

Autodesk Official Training Guide

Essentials

**Autodesk®**

**Vault Professional 2011**

**Learning Autodesk®**

**Vault Professional 2011**

Using hands-on exercises, learn how to organize and share files, manage file versions, work in multi-user environments, and integrate with various Autodesk® products.

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June 2010

**Autodesk®**

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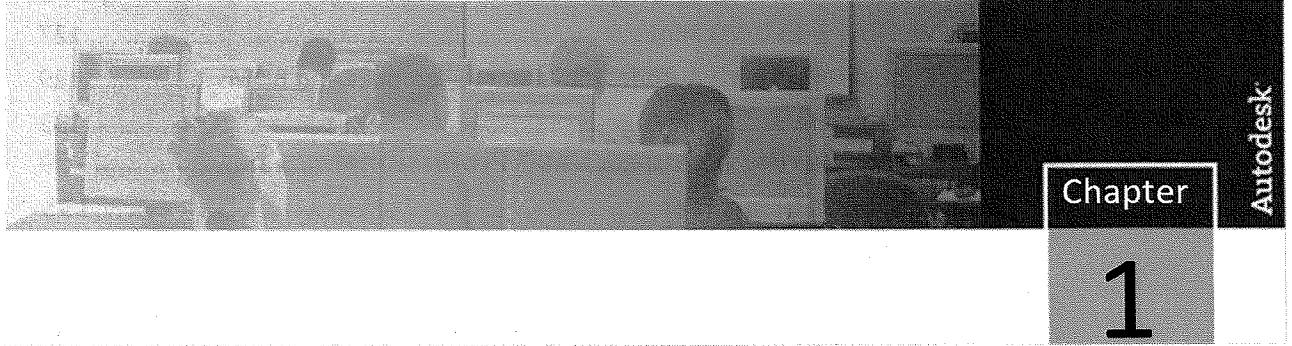
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# Introduction to Autodesk Vault Professional

This chapter gives an overview of Autodesk® Vault Professional, its features, functions, and benefits, and the Autodesk Vault Professional user interface.

## Objectives

After completing this chapter, you will be able to:

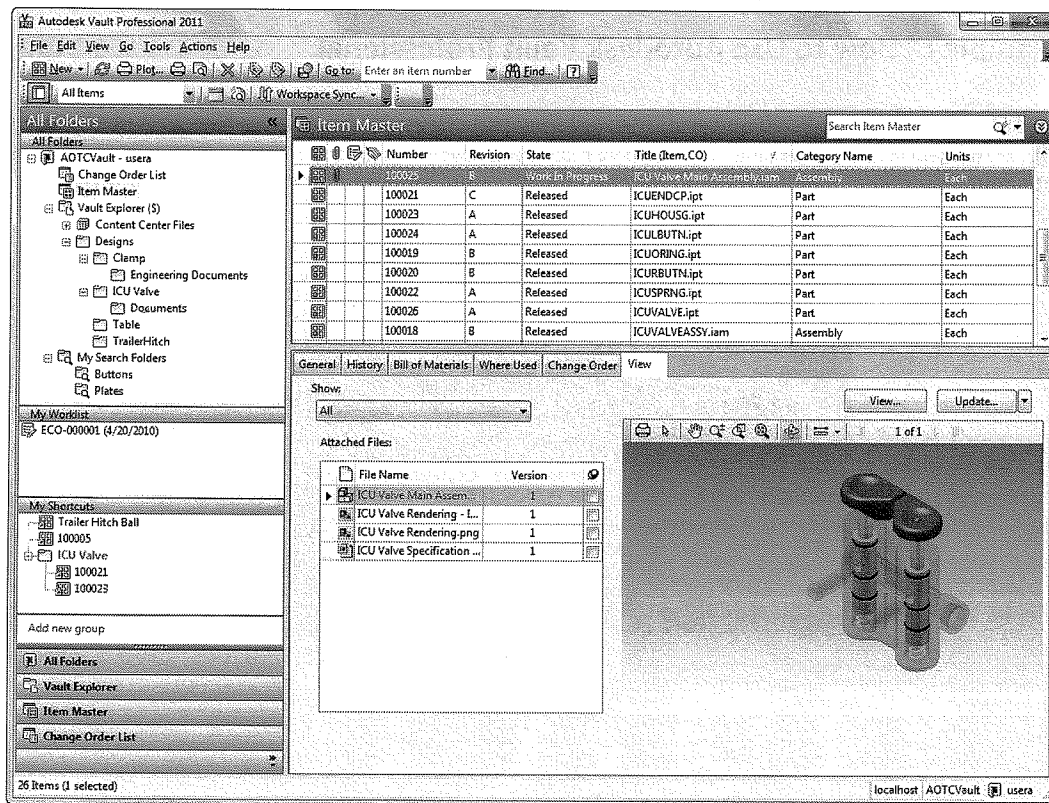
- Describe Autodesk Vault Professional features.
- Identify the user interface elements and navigate the user interface.

# Lesson 1: Autodesk Vault Professional Overview

## Overview

In this lesson, you learn about the basic features and functionalities of Vault Professional, and its advantages as a design data management system.

With Vault Professional, you can implement an automated release and change management process with complete tracking of bills of materials (BOMs) and related design information. Vault Professional also integrates with other business systems such as ERP (enterprise resource planning) systems. With these integrations, your extended team can use design information for purchasing, inventory management, and manufacturing, while allowing the engineering department to maintain control over their design data.



## Objectives

After completing this lesson, you will be able to:

- Describe Vault Professional.
- Explain the roles of Vault Professional in lifecycle management and change management.
- List some of the roles users can be assigned in Vault Professional.
- Describe Vault Professional integration with other design applications.

# About Autodesk Vault Professional

Autodesk Vault Professional is an integral part of the Autodesk data management solution. It uses vault files as item data, making vault files available to an extended design team that can include personnel from departments outside of engineering.

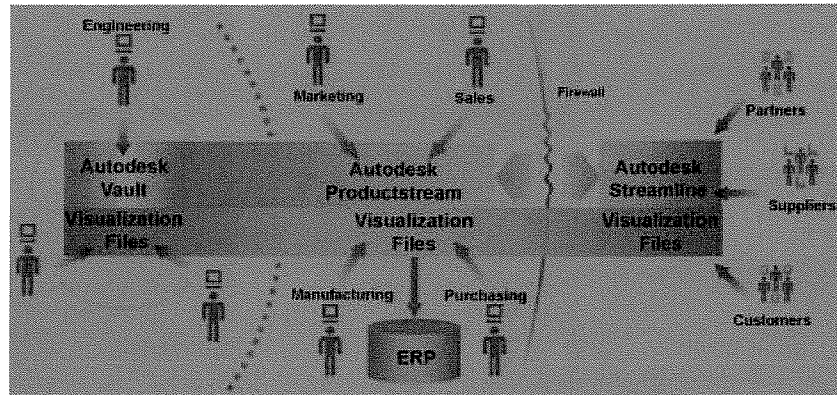
Autodesk Vault Professional helps you manage your vault data by creating and tracking change orders, managing bills of materials, and working with item revisions and lifecycles to oversee files throughout the design and manufacturing process.

## Benefits of Autodesk Vault Professional

When designers and engineers place their data files in a vault, Autodesk Vault Professional connects these files to item numbers that can integrate with ERP systems. Thus Autodesk Vault Professional is a gateway connecting two different parts of a company: the design/engineering team and the extended product team.

## Example of How to Use Autodesk Vault Professional

With Autodesk Vault Professional, more users can connect directly to the files in the vault, assign items to these files, enable other users in a larger team to work with the items, view items using visualization files, and manage these items as they move through their lifecycle from design to manufacturing to completion.





# Autodesk Vault Professional Functions

Autodesk Vault Professional automates the release management process by managing engineering changes and bills of materials. You use Autodesk Vault Professional to manage items throughout their lifecycle.

## Manage Items

Function	Description
Create Items	With Autodesk Vault Professional, you can create items by assigning items to data files or by creating new items.
Delete Items	When an item has reached the end of its lifecycle and is no longer used, you can delete it from the Item Master.
Organize Items	Using the Item Master list, you can quickly search, sort, and filter items, and customize how the item list is viewed.
Add User-Defined Properties to Items	In addition to the default properties for each item, you can add user-defined properties (fields) to item records.
Where Used	You can analyze where items are used and check item dependencies before editing an item or requesting an engineering change order.
Track Item Revisions	A flexible revision numbering scheme keeps track of the history of items. You can use a predefined number of letter schemes, or use the ASME Y14.35M scheme. You can use secondary and tertiary schemes to track data with even more detail.

## Bill of Materials (BOM)

Function	Description
Link Items	A BOM is built automatically when an assembly file in the vault is assigned an item.  You can also link items together to create your own BOM that includes newly created items.
Edit BOMs	You can edit materials and quantities for any design. You can override quantities in a BOM.
Units of Measure	Autodesk Vault Professional and Autodesk® Inventor® support the same units of measure, so any units of measure used in Inventor are automatically transferred to Autodesk Vault Professional BOMs. You can also specify the base measure of items, including mass, volume, quantity, and length.
Property Mapping	You can map CAD properties in design files in Autodesk Vault to item properties. These CAD properties are then carried over to corresponding items in Autodesk Vault Professional and can be used in the Item Master list and in the BOM.

Function	Description
Compare BOMs	You can view BOMs for different revisions of an item. Autodesk Vault Professional also offers a graphical comparison view of BOMs so you can compare revisions.

## Engineering Change Orders (ECOs)

Function	Description
Manage ECOs	<p>You can create ECOs and send them to members of the team. You can also attach notes and red-lined drawings to ECOs.</p> <p>ECOs are reviewed and tracked by members of the team, and can be rejected, approved, or withdrawn. The status of these ECOs is shown graphically and can be tracked to ensure that change orders are not forgotten or misplaced.</p>
Set Up Routes	You can set up routing lists with email support. You can use these lists to ensure that the right team members are notified of changes.

## Item Lifecycle

Every item is tracked with indicators that show the state of the item (Work in Progress, Released, In Review, and Obsolete). Revisions increment automatically in some cases when an item changes state. This process ensures that correct revision control is used. Generally, items are in a Work in Progress state when they are edited and in a Released state when they are released to manufacturing.

## Manage Security

Users receive system access based on their departments, positions, and roles. Security features prevent inadvertent changes and allow only authorized users to access or edit data. Certain functions, such as creating new numbering schemes, mapping CAD properties to item properties, and editing users are restricted to administrators.

## Import and Export Item Data

You can import items from other systems; however, these items are not assigned to files in the vault. You can export item data, including BOMs, to several formats to create reports.

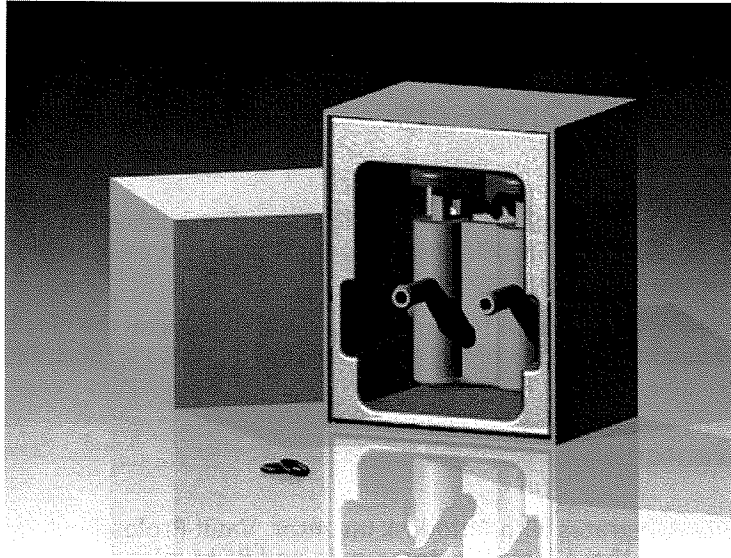
## Link Design Data into ERP Systems

Item data in Vault Professional can be synchronized with data in ERP systems. You can import item data in XML format into most ERP systems. You can also import items from ERP systems into Vault Professional.

## Example of Linking Design Data

The design work on an ICU valve is nearing completion and release by the design team. As part of managing the valve data, you need to set up the packaged product. You add an item representing the final packaged assembly, an item representing the packaging itself, and another representing the product specification sheet. You link these items to the assembly design data to form a BOM for all the components, and then release the items to manufacturing.

Based on an ECO, a new revision of the ICU valve packaged assembly has spare O-rings, and the ICU valve buttons are no longer painted. After the revisions, you compare the assembly's new BOM to the previous version.



## Security and Users in Vault Professional

You can control who has access to certain features in Vault Professional by assigning users different roles and permissions.

### Add Users

As a Vault Professional administrator, you can add, modify, and remove users from the system. You can group users with similar roles and manage permissions and roles for both groups and individual users.

You can also add users from a domain.

### Specify Roles

Autodesk Vault Professional has the following predefined roles: Administrator, Change Order Editor, ERP Manager, Item Editor (Levels 1 and 2), and Item Reviewer. In addition, there are roles for Vault, Vault Workgroup, and Vault Collaboration users as well as the Content Center. Users can be assigned roles based on their required level of access within the company.



When you add a new user, you should include their email address so that they can receive automatic notification of ECOs.

## Role-Based Permissions

Users are assigned Vault Professional task permissions based on the role they are assigned by an administrator. Administrators can also create Access Control lists for any folder in a vault. Folder permissions such as Full Access and Read-Only can be assigned to groups or individual users.

### Example

New employees join the company and require access to design data in the vault. The administrator adds new users and sets their roles based on their required access to vault and Vault Professional data. However, because the new employees are training during the first two weeks, the administrator sets their access to certain sensitive folders as read-only until they have finished training.

## Integration with Other Products

Vault Professional is a web services-based application. The application interfaces with files located in a vault file store and database. The file store and database were created during installation or migrated from another Autodesk Vault release.

Vault Professional integrates with the applications that produced the files in the vault. You can access the vault from the design application or open files created by these applications from within Vault Professional.

### Autodesk Inventor

Vault Professional integrates with Autodesk Inventor. Vault Professional reads Inventor files and the relationships amongst these files. The items' type and BOM information is built on this data.

- Inventor can control BOM data. By assigning BOM structure properties to components, such as phantom or inseparable, Inventor influences how the Vault Professional application reads and builds its BOMs for those items.
- You can transfer custom properties between Inventor and Vault Professional.
- Vault Professional fully supports all units of measure used by Inventor.

### AutoCAD-Based Products

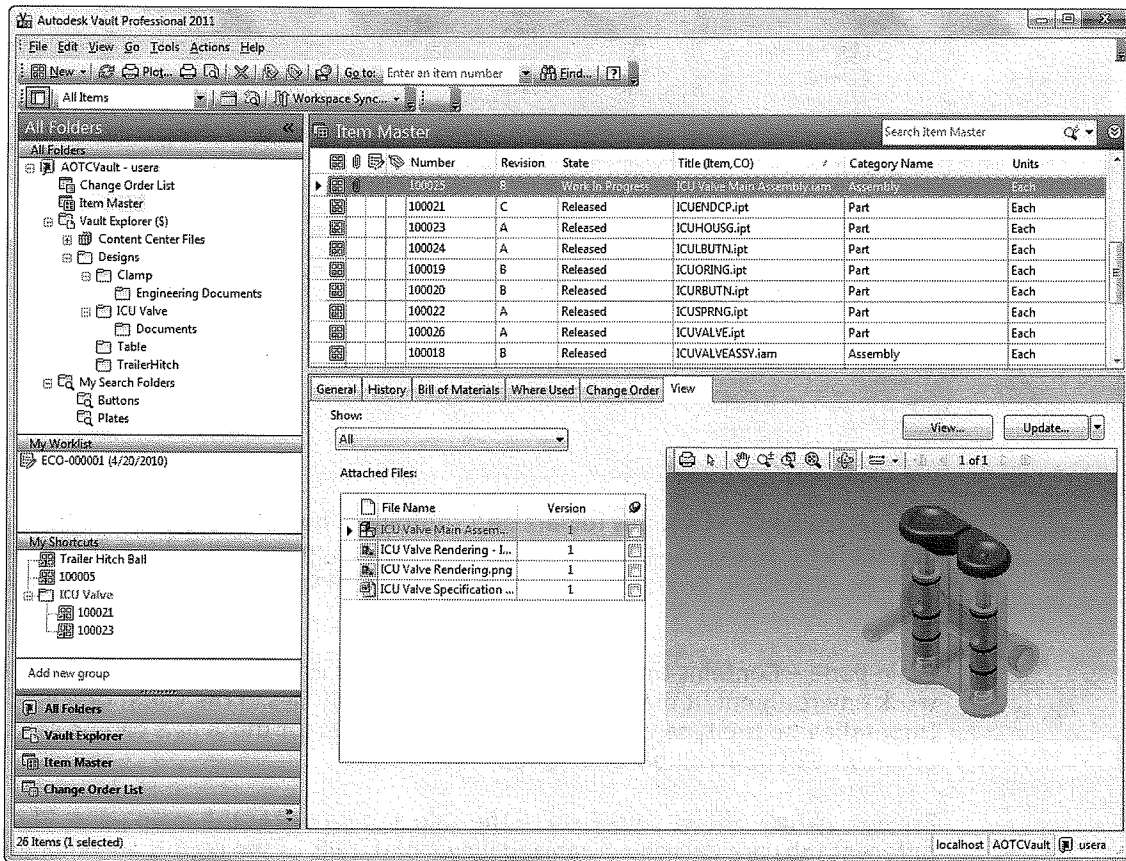
Autodesk Vault Professional integrates with other design applications and reads data in AutoCAD® drawing (DWG™) files. The following list outlines how AutoCAD-based applications work with Autodesk Vault Professional.

- External references (xrefs) are added as attachments to items in Vault Professional when the parent drawings are assigned items.
- Vault Professional can read drawing files and map their properties to item properties.
- Vault Professional can read projects, drawings, and properties from AutoCAD® Civil 3D® drawing files, and it can map their properties to item properties.
- Vault Professional reads BOM data in AutoCAD® Mechanical and AutoCAD Mechanical Desktop drawing files. It uses this data to create BOM data and determine object types.
- If the vault is set to enforce file locking, you cannot check out a drawing from the vault unless its lifecycle state is set to Work in Progress.

# Lesson 2: User Interface

## Overview

This lesson describes the features of the Vault Professional user interface.



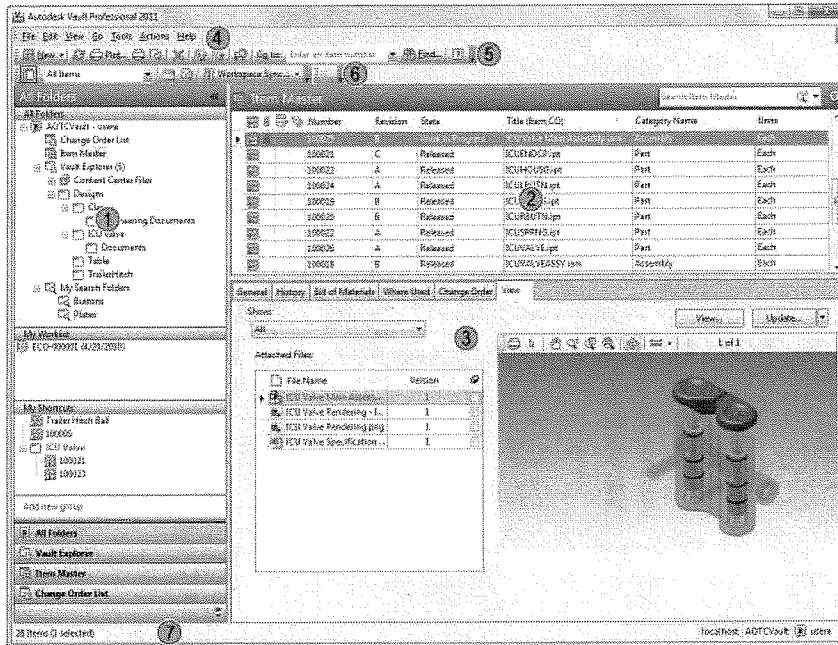
## Objectives

After completing this lesson, you will be able to:

- Identify the user interface elements in Vault Professional.
- Describe the three main areas of the user interface.
- Use the main pane in Vault Professional to show a list of objects that may be files in the vault, items, or engineering change orders (ECOs).
- Navigate the user interface.

# User Interface Elements

With the user interface elements in Vault Professional, you can work quickly and efficiently with data.



- ① Navigation pane – Contains folders and subfolders for different environments, shortcuts for searches, and filters. The work environment (All Folders, Item Master, Change Order List, or Vault Explorer) is determined by the selection in the navigation pane.
- ② Main pane – Contains the primary list of data. This list changes based on the current work environment. It may be a list of items, a list of files in the vault, or a list of ECOs. Depending on the type of environment, the records for these lists can be selected, previewed in more detail, and edited
- ③ Preview pane – Shows a preview of the selected record in the main pane. The different tabs are logically organized views of details of the record and change depending on the environment.
- ④ Main menu – Contains the commands used in Vault Professional.
- ⑤ Standard toolbar – The Standard toolbar provides quick access to common commands depending on the environment
- ⑥ Secondary toolbars – An Advanced and Behavior toolbar provides quick access to other common commands depending on the environment.
- ⑦ Status bar – Shows information such as the number of records in the main pane, the number of records selected, the user name, and the name of the vault in which the user is logged.

## Example of the Autodesk Vault Professional User Interface

In Autodesk Vault Professional, you normally begin in the navigation pane. This pane contains one or more objects that essentially behave as folders, because they contain other objects.

When you select one of these folders, the data in the selected folder is displayed in the main pane. You then work in the main pane.

When a record in the main pane is selected, it is previewed in the Preview pane.

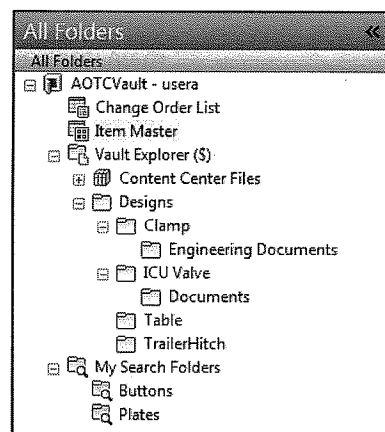
## About the Navigation Pane

The navigation pane is the starting point in the Vault Professional user interface. Use the navigation pane to go directly to desired data.

Using the main workflows, you can work efficiently with Vault Professional and quickly locate the data you need.

### Navigation Pane Areas

Screen Element	Description
All Folders	<p>The upper part of the navigation pane shows the folders you can click. These folders can be filtered so that only the Item Master or only Vault Explorer is visible.</p> <p>In the following illustration the All Folders view is shown, where all possible folders for navigation are visible.</p>



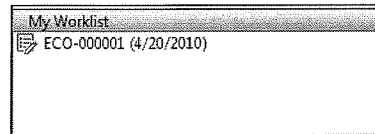
Three major work environments exist in Vault Professional:

- Items
- Change orders
- Vault Explorer

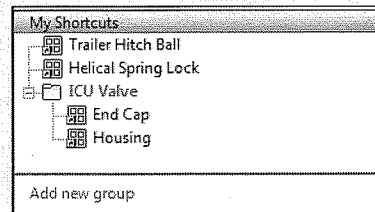
By clicking the folders, you change the work environment displayed, which affects the main pane and the Preview pane.

Screen Element	Description
My Search Folders	In the previous illustration, saved searches are also visible. These saved searches are environment specific. For example, if you create a search in the Item Master for the word Valve and then save this search, it is displayed under My Search Folders. Clicking this Valve folder brings up the Item Master work environment and displays the filtered items containing the word Valve.

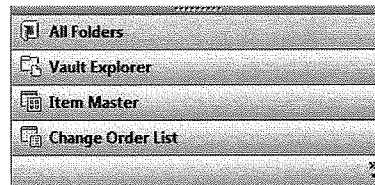
**My Worklist** ECOs requiring your attention or action are listed under My Worklist together with the due date. Clicking the listed item brings up the Change Order list work environment with the ECO highlighted.



**My Shortcuts** You can create group folders in the My Shortcuts area. You can then fill these folders with shortcuts to items, documents, files in the vault, and ECO. Clicking these links takes you to the selected objects immediately.



**Navigation Pane Buttons** Buttons in the navigation pane, located in the lower-left corner of the main interface screen, filter the folders at the top of the navigation pane. For example, clicking Vault Explorer removes all folders except those displayed in Vault Explorer.

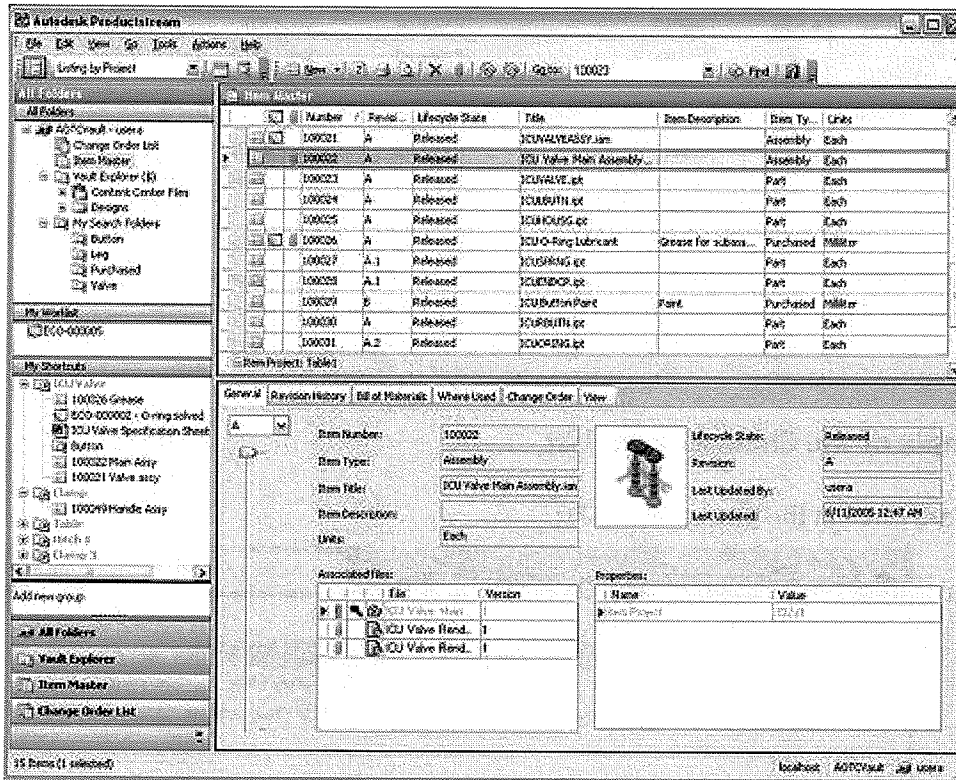


**TIP:** Use these buttons to filter the folders saved under My Search Folders. Under All Folders, you see the results of searches for all work environments. However, when you click a button such as Vault Explorer, only search results for the Vault Explorer environment are displayed under All Folders.



