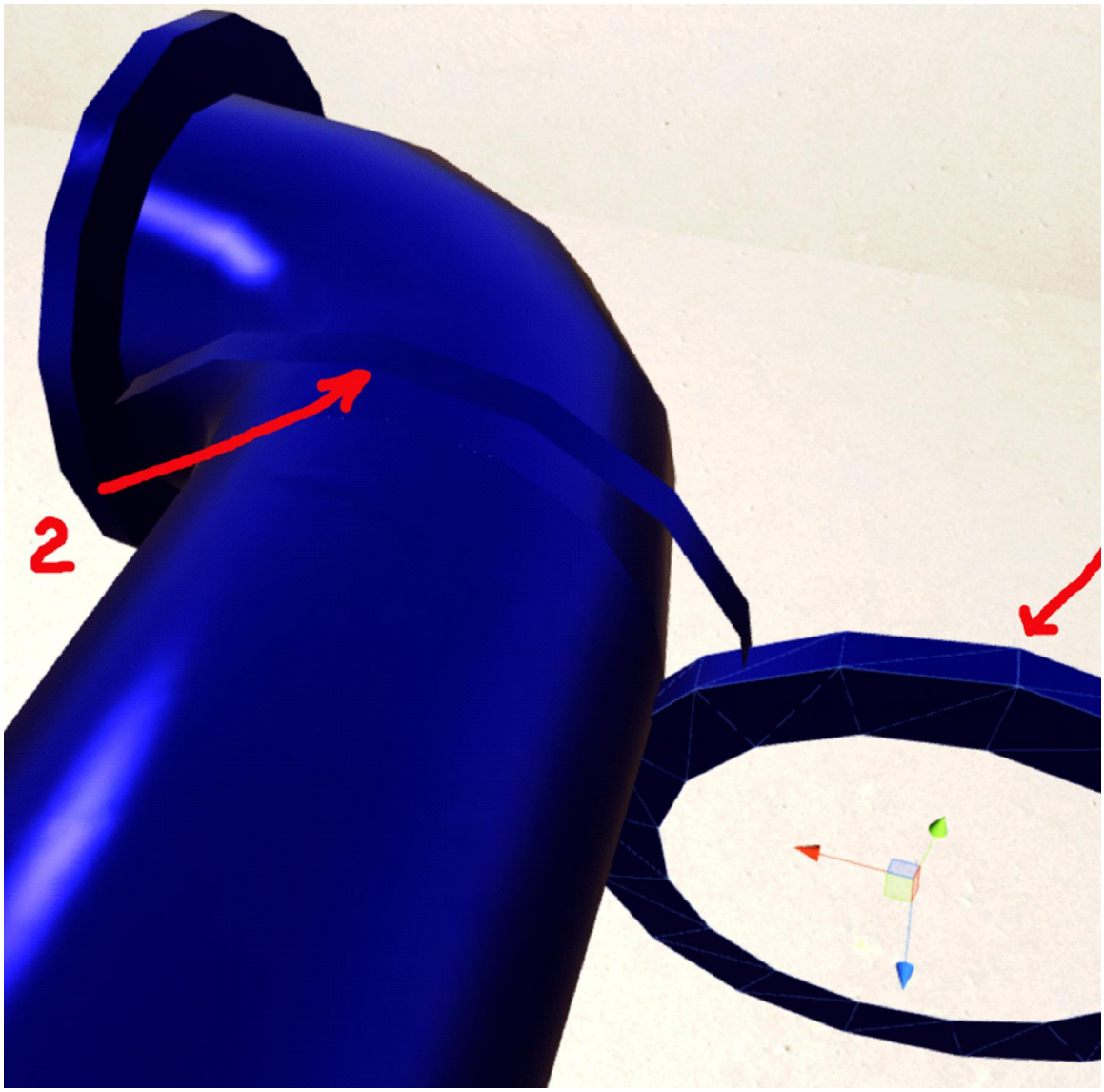




Now the flange needs to be completed , Grab a half flange and rotate it to face the correct direction.

It will be added very similar but this time you choose an outer vertice.

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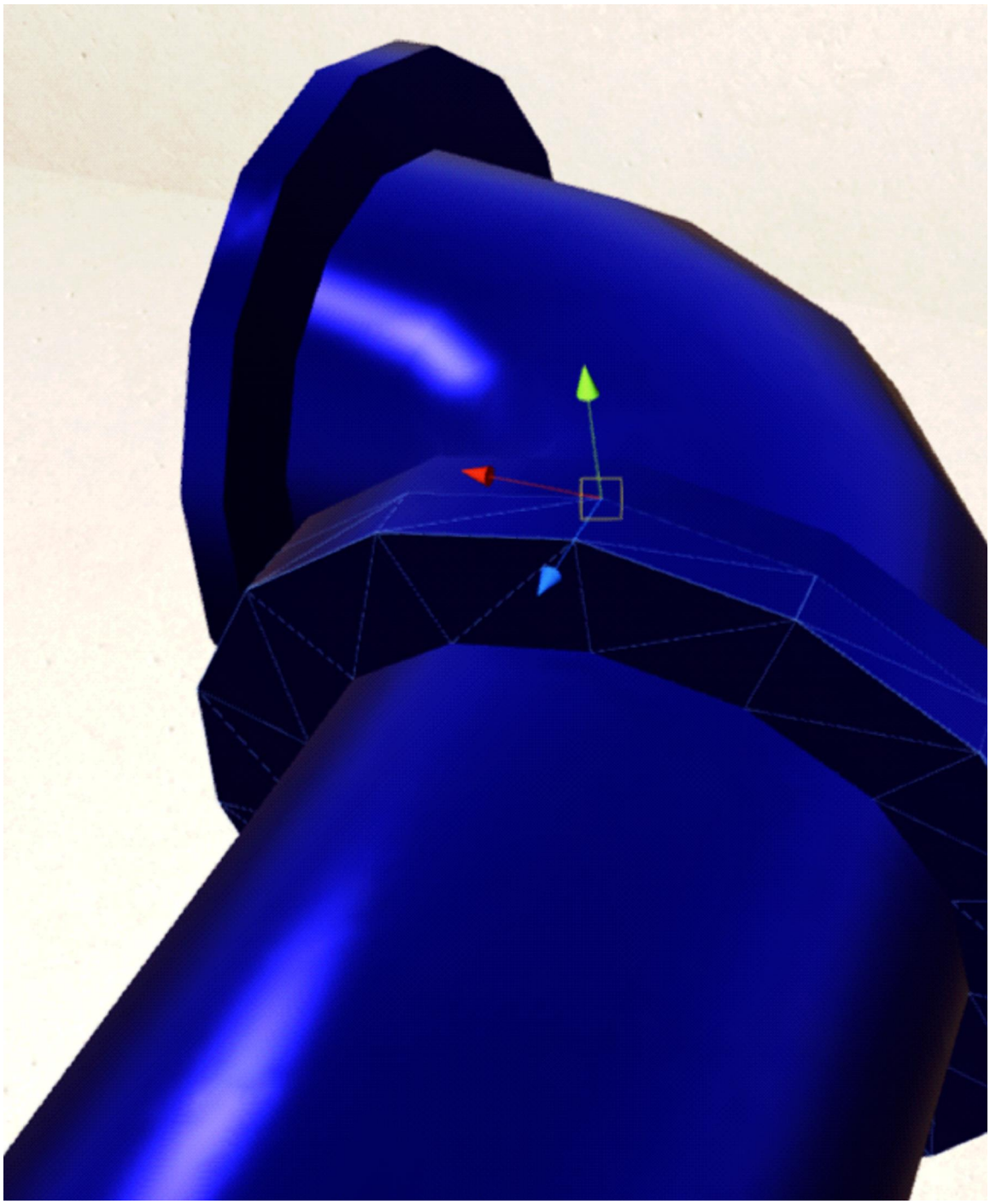


