TestDrive Tutorial

INTERGRAPH SmartPlant P&ID

Intergraph SmartPlant P&ID is an asset-centric, rule-driven engineering solution that creates and maintains the plant configuration and related process, equipment, instrumentation, and piping data for the life of the plant.

Read more about SmartPlant P&ID.

In this test drive, you see the strengths of SmartPlant P&ID.

Try any of the following workflows:

- **Streamline Engineering with Design Rules to discover how SmartPlant P&ID ensures design accuracy and consistency.**
- **Edit a System the "Smart" Way Using SmartPlant P&ID to see how system editing capabilities allow fast and consistent data entry.**
- **Bulk Data Editing with Engineering Data Editor to see how to significantly reduce the design update cycle time.**
- **Create a Display Set to learn how display sets easily create deliverables to execute specific tasks.**
- **Create a Report to generate reports in a familiar Microsoft Excel spreadsheet.**
- **Compare Drawing Versions to see how to maintain multiple versions of P&IDs to make comparisons and roll back design to earlier versions.**

Edit a System the "Smart" Way Using SmartPlant P&ID

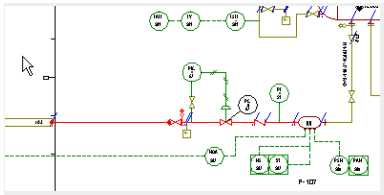
Engineering data and data consistency are key in SmartPlant P&ID. SmartPlant P&ID allows you to modify the process systems on a P&ID to meet the specifications of your project. The software uses rules, either existing or customized by your company, to ensure your changes are:

- Consistent with the design basis
- Correct
- Complete
- Consistent across the design

Try the example below and see for yourself.

1. In the example P&ID, click a pipe run.
2. In the **Properties** window, find **Nominal diameter**. It is currently set at **4”**. Click the list and select **6”**.

The entire pipe run section that is changed to 6" is highlighted. The software recognizes any section that should not be changed; for example, sections that are connected to a reducer. At the point that Nominal Diameter is selected in the property grid, the system editing scope is highlighted.



3. For all nozzles and pipe runs set the **Fluid code** to **P** and the **Piping materials class** to **1C0031** in the **Properties** window.

The entire pipe system remains highlighted because the fluid code does not impact the pipe line components.

4. In the example P&ID, click an instrument in a loop.
5. In the **Properties** window, set the **Tag Seq No** for the instrument to **12820**.
6. In the **Properties** window, set the **Construction Status** for the system to **Existing**.

The entire piping system, including instruments and connections to process lines, is highlighted. The single change to the instrument is propagated to the connected objects highlighted in advance of the change. By highlighting as the property is selected the user is given visual feedback of exactly which objects will be impacted by the single property change.

Now try another task.

Create a Display Set.

Bulk Data Editing with Engineering Data Editor

Create a Report

Compare Drawing Versions

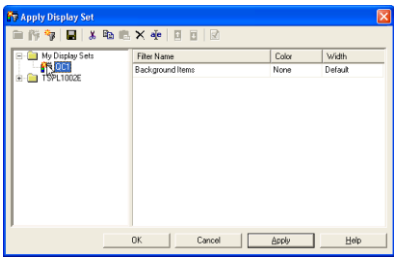
Streamline Engineering with Design Rules

Create a Display Set

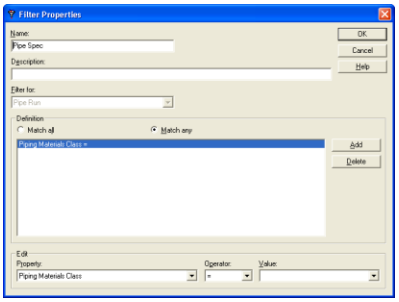
An asset-centric solution, SmartPlant P&ID helps you present your data in the format that best meets the needs of your specific task, such as performing quality checks, issuing drawings for review, or creating construction packages. One function in SmartPlant P&ID that makes this possible is a display set, which basically queries the data and presents it in a graphical view.

Try the example below and see for yourself.

