

Plant SDK 2015 – Project Database ERD

Plant SDK Supplement - Entity Relationship Diagrams

The ERDs described in this document supplement the Plant SDK.

IMPORTANT: Any direct access to the Plant 3D database should be read-only. Use the Plant SDK APIs to modify the database.

The following ERDs PDFs are provided with this supplement:

- **PnID.pdf**
- **Piping.pdf**
- **Ortho.pdf**
- **Iso.pdf**
- **PnID_Empty.pdf**
- **Piping_Empty.pdf**
- **Ortho_Empty.pdf**
- **Iso_Empty.pdf**



The **Empty** PDFs are provided so that you can easily identify the standard (boilerplate) tables that are created with a new project. You can see in the Empty PDFs that each project database is similar to other project databases when first created.

The other (more interesting) ERDs were created after sample objects were added.

As objects are added to a P&ID drawing or the 3D model, AutoCAD Plant 3D tables are added to the database. Table names match the class names. For example, if you add a valve to the 3D Model the following tables are added to the PnID database:

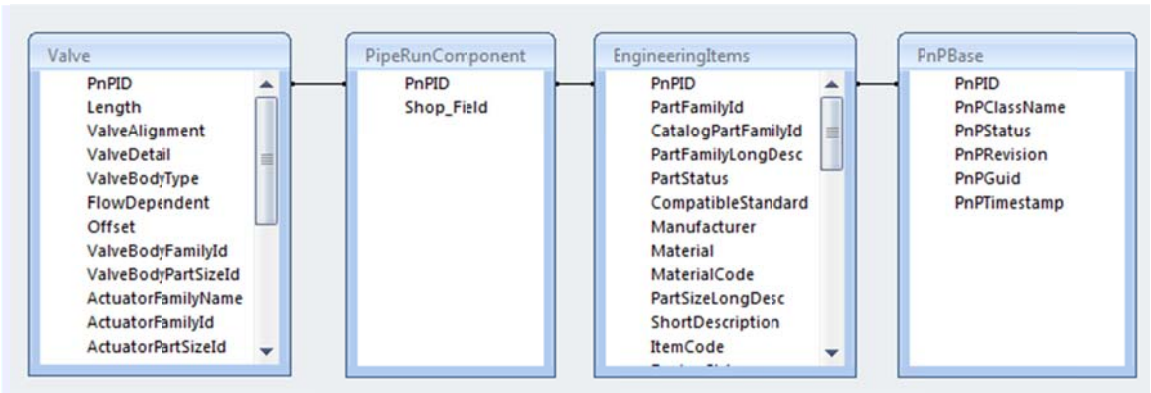
- **Valve** (class)
- **PipeRunComponent** (base class)
- **EngineeringItems** (base class)

See the *Relationships* section below for more information on class hierarchy and object tables.

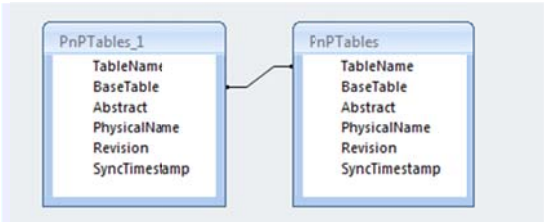
For clarity (and to help avoid huge ERDs) the PnID, Piping, Ortho, and Iso ERDs do not duplicate tables listed in the Empty ERDs. The Ortho and Iso ERDs are included for completeness and do not add class-specific tables for drawing objects.

Relationships

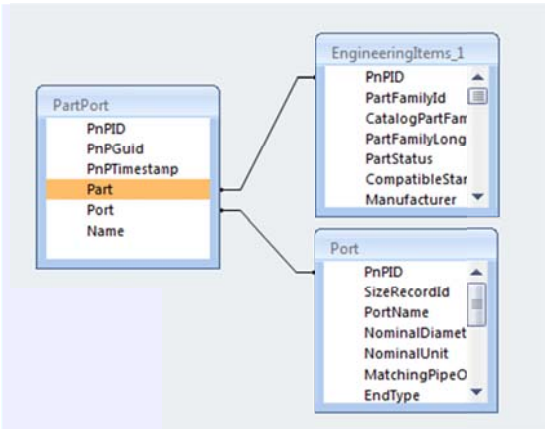
Here are some of the relationships that exist in the Plant 3D Database.



PnPID is used to link a Class table with its base tables.

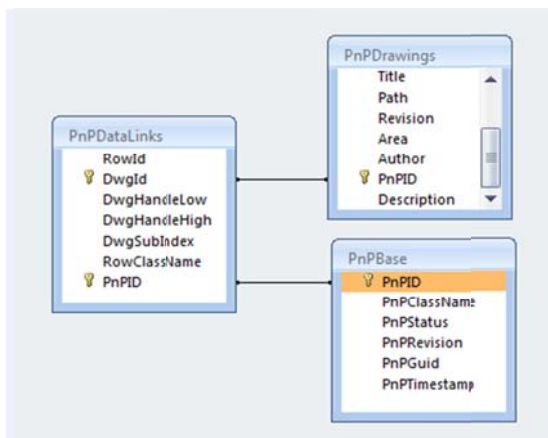


Using PnPTables, you can identify base tables.