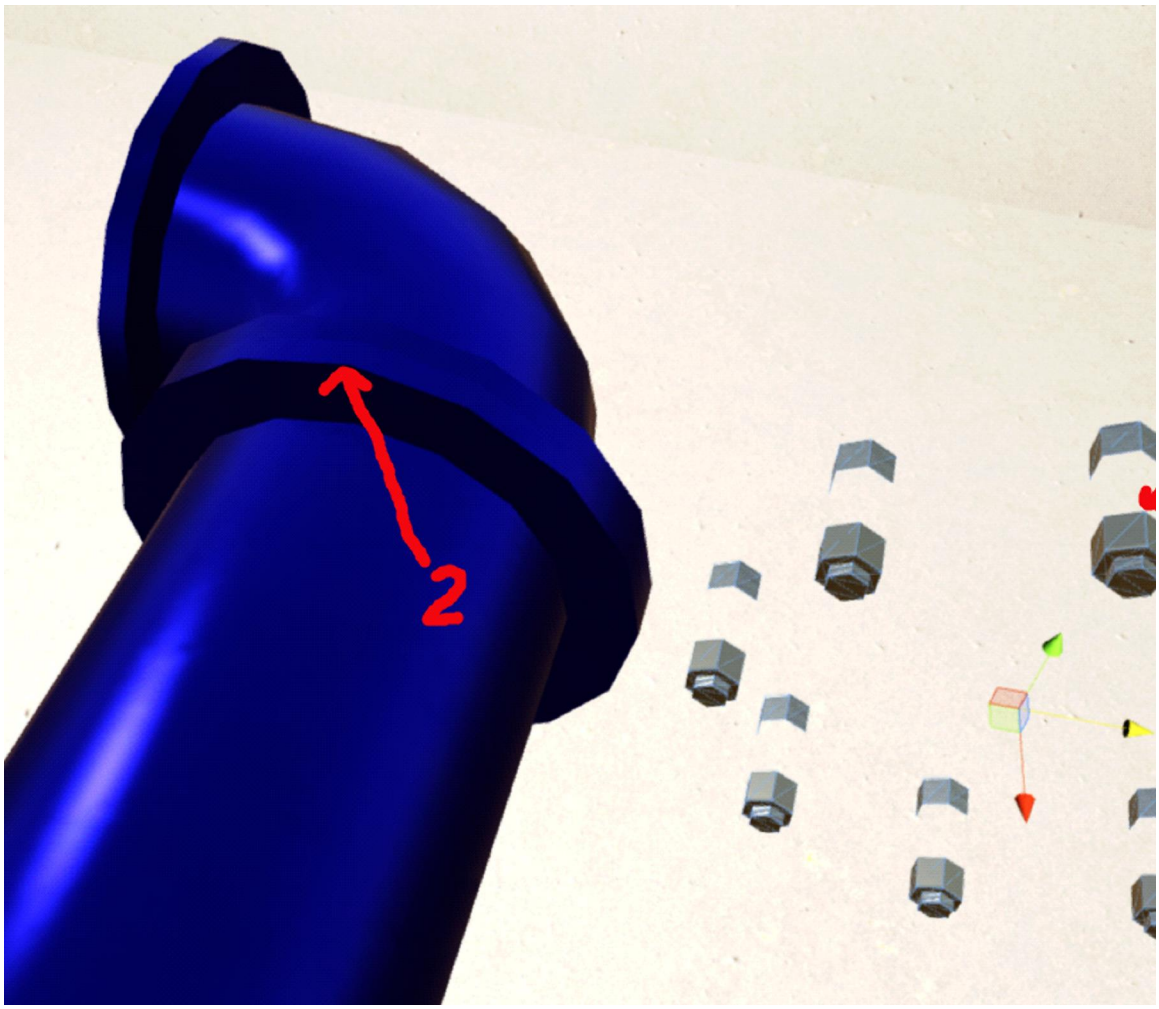
The flange is now complete , if you view it you should not see any gaps or overlapping points.

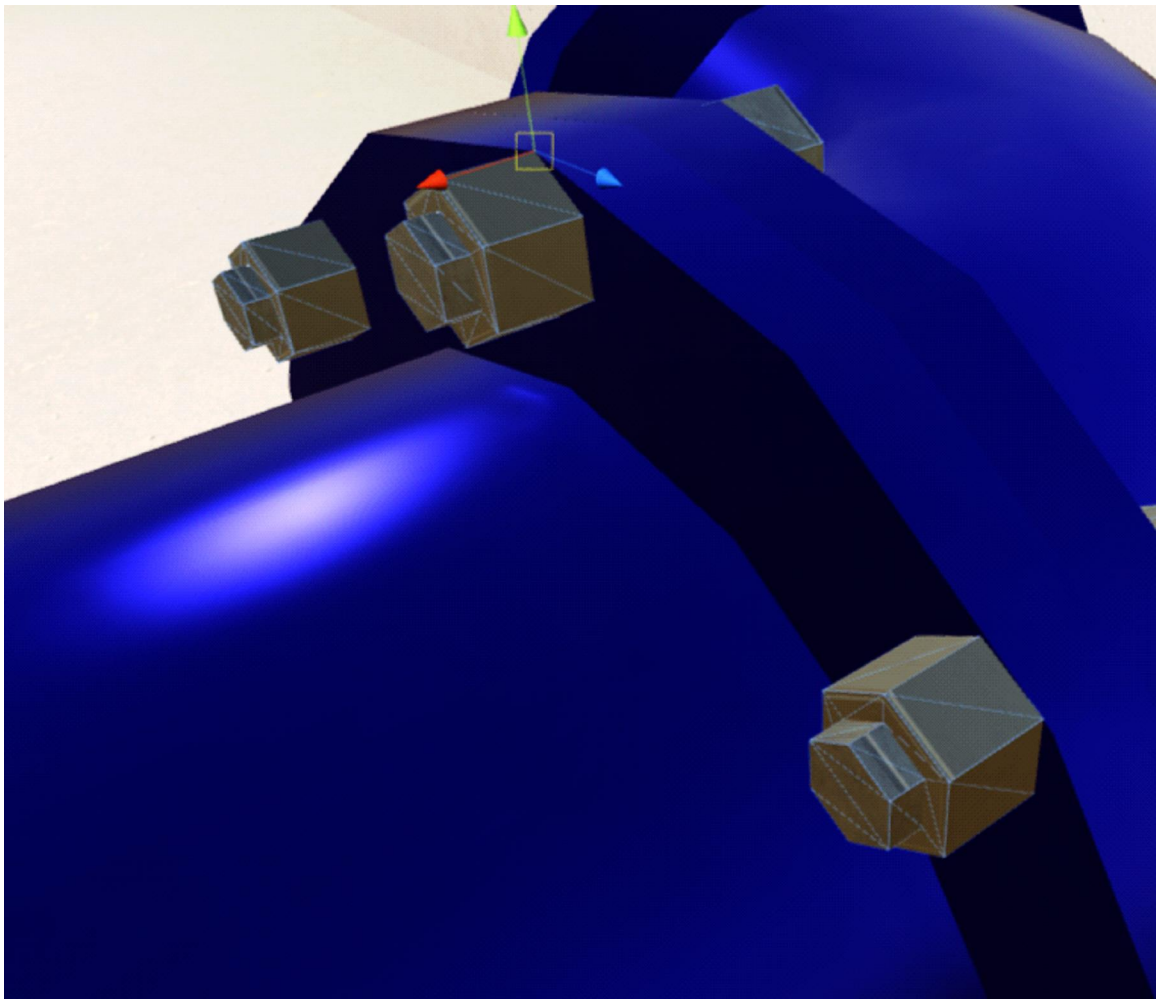
You can choose to add bolts to the flange or not. The bolts sets are about 360 poly each set so if you have a lot of joints you might choose to leave them off.

So grab a bolt set (rusty or non rusty)  and drag it some what near. Point it in the correct direction , doesnt matter if its the heads or nuts facing you. Its your choice.

