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Adding the design power of AutoCAD Plant 3D and P&ID toolset to your workflow
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Learning Objectives

- Accessing and installing the AutoCAD Plant 3D/P&ID toolset.
- How can the AutoCAD Plant 3D/P&ID toolset best fit your needs?
- Intelligent database driven workflows utilizing AutoCAD Plant 3D/P&ID toolset.
- Learn the power of BIM collaboration with the AutoCAD Plant 3D/P&ID toolset.

Description

AutoCAD 2019 has added specialized toolsets to subscribed users of AutoCAD 2019. AutoCAD Plant 3D/P&ID is one of the toolsets that is now available. In this class you will see how to take advantage of the AutoCAD Plant 3D/P&ID toolset to add and improve your existing AutoCAD workflow. AutoCAD Plant 3D/P&ID is an intelligent program that will enable you to work more intelligently and enable you to do things you could not do with basic AutoCAD.

Speaker

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Professional 3D Computer Aided Design Specialist with a solid understanding of process plant design utilizing 3D modeling software and piping and instrumentation diagrams. Quentin has worked for Autodesk since 2012 and an expert for AutoCAD, Plant 3D and P&ID. He has trained/instructed Computer Aided Design in educational/work environments.
Accessing and installing the AutoCAD Plant 3D/P&ID toolset

With the release of AutoCAD 2019 subscription customers were given access to specialized toolsets. The toolsets used to be only available by individual purchase which was not cost effective for some users. Now users can choose from these powerful toolsets to incorporate into their current or new workflows. One of these toolsets made available is AutoCAD Plant 3D.

Accessing AutoCAD Plant 3D/P&ID Toolset

Access to the AutoCAD Plant 3D toolset is available to AutoCAD 2019 subscription customers.

There are in two ways to access these toolsets:

- Autodesk Account portal (https://accounts.autodesk.com/)
  The Autodesk Account portal is ideal for administrators who need to download complete software packages to create deployments
Autodesk desktop app

Individual customers might find it simpler to use the Autodesk desktop app to access products, toolsets, and updates right from the desktop.

The AutoCAD toolsets will be installed as an individual program, in addition to the install of AutoCAD 2019. When using AutoCAD Plant 3D toolset you will need to open the toolset in its own instance.
How can AutoCAD Plant 3D/P&ID toolset fit your needs?

The AutoCAD Plant 3D toolset enables users to efficiently produce P&IDs and then integrate them into a 3D plant design model. The user can then create piping isometric drawings, create ortho drawings and even run detailed reports from the P&IDs and Plant 3D models.

AutoCAD Plant 3D is the piping ideal designer’s solution because of what is all included. The install of AutoCAD Plant 3D comes with the AutoCAD Plant 3D drawing program, AutoCAD Plant 3D Spec Editor and AutoCAD Plant 3D Report Creator. Let’s look at each of these and see how they can help maximize your current workflow.

AutoCAD Plant 3D/P&ID

AutoCAD Plant 3D is project driven and is managed through the Project Manager. In the Project Manager all project drawings are managed and contain all configured settings for your Plant 3D projects.
In the Project Manager you will see the three tabs: Source Files, Orthographic DWG and Isometric DWG.

- The Source Files tab contains P&ID, Plant 3D model, Pipe Specs and other related drawings to your project.
- The Orthographic DWG tab contains orthographic drawings that are generated from the Plant 3D model drawings.
- Isometric DWG tab contains pipe isometric drawings that are generated from the Plant 3D model drawings.

Having the project drawings in the Project Manager aids with drawing management and maintains the stability of the project you are working on. This makes it easy to navigate to all drawings that are part of the project and eliminates downtime when having to search for needed drawing files.

Inside the Project Manager is where you will also access the Project Setup. The Project Setup allows for configuration of the project and drafting preferences, such as component symbology, tagging rules, annotation properties, layers, and colors.
Out of the box AutoCAD Plant 3D has preset items already configured in the Project Setup. However, as piping designers know jobs vary depending on the application being used. The Project Setup gives users the flexibility to add additional information to P&ID and Plant 3D modeling components.

For example, in the P&ID and Plant 3D Class Definitions basic property information is already come with preset properties. If there are additional properties that need to be added to meet project requirements this can be easily done through the Project Setup.

Additional items that can be configured on the piping design side are Piping Connection Settings which sets up simple and compound joint types.
Pipe Bend Settings in which you can further define to treat bends as fittings or treat bends as pipe.

P&ID Object Mapping which matched properties when validating or placing P&ID components into the 3D model.

Spec Update Settings that sets the 3D model properties to update during a spec update.
The Isometrics DWG Settings allows user to fully customize the output of their isometric drawings. The Iso settings available for configuration include styles, dimensions, sloped lines, labels, and the title block.

