AutoPLANT to OpenPlant: WorkSet Configuration

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AutoPLANT-to-OpenPlant Migration
This section describes migrating AutoPLANT Modeler content into OpenPlant Modeler.

This requires iModel Connector for AutoPLANT to publish data to iModelHub/PlantSight. Note that iModel Connector for AutoPLANT is available as a separate installer through Bentley Software Downloads. This utility is also available through AutoPLANT Modeler installer (and can be installed along with AutoPLANT Modeler).

1. Migration Workflow
The workflow to migrate AutoPLANT models and data to OpenPlant Modeler may consist of following steps:

   1. Register a CONNECT Project.

     ![Register a Project](image)

     Through OpenPlant Project Administrator, **Associate** to the CONNECT Project registered in step 1 above with an appropriate WorkSet.
Note: For the AutoPLANT-to-OpenPlant migration workflow, please use the specific OpenPlant WorkSet designed for this very purpose.

Refer to Configuration section for more details.

3. Also, Setup the WorkSet with OpenPlant Schema from within OpenPlant Project Administrator.
4. Load AutoPLANT’s Bentley Project Administrator and login to the AutoPLANT project containing models that need to be migrated to OpenPlant Modeler.

5. Now, through Bentley Project Administrator, **Associate Project** to the same CONNECT project as created in step 1 above:
Note: In order to use In-Session workflow to publish from within the AutoPLANT Modeler session, select the **iModel Provisioning** dialog and pick the iTwin that has already been Setup.

6. Once done, load **iModel Connector for AutoPLANT** to publish data to the CONNECT project on iModelHub/PlantSight.

![iModel Connector for AutoPLANT](image)

Refer to **iModel Connector for AutoPLANT** section for more details.

7. After publishing, load OpenPlant Modeler in the same WorkSet as used in step 3 and open a file.

8. From OpenPlant Modeler, select **Utilities > AutoPLANT Import** ribbon option:

![AutoPLANT Import](image)

9. First Load the AutoPLANT Model list in the dialog, import and upgrade the models to complete the migration through **AutoPLANT Import** dialog.

Refer to **Importing AutoPLANT models in OpenPlant Modeler** section for more details:
2. iModel Connector for AutoPLANT

iModel Connector for AutoPLANT allows users to publish their models along with data to iModelHub / PlantSight based on OpenPlant schemas.

These published models can then be used directly through iModelHub or PlantSight for drawing review, walk throughs and Clash detection etc., or can be imported into OpenPlant Modeler for further usage.

There are two ways user can publish data into iModelHub / PlantSight:

1. Through iModel Connector for AutoPLANT interface
2. From within AutoPLANT Modeler (will be referred as In-Session workflow)

2.1. Publishing AutoPLANT models through iModel Connector for AutoPLANT interface

Users can directly publish all their models in a single go or a set of models to iModelHub / PlantSight based on OpenPlant schemas using iModel Connector for AutoPLANT by itself.

Remember that prerequisite steps to configure WorkSets and AutoPLANT project with CONNECT project should already be completed before starting the publish process.

Once user loads iModel Bridge for AutoPLANT, it will prompt to Sign In with email:
After Signing in with a valid account, the product requests permission. Press **Allow** to continue using Bridge.
AutoPLANT iModel Bridge will load with three options for model selection from AutoPLANT Settings section.

So with **AutoPLANT Project Selection** option, user can select the AutoPLANT project and then through Browse button, can pick multiple or All models from the list of models from the selected AutoPLANT project:
With **DWG File Selection** option, the interface will change slightly and user can pick models (DWG files) from Explorer window to be published through Bridge:
With **Folder Selection** option, the interface will update accordingly and user will be able to select a folder through Browse button to publish all models present in that folder:
The iModel Settings section contains Project Name and iModel fields. Both these fields will get populated when AutoPLANT Project Selection option is selected based on which CONNECT Project and iModel the selected AutoPLANT project is linked to.

Project Name and iModel fields are to be populated for other two options i.e., DWG File Selection and Folder Selection in order to point to where the models are to be published to.

2.2. Publishing AutoPLANT models through In-Session Workflow

User can publish to iModelHub / PlantSight right from inside of the drawing while working on it. Select Import/Export > iModel Bridge ribbon button would load iModel Connector for AutoPLANT with all setting automatically getting populated.
3. Importing AutoPLANT models in OpenPlant Modeler

Once AutoPLANT models have been published into iModelHub / PlantSight, it can be imported into OpenPlant Modeler.

1. To achieve this, first load OpenPlant Modeler in the WorkSet that was Setup with OpenPlant schema. See step 3 from Migration Workflow.
2. Once loaded, create a New file in this WorkSet.

3. After the new OpenPlant Modeler file is loaded, launch Utilities > AutoPLANT Import through the ribbon button.
This will load **AutoPLANT Import** dialog.

![AutoPLANT Import Dialog](image)

The contents of this dialog are explained below:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Select All Icon" /></td>
<td>Select All</td>
<td>Allows to select all models from the list</td>
</tr>
<tr>
<td><img src="image" alt="Clear Selection Icon" /></td>
<td>Clear Selection</td>
<td>Deselects all selected models from the list</td>
</tr>
<tr>
<td><img src="image" alt="Invert Selection Icon" /></td>
<td>Invert Selection</td>
<td>Reverses or swaps the model selection from the list</td>
</tr>
<tr>
<td><img src="image" alt="Load Available Models Icon" /></td>
<td>Load available AutoPLANT Model Names from iModel</td>
<td>Allows to list down all AutoPLANT models that have been published into iModelHub / PlantSight.</td>
</tr>
</tbody>
</table>
### 4. The model list will already be loaded in the AutoPLANT Import dialog. If not, press **Load available AutoPLANT Model Names** button to load all models from the iTwin.

### 5. Next, **Select All** to select the models to be imported into OpenPlant Modeler file just created. Or

Make selection from the list manually through the checkboxes to import the selected set of models.

### 6. Next, press the **Import** button.

This will turn all selected set of models to green color showing that these models have been imported into the OpenPlant Modeler file.

**Press Fit View button to see the imported components in the file.**

### 7. Now since components have been imported into the OpenPlant Modeler file, pressing **Upgrade imported components** button will convert these to OpenPlant Modeler components.

<table>
<thead>
<tr>
<th>OR</th>
<th>Import AutoPLANT Model from iModel</th>
<th>Starts the import process against the selected / All models from the list in the OpenPlant file. Note that if no model is selected from the list, this button remains as grayed out.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upgrade imported AutoPLANT data to OPM Components</td>
<td>Converts the imported AutoPLANT components into OpenPlant components</td>
</tr>
<tr>
<td></td>
<td>Delete AutoPLANT data that has not be upgraded</td>
<td>Deletes all AutoPLANT instances in the DGN file</td>
</tr>
<tr>
<td>Filter AutoPLANT Models</td>
<td>Filter list</td>
<td>Filters list of loaded AutoPLANT Models in the dialog</td>
</tr>
</tbody>
</table>
4. Configurations

A WorkSet has been specifically created for AutoPLANT-to-OpenPlant migration process for Out-of-the-box settings. Contact support for this WorkSet.

AutoPLANT iModel Bridge uses XML mapping file to map AutoPLANT components to OpenPlant ones. It's located at the bridge installation: Assets/AP2OPMapping.xml.

4.1. Mapping file structure

The mapping is an XML file with root element <Mapping>.

