AutoCAD
Plant 3D

What is AutoCAD Plant 3D?

AutoCAD Plant 3D is specification-driven software for creating 3D models of process plant components. You can route pipe, add equipment and other components, and include support structures.

Within AutoCAD Plant 3D, underlying data is directly exchanged between the 3D model, P&IDs, isometrics, and orthographics to ensure that information is consistent and up-to-date.
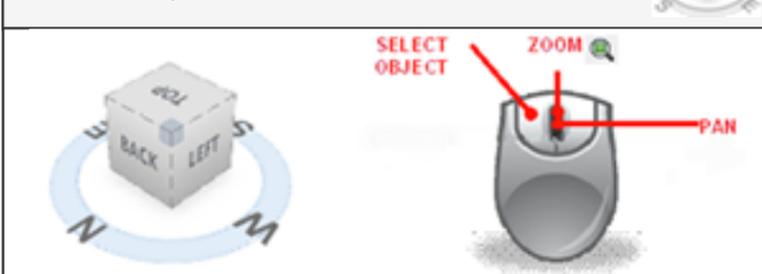
Concepts & Terms
An overview

Project Manager	Central hub for all drawings, specs, and data; you always work within a project
Data Manager	Table containing all project or drawing data. You can manipulate this data directly
Part	Piping Component
Placeholder Part	A component that is temporarily used in the model until the part is added to the spec
Custom Part	A component that is not in a piping spec
Project.xml	The project file
***.dwg**	A Plant 3D model or P&ID drawing
***.dcf**	Data cache files; e.g., piping.dcf
***.pspx *.pspc**	Spec file (pair)
***.pcat**	Catalog file

Navigation
Get around your model

The Drawing Window
Understand the User Interface

Ribbon tabs contain commands for major tasks

Help

Change display

Project Manager

New drawing

Spec Viewer
View a spec and create a tool palette

Create Ortho

Dynamic Tool Palette

View Cube

Workspace switching
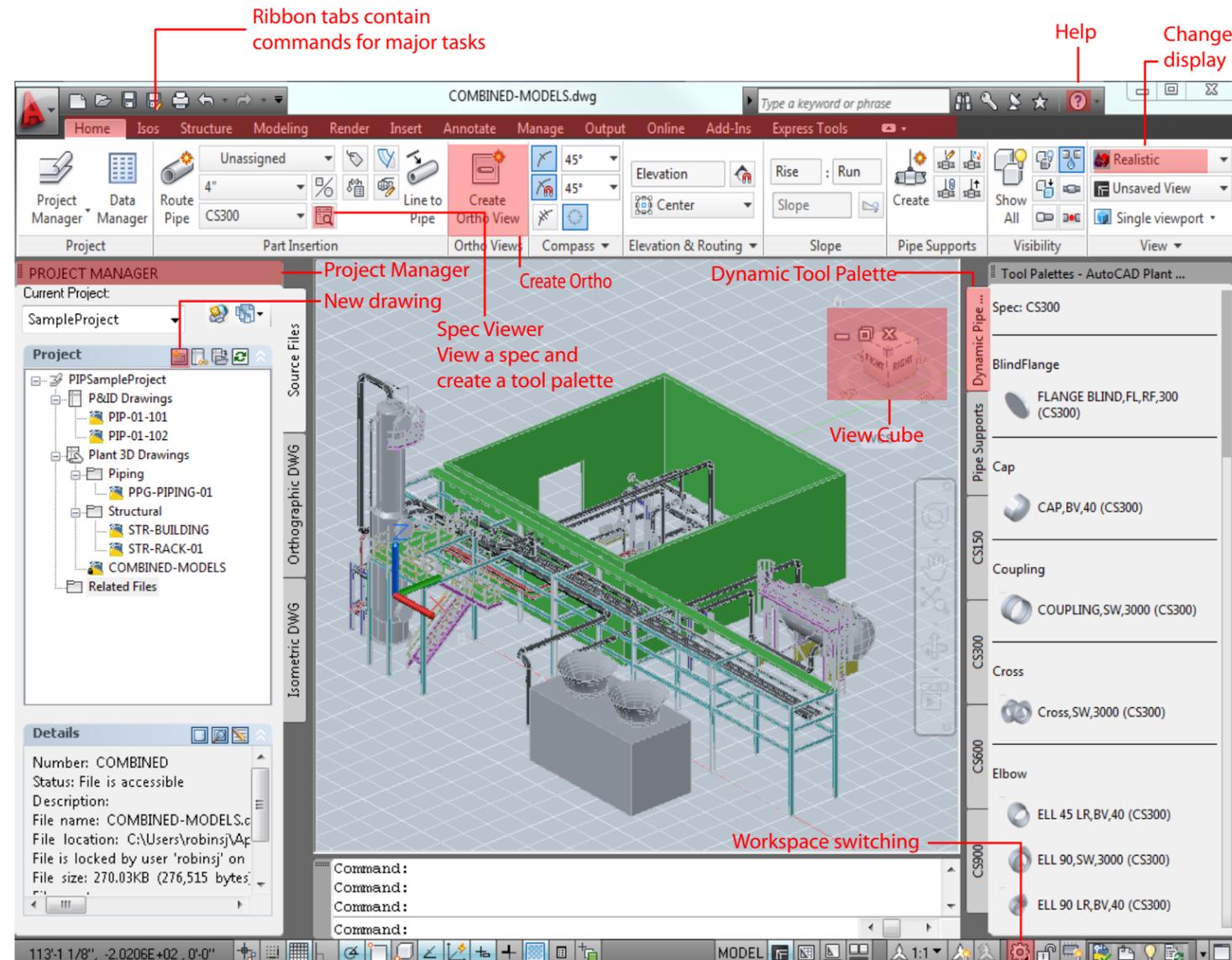
Using the Project Manager

