

# PDMS simplified pipe guide v.3

- ...0\_0
- simplified.. ☹️

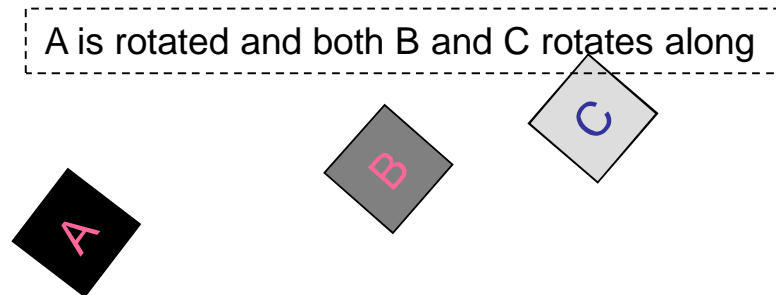
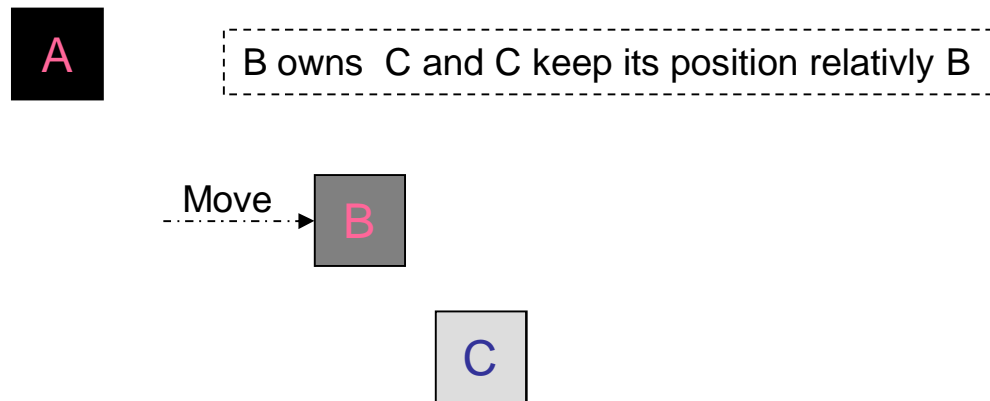
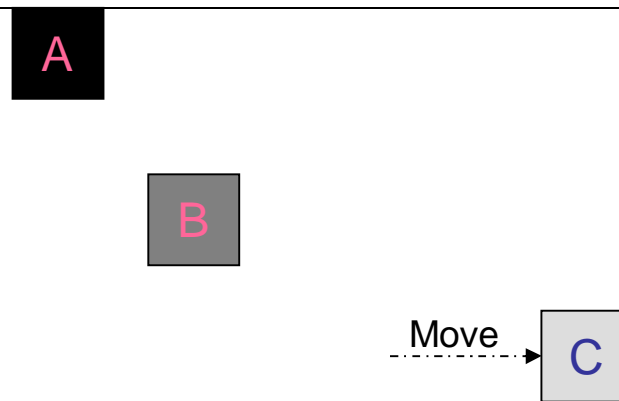
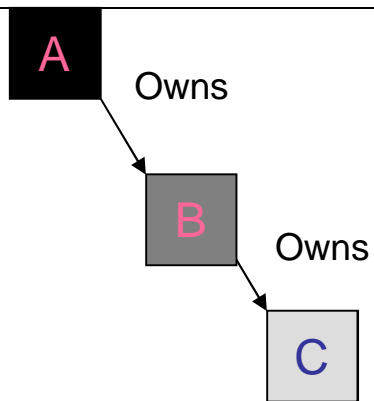
## **Repetition**

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- You should read the equipment guide also..

- Each elements position and orientation depends **on the hierarchical structure**
- An element's position and orientation is relative to its owner

## Repetition: Exempel hierarki



## **Repetition: WORLD**

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- At the top of the hierarchy is WORLD, also known as /\*
- WORLD owns everything

## Repetition: Name

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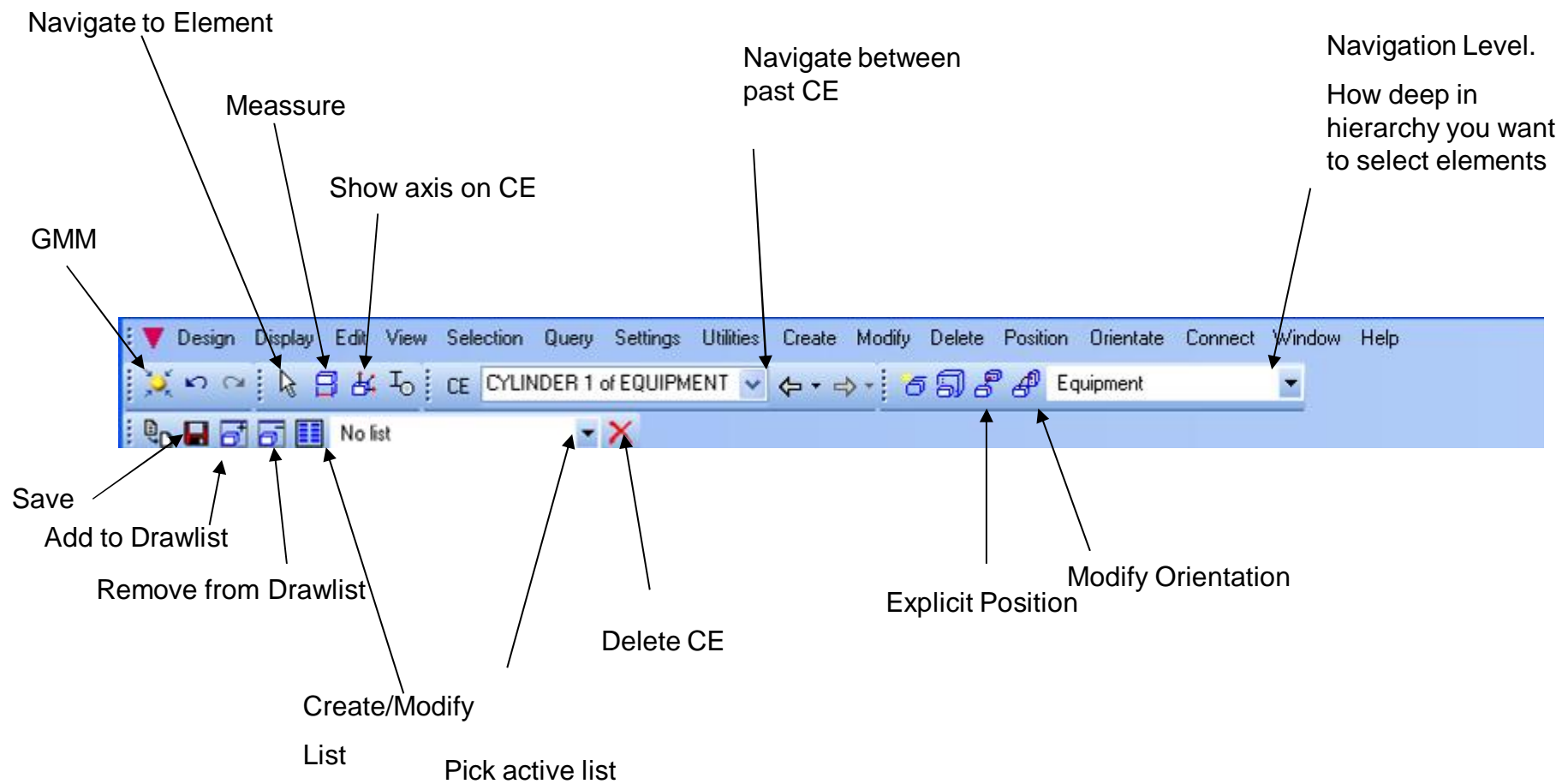
- You can give elements a name
- Names must be unique
- Names begin with a / example: /TANK-1
- Is it common to only name special elements, such as nozzles to have their name on drawings.
- Name give to a nozzle is usually in the form of /"Equipment name"/"Nozzle name" to ensure that the nozzle name is unique

## Repetition: Tips

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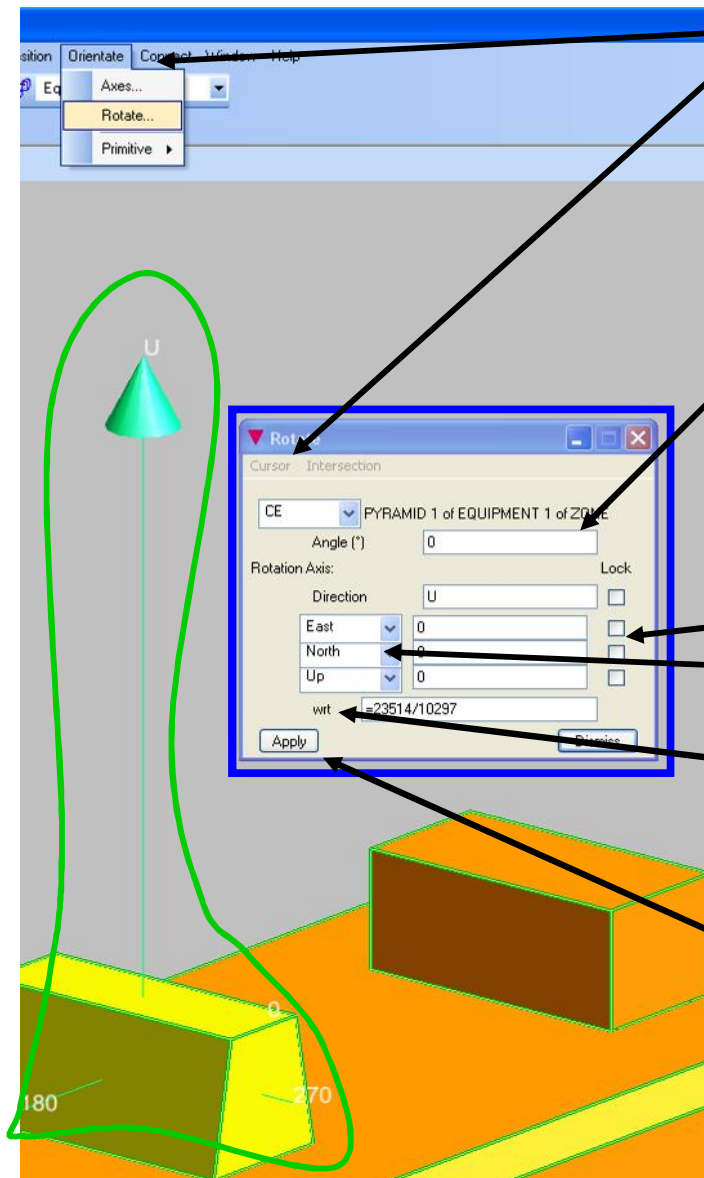
- CE is short for Current Element, and it the element currently selected.
- Everything in PDMS can be done in 42 different ways, 4 of them are really great, 10 good and the rest not so good..
- Don't use the X in top right corner to close forms, use [Dismiss] or [Cancel] buttons
- In "ordinary" CAD you use X, Y and Z. I PDMS (and most other piping software) we have EAST, NORTH, UP aka E,N,U. Negative directions are WEST,SOUTH, DOWN or W,S,D.
- It doesn't matter which of the directions you use, you can even mix them, ex. X,N,U or WEST 40, -Y 500, Z -500.
- Memory rule: NEW YORK.
- NORTH = Y
- This guide uses x, y and z
- Undo works when using new methods, not old..

## Common buttons on main ribbon





## Explanation of layout and words used



Orientate > Rotate Underlined text refers to navigation through menus, on forms or by right clicking with the mouse.

Form, window, dialog box refers to said features. Marked with a blue frame.

Textbox refers to row where you can type in text, when you start typing the box will change colour.

Aid graphics, axes and other visual elements refers to elements that are drawn on screen to. Marked with green.

Checkbox refers to..checkboxes. On/Off option only.

Dropdown list, several options.

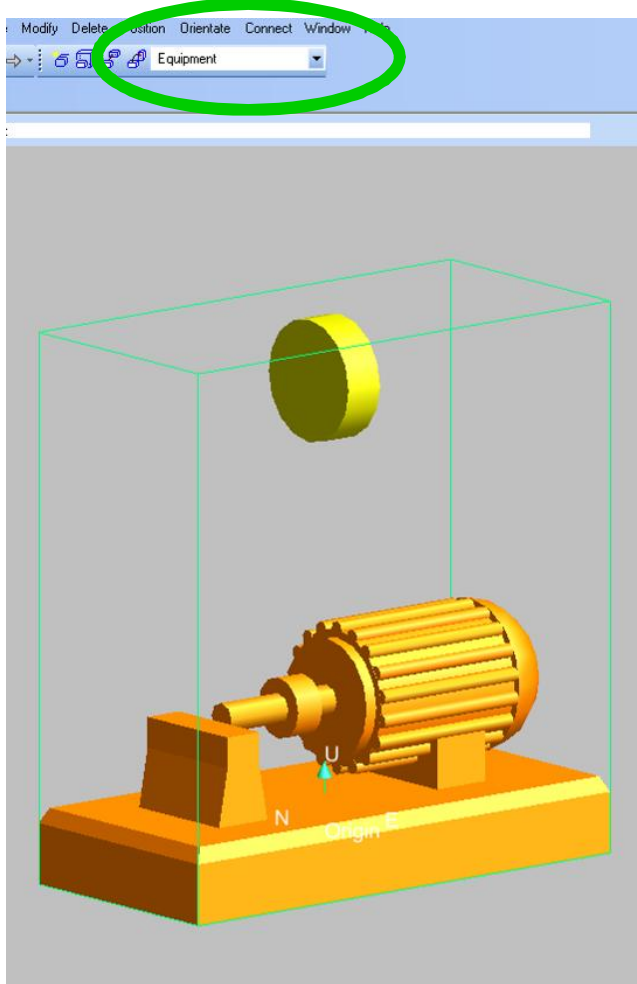
"wrt" refers to the element name in the textbox to the right of the "wrt" text. The abbreviation means 'with respect to'.

[Enter] Text between [ ] refers to buttons. Implied that you should press it.

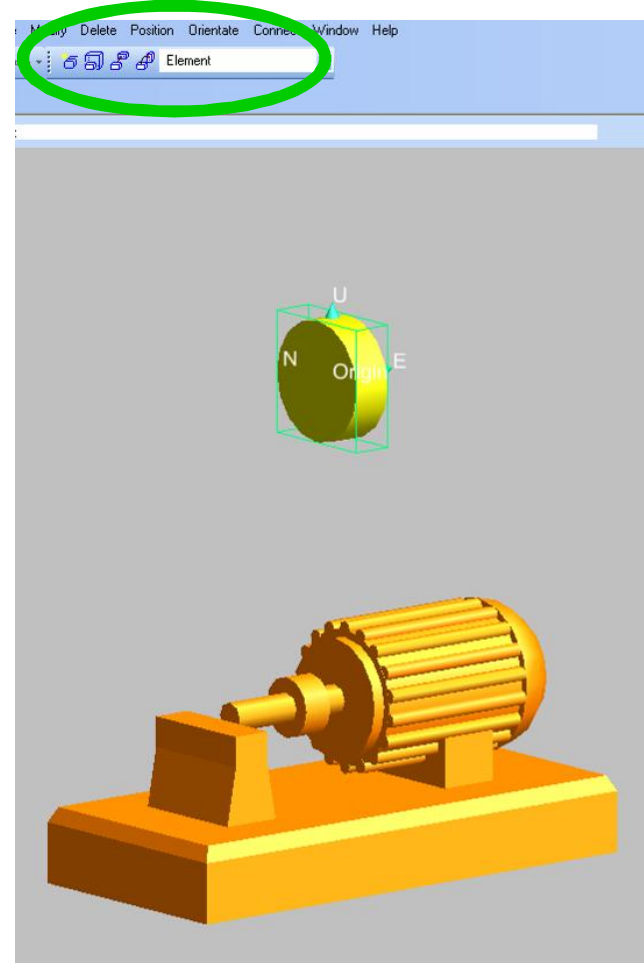
This box is for text commands in the Command Line that have same effect as menu clicking ex, > rot by 45 about z

## Navigation Level

Short explanation fo navigation level

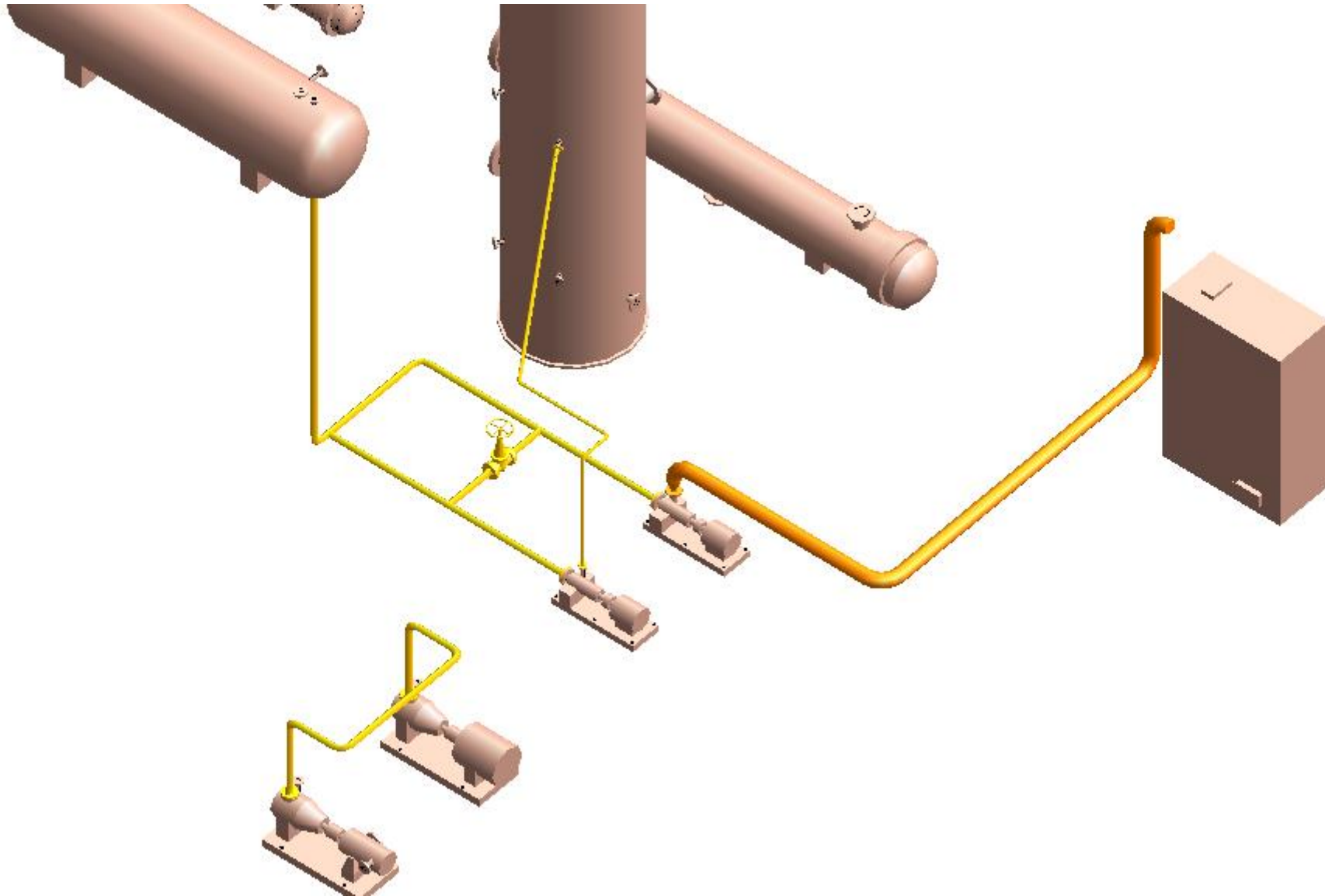


Navigation Level : Equipment is active in the dropdown list. Even though CE is the cylinder, the whole pump is select (enclosed by aid graphics green box).