There are following kinds of sub-elements:

1. <APClass> element is the main entry for AutoPLANT to OpenPlant class mapping.
   It maps multiple AutoPLANT classes to one OpenPlant class.
   It contains attributes: **name, OPname, APBase, PortCount, readMethod**. Only **name** is main attribute.
   - **name** is a list of AutoPLANT classes separated by comma in following format: Module:Class.
   - **OPname** is OpenPlant class name. This attribute can be absent for base APM classes.
   - **APBase** is base APM class. Properties and attributes of this class are added to derived class.
   - **PortCount** is count of ports in component of APM class.
   - **readMethod** is name of method to used to move values from xdata of components to Physical component of representation of data.

   Example below:
   ```xml
   <APClass
   name="Base:AT_VALVE_CNTL,Base:AT_VALVE_CNTL_BFLY,Base:AT_VALVE_CNTL_CHECK,Base:AT_VALVE_CNTL_GLOBE,AT_PVIC:AT_VALVE_BLNC789" OPname="CONTROL_VALVE">
   ```
   Sub-elements of <APClass> are <APProperty>.

2. <APProperty> represents single property mapping.
   It contains two main attributes **name, OPname** and three optional attributes: **ValueMap, ignore, "typeName"**.
   - **name** is a property name in AutoPLANT.
   - **OPname** is a property name in OpenPlant.
   - **ValueMap** is a name of <ValueMap> element located in the end of AP2OPMapping.xml. If **ValueMap** attribute is specified then property is transformed using corresponding map in **< ValueMap>** element.
- **typeName** is a type of data. This attribute is necessary to set if property is defined in base APClass, where "OPClass" is empty. By default it is "string". Example `<APProperty name="GTYPE" typeName="double" OPname="ANGLE" />`

- **ignore** - is used to exclude moving AP property to OpenPlant. This can be used if base class has such property but it need not use this value in OpenPlant. Example : `ignore="1"`

Otherwise the property is not transformed and set to OpenPlant as is (only units transformations are applied).

3. `<ValueMap>` element represents one-to-one mapping for properties with attribute `ValueMap`. It contains `<ValueMapItem>` sub-elements.

4. `<ValueMapItem>` element is a property mapping entry. It represents how to transform the particular property value from AutoPLANT to OpenPlant.

In example below AutoPLANT property value "100LB" transforms into OpenPlant "CL100":

`<ValueMapItem OPname="CL100" APname="100LB" />`

5. `<JointTypeMap>` element is a list of joint types with information about available end preparations and fasteners.

6. `<JointType>` element is a sub-element of `<JointTypeMap>`. It defines the properties of the particular joint type. It contains 4 sub-elements:

   - **<JOINT_NAME>** is a name of joint in OpenPlant.
   - **<END_PREPARATION_1>** is a list of available end preparations for one end.
   - **<END_PREPARATION_2>** is a list of available end preparations for another end.
   - **<FASTENER>** is a list of fasteners for the joint.

### 4.2. Configuration Changes:

This section explains the sample configuration changes need for migration. Since users may have done customization in AutoPLANT for their project needs, this section will help in understanding the changes done in out of the box setup and accordingly further changes can be done as per actual project requirements. The basic objective is to have an OpenPlant WorkSet configured the exact same way as the project content looks like in AutoPLANT. So, if you were to create a new model in OpenPlant in this WorkSet the project nomenclature and definitions for tags and other project objects would look the same way as you would model in AutoPLANT.

The configuration updates done for AutoPLANT-to-OpenPlant migration for out of the box WorkSets are explained below, which will help user not only update their WorkSets accordingly but will also help them understand how to update their WorkSets for customized components.

This section explains these configuration changes done so far:
4.2.1. **Generic Updates**

1. Invoke Expression Editor within OPPA for the WorkSet where changes need to be incorporated.

![Image of Expresssion Editor in OPPA](image1)

2. Make the following changes to Equipment Tag Number:

   - Tag Number = this.DEVICE_TYPE_CODE & "-" & this.NUMBER
   - Parser Regular Expression = (?<DEVICE_TYPE_CODE>\w*-[?<NUMBER>.*])|(?<NUMBER>+.*)

![Image of Tag Number Configuration](image2)

3. Save changes

4. Make the following changes to Pipeline Tag Number:

   - Tag Number = this.NUMBER
   - Parser Regular Expression = Nil *(Leave it blank)*
5. Save changes

6. Make the following changes to Fluid Regulator Tag Number:

Tag Number = this.DEVICE_TYPE_CODE & "," & this.NUMBER
Parser Regular Expression = (?<DEVICE_TYPE_CODE>[^\w]*- (?<NUMBER>.*))|(?<NUMBER>.+)

7. Save changes
4.2.2. Introducing WELD_GAP Custom Class and Joint:

1. Invoke Schema Editor via OPPA and add WELD_GAP as Domain class under Gasket in OP_3D schema and save.

2. Select ‘No’ on the following dialog which would pop-up after the creation of new class ‘WELD_GAP’.

3. Now invoke Joint Map from OPPA and add AP_JOINT which should be a copy of BUTT_WELD but must use WELD_GAP as fastener.
4.2.3.  GETTING THREE_PORTS_GENERIC_PIPING_COMPONENTS into OPM

To do so, please follow these steps:

4.2.3.1.  Configurations Required at AP2OP Workset Level:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Expand the ‘Classes’ and follow the hierarchy as shown below, to find ‘Generic Piping Component’.

6. Right Click on ‘Generic Piping Components’ and select ‘Add Derived Classes.’

7. Specify its ‘Name’ and ‘Display Label’ as ‘GENERIC_PIPING_COMPONENT_TWO_PORT’

8. Go to the Parent Class ‘Generic Piping Component’ and Right click to copy ‘Component Port Information’ as a ‘Custom Attributes’.
9. Paste this custom attribute into the newly created derived class ‘Generic Piping Component Two_Ports’
10. Now ‘Remove’ this custom attribute ‘Component Port Information’ from the Right click menu of the parent class.

11. Again, Right Click on ‘Generic Piping Components’ and select ‘Add Derived Classes’ to add another child class.

12. Specify its ‘Name’ and ‘Display Label’ as ‘GENERIC_PIPING_COMPONENT_THREE_PORT’.

13. Paste the previously copied ‘Component Port Information’ custom attribute into this newly created derived class ‘GENERIC_PIPING_COMPONENT_THREE_PORT’.
14. Add the Port No. as 3 and add its name as ‘BRANCH_PORT’ as shown below. **Note:** It will not be visible in real time once you add it, to see port 3 switch to some other class and revert.

15. Save these changes to schemas and close the ‘Bentley Class Editor’.

16. Now create a new i-model on i-model hub and provision it using this updated workset.
### 4.2.3.2. Configurations Required as AP2OPMapping.xml:

1. Go to the machine where APIMB is installed (if not the same) and navigate to this path:
   
   C:\Program Files\Bentley\APiModelBridge\Assets

   And open ‘AP2OPMapping.xml’ file in Notepad

2. Search for the following keyword: `generic_piping`, until you can find the mapping for ‘Generic_Piping_Component’.

3. Copy this ‘APClass’ including all its ‘APProperties’ and paste it right below.

4. Rename the older ‘Generic_Piping_Component’ to `GENERIC_PIPING_COMPONENT_TWO_PORT`.

5. Rename the pasted ‘Generic_Piping_Component’ to `GENERIC_PIPING_COMPONENT_THREE_PORT`.

6. Remove all AP Classes from `GENERIC_PIPING_COMPONENT_THREE_PORT` and add following:

   ```xml
   <APClass
       name="Base:AT_INLINETRAP,Base:AT_WYESWTRAP,Base:AT_RETTRAP,Base:AT_WYETRAP,Base:AT_VALVE_RELCHANGEOVER"
       OPname="GENERIC_PIPING_COMPONENT_THREE_PORT"
   />
   ```

7. Save this file at some other location and replace it with the original one.


9. Verify on I-model hub preview that the mappings have been updated.

10. Go through the import and upgrade process inside OPM and notice that now ‘Three ports generic piping components are not being missed out.

