PL20989 - Best Practice
Managing Inventor iPart/iAssemblies in Vault PDM

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Class summary

Vault software products specifically support Inventor software's iPart/iAssembly factory and member file management. This class will have practical examples that will illustrate and unveil the secrets from basic file management tasks up to advanced workflows like partial revision of families. Experienced Inventor software users and product data management administrators will learn recommended setup and configurations to capitalize on the full capabilities and benefits managing and consuming component families. The class will discuss file structures, setup of family tables, and the implementation of file and item numbering schemes for family members. Follow considerations and implementation scenarios to drive CAD and item bill of materials. Another important aspect is to manage component families over larger periods of time. Get introduced to revision management and all file management tasks like rename, move, and copy. We will also cover Inventor file migration for vaulted families. This session features Vault Professional, Inventor Professional, and Vault Workgroup.

Key learning objectives

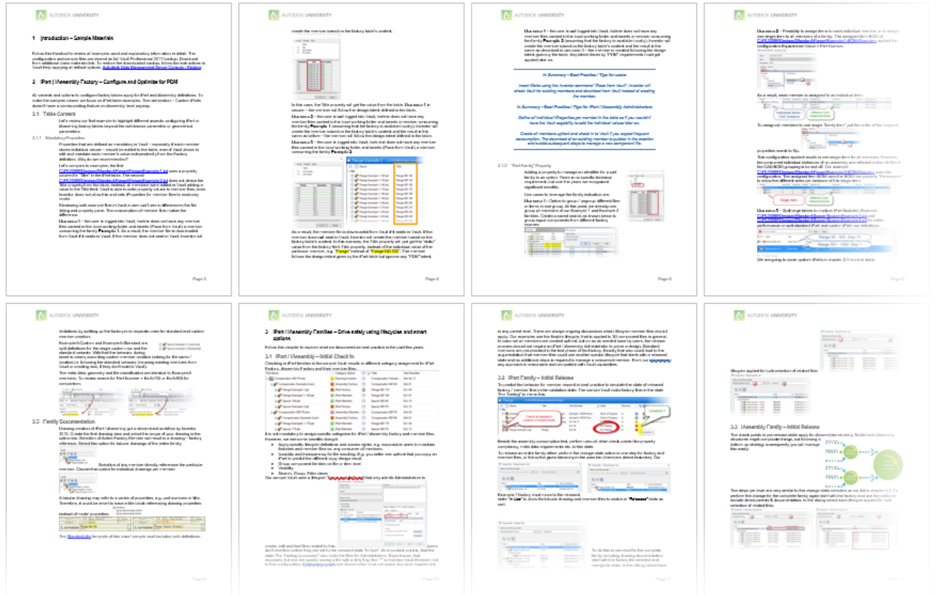
At the end of this class, you will be able to:

- Discover best practices defining robust and rich iPart/iAssembly factory definitions
- Learn how to optimize your Vault configuration to manage component families
- Learn about revision management of iPart/iAssembly factories and its member files
- Learn best practices to rename, move, copy, and migrate component families

Agenda

- Make iPart / iAssemblies robust, compatible and smart for PDM workflows
- „iFamily“ lifecycles
  - From first release to family revisions
- „iFamily“ handling in Vault
  - Rename, Move, CopyDesign

Sample Data & Handout



- Handout talking you through all examples
- Vault Professional 2017 Backup
  - All sample files
  - Fully configured

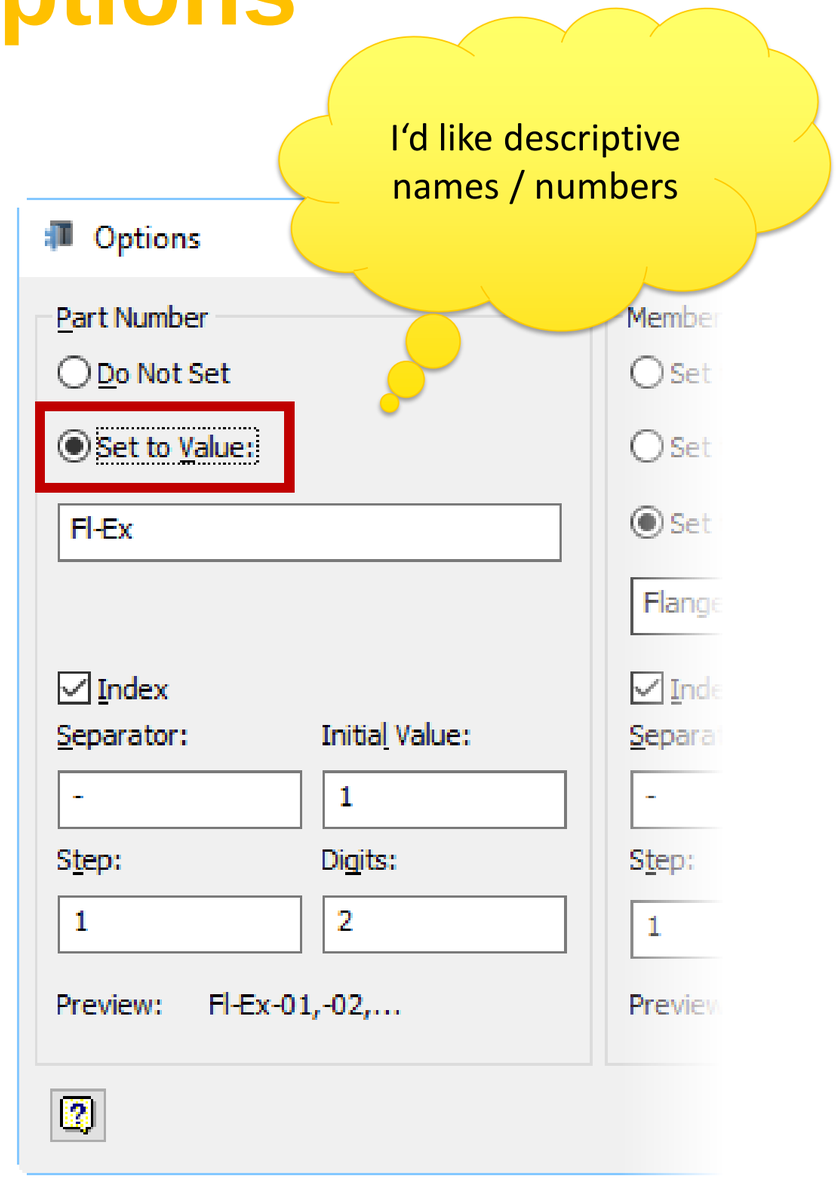
iPart Factory | iAssembly Factory

Configure and Optimize for PDM

Configure Family – Must Have | Options

Set options **according** use case

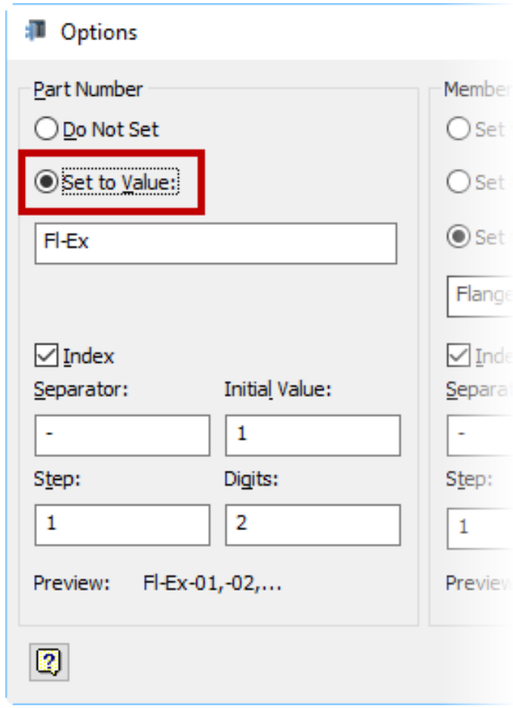
- Part Number = Set to Value
  - Any incremental value allowed
  - Increment of file name allowed

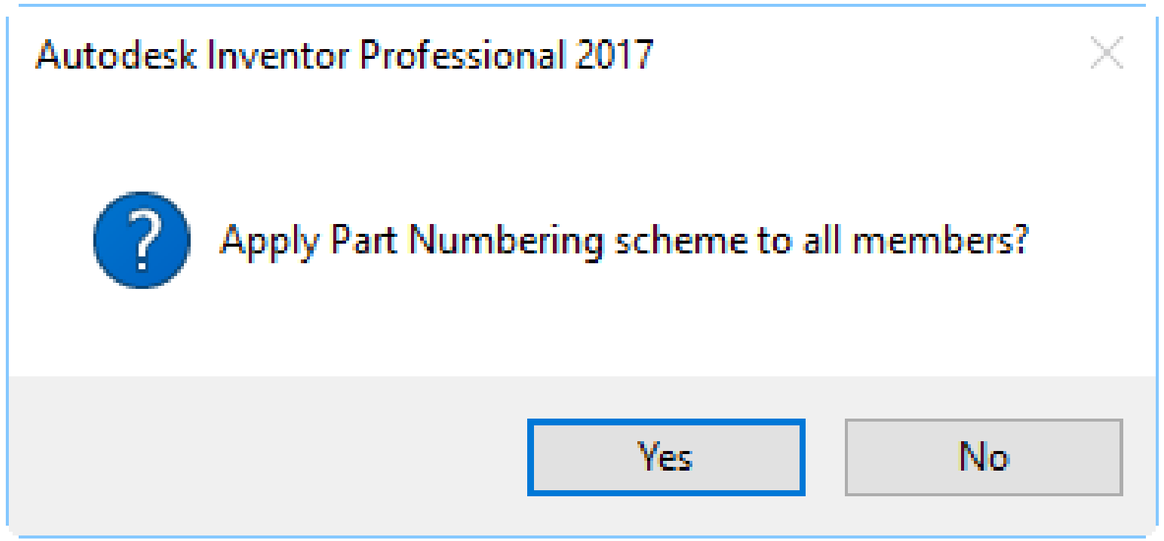


Configure Family – Must Have | Options

Part Number = Set to Value

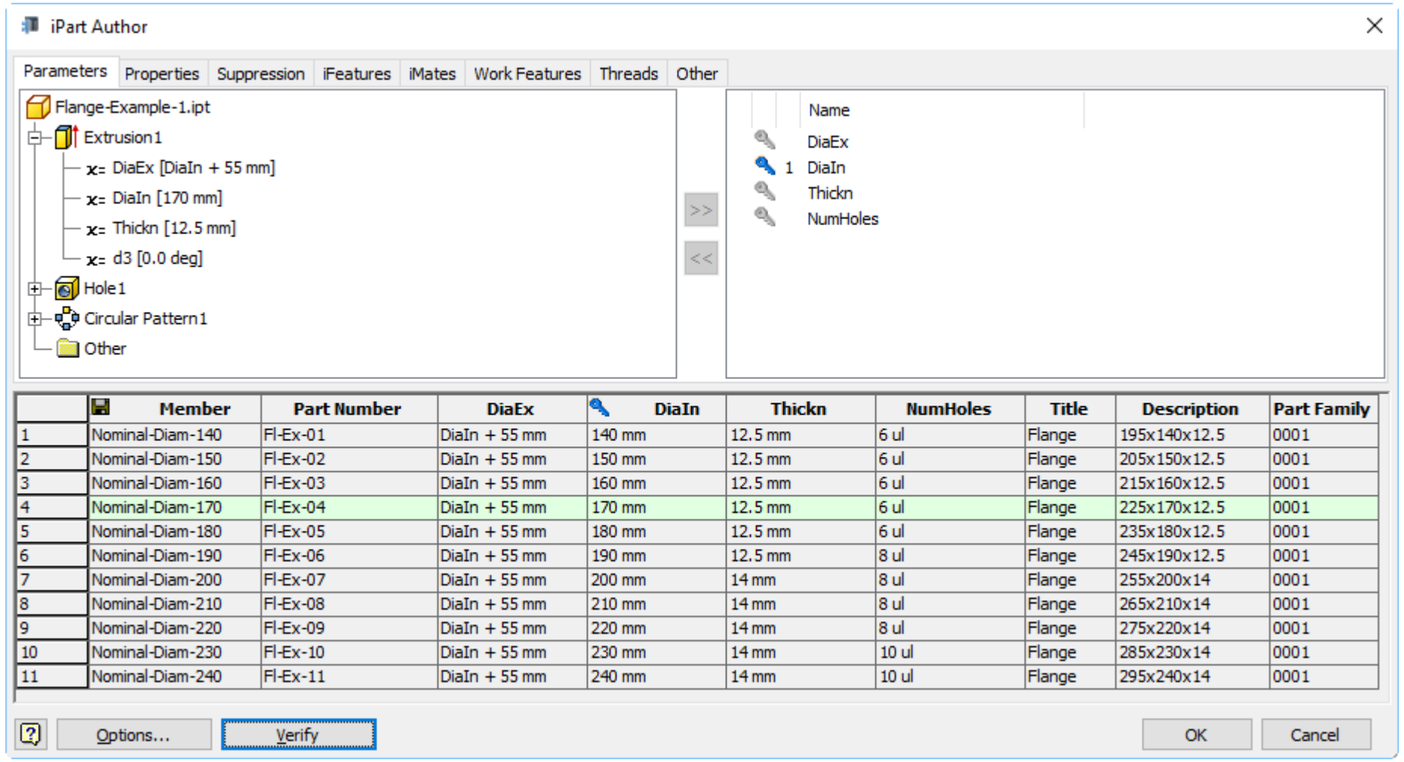
⇒ Yes! Apply the option leaving the options window



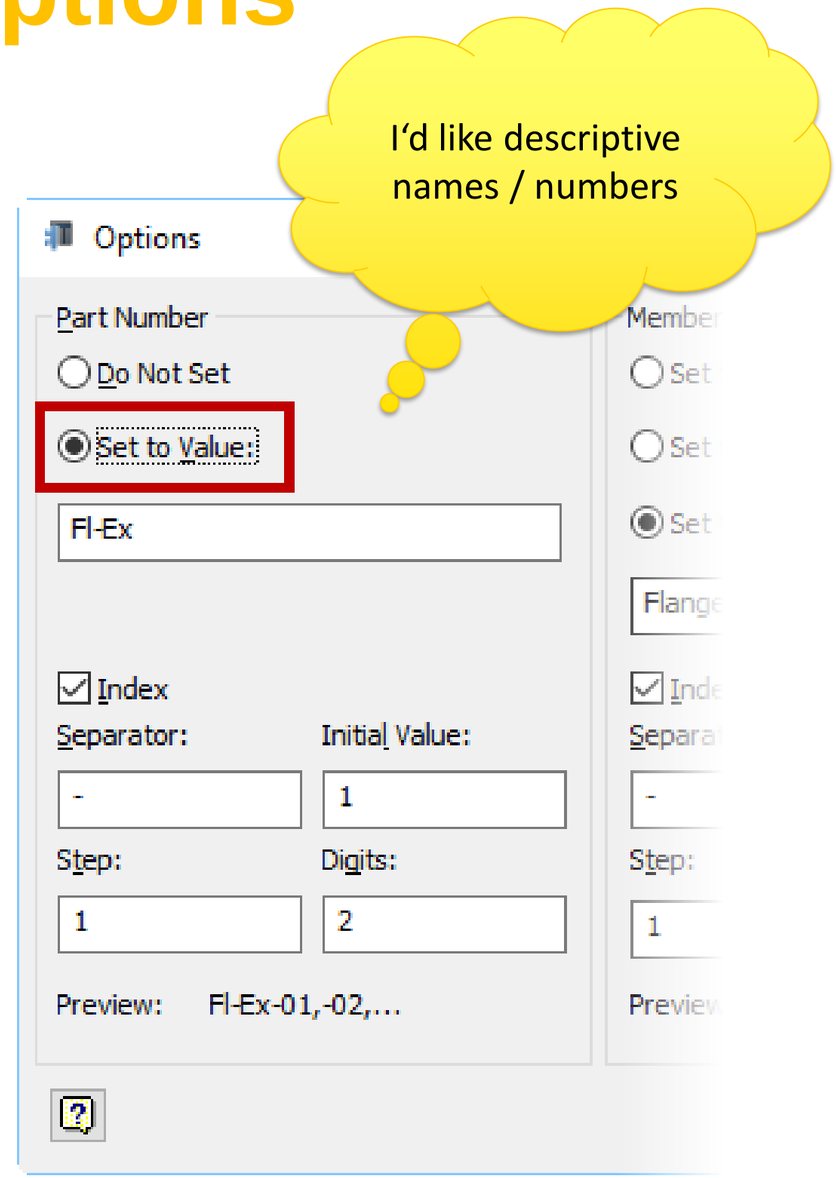


Configure Family – Must Have | Options

Example #1



	Member	Part Number	DiaEx	DiaIn	Thickn	NumHoles	Title	Description	Part Family
1	Nominal-Diam-140	Fl-Ex-01	DiaIn + 55 mm	140 mm	12.5 mm	6 ul	Flange	195x140x12.5	0001
2	Nominal-Diam-150	Fl-Ex-02	DiaIn + 55 mm	150 mm	12.5 mm	6 ul	Flange	205x150x12.5	0001
3	Nominal-Diam-160	Fl-Ex-03	DiaIn + 55 mm	160 mm	12.5 mm	6 ul	Flange	215x160x12.5	0001
4	Nominal-Diam-170	Fl-Ex-04	DiaIn + 55 mm	170 mm	12.5 mm	6 ul	Flange	225x170x12.5	0001
5	Nominal-Diam-180	Fl-Ex-05	DiaIn + 55 mm	180 mm	12.5 mm	6 ul	Flange	235x180x12.5	0001
6	Nominal-Diam-190	Fl-Ex-06	DiaIn + 55 mm	190 mm	12.5 mm	8 ul	Flange	245x190x12.5	0001
7	Nominal-Diam-200	Fl-Ex-07	DiaIn + 55 mm	200 mm	14 mm	8 ul	Flange	255x200x14	0001
8	Nominal-Diam-210	Fl-Ex-08	DiaIn + 55 mm	210 mm	14 mm	8 ul	Flange	265x210x14	0001
9	Nominal-Diam-220	Fl-Ex-09	DiaIn + 55 mm	220 mm	14 mm	8 ul	Flange	275x220x14	0001
10	Nominal-Diam-230	Fl-Ex-10	DiaIn + 55 mm	230 mm	14 mm	10 ul	Flange	285x230x14	0001
11	Nominal-Diam-240	Fl-Ex-11	DiaIn + 55 mm	240 mm	14 mm	10 ul	Flange	295x240x14	0001