Iso Styles encompass all settings and files that control an isometric drawing. Styles determine the iso type (iso or spool drawing), file-naming convention, overflow table behavior, spool size, and file locations.

Iso Themes control the appearance and behavior of piping elements within the iso (and iso style). The default theme, for example, sets up layering of not only piping and components, but also tables, default styles for dimensions, text and so on.
Isometric drawing title blocks can be defined for each isometric style and allows for the placement and display for the following items:

- Drawing area, including overall plot area and north arrow setup
- Attributes (such as project data) and client information (such as company name and primary contact)
- Tables, including the Bill of Materials, cut piece list, weld list, and spool list
- Themes that let you specify where components appear (layer setup) and what elements are included or excluded

Ortho DWG Settings allows configuration to the ortho template and drawing paths, display defaults, such as hidden line piping and elbow center lines. You can also specify layers for specific ortho components.
AutoCAD Plant 3D Spec Editor

The Spec Editor allows you to create and modify spec files using industry standard parts catalogs. The Spec Editor is used to add parts from a Catalog to create spec sheets. You can then specify which fittings to use when routing for a specific pipe size.

Catalogs are used to create specs, and specs are used to route pipe in the 3D model, but they are not linked. Specs, catalogs, and the 3D model are independent after they are created. You can copy part information from a catalog to a spec. When the spec is complete the catalog is not required to use the spec. Likewise, a component added to the 3D model no longer requires the spec.
For parts not found in the out of the box install of AutoCAD Plant 3D the Catalog Builder allows CAD managers and expert users to create piping component content quickly. The Catalog Builder is launched the AutoCAD Plant 3D Spec Editor.

Additional catalogs can also be downloaded from the Autodesk App Store. Catalogs can be found by selecting the AutoCAD Plant 3D product store and then select Catalogs & Specs.
AutoCAD Plant 3D Report Creator

The AutoCAD Plant 3D Report Creator allows you to create and configure reports from data that is contained in the specified Plant 3D project. Report Creator can generate parts lists, BOMs, or specification sheets, using data from P&ID or Plant 3D drawings. AutoCAD Plant 3D Report Creator comes with pre-configured reports that are available to use.

Depending on your requirements you can use Report Creator to create your own report configurations. Documentation to help with this process to create detail reports can be found here, Report Designer guide.
Intelligent database-driven workflows using the AutoCAD Plant 3D/P&ID toolset

The AutoCAD Plant 3D toolset utilizes SQLite for the database files for Plant 3D projects. You can, instead, choose to use a server-based database for improved multi-user performance and reliability.

It is suggested that when working on an AutoCAD Plant 3D project that:

- Utilize SQLite: 1 - 2 active users in the project
- Utilize SQL Server: 3 or more active users

According to SQLite.org, "a good rule of thumb is to avoid using SQLite in situations where the same database will be accessed directly (without an intervening application server) and simultaneously from many computers over a network."

There are several editions of SQL Server available from Microsoft. SQL Server Express is the free version.

AutoCAD Plant 3D projects can be created in Autodesk Vault. If Vault is used for a Plant 3D project, it will require using SQL Server.

AutoCAD P&ID intelligent drawings

Normal workflow for creating P&ID drawings might include using unintelligent blocks. Then after placing blocks and lines you must manually clean up to create uniformed P&ID drawings. Finally determining how to extract useful information from all the P&ID drawing information for reporting purposes can be a huge task.

Fortunately, the AutoCAD P&ID toolset practically does all this for you!

- Quick P&ID drafting - In-context AutoCAD commands help make P&ID drafting easier.
- **Standard symbol libraries** - Symbol representations are visible in the tool palettes and organized by type. Includes PIP, ISA, JIS, and ISO/DIN.

- **Project standard tag and report formats** - Create and customize tags and labels to meet project standards.

- **Data validation** - Quickly identify possible errors. The tool scans P&IDs for data consistency, according to user-definable rules.
- Import/export P&ID data - Use engineering data from Excel to update the P&ID. Use the data updates for output in reports.

- ISO 15926 standard - AutoCAD P&ID uses ISO 15926. Read the white paper for more information about this standard.

AutoCAD Plant 3D intelligent drawings

The AutoCAD Plant 3D toolset allows you to easily create detailed Plant models. This workflow utilizes spec and catalogs. Routing pipe is intuitive because of the use of spec driven specs, this allows for easy pipe component placement. In addition to pipe routing, structures and equipment are included in the toolset to aid with Plant design.
From the Plant 3D model drawings, you can then automatically generate Isometric and Orthographic construction documents.

Isometric Drawings that are annotated and dimensioned can be generated from your Plant 3D models.