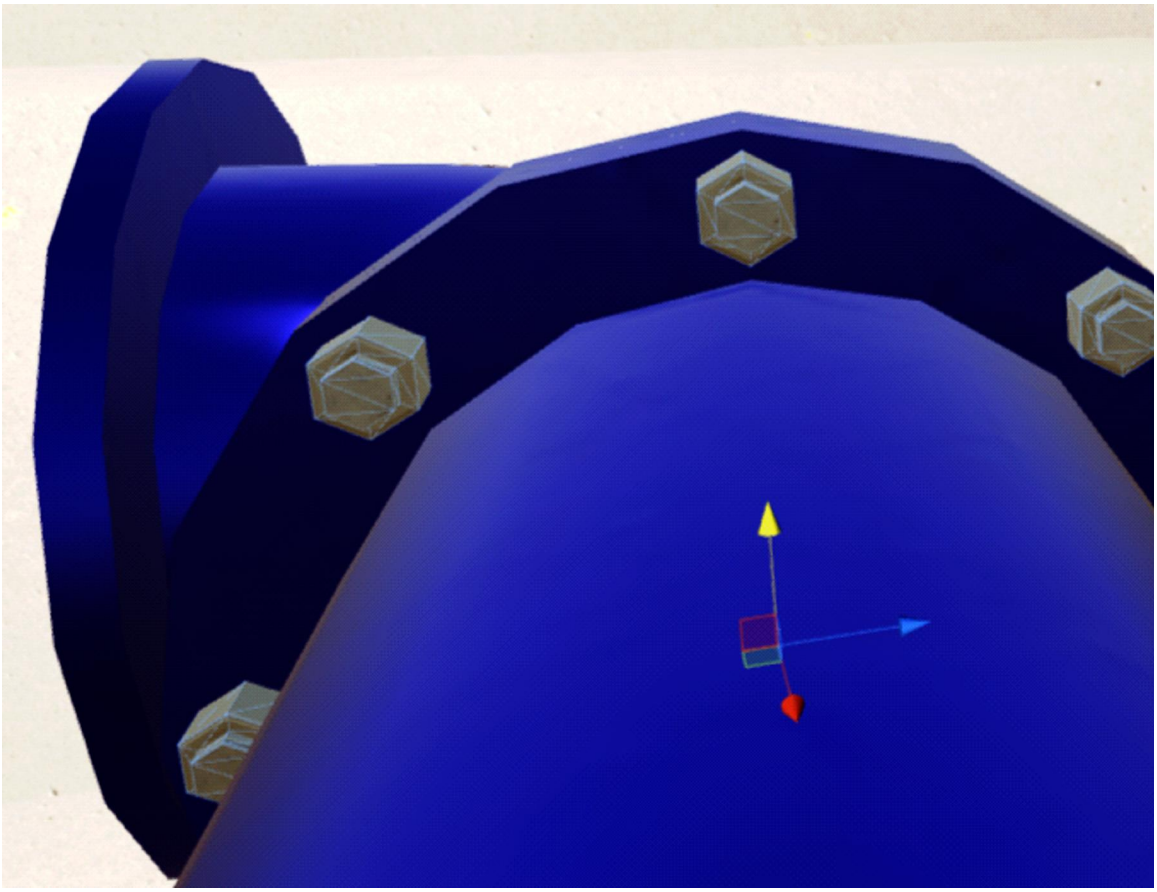
Choose the top most inside vertice of the side that will face you. It is easier to use a top vertice in this case.

Using the "V" key drag it to the top most outer vertice of the flange.

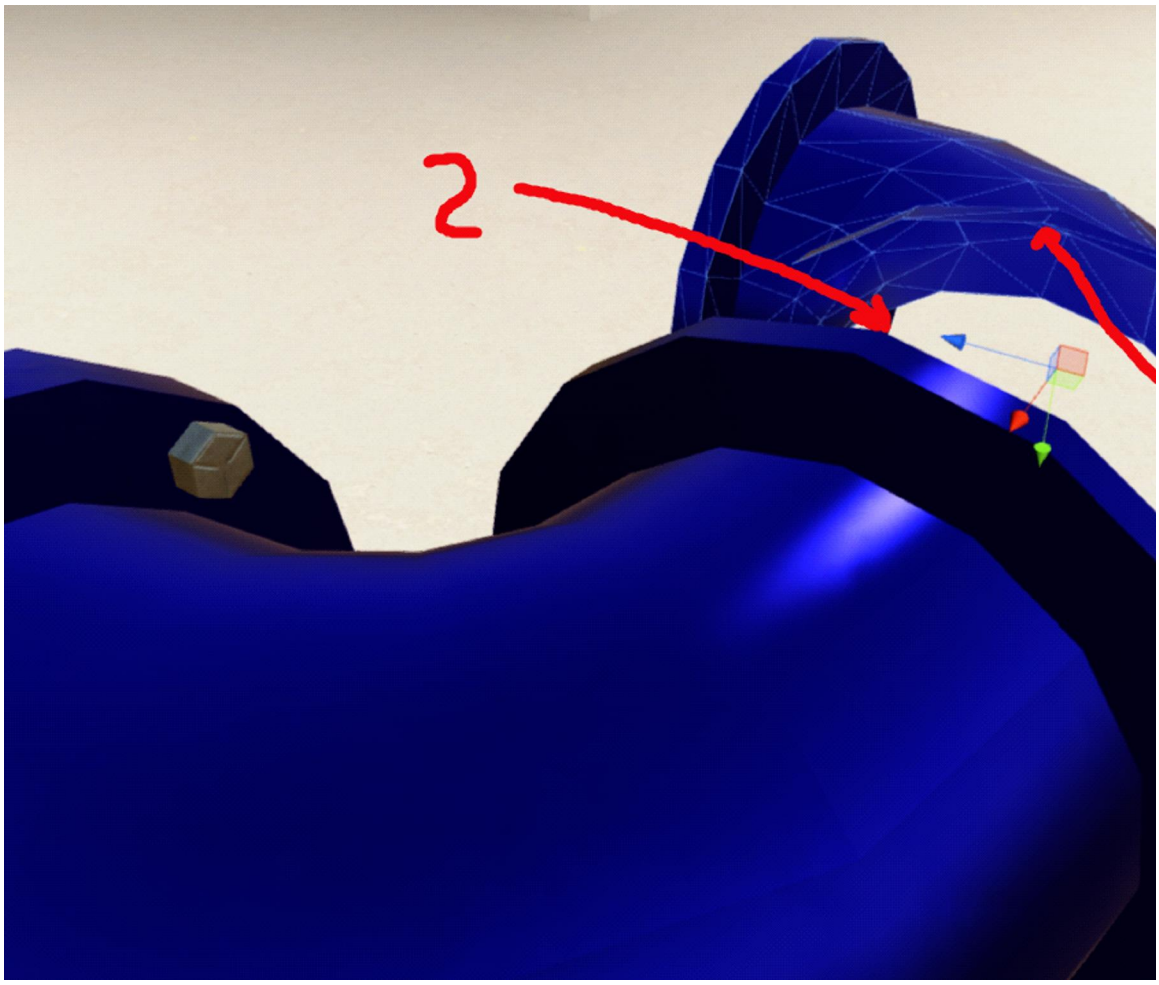




Now move it down in the "Y" axis just a bit so it is centered on the flange. You can move it in towards the flange a bit if you want the bolt heads to be bigger and nuts smaller.



