Aligning Piping Fittings in AutoCAD Plant 3D

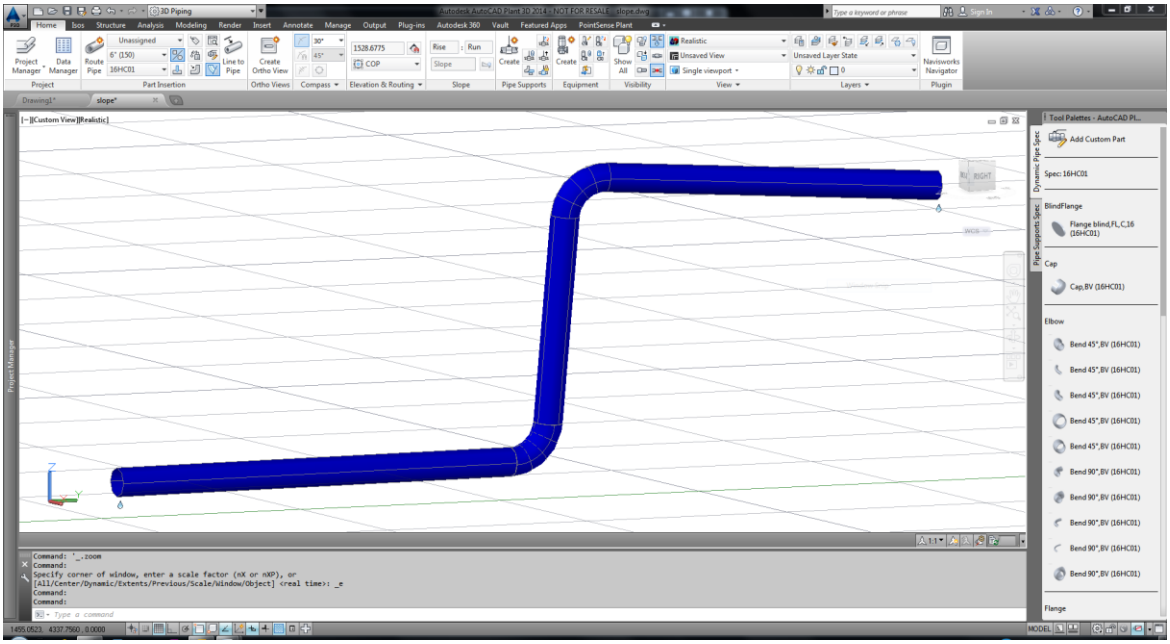
AutoCAD Plant 3D 2014

When inserting pipe run components into a pipe, AutoCAD Plant 3D will align the fittings along the pipe axis, ensuring that they are orthogonal to the pipe. However, there are occasions when the fittings are required to be fitted so that they are aligned in the vertical and horizontal planes of the world UCS when inserted into sloping pipe. To accomplish this, the fittings cannot be placed directly into the pipe.

To insert Fittings into a sloping Pipe to align with World UCS

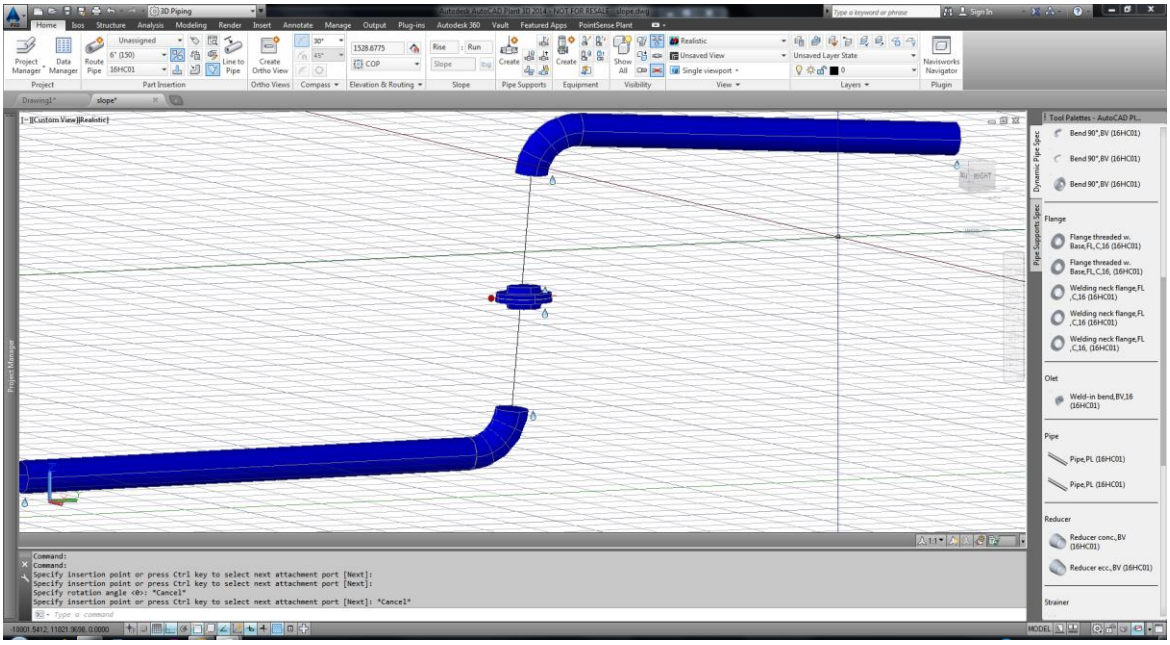
This White Paper describes a method to insert fittings into a sloping pipe and align them to the world UCS.