## Example of the Navigation Pane

In the following illustration, the All Folders button is selected in the lower-left corner of the user interface. The Item Master is selected in the navigation pane. The contents of this folder (Item Master) are displayed in the main pane.



## About the Main Pane

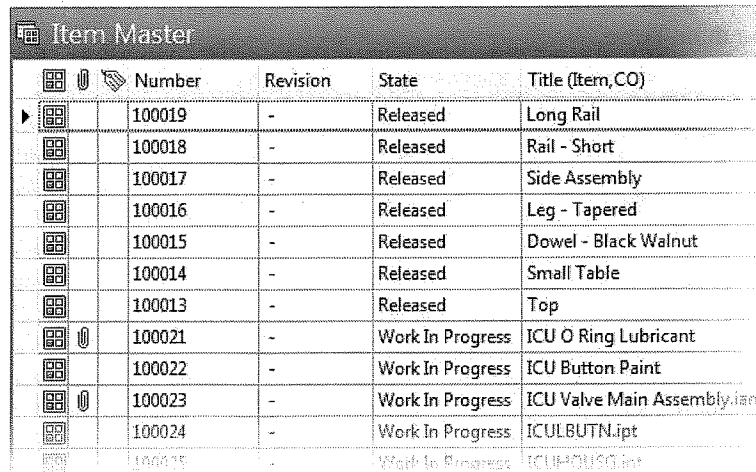
The main pane changes based on the work environment and how the view is customized. Use the main pane to sort, filter, and view records in the list.

The main pane lists records of objects. These objects may be items, files in the vault, or ECOs, based on the work environment.

You can customize the main pane to show different fields and to filter the list based on different criteria. You can also use Find to quickly search a list.

## Example of Item Master

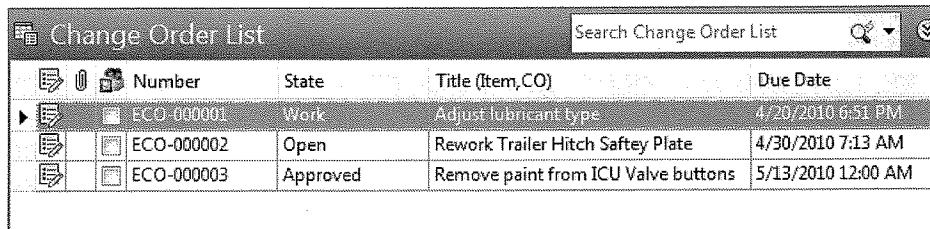
When working with items, the main pane shows the Item Master.



Number	Revision	State	Title (Item, CO)
100019	-	Released	Long Rail
100018	-	Released	Rail - Short
100017	-	Released	Side Assembly
100016	-	Released	Leg - Tapered
100015	-	Released	Dowel - Black Walnut
100014	-	Released	Small Table
100013	-	Released	Top
100021	-	Work In Progress	ICU O Ring Lubricant
100022	-	Work In Progress	ICU Button Paint
100023	-	Work In Progress	ICU Valve Main Assembly.iam
100024	-	Work In Progress	ICULBUTN.ipt
100025	-	Work In Progress	ICUHOUSG.ipt

## Example of the Change Order List

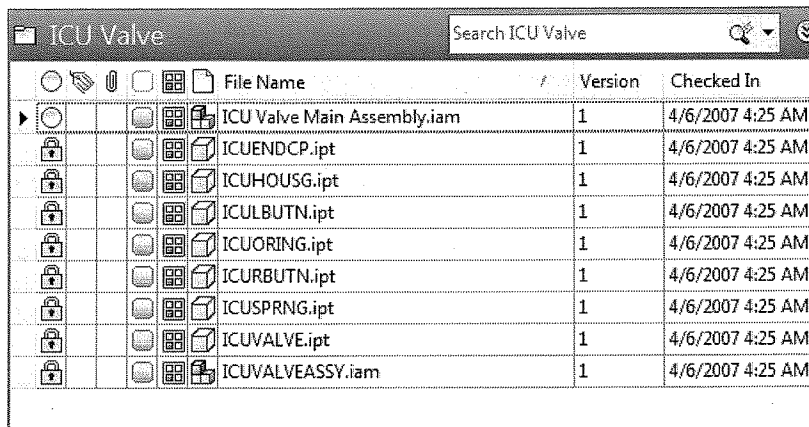
ECOs are listed in the Change Order list.



Number	State	Title (Item, CO)	Due Date
ECO-000001	Work	Adjust lubricant type	4/20/2010 6:51 PM
ECO-000002	Open	Rework Trailer Hitch Saftey Plate	4/30/2010 7:13 AM
ECO-000003	Approved	Remove paint from ICU Valve buttons	5/13/2010 12:00 AM

## Example of Files in a Vault Folder

Files and their properties are listed when a vault folder is selected in the navigation pane.

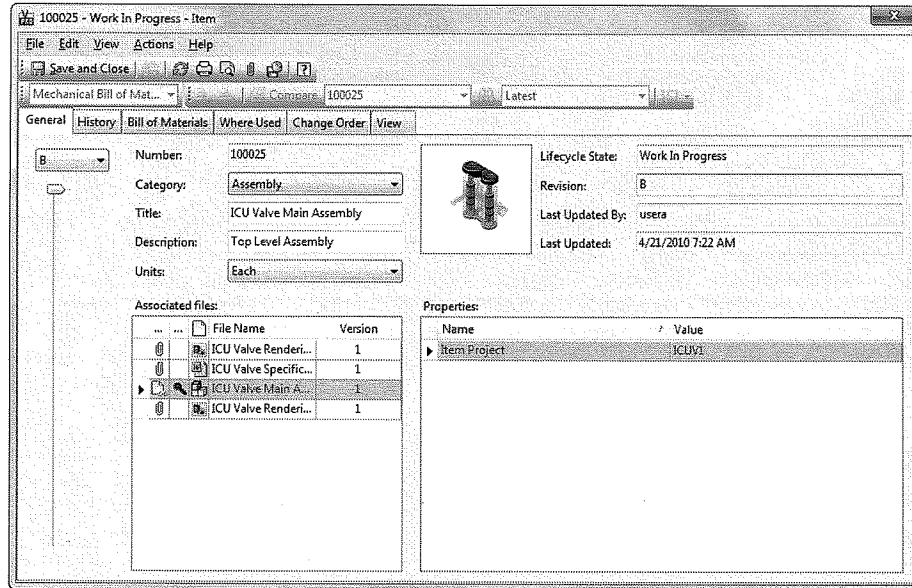


File Name	Version	Checked In
ICU Valve Main Assembly.iam	1	4/6/2007 4:25 AM
ICUENDCP.ipt	1	4/6/2007 4:25 AM
ICUHOUSG.ipt	1	4/6/2007 4:25 AM
ICULBUTN.ipt	1	4/6/2007 4:25 AM
ICUORING.ipt	1	4/6/2007 4:25 AM
ICURBUTN.ipt	1	4/6/2007 4:25 AM
ICUSPRNG.ipt	1	4/6/2007 4:25 AM
ICUVALVE.ipt	1	4/6/2007 4:25 AM
ICUVALVEASSY.iam	1	4/6/2007 4:25 AM

# About the Item Record Dialog Box

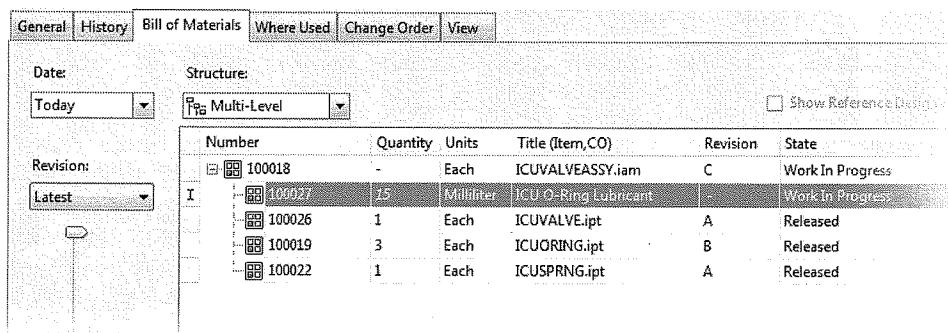
Along with the major interface panes, one of the most commonly used interface elements in Vault Professional is the Item Record dialog box. Use the Item Record dialog box to view (Open) or edit (Edit) items and their BOMs, and to attach and detach files. Items must be in the Work In Progress state in order to open them for editing. Otherwise they can be opened read-only for viewing. This feature is helpful when the item has a lot of details or when you want to view the associated files.

Using the Item Record interface, you can edit an item's properties, including the item's BOM, attach and detach files, and view change orders associated with that item.



## Example of the Item Record Interface

You create a new item such as lubricant in the Item Master. In the Item Master, you double-click an item representing an assembly to open it for editing. You add the lubricant item in the assembly item's BOM. When you have completed the task, you click Save and Close to save the changes and exit the Edit Item Record dialog box.




# Chapter Summary

Autodesk Vault Professional extends provides product management to your manufacturing designs. A common interface provides access to files, items, BOMs, and change orders.

Having completed this chapter, you can:

- Describe Autodesk Vault Professional features.
- Identify the user interface elements and navigate the user interface.



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Chapter

**2**

Autodesk

## Working with Items

All Autodesk® Vault Professional® users must be able to work with items, using the application's various features and functionalities. Your specific Autodesk Vault Professional item tasks are related to your position in the design and manufacturing environment.

You can assign items to CAD files in the vault, or create new items for products not specifically modeled in CAD.

The list of items in Vault Professional can get very large and awkward to handle. By using customized views and filters, you can sort or filter the item list based on item properties to manage the items effectively.

### Objectives

After completing this chapter, you will be able to:

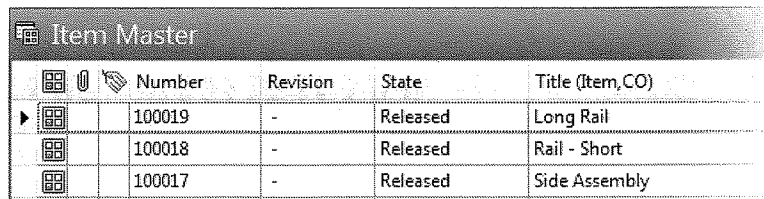
- Create, modify, and delete items, use filters to view items, and add and remove file attachments.
- Create, modify, and delete custom views, use filters to view items, and find items.
- Work with default item properties and user-defined properties, including item numbers, life cycle states, and revisions.
- Export item data for use in other applications.

# Lesson 1: Creating Items

## Overview

In this lesson you learn how to create, modify, and delete items, use filters to view items, and add and remove file attachments.

Use items to help manage your vault data and make that data available to the extended design team.



	Number	Revision	State	Title (Item,CO)
▶	100019	-	Released	Long Rail
	100018	-	Released	Rail - Short
	100017	-	Released	Side Assembly

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## Objectives

After completion

- Create items by assigning items to selected design data from Autodesk® Vault.
- Work with the Item Master.
- Assign items to files in a vault, and create new items from scratch.
- Attach engineering documents such as specifications, design and product data sheets, and regulatory documents to items.
- Use automatic attachments to expedite assigning items to files in the vault.

## About Items

Working with items is a crucial part of automating the data management process and maintaining control of your design data. When a new design is added to the vault, each part or assembly can be assigned an item so it can be clearly identified.

You create items by assigning them to design data from the vault or by creating a new item directly in the Item Master.

### Definition of Items

Items represent physical elements that a company uses to produce the products it manufactures. Common items include parts and assemblies, documents, consumable goods such as grease, paint, fluids and lubricants, and even artwork. Some items are purchased while others are manufactured by the company.

An item is identified by a unique identifier (the item number). This number is used to identify the item in change orders, product lists, bills of materials, and ERP systems.

Number	Revision	State	Title (Item,CO)	Item Description	Category Name	Units
100019	-	Released	Long Rail	Long rail	Part	Each

### Example of Assigning

As part of a new  
has a unique item  
complex set of

This item number  
application uses

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part. The new item  
100352) or a

the item. The

### Item Master

To manage and track the lifecycle of items used in product manufacture, users need to access a list of items where they can preview, create, modify, and delete items as required. The Item Master is where this list of items is found.

### About the Item Master

The Item Master contains a complete list of all items in the system. These items usually represent design data in the vault.

Items in the Item Master are identified by unique identifiers (item numbers). Each item has a number of system and user-defined properties.


Number	Revision	State	Title (Item,CO)	Item Description	Category Name	Units
100019	-	Released	Long Rail	Long rail	Part	Each
100018	-	Released	Rail - Short	Short Rail	Part	Each
100017	-	Released	Side Assembly	Assembly of legs and sid...	Assembly	Each
100016	-	Released	Leg - Tapered	Oak table leg	Part	Each
100015	-					
100014	-					
100013	-					
100021	-					
100022	-					
100023	-					
100024	-					
100025	-					
100026	-					

General History Bill of Materials Where Used Change Order View

Number: 100020  
 Category: Part  
 Title: ICUVALVE.ipt  
 Description:  
 Units: Each

Lifecycle State: Work In Pr  
 Revision:  
 Last Updated By: usera  
 Last Updated: 4/15/2010




General History Bill of Materials Where Used Change Order View

Number: 100024  
 Category: Part  
 Title: ICULBUTN.ipt  
 Description:  
 Units: Each

Lifecycle State: Work In Progress  
 Revision:  
 Last Updated By: usera  
 Last Updated: 4/15/2010 3:04 PM



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### Using the Item Ma

Using the It

- List all
- Add o
- colum
- Group
- Preview comments automatically.
- Go to a specific item.
- Find an item or items, and optionally save the search.
- Change column text alignment.
- Create new items.
- Edit items.
- Preview items in the Preview pane.

ch, and sort by any



## Example of the Item Master

As new designs are added to the vault and assigned items, the Item Master list grows.

Number	Revision	State	Title (Item,CO)	Item Description
100014	-	Released	Small Table	Small Table
100013	-	Released	Top	Top for small tal
100021	-	Work In Progress	ICU O Ring Lubricant	Grease for subas
100022	-	Work In Progress	ICU Button Paint	
100023	-	Work In Progress	ICU Valve Main Assembly.iam	
100024	-	Work In Progress	ICULBUTN.ipt	
100025	-	Work In Progress	ICUHOUSG.ipt	
100026	-	Work In Progress	ICUSPRNG.ipt	
100027	-	Work In Progress	ICUENDCP.ipt	
100028	-	Work In Progress	ICURBUTN.ipt	
100029	-	Work In Progress	ICUORING.ipt	

## Creating Items

To work with Vault Professional, you must add items. Typically, you assign items to data files in the vault. In some cases, you need to create an item that is not modeled in the design. Examples include purchased items, artwork, or packaging. You can also create items for drawings, art, artwork, or packaging.

### Procedure: Creating Items

The following steps describe how to create items:

1. Click the **Item Master** button on the **Item Master** ribbon.
2. On the **Item Master** dialog box, click **New**.
3. In the **Edit Item** dialog box, enter the item number, units, and description.
4. Click **Save and Close**. The new item is created.

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### Procedure: Assigning Items to Files in Vault

The following steps describe how to assign items to files in Vault Professional.

1. Make sure that all files to which you want to assign an item are checked into the vault.
2. Click the **Vault Explorer** button.
3. In the main pane, right-click the part, drawing, or assembly file to which you want to assign an item. Click **Assign Item**.
4. In the **Assign Item Wizard** dialog box, review the new items. If necessary, right-click on an item and select **Change Item Number** to renumber the item.
5. Click in the **Description** field and enter a description of the item.
6. Click **Next**.

7. If there are duplicates of the item, you can replace them with an existing item in the item master by clicking in the Replace With field, or you can select the Auto-select first duplicate item check box. You can also filter which items are displayed by selecting the Hide items without duplicates check box.
8. Click Finish. The new items are created and the files in the vault are linked to the items. A report is generated and displayed on the screen.
9. Click Save to save the report locally or click Send to Vault to save the report to the vault.
10. Click Close to exit the Assign Item Wizard.



**NOTE:** When you assign an item to an assembly file, all parts and subassemblies in that assembly must have items assigned as well. Items are assigned automatically to all the necessary files if they do not have items assigned already.

## Attaching and Detaching Files

When you create an item from a file in the vault, the vault file is automatically attached to the item. You can manage attachments in the Item Master. You can add attachments to an assembly file, and you can remove attachments from the product, and so on.

You attach an assembly file to an item, and the attached file is displayed when you view the item.

In some cases, the attached file is not displayed. This occurs when you pin the attached file. The attached file remains when you delete the item, as specified by a system administrator.

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attached file is

by pinning the originally attached folder part might be

### Procedure: Attaching Files to Items

The following steps describe how to attach files to items.

1. In Item Master, double-click an item to edit it.
2. Select Actions -> Attachments.
3. In the Attachments dialog box, click Attach.
4. Navigate to the file you want to attach. Select the file. Click Open.
5. Review the attached file in the Attachments dialog box. Pin the file if necessary. Click OK.
6. Click Save and Close.

### Procedure: Detaching Files from Items

The following steps describe how to detach files from items.

1. In Item Master, CTRL+click the paper clip icon in the item's record.
2. Select the attached file. Click Detach.
3. Click OK.

# Automatic Attachments

Some files are associated automatically with the parent file when the parent file is promoted to an item.

## Definition of Automatic Attachments

When you add CAD files to a vault, the relationships and links between files are maintained. For example, the links between an assembly file and its part and subassembly files are maintained by the vault. These linked files are automatically promoted to items when the assembly is promoted. In a similar way, cross-reference links between drawings in AutoCAD®, AutoCAD® Mechanical, AutoCAD® Electrical, or AutoCAD® Civil 3D® are also maintained in Vault.

## Example of Automatic Attachments

An Inventor drawing is created from an Inventor part, and both are checked in to the vault. In Vault Explorer the two files are visible.

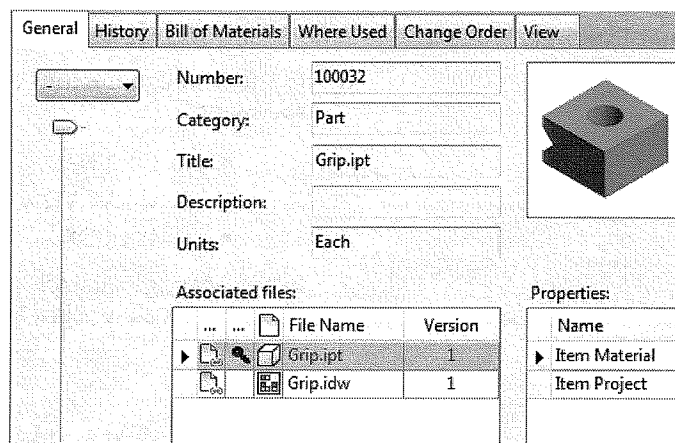
After assigning a  
Explorer.



tem in Vault



After assigning an item to the Grip.ipt part, the item also shows a link to both the files in the Associated files list on the General tab.



# Exercise 1: Assign Items to Vault Files

In this exercise, you create a custom view for Vault Explorer, assign an item to a part and an assembly, and attach files to an item.

Item Master	Number	Revision	State	Title (Item,CO)
	100020	-	Work In Progress	ICUVALVE.ipt
	100021	-	Work In Progress	ICU O Ring Lubricant
	100022	-	Work In Progress	ICU Button Paint
	100023	-	Work In Progress	ICU Valve Main Assembly
	100024	-	Work In Progress	ICULBUTN.ipt

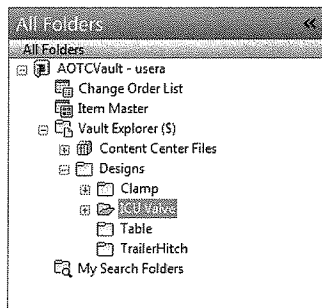
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## Create a Custom View

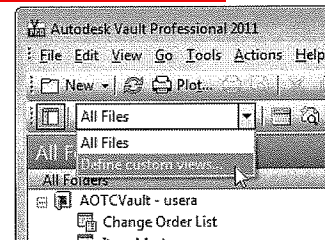
1. Start Autodesk Vault Professional and enter the following information:

- User Name: **usera**
- Password: **vault**
- Database: **AOTCVault**

2. In the navigation pane, click All Folders.
3. Under All Folders, expand Vault Explorer.
4. Navigate to the Designs\ICU Valve folder.



Click Define Custom Views menu.



6. In the Manage Custom Views dialog box, do the following:
  - Click New.
  - Under View Name, enter Thumbnails.
  - Click OK.
7. In the Manage Custom Views dialog box, select the Thumbnails view. Click Modify.

8. Click Fields.

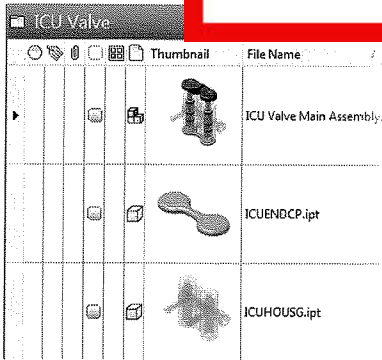
9. In the Customize Fields dialog box, do the following:

- In the Select Available Fields From drop-down menu, select All File Fields.
- In the Available Fields list, select Thumbnail. Click Add.
- Under Show These Fields in This Order, select Comment. Click Remove.
- Under Show These Fields in This Order, select Thumbnail. Click Move Up until Thumbnail appears above File Name.
- Click OK.

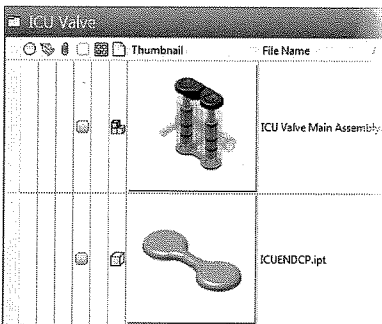


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10. Click Close twice to close the dialog box. The main pane displays the visualization from the visualization

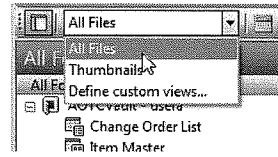


11. To adjust the size of the thumbnails, resize the Thumbnail column.

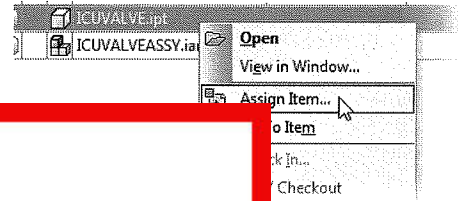


## Assign an Item

1. From the Advanced toolbar, click All Files from the toolbar drop-down menu.

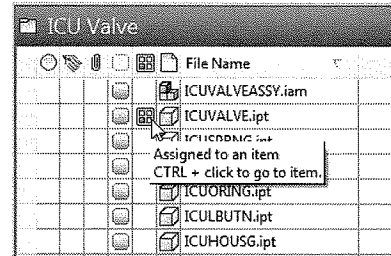


2. In the main pane, right-click ICUVALVE.ipt.  
3. Click Assign Item.

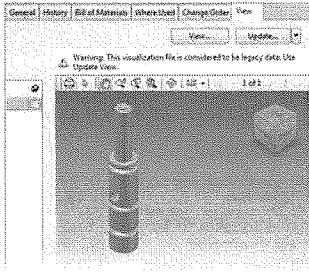


12. In the Assign Item dialog box, do the following:

5. In Vault Explorer, place the pointer on the item icon in front of the part name. The Go to Item tooltip is displayed.



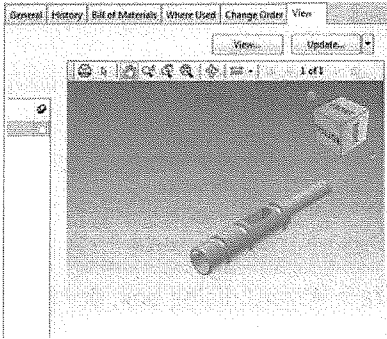
6. CTRL+click the item icon. In the Preview pane, click the View tab (if it is not selected already). Under Attached Files, click ICUVALVE.ipt.



toolbar drop-down menu, click All Items.

The list is updated with the new items.

- Note the warning. In the View tab, click Update to update the view.



- Under All Folders, click All Items. Notice that when you click All Items, it automatically updates subassemblies and parts. Without these extra steps, the list is incomplete.

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- In the main pane, right-click Assembly.iam. Click All Items.

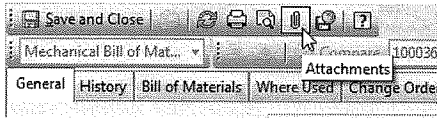
Number	Detail ID		
100009	3		
100008	1	1	ICUHOUSG.ipt
100006	2	1	ICUENDCP.ipt
100005	4	1	ICURBUTN.ipt
100003	5	2	ICUVALVEASSY.iam
100007		1	ICUSPRNG.ipt
100004		3	ICUORING.ipt
100002		1	ICUVALVE.ipt

- In the Assign Item Wizard dialog box, do the following:

- Click Next. An item number is assigned to all parts, and duplicates are found.
- Click Finish.
- Click Close. An item icon is displayed next to all files in the ICU Valve folder.
- Under All Folders, click Item Master. If necessary, from the Advanced

## Attach Files to an Item

1. In the Item Master window, select ICU Valve Main Assembly.iam.
2. In the preview pane, select the General tab.  
Only one file is associated with the item in the main assembly.
3. In the Item Master, double-click ICU Valve Main Assembly.iam to edit the item.
4. On the toolbar, click Attachments.



5. In the Attachments dialog box, click Attach.
6. Navigate to the Designs\ICU Valve\Documents folder. Do the following:
  - Select ICU Valve Rendering.png.
  - Click Open.
7. In the Attachments dialog box, click OK. The attached files are listed under the associated files.
8. On the toolbar, click Save.

The assembly item update paperclip icon is displayed on the attached files.