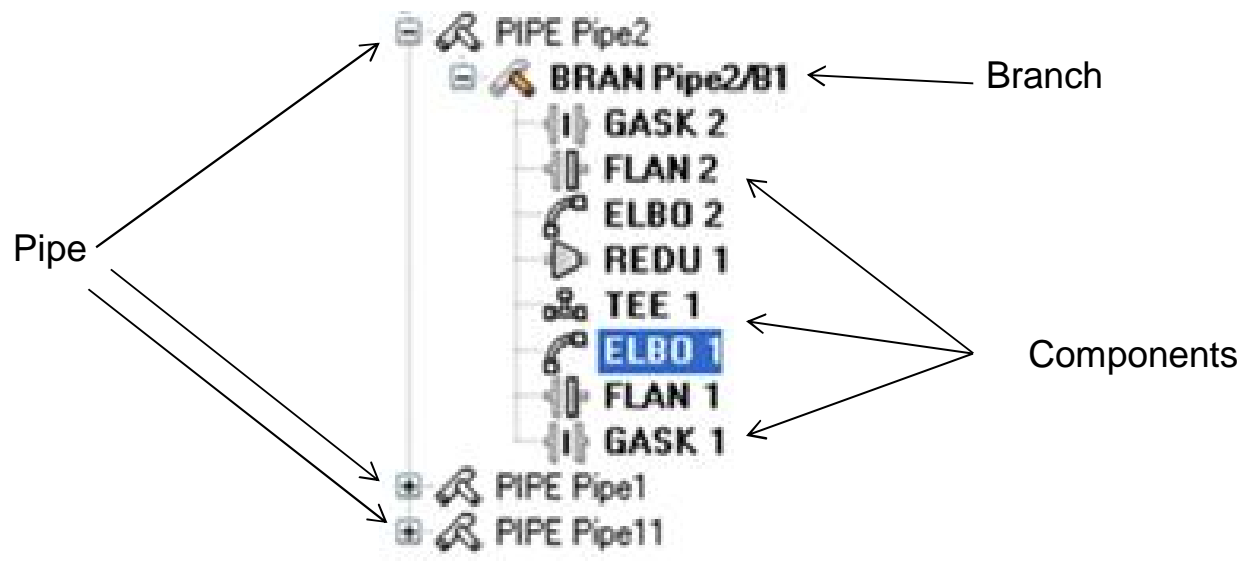
Navigation Level: Element selected, now only the cylinder is enclosed by the aid graphics.

## What we build



## Introduktion: Pipe hierarchy

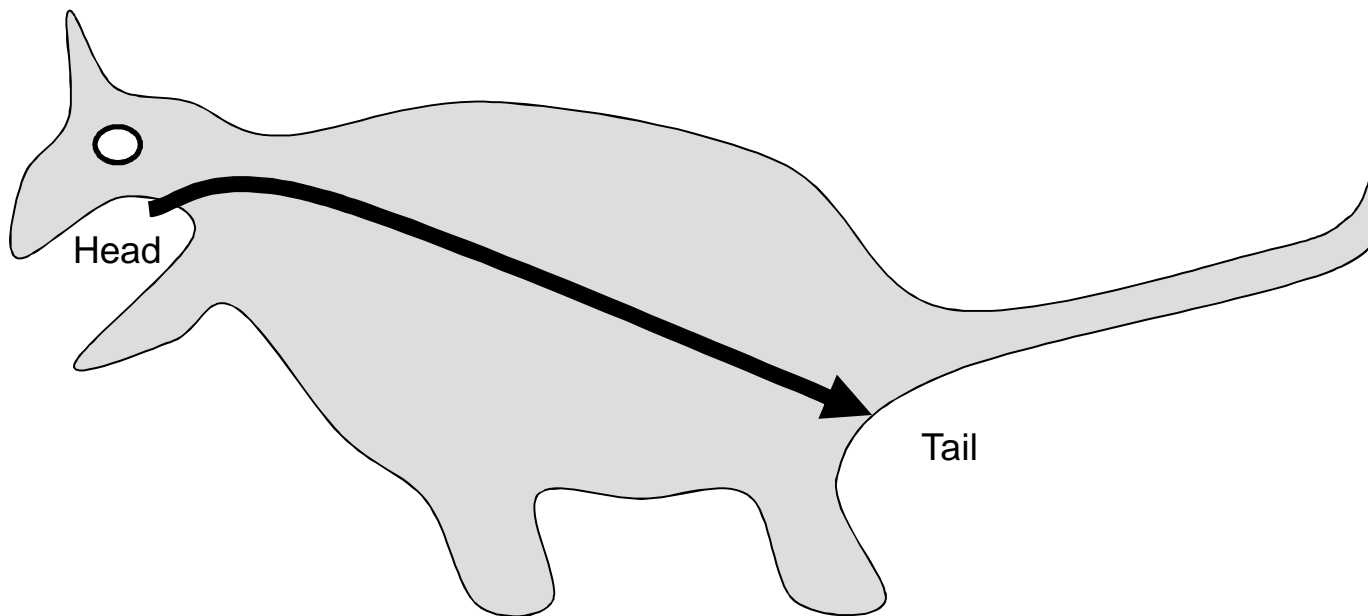
- The Pipe element owns Branch elements.
- Pipe element does not have a position or orientation.
- It is the Branch element that owns all piping components.
- Branch elements does not have a position or orientation



## Introduktion : Branch

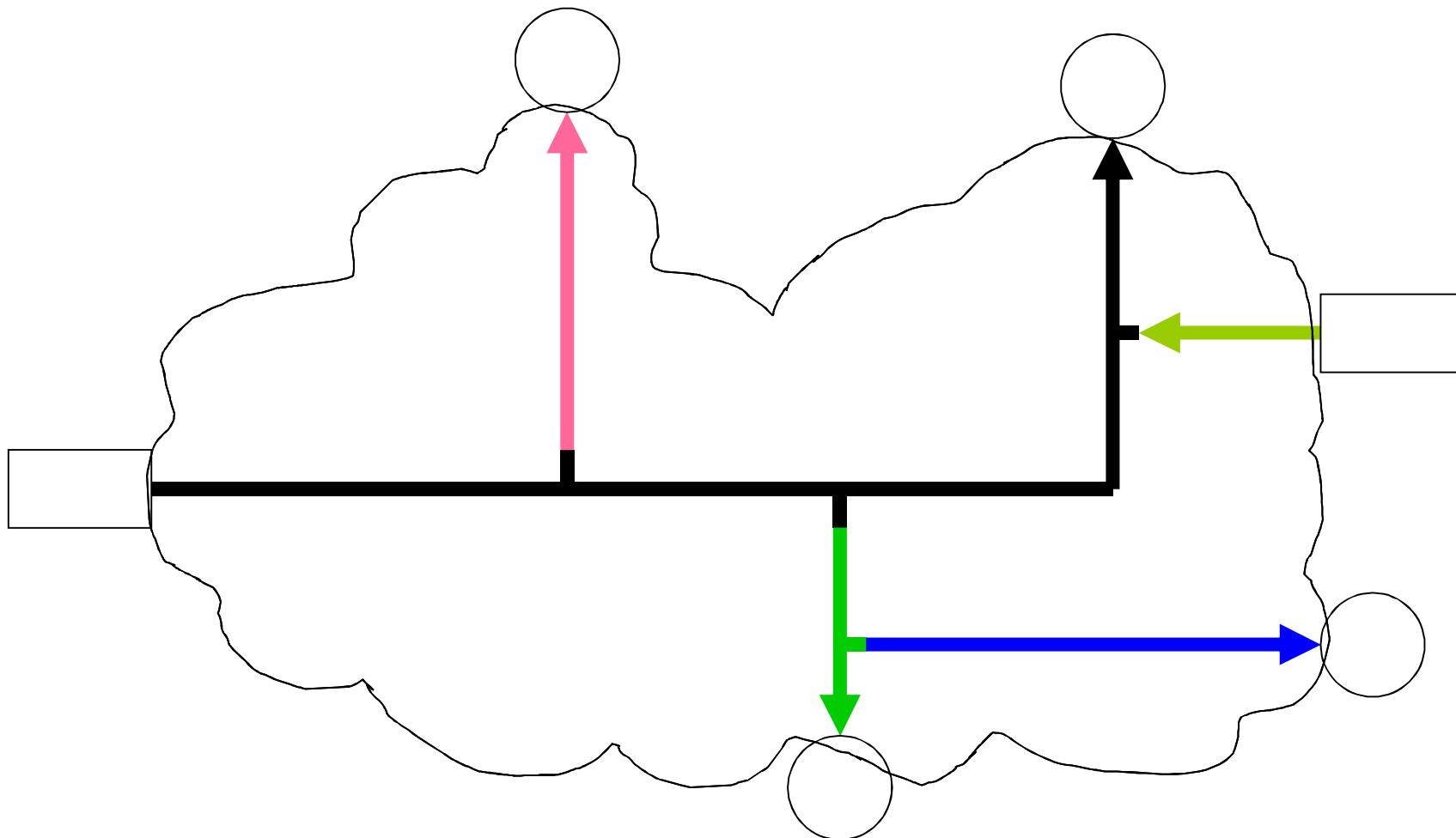
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- The Branch has a Head and a Tail, which corresponds to the beginning and end of the Branch and also flow direction
- Flow is from Head to Tail



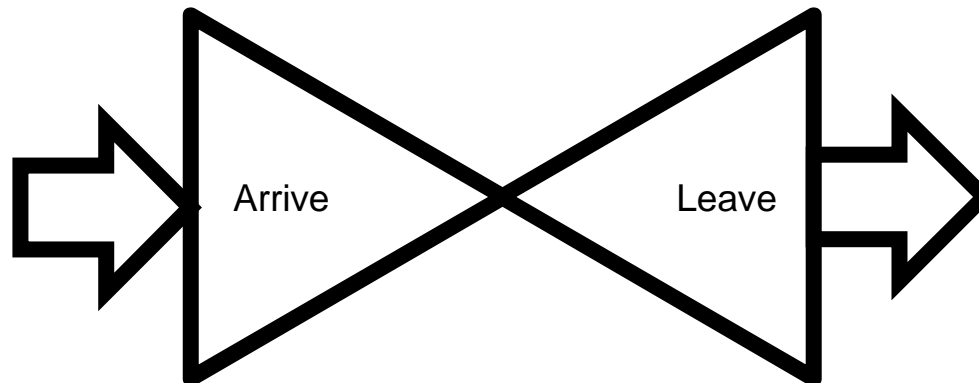
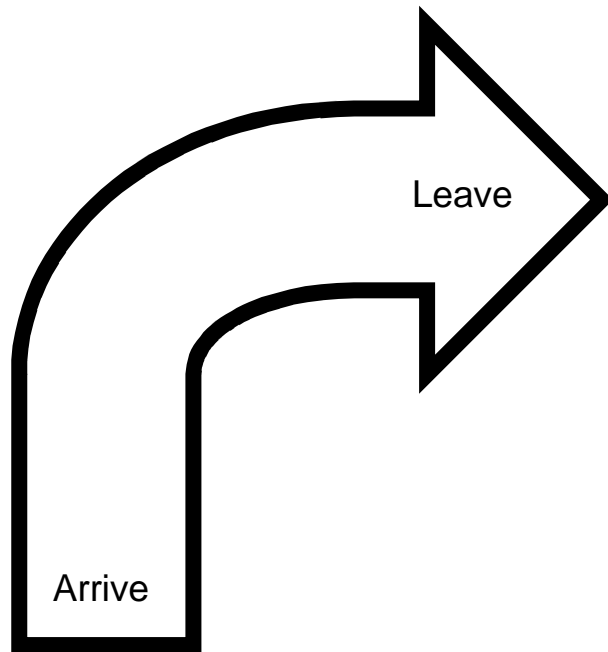
## Repetition: Branch cont.

Schematic Pipe element that owns 5 Branch element (coloured lines) with flow direction in arrow direction. Therefor, location of arrow = Tail of Branch



## Introduktion : Components

- Components are items such as elbows, tees and
- Components have (most of the time) an Arrive and a Leave port. Arrive where flow enters component and Leave where flow...yes...leaves...

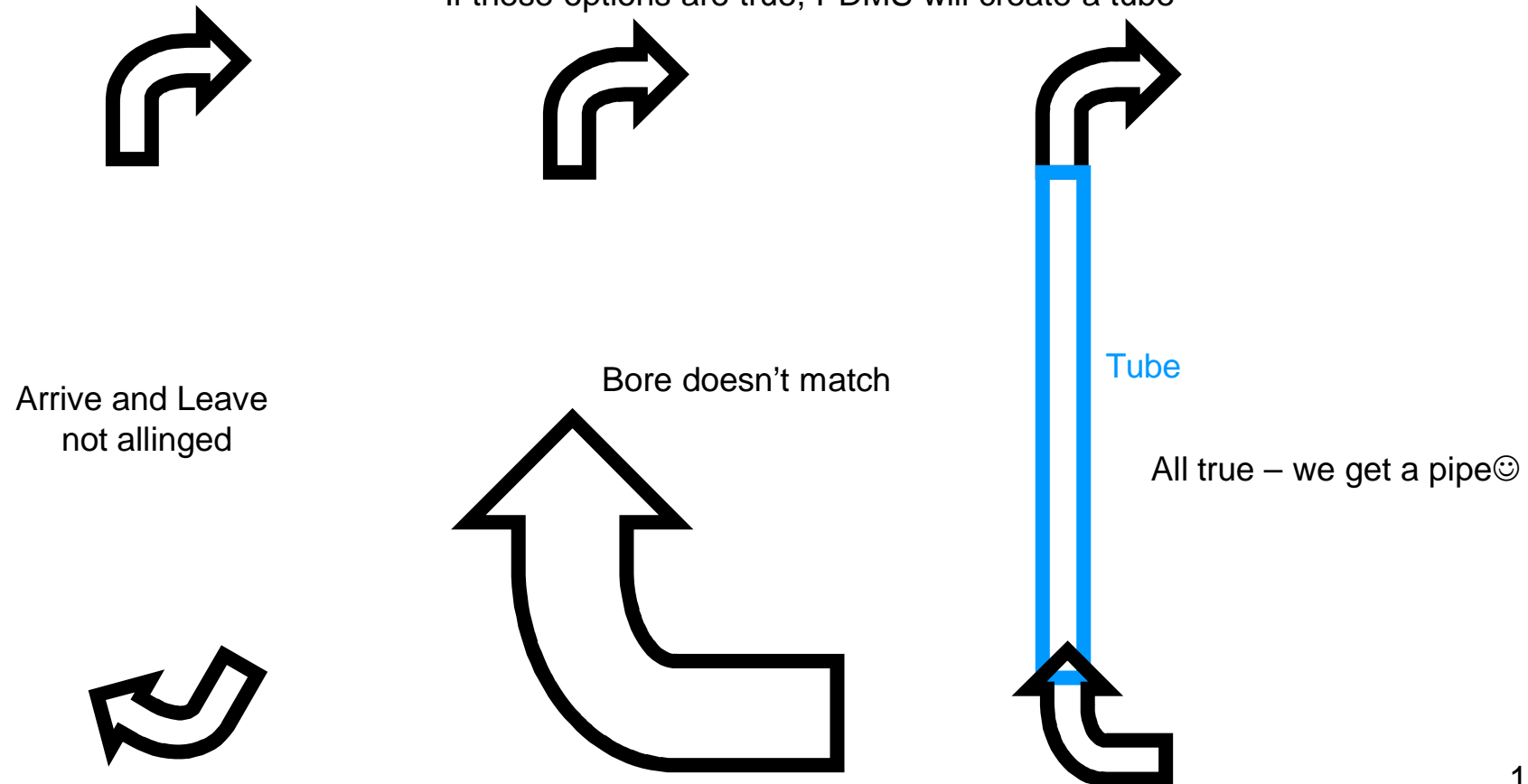


## Introduktion : Pipe

Pipes, or tubes in PDMS are implied items. As a user you don't not create them, rather PDMS will automatically create tubes when certain conditions are met between components.

- 1) Arrive and leave are lined up
- 2) Size (Bore) matches

If these options are true, PDMS will create a tube





## Nu åker vi!

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We are going to use the sample project supplied with PDMS to get some equipment to connect our pipes to and to get some other stuff that we will try and to no clash with.

Start PDMS

Select the following

Project SAMPLE

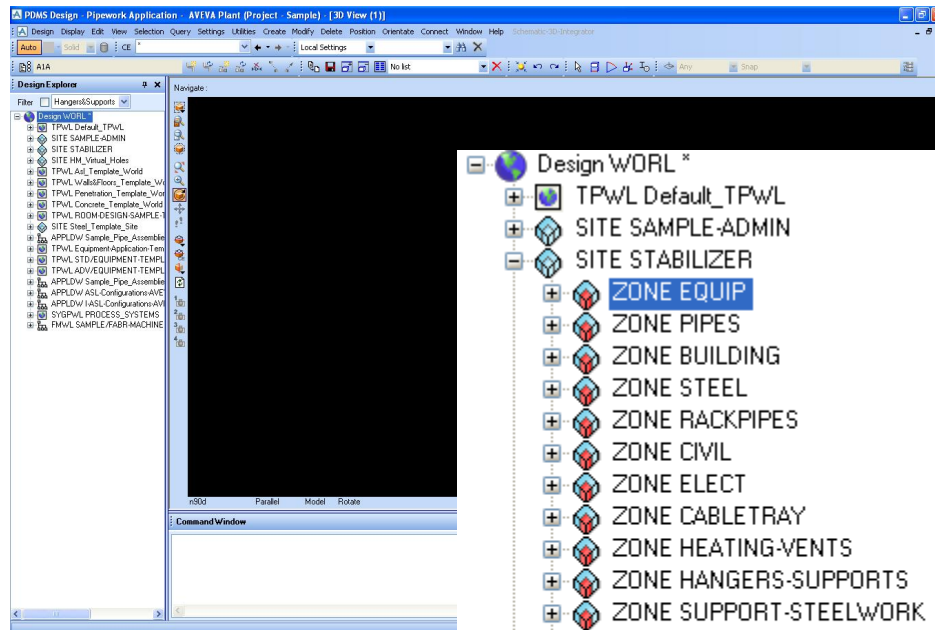
MDB SAMPLE

Module DESIGN

User ADMIN

[OK]

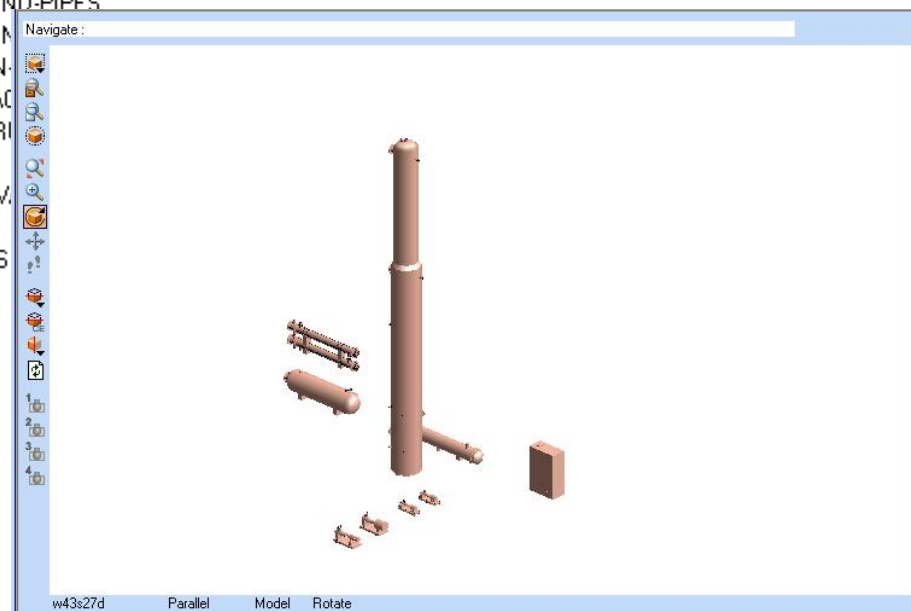
## Nu åker vi!



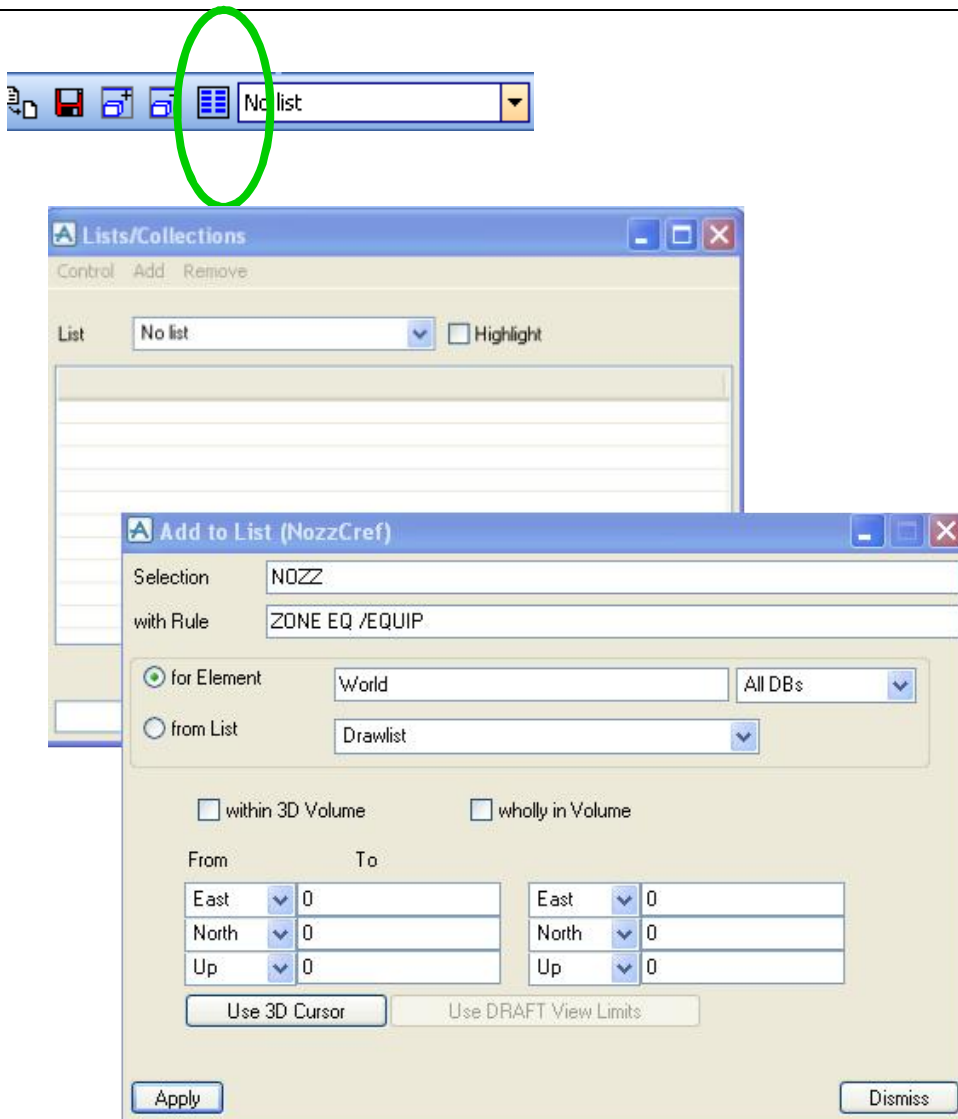
This is how it looks for me..not much fun.