Engineering items contains only one port. Additional ports are stored in the Port table. The PartPort table is used to link a component to its second (and additional) port.

Note: Parts and ports columns are indexed PnPIDs that are not shown on the ERD.



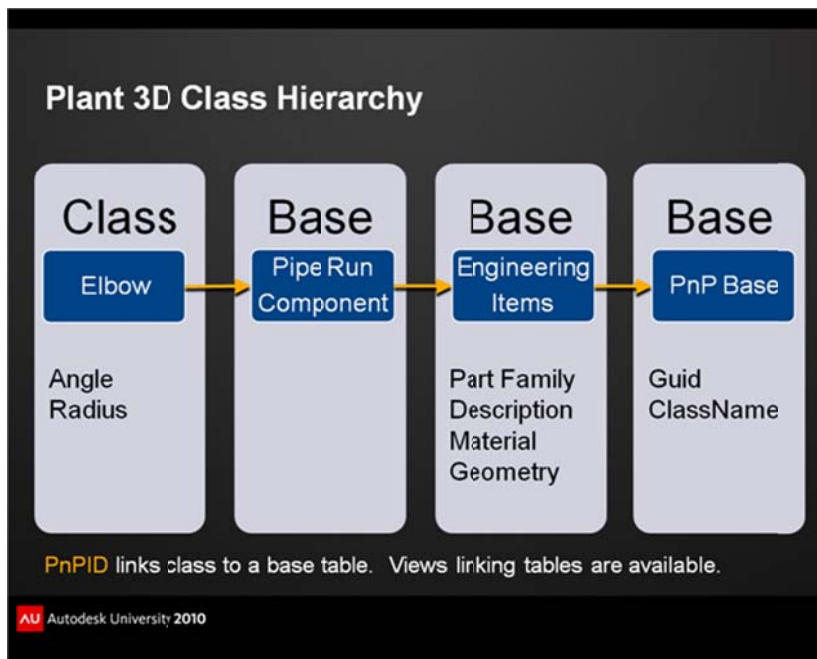
PnPDataLinks is used to identify the drawing that contains a component.

Data Details - Class Name and PnPTables

We want to take a closer look at PnPTables because this table defines class hierarchy (inheritance) and acts as the database directory. When browsing the database, visit this table first.

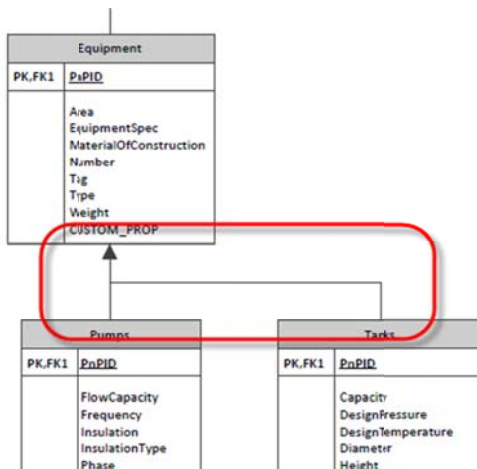
TABLE	PnPTables	Search	Show All	Add	Duplicate	Edit
rowid	TableName	BaseTable	Abstract	PhysicalName	Revis	
1	PnPBase		TRUE	PnPBase		
4	Equipment	EngineeringItems	FALSE	Equipment		
61	Fasteners	EngineeringItems	FALSE	Fasteners		
26	PipeRunComponent	EngineeringItems	FALSE	PipeRunComp...		
69	BoltSet	Fasteners	FALSE	BoltSet		
64	Gasket	Fasteners	FALSE	Gasket		
63	StubEnd	Fasteners	FALSE	StubEnd		
34	Elbow	PipeRunComponent	FALSE	Elbow		
44	Pipe	PipeRunComponent	FALSE	Pipe		
46	Reducer	PipeRunComponent	FALSE	Reducer		
53	SingleBranchFitting	PipeRunComponent	FALSE	SingleBranchFi...		
59	Valve	PipeRunComponent	FALSE	Valve		
3	EngineeringItems	PnPBase	FALSE	Engineeringlte...		
70	Port	PnPBase	FALSE	Port		
55	Tee	SingleBranchFitting	FALSE	Tee		

Above we see that Elbow has a base table of PipeRunComponent. PipeRunComponent has a base table of EngineeringItems. Finally, EngineeringItems has a base table of PnPBase. This is the same inheritance that you see in Project Setup.



The image above illustrates that PnPID is matched to base tables. Each base table provides additional properties to the component. All Plant 3D class definitions use PnPBase as their root class. Notice that the Class Name is a property of PnPBase.

Joins (Foreign Keys)



Note: The relationships shown in the ERD, which are defined by class hierarchy, are not enforced by the database. This means that the FKs shown are illustrative and not database-defined keys.

Views are available in the database with a _PNP suffix. For example **HandValves_PNP** joins the HandValves table to all base classes.