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# Exercise 2: Create New Items

In this exercise, you create new items to represent physical objects not modeled in the vault.

Number	Revision	State	Title (Item, CO)	Item Description	Category Name
100020	-	Work In Progress	ICUVALVE.ipt		Part
100021	-	Work In Progress	ICU O Ring Lubricant	Grease for subassembly	Purchased
100022	-	Work In Progress	ICU Button Paint		Purchased
100023	-	Work In Progress	ICU Valve Main Assembly.iam		Assembly
100024	-	Work In Progress	ICUBUTTON.ipt		Part
100025	-	Work In Progress	ICUHOUSSE.ipt		Part
100026	-	Work In Progress	ICUSPRING.ipt		Part
100027	-	Work In Progress	ICUENDCP.ipt		Part
100028	-	Work In Progress	ICUBUTTON.ipt		Part
100029	-	Work In Progress	ICUCORING.ipt		Part
100030	-	Work In Progress	ICUVALVEASSY.iam		Assembly

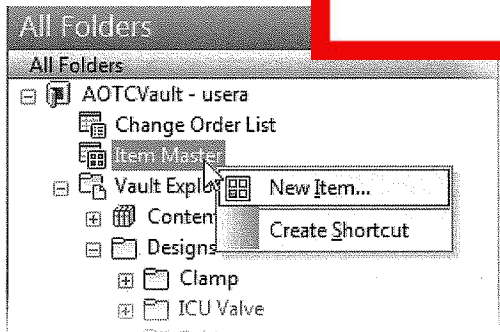
The completed exercise

1. Start Autodesk Vault Professional and enter the following information:

- User Name: user
- Password: vault
- Database: AOTCVault

2. Under All Folders, click Item Master.

- Right-click Item Master.



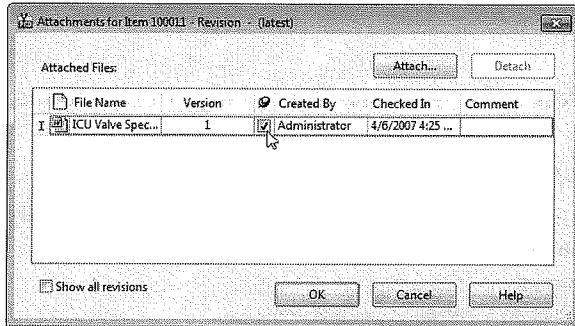
- Click New Item.

3. In the Edit Item dialog box, do the following:

- For Category, select Purchased.
- For Item Title, enter O-Ring Lubricant.
- For Units, select Milliliter.
- Click Save and Close.



4. The new item is displayed in the Item Master.
5. In the Item Master, right-click the O-Ring lubricant and select Attachments.
6. In the Attachments dialog box, click Attach.
7. Navigate to the Designs\ICU Valve\Documents folder. Select ICU Valve Specification Sheet - Grease.doc. Click Open.
8. In the document row, in the Pinned icon column, select the check box.



9. Click OK.

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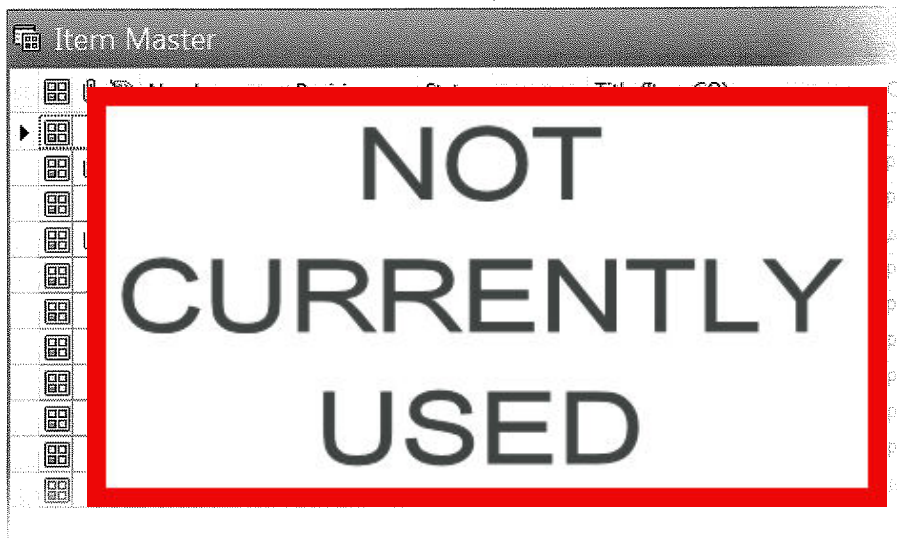
# Lesson 2: Working with Items

## Overview

In this lesson you learn how to create, modify, and delete customized views, use filters to view items, and work with item properties.

You can also export items for use with other applications or to create reports.

Use items to index and manage products in manufacturing. You also use items in the creation of Bills of Materials (BOMs) within Autodesk Vault Professional and in tracking change orders.



## Objectives

After completing this lesson, you will be able to:

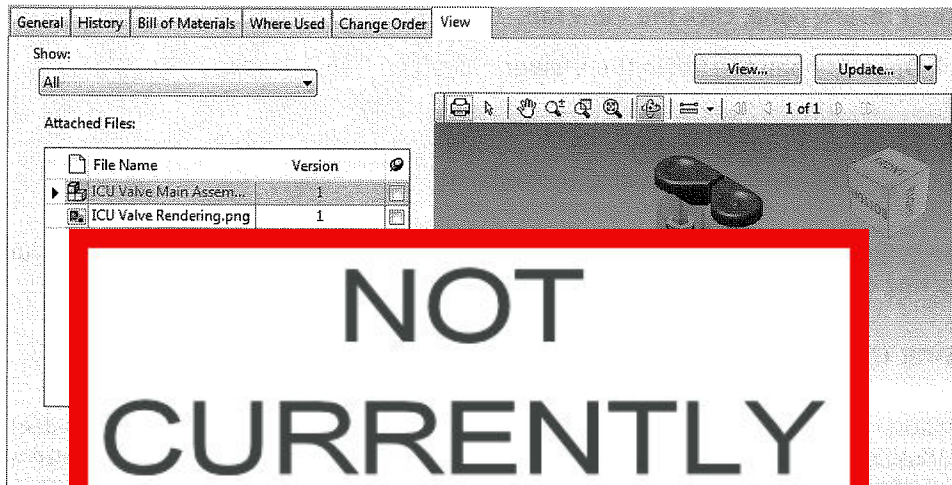
- View specific items and files attached to the item.
- Use the Where Used tab to show item dependencies in the vault.
- Define custom filters to view and work with items.
- Use the Item Master to view, search, and filter items.
- Find items using Go To, shortcuts, and saved searches.

## Using the Item Preview Pane to View Items

The extended design team requires access to design data. Because many team members outside the engineering team do not use CAD, items cannot be viewed directly within the native CAD application.

Visualization files are the main tools used for viewing items. Visualization files can be DWF™ or DWFx files. Visualization files can be published automatically when files are checked in to the vault, thereby making viewing items in the vault easier and faster. With 3D visualization files, users can pan, zoom, and orbit 3D Autodesk® Inventor® models. Individual components in an assembly can be shown, hidden, or isolated. With 2D visualization files, users can print and view drawings and mark them up to provide feedback.

Use the View tab in the preview pane to view an item's associated vault files.



### Viewing Revision Images

You can view different revisions to the item.

Thumbnail images of the

Thumbnail	Number	Revision	State	Title (Item,CO)	Units
	100028	A.1	Work In Progress	ICURBUTN	Each
	100028	A	Work In Progress	ICURBUTN	Each
	100028	-	Work In Progress	ICURBUTN.ipt	Each

## Procedure: Viewing an Item

The following steps describe how to view an item's associated files.

1. In the Item Master window, select the item.
2. In the Preview pane, click the View tab.

## Procedure: Viewing Other Data

The following steps describe how to view other data.

1. In the Item Master window, select the item.
2. In the Preview pane, click the View tab.
3. Click Open to open the file in the Viewer.

## Using the Where Used Tab

With the Where Used tab in the Preview pane, you can analyze where items are included in the vault. By detecting de

### Example of Using the

In the following  
ICUVALVEASSY  
used directly in  
number of pare

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used in the  
bly file. The part is  
assemblies (total

Number	Title (Item, CO)	Category Name	State	...
100020	ICUVALVE.ipt	Part	Work In Progress	-
100030	ICUVALVEASSY.iam	Assembly	Work In Progress	-
100023	ICU Valve Main Assembly.iam	Assembly	Work In Progress	-

# How to Define Custom Filters to View Items

The number of items in the system can grow quite rapidly, and finding items in the list can be difficult. Many methods are available to filter the item list. By default, a custom view is already applied to the Item Master, which shows the items that have been updated in the last seven days.

The default custom view is displayed on the Advanced toolbar.

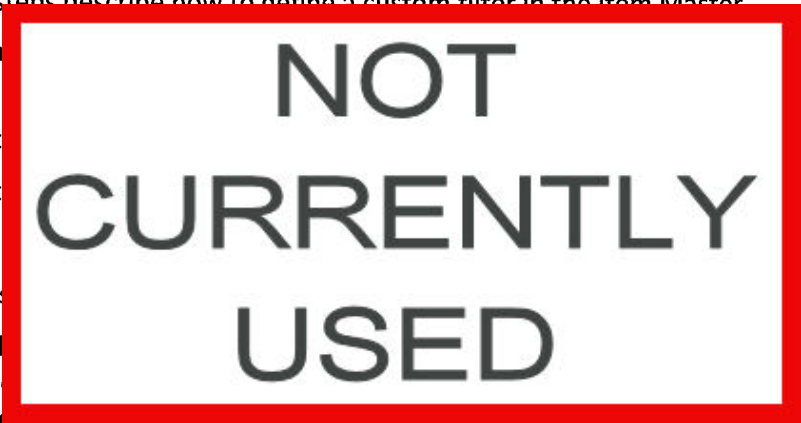


It is strongly recommended that you create custom views to filter your data. Customizing helps speed up the display of item lists because only filtered item data is retrieved from the server rather than the entire item list.

## Procedure: Defining a Custom Filter in the Item Master

The following steps describe how to define a custom filter in the Item Master.

1. In the Item Master, click the Views list to filter. Select Custom Views.
2. In the Custom Views list, click the desired view.
3. In the Custom Views list, click the desired view.
4. Click Add.
5. If desired, click the Filter icon to the criteria list.
6. Click OK. The filter symbol is displayed on the Item Master title bar.

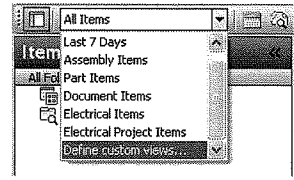


**NOTE:** If the Item Master list is not displaying items you expect to see, check the filter settings and make sure it is displaying the desired content.

## Procedure: Saving Custom Views

The following steps describe how to save custom views.

1. On the Advanced toolbar, from the Views list, select Define Custom Views.
2. In the Manage Custom Views dialog box, click New.
3. In the Create Custom View dialog box, enter the desired view name. Click OK.



**NOTE:** If a custom filter already exists (the filter icon is displayed on the Item Master title bar), then you may not want to edit the filter again. Skip the next four steps.

4. Click Modify.
5. In the Customize View dialog box, click Custom Filters.
6. In the Customize View dialog box, add the filter criteria.

- Click OK to exit the Custom Filters dialog box. Click Close to exit the Customize View dialog box.
- Click Close to exit the Manage Custom Views dialog box.

### Procedure: Managing Custom Views

The following steps describe how to manage custom views.

- On the Advanced toolbar, from the Views list, select Define Custom Views.
- In the Manage Custom Views dialog box, select the desired view name.
- Click Modify, Copy, Rename, or Delete, as desired.
- Close all dialog boxes.

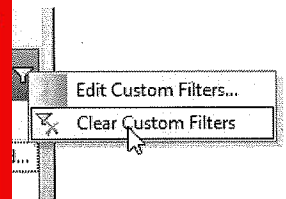


**NOTE:** You cannot rename or delete the default custom views (All Items, Last 7 Days). Although not recommended, it is possible to add additional custom filter criteria to these two custom views

### Procedure: Clearing Custom Filters

The following custom filter

- In the It right-click
- Click Cle



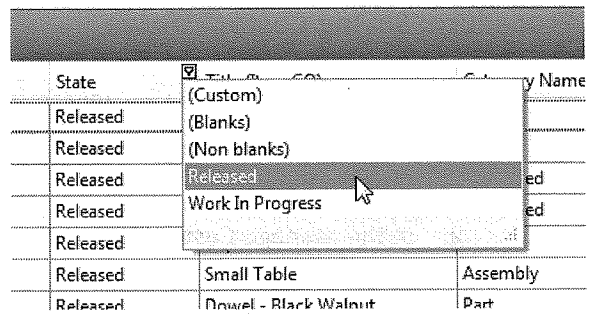
between custom views.

### Procedure: Enabling

The following steps describe how to enable filtering by column.

- On the right side of the column heading, click the Column Filter button.
- Select one of the filter options. The column's values are listed, and you can filter based on these values.

If you select (Custom), you are prompted to set up a custom auto-filter for that column.



# How to Customize Column Display in the Item Master

Columns in the Item Master list represent item properties. Many item properties exist, and you can filter the number of columns (properties) displayed in the list.

In this procedure, you customize the Item Master view by working with the list columns.

## Procedure: Removing Columns in the Item Master

The following step describes how to remove a column in the list.

1. In the Item Master list, right-click the column header you wish to remove.
2. Select Remove This Column.

## Procedure: Adding, Removing, and Rearranging Columns in the Item Master

The following steps describe how to add, remove, and reorder columns.

1. In the Item Master list, right-click a column header in the Item Master. Select Customize View.
2. In the Custom View dialog box, click the column header you want to add, remove, or rearrange.
3. In the Custom View dialog box, click the column header you want to add, remove, or rearrange.
4. Customize the view.



If you rearrange column headers to

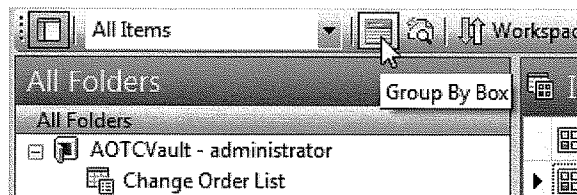
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column headers to

## Procedure: Group Items

The following steps describe how to group items.

1. On the Advanced View toolbar, click the Group By Box icon.



2. In Item Master, drag a column header to the location indicated. The items in the list are automatically listed in groups based on the column header value.

In the following illustration, the items are grouped by state.

State	Number	Revision	Title (Item,CO)	Category Name	Units
State Released					
	100022	A	ICU Button Paint	Purchased	Milliliter
	100021	A	ICU O Ring Lubricant	Purchased	Milliliter
	100013	A	Top	Part	Each
	100014	A	Small Table	Assembly	Each
	100015	A	Dowel - Black Walnut	Part	Each
	100016	A	Leg - Tapered	Part	Each
	100017	A	Side Assembly	Assembly	Each
	100018	A	Rail - Short	Part	Each
	100019	A	Long Rail	Part	Each
	100028	A.1	ICURBUTN	Part	Each
	100024	A	ICULBUTN	Part	Each
State Work In Progress					
	100020	A	ICUVALVE.ipt	Part	Each
	100030	A	ICUVALVEASSY.iam	Assembly	Each
	100029	A	ICUORING.ipt	Part	Each
	100027	A	ICUENDCP.ipt	Part	Each
	100026	A	ICUSPRNG.ipt	Part	Each
	100025	A	ICUHOUSG.ipt	Part	Each
	100023	A	ICU Valve Main Assembly.iam	Assembly	Each



Grouping by column header value can be useful when you work on a number of projects:

- Add a project name property to each item in the Item Master.
- Customize the view to show the Item Project field, and then group the items by this field.

### Procedure: Turn Off the Group By Box Display

The following steps

1. On the Advance
2. Drag the colum
3. On the Advanc

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# How to Find Items

In this procedure, you find items by using the item number, using shortcuts, and searching for items.

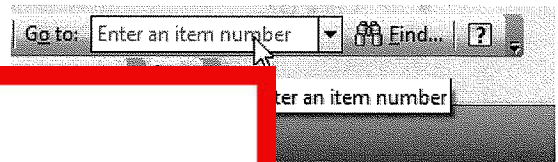
## Search Tips

- Use Go To to go directly to an item.
- Use My Shortcuts to go to items.
- Search for items using Find.

## Procedure: Going to a Specific Item by Item Number

The following steps describe how to go to a specific item by item number.

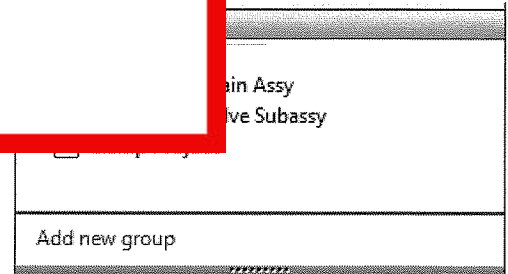
1. On the t
2. Enter an



## Procedure: Creating Shortcuts in the Item Master

The following shortcuts to

1. In the Item Master window
2. Under My Shortcuts, you can also add new groups (folders) to organize the shortcuts.
3. To go to an item, click the item shortcut.



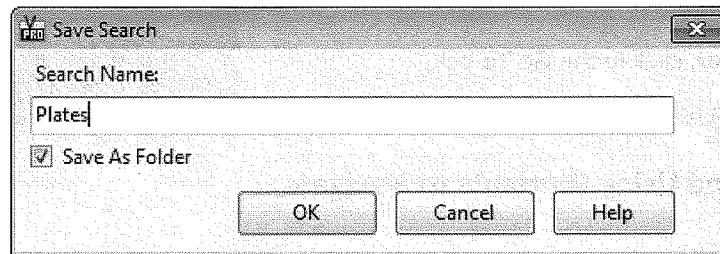
## Procedure: Searching Items

The following steps describe how to search for an item or items, and optionally, how to save the search.

1. In the Search box, enter the search text.



2. Click Search. The items containing the search string are displayed.
3. To save the search, do the following:
  - On the Search bar, click Search Options.
  - Click Save Search.
  - Enter a search name.
  - Click OK.

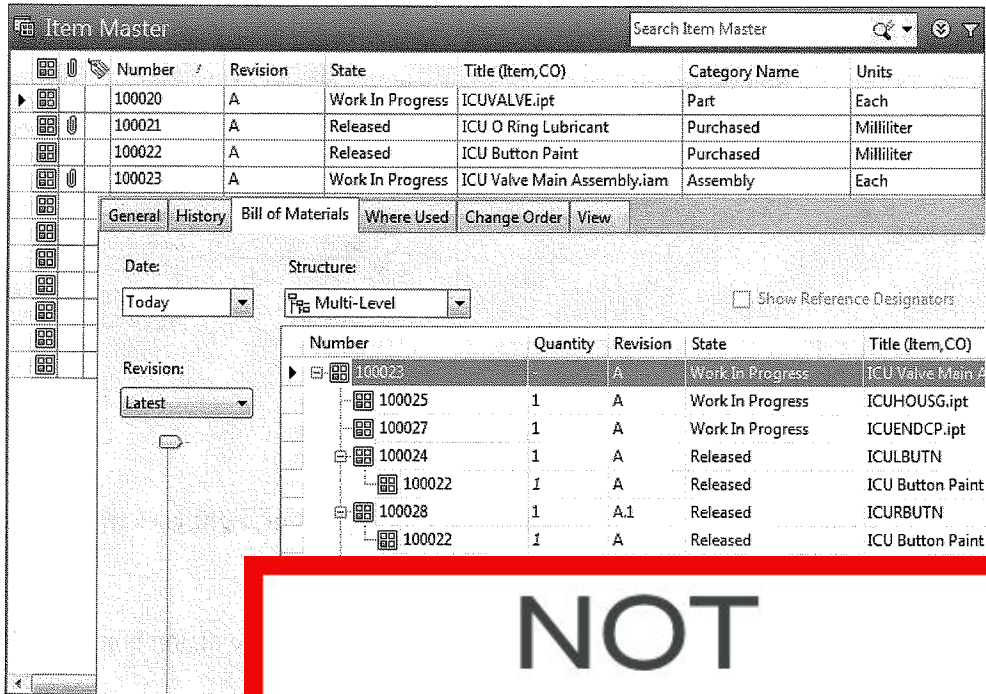


In the navigation pane, under My Search Folders, the saved search is displayed.

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# Exercise 1: Work with Items

In this exercise, you will create shortcuts and a saved search for the project. You will also learn how to link the ICU Button Paint item to the ICU buttons, how to delete items, and how to export the Item Master view.



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## Create Shortcuts

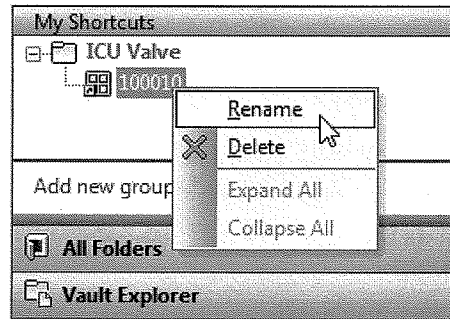
1. Start Autodesk Vault Professional and enter the following information:

- User Name: usera
- Password: vault
- Database: AOTCVault

2. Under My Shortcuts, click Add New Group.

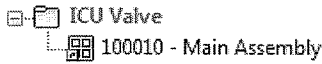
3. Enter ICU Valve. Press ENTER.

4. Right-click the ICU Valve Main Assembly.iam item. Click Rename.



7. Enter - Main Assembly after the item number.

8. Press ENTER.



9. On the standard toolbar, click Find.

10. On the Basic tab, for Search Text, enter \*BUTN. Press ENTER.

11. Click File menu > Save Search.

12. In the Save Search dialog box, for Search Name, enter Buttons. Click OK.

The saved search is displayed under My Search Folders.

13. Close the Find dialog box.

9. Click Save and Close. Repeat the previous steps to link the ICU Button Paint item to the Left button (ICULBUTN.ipt) item.

10. In the ICU Valve shortcut group, click the shortcut to the Main Assembly.

11. In the preview pane, click the Bill of Materials tab. Verify that the ICU Button Paint item is listed twice, under the ICU buttons.

Number	Quantity	Title (Item,CO)
100036		ICU Valve Main Assembly.iam
100038	1	ICUHOUSG.ipt
100040	1	ICUENDCP.ipt
100037	1	ICULBUTN
100035	1	ICU Button Paint
100041	1	ICURBUTN
100035	1	ICU Button Paint
100043	2	ICUVALVEASSY.iam
100033	1	ICUVALVE.ipt
100042	3	ICUORING.ipt
100039	1	ICUSPRNG.ipt
100034	1	ICU O Ring Lubricant

### Link Items

1. Under All Folders, right-click Item Master.

2. Click New Item.

3. In the Edit Item dialog box, do the following:

- For Category, select Purchased Item
- For Item Title, enter ICU
- For Item Description, enter
- Set Units to Milliliter.
- Click Save and Close.

4. Under My Search Folders, click Buttons.

5. Double-click the ICURBUTN item.

6. Click the Bill of Materials tab.

7. Right-click the row. Click Edit Item > Add New Row.

### Delete Items



Number	Quantity	Revision	State
100035		B	Released



NOTE: You can delete an item only if its lifecycle state is set to Obsolete.

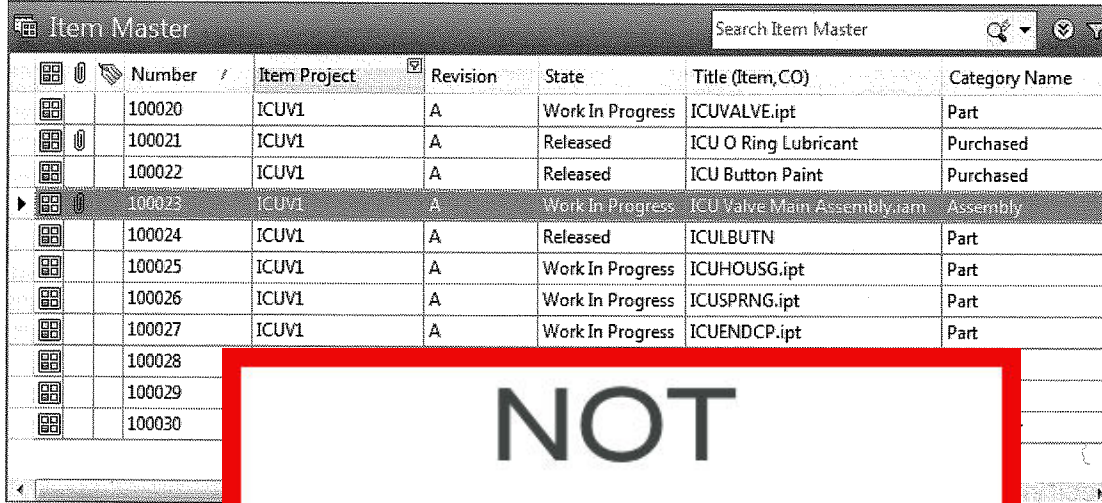
8. In the Find dialog box, click the Basic tab if it is not selected already. Do the following:

- Enter Paint as the search text.
- Click Find Now.
- Select the row displayed.
- Click OK.
- The ICU Button Paint item is linked to the ICURBUTN.ipt item.

# Lesson 3: Item Properties

## Overview

In this lesson, you will learn how to use item properties to search for and sort items, organize items, and filter the Item Master list. You use item properties to manage items.



Number	Item Project	Revision	State	Title (Item,CO)	Category Name
100020	ICUV1	A	Work In Progress	ICUVALVE.ipt	Part
100021	ICUV1	A	Released	ICU O Ring Lubricant	Purchased
100022	ICUV1	A	Released	ICU Button Paint	Purchased
100023	ICUV1	A	Work In Progress	ICU Valve Main Assembly.ipt	Assembly
100024	ICUV1	A	Released	ICULBUTN	Part
100025	ICUV1	A	Work In Progress	ICUHOUSG.ipt	Part
100026	ICUV1	A	Work In Progress	ICUSPRNG.ipt	Part
100027	ICUV1	A	Work In Progress	ICUENDCP.ipt	Part
100028					
100029					
100030					

## Objectives

After completing this lesson, you will be able to:

- Describe default item properties
- Describe the Item Master list

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## Default Item Properties

By default, each item has several properties that store and manage its number, revision lifecycle, and other associated data.