### 4.2.4. Getting ‘Pipe Nozzle’ as Custom Component inside the OPM

#### 4.2.4.1. Configurations Required as AP2OP Workset Level:

Please follow following steps to get ‘Pipe Nozzle’ as a custom component after running the Upgrade process.

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
Can be found at this link
C:\ProgramData\Bentley\OpenPlant CONNECT
Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\AP to OP OPPA33
Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT
   Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Use the same Reference schemas as used in Step:2 and press OK.
6. Expand the ‘Openplant3D-Supplemented’ schema and navigate to find the ‘Pipe Nozzle’ Class
7. Copy following ‘Creation Attributes’ from ‘GENERIC_PIPING_COMPONENT’ and ‘Component Port Information’ from ‘GENERIC_PIPING_COMPONENT _TWO_PORT’ and paste them inside the ‘Pipe Nozzle’ class.
   - Creation Attribute
   - Component Port Information
8. Now save these changes and close the ‘Bentley Class Editor’.
9. Try to publish doc containing ‘Pipe Nozzle’ and verify that if is appears as a custom component inside OPM or not?
4.2.5. Fixing ‘TEE Strainer’, ‘Basket Strainer’ and ‘Duplex Strainer’ by AP2OP Schema customization

4.2.5.1. TEE Strainer
1. Go to AP2OP workset location (in my case) C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\AP_OP_59_Workspace\WorkSets\Metric\Standards\Open Plant\Modeler.
2. Open ‘Modeler.cfg’ file in Notepad.
3. Search for ‘OPM_AP2OP_ALWAYS_TREAT_AS_CUSTOM_COMPONENT’
4. Add class ‘T_STRAINER’ in the list, by separating with a semi-colon (;).

4.2.5.2. BASKET Strainer
1. Go to AP2OP workset location (in my case) C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\AP_OP_59_Workspace\WorkSets\Metric\Standards\OpenPlant\Modeler.
2. Open ‘Modeler.cfg’ file in Notepad.
3. Search for ‘OPM_AP2OP_ROTATE_COMPS_DATA’
4. Add this ‘BASKET_STRAINER|0|-90’ in the list in the following way:

OPM_AP2OP_ROTATE_COMPS_DATA=PIPE_WYE|0|-180;BASKET_STRAINER|0|-90;STRAINER|0|-180

4.2.5.3. Duplex Strainer
Please follow following steps to get ‘Duplex Strainer’ after running the Upgrade process.

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08. ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\AP_OP_59_Workspace\WorkSets Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schema:

- Supplemental Information_3DComponent
- Supplemental Modeling
5. Use the same Reference schemas as used in Step:2 and press OPEN.

6. Navigate to the ‘Strainer’ parent class and expand it.
7. Click on ‘Duplex Strainer’ and change its ports from 3 to 2.
8. Remove the ‘Branch port’ from the element drop-down

So, in this way schema configuration of ‘Duplex Strainer’ is done, which makes it import inside OPM successful.

4.2.6. Getting all types of Supports from APM to OPM by AP2OP schema configuration

Presently all supports from APM are wrongly mapped generally to the ‘Parent Class’ of supports due to which it cannot be imported.

So, for the present situation a solution of creating new Child ‘Generic’ class within their main ‘parent class’ is suggested. Please follow the following steps to add the ‘Generic’ classes:

4.2.6.1. Configuration Required at ‘AP2OP Workset Level:
4.2.6.1.1. GENERIC_PIPE_ANCHOR
1. Add a new derived class under the parent ‘PIPE_ANCHOR’ named ‘GENERIC_PIPE_ANCHOR’
2. Copy the 'Creation Attribute' from 'GENERIC_PIPING_COMPONENT' and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.2. GENERIC_MISC_SUPPORT
1. Add a new derived class under the parent ‘MISC_SUPPORT’ named ‘GENERIC_MISC_SUPPORT’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.3. GENERIC_SHOES
1. Add a new derived class under the parent ‘SHOES’ named ‘GENERIC_SHOES’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.4. GENERIC_PIPE_HANGER
1. Add a new derived class under the parent ‘PIPE_HANGER’ named ‘GENERIC_PIPE_HANGER’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.5. GENERIC_PIPE_BASE_SUPPORT
1. Add a new derived class under the parent ‘PIPE_BASE_SUPPORT’ named ‘GENERIC_PIPE_BASE_SUPPORT’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.6. GENERIC_PIPE_GUIDE
1. Add a new derived class under the parent ‘PIPE_GUIDE’ named ‘GENERIC_PIPE_GUIDE’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.1.7. GENERIC_ELBOW_SUPPORT
1. Add a new derived class under the parent ‘ELBOW SUPPORT’ named ‘GENERIC_ELBOW_SUPPORT’
2. Copy the ‘Creation Attribute’ from ‘GENERIC_PIPE_ANCHOR’ and paste it into this class.
3. Notice that a new child class has been created with ‘Creation Attribute’ as ‘IsGraphical’

4.2.6.2. Configurations Required in AP2OPMapping.xml file:

[This is by-default part of the iModel Connector for AutoPLANT build and user is not required to manually do this. However, mentioning here for record]

As most of the supports which are getting failed to import are actually mapped to the parent classes. So, it is required to rename their OPname mapping to ‘generic’ ones.

Please follow these steps:
4.2.6.2.1. Renaming Following OPname:

4.2.6.2.1.1. PIPE_HANGER’ to ‘GENERIC_PIPE_HANGER’:
2. Rename the mapping with OPname from ‘PIPE_HANGER’ to ‘GENERIC_PIPE_HANGER’

4.2.6.2.1.2. PIPE_ANCHOR’ to ‘GENERIC_PIPE_ANCHOR’:
1. Search for 'PIPE_ANCHOR' inside AP2OPMapping.xml.
2. Rename the mapping with OPname from ‘PIPE_ANCHOR’ to ‘GENERIC_PIPE_ANCHOR’

4.2.6.2.1.3. ‘PIPE_BASE_SUPPORT’ to ‘GENERIC_PIPE_BASE_SUPPORT’:
2. Rename the mapping with OPname from ‘PIPE_BASE_SUPPORT’ to ‘GENERIC_PIPE_BASE_SUPPORT’

4.2.6.2.1.4. ‘SHOES’ to ‘GENERIC_SHOES’:
2. Rename the mapping with OPname from ‘SHOES to ‘GENERIC_SHOES’

4.2.6.2.1.5. ‘PIPE_GUIDE’ to ‘GENERIC_PIPE_GUIDE’:
2. Rename the mapping with OPname from ‘PIPE_GUIDE’ to ‘GENERIC_PIPE_GUIDE’

4.2.6.2.1.6. ‘MISC_SUPPORT to ‘GENERIC_MISC SUPPORT’:
2. Rename the mapping with OPname from ‘MISC_SUPPORT to ‘GENERIC_MISC SUPPORT’

4.2.6.2.2. Reconfiguration required for specific APClass

Although from the previous step of renaming class to ‘Generic’ ones has solved most of the supports but some of them are still need reconfiguration.