1. Right-click in the P&ID, then click **Apply Display Set** on the shortcut menu.
2. Right-click **My Display Sets**, then click **Add Display Set**.
3. In the tree view, type the name **QC1**.
4. Right-click **QC1**, then click **Add Filter**.



5. In the **Select Filter** dialog box, select the **My Folders** folder, then click **New**.
6. In the **New Filter** dialog box, select **Simple Filter**, then click **OK**.
7. In the **Add Filter** dialog box, type the name **Pipe Spec**.
8. Under **Filter for**, select **Pipe Run**.
9. Under **Edit**, set the **Property** to **Piping Material Class**. Set the **Operator** to **=**. Leave the **Value** blank.



10. Click **OK**.
11. Click **Tools** > **Options**. On the **Colors** tab, set the background color to light grey.

> Modifying the background allows you to see all items filtered by the display set.

12. In the **Apply Display Set** dialog box, set the default color for the Pipe Spec filter to red.
13. On the **Apply Display Set** dialog box, click **Apply**.

> Any pipe run that does not have a piping specification associated with it is displayed in red.

Next, find pipe runs that have a missing fluid code.

1. In the **QC1** filter, right-click **Pipe Spec**, then click **Delete**.
2. Repeat steps 4 - 6.
3. In the **Add Filter** dialog box, type the name **Fluid Code**.
4. Under **Filter for**, select **Pipe Run**.
5. Under **Edit**, set the **Property** to **Fluid Code**. Set the **Operator** to **=**. Leave the **Value** blank.

6. Click **OK**.
7. In the **Apply Display Set** dialog box, set the default color for the Fluid Code filter to blue.
8. Click **Apply**.

Any pipe run that does not have a fluid code associated with it is displayed in blue.

Next, find pipe runs that have a construction status of new.

1. In the **QC1** filter, right-click **Fluid Code**, then click **Delete**.
2. Repeat steps 4 - 6.
3. In the **Add Filter** dialog box, type the name **ConstrStatus**.
4. Under **Filter for**, select **Pipe Run**.
5. Under **Edit**, set the **Property** to **Construction Status**. Set the **Operator** to **=**. Set the **Value** to **New**.
6. Click **OK**.
7. In the **Apply Display Set** dialog box, set the default color for the Construction Status filter to green.
8. Click **Apply**.

Any pipe run that has a construction status of new is displayed in green.

Next, find pipe runs in which the design pressure is missing.

1. In the **QC1** filter, right-click **ConstrStatus**, then click **Delete**.
2. Repeat steps 4 - 6.
3. In the **Add Filter** dialog box, type the name **Design Pressure**.
4. Under **Filter for**, select **Pipe Run**.
5. Under **Edit**, set the **Property** to **Design Max Press**. Set the **Operator** to **=**. Leave the **Value** blank.
6. Click **OK**.
7. In the **Apply Display Set** dialog box, set the default color for the Design Pressure filter to purple.
8. Click **Apply**.

Any pipe run that does not have a design pressure associated with it is displayed in purple.

Now try another task.

[Edit a System the "Smart" Way Using SmartPlant P&ID]

[Bulk Data Editing with Engineering Data Editor]

[Create a Report]

[Compare Drawing Versions]

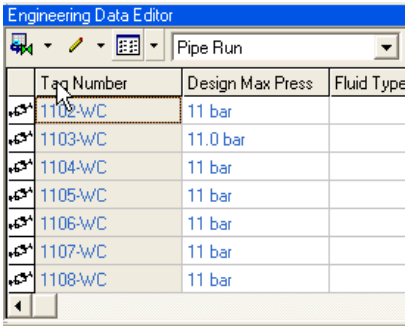
[Streamline Engineering with Design Rules]

Bulk Data Editing with Engineering Data Editor

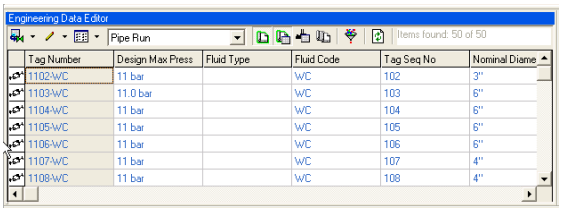
SmartPlant P&ID allows you to create and modify P&IDs in the graphic mode or in a tabular form. Engineering Data Editor is a tabular view that presents the plant data in a tabular format. It also provides filtering capabilities similar to a spreadsheet, allowing you to perform bulk editing of data using familiar commands such as copy and paste or by importing data from another spreadsheet.