## Definition of Default Item Properties

Items have properties that apply to all items by default. These are the system properties and are similar to those for Vault, Vault Workgroup and Vault Collaboration. In some cases the properties are marked (Item, CO) to denote they are unique to items and change orders.

The following list describes the main properties that are displayed on the General tab.

Property Name	Description	Comment or Example
Number	Unique item identifier	Normally a numerical sequence
Category	Categorization of the item.	"Part," "assembly," or "purchased"
Title	Brief description of item or change order	Up to 128 characters
Description	Secondary description of item or change order	Up to 128 characters
Units	Quantity	Select from a list
Lifecycle State	Item lifecycle state	"Work in Progress" or "Released"
Revision	Item revision	String or character
Last Updated By		by system
Last Updated		by system

**Example of Specifying**

When an item is created, the user specifies the item number. The new item has a unique item number (e.g., 100010) or as close to the original item number after it is changed. The user can specify how much (volume, weight, etc.) of the item is used in the product.



sequence (Part Number) to change the item number to distinguish the item from other items for consumables it

The final set of properties is controlled by the system. The Lifecycle State designates the position in the product development process. You can change the lifecycle state to Released, signifying it is ready for production, or Work In Progress, denoting that it is being edited. As designs evolve they are given Revisions to denote major milestones in a product development lifecycle. For example, a part may be released to manufacturing at Revision A but later be modified based on warranty reports to Revision B to correct a defect noted by customers. The updates are tagged with the user that last updated the item (Last Updated By) and the time the update was done (Last Updated).

# User Defined Item Properties

In addition to the system properties, there are a number of pre-defined user defined properties that are assigned to Items as they are created. These are based on common file properties associated with the different authoring applications. For example, the property Material – designating what property the item is made of- can be set from a file property in Autodesk Inventor.

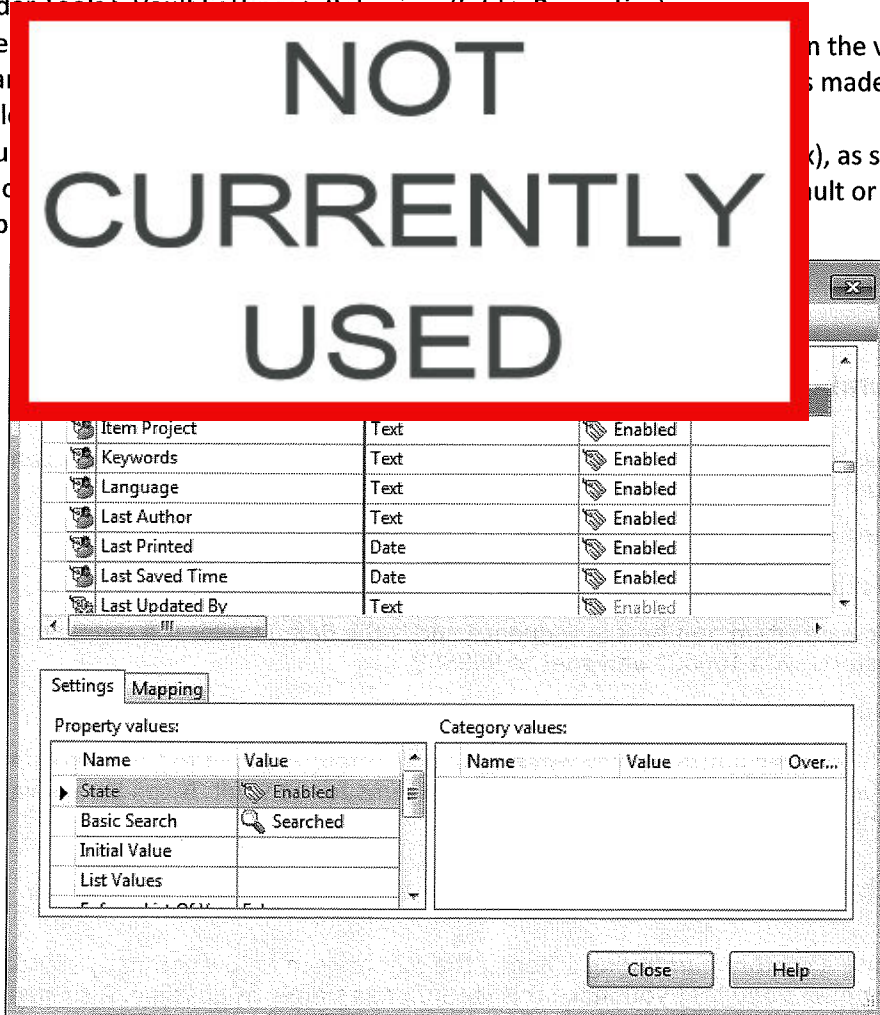
Additionally, you may want to specify some properties that are unique to your company. For example, you may have different Business Units that produce designs that you may want to identify or search on.

## Best Practices for Working with User-Defined Properties

The administrator can define additional item properties to add company-specific properties to items. You can use these properties to help arrange or find items in the vault.

It is recommended that:

- You attach user-defined properties to items or remove them from items in the vault. Properties are created and managed by the administrator using the Property Definitions dialog ( found under Tools > Vault > Settings > Properties > (k) > Property Definitions )
- The administrator should use the Property Definitions dialog to define properties in the vault if possible. For example, the property Material – designating what property the item is made of- can be set from a file property in Autodesk Inventor.
- You should use the Property Definitions dialog to define properties in the vault or in another application (e.g. Microsoft Excel), as shown in the screenshot below.



## Example of Using a User-Defined Item Property

You create an Item Project property value for a predefined Item user-defined property so that you can sort by that property or use it to search for items.

The screenshot shows a software window with several tabs: General, History, Bill of Materials, Where Used, Change Order, and View. The 'General' tab is active. It displays the following information:

- Number: 100036
- Category: Assembly
- Title: ICU Valve Main Asser
- Description:
- Units: Each
- Associated files table:

File Name	Version
ICU Valve R...	1
ICU Valve ...	1
- Properties table:

Name	Value
Item Project	ICUV1
- Lifecycle State: Work In Progress
- Revision: A
- Last Updated By: Administrator
- Last Updated: 4/15/2010 5:00 PM

You can also ask the administrator to map the user-defined item property to properties in the vault files.

## Item Numbering Schemes

All items have unique item numbers for operations. These item numbers are managed by the administrator.

### Guidelines for Item Numbers

There are two predefined numbering schemes. You can also use customized numbering.

The two predefined schemes are:

- Sequential numbering

This scheme creates item numbers using a sequential numbering scheme that starts with 100001 and goes to 999999.

- Mapped numbering

This scheme is selected automatically when a file property is mapped to the item number. You can choose the numbering scheme when you add new items to the vault. It can be any value up to 50 characters long.

### Custom Numbering Schemes

If you choose to use a custom numbering scheme, the scheme can follow company standards or use any other identifier. It is recommended that you make this identifier as simple as possible. A six-digit numbering scheme starting with 100000 is ideal.

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## Example of Using Item Numbers

The following illustration shows the use of a custom sequential scheme. Notice that parts, assemblies, and purchased items are numbered from 100033 to 100043.

Number	Revision	State	Title (Item, CO)	Category Name	Units
100033	A	Work In Progress	ICUVALVE.ipt	Part	Each
100034	B	Released	ICU O Ring Lubricant	Purchased	Milliliter
100035	B	Released	ICU Button Paint	Purchased	Milliliter
100036	A	Work In Progress	ICU Valve Main Assembly.iam	Assembly	Each
100037	B	Released	ICULBUTN	Part	Each
100038	A	Released	ICUHOUSG.ipt	Part	Each
100039	A	Released	ICUSPRNG.ipt	Part	Each
100040	A	Released	ICUENDCP.ipt	Part	Each
100041	C	Work In Progress	ICURBUTN	Part	Each
100042	A	Work In Progress	ICUORING.ipt	Part	Each
100043	A	Work In Progress	ICUVALVEASSY.iam	Assembly	Each

Numbering schemes can include such things as company initials, a type sequence, a numeric sequence, and a manufacturing process code, as in BRD-PRT-10051-P. However, a scheme like this might be needlessly complex and require too much work to set up and use.

It is recommended that you start the item numbering with a digit other than zero since some spreadsheets eliminate the leading zeros when data is imported.

For example, the following parts, assemblies, and purchased items are numbered with leading zeros.

Number	Revision	State	Title (Item, CO)	Category Name	Units
000012	A	Work In Progress	ICURBUTN	Part	Each
000013	C	Work In Progress	ICURBUTN	Part	Each
000014	C	Work In Progress	ICURBUTN	Part	Each
000015	A	Work In Progress	ICURBUTN	Part	Each
000016	C	Work In Progress	ICURBUTN	Part	Each
000017	B	Work In Progress	ICURBUTN	Part	Each
000018	B	Work In Progress	ICURBUTN	Part	Each
000019	B	Work In Progress	ICURBUTN	Part	Each
000020	C	Work In Progress	ICURBUTN	Part	Each
000021	A	Work In Progress	ICUORING.ipt	Part	Each
000022	A	Work In Progress	ICUVALVEASSY.iam	Assembly	Each

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This is poor practice. Many software programs such as spreadsheets import the item numbers without the leading zeros, so item number "000020" appears as "20", which may be undesirable when creating a report.

# Item Lifecycle States

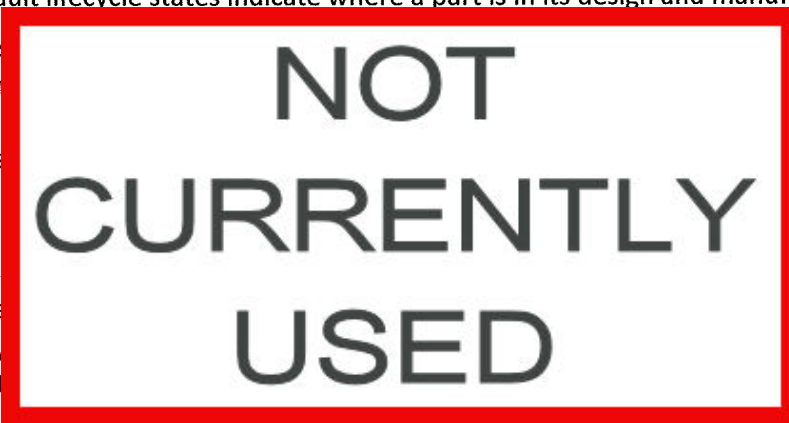
By setting lifecycle states for items in the Item Master, you can manage design data as it changes. For example, Items in the Released state cannot be edited. This restriction prevents any changes while the current revision is being manufactured.

Item Master							
Search Item Master							
Number	Revision	State	Title (Item,CO)	Category Name	Units		
100033	A	Work In Progress	ICUVALVE.ipt	Part	Each		
100034	B	Released	ICU O Ring Lubricant	Purchased	Milliliter		
100035	B	Released	ICU Button Paint	Purchased	Milliliter		
100036	A	Work In Progress	ICU Valve Main Assembly.iam	Assembly	Each		
100037	B	Released	ICULBUTN	Part	Each		
100038	A	Released	ICUHOUSG.ipt	Part	Each		
100039	A	Released	ICUSPRNG.ipt	Part	Each		
100040	A	Released	ICUENDCP.ipt	Part	Each		
100041	C	Work In Progress	ICURBUTN	Part	Each		
100042	A	Work In Progress	ICUORING.ipt	Part	Each		
100043	A	Work In Progress	ICUVALVEASSY.iam	Assembly	Each		

## Lifecycle States Definitions

The following four default lifecycle states indicate where a part is in its design and manufacturing cycle:

- Work in Progress
- In Review – Item
- Released – Item
- Obsolete – Item



This built-in scheme pr designs that are obsole



NOTE: that th processes. In t and the state

ctured.  
indicates  
may be  
ddition,  
business  
Manufactured

Item Master							
Search Item Master							
Number	Revision	State	Title (Item,CO)	Category Name	Units		
000012	B	For Review	ICUVALVE.ipt	Part	Each		
000013	C	Manufactured	ICU O Ring Lubricant	Purchased	Milliliter		
000014	C	Manufactured	ICU Button Paint	Purchased	Milliliter		
000015	B	Work In Progress	ICU Valve Main Assembly.iam	Assembly	Each		
000016	D	For Review	ICULBUTN	Part	Each		
000017	B	Manufactured	ICUHOUSG.ipt	Part	Each		
000018	B	Manufactured	ICUSPRNG.ipt	Part	Each		
000019	B	Manufactured	ICUENDCP.ipt	Part	Each		
000020	D	For Review	ICURBUTN	Part	Each		
000021	A	Manufactured	ICUORING.ipt	Part	Each		
000022	A	Manufactured	ICUVALVEASSY.iam	Assembly	Each		

# Item Revisions

Revisions reflect changes you make to design data. Typically, Vault Professional manages revisions based on the lifecycle state of an item and the lifecycle rules. For example, if you change a released item's lifecycle state to Work in Progress, the revision automatically bumps to the next revision. You can also manually change an item's revision; however, this is not recommended in most situations.

## Revision Schemes

The current revision of an item is indicated using one of three default types:

- **Alphabetical Format**  
Primary revisions are marked with consecutive letters, such as A, B, C, and D.
- **Default ASME Y14.35M Format**  
Similar to the alphabetical format, but letters that might be confused with others have been removed (such as I, O, Q, S, and Z).
- **Default Numeric Format**  
A simple consecutive numbering system.

If the supplied revision scheme is not suitable, you can define new revision behaviors (tab) and

the administrator can define new revision behaviors (tab) and default settings ->




## Example of Revisions

When working on a design, you can revise the item several times.

The following illustrates a revision (Revision A), and the

When you revise the item, you can revise the item each time.

material

General					
Number					
Current Revision: D					
Thumbnail	Number	Revision ▾	State	Title (Item,CO)	Units
	100028	A.1	Manufactured	ICURBUTN	Each
	100028	A	Work In Progress	ICURBUTN	Each
	100028	-	Work In Progress	ICURBUTN.ipt	Each

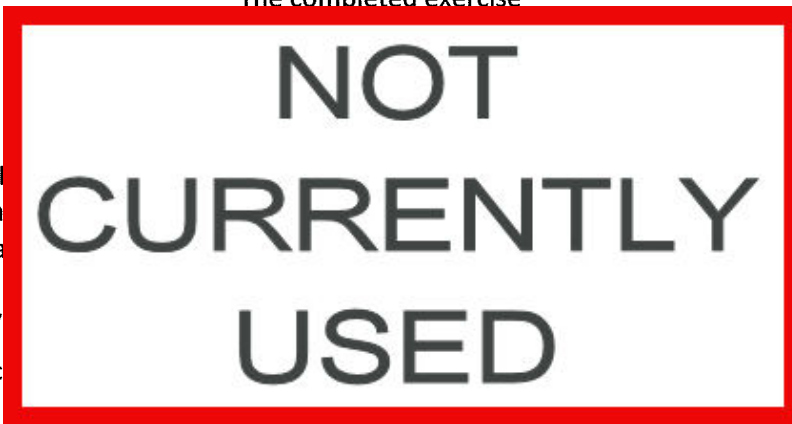
**NOT CURRENTLY USED**

# Exercise 1: Work with Item Properties

In this exercise, you add a new item with user-defined properties, link the item to the ICU valve assembly, display the user-defined property in the item master view, add a customized view for the current project, change the item project property, group the item master list by project, customize the view by box, and renumber items.

Num...	R...	Lifecycle State	Title	Descri...	Type	Units	Item Project
100020	-	Work In Progress	ICUORING.ipt		Part	Each	ICUV1
100021	-	Work In Progress	ICUVALVEASSY.iam		Assembly	Each	ICUV1
100022	-	Work In Progress	ICU Valve Main Assembly.iam		Assembly	Each	ICUV1
100023	-	Work In Progress	ICU O-Ring Lubricant	Grease f...	Purchased	Milliter	ICUV1
100024	-	Work In Progress	ICUBUTN.ipt		Part	Each	ICUV1
100025	-	Work In Progress	ICUVALVE.ipt		Part	Each	ICUV1
100026	-	Work In Progress	ICUHOUSG.ipt		Part	Each	ICUV1
100027	-	Work In Progress	ICU Button Paint	Paint	Purchased	Milliter	ICUV1
100028	-	Work In Progress	ICUSPRNG.ipt		Part	Each	ICUV1
100029	-	Work In Progress	ICUENDCP.ipt		Part	Each	ICUV1
100030	-	Work In Progress	ICURBUTN.ipt		Part	Each	ICUV1

The completed exercise



## Add a New Item

1. Start Autodesk Vault with the following information:

- User Name: usera
- Password: vault
- Database: AOTCV

2. Under All Folders, click for the ICU valve.

- Right-click Item Master.
- Click New Item.

3. In the Edit Item dialog box:

- For Category, select Purchased.
- For Item Title, enter ICU O-Ring Lubricant.
- For Item Description, enter Grease for subassembly

Number: 000013  
 Category: Purchased  
 Title: ICU O Ring Lubricant  
 Description: Grease for subassembly  
 Units: Milliliter

- For Units, select Milliliter.

Item Project user-defined step 7.

click under name. Click Properties.

Properties dialog box:

7. Under Properties, click the value next to Item Project. Enter ICUV1.

Name	Value
Item Project	ICUV1

8. On the standard toolbar, click Attachments.
9. In the Attachments dialog box, click Attach.
10. Navigate to the Designs\ICU Valve\Documents folder.

- Select ICU Valve Specification Sheet - Grease.doc.
- Click Open.
- Click OK.

11. On the standard toolbar, click Save and Close.

The new item is displayed in the Item Master list.

## Link Item to the Assembly

1. Double-click the ICUVALVEASSY.iam item to edit it.
2. Click the Bill of Materials tab.
3. Right-click the top row. Click Edit Bill of Material > Add New Row.
4. In the Find dialog box, click the Basic tab if it is not selected already.
5. Enter Grease as the search text. Click Find Now.
6. Select the row displayed. Click OK.

The ICU O-Ring Lubricant item is linked to the ICUVALVEASSY.iam item.

Number	Quantity	Title (Item,CO)
000022		ICUVALVEASSY.iam
000012	1	ICUVALVE.ipt
000021	3	ICUORING.ipt
000018	1	ICUSPRNG.ipt
000013	1	

7. Click Save and Close.

## Display the User-Defined

1. On the Advanced toolbar, select Listing by Project from the Custom Views list.
2. On the Advanced toolbar, select Listing by Project from the Custom Views list.
3. In the Manage Custom Views dialog box, with Listing by Project selected, click Copy.
4. In the Create Custom View dialog box, for View Name, enter Listing by Project. Click OK.
5. Select Listing by Project. Click Modify.
6. In the Customize View dialog box, click Fields.
7. In the Customize Fields dialog box, for Select Available Fields From, select Items from the list.
8. For Available Fields, select Item Project.
9. Click Add to add Item Project to the list on the right.

Show these fields in this order:

Item Icon
Number of Attachments
Property Compliance
Number
Title (Item,CO)
Item Project
Revision
Description (Item,CO)
Category Name

10. Click OK.
11. Close the remaining dialog boxes.

12. The Item Master list now shows the Item Project column.



**NOTE:** The new customized view you just created lists all items in the Item Master. Because this list can be very long, you create another custom view that is based on it, but that adds a custom filter to search for "ICUV1" in the Item Project property.

## Add a Customized View

1. On the Advanced toolbar, select Define Custom Views from the Custom Views list.
2. Custom Views from the Custom Views list.
3. In the Manage Custom Views dialog box, with Listing by Project selected, click Copy.
4. In the Create Custom View dialog box, for View Name, enter ICU Valve 1 Project. Click OK.
5. With ICU Valve 1 Project selected, click Modify.
6. Click Custom Filters.
7. In the Custom Filters dialog box, do the following:

**NOT CURRENTLY USED**

In Project. contains. Custom Filters dialog box. boxes. select ICU Valve 1 Project. Only one item, the ICU, is displayed because items have ICUV1 in the Item Project property.

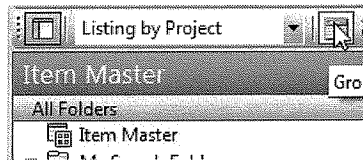
## Change Item Project Property

1. On the Advanced toolbar, select Listing by Project from the Custom Views list.
2. In the Item Master, double-click the ICUVALVE.ipt item.
3. Under Properties, click the value next to Item Project. Do the following:
  - Enter ICUV1.
  - Click Save and Close.
4. Repeat the previous three steps for all of the items belonging to the ICU valve.
5. Under All Folders, expand Vault Explorer, Designs, Table.
6. In the Table list, right-click Small Table.iam. Select Assign Item.

7. In the Assign Item Wizard dialog box, do the following:
  - Click Next.
  - Click Finish.
  - Click Close.
8. Under All Folders, click Item Master.
9. Edit each of the seven items belonging to the Table project, and enter Table1 in the Item Project property.
10. On the Advanced toolbar, for Custom Views, select ICU Valve 1 Project from the list. Only the ICUV1 project items are displayed.
11. For practice, add a new custom view, called Table 1 Project, which is based on the ICU Valve1 project, by searching for the Table1 Item project using the custom filters.

### Group the Listing by Project

1. On the Advanced toolbar, select Listing by Project from the Custom Views list.
2. In the Item Master, right-click the Item Project header. Select Group by This Field.
3. Click View menu > Refresh.
4. In the Advanced toolbar, click Group by Project off. The listed items are grouped by project. You can expand or collapse the project you work.



**NOTE:** The Group by Box appear as expected for items that are used in more than one project. For example, an item that is used in the Table1 and ICUV1 projects might have an Item Project property of "ICUV1, Table1." This shared item lists correctly using the ICU Valve 1 Project custom view and the Table 1 custom view, but does not list correctly under the Group by Box Listing by Project View.

### Renumber Items

1. On the Advanced toolbar, from the Custom Views list, select ICU Valve 1 Project.  
 Make a note of which items are assemblies and which are purchased. In this case, items 100003 and 100010 are assemblies, and items 100011 and

100012 are purchased. (Your item numbers may be different.)

2. In Item Master, do the following:
  - Select the first item in the list.
  - Press SHIFT and select the last item in the list.
  - Right-click anywhere over the selected items.
  - Click Change Item Number.
3. In the Change Item Number dialog box, from the Select a Numbering Scheme list, select AOTC-Complex.
4. In the Change Item Number dialog box, do the following:
  - For Type, select 200 to change the assembly item numbers.
  - For Type, select 300 to change the purchased item numbers.
5. Click OK. The new item numbering scheme is displayed in the Item Master.

Old Item Number	New Item Number	Type
100004	100-#####	100
100003	200-#####	200
100010	200-#####	200
100011	300-#####	300
100009	100-#####	100
100002	100-#####	100

**NOT  
CURRENTLY  
USED**



Custom Views list.  
Custom Views

- Press SHIFT and select the last item in the list.
- Right-click anywhere over the selected items.
- Click Change Item Number.
9. In the Change Item Number dialog box, from the Select a Numbering Scheme list, select AOTC-Numeric. Click OK.

Notice that the item numbers differ from the ones at the start of the exercise. To avoid confusion, old item numbers are not reused.

# Lesson 4: Exporting Items

## Overview

Other data management and analysis applications are often used along with Autodesk Vault Professional. You can export Vault Professional item properties in a range of file formats to provide engineering and product data to other applications.

## Objectives

After completing this lesson, you will be able to:

- Describe how Vault Professional integrates with ERP systems.
- Export item data for use in other applications.

## Items and ERP Systems

Vault Professional i  
item data from Vau  
that are often man

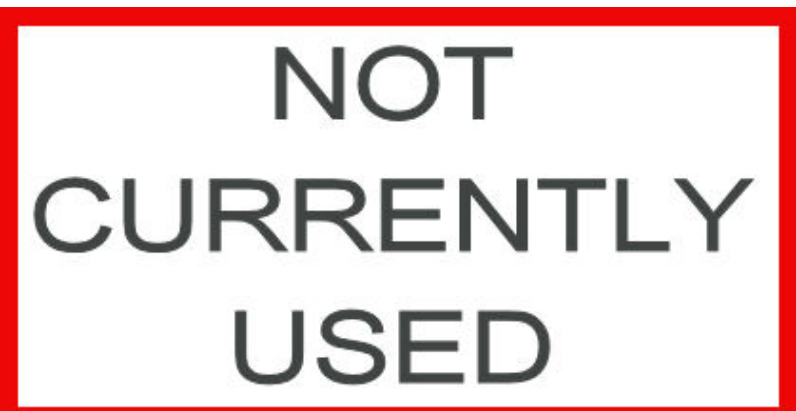
. You can use  
ring operations

### ERP Systems

An enterprise resou  
inventory, suppliers  
modules integrated  
contain design and  
design. In smaller c

hasing,  
mber of software  
professional  
agement of your  
e limited to

Microsoft Excel spreadsheets or in-house database applications. You can export a BOM from any item (or export selected properties directly from an item) in formats accepted by a range of applications. These file formats include text, comma- and tab-delimited, XML, and Microsoft Excel spreadsheet files.



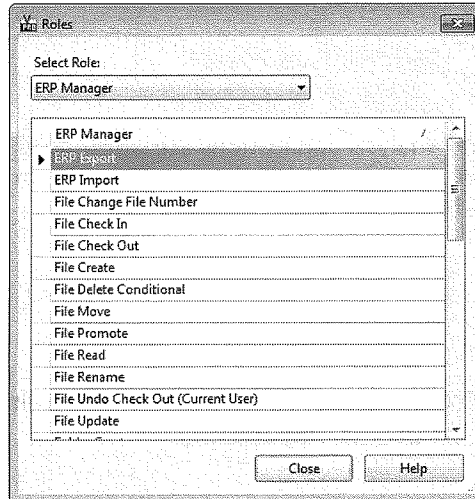
	A	B	C	
1	Level	Number	Title	Quo
2	1	100002	Hitch Assembly	
3	1.1	100012	ISO 8678 M12 x 25	
4	1.2	100008	Hex Thick Nut - Inch 3/4	
5	1.3	100007	Mounting Weldment.iam	
6	1.3.1	100017	end_plate_LH.ipt	
7	1.3.2	100015	DrawBarMountTopPlate.ip	
8	1.3.3	100013	ANSI AISC 2x2x 1/4 - 12	47

Exported item data in Microsoft Excel

## ERP Systems and Vault Professional

You can export to, and import from ERP systems through a neutral file format, such as CSV.

To import or export items, you must be logged in to Vault Professional as an ERP Manager, as shown in the following illustration.



### Exporting Items

You can export

ats.