Please follow these steps to correct mapping for these specific supports:

4.2.6.2.2.1. AT_SUPPORT_GBOLT --- U Bolt Guide
1. Find AT_SUPPORT_GBOLT inside the AP2OPMapping.xml and notice that this support is listed under ‘Ubolt Anchor’ – NOT OK
2. Erase its entry from ‘Ubolt Anchor’
3. Copy and paste the whole ‘Ubolt Anchor’ mapping including its APProperties.
4. Delete all entries of APClass names from the copied class.
5. Rename the OPname to ‘UBOLT_GUIDE’.
6. And paste just one APClass name as ‘Base: AT_SUPPORT_GBOLT’.

4.2.6.2.2.2. **AT_SUPPORT_STEEL --- GENERIC_MISC_SUPPORT**

1. Find AT_SUPPORT_STEEL inside the AP2OPMapping.xml and notice that this support is listed under ‘SUPPORT’ – NOT OK.
2. Erase its entry from ‘SUPPORT’.
3. Search for ‘GENERIC_MISC_SUPPORT’.
4. And paste ‘Base: AT_SUPPORT_STEEL’ inside its APClass name.

4.2.6.2.2.3. **AT_SUPPORT_UABOXES --- GENERIC_PIPE_ANCHOR’**

1. Find AT_SUPPORT_UABOXES inside the AP2OPMapping.xml and notice that this support is listed under ‘DIRECTIONAL PIPE ANCHOR’ – NOT OK.
2. Erase its entry from ‘DIRECTIONAL PIPE ANCHOR’.
3. Search for ‘GENERIC_PIPE_ANCHOR’.
4. And paste ‘Base: AT_SUPPORT_UABOXES’ inside its APClass name.

4.2.6.2.2.4. **AT_SUPPORT_UGBOXES --- GENERIC_PIPE_GUIDE’**

1. Find AT_SUPPORT_UGBOXES inside the AP2OPMapping.xml and notice that this support is listed under ‘DIRECTIONAL PIPE GUIDE’ – NOT OK.
2. Erase its entry from ‘DIRECTIONAL PIPE GUIDE’.
4. And paste ‘Base: AT_SUPPORT_UGBOXES’ inside its APClass name.

4.2.6.2.2.5. **AT_SUPPORT_GENHANGER --- GENERIC_PIPE_HANGER’**

1. Find ‘AT_SUPPORT_GENHANGER’ inside the AP2OPMapping.xml and notice that this support is listed under ‘ROD HANGER’ – NOT OK.
2. Erase its entry from ‘ROD HANGER’.
3. Search for ‘GENERIC_HANGER’.
4. And paste ‘Base: AT_SUPPORT_GENHANGER’ inside its APClass name.
4.2.6.2.6. **AT_SUPPORT_SHOEPADSLOP --- ‘GENERIC_SHOES’**:

1. Find ‘AT_SUPPORT_SHOEPADSLOP’ inside the AP2OPMapping.xml and notice that this support is listed under ‘TEE SHOE’ – NOT OK.
2. Erase its entry from ‘TEE SHOE’.
3. Search for ‘GENERIC_SHOES’.
4. And paste ‘Base: AT_SUPPORT_SHOEPADSLOP inside its APClass name

4.2.6.2.7. **AT_SUPPORT_ELBOWLUG -- GENERIC_ELBOW_SUPPORT**

1. Find ‘AT_SUPPORT_ELBOWLUG-- ‘inside the AP2OPMapping.xml and notice that this support is listed under ‘GENERIC PIPE_HANGER’– NOT OK.
2. Erase its entry from ‘GENERIC PIPE_HANGER’.
3. Copy and paste the whole ‘GENERIC PIPE_HANGER’ mapping including its APProperties.
4. Delete all entries of APClass names from the copied class.
5. Rename the OPname to ‘GENERIC_ELBOW_SUPPORT’.
6. And paste just one APClass name as ‘Base:AT_SUPPORT_ELBOWLUG’.

So, in this way schema configuration for supports is done, which makes them import inside OPM successful.

4.2.7. **Fixing ‘Inline Steam Trap’, ‘Generic Offset’, ‘Steam Trap and ‘Drip Pan Elbow’ by AP2OP Schema customization**

4.2.7.1. **Configurations Required in AP2OP Workset:**

Please follow following steps to incorporate GENERIC_OFFSET, STEAM_TRAP, TEE_TRAP and DRIP_PAN_ELBOW after running the Upgrade process.

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant 3D.01.08.ecschema’ the latest AP2OP Work set.

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schema:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling

5. Use the same Reference schemas as used in Step:2 and press OK.
6. Expand the ‘Openplant3D-Supplemented’ schema and navigate to find:
   1. GENERIC_OFFSET
   2. STEAM_TRAP

7. Copy the ‘Creation Attribute’ from OPM Class ‘GENERIC_PIPING_COMPONENT’ and
   ‘Component Port information’ from ‘GENERIC_PIPING_COMPONENT_TWO_PORT’ and paste
   them inside the ‘GENERIC_OFFSET’ and ‘STEAM_TRAP’ classes.
8. Copy the ‘Component Port information’ from ‘GENERIC_PIPING_COMPONENT_TWO_PORT’
   and paste it into ‘TEE_TRAP’ class.
9. Change the ‘Component Port Information’ for ‘TEE_TRAP’ to ‘3’ and add ‘BRANCH_PORT’ (as
   it contains 3 Ports inside AP environment)
10. Navigate to ‘DRIP_PAN_ELBOW’ inside ‘PIPE_ELBOW’ parent class and change its ‘Creation
    attribute’ to ‘IsGraphical’ by coping it from OPM Class ‘GENERIC_PIPING_COMPONENT’.
11. Now Save these changes and close the ‘Bentley Class Editor’.
12. Try to publish doc containing ‘GENERIC_OFFSET, STEAM_TRAP, TEE_TRAP and DRIP_PAN_ELBOW’
    and verify that if these components appear as a custom component inside OPM

4.2.7.2. Configurations Required in AP2OPMapping.xml file:

   4.2.7.2.1. AT_INLINETRAP --- GENERIC_PIPING_COMPONENT_THREE_PORT
   1. Find ‘AT_INLINETRAP’ inside the AP2OPMapping.xml.
   2. Erase its present entry from any other OP class (if exist).
   3. Search for ‘GENERIC_PIPING_COMPONENT_THREE_PORT’.
   4. And paste ‘Base:AT_INLINETRAP’ inside its AClass name.

4.2.8. Fixing ‘Valve-TopWorks’ by AP2OP Schema customization

   4.2.8.1. Conclusions
While some topworks classes are similar, most are not.

We map compatible classes (with special steps in the AP Connector to convert properties, because some
calculations are required), or keep APM graphics if no OPM draw script is available. Extra EC classes are
created if needed.
Also some valve operators in APM allow another topwork on them: like a chain on a gear operator. EC relationship class VALVE_OPERATING_DEVICE_HAS_VALVE_OPERATING_DEVICE was created for that (with support in AP Connector). Some modifications from OPM are required to support it.

We list existing APM and OPM topworks classes with notes. Found or possible issues are highlighted in red.

APM topworks are from the Base module. APM vs OPM classes comparison was mostly name then graphics based.

Important difference is about specs: OPM has TOPWORKS table in the specs, but APM just uses parameters from the dialog in the script.