Joining two elbows together is the same as joining a flange. Here i duplicated, rotated the elbow we have, joined them and then duplicated, rotated a set of bolts. The duplicated bolts are at the correct height , but it is faster to V align them and move down a bit  rather than try to position them by hand.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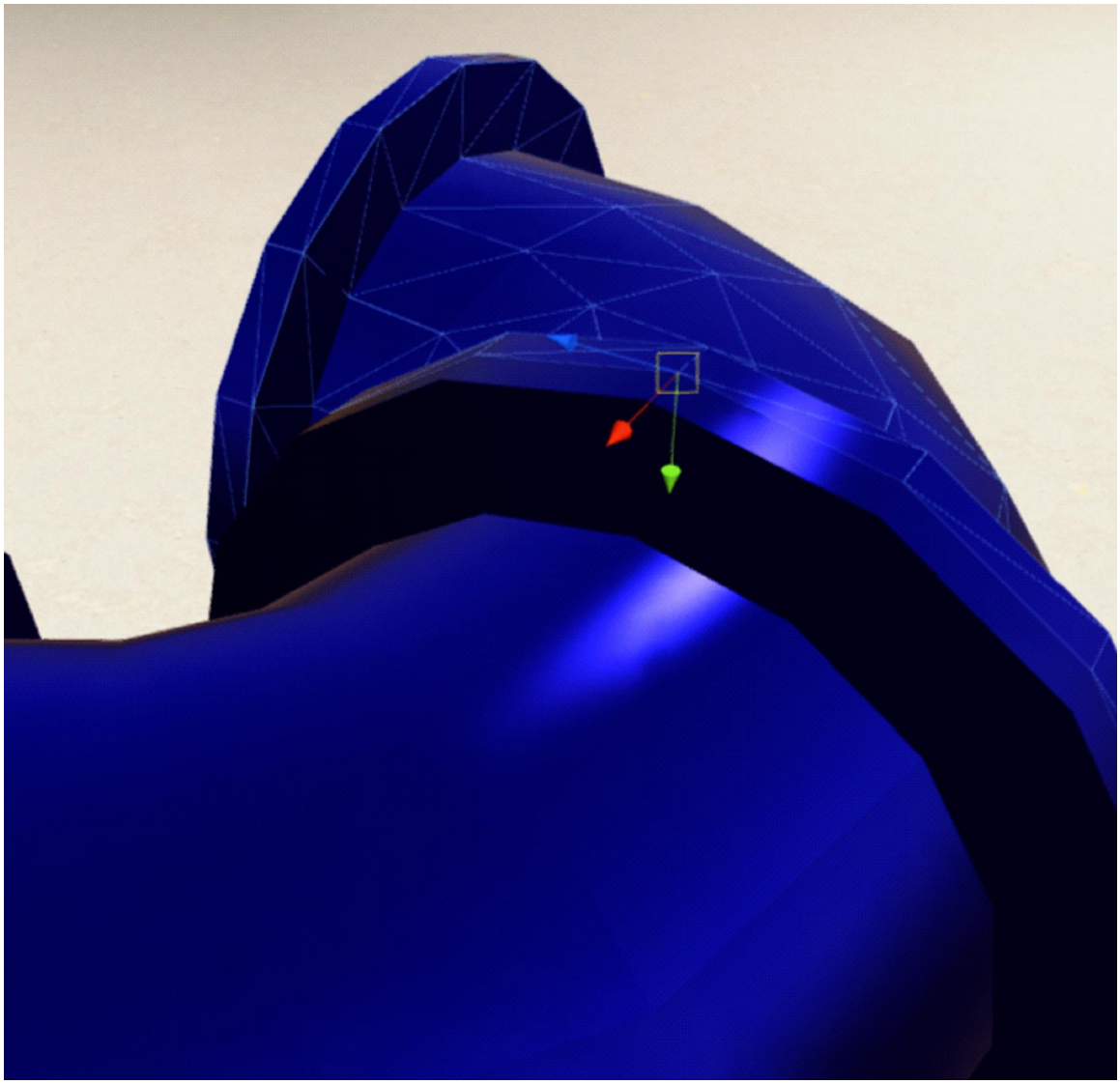

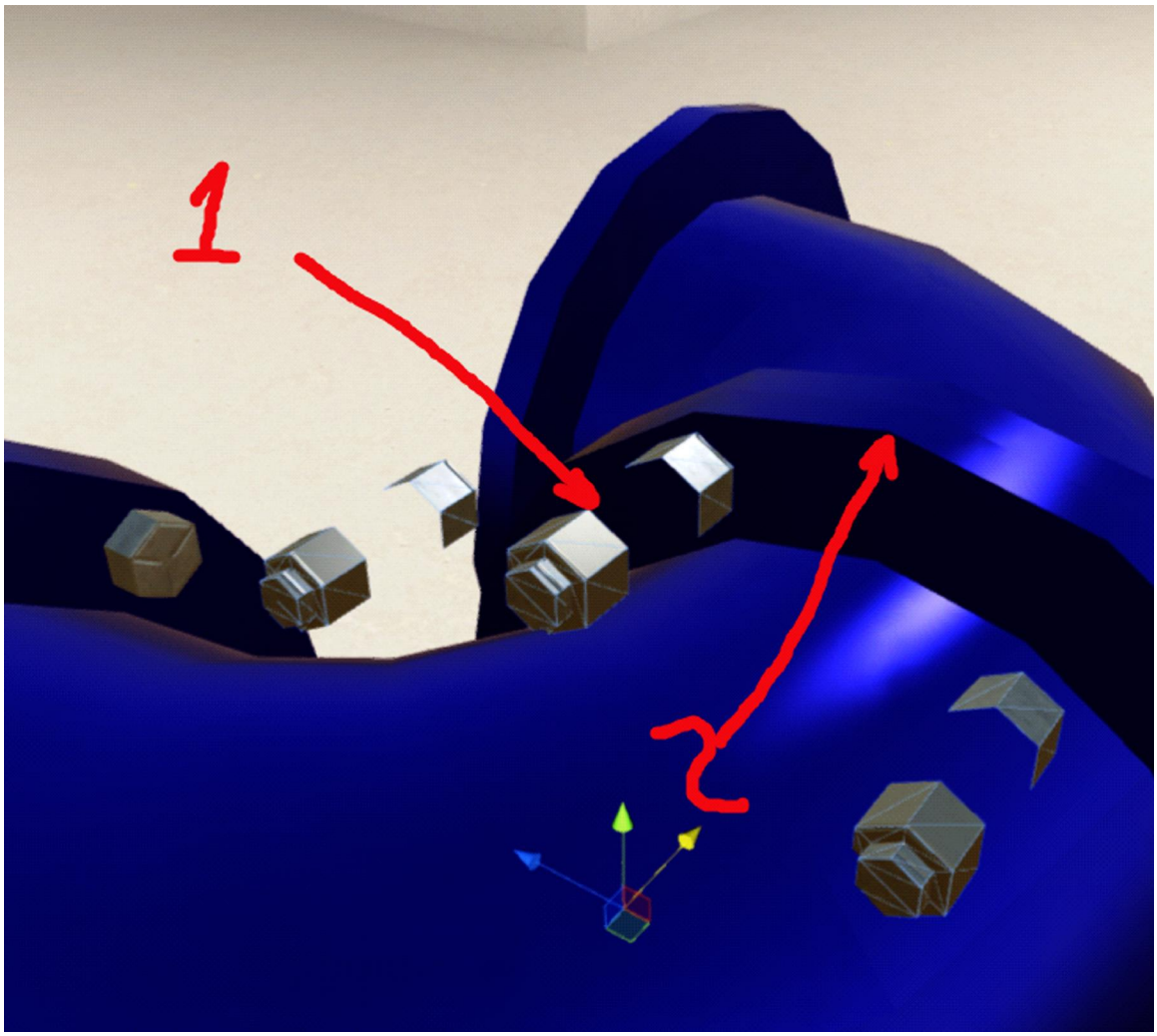
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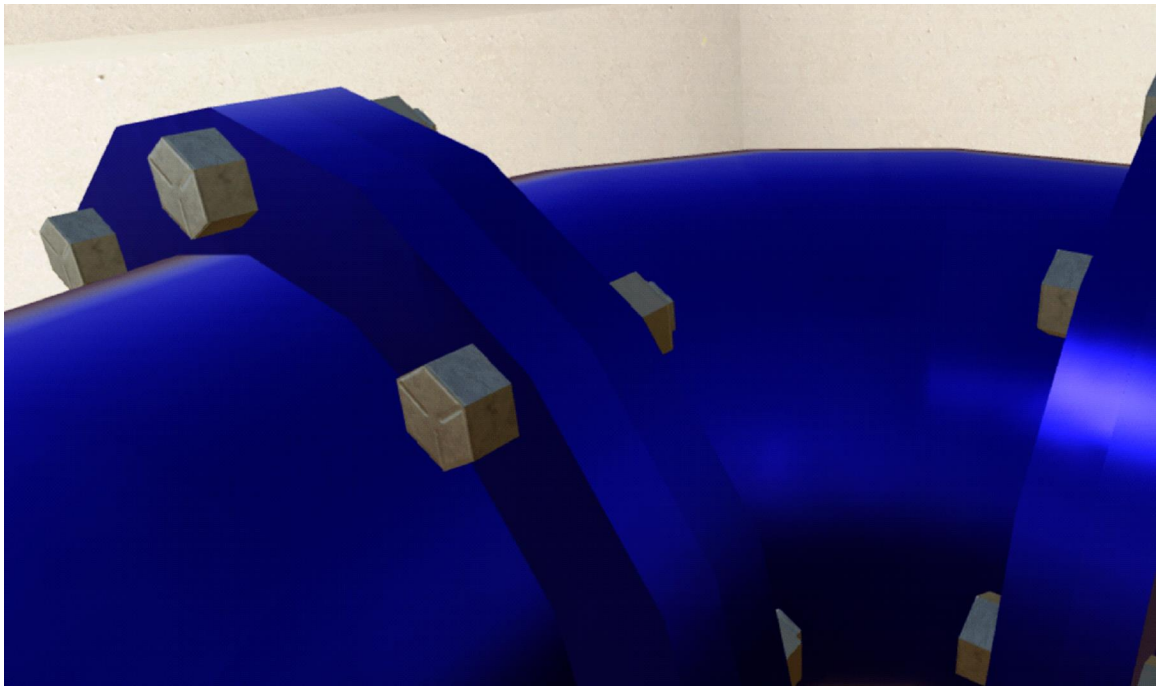
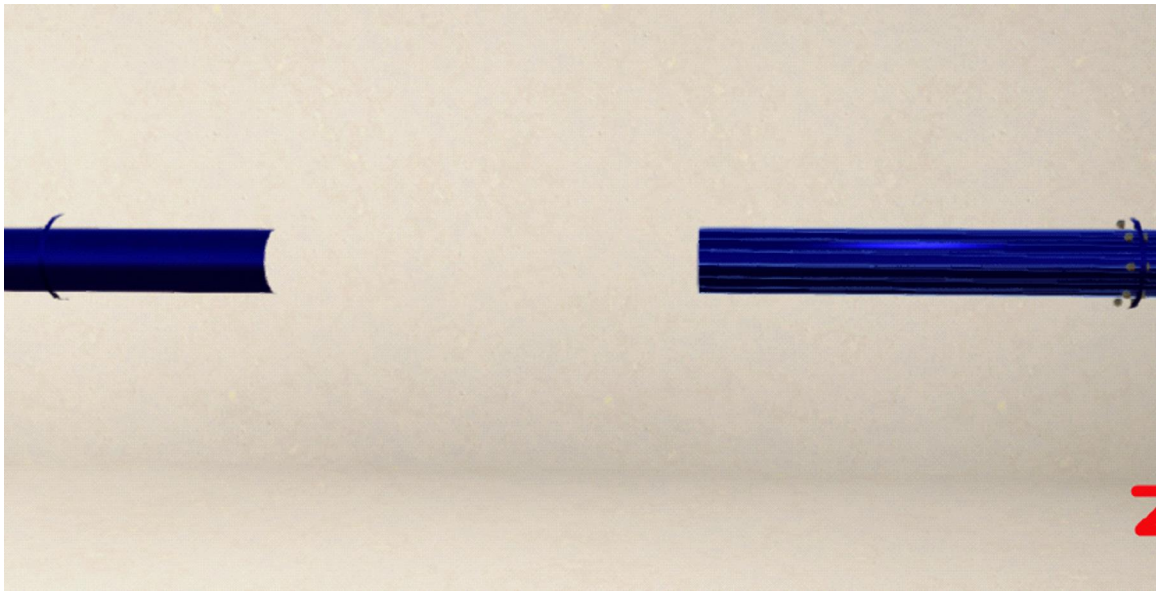