You can create new drawings, open existing drawings, link or copy files to the project folders, and create a project

To create a project drawing:
1. In the Project Manager, right-click Plant 3D Drawings and click New Drawing
2. In the New DWG dialog box, enter the drawing number, author, drawing title, and file name
3. Click OK

Quick Tips
- Right-click a node to see a list of useful commands
- Create and organize folders to your project requirements
- To work with referenced drawings, copy or link them here

Using Tool Palettes

You can use Tool Palettes to place valves and fittings in your piping model: set the spec in the ribbon, click an item in a tool palette, and then click in the model to place it

Quick Tip
- In the Spec Viewer, click Insert in Model, Add to Tool Palette or Create Tool Palette

Getting Started
A Quick Tutorial

Step 1: Open AutoCAD Plant 3D

Step 2: Create a project drawing
- Project Manager > Plant 3D Drawings > New Drawing
- Enter info > OK

Step 3: Create Structure
- Ribbon > Structure tab:
    - Grid > Create
    - Settings > member info > Select
    - Member > place and align with grid
    - Repeat for stairs, ladders, etc.

Step 4: Create Equipment
- Ribbon > Home tab > Create Equipment
- Select component, specify shape and nozzle info
- Create and place in model

Step 5: Route Piping
- Ribbon > Home tab > drop-down lists:
    - Line Number
    - Spec
- Ribbon > Route Pipe
- Click points in model; press ENTER to finish

Step 6: Insert a Valve or Fitting
- Tool Palette or ribbon > Home tab > Spec Viewer
- Select valve > Insert in Model
- Place in model

Step 7: Create Isometric Drawings
- Ribbon > Isos tab > Create Iso > Production Iso
- Specify project line numbers, Iso type, and output settings
- Create Iso

Step 8: Create Orthographic Drawings
- Ribbon > Home tab > Create Ortho View
- Select ortho drawing > OK
- Select a view, adjust the scale and view extents > OK
- Place view on Ortho drawing

Want More Information?

AutoCAD Plant Exchange: autodesk.com/plantexchange
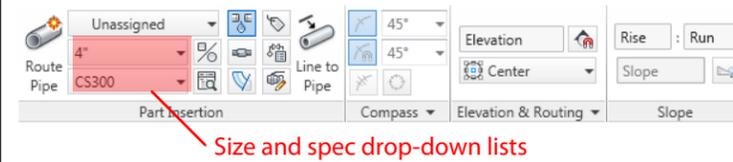
autodesk.com/autocadplant3d-discussion

Online Help: autodesk.com/autocadplant3d-help

Autodesk Consulting: autodesk.com/consulting
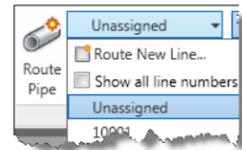
Routing Pipe
A general overview

Before Routing Pipe

Size and spec drop-down lists

These panels contain the pipe-routing tools: Part Insertion, Compass, Elevation & Routing, and Slope.