Try the example below and see for yourself.

1. In **Engineering Data Editor**, select Edit View from the drop-down list.



2. Select **Pipe Run** from the filter list.
3. Select **Design Max Pressure**.



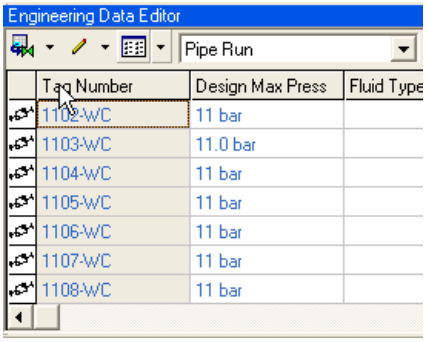
All pipe runs are displayed.

4. In the **Design Max. Pressure** column, type **40**.
5. Right-click on **40**, then click **Copy**.
6. Highlight the **Design Max. Pressure** column.
7. Right-click the column, then click **Paste**.

All instances are changed to **40**.

AutoFilter

8. On the toolbar, click **View**, then click **AutoFilter**.



AutoFilter allows you to filter the items displayed in the Engineering Data Editor. When you click **AutoFilter**, arrows appear at the top of each column.

9. Click the arrow at the top of the column that contains the data that you want to filter on and choose the value from the list that appears.

For instance, if the **Engineering Data Editor** displays **Pipe Component**, but you want to see only **gate valves**, use the AutoFilter command to view the data.

10. Click the arrow at the top of the **Pipe Components Type** column and choose **gate valves**.

Now try another task.

Edit a System the "Smart" Way Using SmartPlant P&ID

Create a Display Set.

Create a Report

Compare Drawing Versions

Streamline Engineering with Design Rules

Create a Report

SmartPlant P&ID provides easy to use report generation capabilities, allowing you to quickly create standard plant reports, such as equipment, line or valve lists, material takeoffs, and to do lists. Reports appear in familiar Microsoft Excel. Reports are easily customizable to meet your company standards.

Try the example below and see for yourself.

1. On the SmartPlant P&ID menu, click **Reports** > **Plant Reports**.
2. In the **Plant Reports** dialog box, select **Equipment List**, then click **OK**.

The equipment list appears in Microsoft Excel.

3. Repeat steps 1-2 for a line list and a valve list.
4. In the P&ID, highlight a pipe run.
5. Click **Reports** > **Plant Reports**.
6. In the **Plant Reports** dialog box, select **Pipe Run List**, then click **OK**.
7. In the Microsoft Excel report, change the following values:
    - Construction Status - Future
    - Diameter - 4"
    - Design Max. Pressure - 40.0 bar
8. Click **File** > **Save**, then click **File** > **Exit**.
9. In SmartPlant P&ID, click **File** > **Import** > **Data File**.
10. In the File Import dialog box, select **My Recent Documents**, sort the documents by **Date Modified** (with most recent at the top) and find the **Pipe Run List.xls** that was just created.

SmartPlant P&ID imports your changes.

11. The symbology of the pipe run has changed to indicate its construction status is future.
12. 

In the **Properties** dialog, view your other changes to the pipe run.

Now try another task.

Edit a System the "Smart" Way Using SmartPlant P&ID

Create a Display Set.

Bulk Data Editing with Engineering Data Editor

Compare Drawing Versions

Streamline Engineering with Design Rules

Streamline Engineering with Design Rules

SmartPlant P&ID's built-in design rules and system editing capabilities also allow fast and consistent data entry throughout a complete piping system. The rules enable design validation across the project, and allow automatic updating of the design when the design basis changes.