Joining pipes this varies somewhat depending on what you are trying to accomplish. I found i didnt really need to do this , you are more likely to be joining pipes to an elbow or something else , or trying to span bewteen two pipes.

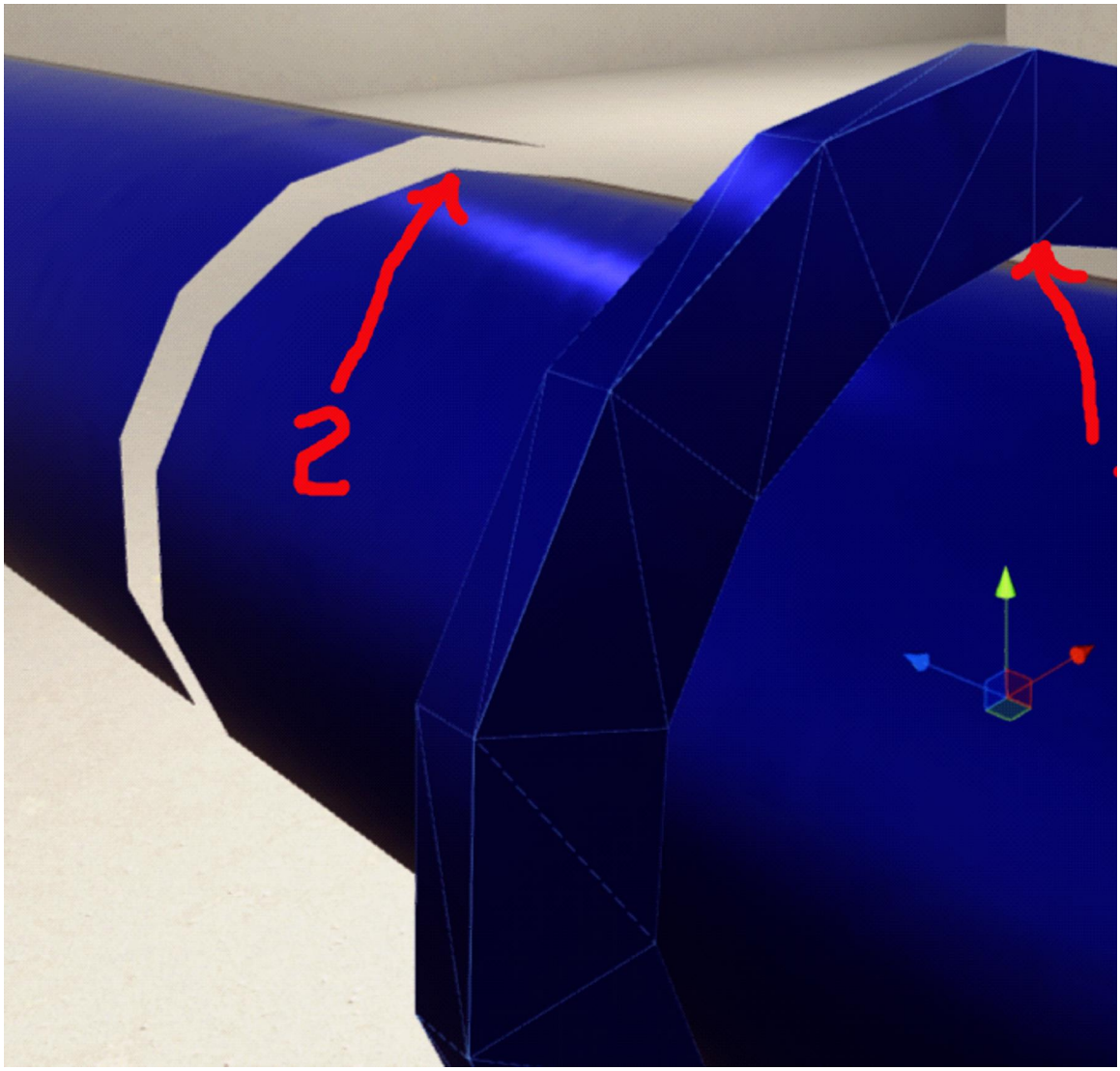
I found it was easier to start at one end of the piping system and work towards where you want it to go , rather than doing some at both the start and end point and trying to meet in the middle.

First i will show how to join a pipe to a pipe , then a few tricks on aligning .

I have the pipe we have been working with and ill add a prefab to it .