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CURRENTLY  
USED**

### Procedure: Exporting Items

The following steps describe how to export items to a comma-delimited file. You can use the same Export Items wizard to export items to other file formats.

4. Log in to Autodesk Vault Professional as a user assigned the ERP Manager role.
5. Make sure the items to be exported have a Released or Obsolete lifecycle state.

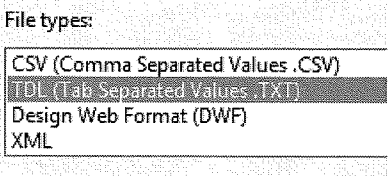


# NOT CURRENTLY USED

one of the items. Click Export Items.  
Items are automatically selected for

DrawBarMountTopPlate.ipt:100015

7. Click Next.
8. Under Specify Target, select Other. Click Next.
9. On the Specify File pane, under File Types, click CSV (Comma Separated Values .CSV).



10. Under BOM Indicator, click Level Numbers.  
The exported file includes a numeric indicator of the hierarchical position of the file in the item structure. For example, if the first subassembly was assigned Level 1, the first child part in the subassembly is assigned Level 1.1, the second part 1.2, and so on.



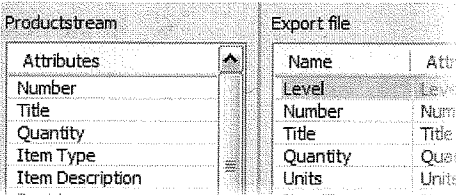
**NOTE:** If you select Parent Item for the BOM indicator, each exported item, other than the top-level items, includes the item number of its parent item.

	A	B	C	
1	Level	Number	Title	Quantity
2	1	100002	Hitch Assembly	
3	1.1	100012	ISO 8678 M12 x 25	
4	1.2	100008	Hex Thick Nut - Inch 3/4 -	
5	1.3	100007	Mounting Weldment.iam	
6	1.3.1	100017	end_plate LH.ipt	
7	1.3.2	100015	DrawBarMountTopPlate.ipt	
8	1.3.3	100013	ANSI AISC 2x2x 1/4 - 120 47	

11. Click Browse. Browse to your export folder. Enter the file name. Click Save.
12. Click Next. On the Specify Attributes pane, drag field names from the Attributes list to the Export File list. To remove a field from the Export File list, drag it outside the Export list. Click Clear Mapping to remove all fields except Level.



**NOTE:** If you select Level Numbers as the BOM indicator, you must include the Number attribute in the Export File list.



13. Click Export. An export summary is displayed. On the Summary pane, you can print the report or distribute it by email.
14. Click Finish. The exported file is available for import into an ERP system or other software. An example CSV export file is shown in the following illustration.

```

Level,Number,Title,Quantity,Units,Released
1,100002,Hitch Assembly,1,Each,Released
1.1,100012,ISO 8678 M12 x 25,4,Each,Released
1.2,100008,Hex Thick Nut - Inch 3/4,1,Each,Released
1.3,100007,Mounting weldment.iam,1,Each,Released
1.3.1,100017,end_plate_LH. ipt,1,Each,Released
1.3.2,100015,DrawBarMountTopPlate. ipt,1,Each,Released
1.3.3,100013,ANSI AISC 2x2x 1/4 - 1,1,Each,Released
1.3.4,100016,end_plate_RH. ipt,1,Each,Released

```

## Exercise 1: Export Items from Vault Professional

In this exercise, you change an assembly and its components to a Released lifecycle state, and then export properties of the items to a tab-delimited text file.

Level	Number	Quantity	Units	Title	Item Type
1	100014	1	Each	Small Table	General
1.1	100017	2	Each	Side Assembly	General
1.1.1	100016	2	Each	Leg - Tapered	General
1.1.2	100018	1	Each	Rail - Short	General
1.1.3	100015	4	Each	Dowel - Black walnut	General
1.2	100019	2	Each	Long Rail	General
1.3	100015	8	Each	Dowel - Black walnut	General
1.4	100013	1	Each	Top	General

The completed exercise

1. Start Autodesk Vault Professional. Log in using the following information:

- User Name: administrator
- Password: leave this blank
- Database: AOTCVault

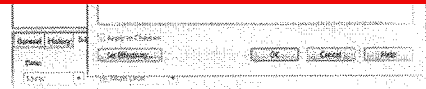


NOTE: To export items, you must be logged in as a user with at least ERP Manager permissions.

2. Under All Folders, click Item-Master to display a list of items in the vault.
3. On the Advanced toolbar, select Assembly Items from the Custom Views list.
4. In the main pane, right-click the Small Table assembly item.



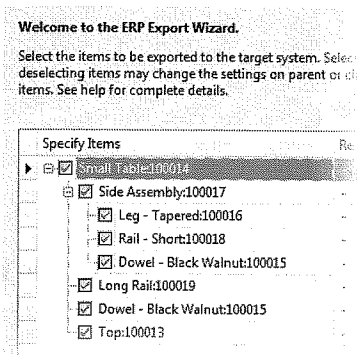
Released.



The lifecycle state of the table assembly and each of its components is set to Released.

6. In the main pane, click the Small Table assembly item.

7. Click File menu > Export Items. All items associated with the table assembly are listed in the Export Wizard dialog box.



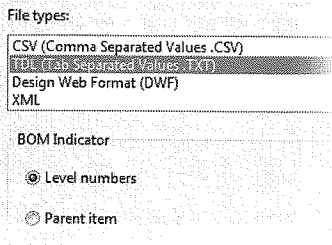
13. Click Export. Click Finish to complete the item export.

Open the file in Notepad and review the data. All the items in the table assembly are listed.

8. In the Export Wizard dialog box, click Next.

9. Click Next to go to the Specify File page. Do the following:

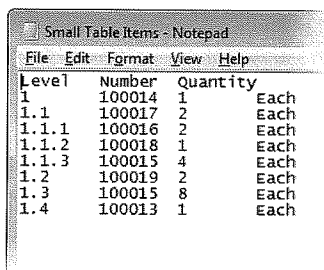
- Under File Types, click TDL (Tab Separated Values .TXT).



- Under BOM Indicator, click Level Numbers.

10. To browse for the file location, do the following:

- Click Browse.
- Browse to the Desktop folder.
- For File Name, enter Small Table Items
- Click Save.



11. In the Export Wizard dialog box, click Next.

12. On the Specify Attributes page, drag the following fields from the Attributes list to the Export file list:

- Number
- Quantity
- Units
- Title (Item, CO)

# Chapter Summary

All Autodesk Vault Professional users must be able to work with items, using the application's various features and functionalities.

You can assign items to CAD files in the vault, or create new items for products not specifically modeled in CAD.

The list of items in Vault Professional can get very large and awkward to handle. By using customized views and filters, you can sort or filter the item list based on item properties to manage the items effectively.

Having completed this chapter, you can:

- Create, modify, and delete items, use filters to view items, and add and remove file attachments.
- Create, modify, and delete custom views, use filters to view items, and find items.
- Work with default item properties and user-defined properties, including item numbers, life cycle states, and revisions.
- Export item data for use in other applications.

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CURRENTLY  
USED**



# Managing Change

Vault Professional provides control over how new designs or design changes are released, eliminating the issues commonly involved with manual processes. Creating a change order allows you to describe the changes to a design and manage the progression of that change order as it is reviewed, approved, or rejected.

## Objectives

After completing this chapter, you will be able to:

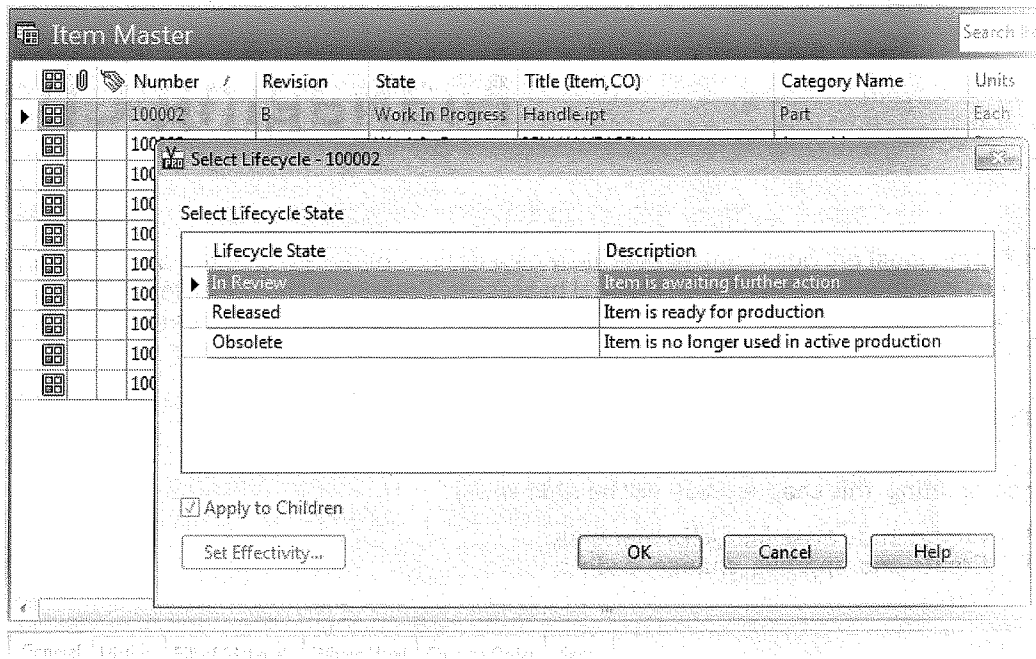
- Create and revise lifecycles manually.
- Create and approve change orders.

# Lesson 1: Revision Control

## Overview

In this lesson, you learn how to use revision control to manually control lifecycle states and how different workflows affect revision control.

In design and manufacturing, a part may go through many design iterations. Lifecycle states control the revisions of a part or assembly within this process.



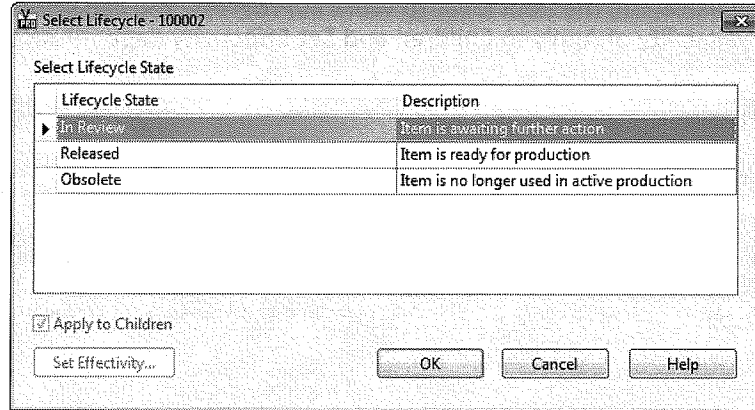
## Objectives

After completing this lesson, you will be able to:

- Define item lifecycle states.
- Control lifecycle states.
- Manually change lifecycle states.

# Item Lifecycle States

To manage design data you must control the various stages from design to manufacturing. To do this, you mark an item using one of four lifecycle states.



## Definition of Lifecycle States

The lifecycle state of an item indicates where it is in the design and manufacturing process. The following table describes the default states:

Lifecycle State	Description
Work in Progress	The item is available for editing. Files associated with the item can be checked out and edited. The item can be updated to the latest file versions. New items are automatically assigned Work in Progress status.
In Review	The item is being reviewed prior to release to production. The item and its associated files cannot be edited or updated.
Released	The item is available for production based on its effectivity start date. The item cannot be edited or updated.
Obsolete	The item is no longer used in production and cannot be updated. Items in the Obsolete state can be deleted.

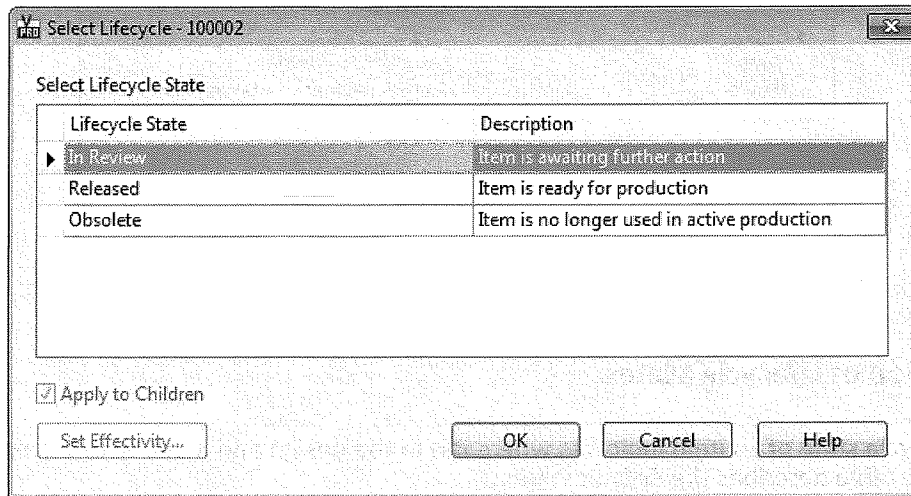


The actual names of the lifecycle states can be changed to reflect those used in your organization. This will be covered in a later lesson.

## How to Manually Change a State

To change a state, right-click the item in the Item Master and select Change State. The Select Lifecycle dialog box displays the states and options available based on the current state of the item.

In the following illustration, the item is set to Work in Progress. You can select In Review, Released, or Obsolete. The availability of Apply to Children and Set Effectivity depends on the selected lifecycle state.



## Example of a Manual State Change

The design team has determined that a part is ready for manufacturing. During the design phase, the part has a Work in Progress lifecycle state. You set the lifecycle state to Released to indicate that the part is ready for manufacturing and distribution.

## Controlling Lifecycle States

You can change lifecycle states manually or they can change as a function of change order workflow. The settings created by the administrator determine the way in which lifecycle states affect revision control.

## Example of a Bump Rule

Although a part has been in service for a period of time, its failure under certain conditions requires that it be modified. Currently, the lifecycle state of the part is set to Released. When you change this state back to Work in Progress, you create a revision.



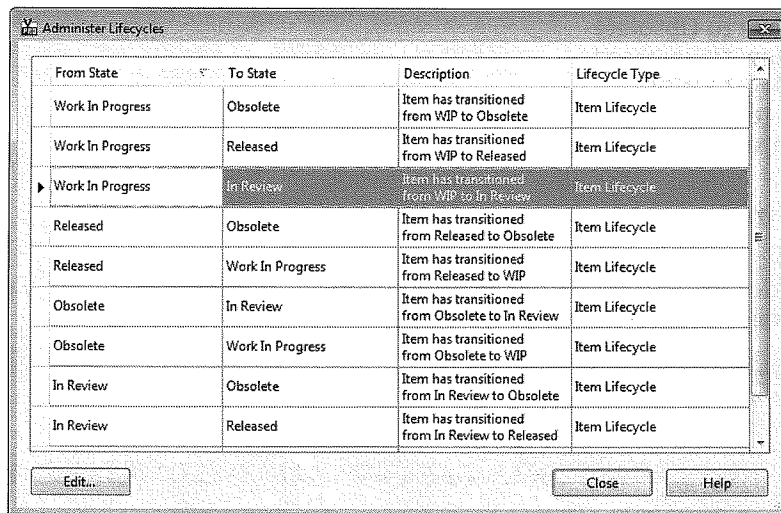
## Procedure: Setting the Bump Rules

The following steps describe how to set the bump rules.

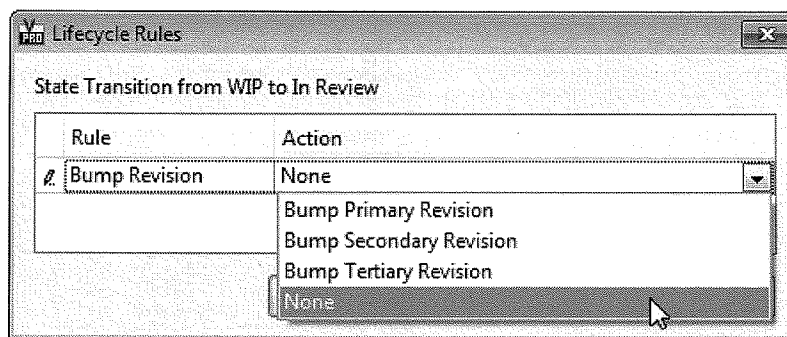


**NOTE:** You must be an administrator to complete the following procedure.

1. Select Tools -> Administration -> Vault Settings. Select the Items tab and under Lifecycles click the Rules buttons to display the Administer Lifecycles dialog.



2. The four columns display the possible transitions of lifecycle states.
3. Select a state and then click Edit.
4. The Lifecycle Rules dialog box is displayed.



5. By default, all transition rules, except Released to WIP, are set to None. To modify a rule, select a new bump revision rule from the Action list. The four available revision sequences are None, Bump Primary Revision, Bump Secondary Revision, and Bump Tertiary Revision.

## Revisions and Lifecycle State

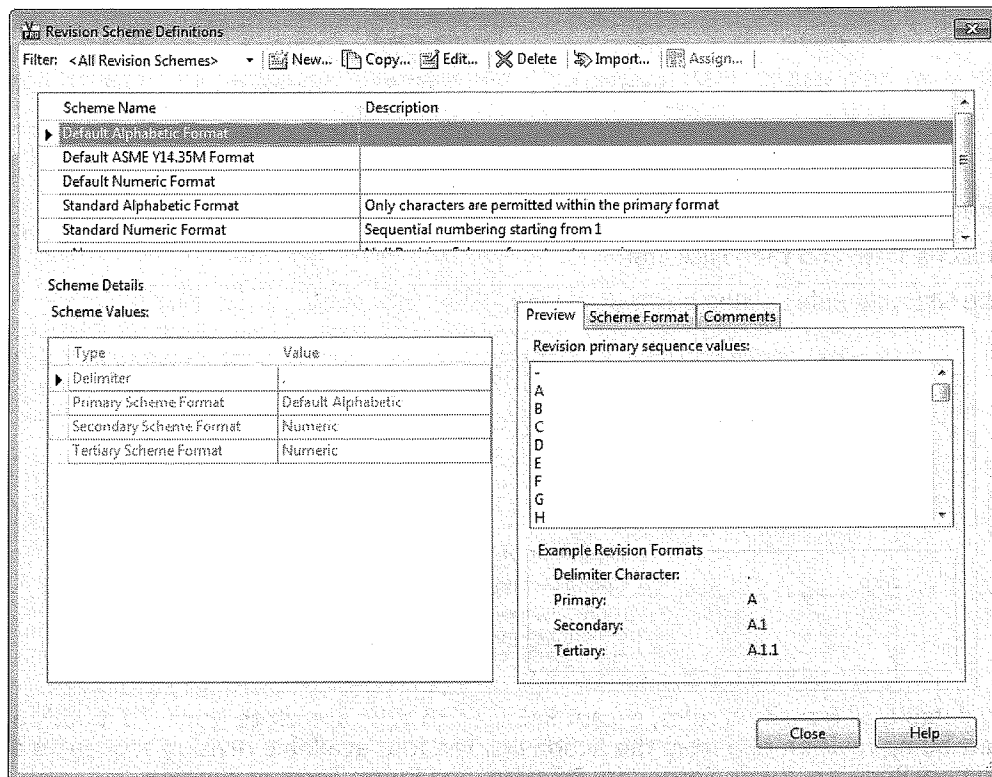
By default, when you change an item's state from Released to WIP, the revision automatically bumps using the primary revision bump action.

The following state changes do not bump the revision status of an item:

- WIP to Obsolete
- WIP to Released
- WIP to In Review
- Released to Obsolete
- In Review to Obsolete
- In Review to Released
- In Review to WIP
- Obsolete to In Review
- Obsolete to WIP

## Revision Formats

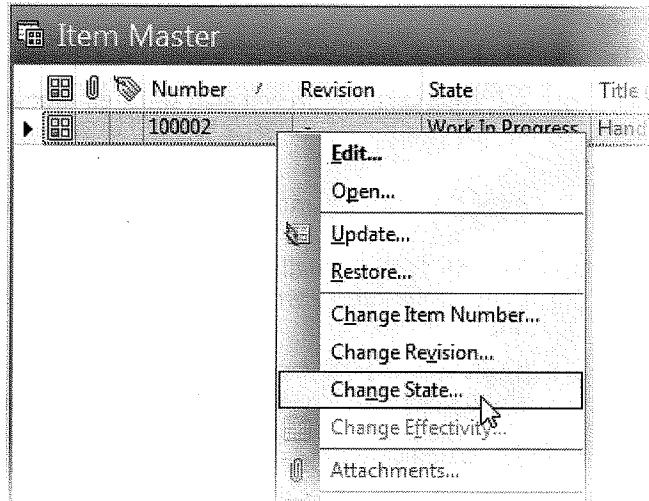
The administrator or creator sets the revision sequence and can either specify one of the formats shown in the following illustration or create a custom revision scheme.



Examples of the revision format are displayed in the Preview tab of the Revision Scheme Definitions dialog.

# Changing States Manually

Administrators and creators can change an item's lifecycle state manually in the Item Master.



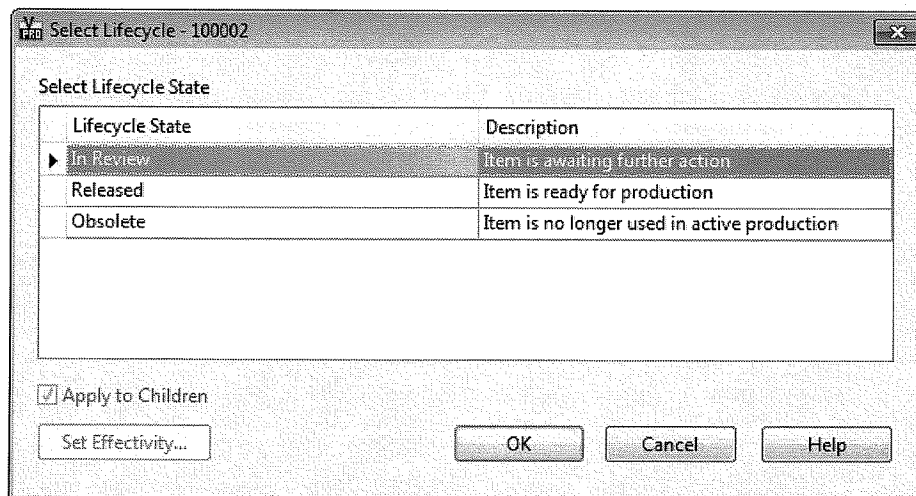
## Definition of Manually Changing Lifecycle States

You can use lifecycle states to control the release status of items by manually changing an item to Work in Progress, In Review, Released, or Obsolete.

### Changing a State

To change a state, right-click the item in the Item Master and select Change State. The Select Lifecycle dialog box displays the states and options available based on the current state of the item.

In the following illustration, the item is currently set to Work in Progress. When the Select Lifecycle dialog appears you can select In Review, Released, or Obsolete. Notice that the options Apply to Children and Set Effectivity are not available.



## Lifecycle State Options

When you select a state, the options available vary.

Options	Description
Work In Progress	Apply to Children is available but not set. If the item has children, selecting this option will also set their lifecycle state set to Work In Progress.
In Review	Apply to Children and Set Effectivity are unavailable as options.
Released	Set Effectivity is available as an option. This allows you to specify a point in the future when the new revision will supersede the current one. Apply to Children is selected and cannot be changed. If the item has any un-released children, their lifecycle state is also set to Released.
Obsolete	Apply to Children is available as an option but is not selected. If the item has children, selecting this option will also set their lifecycle state set to Obsolete.

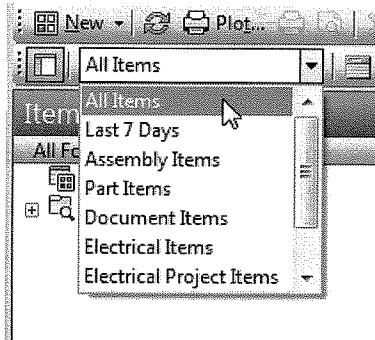
# Exercise 1: Change Lifecycle States Manually

In this exercise, you create an item, attach it to a change order, and manually change the lifecycle state.

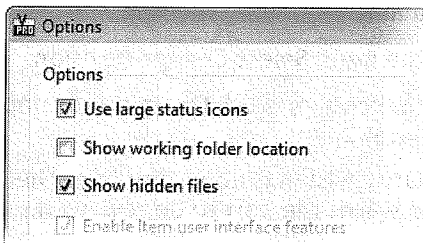
Item Master				
Number	Revision	Lifecycle State	Title	
100031	B	Work In Progress	Handle.ipt	
100030	-	Work In Progress	ICUVALVE.ipt	
100029	-	Work In Progress	ICUVALVEASSY.iam	

The completed exercise

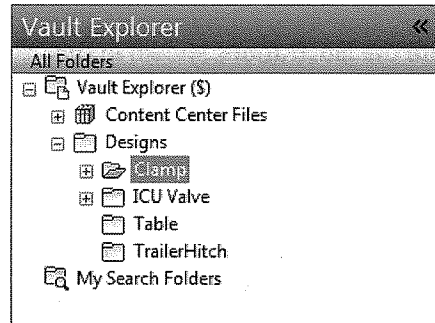
- Start Autodesk® Vault Professional®. Log in using the following information:
  - User Name: usera
  - Password: vault
  - Database: AOTCVault
- Click Go menu > Item Master.
- On the Advanced toolbar, select All Items from the Custom Views list.



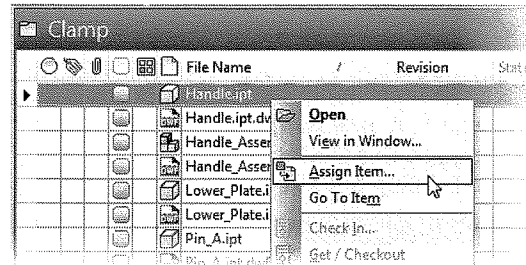
- Click Go menu > Vault Explorer.
- Under All Folders, expand Vault Explorer.
- Click Tools menu > Options. Ensure that Show Hidden Files is selected. The DWF™ files are displayed



- Click OK.
- Expand the Designs folder. Click the Clamp folder.



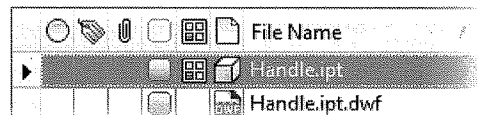
- Right-click Handle.ipt. Select Assign Item.