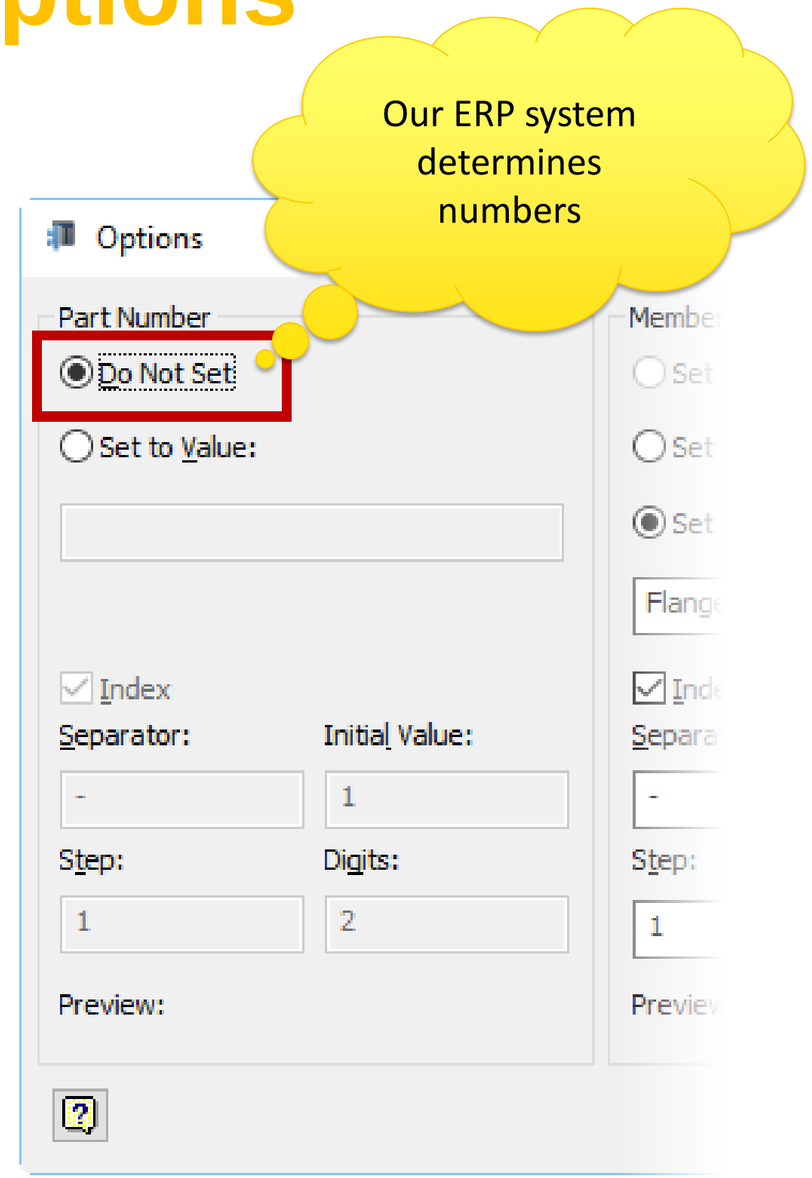


Configure Family – Must Have | Options

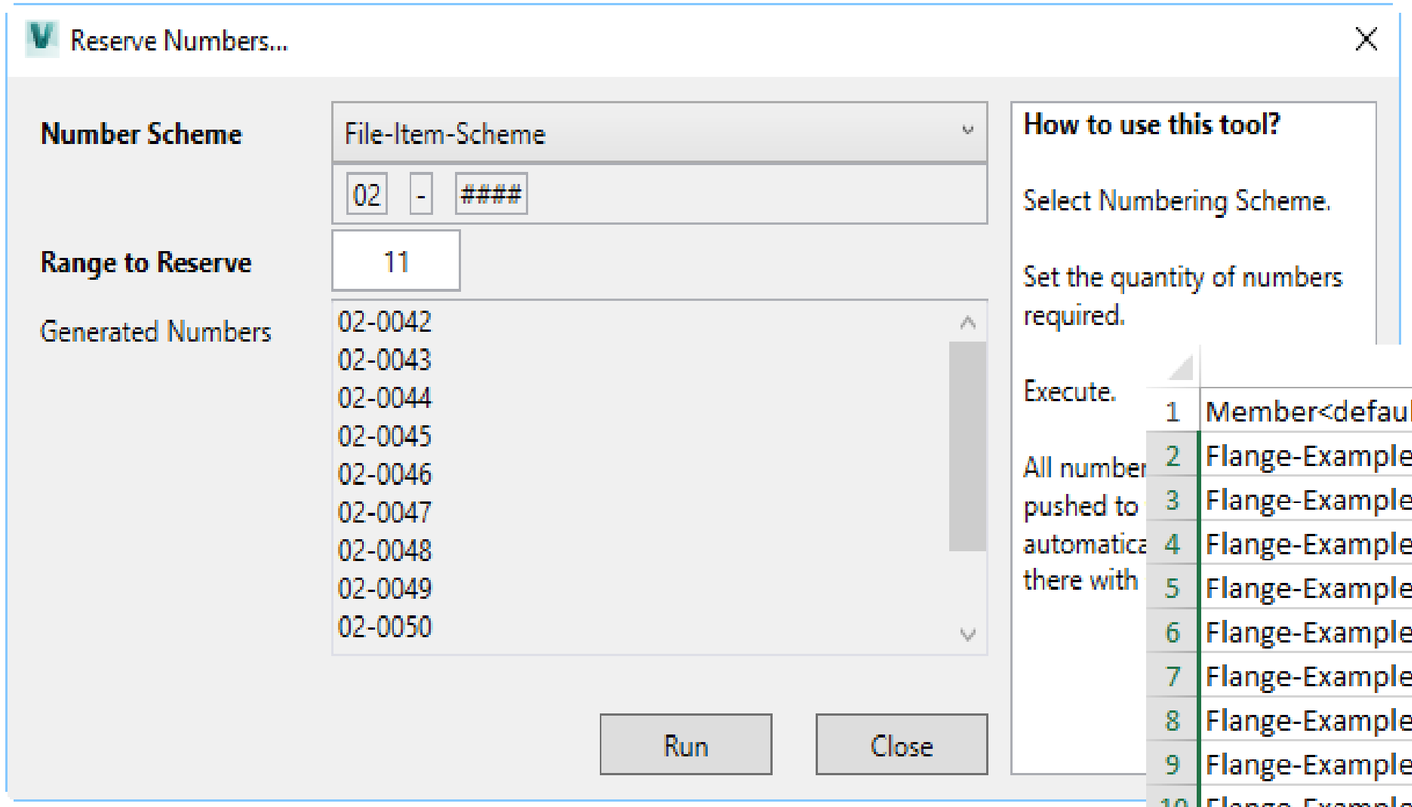
Set options **according** use case

- Part Number = Do not Set
  - Specific number required

⇒ Provide number for each row



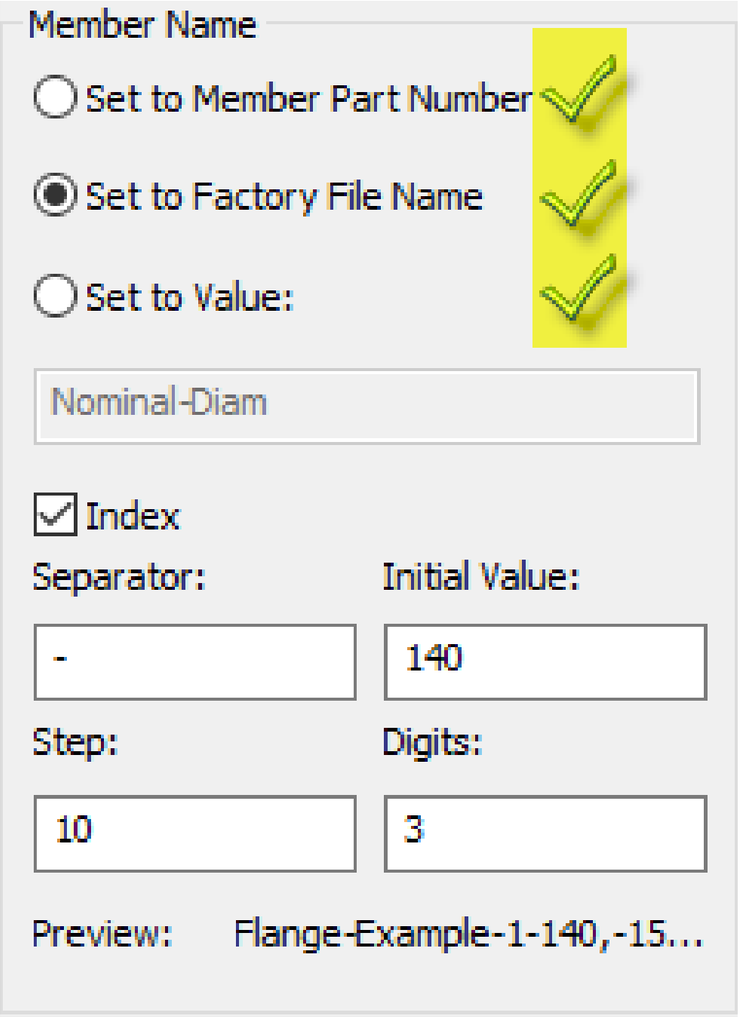
Configure Family – Must Have | Options
Demo



	A	B	C	D
1	Member<defaultRow>4</defaultR	Part Number [Project]	DiaEx	DiaIn<key
2	Flange-Example-3-140	02-0042	DiaIn + 55 mm	140 mm
3	Flange-Example-3-150	02-0043	DiaIn + 55 mm	150 mm
4	Flange-Example-3-160	02-0044	DiaIn + 55 mm	160 mm
5	Flange-Example-3-170	02-0045	DiaIn + 55 mm	170 mm
6	Flange-Example-3-180	02-0046	DiaIn + 55 mm	180 mm
7	Flange-Example-3-190	02-0047	DiaIn + 55 mm	190 mm
8	Flange-Example-3-200	02-0048	DiaIn + 55 mm	200 mm
9	Flange-Example-3-210	02-0049	DiaIn + 55 mm	210 mm
10	Flange-Example-3-220	02-0050	DiaIn + 55 mm	220 mm
11	Flange-Example-3-230	02-0051	DiaIn + 55 mm	230 mm
12	Flange-Example-3-240	02-0052	DiaIn + 55 mm	240 mm

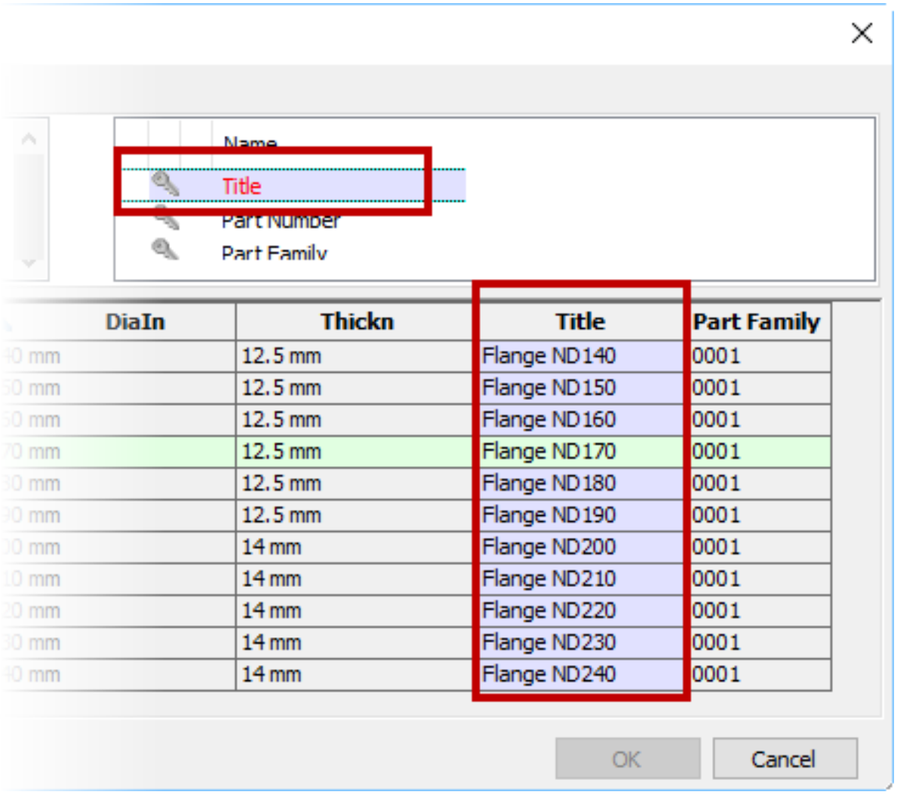
Configure Family Tables | Options

- Variant Name
  - Use any of the available options
  - No specific relevance for PDM



Configure Family Tables | PDM Meta Data

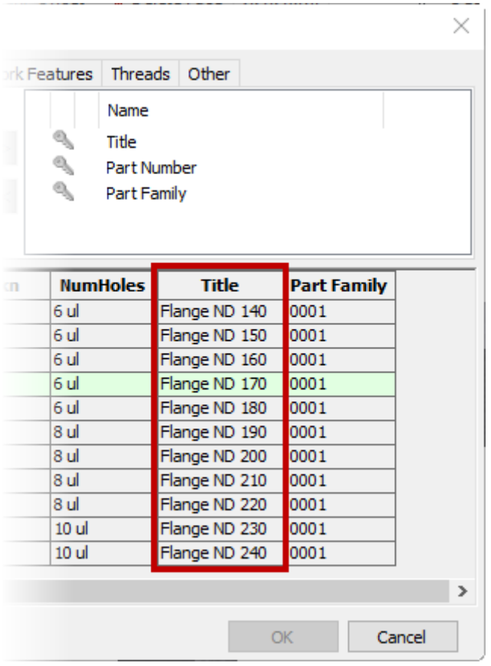
- Component parameters and keys
- Add iProperties
  - Mandatory properties
  - Part family for flexibility