In the following example, a flange set will be inserted at the mid-point of the near vertical pipe shown below. The pipe slopes in both the XZ and YZ planes, the flange set is to be inserted so that it is aligned with the Z-axis.



If the flange set was simply placed into the existing pipe, it would be aligned along the pipe axis. To prevent this, it must be placed and orientated in space before it is connected to the pipe.

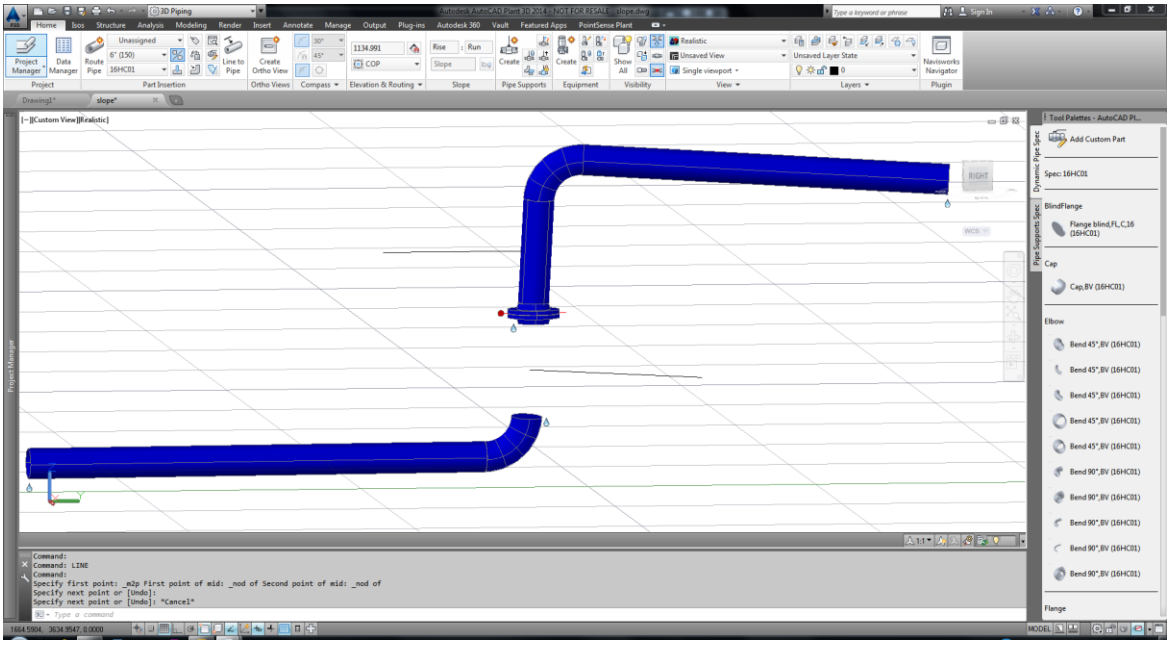
In this example, the near-vertical pipe is deleted from the model and a temporary construction line inserted to join the node points of the two elbows. The flange set is then inserted into the model at the mid-point of the line and oriented correctly with along the Z-axis in the XY plane.



Having placed the flange set, it is not possible to connect the elbows directly to the flange as the autorouting will not allow both ends to be connected when neither is orthogonal to the original pipe axis.