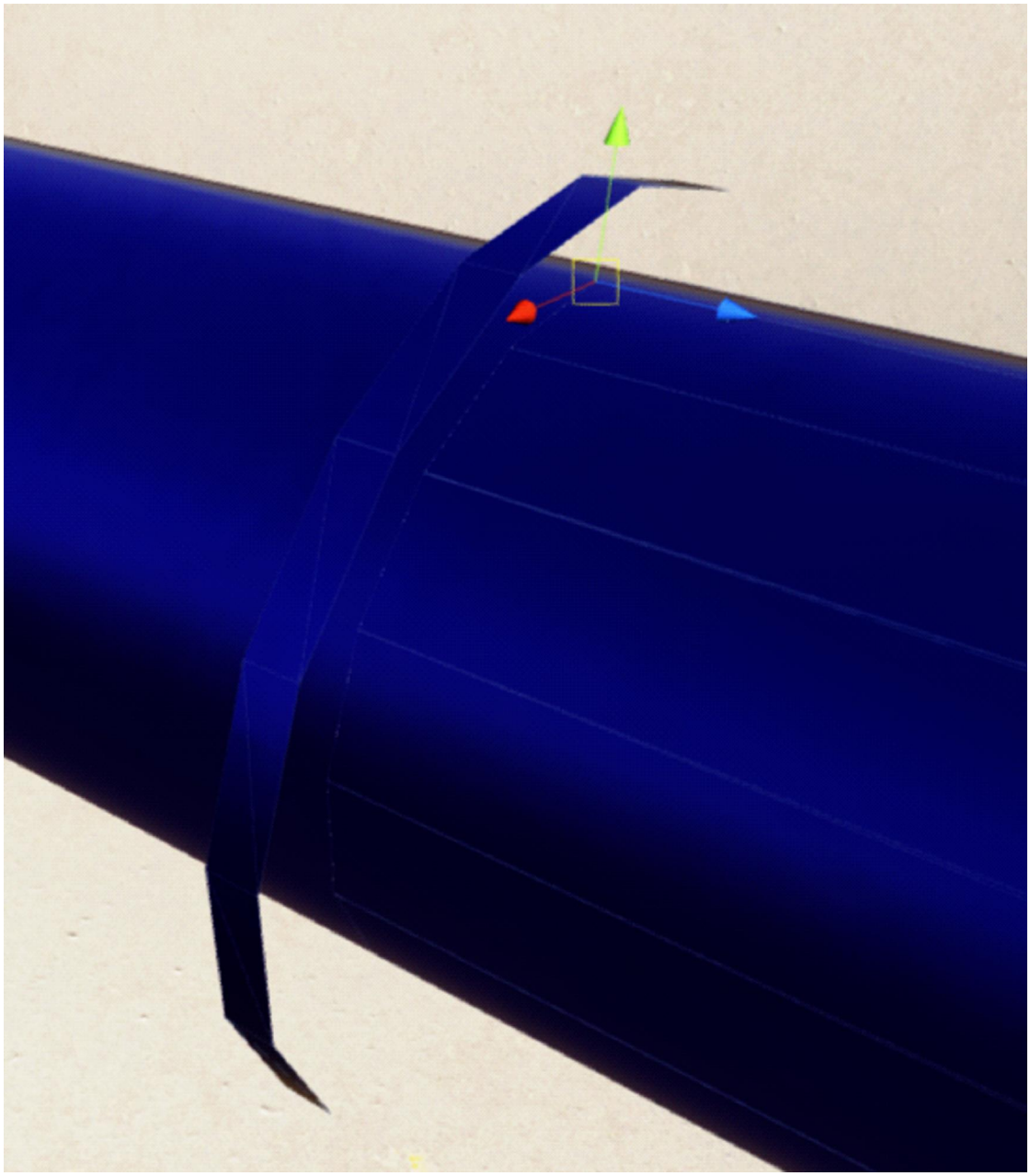


Try to position the prefab in the middle of where you want to span , then using the scale mode adjust the "Z" axis so the pipes are close together. When you scale it the pipe will grow or shrink in both directions.  When it is close join the pipes. Using the #2 vertice below.

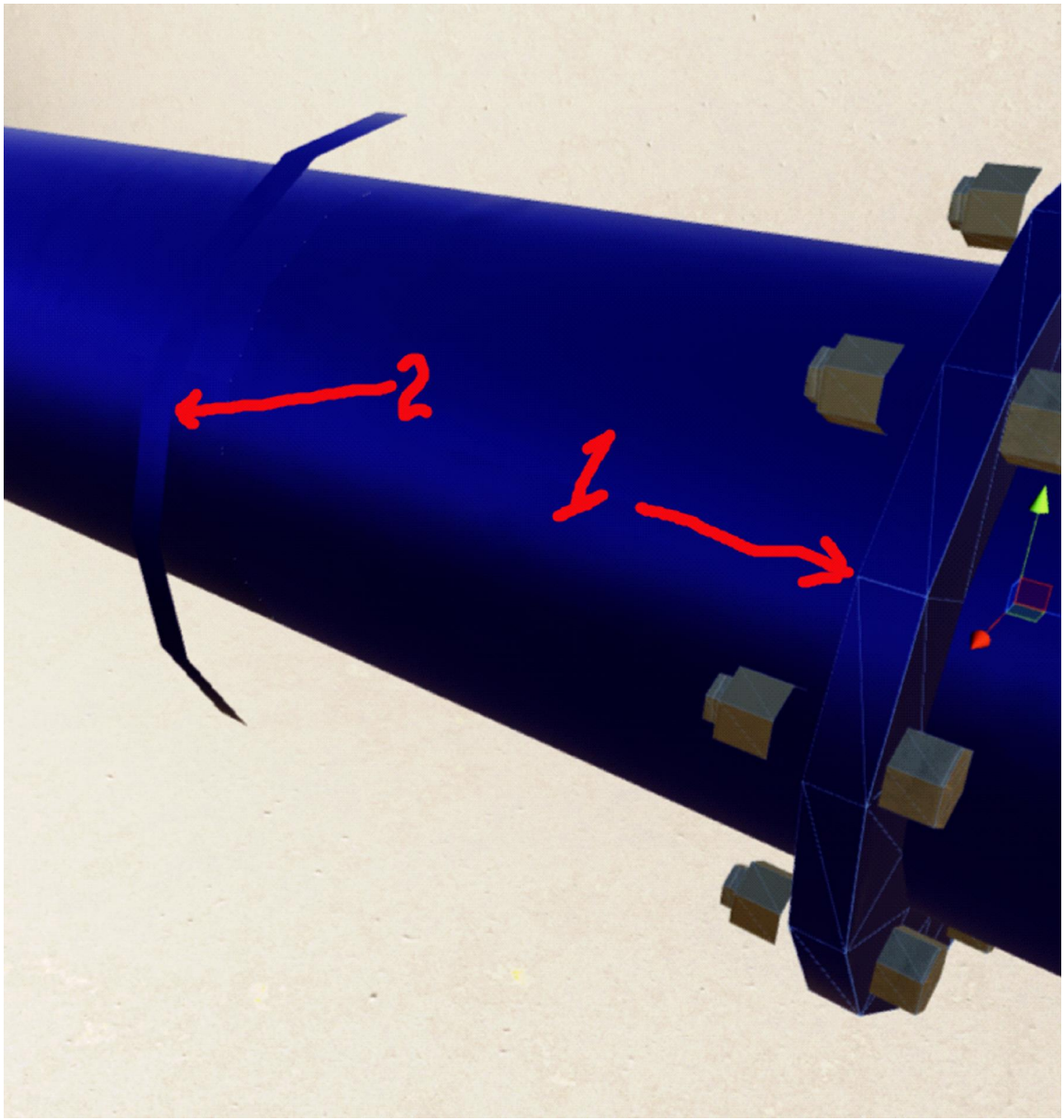



Now you dont need to put a flange here , but i stuck them on some prefabs , and this one has one. Duplicate the flange on the prefab that is facing away from you and slide it along the pipe.

We want to attach it to the pipe we are not trying to size.