### 4.2.8.2. OPM placeable topworks

<table>
<thead>
<tr>
<th>Name (as in placement tool)</th>
<th>APM equivalent</th>
<th>Notes</th>
<th>EC class name</th>
<th>Ok?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAND WHEEL</td>
<td>Handwheel</td>
<td></td>
<td>HAND_WHEEL</td>
<td>+</td>
</tr>
<tr>
<td>VALVE WRENCH</td>
<td>Wrench Operator</td>
<td></td>
<td>VALVE_WRENCH</td>
<td>+</td>
</tr>
<tr>
<td>BAR HANDLE</td>
<td>Bar Handle Operator</td>
<td></td>
<td>BAR_HANDLE</td>
<td>-</td>
</tr>
<tr>
<td>CUBE OPERATOR</td>
<td>Cube Operator</td>
<td></td>
<td>CUBE_OPERATOR</td>
<td>f</td>
</tr>
<tr>
<td>CONE OPERATOR</td>
<td>Cone Operator</td>
<td></td>
<td>CONE_OPERATOR</td>
<td>+</td>
</tr>
<tr>
<td>SEAL CAP OPERATOR</td>
<td>Seal Cap</td>
<td></td>
<td>SEAL_CAP_OPERATOR</td>
<td>+</td>
</tr>
<tr>
<td>DIAPHRAGM OPERATOR</td>
<td>Diaphragm Operator</td>
<td></td>
<td>DIAPHRAGM_OPERATOR</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Has picture of Cylinder Operator in the placement tool! (OPM 10.9.0.59)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEAR BOX OPERATOR</td>
<td>Gear Operator</td>
<td></td>
<td>GEARBOX_OPERATOR</td>
<td>^</td>
</tr>
<tr>
<td>PNEUMATIC VALVE ACTUATOR</td>
<td>Pneumatic Actuator</td>
<td></td>
<td>PNEUMATIC_VALVE_ACTUATOR</td>
<td>+</td>
</tr>
<tr>
<td>ELECTRIC VALVE ACTUATOR</td>
<td>Electric Actuator</td>
<td></td>
<td>ELECTRIC_VALVE_ACTUATOR</td>
<td>-</td>
</tr>
<tr>
<td>DIAPHRAGM GEAR OPERATOR</td>
<td>Diaphragm-Gear Operator</td>
<td>Wrong graphics! (OPM 10.9.0.59)</td>
<td>DIAPHRAGM_GEAR_OPERATOR</td>
<td>-</td>
</tr>
<tr>
<td>Bar Handle</td>
<td>—</td>
<td>Missing picture in the placement tool! (OPM 10.9.0.59)</td>
<td>T_HY_BAR_HANDLE</td>
<td>0</td>
</tr>
</tbody>
</table>
For some reason Relief Operator is not in the placement menu. OPM draw script is present. Its EC class is RELIEF_OPERATOR.

### 4.2.8.3. APM placeable topworks

<table>
<thead>
<tr>
<th>Name (as in placement tool)</th>
<th>OPM equivalent</th>
<th>Notes</th>
<th>AP class name</th>
<th>Ok?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cone Operator</td>
<td>CONE OPERATOR</td>
<td></td>
<td>AT_TOPWORKS_CONE</td>
<td>+</td>
</tr>
<tr>
<td>Cube Operator</td>
<td>CUBE OPERATOR</td>
<td></td>
<td>AT_TOPWORKS_CUBE</td>
<td>f</td>
</tr>
<tr>
<td>Cylinder Operator</td>
<td>Cylinder Operator</td>
<td></td>
<td>AT_TOPWORKS_CYLINDER</td>
<td>-</td>
</tr>
<tr>
<td>Seal Cap</td>
<td>SEAL CAP OPERATOR</td>
<td></td>
<td>AT_TOPWORKS_SEALCAP</td>
<td>+</td>
</tr>
<tr>
<td>Handwheel</td>
<td>HAND WHEEL</td>
<td>One extra parameter in APM.</td>
<td>AT_TOPWORKS_HANDWHEEL</td>
<td>+</td>
</tr>
<tr>
<td>Handwheel (Rising Stem)</td>
<td>—</td>
<td></td>
<td>AT_TOPWORKS_HWHEELRISING</td>
<td>-</td>
</tr>
<tr>
<td>Wrench Operator</td>
<td>VALVE WRENCH</td>
<td>Somewhat different graphics!</td>
<td>AT_TOPWORKS_BALLEVER</td>
<td>+</td>
</tr>
<tr>
<td>Bar Handle Operator</td>
<td>BAR HANDLE</td>
<td></td>
<td>AT_TOPWORKS_BHANDLE</td>
<td>-</td>
</tr>
<tr>
<td>Gear Operator</td>
<td>GEAR BOX OPERATOR</td>
<td>OPM class has more parameters.</td>
<td>AT_TOPWORKS_GEAROPERATOR, ROTOCHAINCHECK=0</td>
<td>^</td>
</tr>
<tr>
<td>Diaphragm Operator</td>
<td>DIAPHRAGM OPERATOR</td>
<td>One extra parameter in APM.</td>
<td>AT_TOPWORKS_DIAPHRAGMSPRING</td>
<td>-</td>
</tr>
<tr>
<td>Diaphragm-Gear Operator</td>
<td>DIAPHRAGM GEAR OPERATOR</td>
<td>OPM graphics/placement tool do not look right.</td>
<td>AT_TOPWORKS_DIAGEAR</td>
<td>-</td>
</tr>
<tr>
<td>Relief Operator</td>
<td>Relief Operator</td>
<td>Not in the placement tool. OPM draw script is present.</td>
<td>AT_TOPWORKS_RELIEF</td>
<td>+</td>
</tr>
<tr>
<td>Chain Operator (I)</td>
<td>CHAIN OPERATOR</td>
<td>Name is the same as Chain Operator (II.)</td>
<td>AT_TOPWORKS_CHAIN</td>
<td>-</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td>-------------------------------------------</td>
<td>-------------------</td>
<td>---</td>
</tr>
<tr>
<td>Rotork Actuator</td>
<td>—</td>
<td>AT_TOPWORKS_ROTORKACTUATOR</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Diaphragm Actuator</td>
<td>—</td>
<td>AT_TOPWORKS_DIAPHRAGM</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Roto Chain Links On Gear Operator</td>
<td>—</td>
<td>Topwork on topwork! (On Gear Operator.) Or part of Gear Operator.</td>
<td>AT_TOPWORKS_ROTOCHAIN_GEAROP, or part of AT_TOPWORKS_GEAROPERATOR with ROTOCHAINCHECK=1</td>
<td>-</td>
</tr>
<tr>
<td>Chain Operator (II)</td>
<td>—</td>
<td>Name is the same as Chain Operator (I).</td>
<td>AT_TOPWORKS_CHAINROTO</td>
<td>-</td>
</tr>
<tr>
<td>Chain Operator Links</td>
<td>—</td>
<td>Topwork on topwork! (On Chain Operator (II).)</td>
<td>AT_TOPWORKS_CHAIN_LINK</td>
<td>-</td>
</tr>
<tr>
<td>Electric Actuator</td>
<td>ELECTRIC VALVE ACTUATOR</td>
<td>AT_TOPWORKS_ELECT</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Pneumatic Actuator</td>
<td>PNEUMATIC VALVE ACTUATOR</td>
<td>AT_TOPWORKS_PNEUM</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pneumatic Spring Return Actuator</td>
<td>—</td>
<td>AT_TOPWORKS_G</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>G20xx-SR Actuator</td>
<td>—</td>
<td>AT_TOPWORKS_G20xx</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Spring Return Actuator c/w Manual Overdrive</td>
<td>—</td>
<td>AT_TOPWORKS_G_M11</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>G20xx-SR-M11 Actuator c/w Manual Overdrive</td>
<td>—</td>
<td>AT_TOPWORKS_G_SR_M1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Diaphragm and Handwheel Actuator</td>
<td>—</td>
<td>APM graphics may be a bit wrong.</td>
<td>AT_TOPWORKS_DIAPHANDWHEEL</td>
<td>-</td>
</tr>
<tr>
<td>Bayonet Actuator</td>
<td>—</td>
<td>AT_TOPWORKS_BAYONET</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