Configure Family Tables | PDM Meta Data

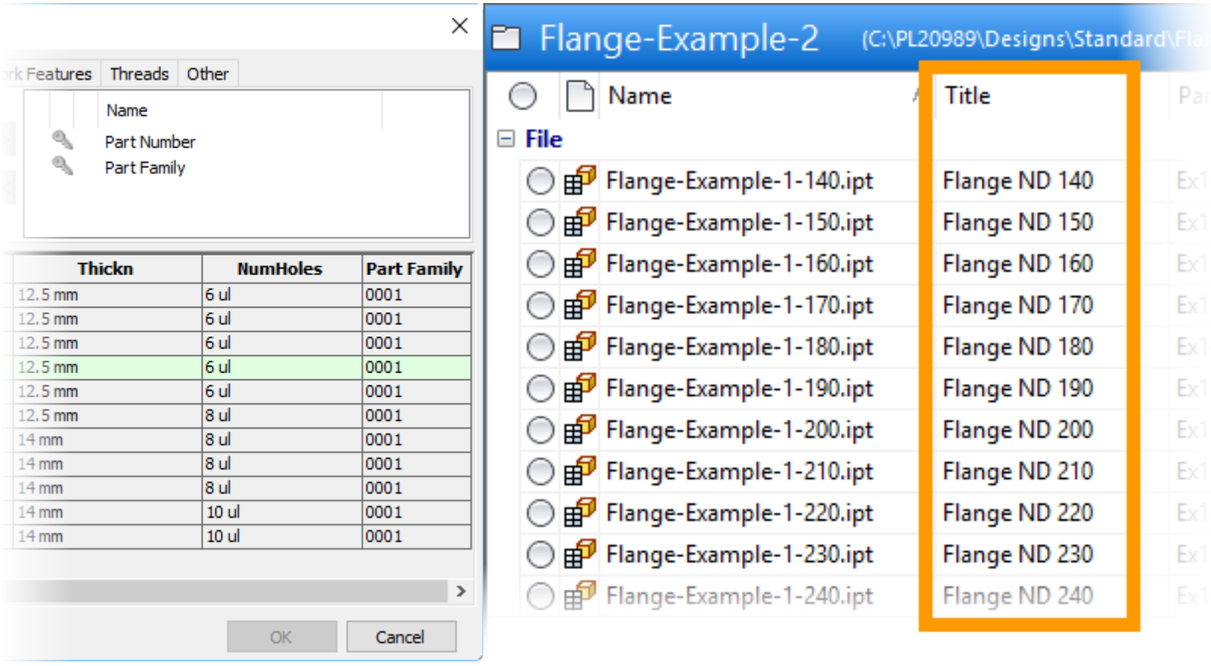
Example #1

- Title => table column
- Title read by Vault



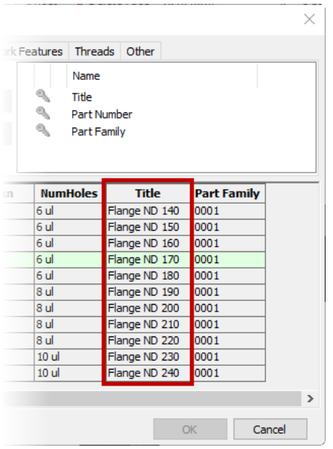
Example #2

- Title => no table column
- Title value added by Vault



Configure Family Tables | PDM Meta Data

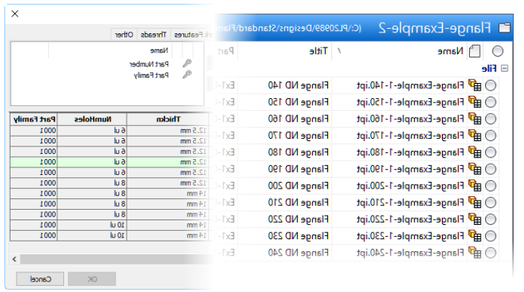
Example #1 - Consumption



- ✓ Logged in user
  - ✓ Existing members are retrieved
  - ✓ Missing members are created correctly
- ✓ “Offline” user
  - ✓ Missing members are created correctly

Configure Family Tables | PDM Meta Data

Example #2 – Consumption



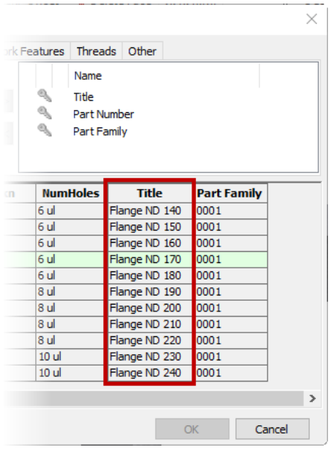
- ✓ Logged in user
  - ✓ Existing (vaulted) members are retrieved
  - ○ Missing members are created differently!
- ○ “Offline” user
  - ○ Missing members are created differently!

In Summary - Best Practice / Tips for Users

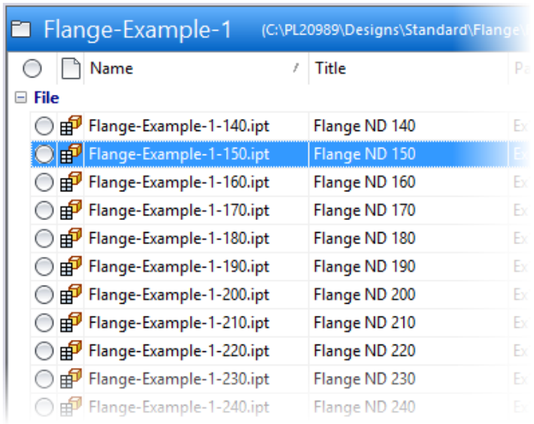
- *Insert iParts using the Inventor command “Place from Vault”. Inventor will check Vault for existing members and download from Vault instead of creating the member.*

In Summary - Best Practice for Administrators

- Set Part Number Option wisely
- Include iProperty value definition in factory
- Decide for a default row*

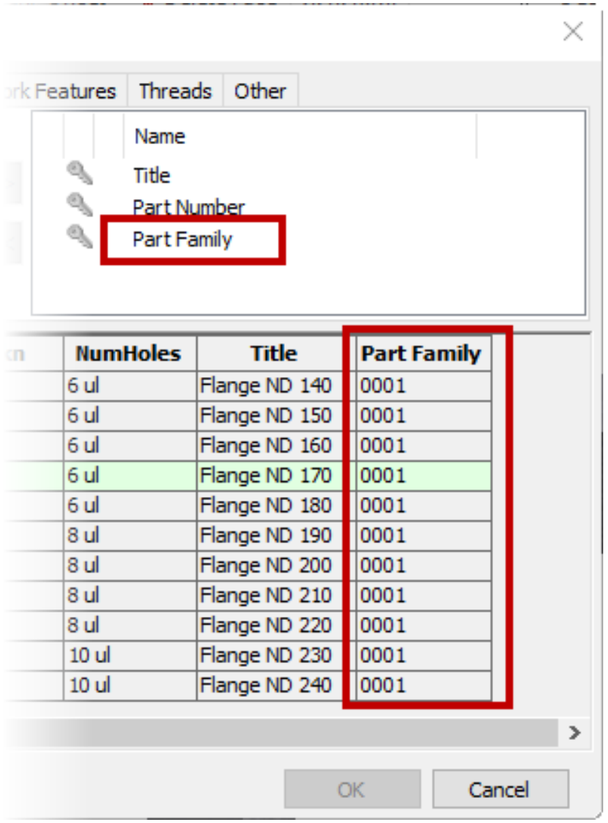


- For frequent consumption…
  - Create all members and share these by Vault



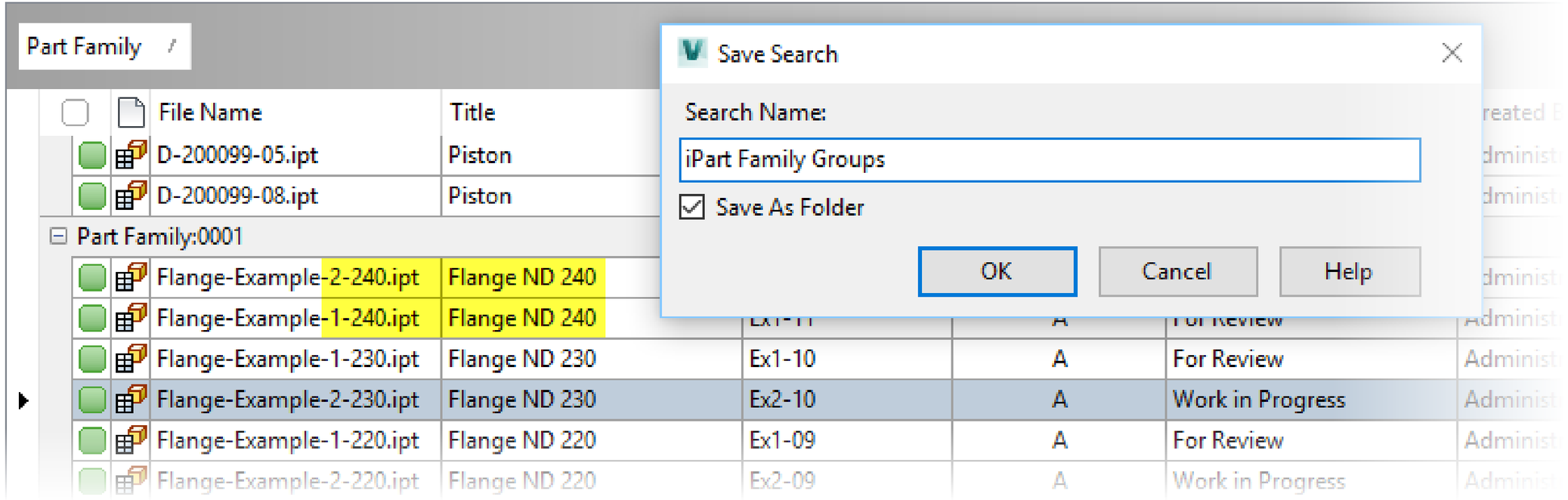
Configure Family Tables | PDM Meta Data

- Component parameters and keys
- Add iProperties
  - Mandatory properties
  - Part family for flexibility



Configure Family Tables | PDM Meta Data Benefit 1

File and Item Sorting & Grouping



Configure Family Tables | PDM Meta Data Benefit 2

Part family for flexibility

- ✓ Enhanced grouping
- ✓ Flexible item assignments

Number	Row Order	Position Nu...	Quantity	Title (Item,CO)	Dimensions	Revision	...	State (Historical)
Example-1-BOM-Rows	-	-	-	Example-1-BOM-Rows	-	A		Work In Progress
Ex1-04	1	1	1 Each	Flange ND 170	225x225x12.5	A		Work In Progress
Ex1-11	2	2	1 Each	Flange ND 240	295x295x14	A		Work In Progress

Individual Items /

Different CAD

Number	Row Order	Position Nu...	Quantity	Title (Item,CO)	Dimensions	Revision	...	State (Historical)
Example-2-BOM-Row	-	-	-	Example #2	-	A		Work In Progress
Ex2-01	1	3	1 Each	Flange	195x195x12.5	A		Work In Progress
Ex2-01	2	4	1 Each	Flange	205x205x12.5	A		Work In Progress

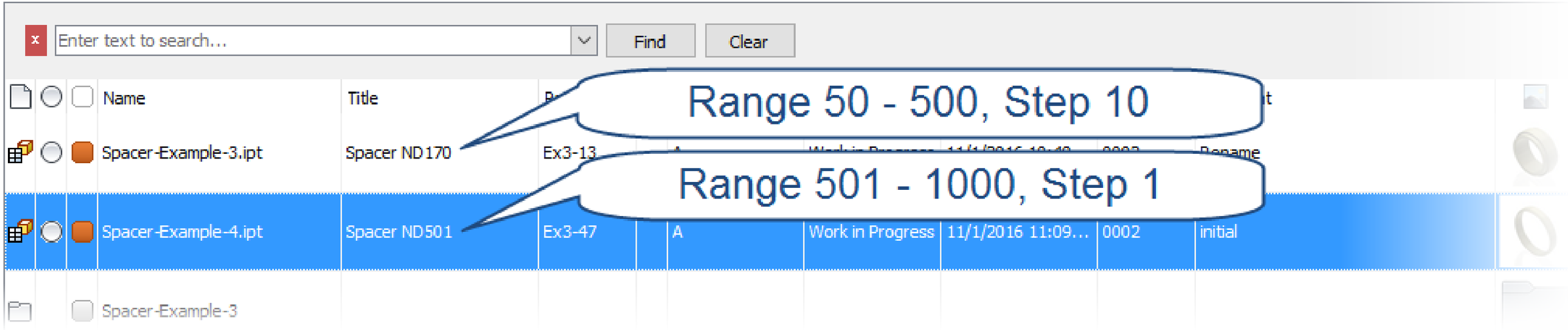
Single Item

Different CAD Instances/Sizes

Configure Family Tables | PDM Meta Data Benefit 3

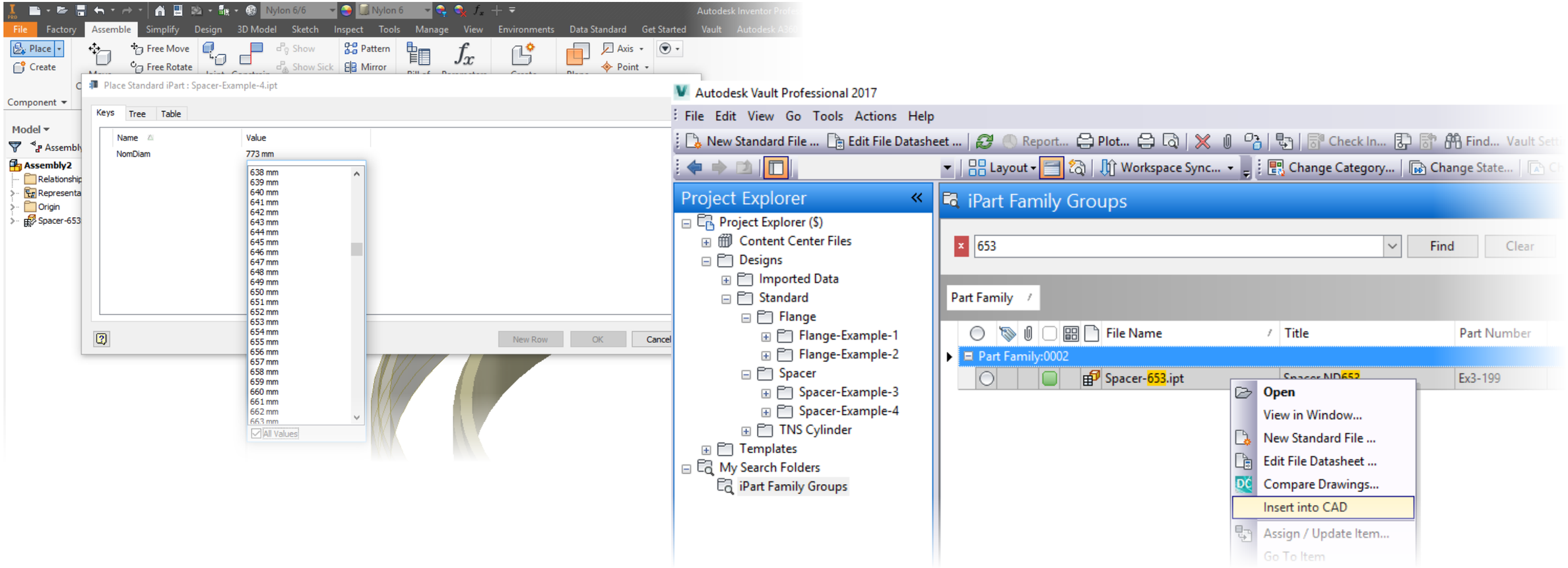
Split iPart/iAssembly Factories to

- Improve performance
- Increase usability



Configure Family Tables | PDM Meta Data Benefit 3 - Demo

- Improve performance



Configure Tables | Summary & Tips

- Add iProperties to table
- Apply ***Part Number*** option in accordance with part number columns' content
- Create member files in checked out state
  - If iLogic rules are in place
  - If physical properties are mapped
- Create and manage all members before consumption*

Configure Family Tables | Custom Members

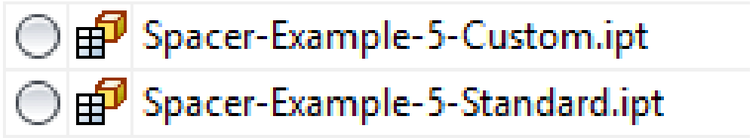
Need to know…

- Vault handles custom members like standard members
  - Parent child relationship
  - File handling – CopyDesign, Move, Rename

Configure Family Tables | Custom Members

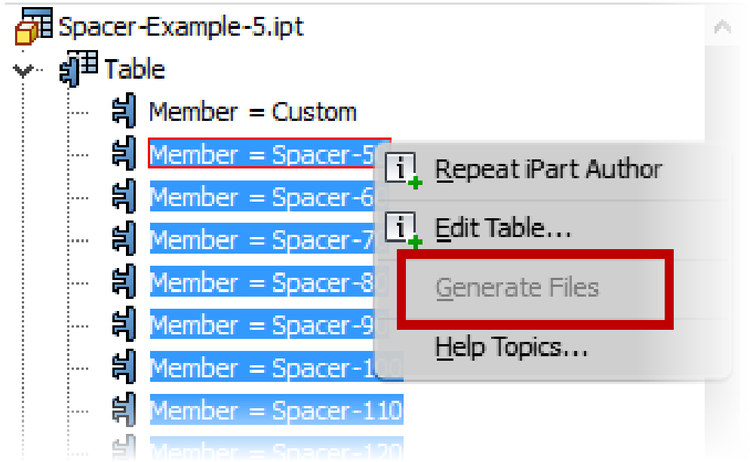
Define standard custom members…

- Single factory / table for both?
- Separate factory for each type?