Select the bolts and the flange on the prefab that will be mated to that first flange and align those.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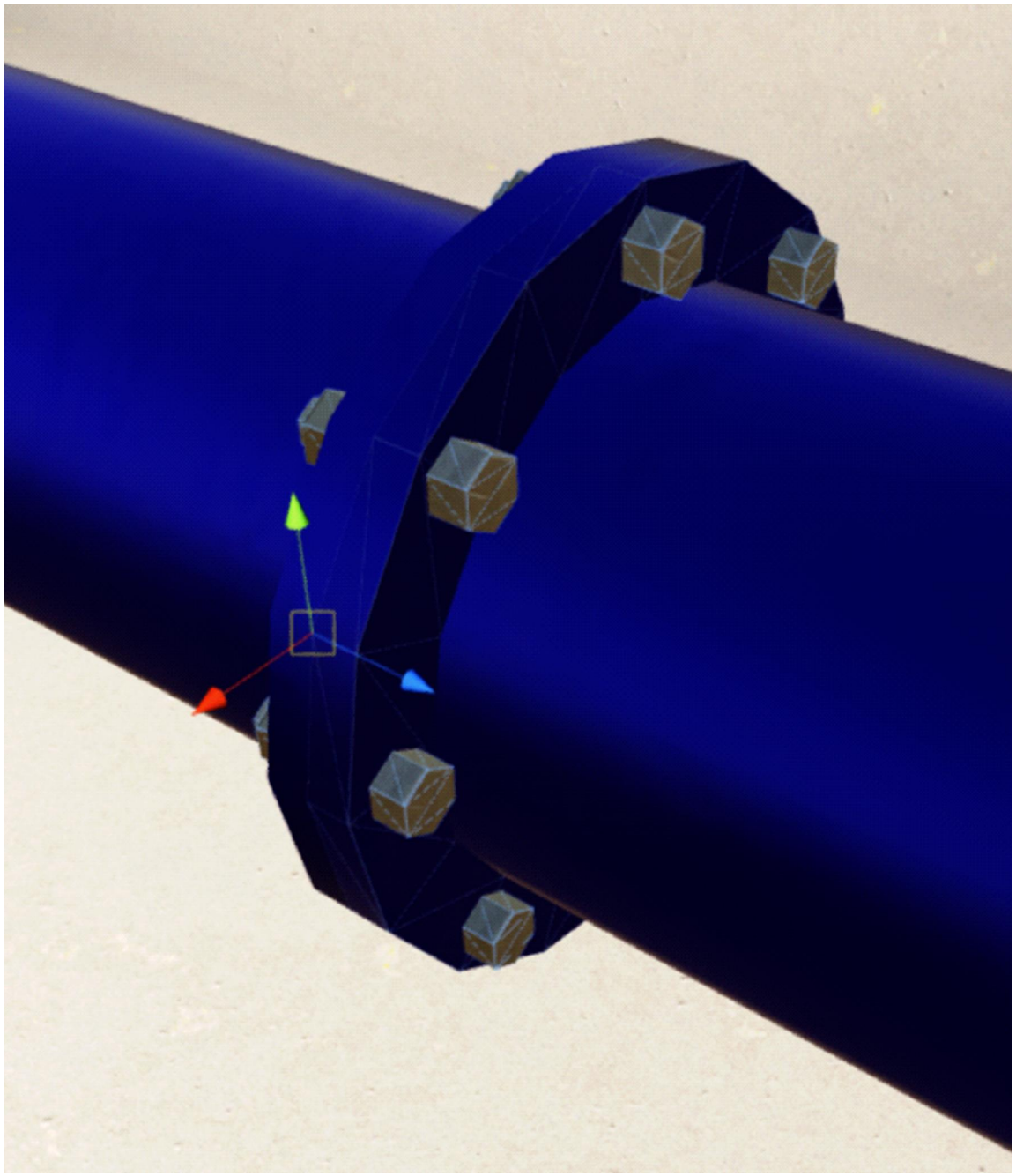
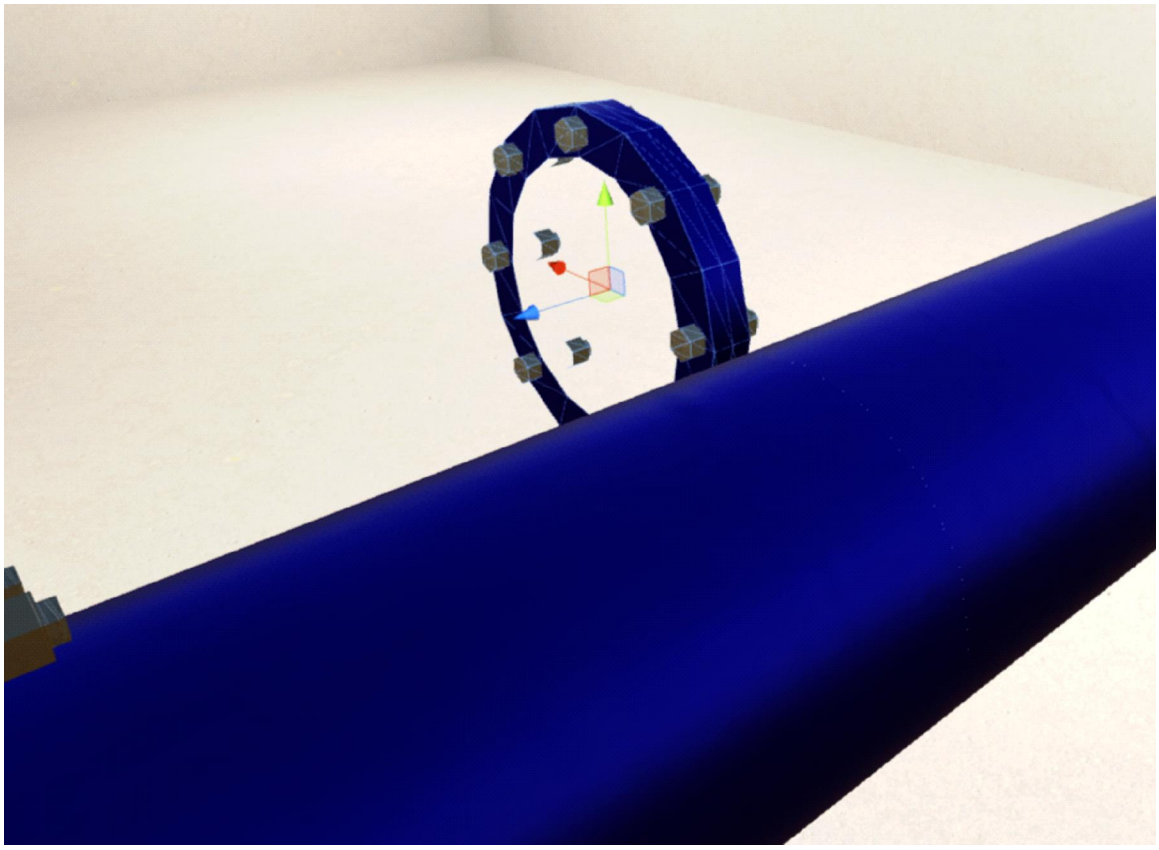


Now you have a flange on it , you have a bit of wiggle room where your pipe can be a bit shorter and not show a gap if it was not 100% centered or the correct length.

I was working in a fairly small room , but i found it easier to just scale the pipes to go from one point to another , and putting on a full flange where i wanted them.  Or you can leave off the flanges if the pipes are joined, the joint is virtually invisible.