Now lets add some stuff to our Draw List so we can get a visual

Expand the Site named STABILIZER and select the Zone named EQUIP and add it to the Drawlist



## Prework, removing connections..



We need to do a change to the equipment before we can use them, because most of the nozzles are already connected to sample piping and we want to remove that connection.

The actions taken here will not be explained in detail.

[Create\Modify List]

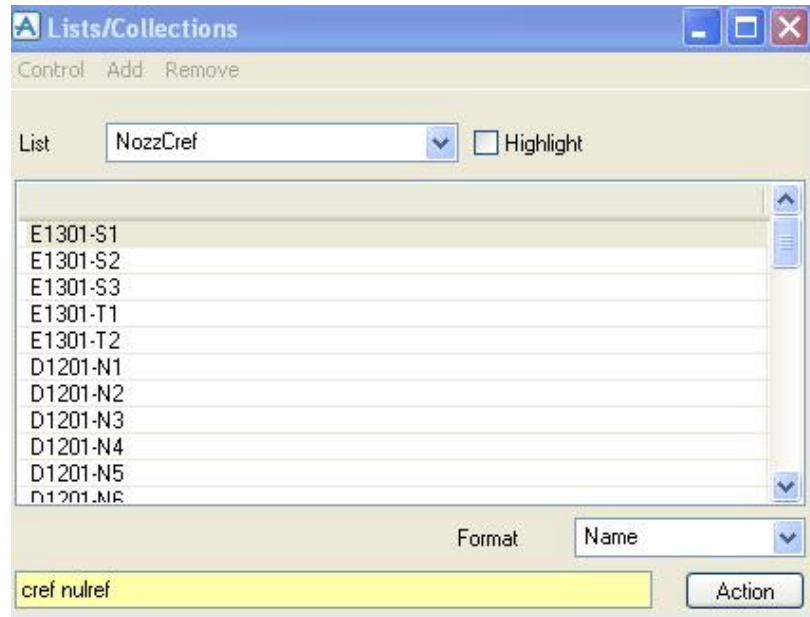
Add>List... enter NozzCref as name

Add>Selection..

Fill the form the same way as the image

[Apply]

## Nu åker vi!



Now we have a list of all nozzles.

Type in

Cref nulref

in the textbox and [Action]

Now we have removed all connection from  
nozzles to pipes...

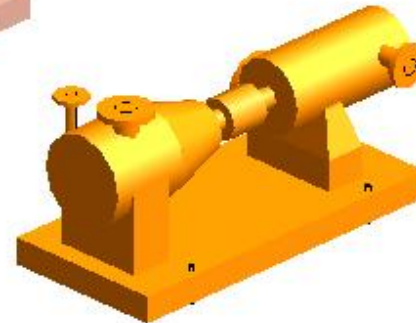
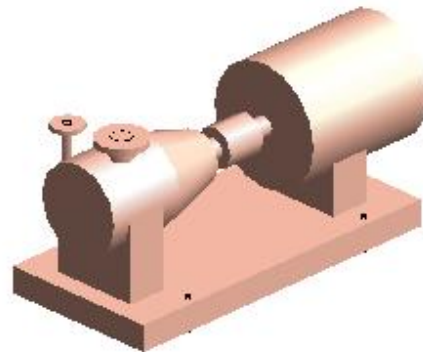
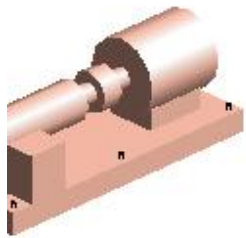
Cref = Connection Reference and we just  
changed it to nul...

Back on track!

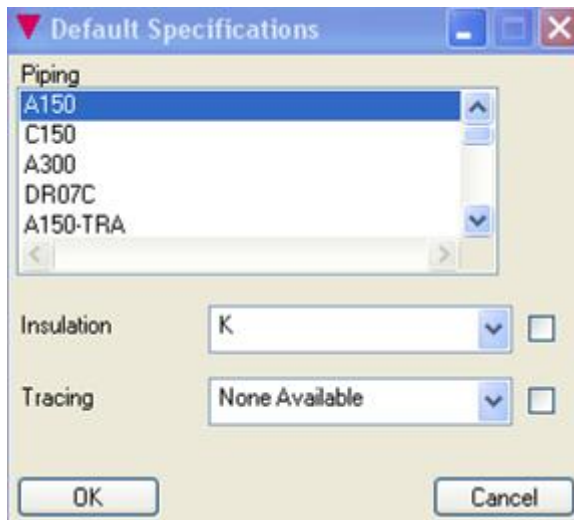
## New Branch

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Zoom in and rotate to get a good view on the pumps P105A and P150B



## Pipework



Enter the Pipework module

Design > Pipework

The first thing that happens is the Default Specifications dialog box jumping out. Here you can select the default piping specification, as well as insulation and tracing.

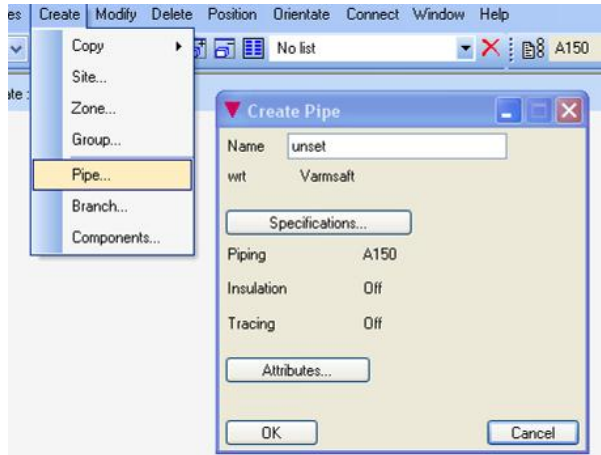
You can and will change the specification later and other options later at any stage.

So lets accept the defaults and press [OK] to move forward.

If the option Pipework is grayed out and unselectable it means you are already within Pipework.

# How to create pipes?

## Old



There are two major methods in PDMS regarding how you create your piping, the old and the new.

Old method uses a couple of floating dialog boxes and new method uses more stylish docked dialogs.

In this guide we are going to use to new method.

If you wan to try the old, you can reach the dialogs from Create > Pipe, Create > Branch and Create > Components.

## New



Now, lets create a Zone to own or pipes  
Create>Zone

“NEWPIPES” as name.

Select the zone /NEWPIPES (it is now our CE)

## New method: Pipework toolbar

If you do not have the Pipework tool ribbon, right click on an empty space next to another ribbon and select Pipework.

The different buttons are:

[1] Change specification, current specification is written to the right, this case: A150

[2] Create new Pipe

[3] Modify existing pipe

[4] Create new Component

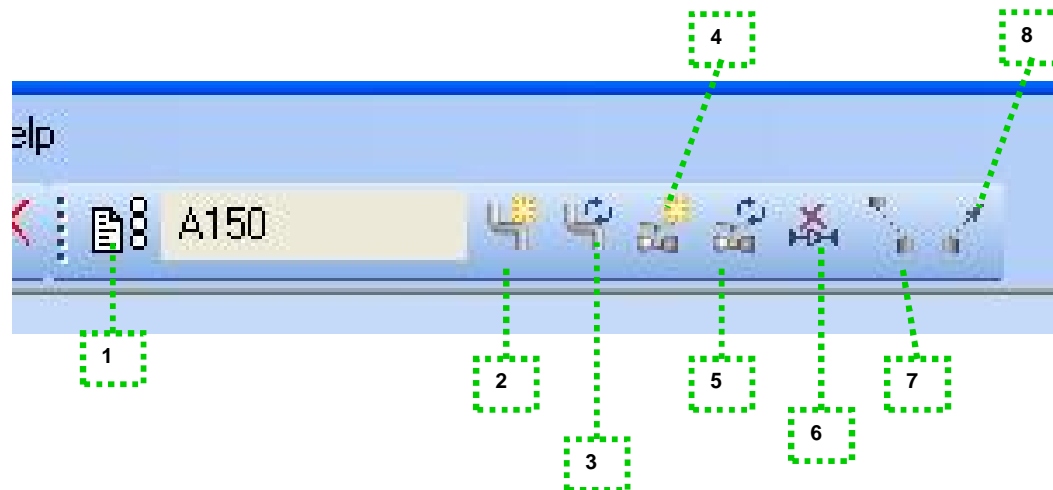
[5] Modify existing Component

[6] Delete Component

[7] Align Components

[8] Modify orientation of Component

Press on button [2], Create new Pipe





## New Pipe

**Create Pipe**

Create New Pipe:

Pipe Name:

Primary System:

Select Pipe Specification:

- A1A
- F1C
- A3B
- A150
- C150
- A300
- DR07C
- SP/DR07C
- E-TRACING
- S-TRACING
- CADC/HS/MASTER/SPEC/ATTA
- ELEC
- A1A
- A3B
- F1C
- S1A
- REF
- ELEC

Basic Pipe Process Data

Bore:

Insulation:

Tracing:

Temperature:

Pressure:

Ok, now we got the Create Pipe form up and docked to our right. We can now give our new Pipe a name, select a Specification and couple of other data attributes

Lets pick the name "P-A1A-N1 and select he specification A1A

We are not entering any information regarding size at this stage, because that information will come automatically when selecting nozzles during Branch creation

[Apply]

## New Branch

**Modify Pipe**

Pipe: P-A1A-N1

Spec: A1A

Connectivity:

Branch	Head	Tail
B1	undefined	undefined

Branch: P-A1A-N1/B1

Spec: A1A

Head Detail:

Undefined

Head Connection:

Undefined

Tail Detail:

Undefined

Tail Connection:

Undefined

Numbered callouts in the image:

- 1: Points to the 'Connectivity' table.
- 2: Points to the 'New Branch' button.
- 3: Points to the 'Change Detail' button for the Branch specification.
- 4: Points to the 'Change' button for the Head Detail.
- 5: Points to the 'Change' button for the Tail Detail.
- 6: Points to the 'Change' button for the Head Connection.
- 7: Points to the 'Change' button for the Tail Connection.

Now a Pipe is created in the heirarchy owned by NEWPIPES (if some other zone had been CE, the Pipe had ended up owned by that Zone). The Create Pipe form changes apperance and we can now create and connected Branches.

1) Current Branches owned by the Pipe. Right now the one we are creating.

2) Create new Branch

3) Change specification and name of the Branch

4) Change Head attributes

5) Connected Head

6) Change Tail attributes

7) Connected Tail

Press [Change] for Head Connection, 5)

## New Branch, Head

**Modify Pipe**

Pipe: P-A1A-N1

Spec: A1A

Connectivity:

Branch	Head	Tail
B1	undefined	undefined

Connect Branch Head to:

Name: P-A1A-N1

Now the form changes appearance again....a couple of buttons are the same as before, but on the bottom part of the form is new button

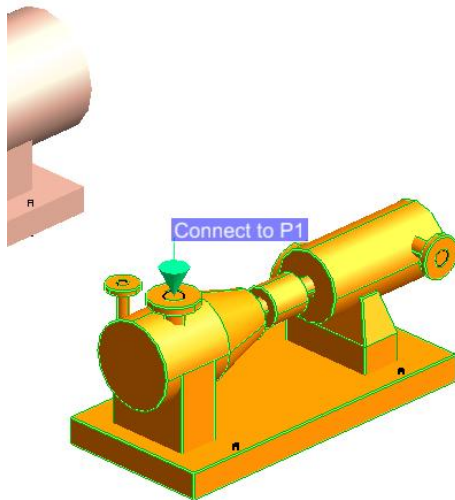
1) Pick element to connect Head to

Choose [Pick] and click the N1 nozzle of P105B

Now Name will change to the name of the Nozzle, P150B-N, we also get Bore and Connection information

There's also aid graphic arrow showing in the 3D-view with information regarding P-Point number

Finish with [Connect]



Connect Branch Head to:

Name: P1502B-N1

Bore: 100 Connection: FBD

## New Branch, Tail

**Modify Pipe**

Pipe: P-A1A-N1

Spec: A1A

Connectivity:

Branch	Head	Tail
B1	/P1502B-N1	/P1502A-N1

Branch: P-A1A-N1/B1

Spec: A1A

Head Detail:

Bore: 100mm Connection Type: FBD

Direction: U

Position: E 15135.00  
N 12355.00  
U 2150.00

Head Connection:

Connected to /P1502B-N1

Tail Detail:

Bore: 100mm Connection Type: FBD

Direction: U

Position: E 12745.00  
N 12355.00  
U 2150.00

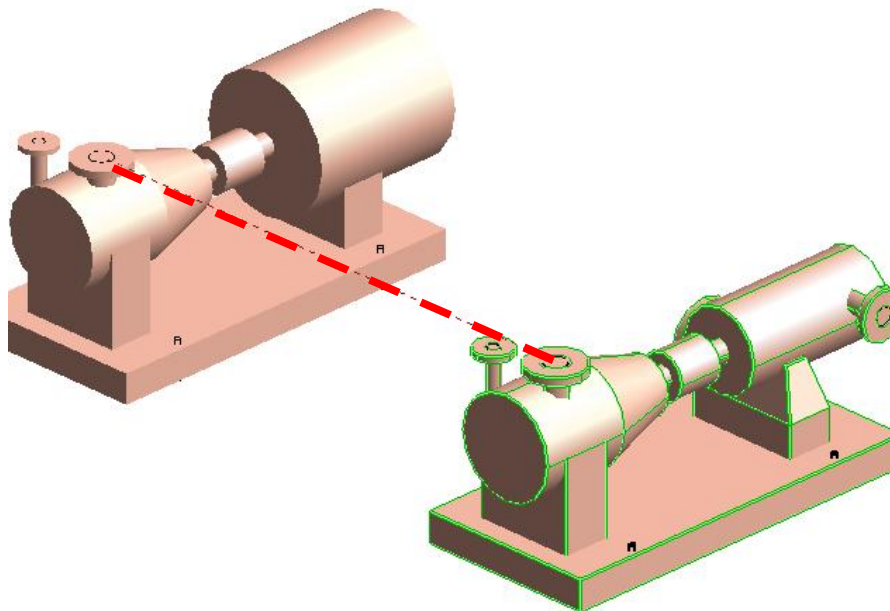
Tail Connection:

Connected to /P1502A-N1

Now choose [Change] for Tail Connection and [Pick] the top nozzle on P150A.

The Create Pipe form now magically changes name to Modify Pipe and the image to left should resemble what you have on screen.

In the 3D-view there's a dashed line between Head and Tail , so you get a visual on what you have connected the Branch to.



## Create Components



Now we got a Pipe, which owns a Branch and the Branch has its Head and Tail connected to nozzles.

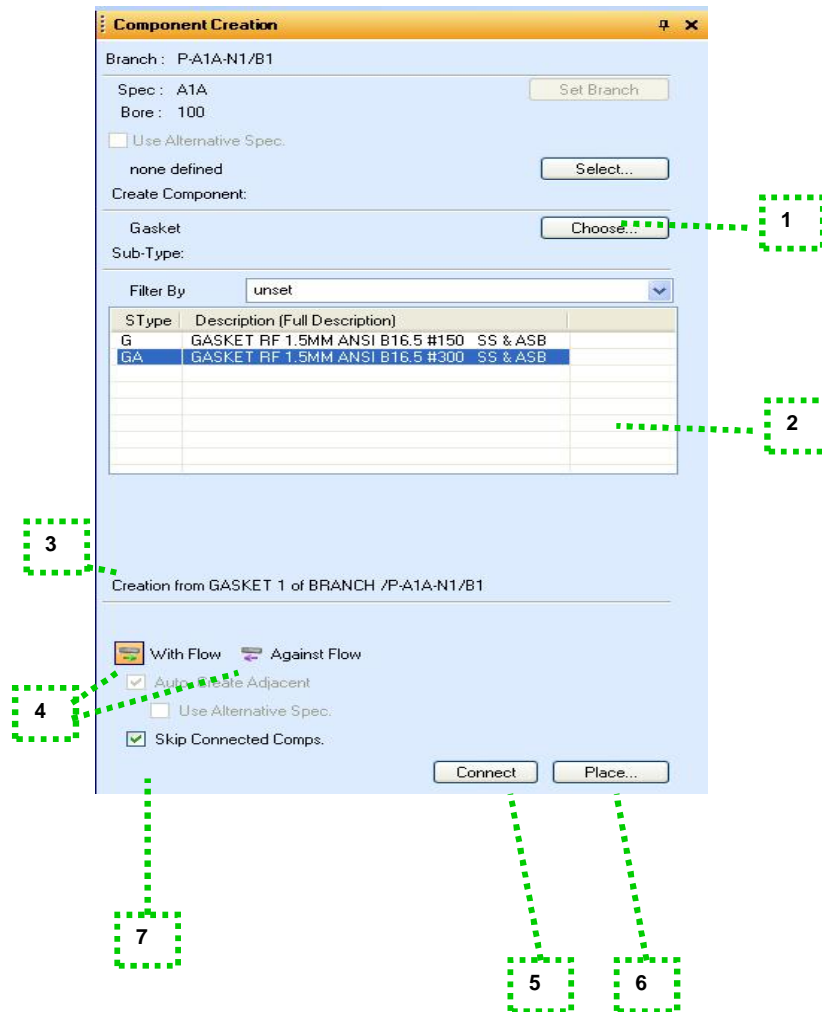
Lets create a component

Press [4] to bring up the Component Creation Form

- 1) Select another Branch where you want to place Components into.
- 2) Select another specification for the Branch.
- 3) List of Components in the specification you can build.

Select Gasket

## Create Components, cont.

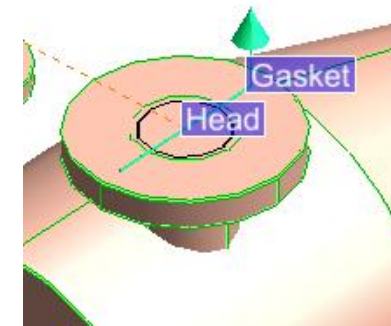


- 1) Back and choose another Component
- 2) List of different types of selected Component
- 3) The component the new component will Connect to (we have no Components now, but let's keep an eye on that line after we add the gasket)
- 4) Change build direction. If it's Against Flow, switch to With Flow
- 5) Places and connects new Components to Components listed at 3)
- 6) Place new Component on the Branch
- 7) Deselect if Component should be places after CE or after Component listed at 3)

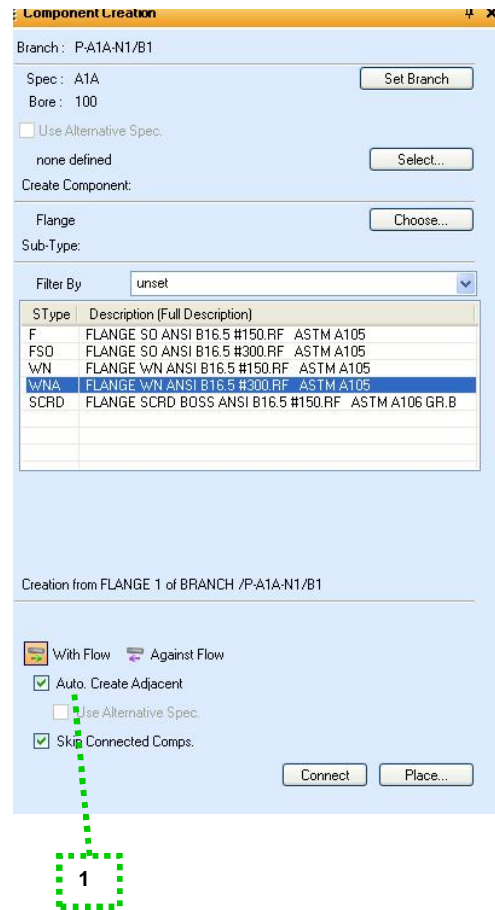
Select the #300 Gasket and [Connect]

Now 3) "Creation from..." will change to Gasket 1. There's also aid text at the nozzle stating we have a gasket, thou it's invisible

Click 1) [Choose]



## Create Component, Flange



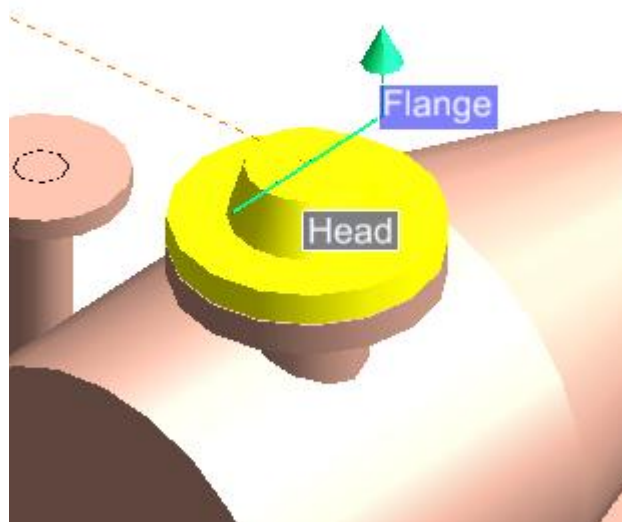
Now pick Flange.