- In the Assign Item wizard:

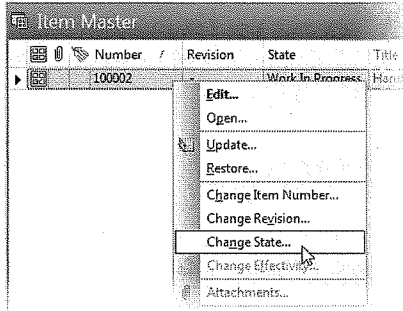
- In Preview Items, click Next.
- In Find Duplicates, click Finish.
- In View Results, click Close.

An item icon is displayed next to the file name.



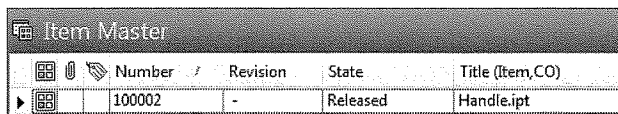
- Click Go menu > Item Master.
- In the Item Master, click the Number column to sort the item numbers in ascending order.
- In Item Master, right-click the new item.

14. Select Change State.

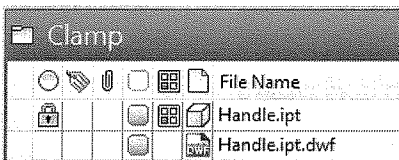


**NOTE:** Your item number may differ from the illustrations shown in this exercise. Your item should be the highest number. In this example, it is 100002.

15. In the Select Lifecycle dialog box, select Released.
16. Click OK. Notice that the revision is a dash (-) and the lifecycle state is changed to Released.

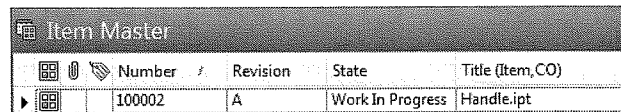


17. Click Go menu > Vault Explorer.
18. Review the part. A lock symbol is placed beside the part. You see this symbol because of the Enforce File Locking per Lifecycle State setting.



19. Click Go menu > Item Master.
20. Right-click the item. Select Change State.
21. Select Work In Progress.
22. Click OK.

23. Review the status of the part. The Revision is now set to A.

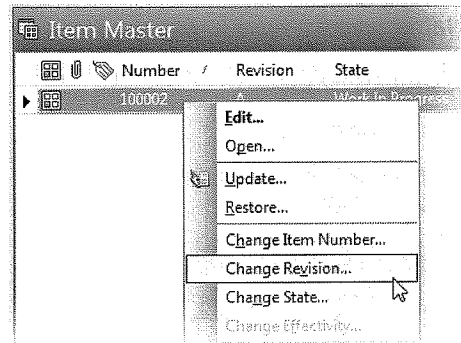


The bump rules determine which actions take place for a change of lifecycle state. In this example, the administrator has selected the default behavior of a primary revision using the Default Alphanumeric Format.

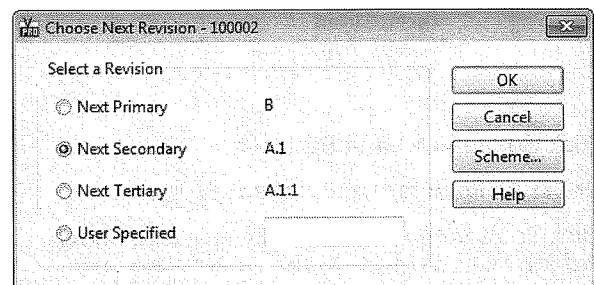
24. Return to Vault Explorer. Notice that the lock icon is removed from the part.

The part is now set to Work in Progress and the company wants to create a series of revisions before releasing the part. To do this, you use secondary revisions.

25. Return to the Item Master.
26. Right-click the item. Select Change Revision.



27. Select Next Secondary. Click OK. In this example, the revision is A.1.

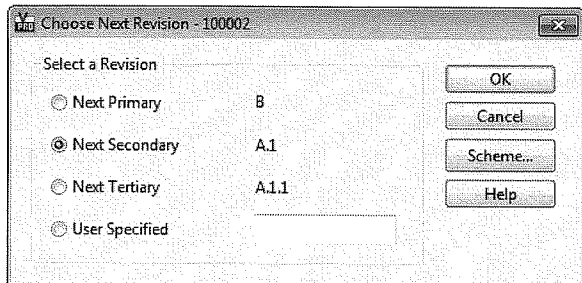


The modification to the part is now complete. You select a new secondary revision.

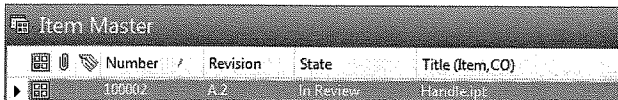
28. Right-click the item. Select Change Revision.
29. Select Next Secondary. Click OK. In this example, the revision is A.2.

The secondary revision is now complete. The design team wants the part to be reviewed.

30. Right-click the item. Select Change State.



31. Select In Review. Click OK.

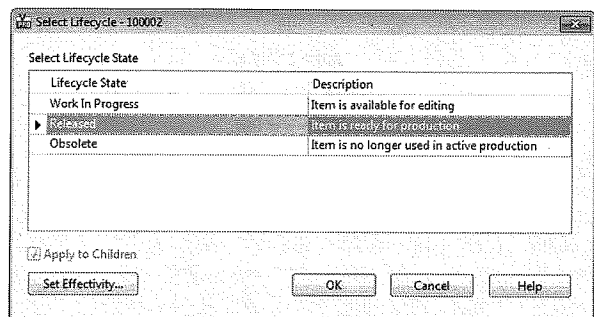


32. Return to Vault Explorer. Notice that the part is locked.

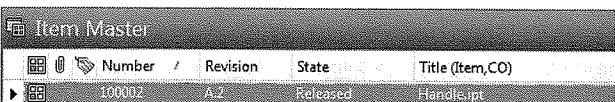
33. Return to Item Master.

34. Right-click the item. Select Change State.

35. Select Released. Click OK.



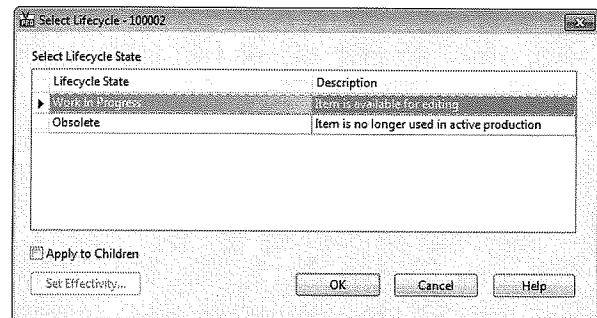
36. The lifecycle state is changed to Released and the revision stays at A.2.



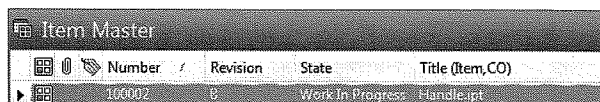
37. Return to Vault Explorer. Notice that the part is still locked. After the part is released, you decide that further work needs to done.

Return to the Item Master. Right-click the item. Select Change State.

38. Select Work in Progress. Click OK.



39. The lifecycle state is changed to Work in Progress and the Revision changes to B.



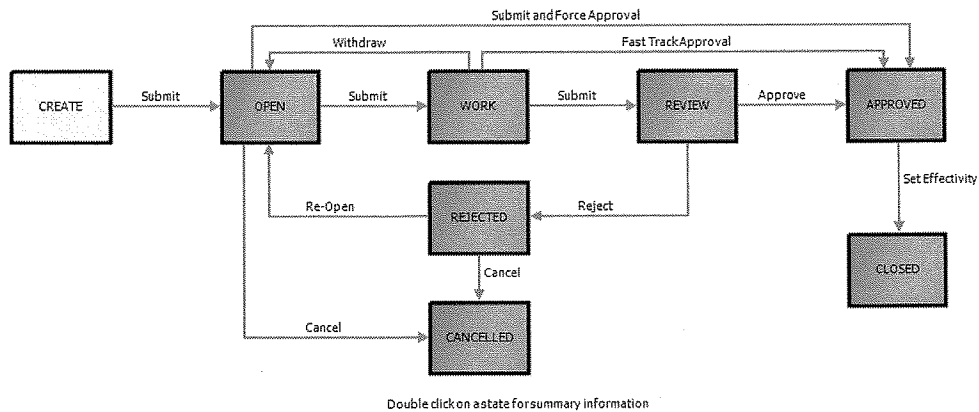
40. Return to Vault Explorer. Notice that the part is unlocked. You can now make modifications to the part.

# Lesson 2: Change Orders

## Overview

This lesson describes how to create change orders to control the release of new designs or changes to those designs.

You must have Vault Professional Creator or Vault Professional Reviewer permissions to create or participate in a change order. In addition, the administrator defines appropriate change order permissions for each participant in the change order process.



## Objectives

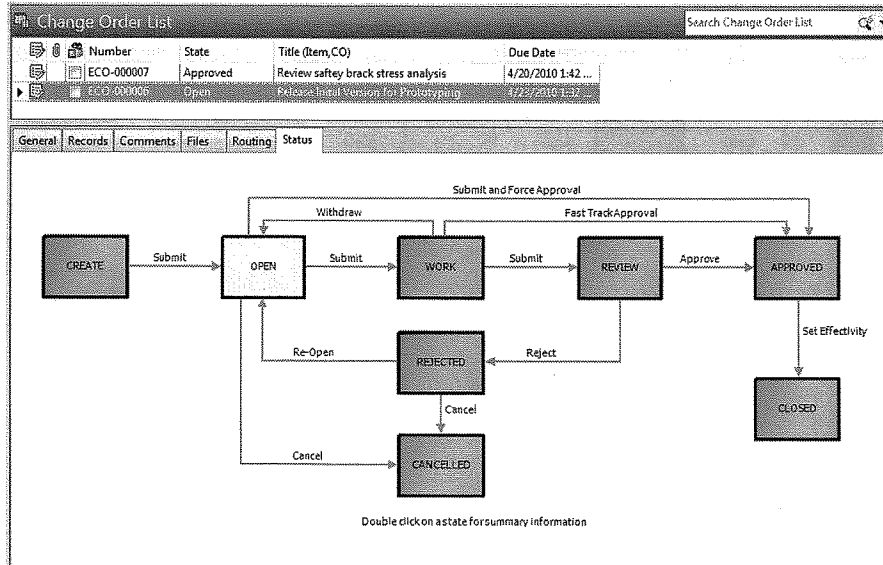
After completing this lesson, you will be able to:

- Review the Change Order dialog box.
- Create a change order.
- Attach an item to a change order.
- Review lifecycle states.
- Review change order routing.



# Introduction to Change Orders

When you create a revision, design changes are made and the changes are then approved by one or more people. Using the Change Order process, when you (the change requestor) modify files or items, the change is routed to the correct members in the design team before being released to production. Unlike the manual process covered in the last lesson, files and items associated with change orders will automatically change state depending on the results of the approval process.



## Definition of Change Orders

You can use change orders to both describe the changes made to a design and to manage the progress of those changes through review, approval, rejection, and release to production. The Change Order dialog box provides a historical record of why, how, and when changes were made.

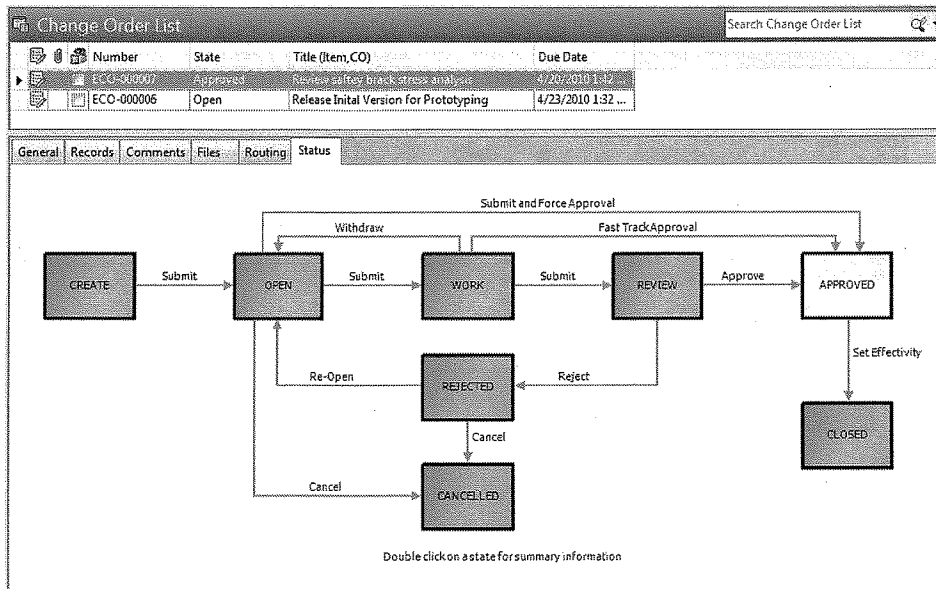
The dialog box displays the following information for Change Order Number ECO-000006:

- Change Order Number:** ECO-000006
- State:** Open
- Change Order Title:** Release Initial Version for Prototyping
- Detailed Description:** Approve and release the clamp parts, assemblies and documents
- Due Date:** 4/23/2010
- Submitted by:** [Empty]
- Date Submitted:** [Empty]
- Properties:**

Name	Value
OriginatorID	Design








## Description of Change Order Workflow

The Status tab in the Change Order dialog box displays a workflow chart of all possible combinations of state progressions.



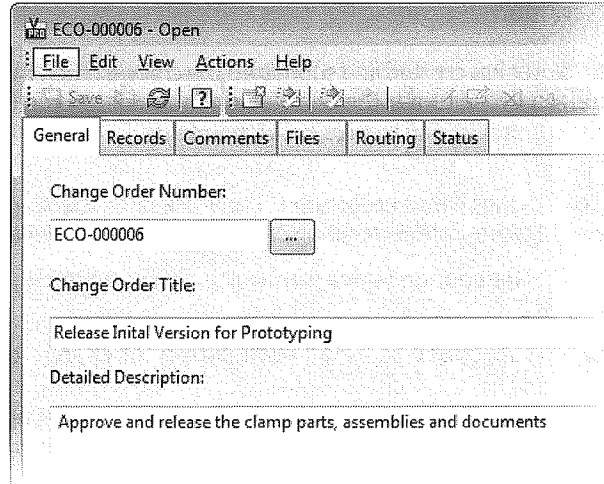
## Change Order Workflow Chart

You can also visually identify the current status of the change order by clicking the Status tab on the respective Change Order dialog box. Double-clicking a state gives you summary information about that state.

State	Description
	After a user has created and submitted the change order, the change order enters the Open state. In the Open state, the Change Administrator can edit the title, edit the value of a user-defined property, and change the attachments.
	As soon as the change order enters the Work state, the Responsible Engineer is notified that there is a change order requiring attention, and the following occurs: <ul style="list-style-type: none"><li>▪ The change order number is added to each participant's work list.</li><li>▪ An email message is sent to each person on the routing list if they have subscribed to email notification for change order events.</li></ul>
	As soon as the change order enters the Review state, routing participants are notified that there is a change order requiring attention, and the following occurs: <ul style="list-style-type: none"><li>▪ The change order number is added to each participant's work list.</li><li>▪ An email message is sent to each person on the routing list if they have subscribed to email notification for change order events.</li></ul>
	When a participant with Approver status approves a change order, the change order enters the Approved state. In the Approved state, the Change Administrator must set the effectivity date to release the items for production on the change order.
	When a participant with Approver status rejects a change order, the change order enters into the Rejected state. As a Change Administrator, you can do the following: <ul style="list-style-type: none"><li>▪ Cancel the change order.</li><li>▪ Reopen the change order.</li></ul>
	In the Cancelled state no action can be taken by anyone.
	In the Closed state no action can be taken by anyone.

# Create a Change Order

Use the Change Order dialog box to create change orders. A change requestor initiates the process and adds comments, attaches files, and selects the routing participants.



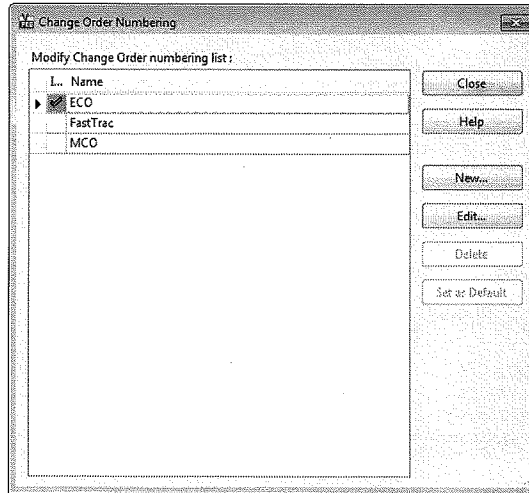
## Change Order Options

The tab functions in the Change Order dialog box are described in the following table.

Options	Description
General	Specifies the change order attributes, including the list of items associated with the change order.
Records	Lists files and/or items (collectively called Records) associated with the change order.
Comments	Contains the decisions for the change order in the form of comments, replies to comments, attachments, and markups.
Files	Lists all files including all those associated with items and any added markups.
Routing	Lists the participants involved with the current change.
Status	Shows the current status of the change order in a workflow diagram.

## Change Order Number

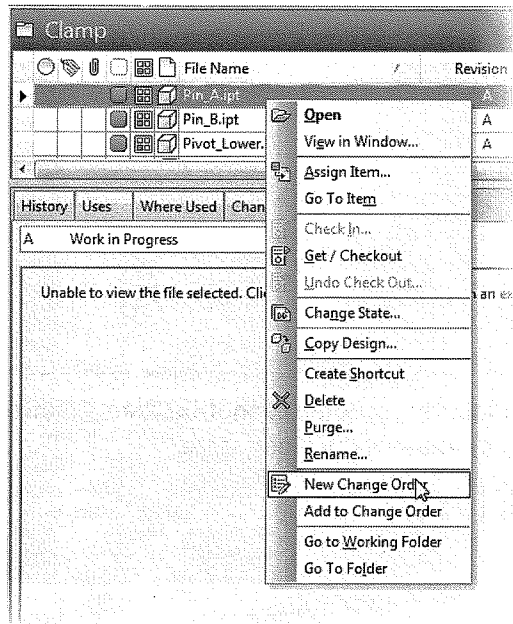
As an administrator, you can create numbering schemes that meet the needs of multiple projects. For example, you might want to distinguish between change orders created by Manufacturing and those submitted by Engineering. The change order numbering schemes are accessed on the Tools menu > Vault Settings > Change Order tab by clicking the Define button in the Change Order Numbering group.



## Procedure: Creating a Change Order

The following steps describe how to create a change order. You must have Administrator or Change Order Editor Permissions to create or participate in a change order.

1. You can right-click on items in the Item Master or file in the Vault Explorer view to display the context menu. Select New Change Order..



2. The Change Order dialog box is displayed.

The screenshot shows a software window titled "ECO-000009" with a menu bar (File, Edit, View, Actions, Help) and a toolbar (Save, ?). The window has several tabs: General, Records, Comments, Files, Routing, and Status. The "General" tab is active. It contains the following fields and controls:

- Change Order Number:** A text field containing "ECO-000009" and a button with three dots (...).
- State:** A text field containing "Create".
- Change Order Title:** An empty text field.
- Detailed Description:** A large empty text area.
- Due Date:** A dropdown menu showing "4/17/2010".
- Submitted by:** An empty text field.
- Date Submitted:** An empty text field.
- Properties:** A table with two columns: "Name" and "Value".

Name	Value
▶ Originator01	Design

3. Click the button next to the change order number [...] to display the Change Order Numbering Scheme dialog. Select a numbering scheme from the list.

The screenshot shows a dialog box titled "Change Order Numbering" with the subtitle "Modify Change Order numbering list:". It contains a list box with the following items:

- ECO (selected with a checkmark)
- FastTrac
- NCO

On the right side of the dialog, there are several buttons: Close, Help, New..., Edit..., Delete, and Set as Default.



**NOTE:** The numbering scheme cannot be changed after the change order has been created and has entered the Open state.

- Enter a title under Change Order Title and enter a detailed description. Under Due Date, select a date when the change order is to be completed

General Records Comments Files Routing Status

Change Order Number: ECO-000009 State: Create

Change Order Title: Modify Pin A for tighter fit

Detailed Description: Customer service reports that the pins are coming loose due to too much play in the assembly. Need to determine what the optimal diameter is and adjust the design.

Due Date: 4/17/2010 Submitted by: Date Submitted:

- Click the Records tab. The file selected in step 1 is displayed.

General Records Comments Files Routing Status

Associated Records: Look For: All

Name	Title	Description	Revision	State (Hist...)	Units
Pin_A.ipt			A	Work in Pro...	

Add... Remove

You can use the Add button to attach other files or items to the change order.

- Select the Comments tab. Select Add Comment to add information about the required design change, etc.

ECO-000014

File Edit View Actions Help

Save

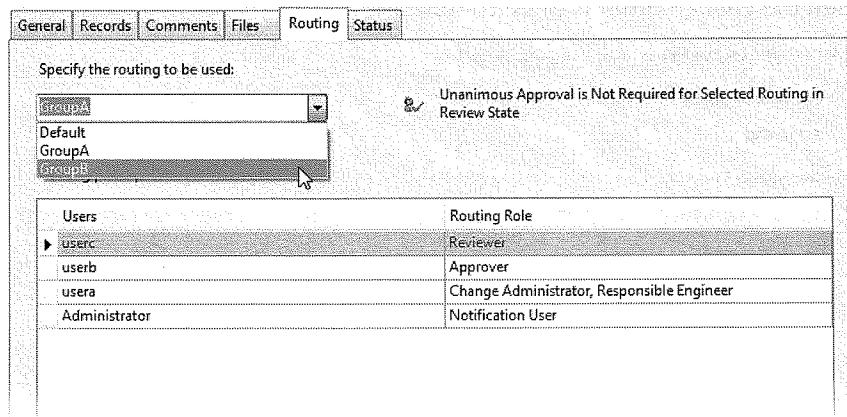
General Records Comments Files Routing Status

Add Comment...

Title	Created By	Created	State
Pin redesign to remove excessive play	user	4/17/2010 3:03 PM	

Pin diameter needs to be increased to account for excessive play. See the attached photo for details from a returned part.

- Click the Routing tab. Select a routing list.



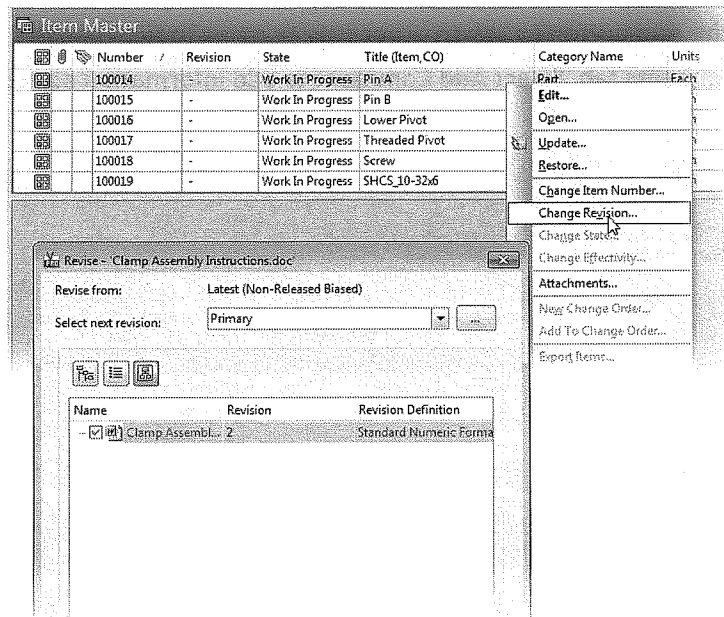
- Click Save and Close to create the change order and exit the dialog box.

## Change Orders and Revisions

A change order can automatically generate a primary revision to the items or files included in the change order. You can also manually change the revision for any work-in-progress item or file.

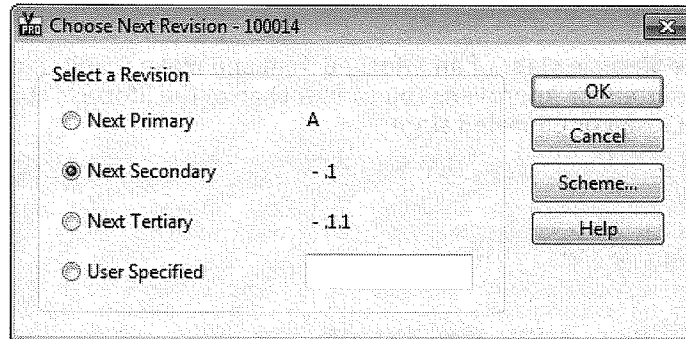
### Definition of Change Orders and Item Revisions

You can manually change an item or files revision regardless of its participation in a change order.





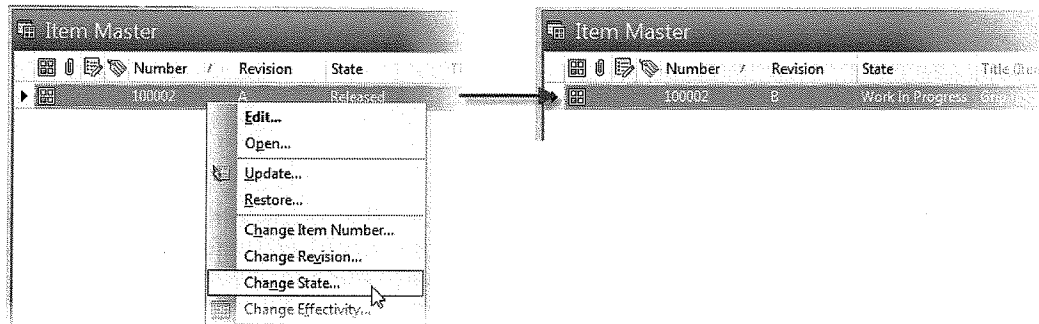
For example, if a part is currently a work in progress, a department can create a secondary revision to indicate a design change.



By default, items are locked and only the Change Administrator and Responsible Engineer can make them editable. If an item in the Released state is added to a change order and editing is enabled, the item's state changes to Work in Progress. A new revision is automatically created unless the bump revision action is set to None in the Lifecycle Rules dialog box.

### Example of a Revision Change

In the following example, the part file *Grip.ipt* is released and has a revision A. When you use the Change State option to change the item state to Work in Progress, the revision changes from A to B and the part is now editable.