"Ok?": "+" means ok, "f" means flipped graphics, "^" means almost correct, "0" means not applicable, "-" means missing or wrong.
4.2.8.4. Required work

1. Configure in OPM project: flip Cube operator.
2. Create EC classes with IsGraphical creation attribute OR map to some suitable classes with:
   
   Note 1: both “Pneumatic Spring Return Actuator” and “Pneumatic Actuator” are mapped to “Pneumatic valve actuator”, and while that class has OPM draw script, APM graphics are kept.
   
   Note 2: RELIEF_OPERATOR, PNEUMATIC_VALVE_ACTUATOR and VALVE_WRENCH are configured to keep APM graphics (in Modeler.cfg).
3. Fix mapping: Cylinder operator, Bar handle operator, Diaphragm operator, Diaphragm-Gear operator, Chain operator (II), Electric actuator.

4.2.8.5. Work done

1. Appending “CUBE_OPERATOR|2|-180” to OPM_AP2OP_ROTATE_COMPS_DATA setting seems to work.
2. Class by class:
   a. Added ELECTRIC_VALVE_ACTUATOR to OPM_AP2OP_ALWAYS_TREAT_AS_CUSTOM_COMPONENT list of exceptions.
   b. Changed mapping of “G20xx-SR Actuator”, “Spring Return Actuator c/w Manual Overdrive” and “G20xx-SR-M11 Actuator c/w Manual Overdrive” from “Gear operator” to PNEUMATIC_VALVE_ACTUATOR (they seem to be pneumatic).
   c. Created new classes for “Bayonet actuator” and “Diaphragm and handwheel operator”. Just BAYONET_ACTUATOR and DIAPHRAGM_AND_HANDWHEEL_ACTUATOR, VALVE_ACTUATOR descendants.
3. Class by class:
   a. Cylinder operator in OPM lacks C and D parameters from APM. Fixed mapping, ignoring extra parameters. Note that APM graphics are closer to diaphragm operator, so graphics are configured to be kept.
   b. Bar handle operator in OPM has more parameters than in APM. Fixed mapping, ignoring extra parameters. Graphics are kept too.
4.2.9. Fixes for Piping ‘Base’ module components getting 'missed' or give 'wrong graphics' due to incorrect mappings.

4.2.9.1. Fixing ‘Fire Hydrant’:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset. Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Expand the ‘Classes’ and follow the hierarchy, to find ‘Fire Hydrant’.
6. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
7. Paste this custom attribute into the 'Fire Hydrant' class.
8. Now copy the 'Component Port Information' from
   GENERIC_PIPING_COMPONENT_TWO_PORT.
9. Paste it into the 'Fire_hydrant' class.
10. Edit the No.of Ports from 2 to 1.
11. Delete the ‘Run_Port’ from ‘Port Type’.
12. As a result, we can now incorporate Fire Hydrants into the OP world.

4.2.9.2. Fixing ‘Pressure_Relief_Valve’:
1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP
   Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT
   Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\Open
   Plant\Schemas
2. Load all Reference schemas from this location:
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Search for the class ‘**Presssure_Relief_Valve**’.
6. Navigate to it.
7. Edit the No.of Ports from **2** to **1**.
8. Delete the ‘Run_Port’ from ‘Port Type’.
9. Go to the class ‘**Generic Piping Component**’ and Right click to copy ‘Creation Attribute’ as a ‘**Custom Attributes**’.
10. Paste this custom attribute into the ‘Pressure_Relief_Valve’ class.
11. As a result, we can now incorporate Pressure_Relief_Valve into the OP world.

4.2.9.3. Fixing ‘WELDOFLANGE’ and ‘Welding_Boss’:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Expand the ‘Classes’ and follow the hierarchy, to find ‘**Welding Boss**’ and ‘**Weldoflange**’.
6. Go to the class ‘**Generic Piping Component**’ and Right click to copy ‘**Creation Attribute**’ as a ‘**Custom Attributes**’.
7. Paste this custom attribute into both ‘Welding Boss’ and ‘Weldoflange’ classes.
8. As a result, we can now incorporate ‘Welding Boss’ and ‘Weldoflange’ into the OP world.

4.2.9.4. Fixing ‘Pipe_Elbow_Street’:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\........\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location: 
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Expand the ‘Classes’ and follow the hierarchy, to find ‘Pipe_Elbow_Street’.
6. Go to the class ‘PIPE_ELBOw_45_DEGREE_STREET’ and Right click to copy ‘Component Port Information’ as a ‘Custom Attributes’.

Use the same Reference schemas as used in Step:2 and press OK.
9. Paste this custom attribute into parent class ‘Pipe Elbow Street’.

10. As a result, we can now incorporate ‘Pipe Elbow Street’ into the OP world.

4.2.9.5. Fixing ‘Pipe End’:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Expand the ‘Classes’ and follow the hierarchy, to find ‘Pipe_End’.
6. Now copy the ‘Component Port Information’ from `GENERIC_PIPING_COMPONENT_TWO_PORT`.
7. Paste it into the ‘Pipe_End’ class.
8. Edit the No.of Ports from **2** to **1**.
9. Delete the ‘Run_Port’ from ‘Port Type’.
10. Go to the class ‘**Generic Piping Component**’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
11. Paste this custom attribute into parent class ‘Pipe_End’.
12. As a result, we can now incorporate ‘Pipe_End’ into the OP world.

4.2.10. Incorporating ‘Concentric_Swage’ as a Custom Component.
1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Search for ‘CONCENTRIC_SWAGE’ class and select it.
6. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
7. Paste this ‘Creation Attribute’ into the ‘CONCENTRIC_SWAGE’.
8. Now copy the ‘Component Port Information’ from
   GENERIC_PIPING_COMPONENT_TWO_PORT.
9. Paste this attribute to ‘CONCENTRIC_SWAGE’ class also.
10. As a result, we can now incorporate ‘CONCENTRIC_SWAGE’ into the OP world.

4.2.11. Incorporating ‘LATROLET_90_DEGREES’ as a Custom Component

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\Open Plant\Schemas
2. Load all Reference schemas from this location:
C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Search for ‘LATROLET’ class and select it.
6. Right Click on ‘LATROLET’ and select ‘Add Derived Classes.’
7. Specify its ‘Name’ and ‘Display Label’ as ‘LATROLET_90_DEGREES’
8. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
9. Paste this ‘Creation Attribute’ into the newly created ‘LATROLET_90_DEGREES’ class.