Select the flange with Style WNA

[Connect]

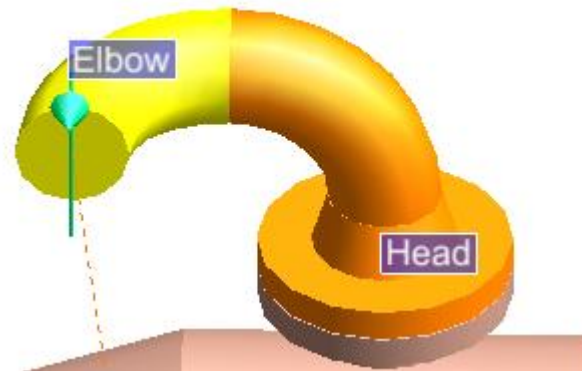
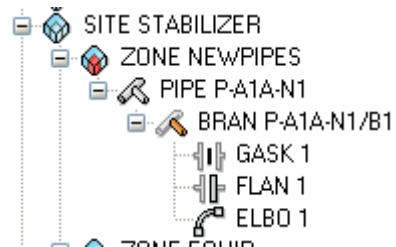
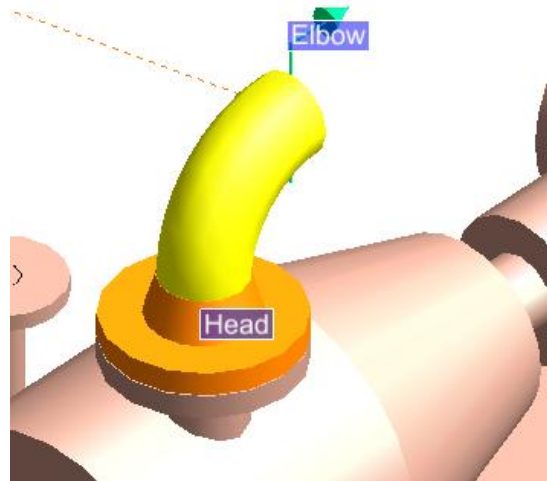
Now we have a Flange in place after the Gasket

Notice of the "Creation from.." text now prints FLANGE and the same with aid graphics.



1) We created our Gasket first and then Flange. If you have 1) checked you can skip the Gasket and create the Flange first, and PDMS will place a Gasket by itself...

## New Component, Elbow



Ok, back to list of Components and this time we pick an Elbow.

Select the Elbow at the top of the list and [Connect]

Current results in 3D-view and Design Explorer should look like images to the left.

Notice that the dashed line that earlier connected Head and Tail now connects Leave of Elbow and Tail

Create another Elbow



## Move Component, 1



Model Editor Off



Model Editor On

You can move Components with three different methods, >*Command Line*, dialog boxes or the Model Editor (GMM)

We will start with the Model Editor, and stick with it for most of the tutorial.

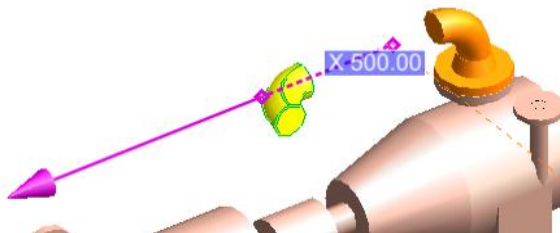
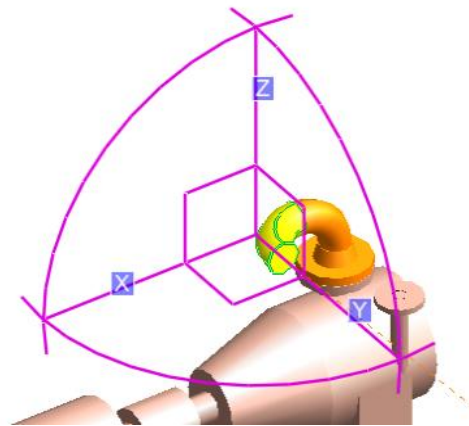
So turn it on by clicking its icon in the toolbar and close the Create Component Form.

When you turn it on, a purple axis-ish looking feature will appear at the center of your CE.

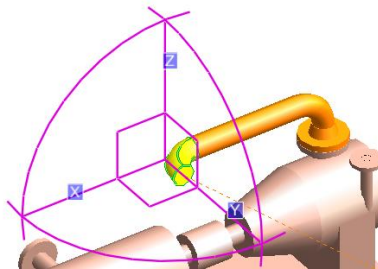
Lets just call it ME, short for Model Editor..

With the ME, you can drag in the purple lines or arcs for interactive moment of component or right click them for more options.

We start of easy by pulling in the X-axis line by clicking and holding the left mouse button

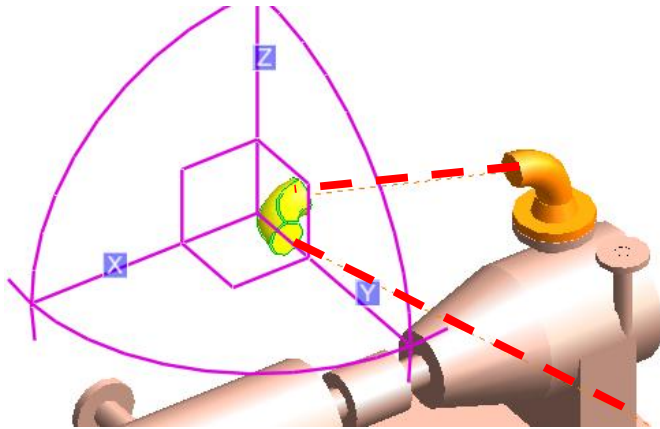


You get direct feedback on how far you have moved the Elbow



Release the mouse and PDMS creates the tube

## Move Component, 1 cont.



Now drag the Y axis to miss align the current Elbow from the previous Elbow and notice how the tube disappears.

Now the dashed Branch line is draw from first Leave of first Elbow to Arrive of the last, and then onwards to Branch Tail.

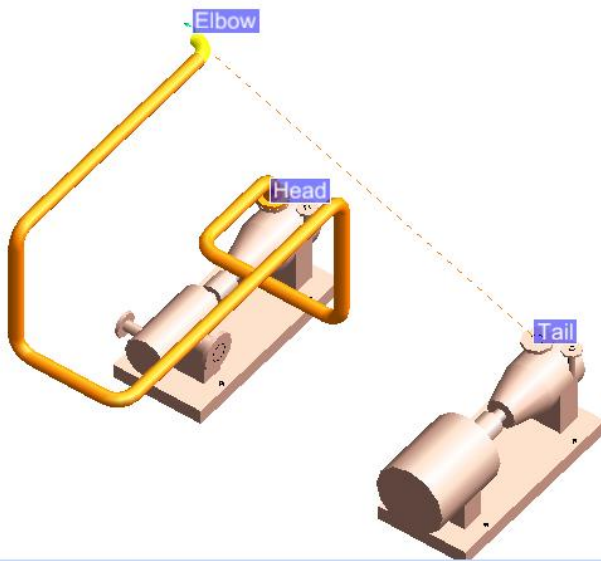
Undo works when using the ME, so lets undo this move.

Go crazy and create a whole lot of Elbows and move them all around while exploring different ways on how to use the ME.

You can rotate the Elbows by pulling the arcs between the axes, but only rotate in steps of 90 degrees.

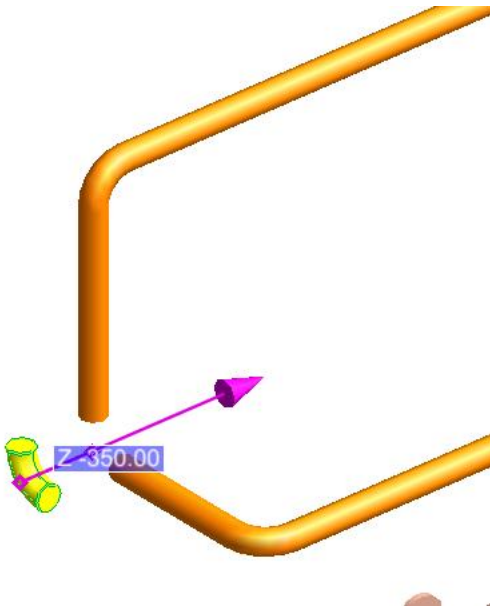
When you create a new Elbow you need to click on it to have the ME change target.

Try different options when right clicking axes or arcs



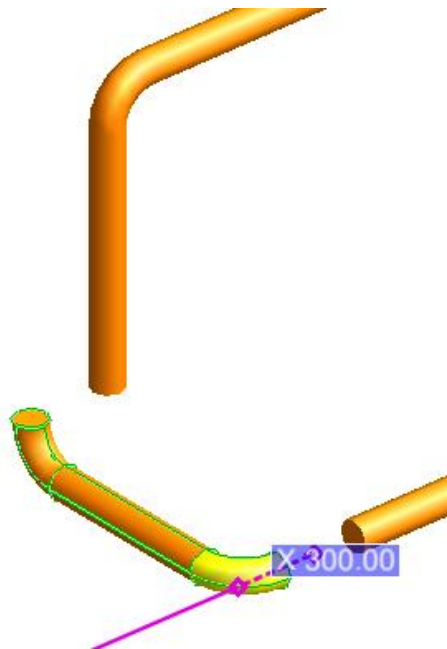
## Move Components

Clicking on a Elbow between two tubes and dragging it away from tubes will break the pipe.



Clicking on the Tube between two Elbows will make one Elbow CE (yellow) and mark the Tube and other Elbow with green outline.

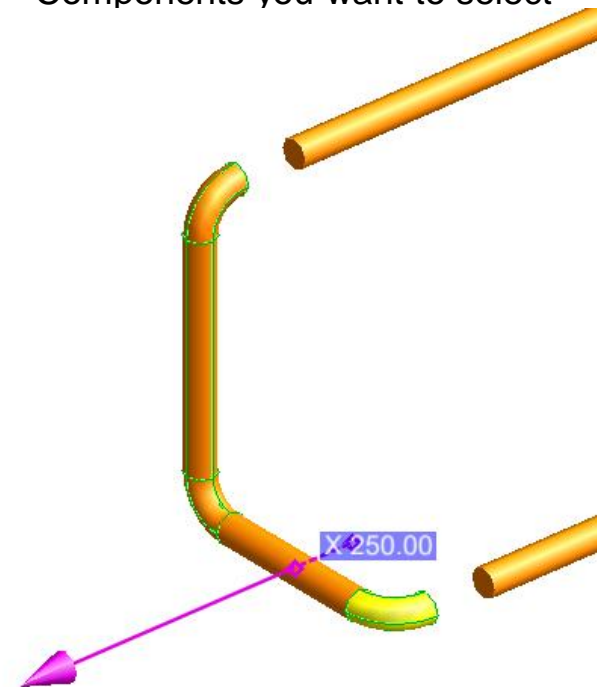
Dragging with the ME now moves all three Components



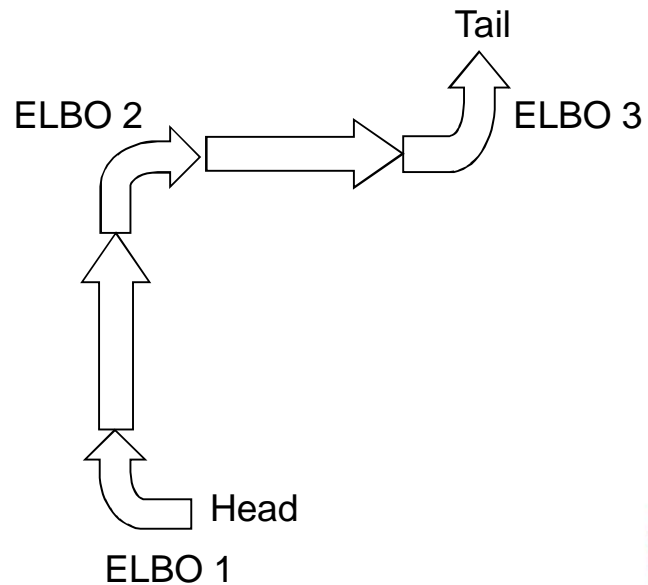
Pressing [CTRL] key and clicking let you select several Tubes

Clicking on a selected Component will deselect it.

You can also do an ordinary selection box (like AutoCAD or Explorer) that covers the Components you want to select



## Component flow

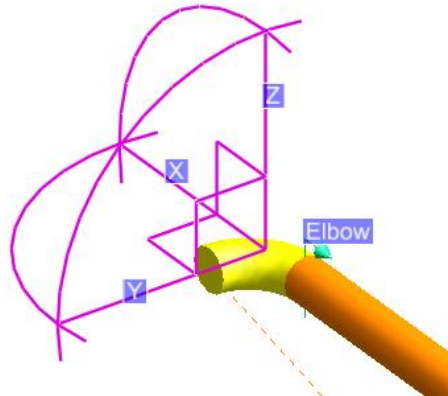


So far we have built in the flow direction of the Branch, from Head to Tail

Bring up the Component Creation Form and select Against Flow



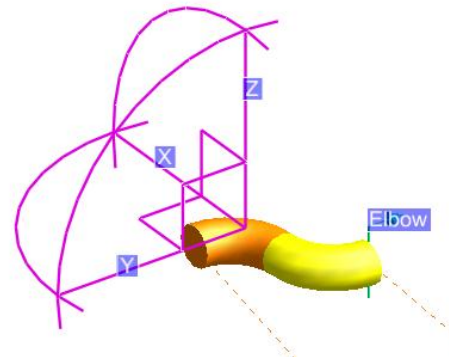
Select the last Elbow you have created, notice that the aid graphic and text is at the Elbows Arrive port now.



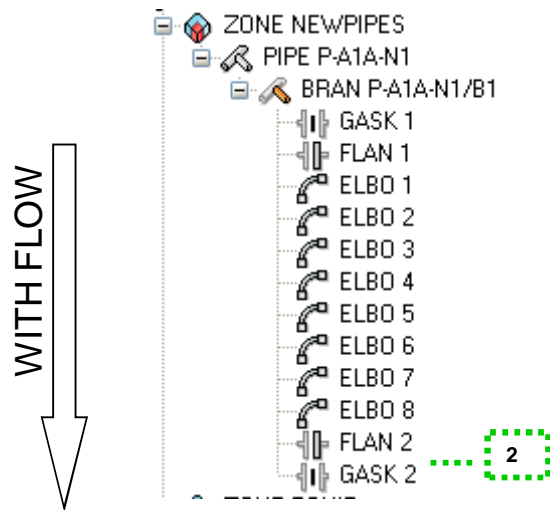
[Connect]

And now we new Elbow placed Against Flow..

..delete that Elbow.



## Component flow, Flange at Tail



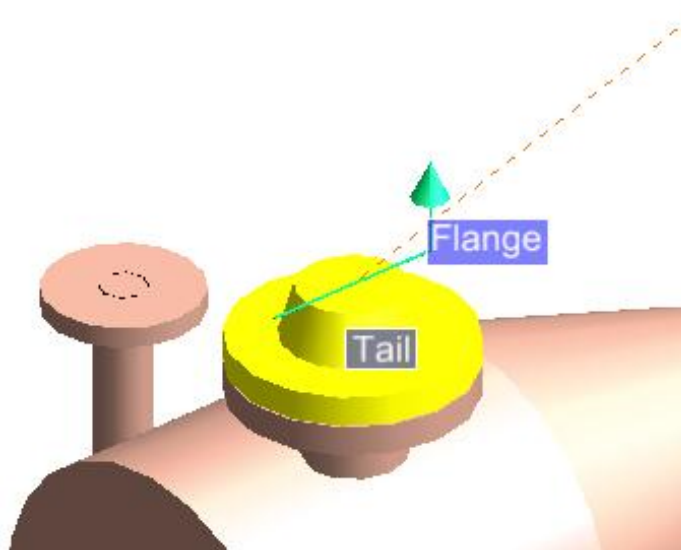
Keep the Against Flow setting.

Select the Branch as CE

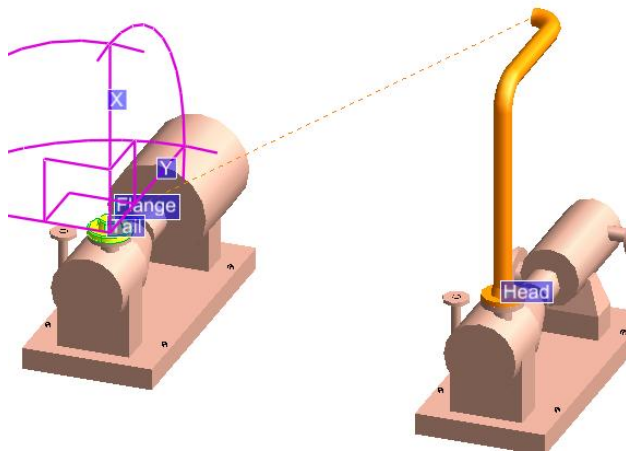
[Choose] and select Flange as Component, and select SType WNA #300 [Connect]

Notice that PDMS automatically created the Gasket

1) Also look at the Design Explorer's list of Components in Flow Direction. The newly created Components are at the end of the list.



## Lets finish our first pipe



Delete the Pipe you have done so far and create a new Pipe, with the same name and specification

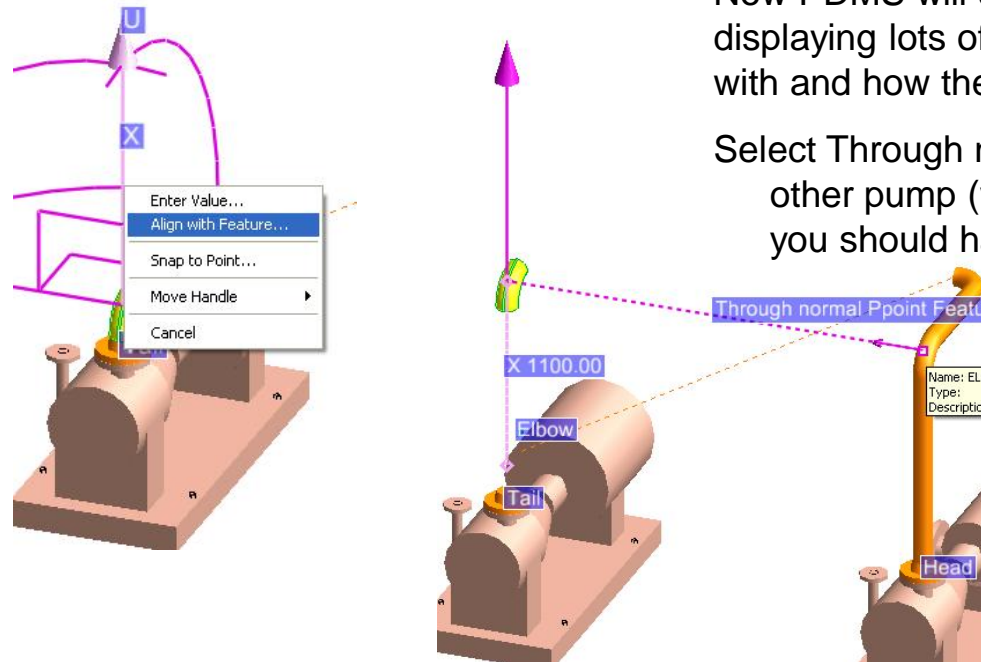
Build something that's similar to image

Switch to Against Flow and create a new Elbow at the Tails Flange.

Select the Elbow with ME on, and right click on the X axis. Then select Align with Feature...