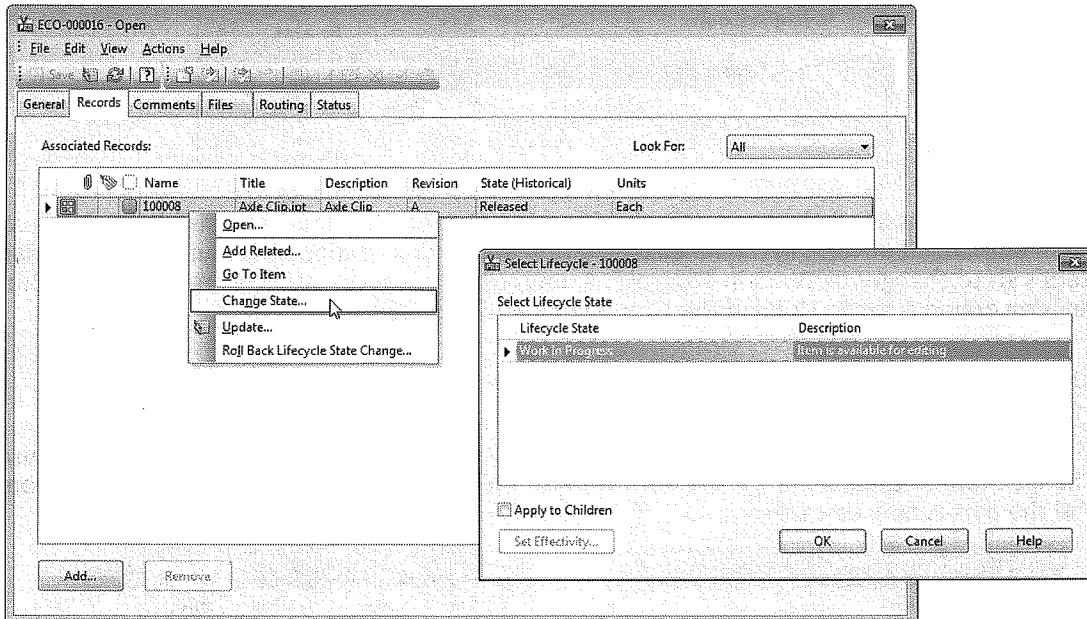
### Change Order and Item Revision Rules

When items are controlled with a change order, the rules about changing state are different than non-controlled items.

- Only users with Vault Professional Creator, ERP Manager, or Administrator roles can change the state of an item.
- When you add an item to a change order, the item's lifecycle is controlled by the change order.
- If a change order is rejected, the item version remains unchanged.
- Approval of a change order changes the state to Released.
- To set the effectivity of an item under a change order, you must set the lifecycle state to Released.
- The BOM shows the most current revision of the released children.

# Change Orders and Lifecycle States

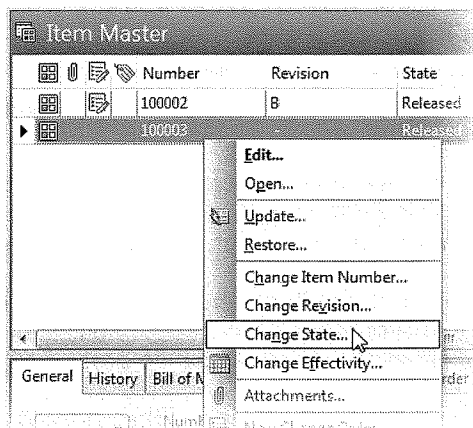
You can change the lifecycle state of an attached item and make it editable in any change order state such as Open, Submitted, or Approved. You cannot change the lifecycle state in the change order if the change order is in Closed or Canceled state.



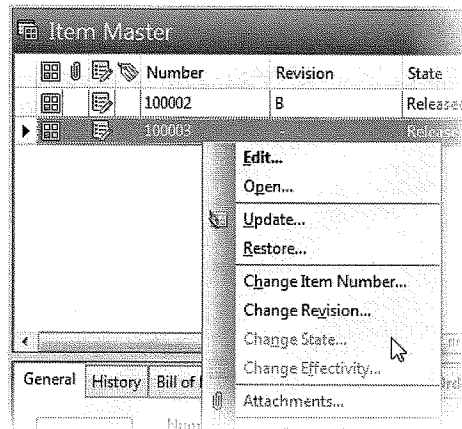
## Example of a Change Order

Engineering has been notified that a part has had a higher-than-expected failure rate under certain conditions and must be redesigned. When you create the change order for the existing item, the part can be modified and the change routed through the design team for approval.

When the item is not included in an active change order, you can manually change the state of the item.



When the item is attached to a change order, this functionality is not enabled.



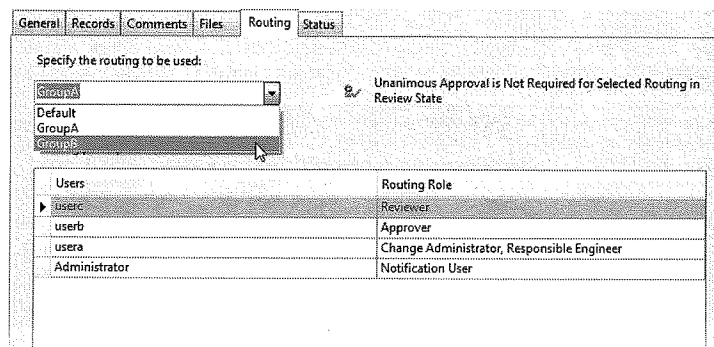
## Rules for Using Change Orders and Lifecycle States

When you attach items to change orders:

- Manual lifecycle state changes are not permitted.
- The items can be in the Released state.
- Files are locked and not editable on Released items.
- You can change the item's state from Released to WIP.
- Obsolete items cannot be added to change orders.
- Items put into the WIP state on change orders can be released only upon approval of the change order.
- If the change order of an item whose state has been changed to WIP is rejected, the item cannot be rolled back.
- If the change administrator changes Allow Edit on a change order so that the item cannot be edited (check box on Allow Edit is off) on an item in the Work in Progress state, the item changes to In Review so that it is not editable.

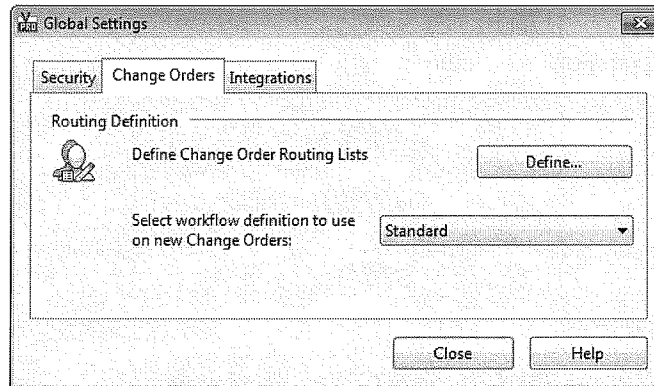
## Identifying Change Order Participants

When you create a change order, you specify a routing list of participants with predefined roles and specific permissions and responsibilities. Participants are notified that a change order requires their attention. The change requestor and approver roles control the progression of the change order. The reviewer role can only view, add, and reply to comments.



## Example of Change Order Routing

The administrator creates routing participant lists in the Global settings dialog (Tools menu > Administration > Global Settings > Change Order tab) dialog box, as shown in the following illustration.

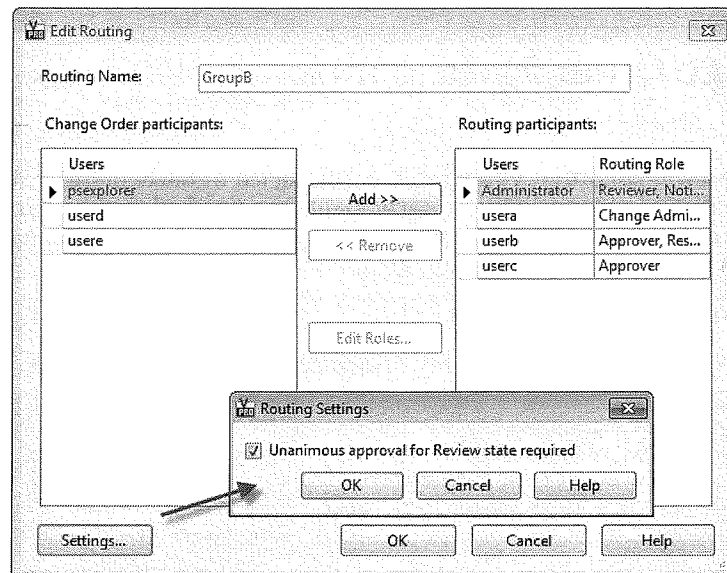


Lists can contain any number of users, but you must specify at least one Approver, one Responsible Engineer, and one Change Administrator in order to create a routing list.

Routing participants:

Users	Routing Role
▶ Administrator	Reviewer, Notification User
usera	Change Requestor, Change Administrator
userb	Approver, Responsible Engineer
userc	Approver

To set the routing, the administrator can select Unanimous Approval for Review State Required in the Routing Settings dialog box.



## Routing Editing Rules

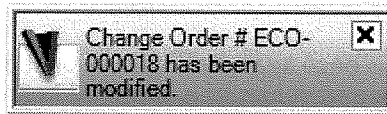
The following rules apply to editing the routing after the change order has been created:

- Depending on the state of the change order, anyone on the routing list can add another Reviewer, except for Notification User.
- The administrator, Change Administrator, and Responsible Engineer can add and remove Approvers and Change Administrators.
- Only the administrator, Change Administrator, and Responsible Engineer can remove a Reviewer.
- Assigning a role to the administrator on a routing list can their ability to edit routing lists.
- The author (the creator of the change order) can never be removed.
- Change order activities can only be performed by the routing participants.
- Anyone can create a change order even if they are not on a routing list. This user becomes the Change Requestor

## Notification

A user on the routing list is notified when the change order enters a state that requires their attention. There are three notification methods:

- **My Worklist:** In the navigation pane when All folders or Change Order List is displayed. The change order number and due date appear on this list. Clicking on a change order in this list will change the main pane to Change Orders with that change order selected.
- **Pop-up alert:** Similar to Outlook e-mail messages, these appear briefly in the lower right hand corner when a change order is added to the user's work list. This pop-up message can be turned off or on. By default, the pop-up notification is on. To change the setting, click View menu > Notification Display.



- **E-mail notification.** The administrator must configure Autodesk Data Management Server for email notification and Vault Professional users must have valid e-mail addresses in their user profiles.

Routing participants are notified

- The change order number appears on each Routing participant's 'My Worklist' list depending on the state of the change order. For example, the Responsible Engineer is notified when the change order enters the Work state, but the Approver does not get notified until it enters the Review state.
- Following the same logic, an email message is sent to each person on the routing list depending on the state of the change order. For example, the Reviewer is notified by an e-mail when the change order enters the Review state.
- Vault Professional includes a role called Notification Users in the ECO Routing tab. This user is notified when a change order is closed, usually indicating that a new revision of items or documents is now available.
- If Vault Professional is running but inactive, a pop-up alert appears momentarily on the user's screen in the lower right corner when the change order is added to his or her work list.

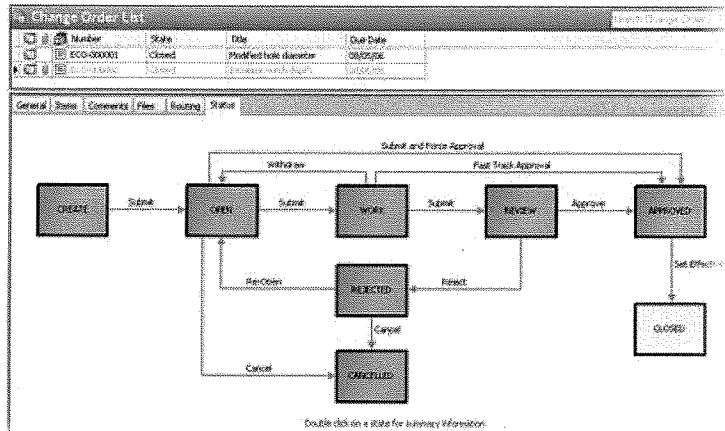
## Participants and Change Order Roles

The following steps describe the typical workflow for creating a change order as well as the roles of participants at each step in the process.

1. A user creates a change order. This user can be any member of the design team as long as they have a Change Order Editor role. The following actions occur:
  - They are added to the routing list as a Change Requestor.
  - The change order enters the Create state.
  - The Change Administrator is notified.
  - The Change Requestor or the Change Administrator submits to the Open state.
2. In the Open State the Change Administrator reviews the order and determines whether to add comments, markups, or additional properties.
  - The Change Administrator selects the items in the Records tab of the change order and changes state to put them in Work In Progress.
  - The Change Administrator submits the change order to the work state.
  - The Responsible Engineer is notified.
3. If the Change Administrator did not put the items into the Work In Progress state the Responsible Engineer can at this point. The Responsible Engineer checks out the files from the vault and modifies them with regards to the change order. The files are then checked back in to the vault, the items are updated and the State changed to In Review.
4. The Responsible Engineer submits the change order and it enters the Review state.
5. The Reviewers and Approvers are notified. They can review the design changes, add comments and markups. The Approvers can, at any time, accept the change order. If the administrator has selected the Unanimous Approval for Review State Required in the Routing Settings dialog box, all Approvers must review and submit their acceptance of the change order. The change order is now set to Approved.
6. The Change Administrator is once again notified. He or she now sets the change order effectivity. The date for the item to become released is specified in the Set Effectivity dialog box. Any Work In Progress or In Review items on the change order are set to Released.
7. The change order is now closed. All Notification Users are notified by e-mail (if configured), indicating new items are ready for production.

# Exercise 1: Create and Approve Change Orders

In this exercise, you create two change orders. You submit and approve the first. For the second, three routing participants must approve the change order because unanimous approval is required.



The completed exercise

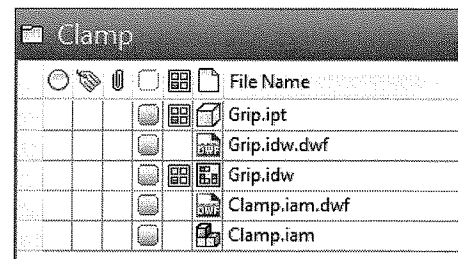
## Create and Approve Change Orders

1. Start Autodesk Vault Professional. Log in using the following information:
  - User Name: usera
  - Password: vault
  - Database: AOTCVault
2. In Vault Explorer, expand the Designs folder.
3. Click the Clamp folder.

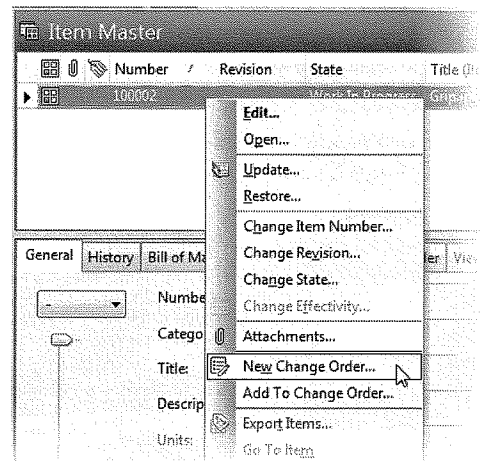


4. Right-click Grip.ipt. Select Assign Item.
5. In the Assign Item wizard, Preview Items page, click Next. Do the following:
  - On the Find Duplicates page, click Finish.
  - On the View the Results page, click Close.

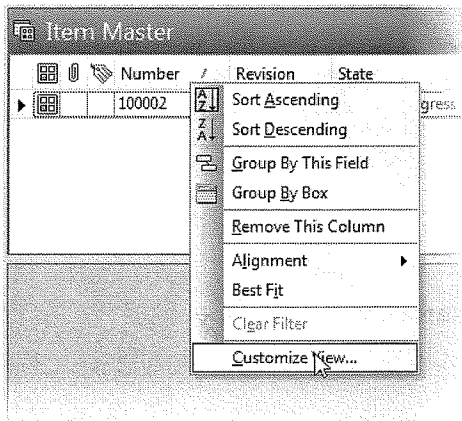
An icon is displayed next to the part name and the associated drawing.



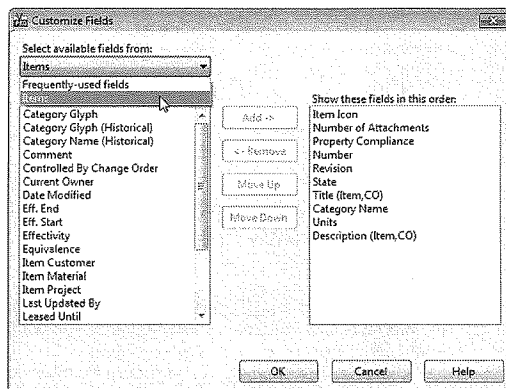
6. Switch to the Item Master. Right-click the new item. Select New Change Order.



7. In the Change Order dialog box, General tab, for Change Order Title, enter Modified hole diameter.
8. For Detailed Description, enter Increased hole diameter to 7.92 mm.
9. Click Save. Close the Change Order dialog box.  
You can now customize the view to indicate that the item is controlled by a change order. To do this, add a field to the table.
10. In the Item Master, right-click one of the column headers. Click Customize View.

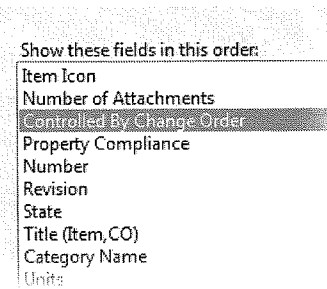


11. In the Customize View dialog box, select Fields.
12. Under Select Available Fields From, select Items from the list.

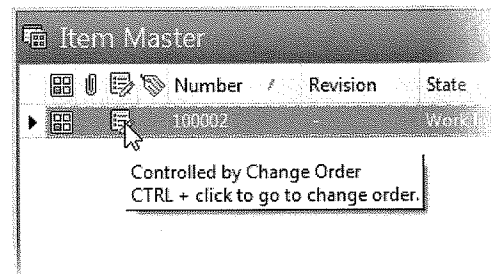


13. From Available Fields, select Controlled by Change Order.
14. Click Add.

15. Under Show These Fields in This Order, select Controlled by Change Order. Click Move Up until it is below Number of Attachments.



16. Click OK.
17. Click Close. An icon is displayed next to items controlled by a change order.



NOTE: Your item and change order numbers may differ from the illustrations in this exercise.

18. Switch to the Change Order list.
19. In the Change Order list, right-click the new change order. Do the following:
  - Select Respond > Submit.
  - Click OK to dismiss the Submit – Add Comment dialog.

The status of the change order is set to Open.

20. In the Change Order list, right-click the new change order. Do the following:
  - Select Respond > Submit and Force Approval.
  - Click OK.

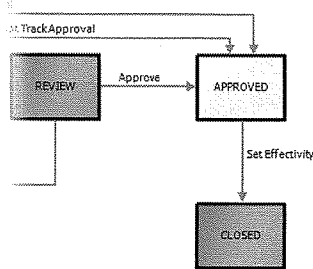
NOTE: Usera is a Change Administrator and can force the approval of a change order.

21. Select the change order.



22. Click the Status tab to display the workflow chart. Do the following:

- Double-click the Approved state icon to display summary information about the state.
- Close the Summary dialog box.

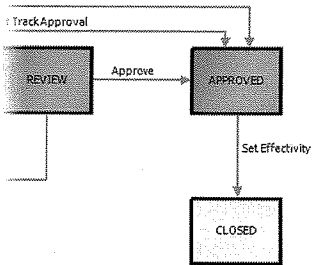


23. Right-click the new change order. Select Respond > Set Effectivity.

**NOTE:** Only a Change Administrator can perform the Set Effectivity activity on an item attached to a change order. The Change Administrator must set the effectivity in the Approved state to release the items to production and close the change order.

Click OK twice.

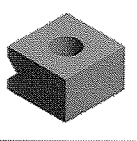
24. Review the status. Because the effectivity was set to immediate, the status is now closed.



25. Switch to the Item Master.

26. Select the item.

27. In the preview pane, notice that the lifecycle state is set to Released.



Lifecycle State:	Released
Revision:	-
Last Updated By:	usera
Last Updated:	4/17/2010 7:09 PM

## Create a New Change Order

1. Switch to Vault Explorer.
2. Switch to the Item Master.
3. In the Item Master, right-click the item created in the previous section of the exercise. Do the following:
  - Select Change State > Work in Progress.
  - Click OK.

A revision is created. In this example, the new revision is A.

Item Master			
Number	Revision	State	Title (Item,CO)
100002	A	Work In Progress	Bracket

Right-click the item. Select New Change Order. Do the following:

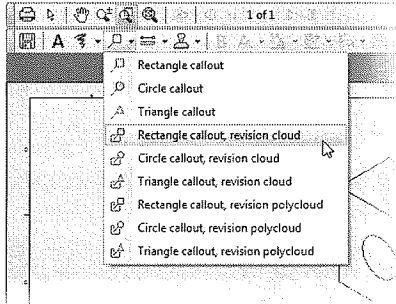
- For Change Order Title, enter Increased notch depth.
  - For Detailed Description, enter Notch depth increased to 3.18 mm.
4. Under Properties, Value column, click Design. Select Manufacturing from the list.

Properties:

Name	Value
Originator01	Design
	Customer Support
	Design
	Manufacturing
	Marketing

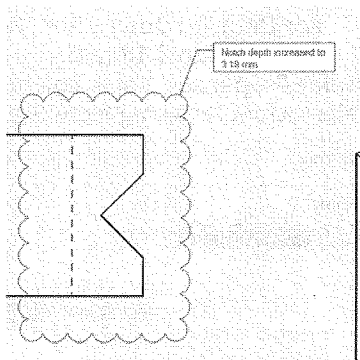
5. Go to the File Name tab the Attached Files list, select Grip.idw. Do the following:

- On the top view, zoom in to the notch feature.
- Click the arrow next to Create Markup.
- Click Rectangle callout, revision cloud.



6. Click and drag to create a markup around the notch.

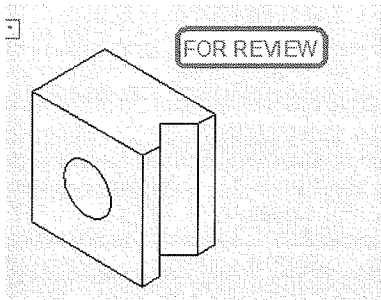
7. In the text box, enter Notch depth increased to 3.18 mm.



8. Click Fit to Window.

9. Click the down arrow next to Stamps. Do the following:

- Select the For Review stamp.
- Click in the sheet to place the stamp.



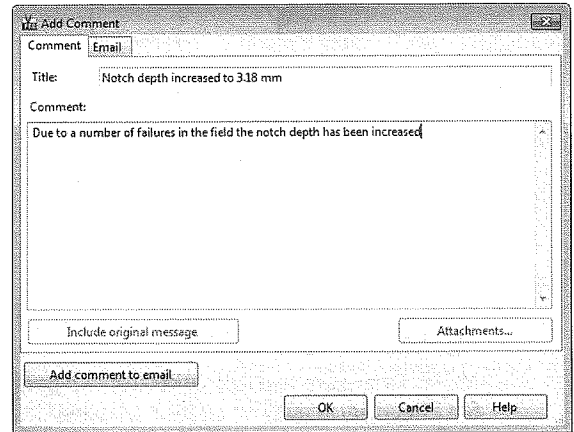
10. On the toolbar above the DWF window, click Save. Do the following:

- In the Save As dialog box, navigate to the Clamp folder.
- Accept the default file name

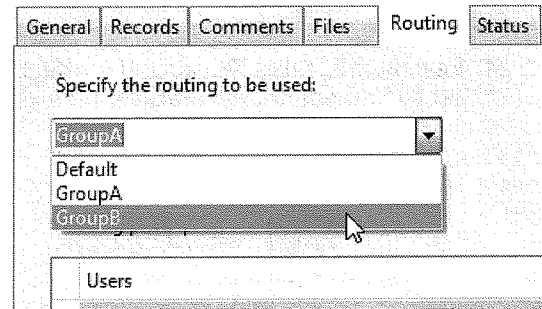
Click Save to add the markup file to the vault.

11. In the Add Comment dialog box, do the following:

- For Title, enter Notch depth increased to 3.18 mm.
- For Comments, enter Due to a number of failures in the field; the notch depth has been increased.
- Click OK.



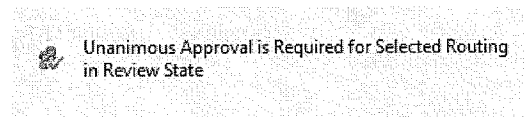
12. Click the Routing tab. From the list, select GroupB.



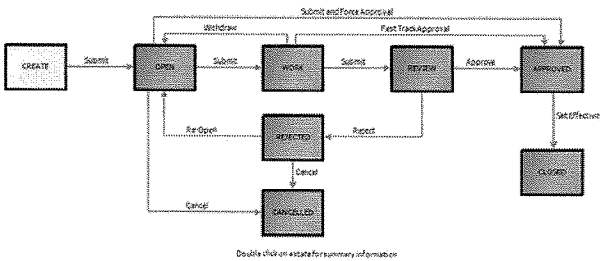
13. Review the Routing participants. usera, userb, and userc are part of this group.

- usera is the Change Administrator. Since usera is creating the change order he will also be the Change Requestor for this change order.
- userb is an Approver and the Responsible Engineer.
- userc is an Approver.

The administrator created this list with unanimous approval required for a change order.



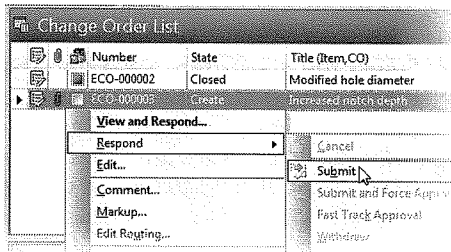
14. Click the Status tab. The workflow chart shows that the change order is set to Create.



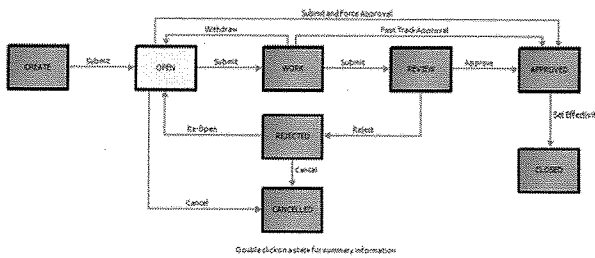
15. Click Save. Close the Change Order dialog box.