Inventor restricts in single table

- Key parameter column and custom cell combined
- Automatic member creation



Configure Family Tables | Custom Members

- ✓ Split Custom and Standard Factory
- ✓ Vault helps to aggregate split variants ☺

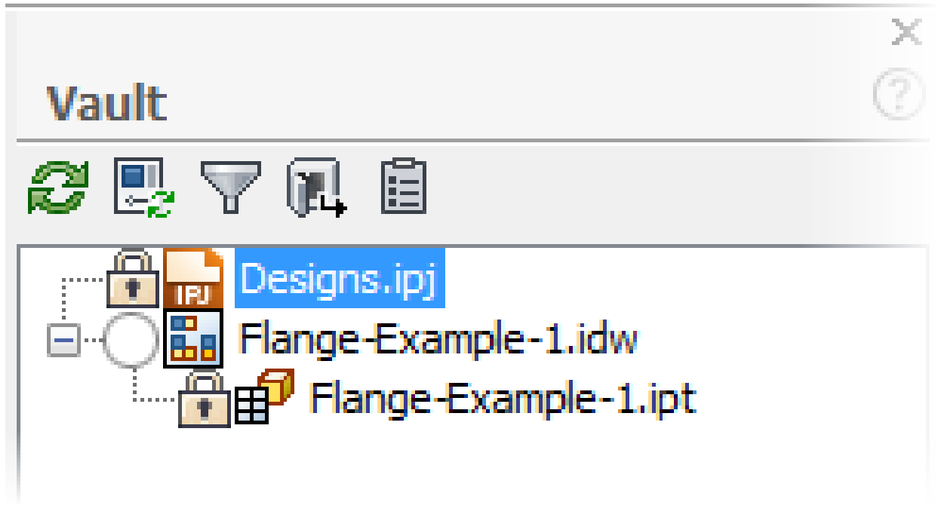
Place custom member…

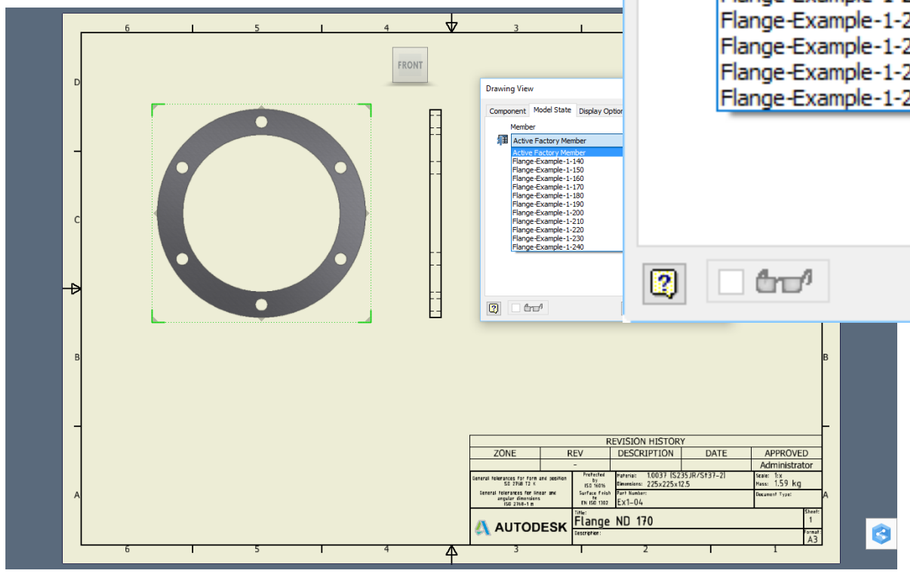
- ✓ Re-Use family subfolder for beneficial file handling – Move, Rename

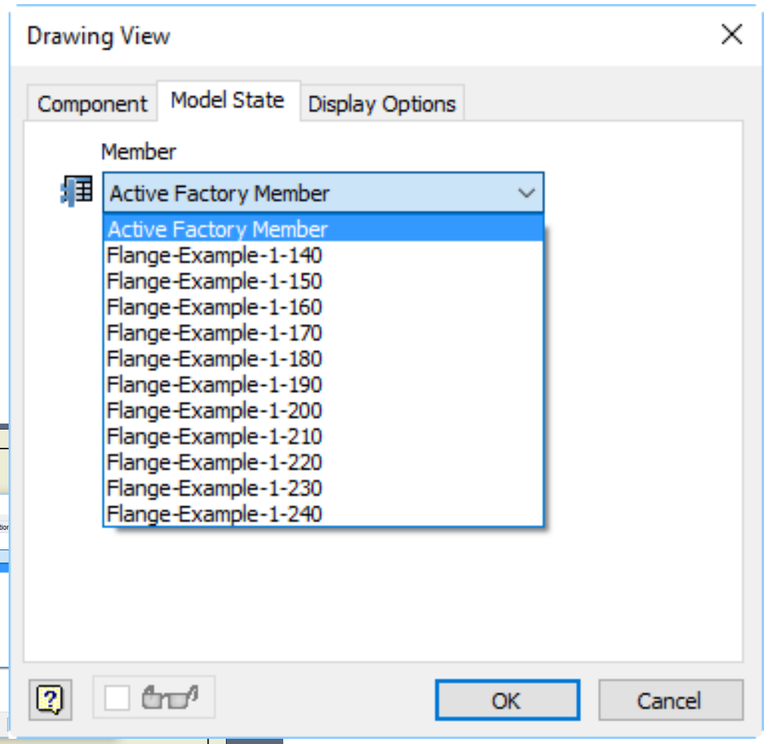
Configure Family Documentation | Drawings

Scope of documentation

- Tabular drawing
  - Select Active Factory Member*



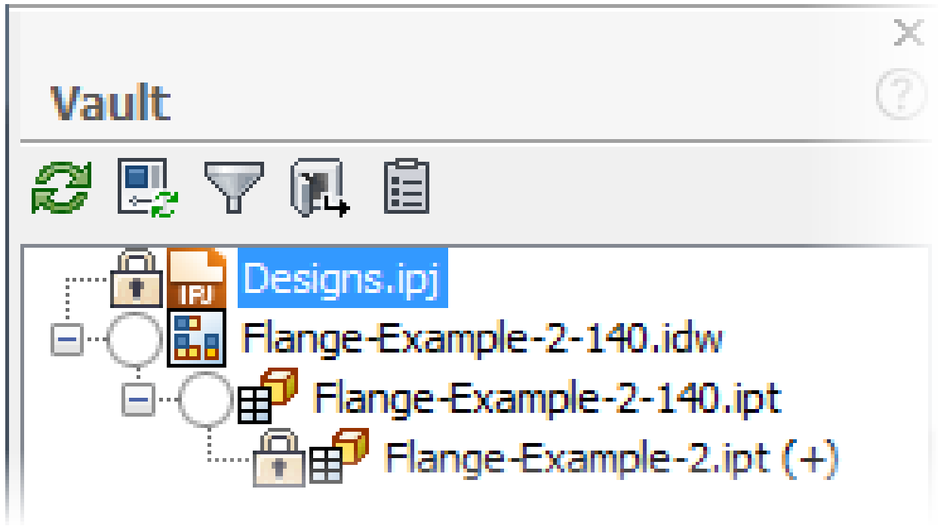


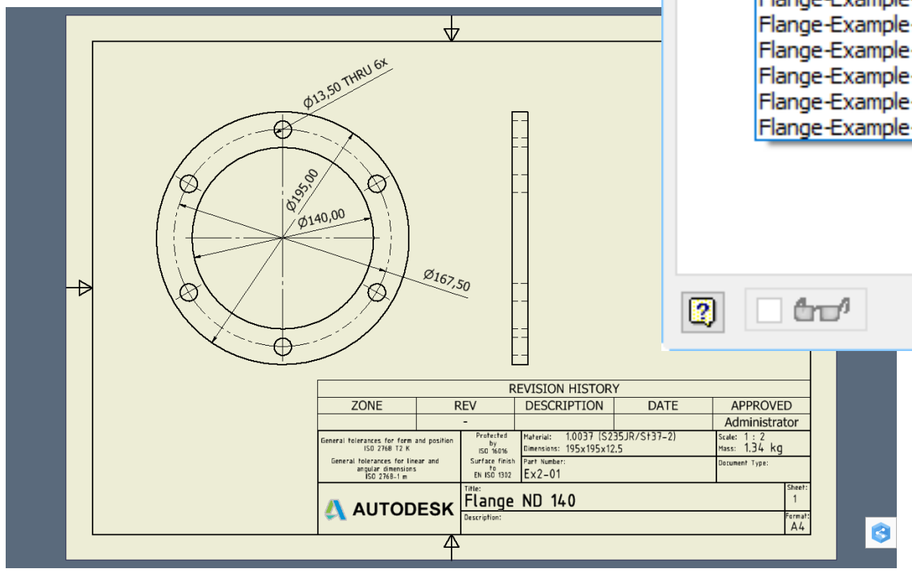


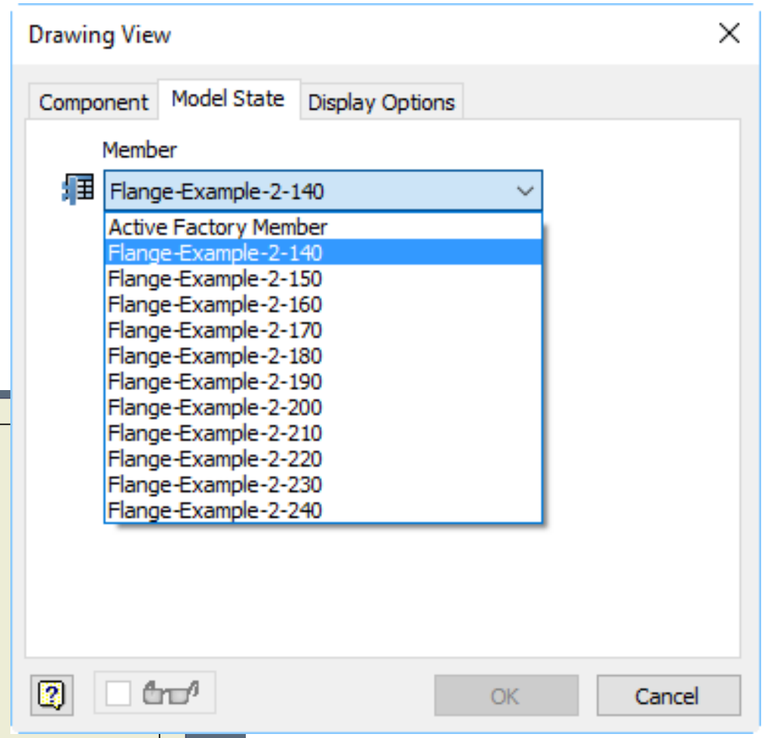
Configure Family Documentation | Drawings

Scope of documentation

- Tabular drawing
- Individual drawings

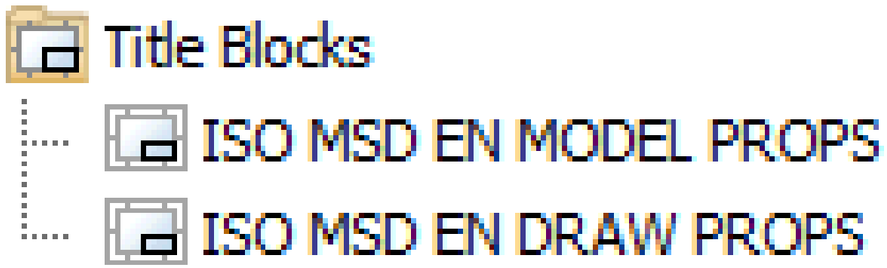






Configure Family Documentation | Drawings Tip

Tabular drawings…it’s good to have another title…



General tolerances for form and position ISO 2768 T2 K General tolerances for linear and angular dimensions ISO 2768-1 m	Protected by ISO 16016 Surface finish to EN ISO 1302	Material: 1.0037 (S235JR/St37-2) Dimensions: 225x225x12.5 Part Number: Ex1-04	Scale: 1 : 2 Mass: 1.59 kg Document Type:
AUTODESK		Title: Flange ND 170 Description:	Sheet: 1 Format: A3

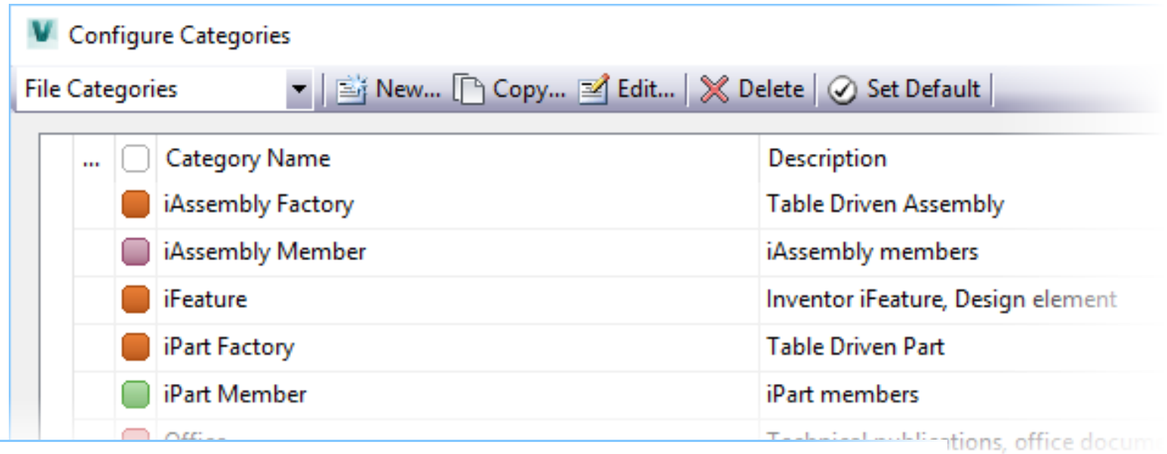
General tolerances for form and position ISO 2768 T2 K General tolerances for linear and angular dimensions ISO 2768-1 m	Protected by ISO 16016 Surface finish to EN ISO 1302	Material: 1.0037 (S235JR/St37-2) Dimensions: <variies see table> Part Number: Ex1-04..11	Scale: 1 : 2 Mass: <variies> Document Type:
AUTODESK		Title: Flange Tabular Drawing Description:	Sheet: 1 Format: A3

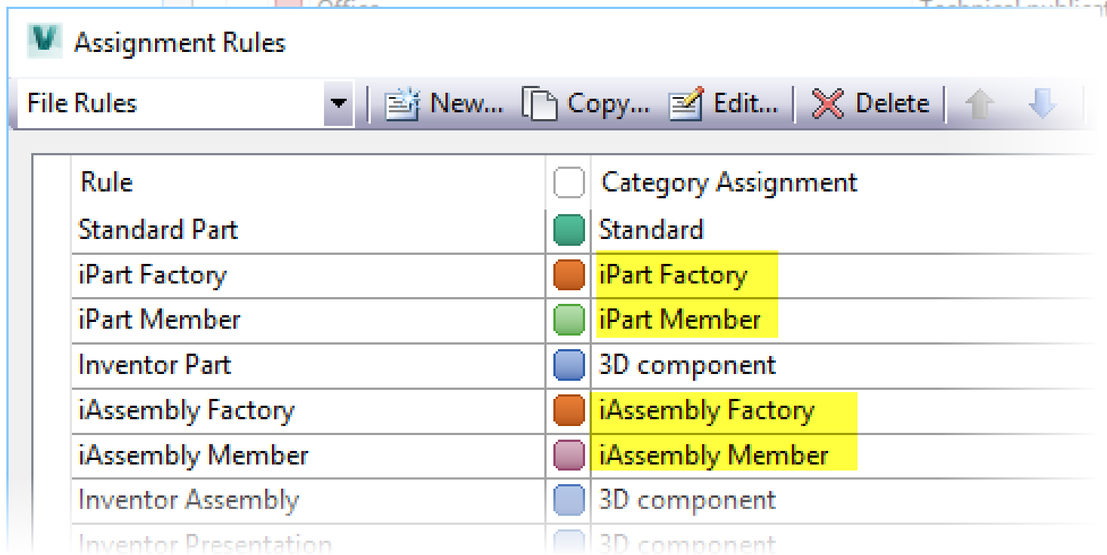
iPart Families | iAssembly Families

PDM - Workflows

Initial Check In | Category Assignment

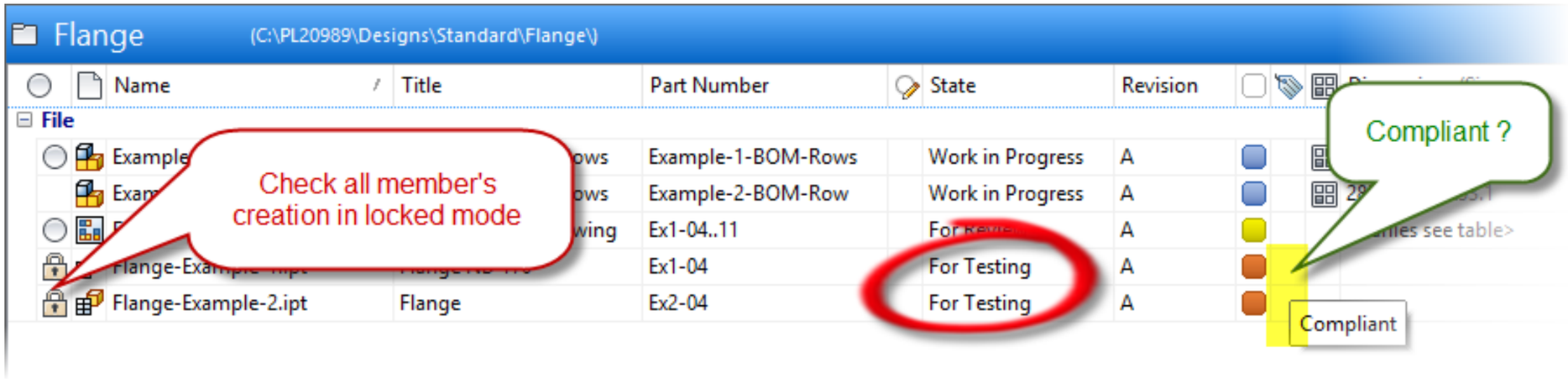
- Category
  - Lifecycle for Factory
- Rules