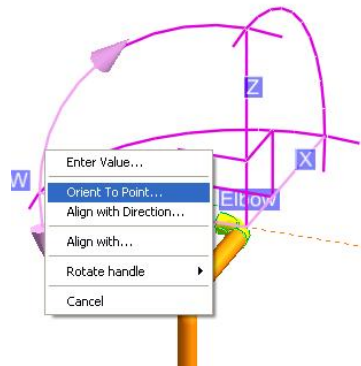
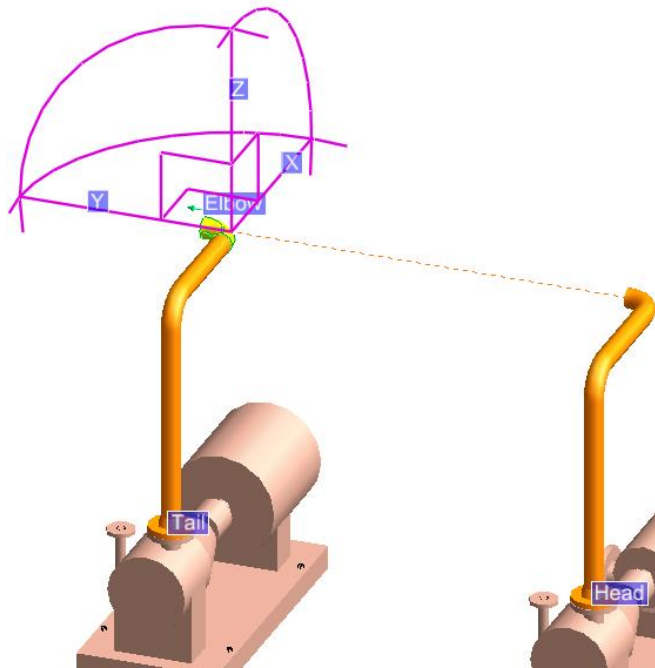
Now PDMS will start tracking your mouse movements and displaying lots of aid lines to visualize what the Elbow will align with and how the alignment will work..

Select Through normal Ppoint Feature on the Elbow above the other pump (while trying out the different ME functions earlier you should have used this....)





## Lets finish our first pipe

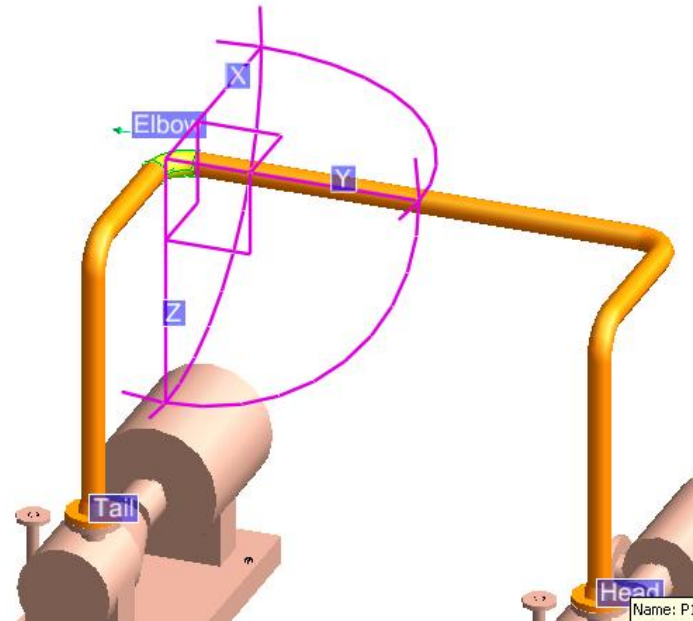


Place another Elbow and align it also.

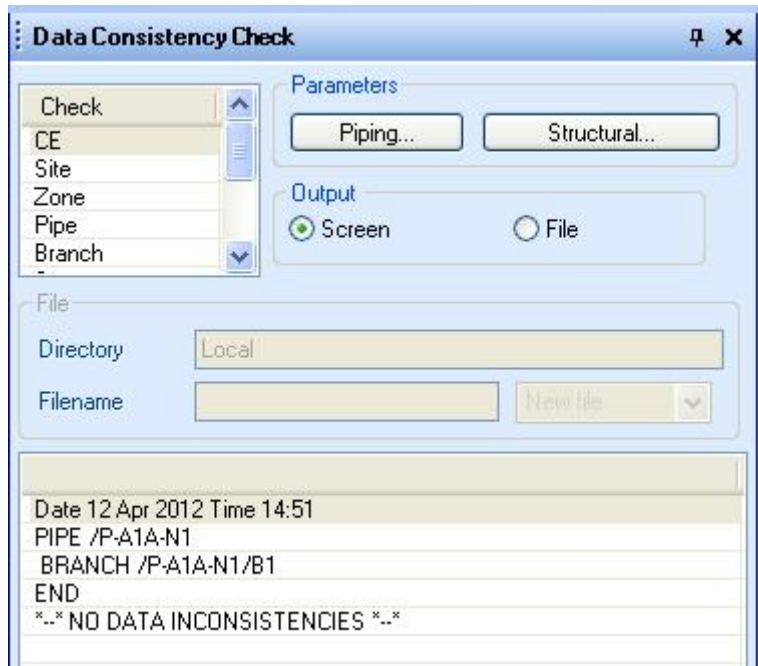
Now we need to rotate our CE.

Right click on the lower half of the arc between the Y and Z axis and select Orient To Point...

Then select the other Elbow and we are done!



## Data Consistency Check



We are not done! When you think you're done you need to run a check to know if the Pipe is health or if something is astray

Enter the menu with Utilites>Data Consistency.  
Select the Branch or Pipe as CE and [Apply]

Or you can select the Branch and type in  
>check ce

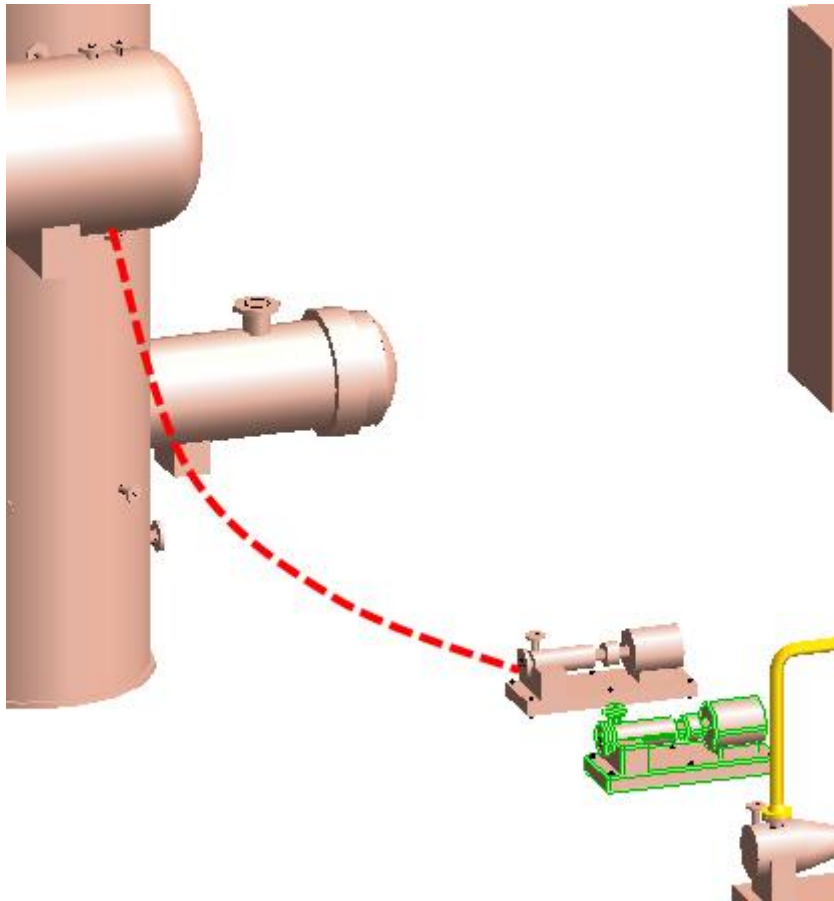
If everything is Ok you'll get the following message  
\*--\* NO DATA INCONSISTENCIES \*--\*

If there are errors, you need to consult PDMS Design  
Reference Manual Part 4 or ask someone who might  
know...

Done...



## ..more piping, Align Selection/Component

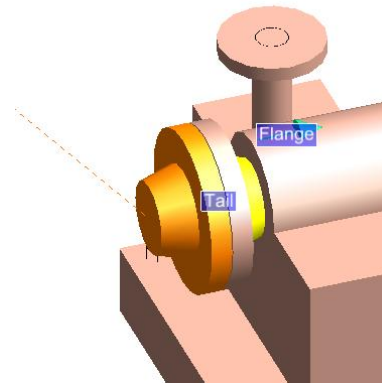


Create a new Pipe, call it P-A3B-N2 (or whatever you like...)

Connect the Branch Head to the vertical drum and the Tail to the pump as show.

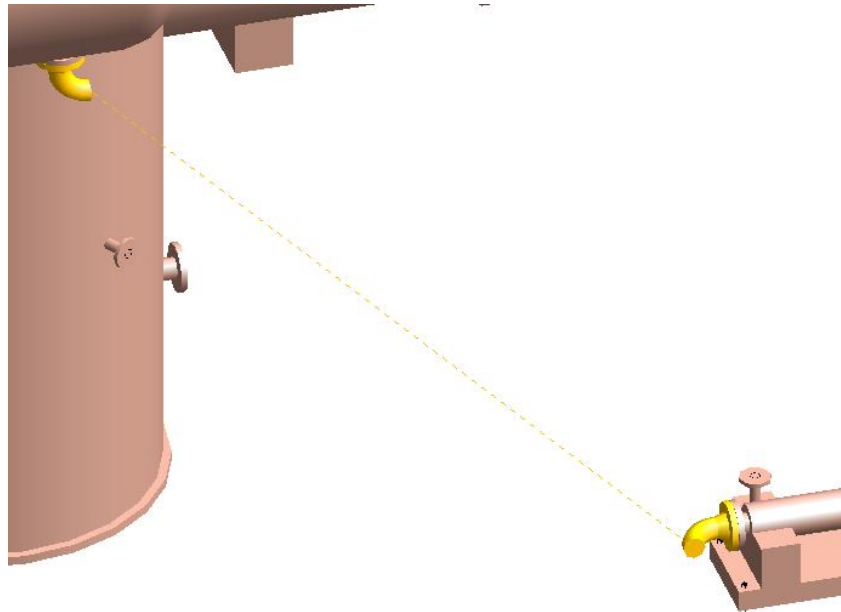
Then create a Flange and Elbow, SType WN at both Head and Tail.

If you create your components and they don't appear where you expected, double check your flow setting and what you had as CE before clicking [Connect].



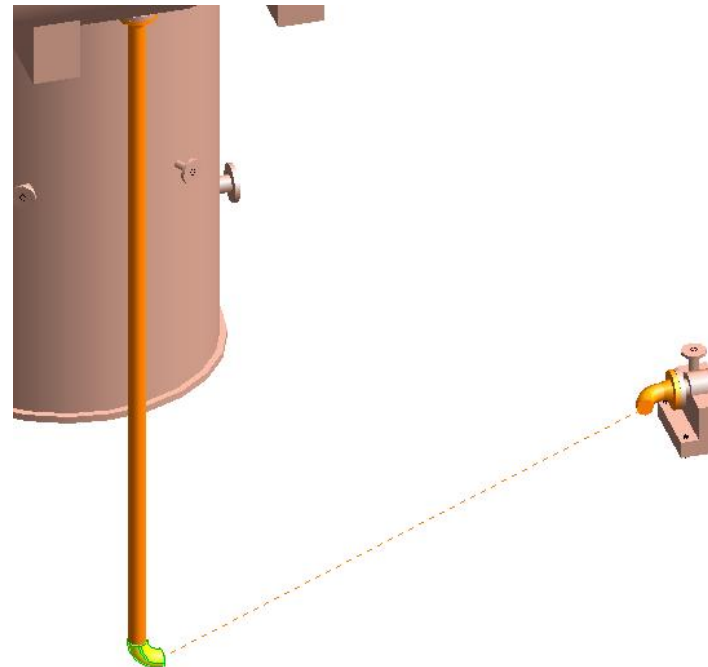
Otherwise it can end up like this..with the second Flange inside the pump

## Align Selection/Component



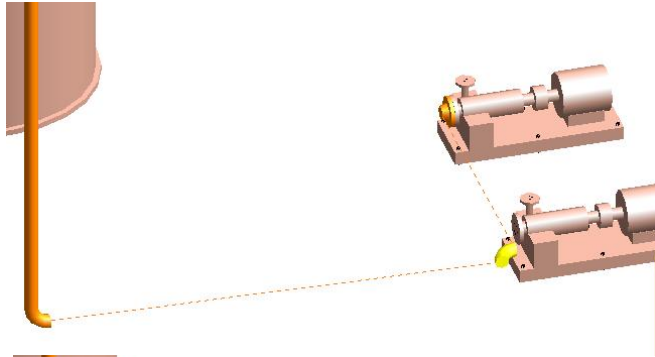
Create an Elbow at the Flange under the drum.  
Create an Elbow at the pump's flange also (should have been a Reducer first but we're skipping that now..)

Now set the Elbow at the drum as CE and press  
[Align selection/component]



Automatically PDMS will move the CE and try to align  
Leave of CE and Arrive of the next component in  
flow.

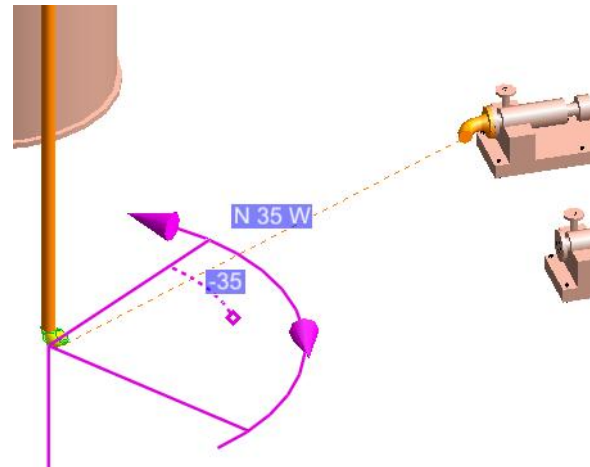
## Align Selection/Component



Select the Elbow at the pump and press [Align selection/component] again

...not that good..it Align with the other Elbow but broke the tube to the pump..

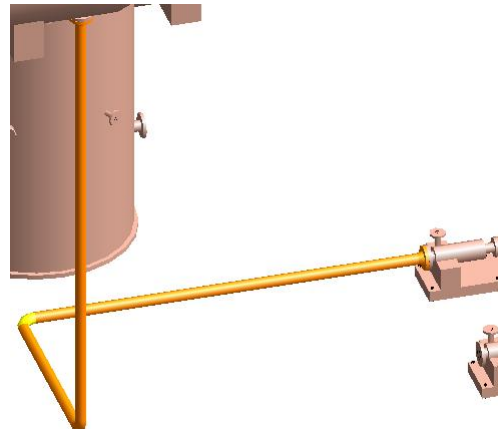
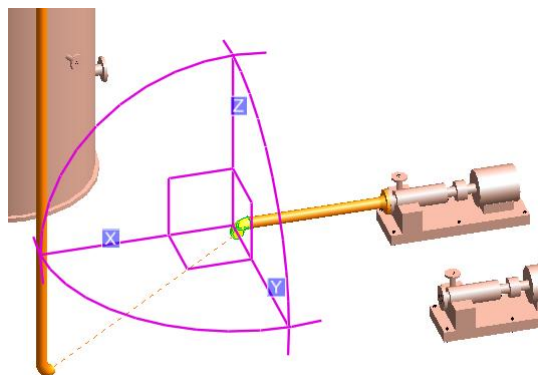
Undo to return to previous position.



Change the orientation of the first Elbow by a couple of degrees and [Align selection/component] again.

Now it's a bit better, but not good enough. We need to rotate the first Elbow more. Rotate by the ME to align the Leave port with the W direction

[Align selection/component] a last time to finish the pipe.






## A Tee

Filter By: unset



Bore	SType	Description (Full Description)
100	T	TEE ANSI B16.9 BW ASTM A234-WPB
100	TS	TEE SET ON API5L GR.B
100	TEE	TEE ANSI B16.9 BW STD ASTM A105 GR.B
100	TSO	TEE SET ON ASTM A53 GR.B

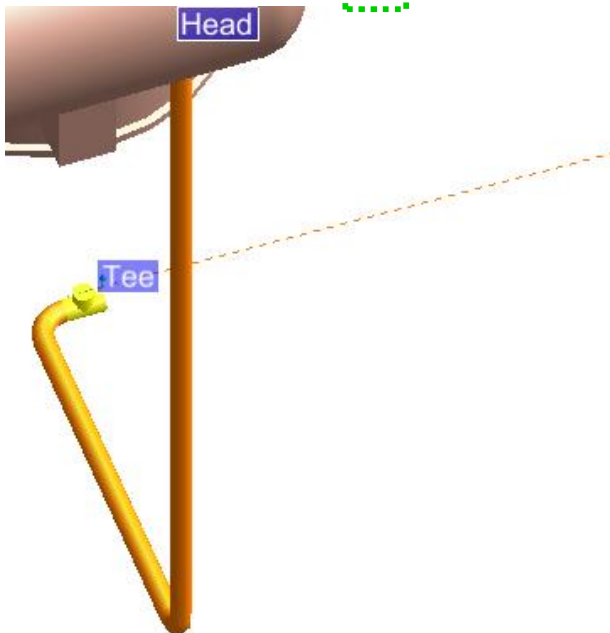
Connection Information

Conn. Bore: 100

Config:   

Creation from P-A3B-N2/B1

 With Flow  Against Flow



Now lets create a Tee

Select Tee in the Component Creation form

- 1) Size of Connection
- 2) How our current Branch will flow through the Tee

Pick "Conn. Bore" 100 and Stype TEE and set 2) to the middle option.

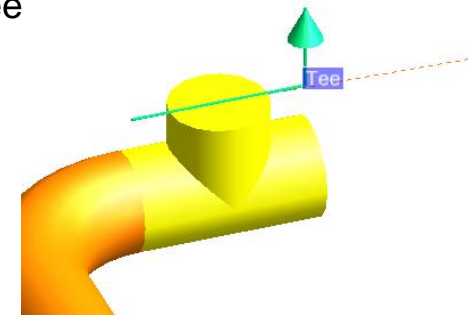
Take note on which component you have as CE and your build direction, With or Against Flow.

[Connect]

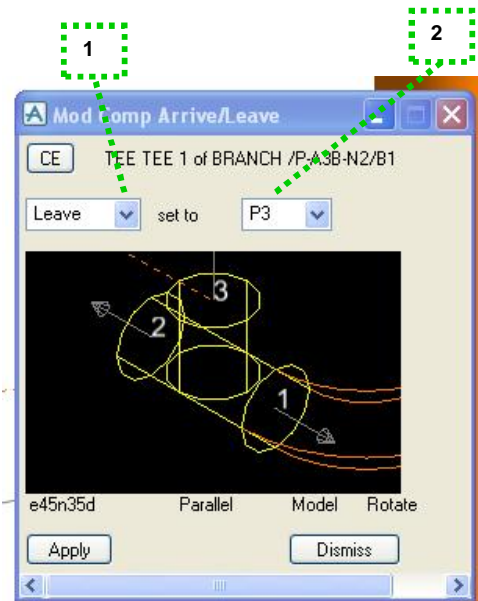
And we broke the pipe...why??

Zoom in on the Tee and take a look, the Branch line is leaving from the branch of the Tee

Lets fix it!



## Tee, Leave and Arrive



On the toolbar Modify > Component > Arrive/Leave to bring up the Mod Comp Arrive/Leave-fönstet

1) Select if you want to change port for Arrive or Leave

Pick Leave

2) Select which Ppoint the Leave port should be located at.