Quick Isometric drawings can be generated to allow the designer to check piping work before creating an issuable production isometric drawing.

Production Isometric drawings can be created using the included isometric styles (check, stress, final) or your custom style. You can add additional isometric styles depending on what output you require for your isometric drawings.

Isometric drawings usually contain reports including the Bill of Materials. You can configure isometric tables in the title block.
Orthographic views can be created of Plant 3D models and can be placed in a 2D drawing.

Orthographic drawings are DWG files, and each one can contain multiple orthographic views with data extracted from Plant 3D models. If the source models change, you can update the ortho drawings to reflect the changes.

Orthographic drawings display two-dimensional views of piping, valves, equipment, and structural steel in Plant 3D models. The drawings can have annotations, dimensions, matchlines (plan view only), pipe gaps, and can show or hide lines and objects.
The power of BIM collaboration with the AutoCAD Plant 3D/P&ID toolset

The AutoCAD Plant 3D 2019 toolset allows for project collaboration through use of Autodesk BIM 360 Team. Project collaboration can be able to take advantage of hosting to the cloud. Users can work collaboratively together simply by having AutoCAD Plant 3D 2019 installed with internet access to a BIM 360 Team hub. Collaborative projects are stored in a secure environment and users across the world can work as a team on the project.

With the Cloud, AutoCAD Plant 3D/P&ID users have an easier option to work collaboratively. Essentially you upload your project to the Cloud and then invite your team members. It’s really that easy!

![Plant Project Collaboration]

The Cloud option will enable current AutoCAD Plant 3D users to break the chains from hosting Plant 3D/P&ID projects using SQL Server with a Windows Server as well as those other users that might be using Vault. There is also a monetary savings by not having to maintain the infrastructure that is involved with a SQL Server or Vault environment. This is a great opportunity for users to compete for work because of how easily you can share project information with others. Working collaboratively will also make sure that project information is communicated effectively. Security of your data is ensured by the fact that you control who has access to project data.
AutoCAD Plant 3D Collaboration Features

Collaboration features can be found by accessing the AutoCAD Plant 3D ribbon menu and selecting the Collaboration tab.

The Share Project button will bring up Plant Project Collaboration window. You can also type PLANTPROJECTCOLLABORATION to display the Plant Project Collaboration window.

The Check In and Check Out buttons do as expected in checking in and checking out in Plant collaboration projects. You can also type PLANTCHECKIN to check in and PLANTCHECKOUT to check out.

Undo Check Out undoes the check out of a collaboration drawing so that any changes you made to the drawing are abandoned and not checked into the collaboration project. You can also type PLANTUNDOCHECKOUT to undo the check out of the collaboration drawing.

Options displays the Collaboration Options dialog box, to set time options for project updates from team members, Check out and Check in options and local workspace location. You can also type PLANTCOLLABORATIONOPTIONS to display the options window.
Attach, attaches a project drawing file from a collaboration project. You can attach a project file directly from the collaboration project, the xref file does not first need to be downloaded to the local workspace. Typing PLANTATTACH at the command line also displays the Attach External References window.

What you need to begin working Collaboratively

Before getting started and jumping into working Collaboratively, let’s look at what is required.

- Existing access to BIM 360 Team Hub (A360 and Fusion Hubs are not supported)
- Autodesk AutoCAD Plant 3D 2019
- Internet Access
- Proxy/Firewall configuration (Proxy server settings changes required to unblock Autodesk A360 services)

To ensure you do not have any issues accessing BIM 360 Team make sure you review the Proxy/Firewall configuration Autodesk Knowledge Network article above.

Autodesk BIM 360 TEAM

On April 9, 2018, Autodesk announced that it would no longer offer new subscriptions to BIM 360 Team. If you are a current BIM 360 Team subscriber, you can continue to use BIM 360 Team with uninterrupted access to your services and projects for as long as you renew.

For users that do not have current access to BIM 360 Team you can refer to this link, Plant Collaboration in BIM 360 Design
Reference Links

Autodesk AutoCAD Plant 3D 2019
https://www.autodesk.com/products/autocad/included-toolsets/autocad-plant-3d

In the Pipes (Tips and Tricks from the Autodesk Product Support Team)
http://in-the-pipes.typepad.com/

AutoCAD Plant 3D Community Forum

AutoCAD Plant 3D Troubleshooting
https://knowledge.autodesk.com/support/autocad-plant-3d/troubleshooting?sort=score


Autodesk App Store
https://apps.autodesk.com/

How to configure Microsoft SQL Server for AutoCAD Plant 3D projects document

Proxy server settings changes required to unblock Autodesk A360 services

AutoCAD Plant 3D Content Notices

Autodesk Screencast - Uploading Plant 3D Project to the Cloud
http://autode.sk/2yQ1vv8