Initial Release | Factory / Members

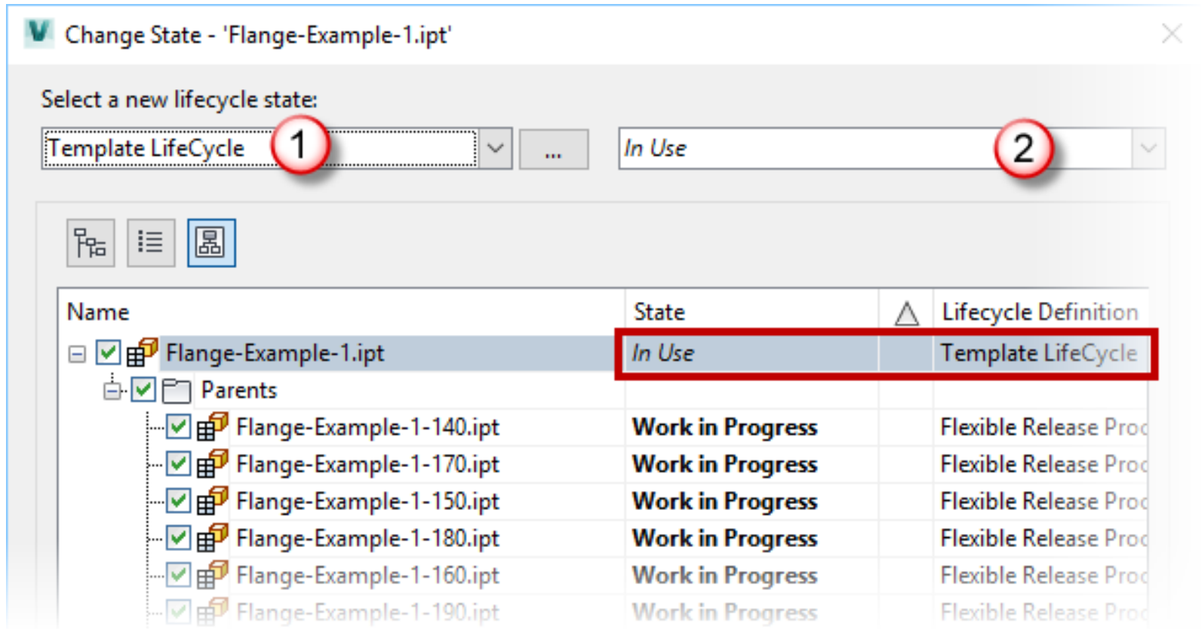
- ✓ The factory works, all members are created
- Change state to „Validation“
- Re-test member consumption, switching sizes
- Check property compliancy



Initial Release | iPart Factory / Members

Release entire family [& documentation]

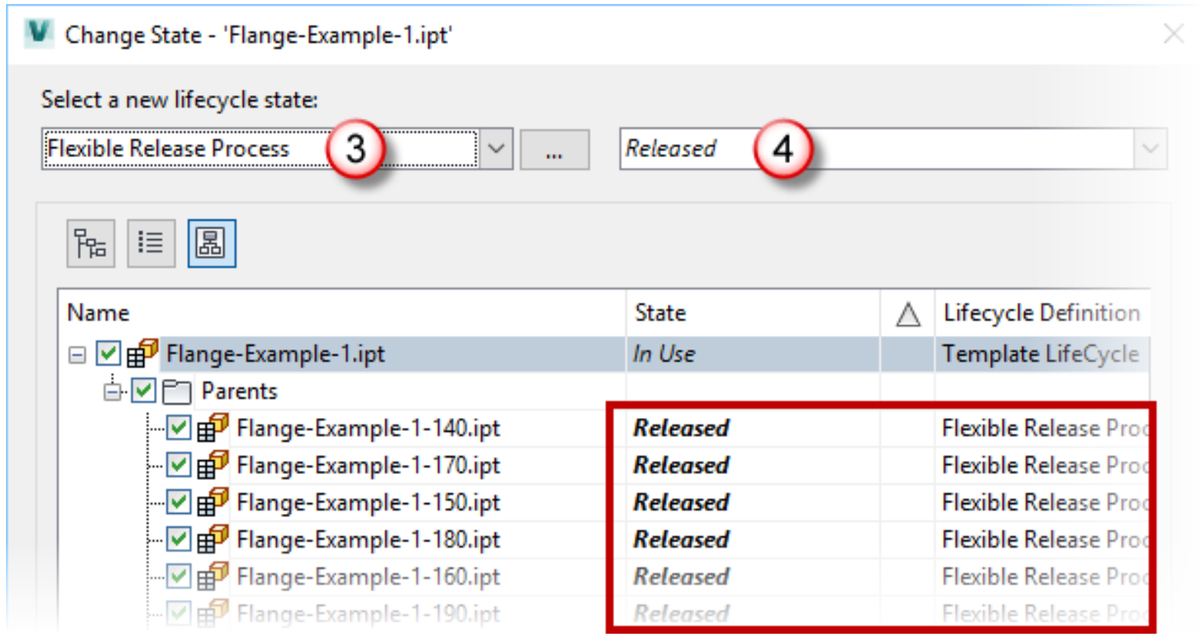
- Select factory -> change state
- Include direct parents only
- Set state for factory
- Set state for members



Initial Release | iPart Factory / Members

Release entire family [& documentation]

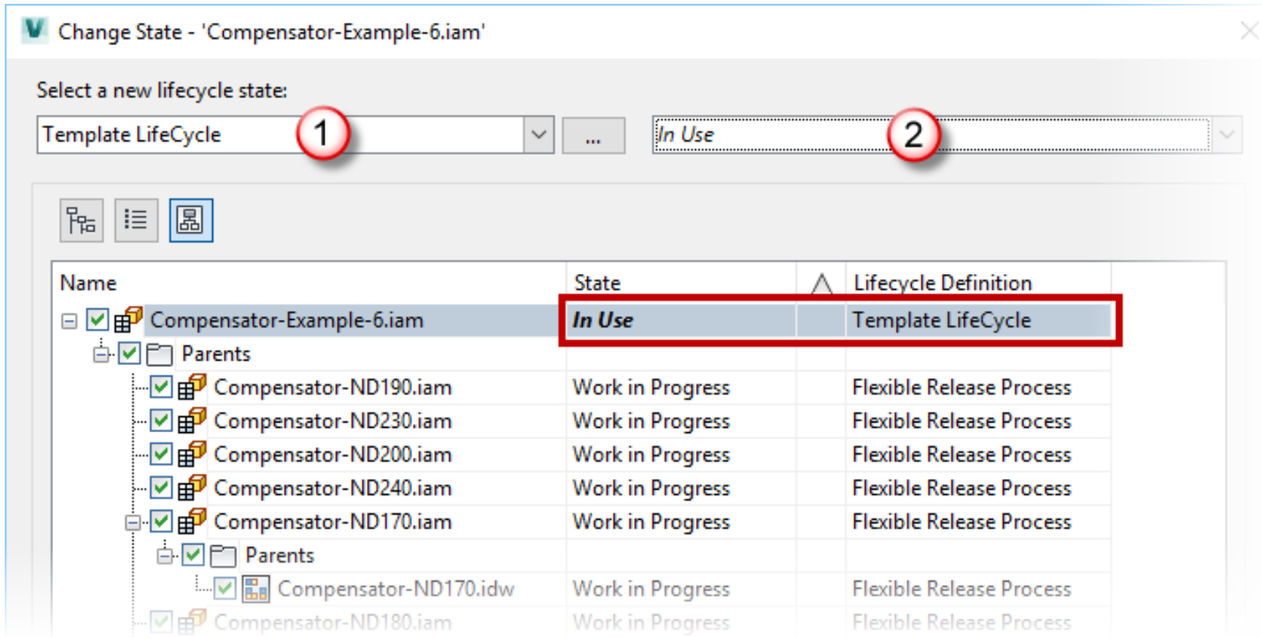
- Select factory -> change state
- Include direct parents only**
- Set state for factory
- Set state for members



Initial Release | iAssembly Factory / Members

Release entire family [& documentation]

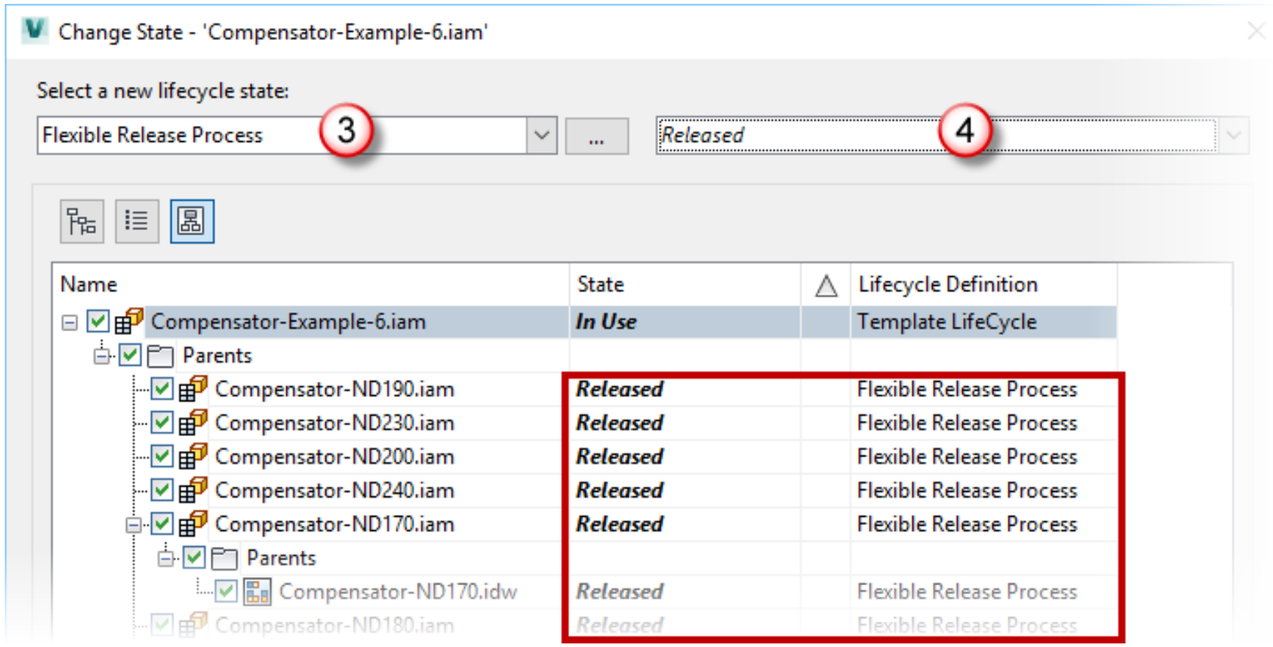
- Select factory -> change state
- Include direct parents only
- Set state for factory
- Set state for members



Initial Release | iAssembly Factory / Members

Release entire family [& documentation]

- Select factory -> change state
- Include direct parents only**
- Set state for factory
- Set state for members



Initial Release | Multi-Level – iAssembly

„iFamily“ Revision | „Overall“ or „Smart“

Scope of change ?

- All members

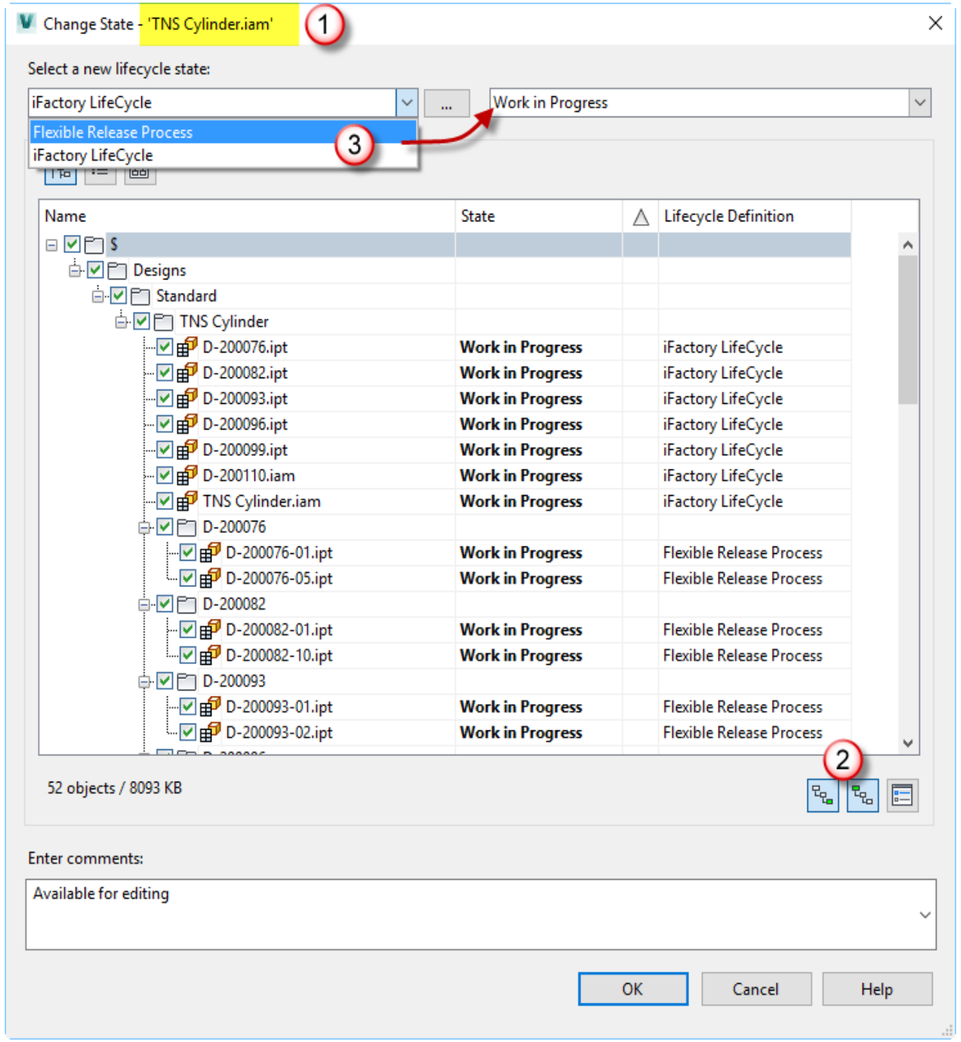
  ⇒universal / overall revision

- One or a few members?