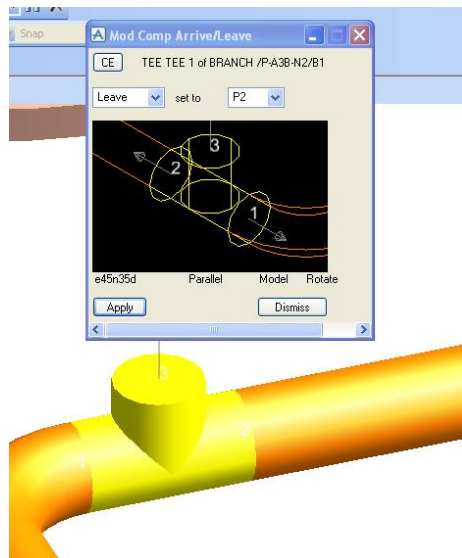
Pick P2

[Apply]

Move the Tee to the middle of the tube with the Command Line, select Tee as CE and type in

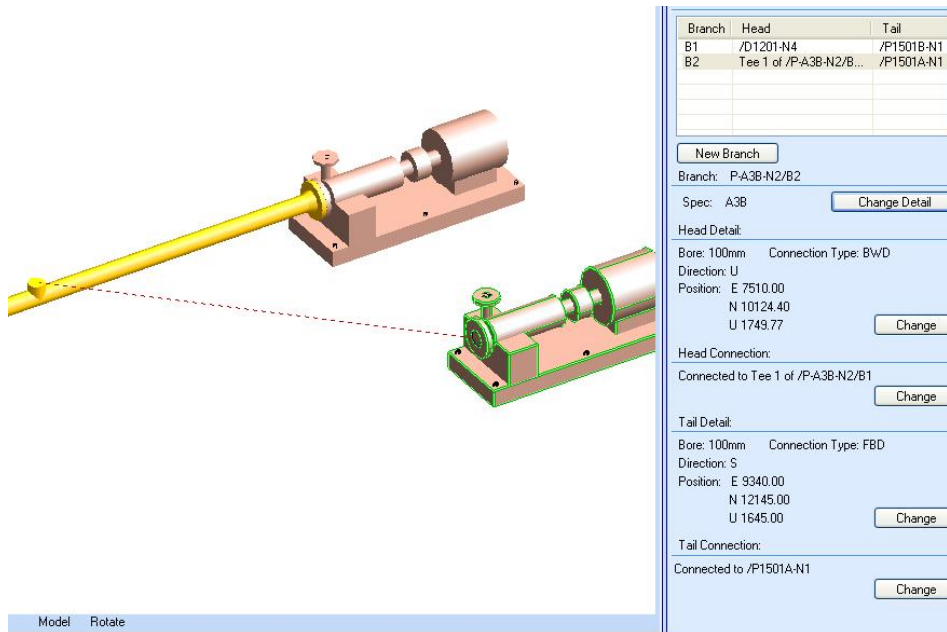
*> move dist 1900*

Or just use the ME if you hate typing 😊



```
> q arr
> q lea
> arr 2
```

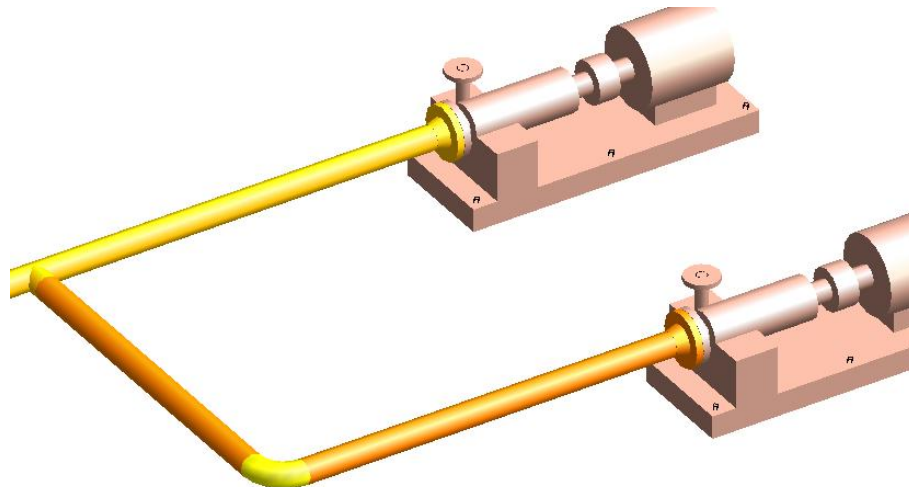
## New branch



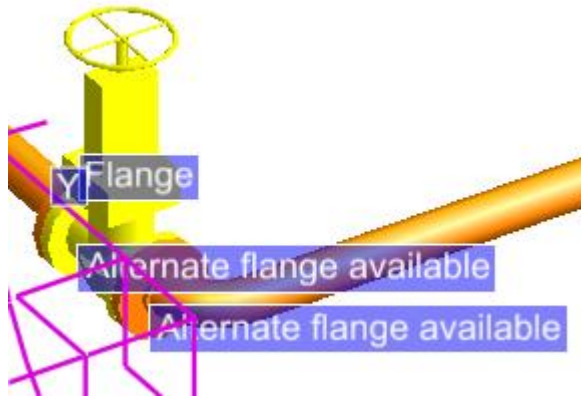
Bring up the Modify Pipe form and press [New Branch]

Connect the Head to the Tee and Tail to pump P1501A's suction

Rotate the Tee so it doesn't point upwards and place a Flange at the pump and then complete the pipe by adding an Elbow



# Valve



Components with Alternatives	
Flange	
Available Alternatives	
SType	Description (Full Description)
FSO	FLANGE SO ANSI B16.5 #300.RF ASTM A105
WN	FLANGE WN ANSI B16.5 #300.RF ASTM A105
ORI	FLANGE ORIF WN ANSI B16.36 #300.RF ASTM A105
FSC	FLANGE SCRD BOSS ANSI B16.5 #300.RF ASTM A105 GR.B

Create Components form and select Valve type

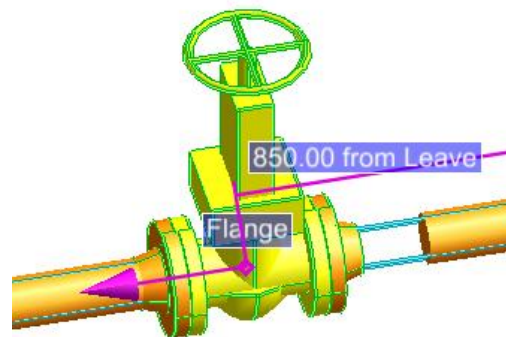
Select the Tee if you'r building with the flow, or the Elbow if you'r building against the flow.

Pick SType Gate and press [Connect]

Now PDMS informs us that we need to make a decision regarding Flange type.

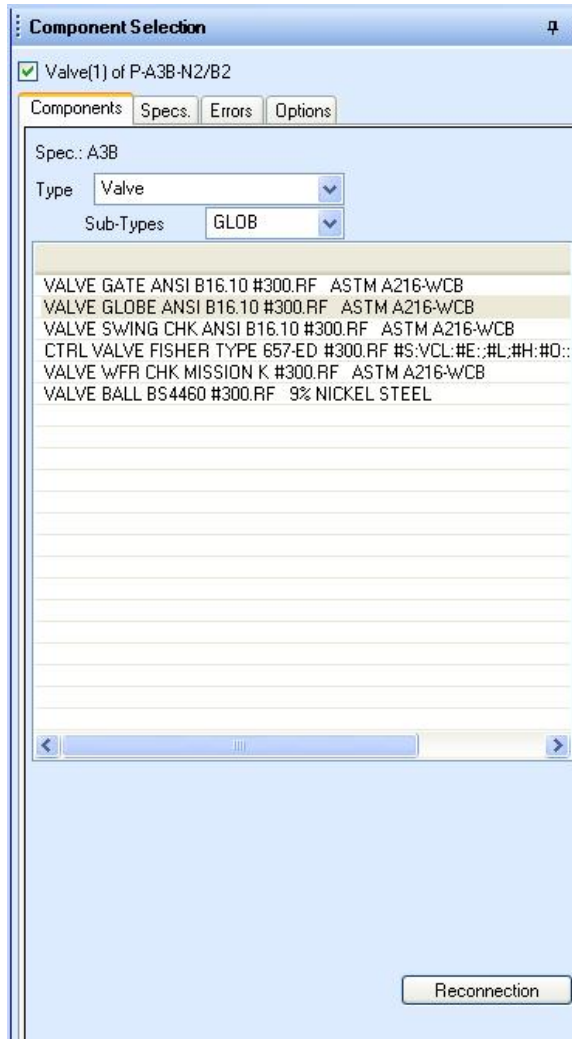
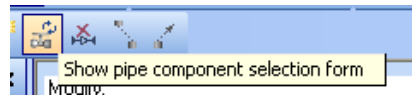
If you zoom in on the Valve and pick between the STypes FSO, WN and ORI you can see PDMS updating components and graphics on the fly

Try selecting the Valve with the ME and drag, and notice that PDMS also moves the flanges.





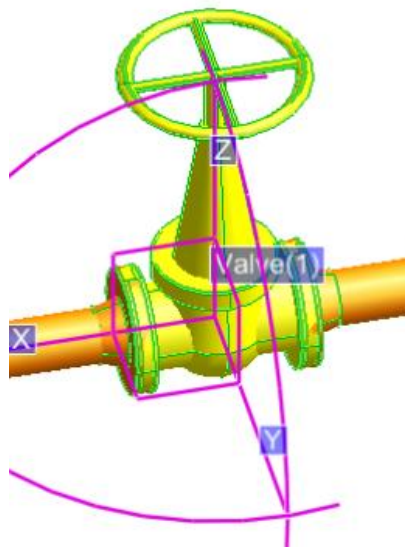
## Change Valve SType



Ok, you'r happy with a Gate valve but somehow there's a change and now it should be a Globe valve instead.

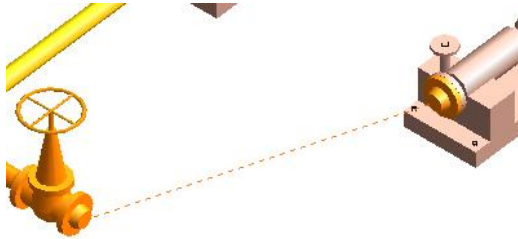
Bring up Component Selection Form, and select the Globe valve. 3D-view updates after selection, make the change by pressing [Reconnection]

There's a dropdown list called Type, using this you can even change the valve into something else, like a restrainer...try it ☺



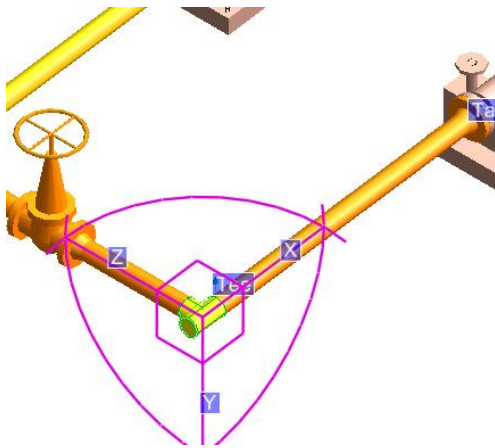


## New Branch on your own...

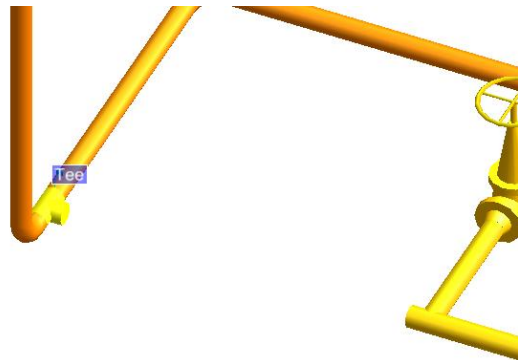


Delete Elbow

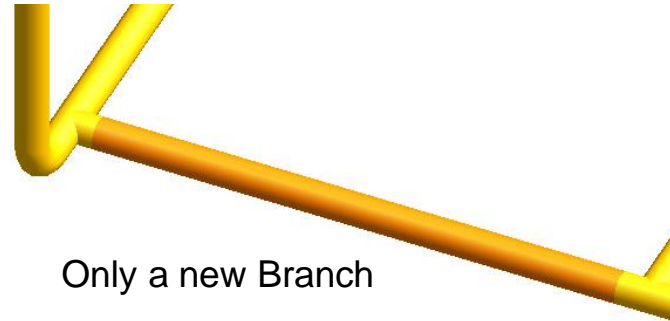
Here's a set of images, displaying what you should do, try to follow them.



Use these buttons  
to move Tee

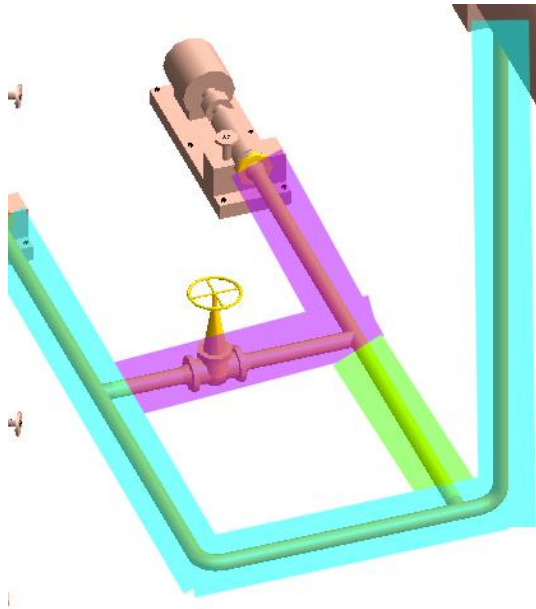


Remember to  
change branch  
when creating  
second Tee



Only a new Branch

## Check CE



Ok, lets check the topology

We'll take one Branch at the time

Blueish: >check ce

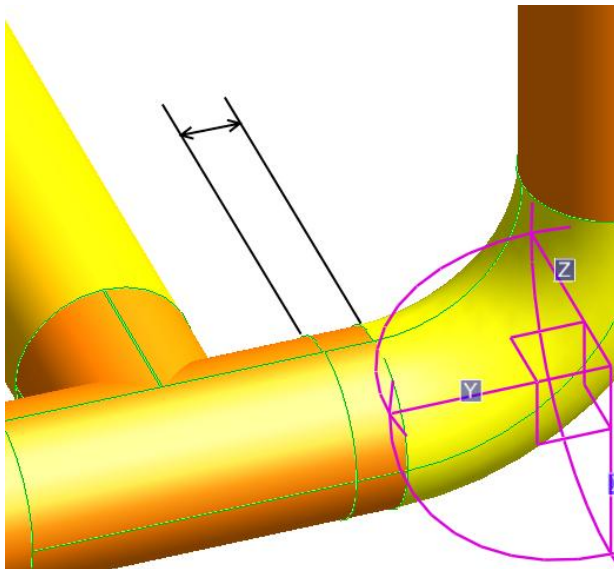
TEE 1 =15392/10192

D400 ARRIVE TUBE LESS THAN TUBE  
MINIMUM ACTUAL TUBE LENGTH IS 32.83mm

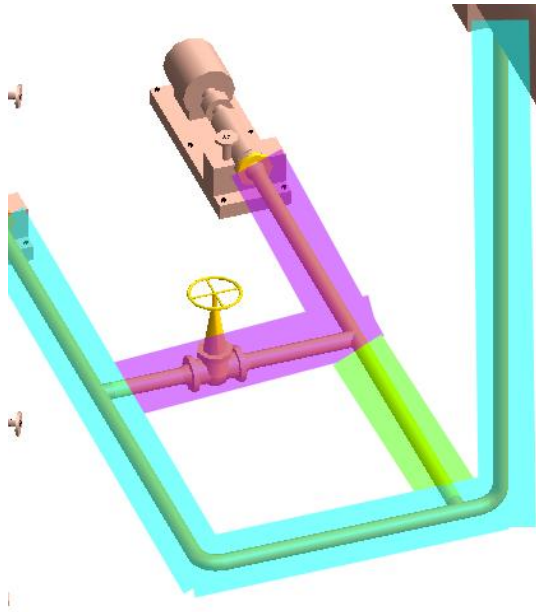
Double click the row TEE 1 = in the Command Window, then erase the TEE 1 string and space before =, leaving you with =15392/10192 (you'll have another number..)

Now that Tee with error is CE. Looking in the manuals, the error D400 is exactly as printed, we'r breaking a rule specifying minimum pipe length.

Good rule as you can't weld like that, but this is for fun so let's ignore it.



## Check CE



Greenish: >check ce

Date 17 Apr 2012 Time 17:16

BRANCH /P-A3B-N2/B3

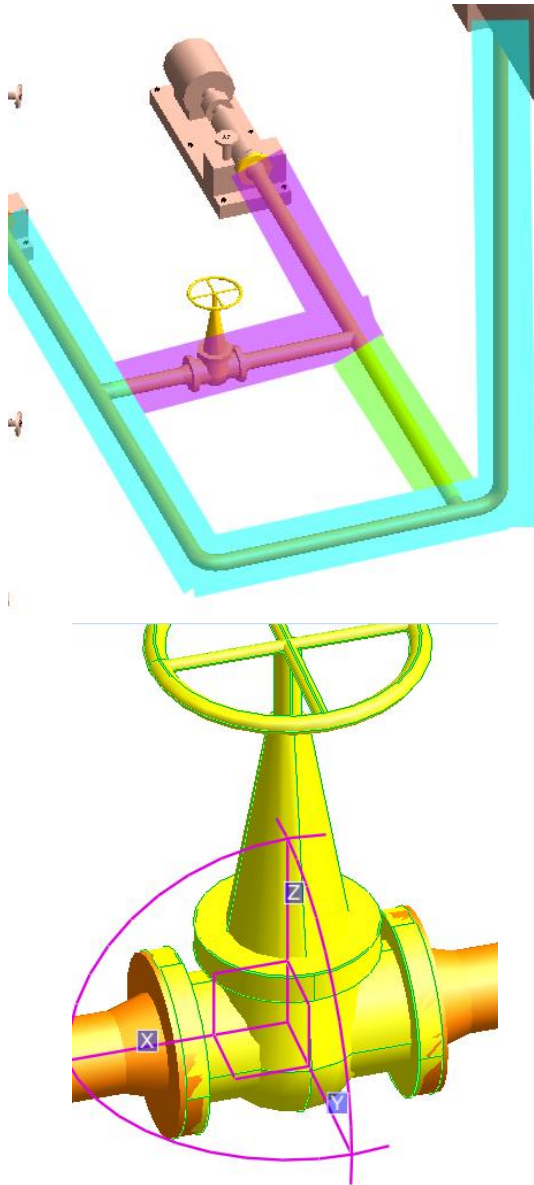
C540 THIS BRANCH HAS NO COMPONENTS

END

\*--\* NO DATA INCONSISTENCIES \*--\*

Good, no inconsistencies, C540 is just a warning.

## Check CE



Purpleish: >check ce

Date 17 Apr 2012 Time 17:17

BRANCH /P-A3B-N2/B2

GASKET 1 =15392/10187

D610 LEAVE CONNECTION TYPE NOT  
COMPATIBLE WITH CONNECTION  
TYPE OF LSTUBE

VALVE 1 =15392/10184

D400 ARRIVE TUBE LESS THAN TUBE  
MINIMUM ACTUAL TUBE LENGTH IS 25.4mm

D410 BAD ARRIVE GEOMETRY

Tolerance Angle is : 0.572958E-01 Actual  
angle is : 180.000

D430 BAD ARRIVE CONNECTION TYPE

D610 LEAVE CONNECTION TYPE NOT  
COMPATIBLE WITH CONNECTION  
TYPE OF LSTUBE

GASKET 2 =15392/10185

D400 ARRIVE TUBE LESS THAN TUBE  
MINIMUM ACTUAL TUBE LENGTH IS 25.4mm

D410 BAD ARRIVE GEOMETRY

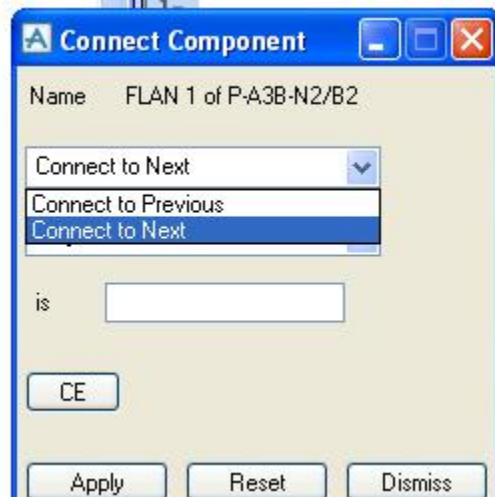
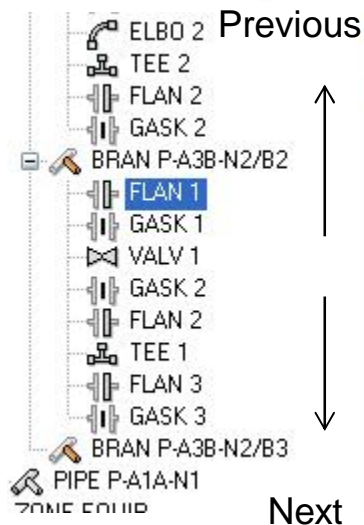
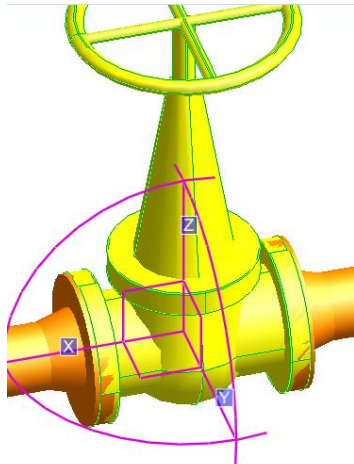
Tolerance Angle is : 0.572958E-01 Actual  
angle is : 180.000

D430 BAD ARRIVE CONNECTION TYPE

END

If you did not get this error – good for you ☺

## Check CE



Zooming in we can easily view how the valves flanges crash with the connection flanges.

You can fix this in a couple of ways.

Easy and straightforward is deleting the flanges and gaskets, and then creating new ones.