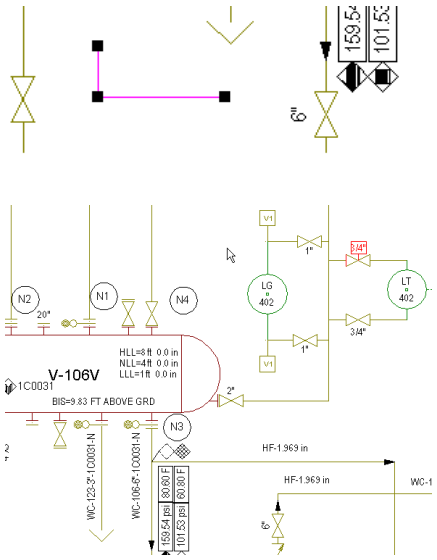
Rules are used in SmartPlant P&ID for the following reasons:

- Placement rules ensure that the correct relationships are created when you place a new item or move an item in a drawing.

- Rules govern how properties are copied from one item to another in a relationship, and how properties are designated at placement.
- Rules check consistency.
- Implied items are defined in rules.

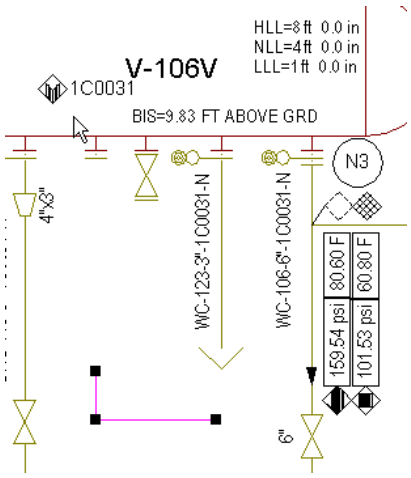
Try the example below and see for yourself.

1. In the **Catalog Explorer** tree view, expand the **Piping** > **Routing** > **Process Lines** node and select **Primary piping**.
2. In the P&ID, route a process line in free space. Left mouse click, then move to another position, and then left mouse click again. Right mouse click to exit placement mode.



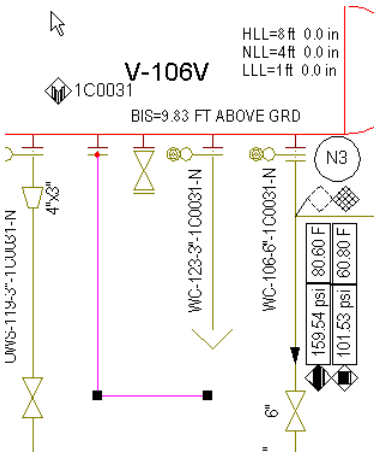
3. In the **Properties** dialog, give the pipe run the following properties:
   - Fluid code - X
   - Insulation purpose - P
   - Nominal diameter - 3"
   - Design Max Press - 20.0 atm
4. In the **Catalog Explorer** tree view, expand the **Equipment Components** > **Nozzles** node and select a nozzle to place.
5. Place a nozzle on the vessel in the drawing. The nozzle will not allow placement in free space, it has to be connected to equipment, as can be seen with the 'no place' glyph (circle with slash line). Select the nozzle in the Catalog Explorer by left clicking once. Hover with the nozzle over the line to show the Alignment Indicator. Move the cursor to the vessel, and left click to place on the vessel.

   Both the pipe run and the nozzle show data inconsistencies because the connect points are not attached.



Rules provide visual indicators of data inconsistency.

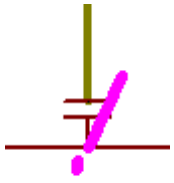
6. To connect the pipe run with the nozzle, select the top-most ‘black dot’ on the pipe run seen in the screenshot just before step 6. Once selecting the black dot with the mouse (left click the dot and hold mouse button down) move the dot up to the nozzle. Once the nozzle highlights the system is informing the user that a recognized relationship can be established between those two items and they can release the mouse button.