  ⇒Partial / “smart” revision

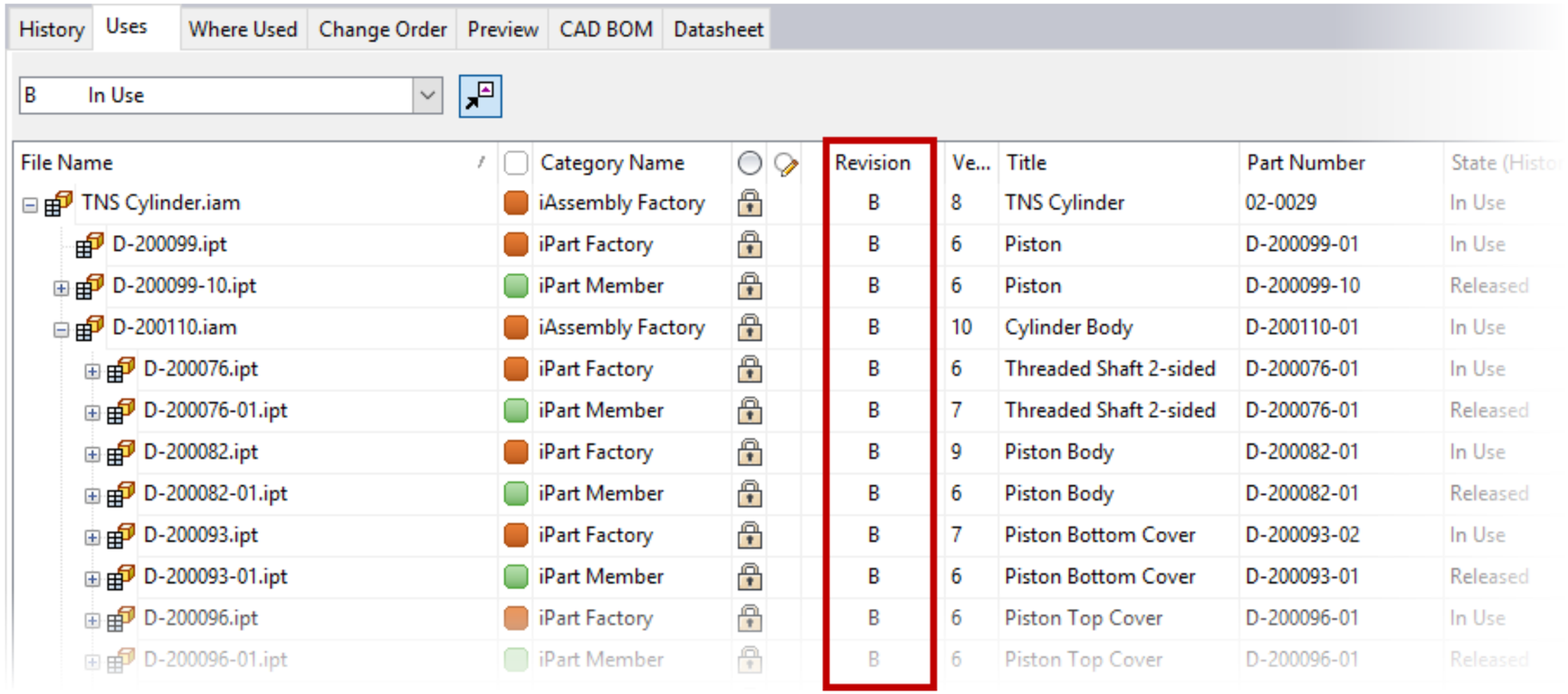
„iFamily“ Revision | „Overall“

- Factory and all member files increment revision



„iFamily“ Revision | „Overall“

- Result



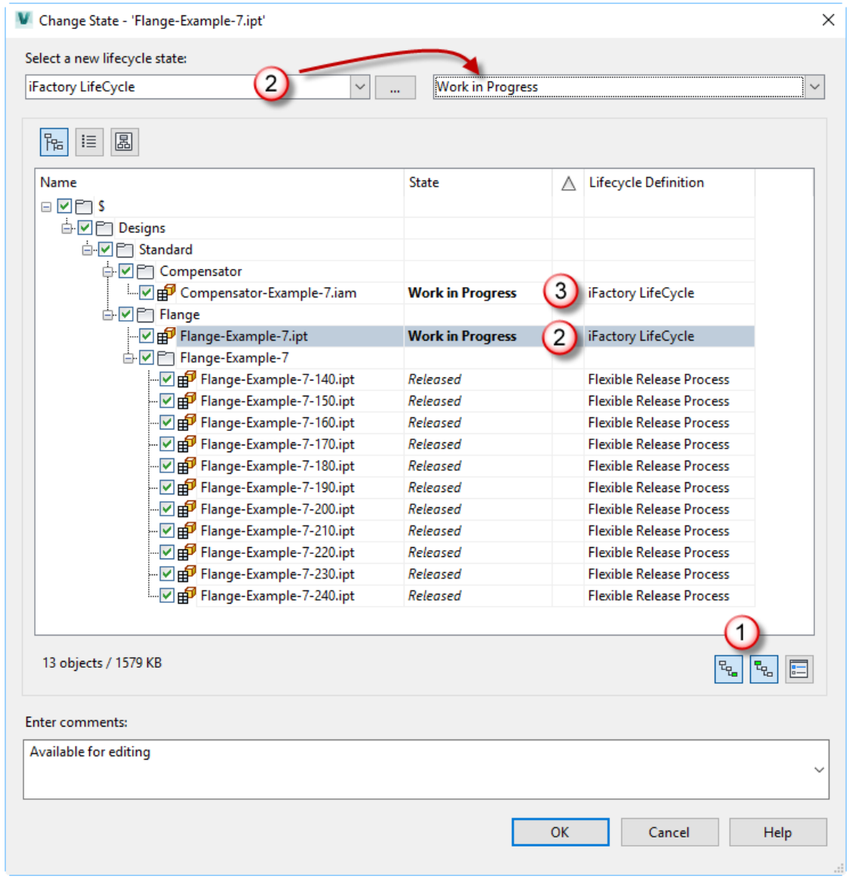
File Name	Category Name	Revision	Ve...	Title	Part Number	State (Histo
TNS Cylinder.iam	iAssembly Factory	B	8	TNS Cylinder	02-0029	In Use
D-200099.ipt	iPart Factory	B	6	Piston	D-200099-01	In Use
D-200099-10.ipt	iPart Member	B	6	Piston	D-200099-10	Released
D-200110.iam	iAssembly Factory	B	10	Cylinder Body	D-200110-01	In Use
D-200076.ipt	iPart Factory	B	6	Threaded Shaft 2-sided	D-200076-01	In Use
D-200076-01.ipt	iPart Member	B	7	Threaded Shaft 2-sided	D-200076-01	Released
D-200082.ipt	iPart Factory	B	9	Piston Body	D-200082-01	In Use
D-200082-01.ipt	iPart Member	B	6	Piston Body	D-200082-01	Released
D-200093.ipt	iPart Factory	B	7	Piston Bottom Cover	D-200093-02	In Use
D-200093-01.ipt	iPart Member	B	6	Piston Bottom Cover	D-200093-01	Released
D-200096.ipt	iPart Factory	B	6	Piston Top Cover	D-200096-01	In Use
D-200096-01.ipt	iPart Member	B	6	Piston Top Cover	D-200096-01	Released

„iFamily“ Revision | „Smart“

- Revise Factory

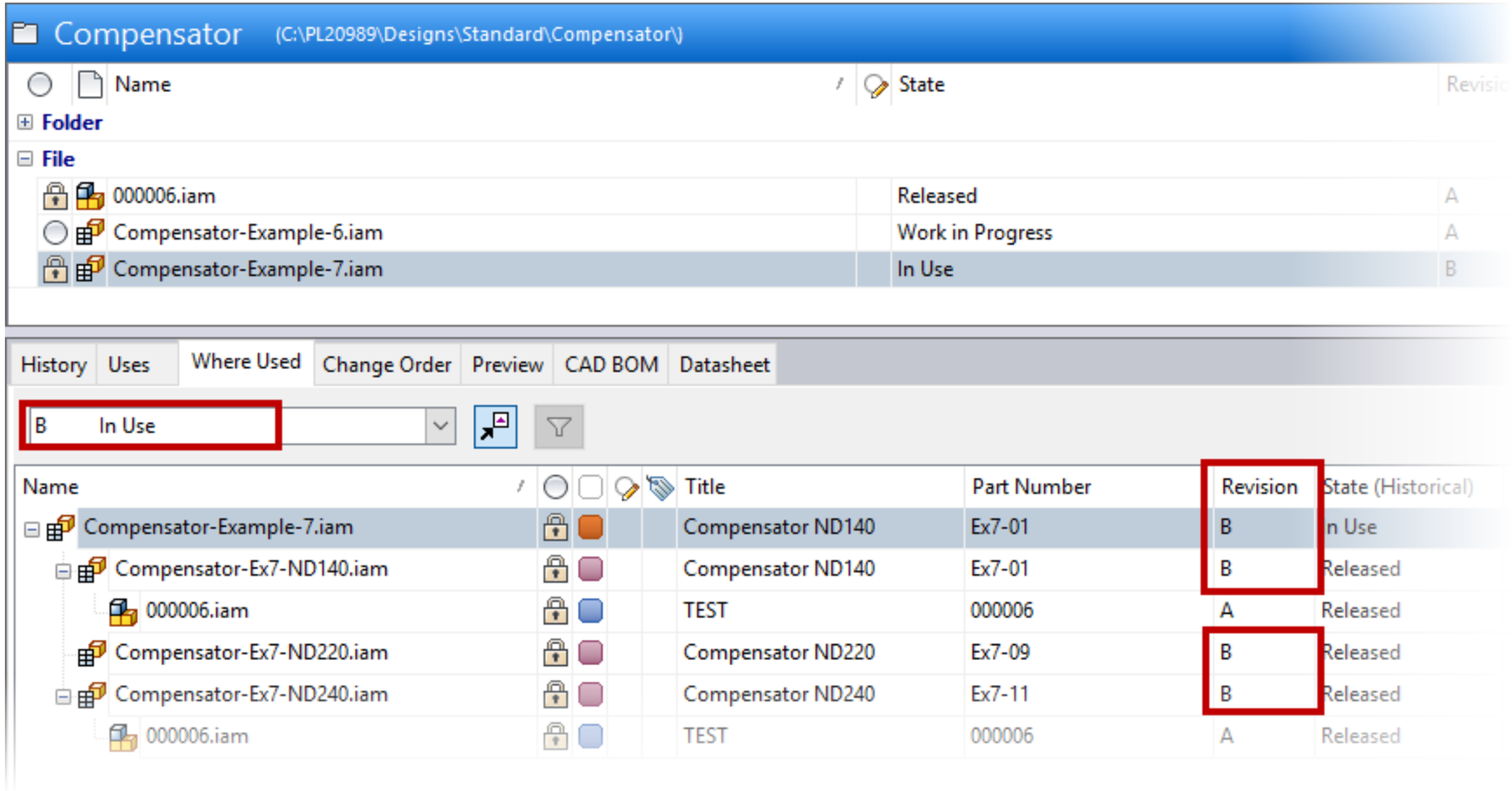
⇒ Watch for changes on member files

⇒ Revise edited member files



„iFamily“ Revision | „Smart“

- Result



„iFamily“ Revision | Summary

“Overall”

- Risk free, easy
- Any parent in where used is impacted, even it is not really changed

„Smart“

- Advanced workflow
- „real“ impact reflected in where used view

iPart Families | iAssembly Families

File Handling

Copy Design | What we do…

iPart/iAssemblies are “shared” libraries

⇒ Copy assemblies

- … reusing library files and part families members
- … modifying members as new unique components

⇒ Copy iPart / iAssembly factories

- … to get a starting point for new family definition(s)

Copy Design | What we don’t…

We don’t create new variants / members via Copy Design

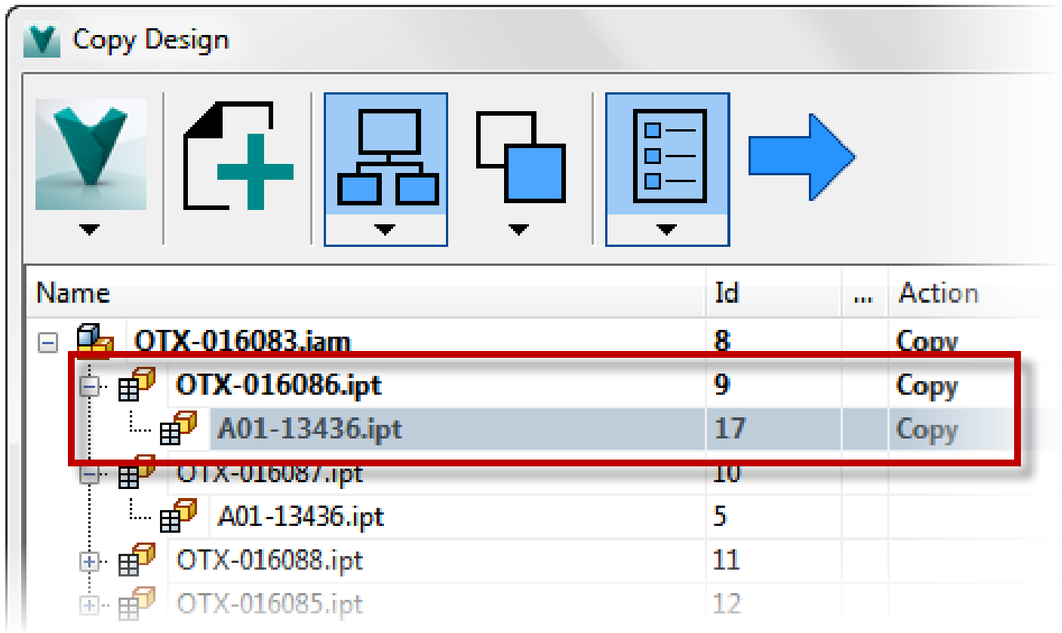
⇒ Use the iPart / iAssembly Author instead to create new ones

⇒ Use Copy Design to use / replace the new variants

Copy Design | Member(s) in Assembly

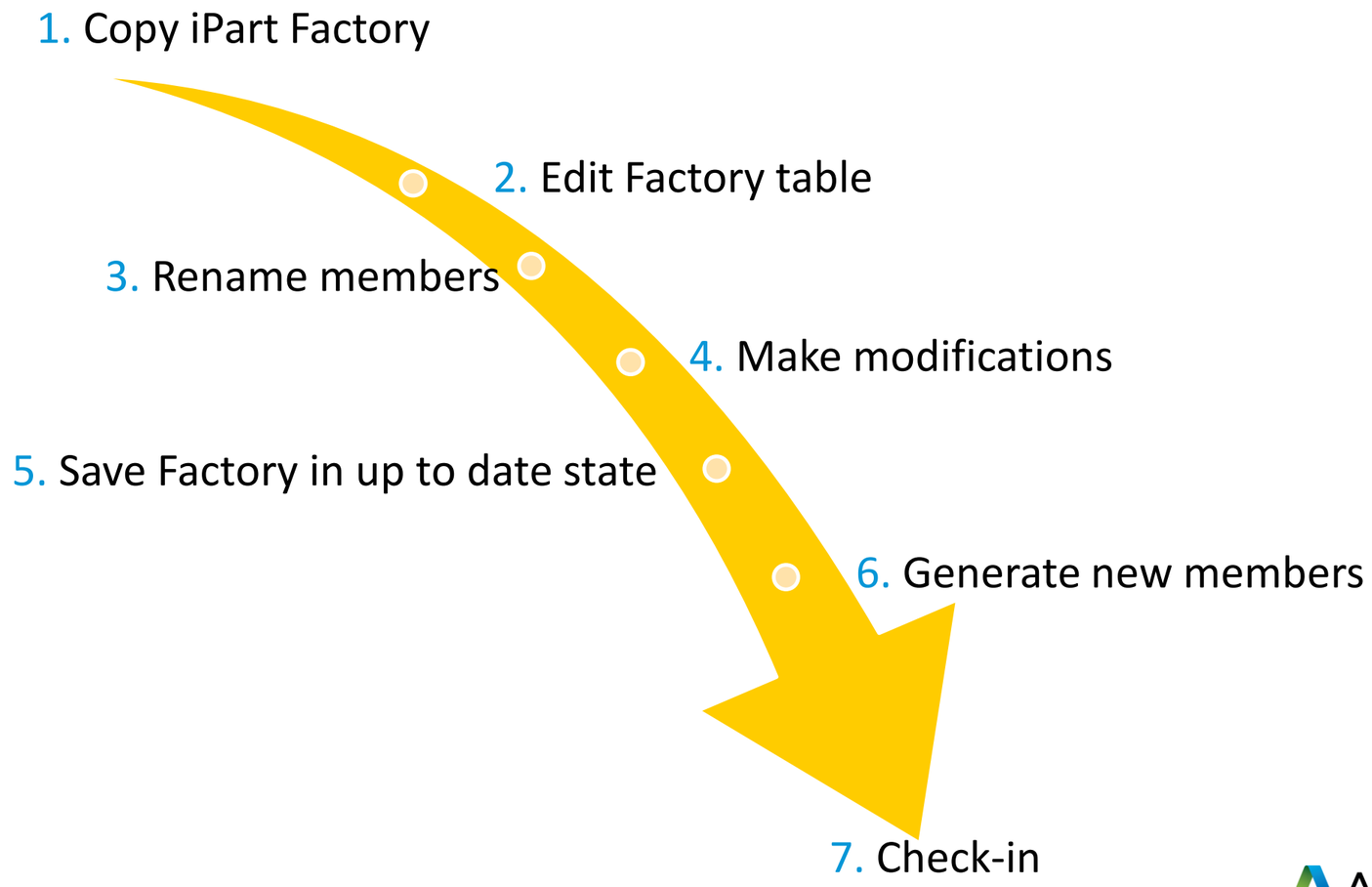
Don’t copy Factory/Members
Otherwise…

- Links to factory will set to “Broken”