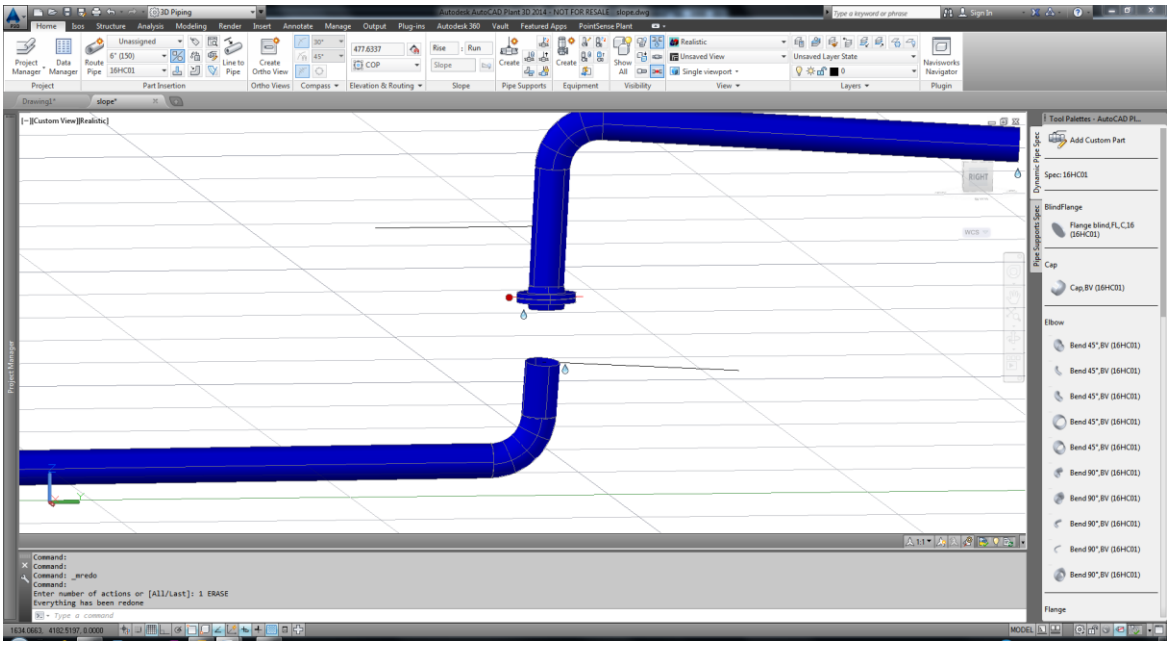
To work around this, construction lines are created to provide endpoints that are midway between the nodes on the elbows and the nodes on the weldneck ends of the flanges.

Pipe is then routed from an elbow to the endpoint of the construction line and then from the corresponding flange to the node on the open end of the pipe routed from the elbow.

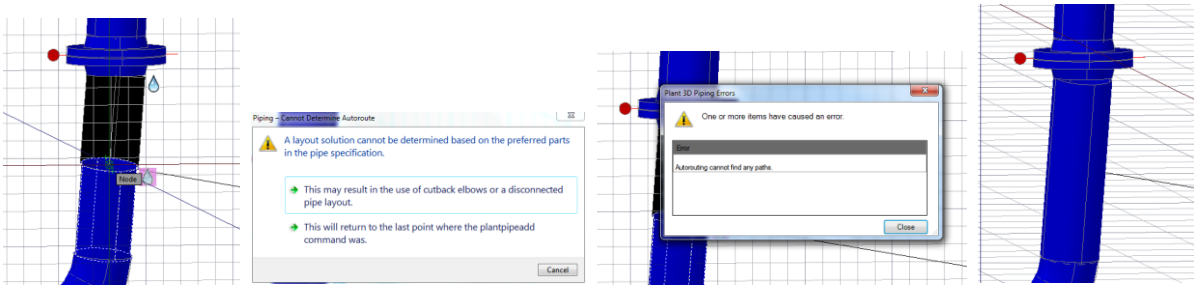


To do this, tolerance needs to be enabled on the routing compass and the correct routing plane selected to prevent a fitting being placed directly at the elbow. It may also be necessary to turn off the routing compass. If the pipe connections are outside of the default tolerance (3 degrees and 0.1 mm for a Buttweld joint), these values can be increased in the DefaultConnectorsConfig file for the project.

The procedure is repeated for each elbow to flange connection.



As the connections are made, Plant will produce a warning message to indicate that it may have to cutback elbows to make the connection, this can be ignored. The connections will be made correctly.



The resulting piperun is shown below.