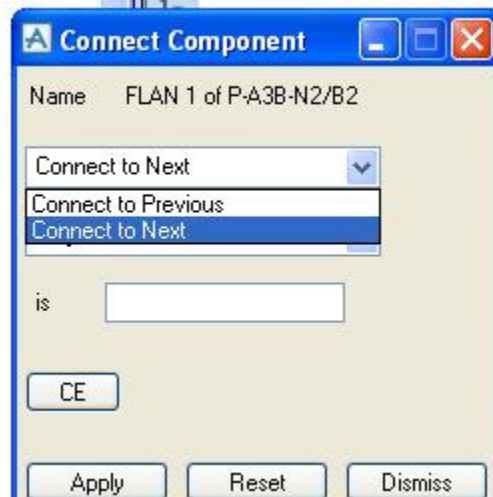
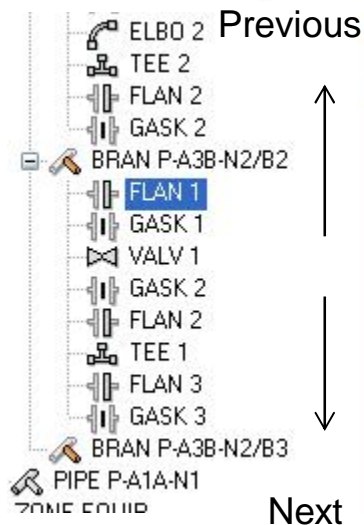
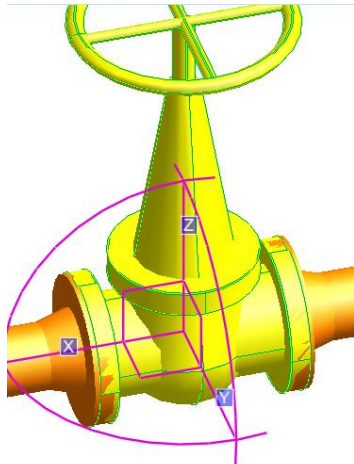
Another one is reconnecting the components, this can be done with the Command Line or a dialog box through Connect>Component

First, select gasket the Gasket above the Valve in the Design Explorer. Now the Gasket should connect to the Valve which is Next in flow, to pick Connect to Next and [Apply]. Then select the Flange first in flow order, press [CE] to have the Connect Component form load it as CE and [Apply]

For the Gasket and Flange after the Valve you need to change the dropdown list to Connect to Previous and repeat.

All should be OK now.

## Check CE, Command Line



Instead of using the Connect Component form you can as mentioned use the Command Line.

Follow the same pattern as with the form, but instead of using the dropdown list to change direction you type

> back or >forw

To connect you type

> Conn

And to check your current build direction you use

> q mode

But that was a lot of typing...to make it easier you can just type in

>conn to next

>conn to pre

And use

>next

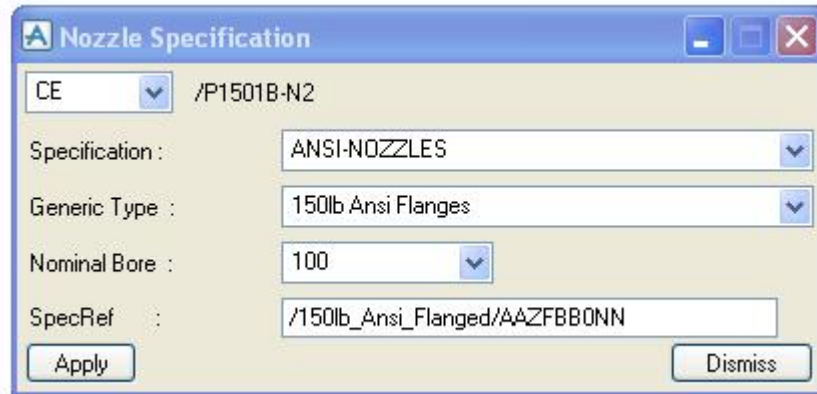
>pre

To navigate between the components

**Before using the Command Line to change direction and connect stuff, please take a look at the end of this document and read Forwards/Backwards VS With Flow/Against Flow**



## Change Nozzle specification



Lets change spec on a Nozzle.

Enter Equipment, Design>Equipment

Select Nozzle P1501B-N2

Modify>Nozzle Specification

PDMS might prompt an error message now (did for me, but just ignore it..)

Now lets pick a nozzle spec like the image and [Apply]

## New Pipe

Tail Detail:  
Undefined

Change

Tail Connection:  
Undefined

Change

Modify Branch Tail:

Bore: 100

Connection: unset

Direction: E

Position wrt World: Pick Position

		Lock
East	0.00	<input type="checkbox"/>
North	0.00	<input type="checkbox"/>
Up	1000.00	<input type="checkbox"/>

Apply Copy To Head Back

Create a new pipe with the A150 spec. Name it P-A150-N3

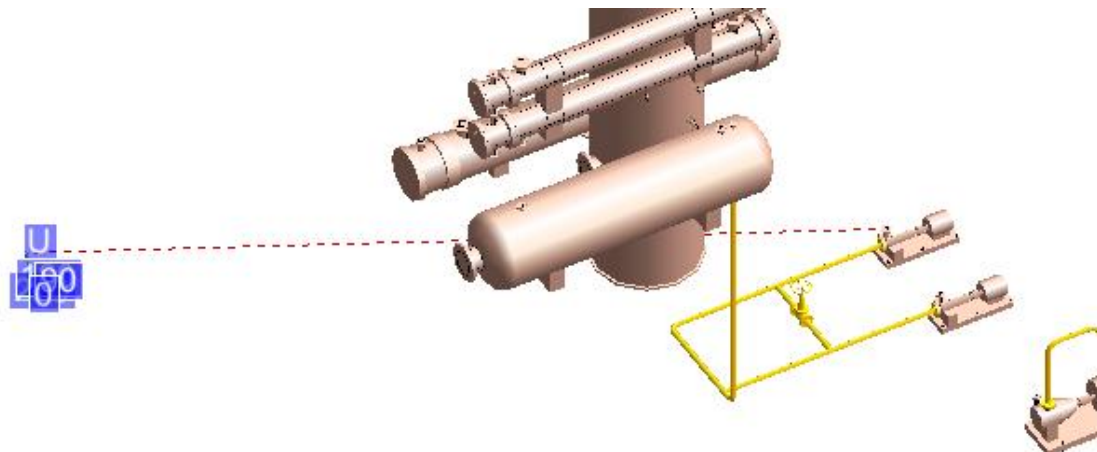
Connect the Head to P1501B-N2

Instead of connecting the Tail we're going to place it by coordinates.

[Change] for Tail Detail

Now we can set Bore at 100 (both Tail and Head need a Bore otherwise you can't create Components) and enter position. We could place this anywhere but let's just leave it per default.

[Apply]

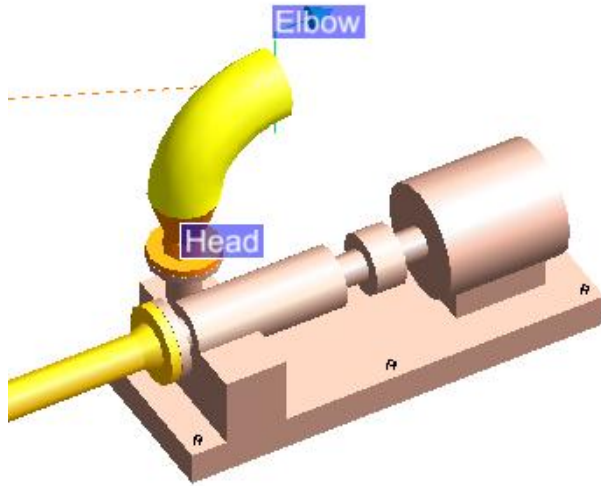




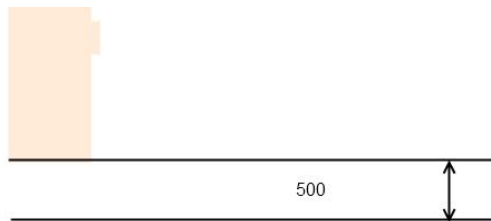
## New Pipe, add components

---

Place a Flange at the Nozzle and a Reducer up to 200,  
end with an Elbow



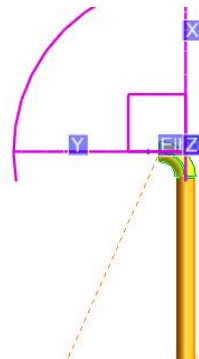
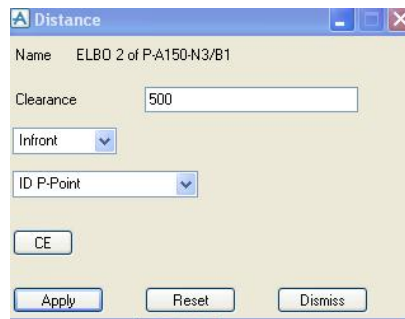
## Move Clearance



When pushing components around you often have clearance rules governing your work. 400mm from this equipment, 200 from that and so on..

..luckily Move Clearance works exactly the same for piping components as it does for equipment primitives

Through the menu Position > Component > Clearance



[Apply] and select appropriate Ppoint on the equipment.

If you want to use the ME, the best way I have found is Aligning with the surface, then moving backwards  $500 + \text{outside diameter} / 2$

Get outside diameter by Query>Properties...

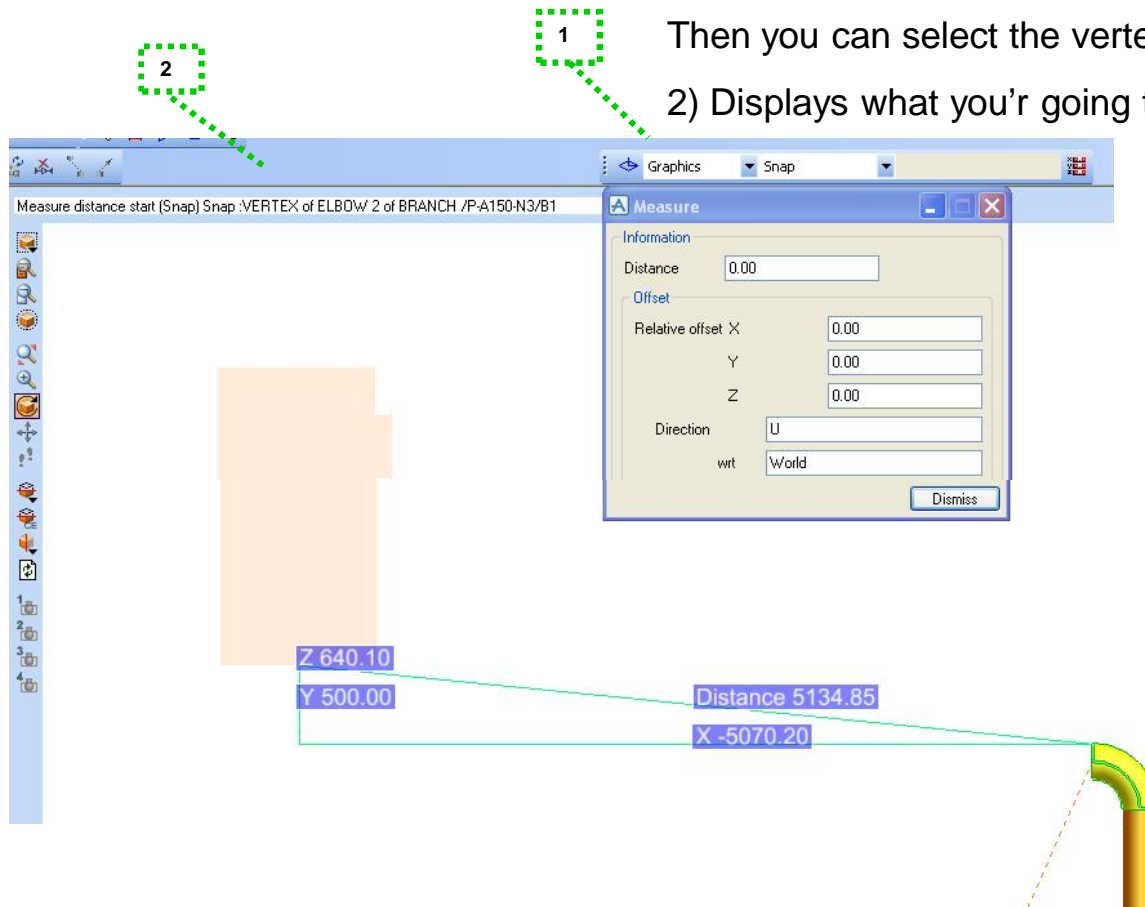
```
[ > move clear 500 infront idp@ ]
```

## Move Clearance, measure

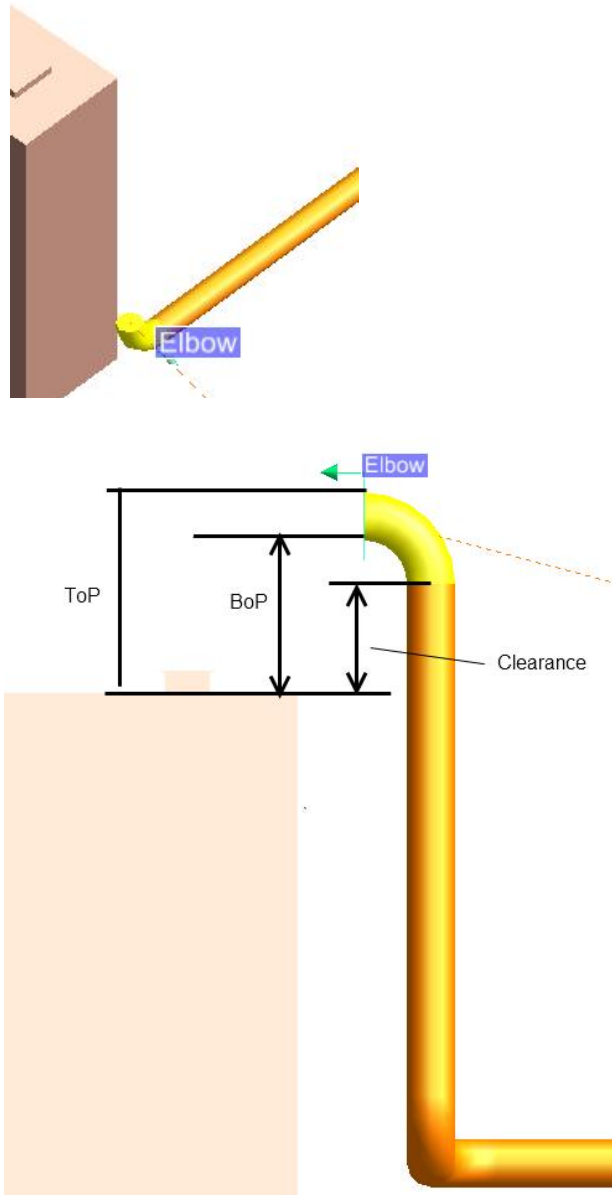
When measuring components and you want the distance to the surface and not centre you need to change settings from Any to Graphics in 1)

Then you can select the vertex on the edge of the Elbow .

2) Displays what you'r going to select



## Move Clearance, BoP/ToP



Create a new Elbow and drag it in front of the equipment Ventilation\_Unit1

Rotate the Elbow upwards and create a second Elbow

Pipes and Components have two attributes known as BoP – Bottom of Pipe and ToP – Top of Pipe.

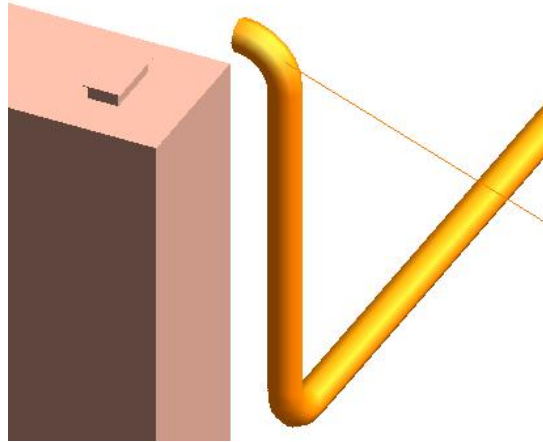
Position > Component > BoP/ToP



[Apply]

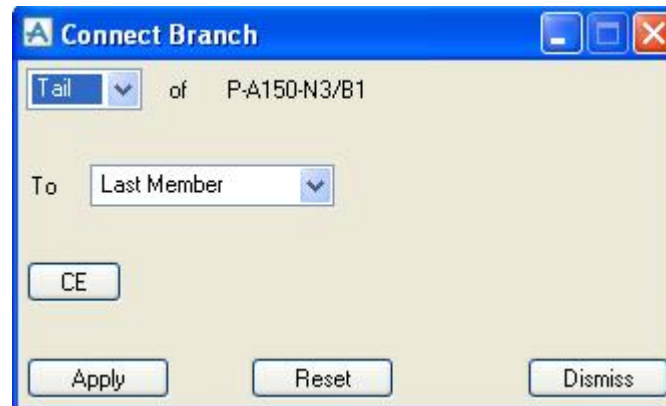
[ > bop 500 onto idp@ ]

## Connect Branch

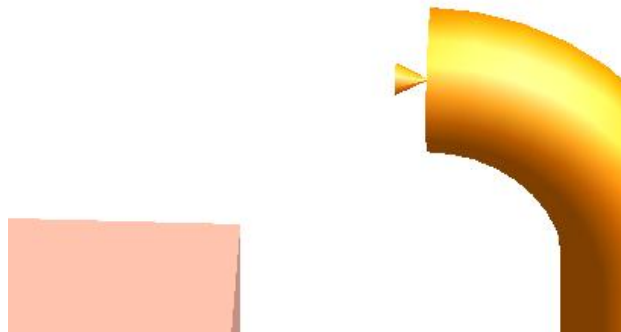


We still have the Branch line leaving the elbow and heading of in space.

We fix this by going into Connect>Branch

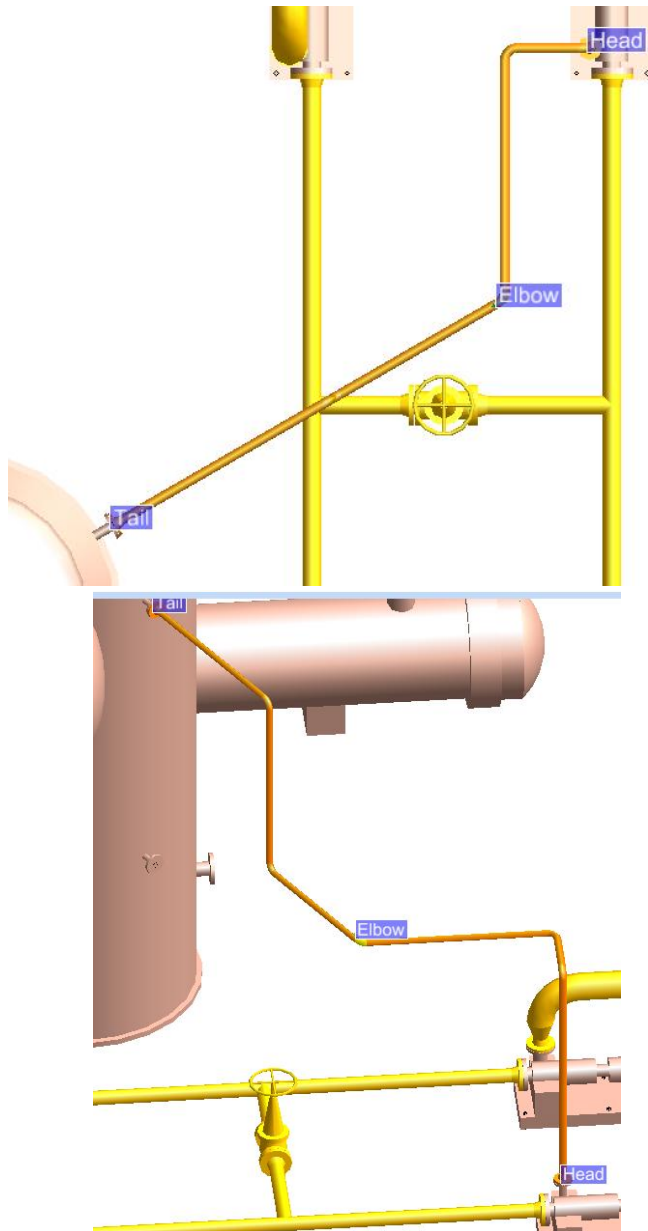


Change to Tai, and in the dropdown list to Last Member  
[Apply]



Reason for this is if you have 10 users, everyone leaving Branch lines all over the place it can quickly get ugly...

## Angels and random moves



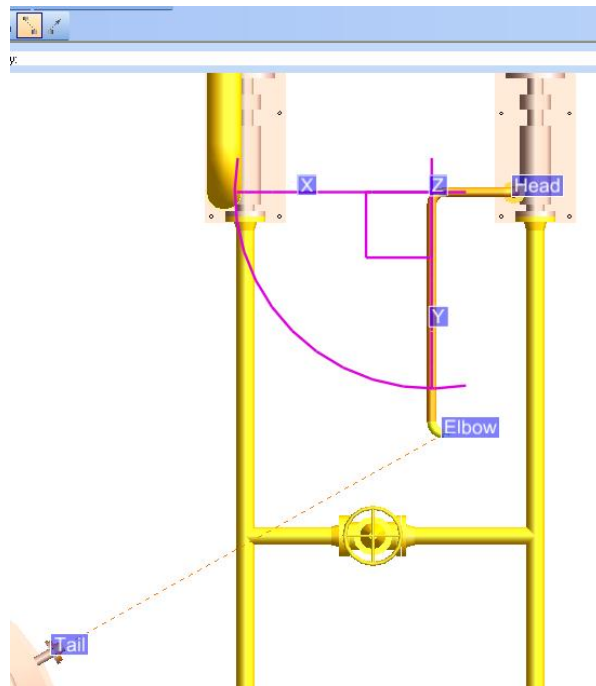
Now we're going to build this pipe

First, enter the Equipment module and change Nozzle specifications to 150 Ansi and Bore of 50 for both Nozzles.