10. As a result, we can now incorporate ‘LATROLET_90_DEGREES’ into the OP world.

4.2.12. Incorporating ‘TAP-TAP' End-Conditions for ‘TAP_JOINT’

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.escchema’ the latest AP2OP Workset.
Can be found at this link
C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Under the ‘Plant Base Object’ click on ‘Joint’

6. Expand the ‘Joint Type’ from ‘OpenPlant_Physical_JointType_Map’.
7. Please look for the ‘TAP_JOINT’ (can be found at [8] position).
8. Expand the ‘End Preparation 2’ and add ‘TAP’ (as a new End Condition 2) as shown below.

9. As a result, we can now incorporate ‘TAP-TAP’ End Conditions for ‘Tap_Joint’

4.2.13. Incorporating ‘Straightway Y Check Valve’ and ‘Relief Change Over Valve APM’

1. Launch ‘Bentley Class Editor’ and Open ‘**OpenPlant_3D.01.08.ecschema**’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

![OpenPlant 3D interface showing supplement schema selection]

4. Add following two Supplemental schemas:
   - SupplementalInformation_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Navigate to ‘Plant Base Object > Named Item > Device > Piping and instrument Component > Piping Component > Fluid Regulator > One Way Flow Regulator > Check Valve.”
6. Right Click on ‘Check Valve’ and select ‘Add Derived Classes.’

7. Specify its ‘Name’ and ‘Display Label’ as ‘VALVE_YCHECK’ and “Straightway Y Check Valve” respectively.

8. Similarly Navigate to ‘Plant Base Object > Named Item > Device > Piping and instrument Component > Piping Component > Valve > Multi Way Valve > Three Way Valve.’
9. Right Click on ‘Three Way Valve’ and select ‘Add Derived Classes.’
10. Specify its ‘Name’ and ‘Display Label’ as ‘CHANGE_OVER_VALVE_APM’ and “Relief Change Over Valve APM” respectively.
11. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
12. Paste this ‘Creation Attribute’ into the newly created classes ‘VALVE_YCHECK’ and ‘CHANGE_OVER_VALVE_AP’

13. As a result, we can now incorporate ‘Straightway Y Check Valve’ and ‘Relief Change Over Valve APM’ into the OP world.

4.2.14. Incorporating ‘THREADED_WELD_JOINT’

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\Open Plant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Navigate to ‘Plant Base Object > Joint’ and expand the ‘OpenPlant_Physical_JointType_Map’.
6. Right Click on ‘Joint Type’ and select ‘Add element’ to add a new joint.
7. Scroll down and notice that a new empty Joint has been created. (If it does not appear, please refresh or click on any other node)

8. Please Fill the information of ‘THREADED_WELD_JOINT’ as shown below:
9. Save all the changes.
10. As a result, we can have now incorporated ‘THREAD_WELD_JOINT’ into the OP world.

4.2.15. Incorporating ‘CLAMP_GASKET’ and ‘CLAMP_BOLT’:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in Step:2 and press OK.

6. Right Click on ‘Gasket’ and select ‘Add Derived Classes’.
7. Specify its ‘Name’ and ‘Display Label’ as ‘CLAMP_GASKET’ and “CLAMP_GASKET” respectively.
8. Navigate to ‘Plant Base Object > Named Item > Device > Fastener > Bolt
9. Right Click on ‘Bolt’ and select ‘Add Derived Classes’.
10. Specify its ‘Name’ and ‘Display Label’ as ‘CLAMP_BOLT’ and “CLAMP_BOLT” respectively.
11. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
12. Paste this ‘Creation Attribute’ into the newly created classes ‘CLAMP_GASKET’ and ‘CLAMP_BOLT’.
13. As a result, we can now incorporate ‘CLAMP_GASKET’ and ‘CLAMP_BOLT’ into the OP world.

4.2.16. Introducing ‘UPDATE_GRAPHICS’ property inside ‘Fastener’ and ‘Seal’ classes:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.....\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Navigate to ‘Plant Base Object > Named Item > Device > Piping and instrument Component > Piping Component

7. Paste this property to the ‘Fastener’ and ‘Seal’ class.
8. Finally, we are now able to use ‘Update_graphics’ property inside all of the Derived class from ‘Fastener’ and ‘Seal’

4.2.17. Some Corrections required inside the ‘Modeler.cfg’ file:

1. Launch the ‘Modeler.cfg’ file from the following location:
2. Find ‘OPM_AP2OP_ALWAYS_TREAT_AS_CUSTOM_COMPONENT’ inside this file.
3. Add ‘MITERED_PIPE’ like:

    SUPPORT;MITERED_PIPE;INSTRUMENT:T_STRAINER;

4. Introduce a new variable inside the ‘Modeler.cfg’ file as

    ‘OPM_AP2OP_POST_UPGRADE_KEYINS = mechaddin deleteemptylines PIPING_NETWORK_SYSTEM’

5. Remove the following variable from ‘Modeler.cfg’ file:

    OPM_AP2OP_DISABLE_CROSS_MODEL_REL=1

4.2.18. Fixing ‘PIPE_ELBO’ Ports information:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT
   Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT
   Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in Step:2 and press OK.

5. Search for the class ‘PIPE_ELBOW’.
6. Update the Port information to 2 –Ports.
7. Please make sure that the Two –Port types are present,
   - MAIN_PORT
   - RUN_PORT
8. Save the changes to Bentley Class Editor.

4.2.19. Fixing ‘PIPE_FLANGE_SPADE’ Creation Attribute:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\........\Metric\Standards\Open Plant\Schemas
2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
Use the same Reference schemas as used in **Step:2** and press **OK**.

5. Search for the class ‘PIPE_FLANGE_SPADE’ and select it

6. Go to the class ‘Generic Piping Component’ and Right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
7. Paste this ‘Creation Attribute’ into the ‘PIPE_FLANGE_SPADE’ class.

9. Save the changes to Bentley Class Editor.

4.2.20. Fixing ‘JOINT_GAP’ BUG: 598573:

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
2. Load all Reference schemas from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’

4. Add the following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Search for the ‘Gasket’ Class
6. Right Click on ‘Gasket’ class and select ‘Add Derived Class’.
7. Name this newly created class as ‘JOINT_GAP’.
8. Save the changes on Bentley Class Editor.
9. Launch OPPA and navigate to the recently opened AP2OP Base Workset.
10. Navigate to the ‘Joint Map’ option inside the ‘Settings’ tab.
11. Create a new joint named ‘AP_JOINT_GAP’ with details as follows:

12. Save the changes in OPPA
13. Now we have successfully incorporated ‘JOINT_GAP’ inside the AP2OP workflow.

4.2.21. Incorporating ‘Equipment’ from APM inside the AP2OP Schemas

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\.......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemes from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add the following two Supplemental schemas:
   - Supplemental Information 3D Component
   - Supplemental Modeling

Use the same Reference schemas as used in Step 2 and press OK.

5. To incorporate diverse varieties of Equipment from APM, we need to add new classes for them inside the AP2OP Schema.

Classes can be added by selecting ‘Add Derived Class’ from the right click context menu of the parent class.

<table>
<thead>
<tr>
<th>Parent Class</th>
<th>Derived Class</th>
<th>Description</th>
<th>Display - Label</th>
</tr>
</thead>
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<tr>
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<td>AutoPLANT equipment primitives</td>
<td>AP Equipment Primitives</td>
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<td>AutoPLANT equipment primitives - cylinders</td>
<td>Cylinders</td>
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<td>AutoPLANT equipment primitives - cones</td>
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<td>AutoPLANT assosiative primitives</td>
<td>AP Associative Primitives</td>
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<td>EQUIPMENT</td>
<td>APSPECREAC</td>
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<td>AutoPLANT assosiative primitives - cylinders</td>
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</tr>
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<td>Cones</td>
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<td>APASSOCPRIM_HE AD</td>
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<td>APRADDAVIT</td>
<td>AutoPLANT structures - radial davits</td>
<td>Radial Davits</td>
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</table>

6. Then Add Sub Classes inside the following previously derived classes:

<table>
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<th>Derived Class</th>
<th>Description</th>
<th>Display - Label</th>
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7. In the end the Equipment would look like this:
8. Go to the class ‘Generic Piping Component’ and right click to copy ‘Creation Attribute’ as a ‘Custom Attributes’.
9. Paste this ‘Creation Attribute’ to the following classes one by one.