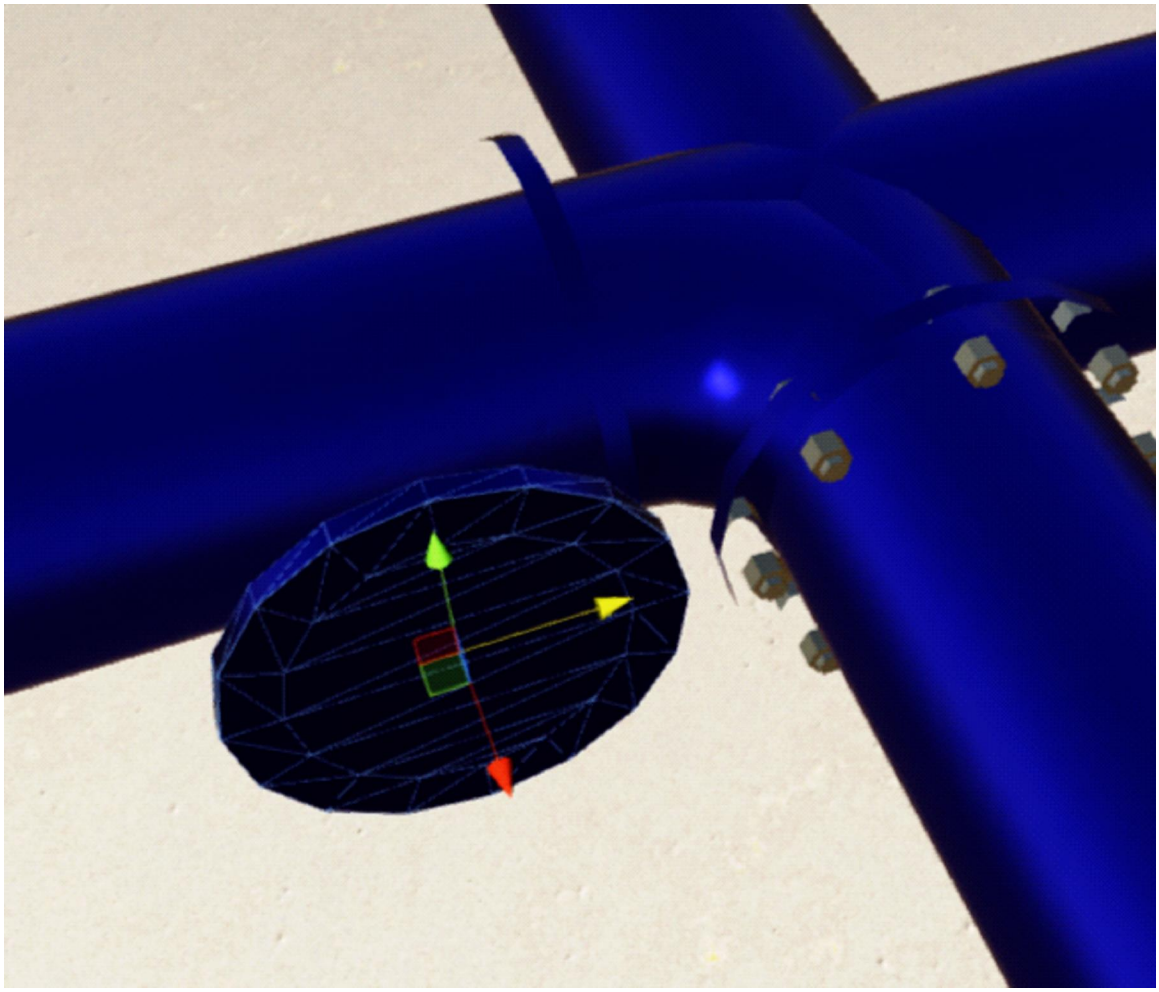


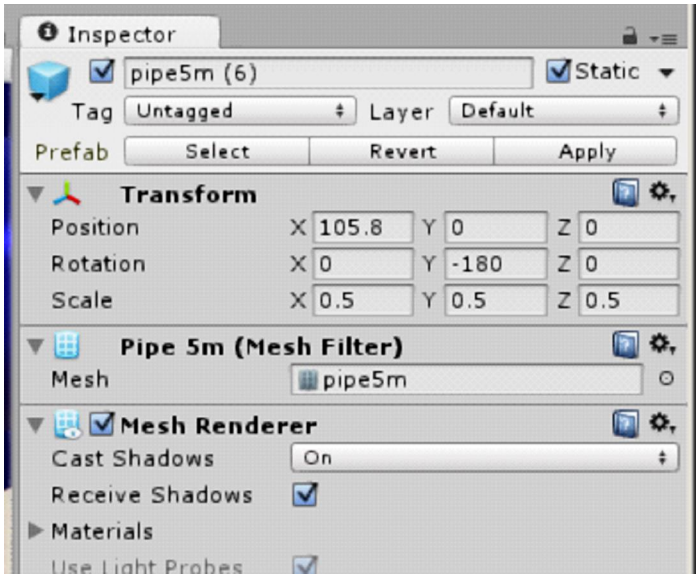
There is a joint there can you see it :-)

Want to join something at 90 degrees but not sure where to put the elbow ?

Attach an elbow to your pipe then attach another pipe to the elbow. Extend the pipes and slide the elbow and second pipe along the first one till it is where you want it. Then shorten the pipes to proper length. You can use them sort of like rulers.

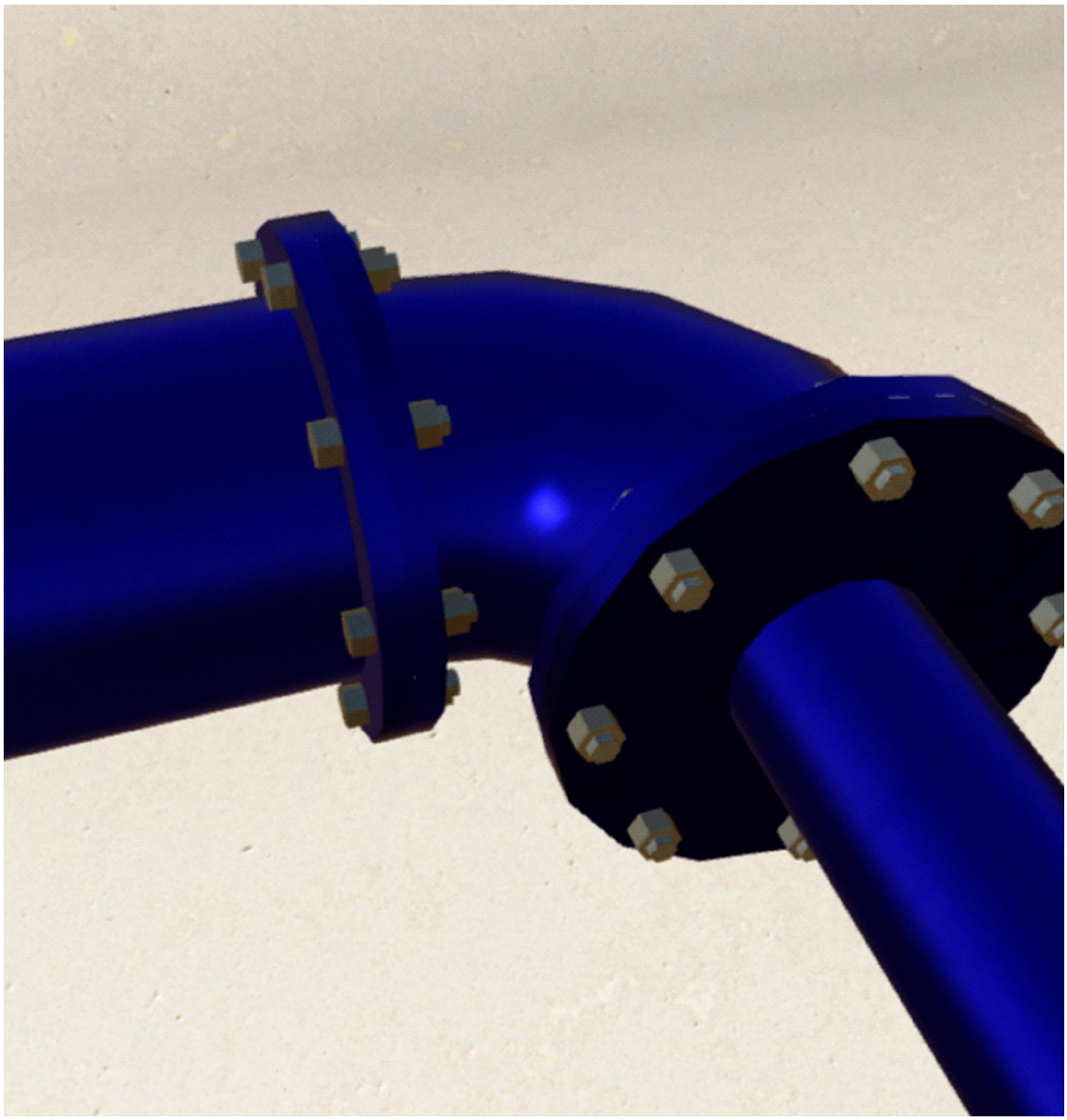
Suppose you want a smaller pipe here .  I added blank covers you can use for this. Delete one side of the flange and bring up a blank cover plate ,attach it the same way as a flange.






Select the pipe and adjust the scale in all three axis from 1 to 0.5 . The pipe is now half size.

Finishing it off by setting the pipe lengths and adding bolts and flange parts you get this.



You should have an idea now how things were meant to go together. I wish i could have made it simpler  and still allow all the flexibility without a modeler program . I am open to ideas to improve things.

I will just mention a few other tidbits .

Decals , i made some decals you can use to add wording to the pipes. They are slightly larger than a standard pipe. which means you just align it to the end of a pipe like adding a flange. Then slide it along to where you want it.

If you need to rotate something around the pipe , remember to do it in 22.5 deg increments so the pipe sides line up. You may want to do this for a piece of texture to show, or rotate a decal at some angle.