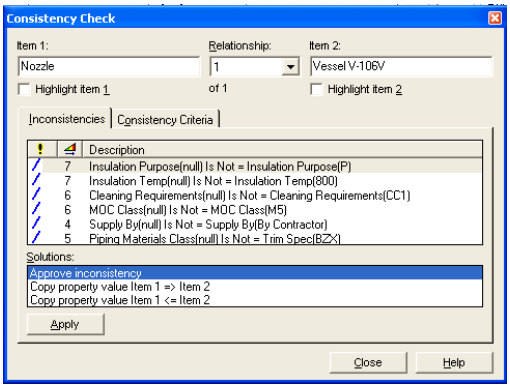
7. Click the nozzle and view the properties, in the **Properties** window.

   The pipe run has copied some of its properties to the nozzle, but an inconsistency remains.

8. Click the inconsistency flag, then right click and select **Consistency Check**.



The insulation purpose that the nozzle inherited and the vessel do not match.



9. Under **Solutions**, select the action you want to take. Notice that the system editing 'scope' changes according to which solution is selected. Again, providing visual feedback to the user how 'far' the change will propagate, before the change is made. Once the solution is decided **Apply**.

Rules provide feedback for data discrepancy and a solution.

Now try another task.

Edit a System the "Smart" Way Using SmartPlant P&ID

Create a Display Set.

Bulk Data Editing with Engineering Data Editor

Create a Report

Compare Drawing Versions

Compare Drawing Versions

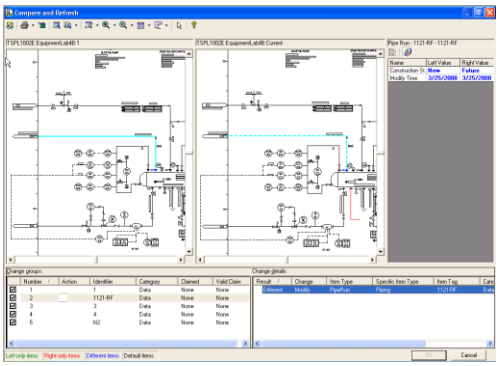
When more than one version of a drawing exists, SmartPlant P&ID allows you to view two versions side-by-side and examine their differences. You can only compare a drawing only against a version of itself; that is, you cannot compare one drawing to a different drawing.

Try the example below and see for yourself.

1. Click **Tools** > **Compare & Refresh**.
2. On the **Compare With** dialog box, select a database using the **Available databases** drop-down list box.
3. In the **History** list box, select the drawing you want to compare your current drawing with.
4. Click **OK**.
5. On the **Compare and Refresh** dialog box, review the information in the **Change groups** and **Change details** areas.

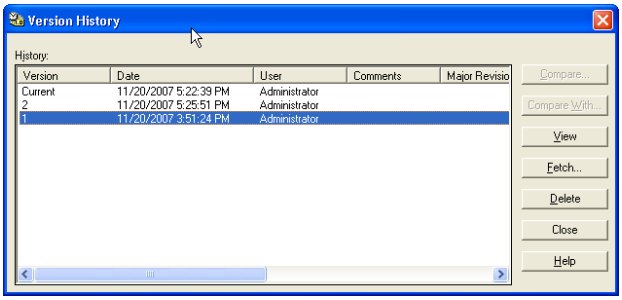
Your current drawing displays on the right side of the screen. The version you are comparing it to displays on the left.

6. In the **Change groups** area, click in the **Action** column.
7. Using the drop-down list, select **No Action** or **Refresh.**
8. Click **OK** to refresh the drawing and accept any changes or **Cancel** to dismiss the dialog box.



SmartPlant P&ID keeps a record of all previous versions of a drawing. Using the History that is maintained, you can easily roll back to a previous version of a P&ID.

1. In SmartPlant P&ID Drawing Manager, click **Revisions** > **Version History**.
2. Select the version of the P&ID that you want to make current, then click **Fetch**.



The P&ID is now the current version. Your later versions are maintained when you need to make them current.

Now try another task.

Edit a System the "Smart" Way Using SmartPlant P&ID

Create a Display Set.

Bulk Data Editing with Engineering Data Editor

Create a Report

Streamline Engineering with Design Rules