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</tr>
<tr>
<td>HORIZREACTOR_AP</td>
<td>Horizontal Reactor</td>
</tr>
<tr>
<td>HORZVAP_AP</td>
<td>Vapor Column On Horizontal Vessel</td>
</tr>
<tr>
<td>HORZBOOT_AP</td>
<td>HORZBOOT_AP</td>
</tr>
<tr>
<td>HORIZCLIPS_AP</td>
<td>Horizontal Vessel Clips</td>
</tr>
<tr>
<td>VERTLEG_AP</td>
<td>Vertical Vessel Legs</td>
</tr>
<tr>
<td>VERTALLEGAP</td>
<td>Vertical Vessel Legs</td>
</tr>
<tr>
<td>VERTCLIPS_AP</td>
<td>Vertical Vessel Clips</td>
</tr>
<tr>
<td>VERTLUG_AP</td>
<td>Vertical Vessel Legs</td>
</tr>
<tr>
<td>STRLDDRH_AP</td>
<td>Ladder On Horizontal Vessel</td>
</tr>
<tr>
<td>STRLDDLDR_AP</td>
<td>Ladder On Vertical Vessel</td>
</tr>
<tr>
<td>STRLDDRSR_AP</td>
<td>Ladder On Vertical Vessel</td>
</tr>
<tr>
<td>STRPLTRH_AP</td>
<td>Rectangular Platform On Horizontal Vessel</td>
</tr>
<tr>
<td>STRPALTC_AP</td>
<td>Circular Platform On Vertical Vessel</td>
</tr>
<tr>
<td>STRPLTRRV_AP</td>
<td>Rectangular Platform On Vertical Vessel</td>
</tr>
<tr>
<td>PUMPVIS_AP</td>
<td>Vertical Industrial Submersible Pump (VIS)</td>
</tr>
<tr>
<td>PUMPVIT_AP</td>
<td>Vertical Inline Turbine Pump</td>
</tr>
<tr>
<td>PUMPVMP_AP</td>
<td>Vertical Marine Pump (VMP)</td>
</tr>
</tbody>
</table>
10. Now copy the ‘Component Port Information’ from `GENERIC_PIPING_COMPONENT_TWO_PORT`.

11. Paste it into the following classes:
   a. PUMPVIC_AP with display Label="Vertical Industrial Can Type Pump (VIC)"
   b. PUMPVIS_AP with display Label="Vertical Industrial Submersible Pump (VIS)"
   c. PUMPVIT_AP with display Label="Vertical Inline Turbine Pump"
   d. PUMPVMP_AP with display Label="Vertical Marine Pump (VMP)"

12. Edit the No.of Ports from 2 to 1.

13. Delete the ‘Run_Port’ from ‘Port Type’.

14. Navigate to the ‘Plate Exchanger’.

15. Create 8 Ports, in the following order:

16. As a result, we can now incorporate all Equipment from AP world into the OP world.

4.2.22. Solving the Hyphen (-) issue for Equipments by configuring AP2OP Schemas

1. Launch OPPA and Navigate to the latest AP2OP Workset.
2. From the Drop-down select the ‘OpenPLANT Modeler’
3. Then within the ‘Settings’ tab, select ‘Expression Editor’ as shown in the below image:
4. Navigate to the ‘Equipment’ Class and select the ‘Tag Number’.
5. Enter the following values in the empty field as shown in the image below:

\[
\text{IIF(this.DEVICE_TYPE_CODE = "", this.NUMBER, this.DEVICE_TYPE_CODE \& \" - \" \& this.NUMBER)}
\]

6. Save the changes.
7. Navigate to the ‘Fluid Regulator’ Class and select the ‘Tag Number’.
8. Enter the following values in the empty field as shown in the image below:

\[
\text{IIF(this.DEVICE_TYPE_CODE = "", this.NUMBER, this.DEVICE_TYPE_CODE \& \" - \" \& this.NUMBER)}
\]
9. Save the changes.
10. Navigate to the ‘Nozzle’ Class and select the ‘Equipment_tag’.
11. Enter the following values in the empty field as shown in the image below:

   this.GetRelatedInstance("EQUIPMENT_HAS_NOZZLE:1:EQUIPMENT_TAG, NAME").NAME

   Unable to validate related class specifier from string 'EQUIPMENT_HAS_NOZZLE:1:EQUIPMENT_TAG'.

12. Save the changes.
13. Navigate to the ‘Support’ Class and select the ‘Tag Name’.
14. Enter the following values in the empty field as shown in the image below:

\[ \text{IIF(this.DEVICE\_TYPE\_CODE} = "", \text{this.NUMBER, this.DEVICE\_TYPE\_CODE} \& "\-" \& \text{this.NUMBER}) \]

15. Save the changes.

16. In this way the hypen issue would be fixed.

4.2.23. Incorporating ‘ELBOWPIPET’ from APM inside the AP2OP Schemas

1. Launch ‘Bentley Class Editor’ and Open ‘OpenPlant_3D.01.08.ecschema’ the latest AP2OP Workset.
   Can be found at this link
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\......\Metric\Standards\OpenPlant\Schemas

2. Load all Reference schemes from this location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\Standards\OpenPlant\Schemas

3. Right Click on ‘OpenPlant 3D’ schema and select ‘Supplement Schema.’
4. Add the following two Supplemental schemas:
   - Supplemental_Information_3DComponent
   - Supplemental Modeling
5. Navigate to the ‘Elbolet’ class via Search.
6. Create a new Derived Class by selecting ‘Add Derived Class’ from the right click context menu of the parent class ‘Elbolet’.
7. Give the name ‘ELBOWPIPET”, description "elbow pipet" and display_Label "Elbow pipet".
8. So finally we have incorporated ‘ElbowPipet’ class inside the AP2OP Schemas

4.2.24. Introducing ‘TAP_JOINT_OLET_WELD’ for Olet Connection:
1. Launch OPPA and Navigate to the latest AP2OP Workset.
2. From the Drop-down select the ‘OpenPLANT Modeler’
3. Then within the ‘Settings’ tab, select ‘Joint_Map’.
4. Create a new Joint named ‘TAP_JOINT_OLET_WELD’
5. Enter Fasteners, End preparation 1 and End preparation 2 values as shown in the image below.
6. Save the changes.
7. So after following these basic steps, we have introduced a new joint for Olet Connection named ‘TAP_JOINT_OLET_WELD’

4.2.25. Fixing the ‘Gasket’ issue while generating isometrics:

1. Launch the ‘Modeler.cfg’ file from the following location:
   C:\ProgramData\Bentley\OpenPlant CONNECT Edition\Configuration\WorkSpaces\OpenPlantExample\WorkSets\AP2OP Base Metric\Standards\OpenPlant\Modeler
2. Introduce a new variable in the bottom of the file as ‘OPM_AP2OP_UPGRADE_CALC_GASKET_ORIGIN=1’