Line Numbers

- Pipelines are organized by line number
- Line numbers are required when generating ISOs
- You can set up a separate layer for each line number, and piping components are automatically placed on these layers

### Select Specs and Sizes Before Routing

Before routing pipe, you choose its size and spec. The spec controls:
- Connection types (FL, BW, SW, THD, and so on)
- Flange ratings, facings (150# RF, 300#, PN10, and so on)
- Default branch types (tees, stub ins, SOL, WOL, and so on)
- Valve types allowed (Gate, Globe, Check, and so on)

On the ribbon, click Route Pipe to start routing in the model.

Use the Compass

If you use the Continuation grip, the compass starts by displaying the elbows available in the current UCS plane. It uses the elbows from the current pipe spec. If you have
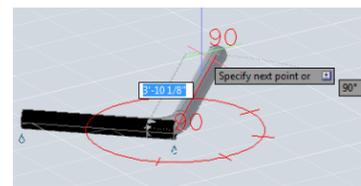
45-degree elbows in your spec, the compass displays them. Otherwise, the compass displays tick marks at 90 degrees. If you want to route straight ahead, you can pick a point or enter a distance.

Quick Tips - Using Snaps While Routing

- Use object snap when connecting pipe
- Use Node object snap to connect to open nozzle or piping ports
- Use the From object snap to place a valve a precise distance from a fitting

Quick Tips - Routing Shortcut Keys

- To remove a selected flanged valve without removing connecting flanges, press CTRL+Del
- To change the routing plane, press and hold CTRL and right-click in the drawing area
- To substitute a bolt set, hold CTRL and select the red circle of a flanged connector
- To orbit the 3D model, press and hold SHIFT+ mouse wheel
- To change the compass plane while routing, press CTRL+ right click

Routing Pipe
### A general overview continued

Routing Assistant

When you are finishing a pipe route, it's often difficult to directly line up the final connection. A routing assistant is available. You can connect to an existing component, and then right-click and choose from multiple possible routes.

Quick Tips:
- To change the plane, press P for Plane, and toggle through the three orthogonal planes. (You can also press CTRL + right-click.)
- At any time, you can switch viewports to change a view direction
- To undo while routing, press U

To place piping components while routing

1. At a plantpipeadd prompt, enter i (Insert).
2. In the Part Placement dialog box, click a category icon.
3. In the Class Types list, click a component description (for example: Ball Valve).
4. In Available Piping Components, click component (for example: Ball Valve, Long Pattern, 300LB, RF).
5. Click Place.
6. If you want to specify a different connection port, enter n (orieNtation).
7. If you want to specify the center of the valve, enter i (Insertionpoint).
8. Specify a point to place the valve.
9. Click to specify a component rotation or press ENTER for zero.
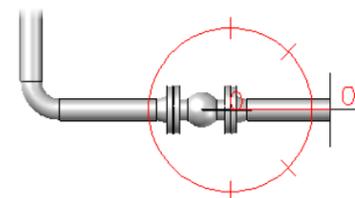

Quick Tips - Pipe & Component Grips

Continuation	Starts or continues routing pipe
Flip	Flips a component in opposite direction
Substitution	Displays a list of components that can be substituted for the original
Elevation	Moves pipe up/down to set elevation
Move/Stretch	Moves a component; stretches an existing pipe
Rotate	Displays the compass so you can rotate the component
Add Nozzle	Adds a nozzle on a piece of equipment
Edit Nozzle	Edits a nozzle on a piece of equipment

Quick Tips - Routing Right-Click Menus

- To reconnect piping, use Connect Component to Adjacent from the pipe's shortcut menu
- When assigning a line number to piping, first use Append to Selection > Connected Parts > All Connected Parts from the pipe's shortcut menu

Edit Data in the Data Manager
Make changes to your model data
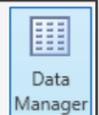
You can enter, view, edit, and report on information for components and lines in a drawing. The Data Manager is ideal for viewing and editing multiple rows of data at one time. You can also export items to Microsoft Excel® and modify data there.

Modeling Equipment
A general overview

With equipment, you have 3 choices:
- Use pre-defined equipment types, such as pumps
- Build equipment using provided shapes
- Build custom equipment from AutoCAD solids or surfaces

Using the Create Equipment dialog, you can set up your equipment by class (for example: Pump > Centrifugal Pump).

Once equipment has been placed, your can add or change nozzles by clicking any Add Nozzle grip.