Then create a new Pipe and connect the Head and Tail.

Create Flanges and both Head and Tail and the two first Elbows at the Head, exact tube lengths are not important.

## Angels and random moves, cont.

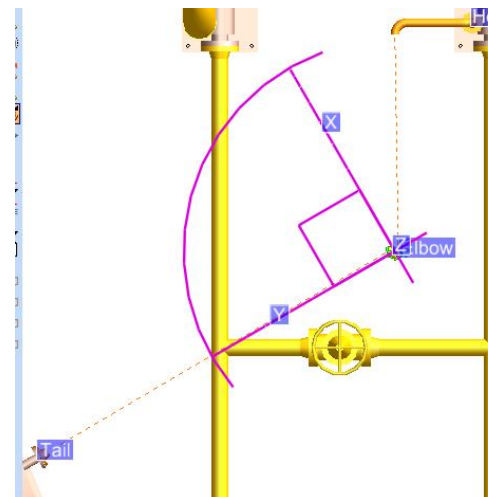
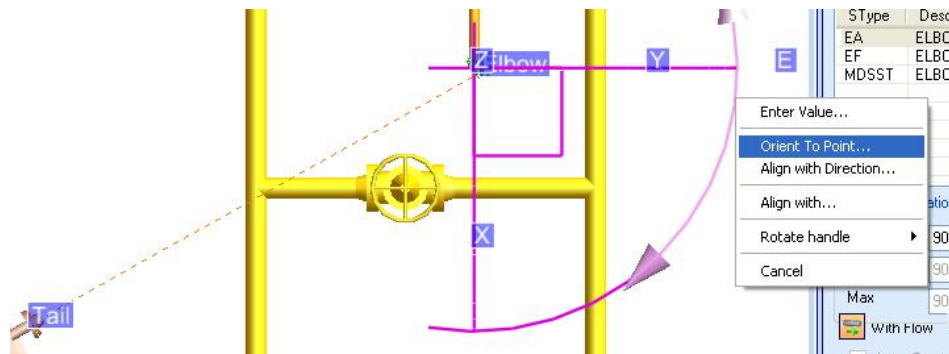


Create another Elbow and use the Align selection\component button to move it to the intersection of the Tail.

Use the ME and select the Leave axis, right click and Orient To Point.

Select the Tail Nozzle.

Now the Elbows rotates to orient it's leave without changing the X-Y plane.



## Angles and random moves, cont.

Use the Command Line to ask for the information regarding the Ppoint at the Leave port.

> q pl

Ppoint 2 of ELBOW 3 of BRANCH /test/B1

Bore 50mm

Direction W 30 S

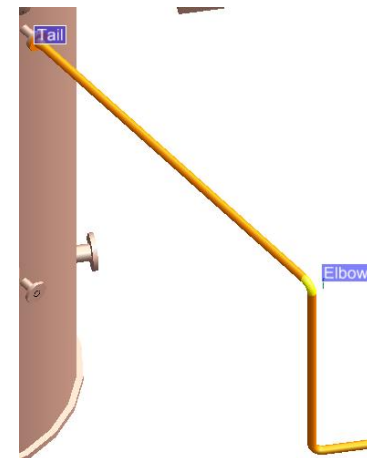
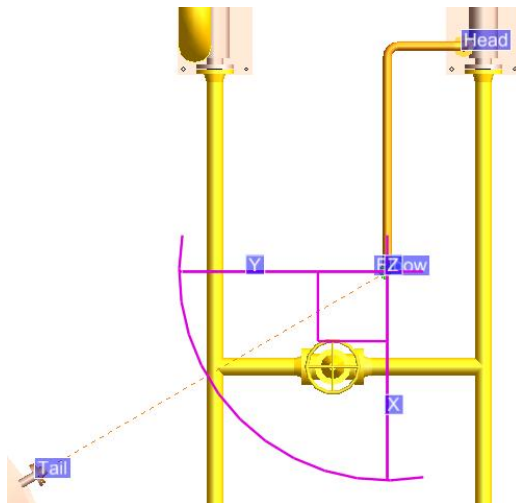
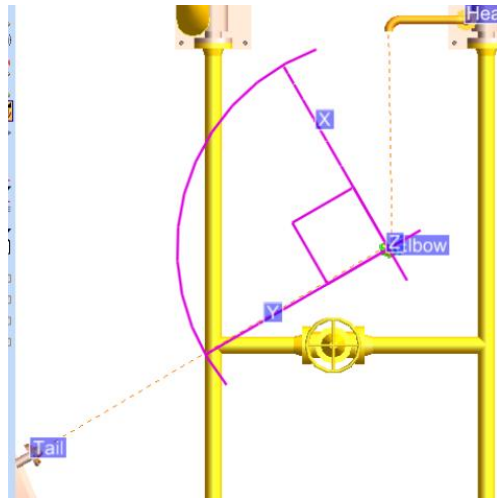
Position E 8619.589mm N 10731.922mm U 2816.2mm

Connect BWD

Double click the row Direction W 30 S and hit [Enter]

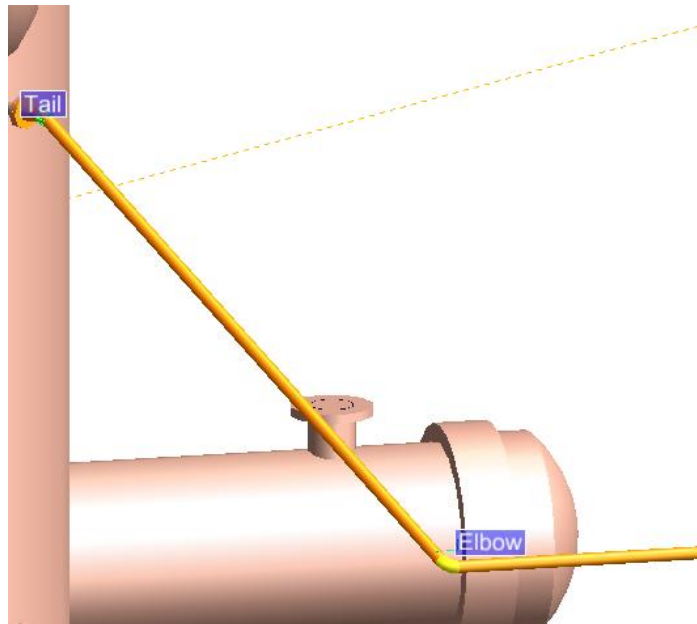
PDMS now changes the direction of the Elbow and in that process the angle is changed to match the Arrive port.

Now it's easy to add the last Elbow and move it up to complete the pipe.





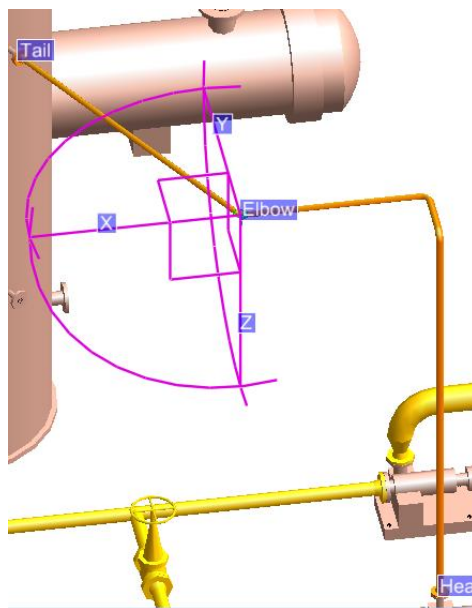
## Angels and random moves, cont.



The reason we went through the trouble with >q pl and changing direction is because we wanted to change one direction at the time.

If we wanted to do like in the left image, we would have created an Elbow at the Tail, and then used the following commands, starting with Tail Elbow as CE

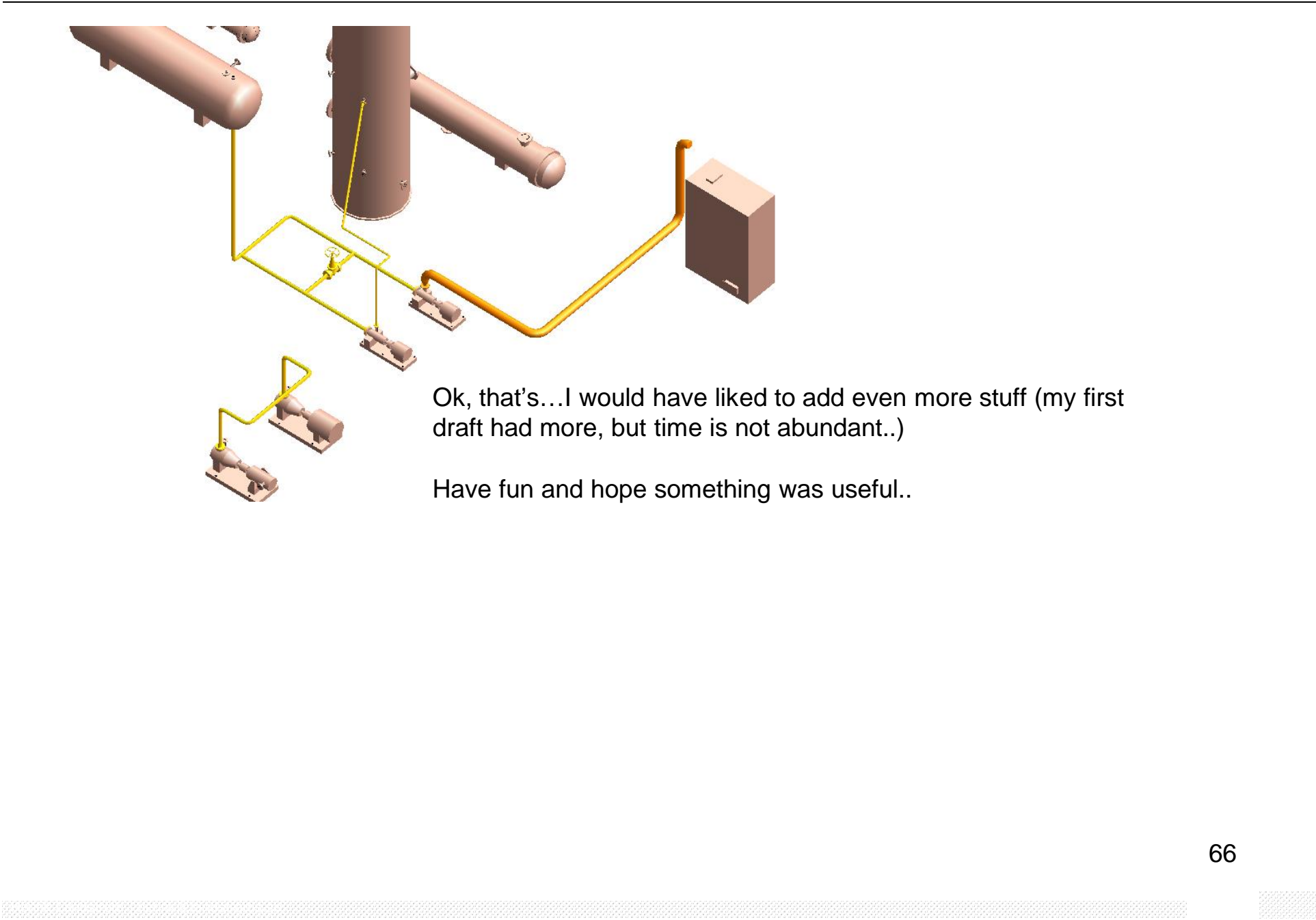
```
> back  
> conn to next  
> forw  
> pre (to select other Elbow, or just select it with the mouse)  
> conn to next
```



Or if we had the pipe at same elevation as the Tail Flange we could have just used the Align and Orientate buttons...



Thinking of it – pulling the pipe of to the same elevation, fixing the Elbow angle and then pushing it back down is even easier than going through past pages...



Have fun and hope something was useful..

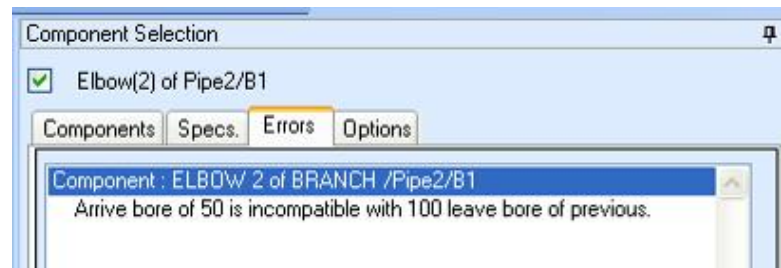
## General: Component Selection - Errors

If you think PDMS should create a tube between your components, and it doesn't you might wonder why...

To find out, you need to open up the [Show pipe component selection form]

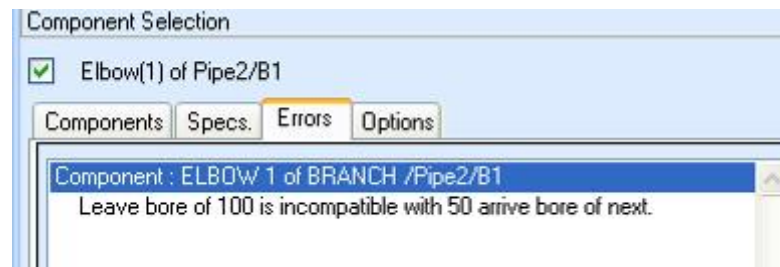


Component Selection form is brought up, hit the Errors page



And there you have it, ELBOW 2 is CE and its Arrive bore at 50 doesn't match the Leave Bore of the previous component

Switch CE ELBOW 1.  
(the previous)

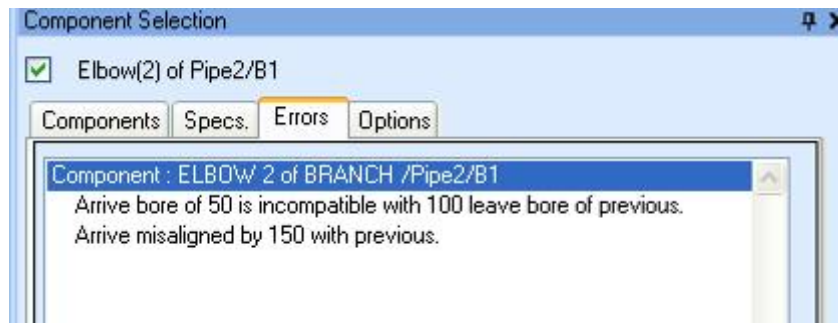


Same information, but from the another point of view

## General: Component Selection – Errors cont.

Moving ELBOW 2 so it no longer is align with Elbow 1

[Refresh] at the bottom of the Component Selection form to update the Error information.  
Errors also updates by chaging CE



> q ldir  
> q adir  
> q abore  
> q lbore

## Forwards/Backwards VS With Flow/Against Flow

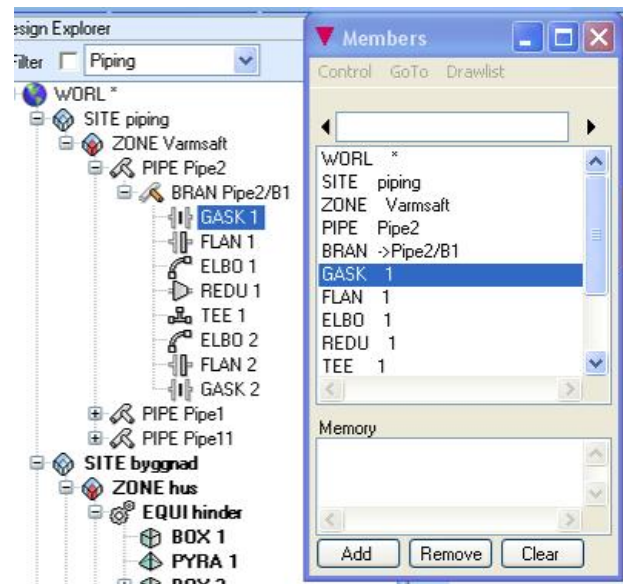
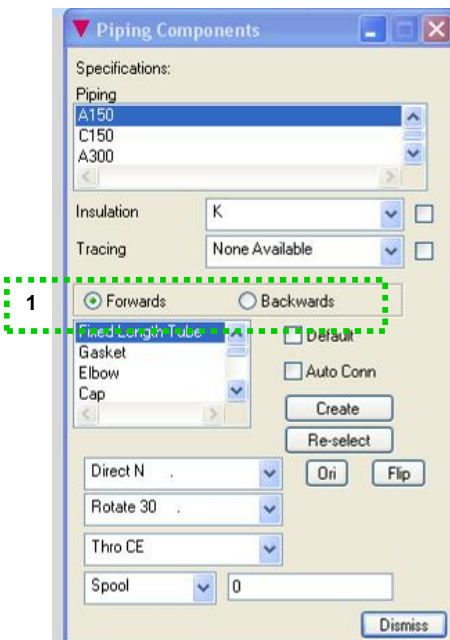
As mentioned in the beginning, there are new and old methods that can be used within PDMS to achieve your goals. Most of them work the same and everyone is happy.

But when talking to old school pipers using older methods, telling you how easy things are you need to be aware of on issue.

First, bring up the Piping Components window, used to create components. Create > Components

1) Here you change Forwards or Backwards, just like Against Flow or With Flow

But. Changing from Forwards to Backwards does not effect selection of Against Flow or With Flow – so they work independently.



New user use the Design Explorer to navigate the hierarchy and old school users can use other windows.

Display > Advanced Members

And we have the Members window up. Both display the same information.

## Forwards/Backwards VS With Flow/Against Flow cont.

Bring up all forms and windows at the same time.

1) Design Explorer, 2) Members, 3) Piping Components and 4) Component Creation

Keep an extra eye on the 5) CE dropdown lista on the ribbon.

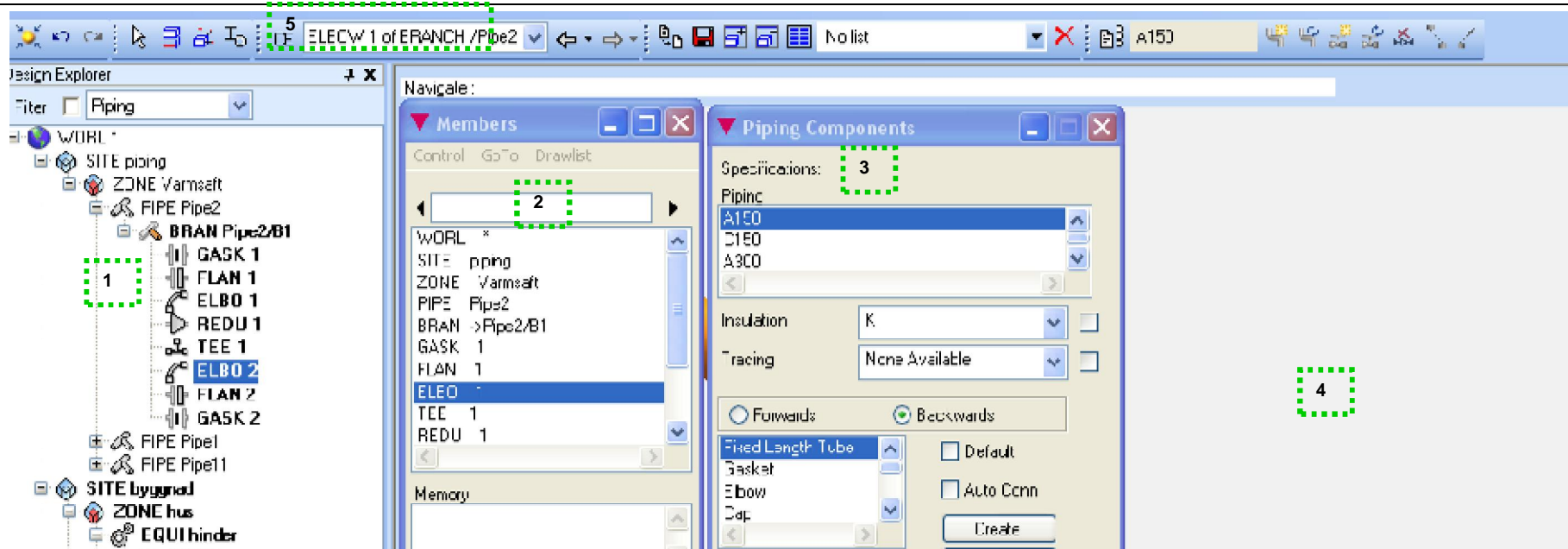
Here's an Elbow CE, next to a Tee.

Changing between With Flow and Against Flow with 4) only updates the aid graphic in the 3D view.

Now pick Backwards in 3) Piping Components  
What happened?



## Forwards/Backwards VS With Flow/Against Flow cont.



No effect in Design Explorer, 1), ELBO 2 is still CE.

But, both 2) Members and 5) lists ELBO 1 as CE....??

Taking a closer look at 2) you'll notice that the entire hierarchy has been inverted. GASK 2 who is last in flow for 1) is GASK 1 and first in flow in 2).

In 4) Component Creation form, [Connect] to create new Elbow.

It's connected With Flow, which means the 4) form does not take into account the flow direction set by 3).

That's it. 4) Design Explorer does not reorder the hierarchy and does not listen to changes from 3) Piping Creating or the Command Line