Copy Design | iPart Factory

Copy / Save as existing iPart Factory



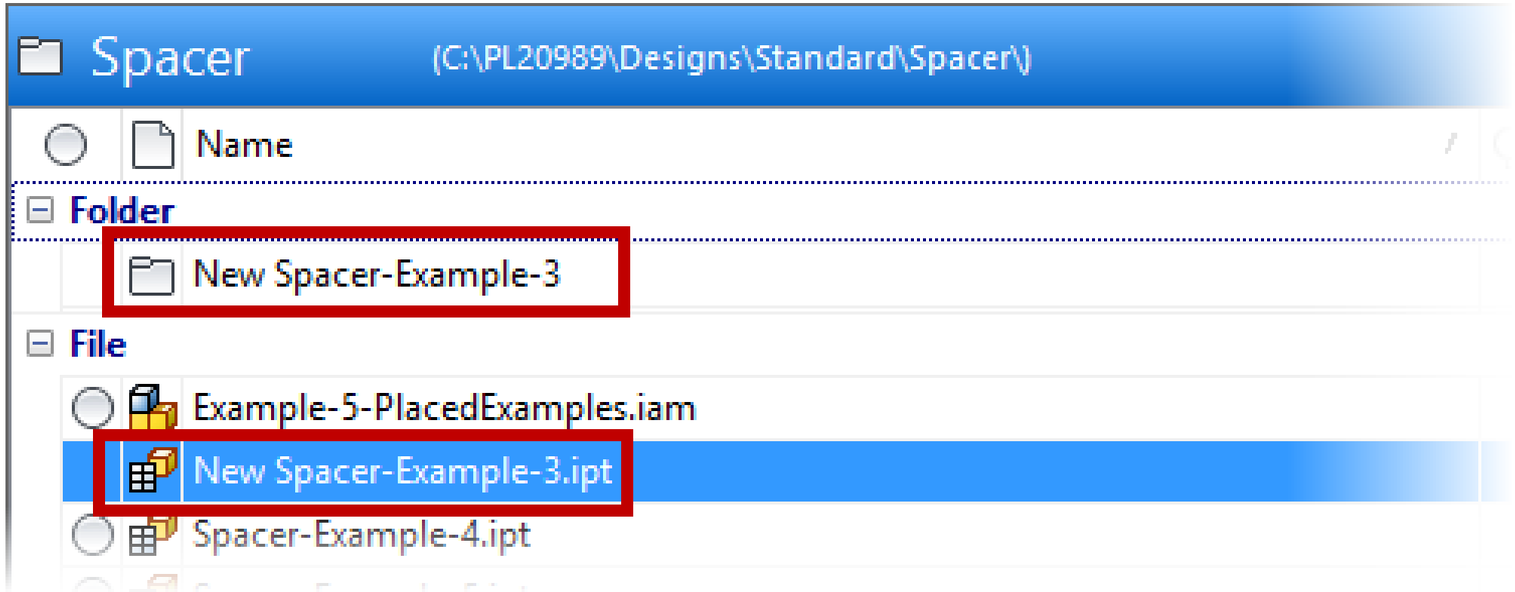
Copy Design | iAssembly Factory

1. Bottom Up approach
   - iParts first
   - Nested iAssemblies
2. Copy iParts Factory separately
   - Regenerate Members with new File Names
3. Copy Design – iAssembly
   - Replace with new iParts/iAssembly members
   - Open copy, edit and “Generate Files”

Rename | Factory

- ✓ Factory files rename, if the subfolder is named as expected.
  Expected name = Factory name
- ✓ Factory renaming will update the subfolder as well

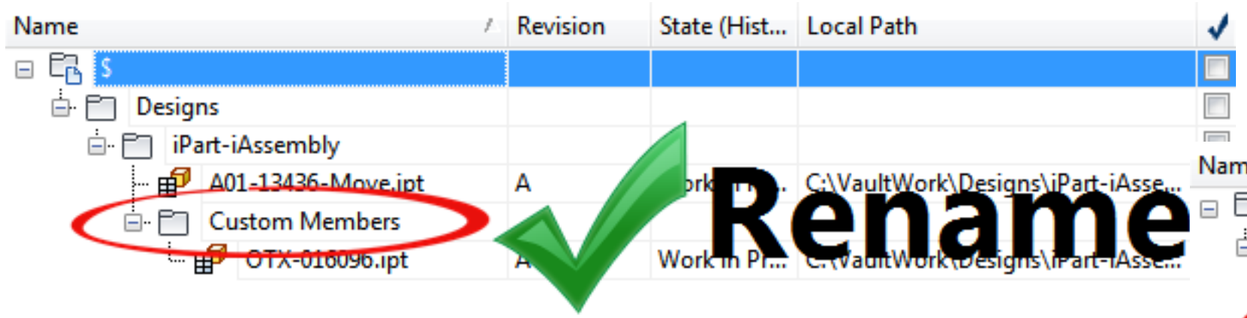
⇒ Renaming a factory = rename + re - organization

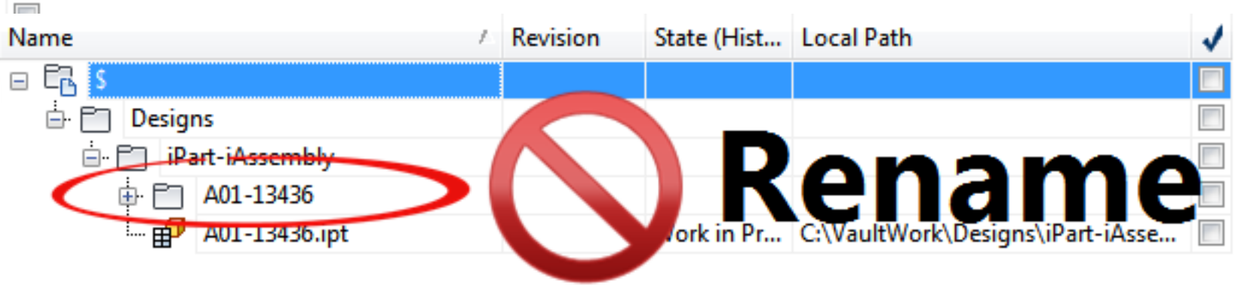


Rename | Factory - Subfolder

Note – Vault helps to solve violations of iPart organization

- In case the subfolder for member parts is not set to the factory file name, Vault allows to rename the subfolder
- Once the subfolder is aligned to the naming convention, renaming of subfolders is blocked

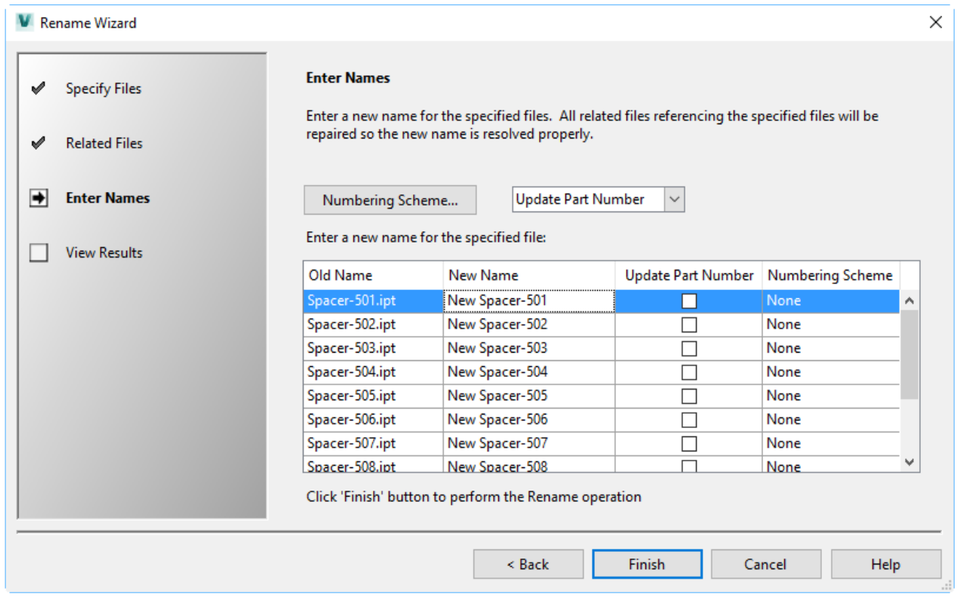


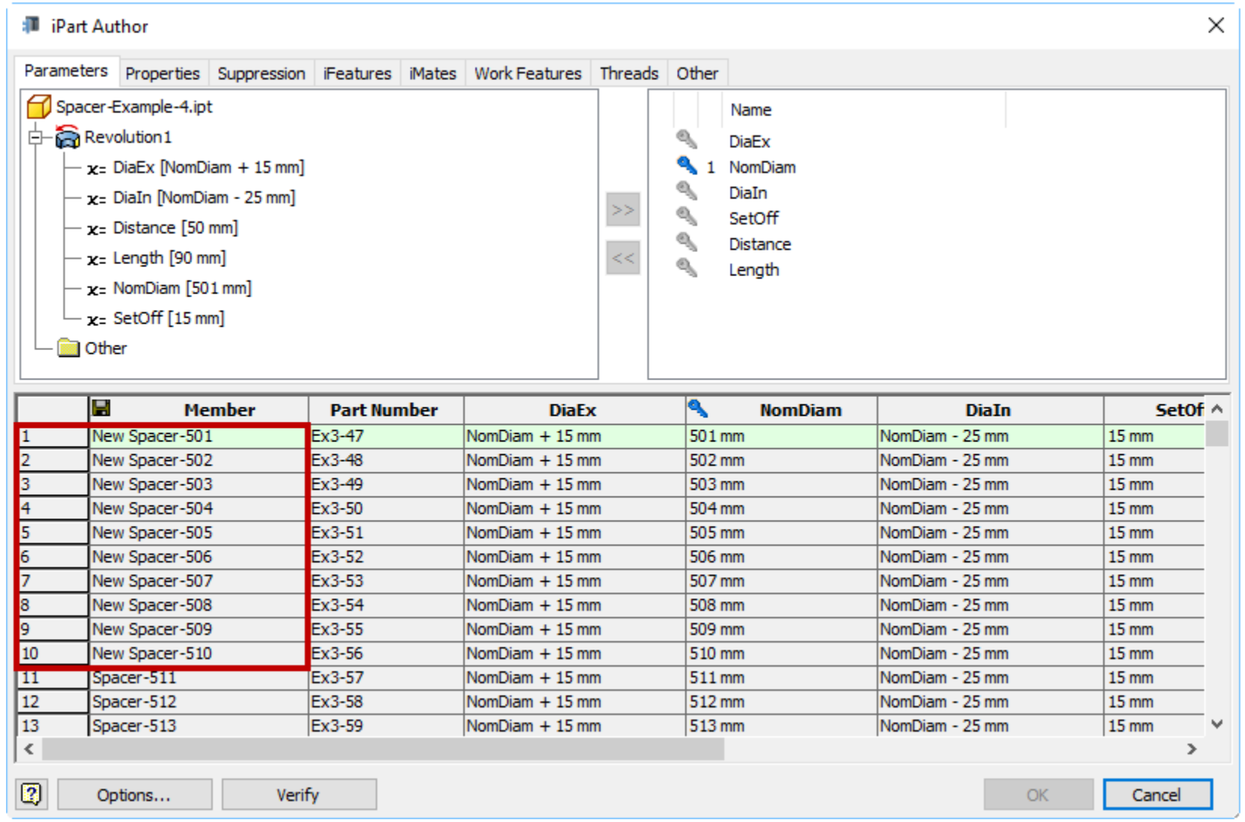


Rename | Standard Member(s)

Standard members..

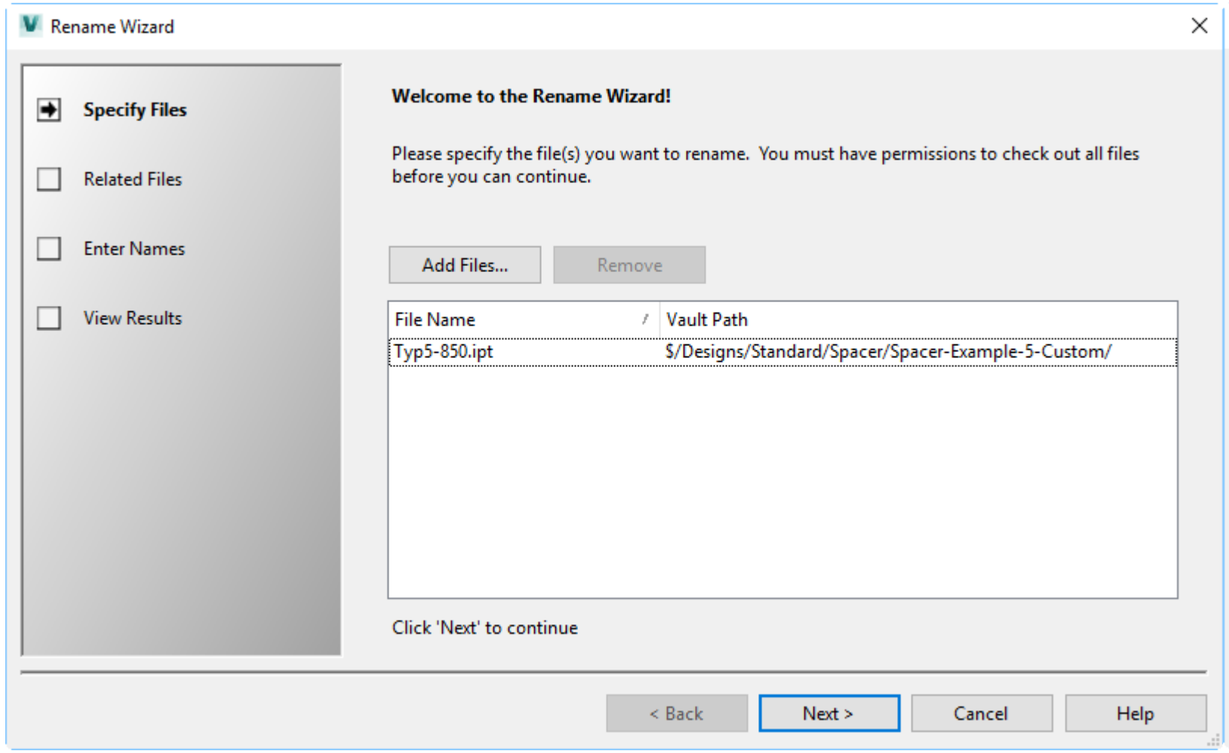
- ✓ Rename
- ○ Update the factory table*

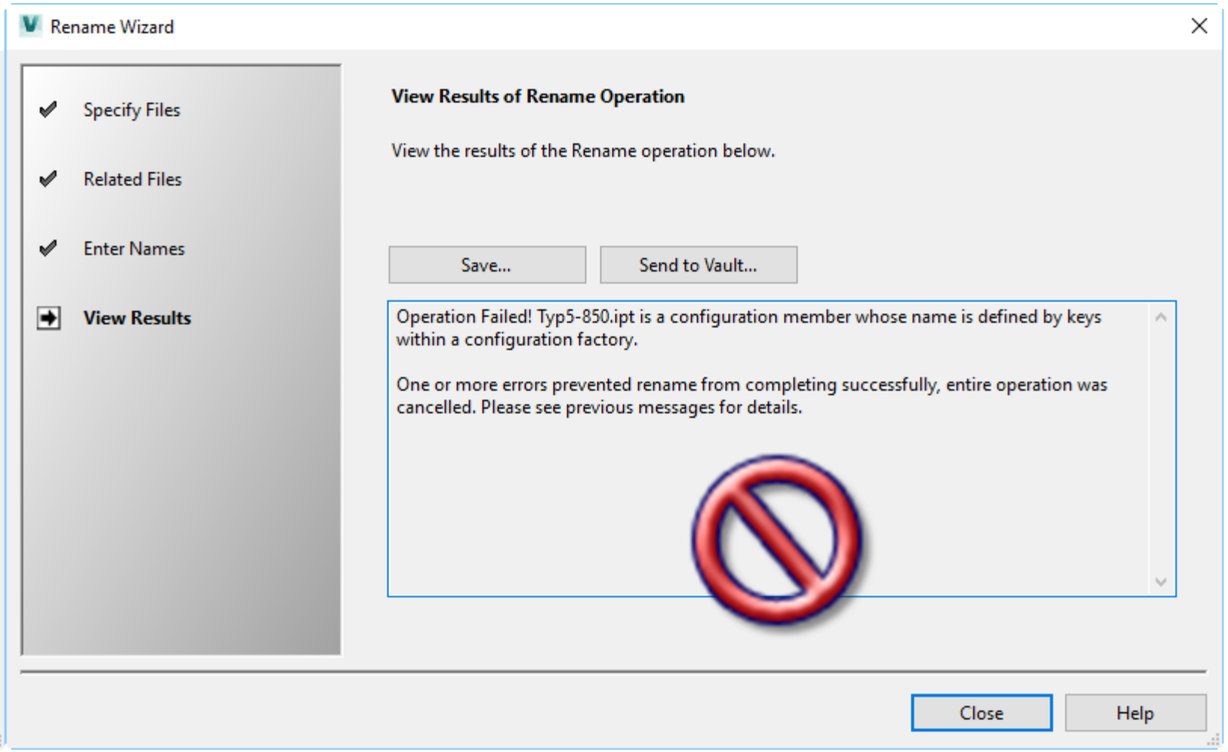




Rename | Custom Member(s)

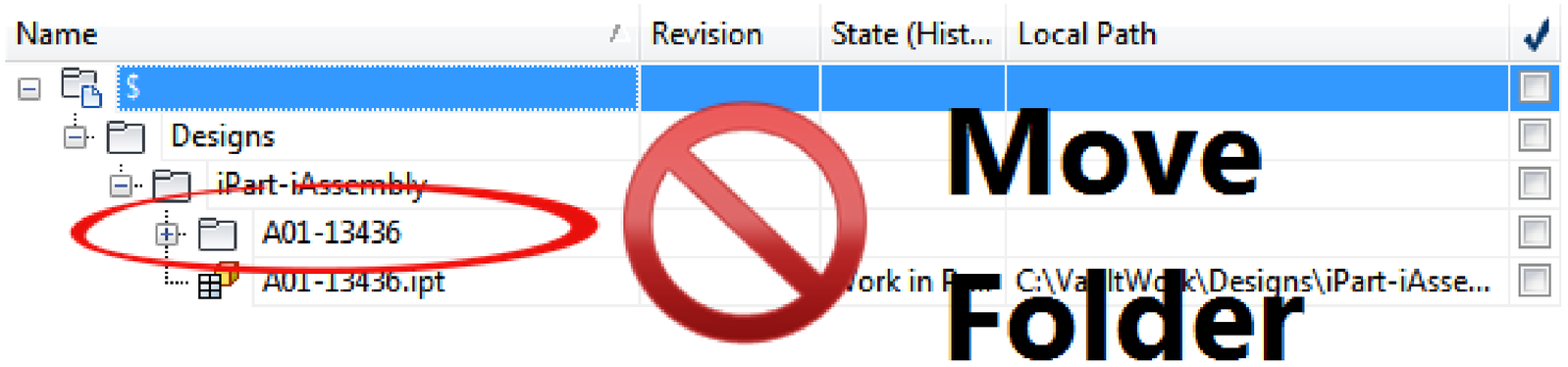
- Custom members don’t allow rename*





Move | iPart Factory

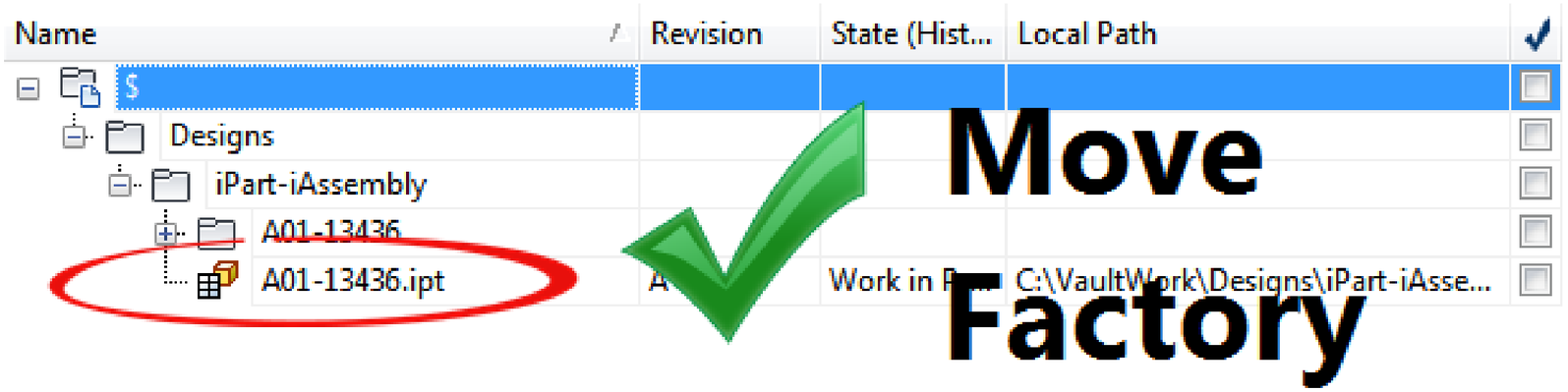
- ✓ Factory files move, if the subfolder is named as expected.
  Expected name = Factory name



Move | iPart Factory

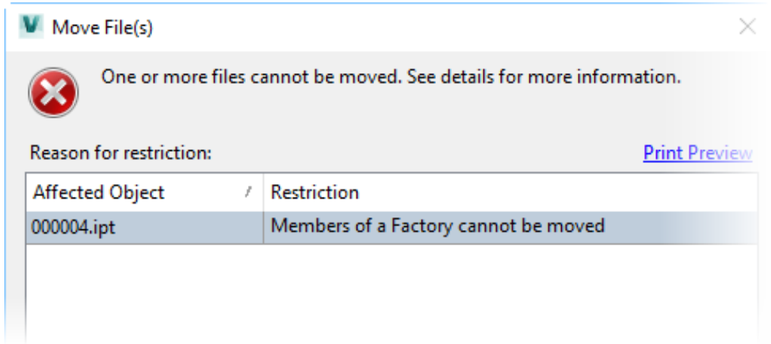
- ✓ Factory files move, if the subfolder is named as expected.
  Expected name = Factory name
- ✓ Factory move will relocate the subfolder and members

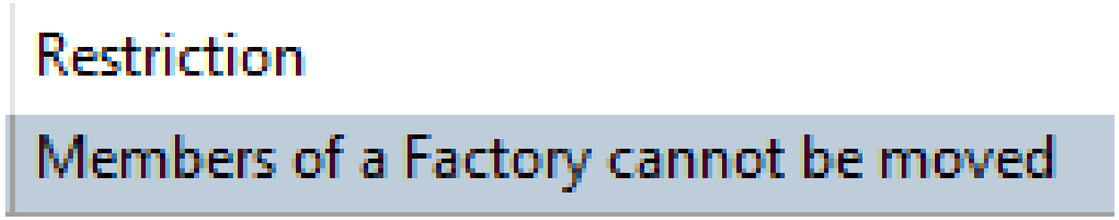
⇒ Moving a factory is a relocation of the complete family



Move | iPart Member(s)

- Move Standard Members – prevented in general
- Move **Custom** Members – ***prevented*** in general



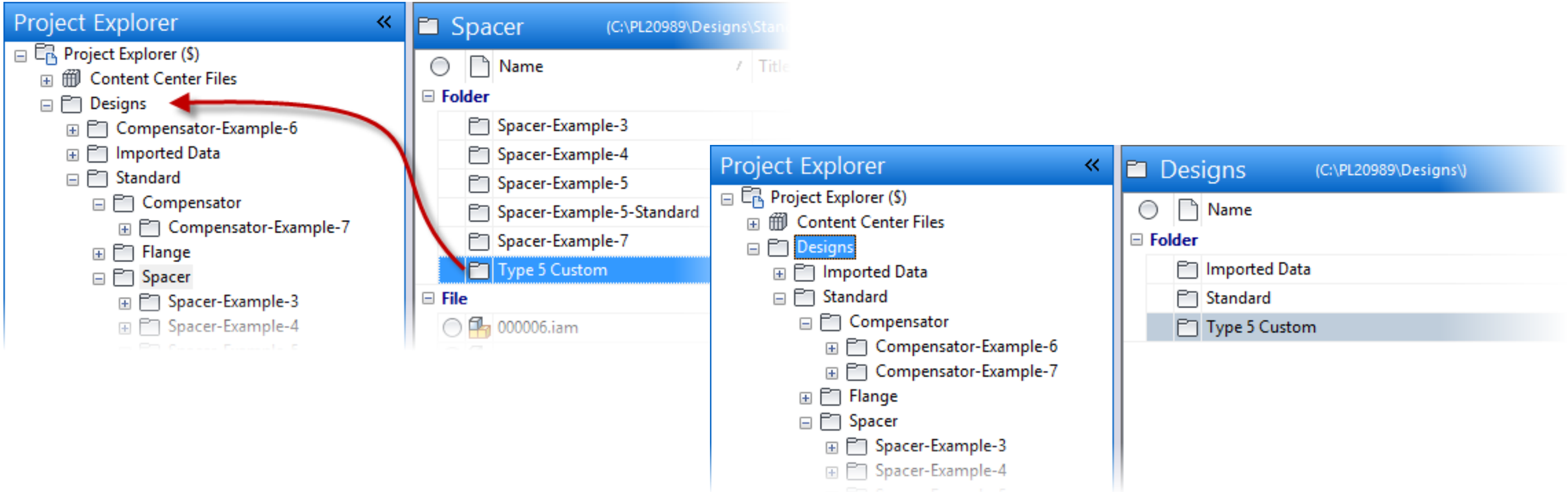


⇒ Again – iPart Families are managed as a whole

⇒ To move particular member(s), Inventor needs to break the link before

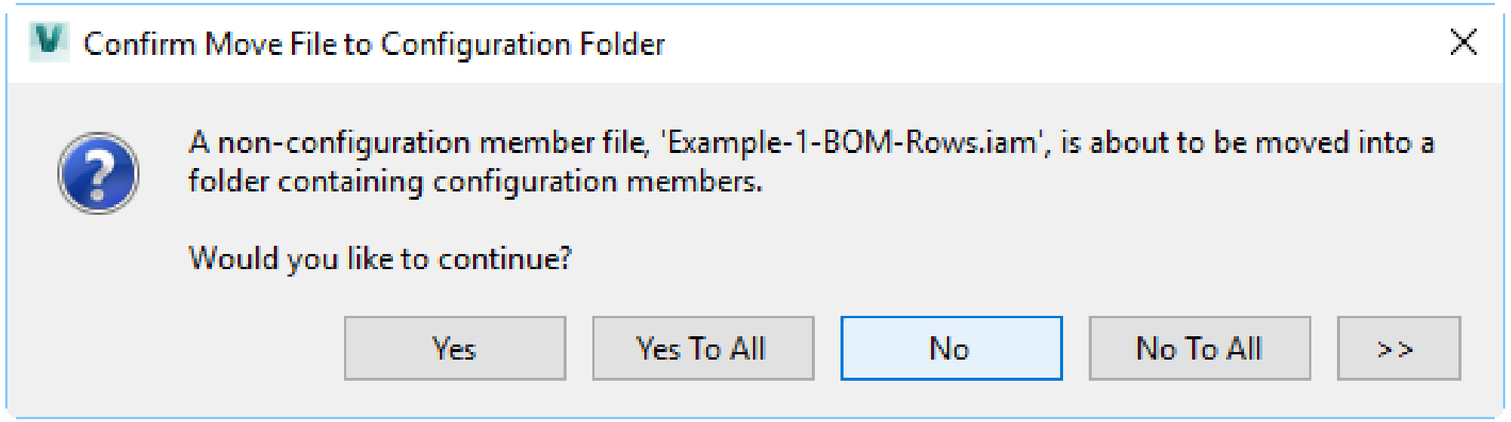
Move | Custom iPart Folder

- Custom configuration folders move



Move | iPart Members folder

- Avoid to move design files into members folder



- Remember - moving Factory, all files in the members folder will be moved

File Handling | Summary

- Copy
  - Reuse members
  - Create new variants first and replace copying
- Rename / Move
  - Manage the factory to reorganize the entire family

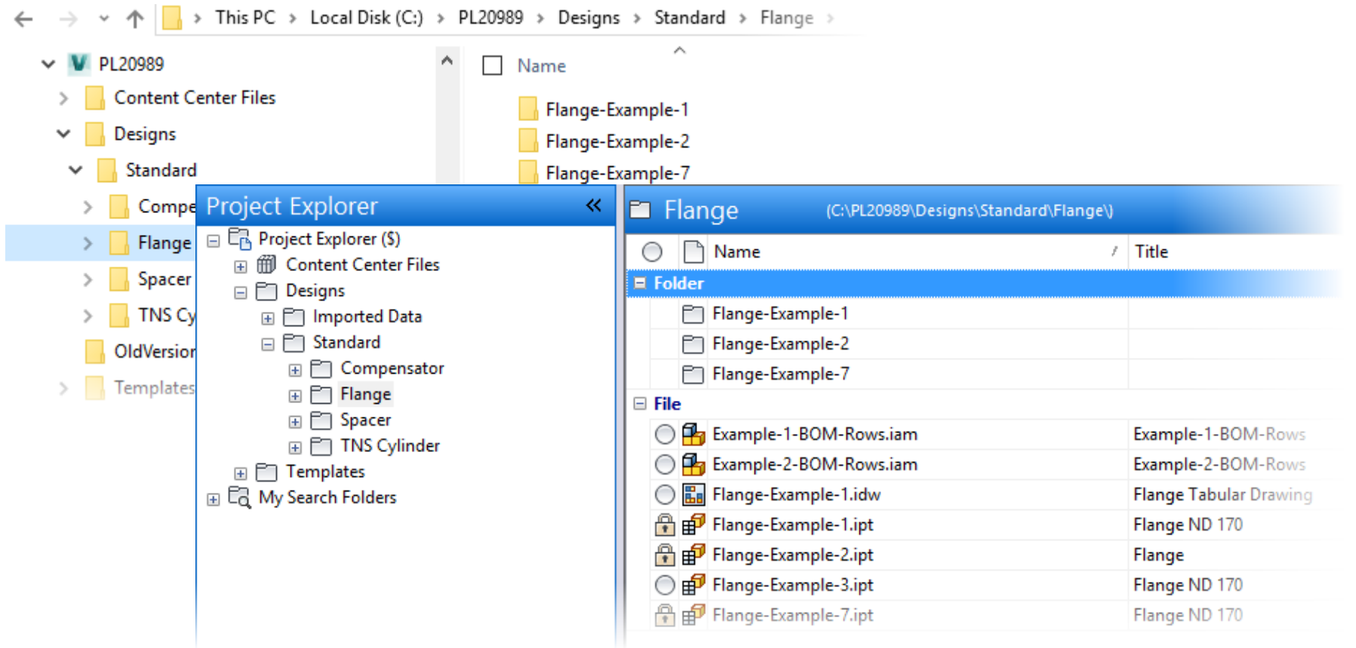
Managing iPart/iAssemblies | Key Learnings

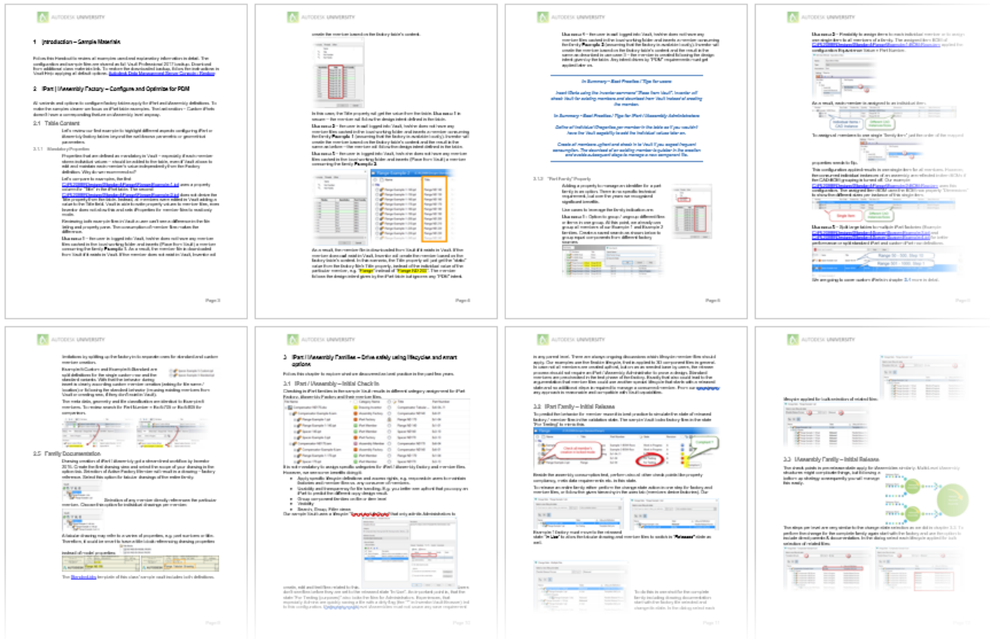
- Factory Authoring
  - Matching Options make your family robust
  - Meta Data included enhance PDM capabilities & workflows
- Vault Configuration
  - Category & Lifecycles to manage factory files => Fearless Consumption
- Lifecycle and Revision
  - Keep it simple = manage the family as a whole
  - Keep it smart = manage the family / members on as needed basis
- File Handling
  - Powerful factory handling
  - Reasonable restrictions for member files

… what you can do to follow up and review

Download sample Vault / Full Backup or local Inventor files

Recap examples and background information following the Hand Out





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