16. In the Change Order list, right-click the new change order. Do the following:

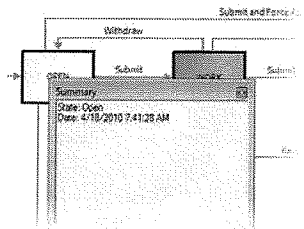
- Select Respond > Submit.
- Click OK to dismiss the Submit – Add Comment dialog, again accepting the default comment.



17. In the Change Order list, select the new change order. Click the Status tab to display the workflow chart.



18. In the Status diagram, double-click the Open state to display the summary information about the state. Close the Summary dialog box.

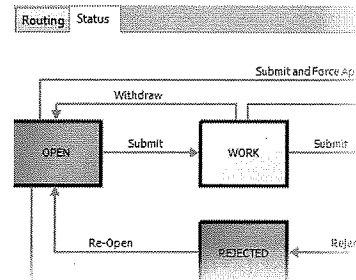


usera submits the change order again to change the status to Work.

19. In the Change Order list, right-click the new change order. Do the following:

- Select Respond > Submit.
- Click OK in the Submit – Add Comment dialog box, again accepting the default comment.

Note in the Status tab the new state of the change order.



You now log in as userb, the Responsible Engineer.

20. Click File menu > Log Out.

21. Click Log In.

22. Log in using the following information:

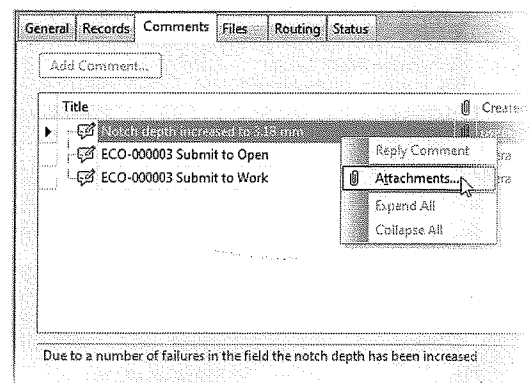
- User Name: userb
- Password: vault
- Database: AOTCVault

23. Review My Worklist. The ECO is listed.

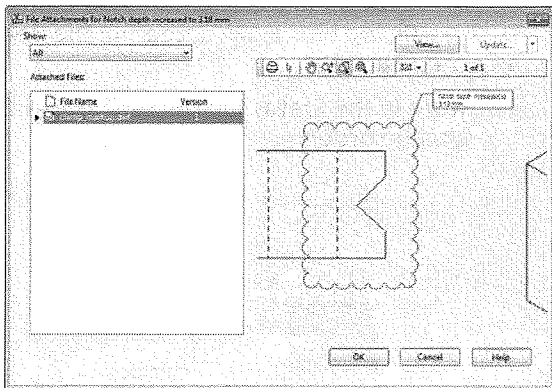


Clicking on the ECO in your worklist will take you directly to the Change Order list with the change order selected.

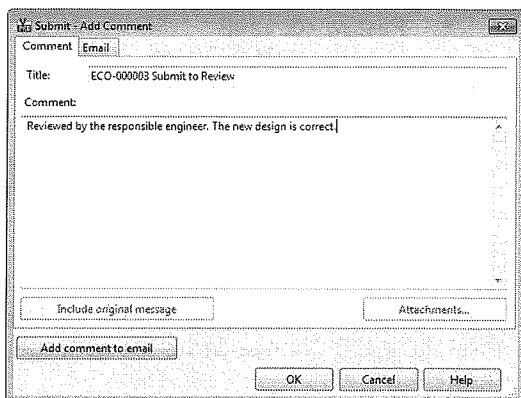
24. Click the Comments tab. Review the comments. Note the details in the comment titled Notch depth increased to 3.18mm. Right click on this comment and view the attachment.



25. Select the Files tab and click the attached markup file clamp\_markup.dwf in the Attached files list. Note the markups on the drawing.



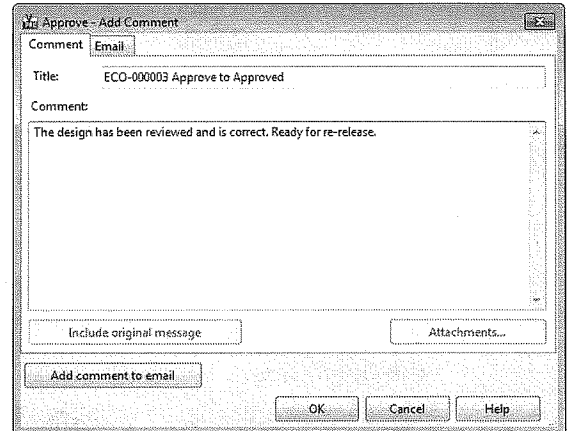
26. In the Change Order list, right-click the new change order. Do the following:
  - Select Respond > Submit. This will move the change order to the next state Review.
  - The Submit – Add Comment dialog appears. In the Comments field enter “Reviewed by the responsible engineer. The new design is correct.”
  - Click OK.



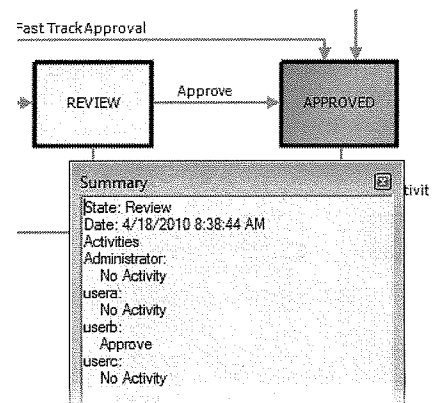
27. Note that the change order still appears in My Worklist. The change order requires unanimous approval from all reviewers. In addition to being the Responsible Engineer, userb is also a Reviewer. userb must also approve the change order.

28. In the Change Order list, right-click the new change order. Do the following:

- Select Respond > Approve.
- In the Approve – Add Comment dialog enter “The design has been reviewed and is correct. Ready for re-release.”
- Click OK.

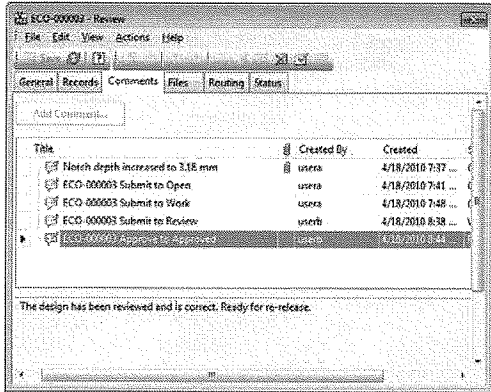


29. Select the Status tab. Note that the change order state is still Review. Double click on the State to review the status. The change order requires unanimous approval from all reviewers. userc must also approve the change order.

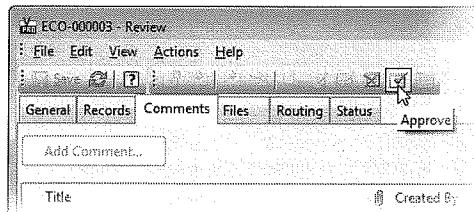


30. Click File menu > Log Out.
31. Click Log In.
32. Log in using the following information:
  - User Name: userc
  - Password: vault
  - Database: AOTCVault

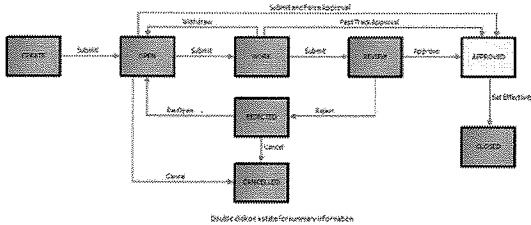
33. Note that the change order is in My Worklist. Select on the change order to switch to the Change Order list with the change order selected.
34. Double click on the change order to open it for review.
35. Select the Comments tab and review the comments.



36. In the Respond toolbar note that there are two possible icons enabled – Reject and Approve. Select Approve.

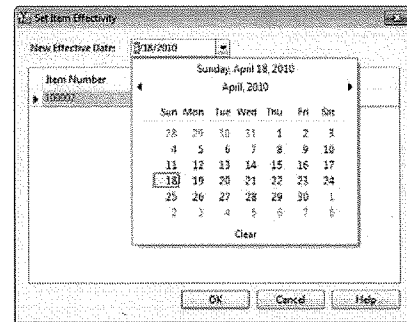


37. In the Approve – Add Comments dialog enter in the Comment section “Agreed – ready for immediate re-release.”
38. Select OK to dismiss the dialog.
39. Close the Change Order dialog box.
40. Click the Status tab. Because all three participants have approved the change, the state is set to Approved.



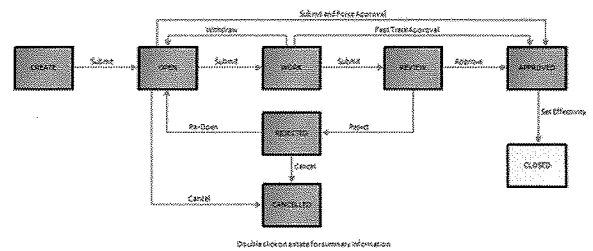
The Change Administrator is responsible for Closing the change order by setting the effectivity of the items on the change order. In this scenario usera is the Change Administrator.

41. Log in as usera using the data provided earlier in this lesson.
42. Note once again the change order appears in My Worklist. Select on it to go to the change order.
43. In the Change Order list, right-click the new change order. Do the following:
  - Select Respond > Set Effectivity.
  - In the Set Effectivity – Add Comment dialog enter “Release set effective immediately.”
  - Click OK.
  - In the Set Item Effectivity dialog review the default settings. Note that it is possible to set the effectivity in a future date by selecting the date drop down. In our case we will set the item new revision to be immediately available for manufacturing.

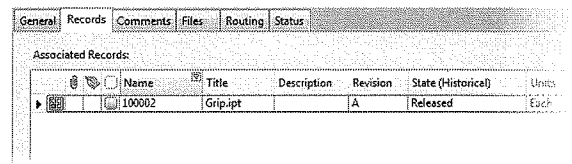


- Click OK to dismiss the dialog and create the new revision.

44. In the Change Order list, review the status of the change order. Note it is now closed.



45. Select the Records tab and note the Revision and State (Historical) of the item. It has been now released at Revision A.



# Chapter Summary

In this chapter, you learned how to use Autodesk Vault Professional to attach items to a part and then create a new change order using the item. You also used the preferred work flow to release and set the effectivity of a part.

Having completed this chapter, you can:

- Create and revise lifecycles manually.
- Create and approve change orders.



# Working with Bills of Materials

This chapter describes how to use bills of materials in Autodesk® Vault Professional®. You learn how these BOMs are integrated with other applications, including Autodesk® Inventor® and Autodesk® Vault.

## Objectives

After completing this chapter, you will be able to:

- Manage bills of materials (BOMs).
- Describe the integration of Inventor, Vault, and Vault Professional and the relationship between an Inventor bill of materials (BOM) and the associated Vault Professional item BOM.

# Lesson 1: Bills of Materials

## Overview

This lesson describes how to manage and use bills of materials (BOMs).

As an essential element in the design or manufacture of products, a BOM, in its simplest form, can be a list of components and the quantity of each required. It may, however, describe much more. BOMs may indicate which parts are manufactured and which are purchased, the materials, part numbers, and stock numbers of each part, and how the parts are structured and assembled.

Use the Bill of Materials tab in the Edit Item Record dialog box or in the Preview pane to work with the items' BOM.

Number	Quantity	Units	Category Name (Historical)	Title (Item, CO)	Revision	State
100011		Each	Product	Valve Assembly Packaged Product	C	In Review
100009	1	Each	Assembly	ICU Valve Main Assembly	C	Released
100002	2	Each	Assembly	Valve Assembly	C	Work In Progress
100003	3	Each	Part	O Ring	A	Released
100006	1	Each	Part	Valve Spring	A	Released
100010	1	Each	Part	Valve	B	Released
100012	30	Milliliter	Purchased	ICU O-Ring lubricant	A	Released
100004	1	Each	Part	Right Button	A	Released
100005	1	Each	Part	End Cap	A	Released
100007	1	Each	Part	Housing	A	Released
100008	1	Each	Part	Left Button	A	Released
100015	1	Each	Document	ICU Valve Rendering - Internals	B	Released
100016	1	Each	Document	ICU Valve Rendering	B	Released
100013	1	Each	General	Valve Packaging Assembly	-	Released
100014	1	Each	Document	ICU Valve Instructions	B	In Review

## Objectives

After completing this lesson, you will be able to:

- View part BOMs.
- Edit BOMs to add, delete, and reorder items, and change item quantities.
- Compare BOM revisions or BOMs between different items.
- Format, print, and export BOMs.



# About BOMs

You can manage and track components of an assembly by using a BOM that lists all its parts and subassemblies. When you link purchased items to an assembly, the items become part of the BOM list as well. Although you typically associate a BOM with an assembly, all items have a bill of materials. You can view the BOM for any item by clicking the Bill of Materials tab.

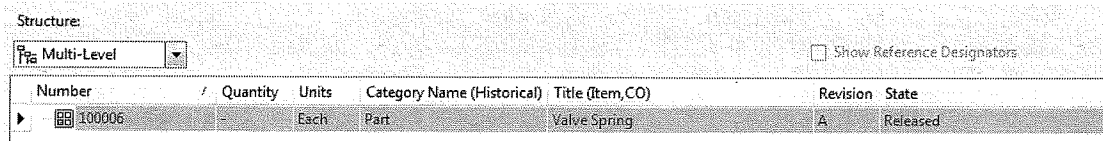
## Part and Assembly BOMs

A part BOM contains information related to a single item. The item can represent an Autodesk Inventor part, a purchased part, or another item added to the Item Master. If the item is linked to other items as part of a larger group, you may not be able to edit some of its properties, such as the quantity. You can add rows of other items to a part BOM. For example, you can include an existing document item that provides process or materials information on the part.

Unlike a part BOM, an assembly BOM contains multiple rows of item data that are linked directly or indirectly to the assembly item. Because these linked items are required for an assembly, some industries refer to this list as a recipe or formula. An assembly BOM does not require an actual modeled assembly. You can create a new item for non-modeled assemblies and add rows of other items to this new item's BOM.

## Examples of Part BOMs

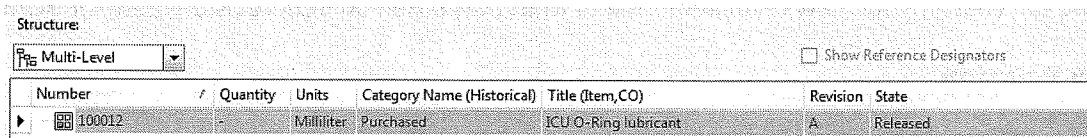
The following illustration shows a BOM for an ICUSPRING part. Standard modeled parts are usually measured in units of one (each). Notice that the quantity field for this item is edited in its parent BOM.



The screenshot shows a software interface for a BOM. At the top, there is a 'Structure:' label, a dropdown menu set to 'Multi-Level', and a checkbox for 'Show Reference Designators'. Below this is a table with the following data:

Number	Quantity	Units	Category Name (Historical)	Title (Item,CO)	Revision	State
100006		Each	Part	Valve Spring	A	Released

The following illustration shows a BOM listing for a non-modeled part (lubricant). Its unit of measurement is set to milliliter.



The screenshot shows a software interface for a BOM. At the top, there is a 'Structure:' label, a dropdown menu set to 'Multi-Level', and a checkbox for 'Show Reference Designators'. Below this is a table with the following data:

Number	Quantity	Units	Category Name (Historical)	Title (Item,CO)	Revision	State
100012		Milliliter	Purchased	ICU O-Ring lubricant	A	Released

## Examples of Assembly BOMs

The following illustration shows the BOM for an ICU valve main assembly, including parts, subassemblies, and non-modeled items such as paint and lubricant.

Notice that the row numbers start at 1 (one) for each level of the structured BOM and increment until all items in that level are listed.

Number	Row	Quantity	Units	Category Name (Hist...	Title (Item,CO)	Revision	State
100009	1		Each	Assembly	ICU Valve Main Assembly	C	Released
100007	1	1	Each	Part	Housing	A	Released
100005	2	1	Each	Part	End Cap	A	Released
100008	3	1	Each	Part	Left Button	B	Work In Progress
100017	1	15	Milliliter	Purchased	ICU Button Paint	-	Work In Progress
100004	4	1	Each	Part	Right Button	B	Work In Progress
100017	1	15	Milliliter	Purchased	ICU Button Paint	-	Work In Progress
100002	5	2	Each	Assembly	Valve Assembly	C	Work In Progress
100010	1	1	Each	Part	Valve	B	Released
100003	2	3	Each	Part	O Ring	A	Released
100006	3	1	Each	Part	Valve Spring	A	Released
100012	4	30	Milliliter	Purchased	ICU O-Ring lubricant	A	Released
100016	6	1	Each	Document	ICU Valve Rendering	B	Released
100015	7	1	Each	Document	ICU Valve Rendering - Internals	B	Released

The following illustration shows the BOM for an ICU valve left button. Notice that another item (button paint) is linked to the button part, making it an assembly.

Structure:

Multi-Level  Show Reference Designations

Number	Row	Quantity	Units	Category Name (Hist...	Title (Item,CO)	Revision	State
100008	1		Each	Part	Left Button	B	Work In Progress
100017	1	15	Milliliter	Purchased	ICU Button Paint	-	Work In Progress

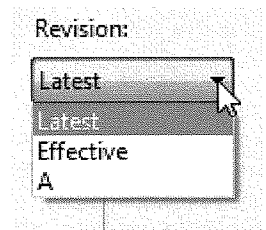
## Viewing a Bill of Materials

You can change your view of an item's Bill of Materials based on item revision, date, or BOM structure.

### By Revision

Select the desired revision. Depending on the item and its state, you may also select one of the following from the list:

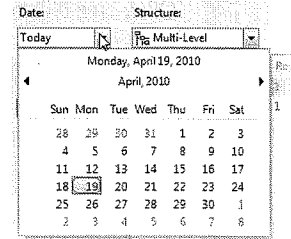
- Latest – The current BOM, which may be in any state and the items in the BOM may be in any state.
- Effective – The current effective BOM, which is the latest released BOM with all items in a released state.
- Past effective – Past effective BOMs that have been superseded. Obsolete items display past effective revisions.



## By Date

Select the desired date and the BOM in effect at that date will be displayed.

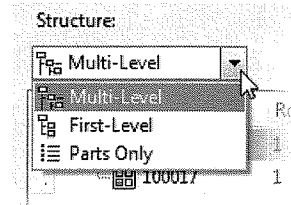
Select a date from the calendar to display the item's BOM in effect on that date.



## By BOM Structure

You can also select from three types of BOM structures:

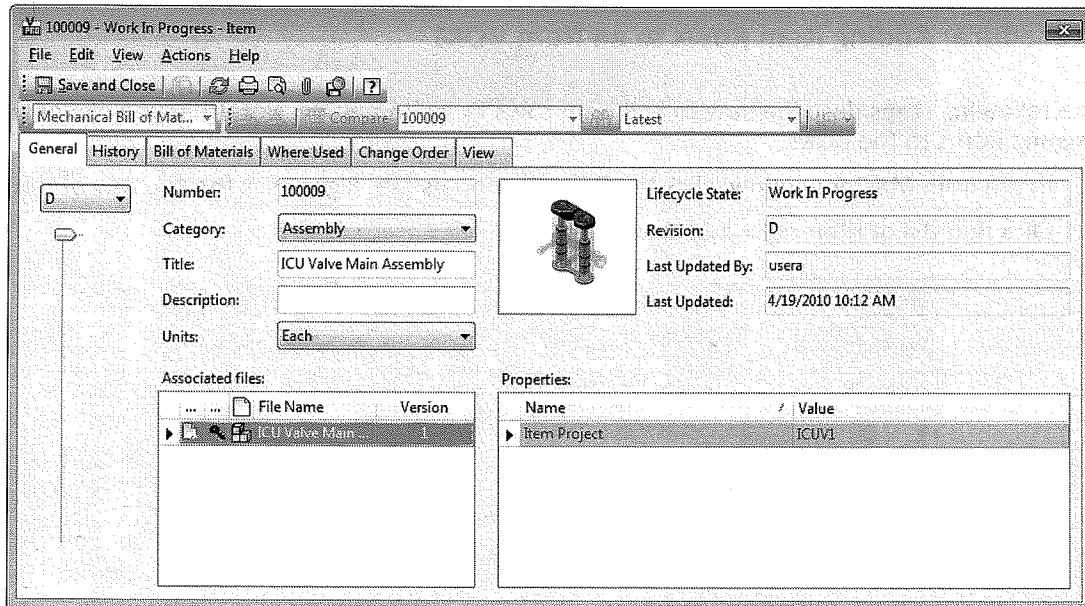
- **Multilevel** – A tree structure of all child items in the current BOM. This is the most useful of the three BOM structures.
- **First Level** – This displays only the first-level child items of the current item.
- **Parts Only** – The BOM is flattened to a single level. No subassembly items are displayed.



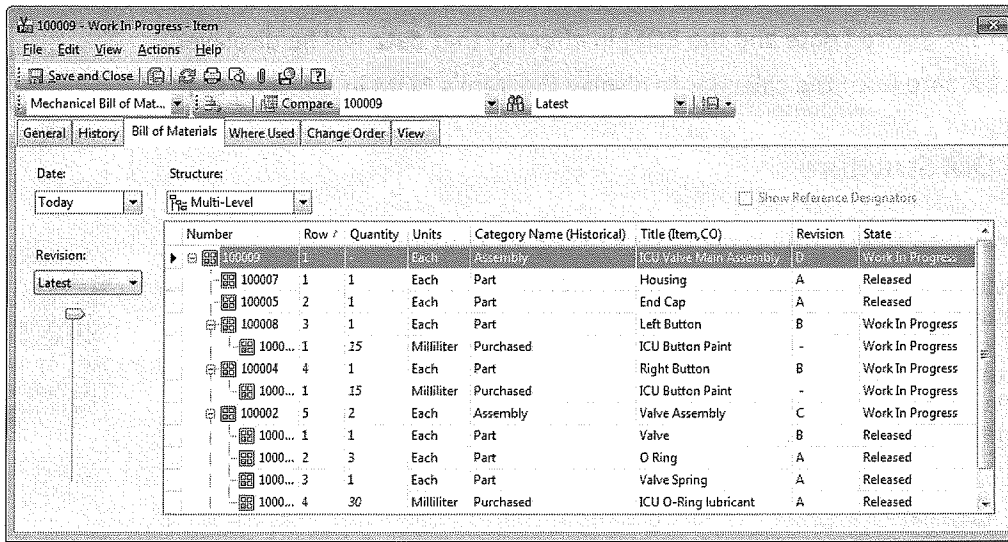
## Editing a BOM

You can view an item's BOM on the BOM tab in the Item Master. You must open the Item Editor to make changes to the BOM. The item must be in a Work in Progress state.

To edit an item, double-click it in the Item Master. The Edit Item dialog box is displayed.



Click the Bill of Materials tab to access the BOM data.



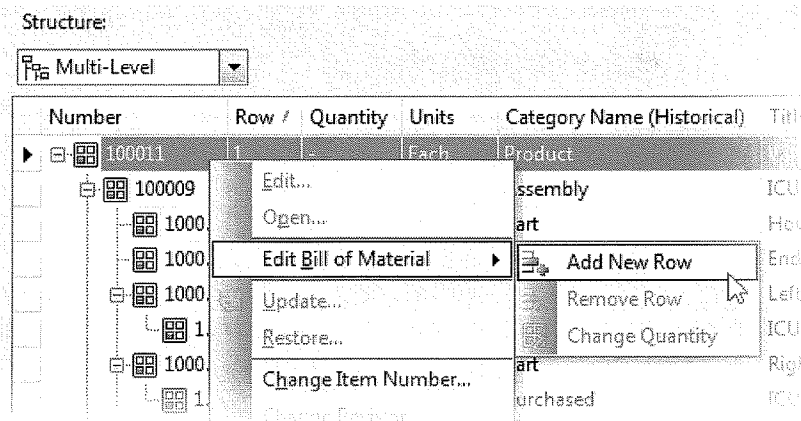
Notice that the BOM Item toolbar is active. Using this toolbar, you can add, delete, and renumber item rows and compare BOM revisions.



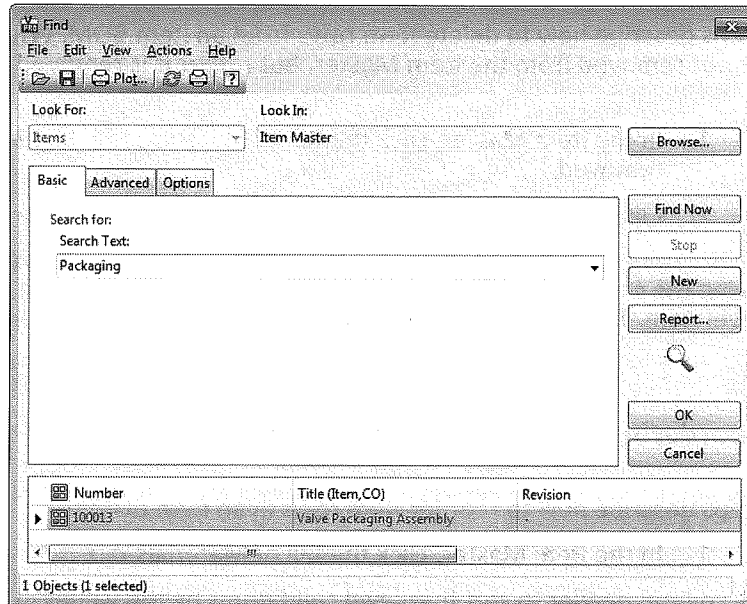
### Procedure: Adding Item Rows to an Item BOM

The following steps describe how to add item rows to an item BOM. Note that you can only add existing items to the BOM.

1. In the Item Master window, click the Bill of Materials tab. Right-click the top row of the BOM.
2. Click Edit Bill of Material > Add New Row.



- Enter the item number or search for the item in the list.



- Click OK. The new item row appears in the BOM list.

Number	Row #	Quantity	Units	Category Name (Historical)	Title (Item,CO)	Revision	State
100011	1	-	Each	Product	Valve Assembly Packaged...	C	Work In Progress
100009	1	1	Each	Assembly	ICU Valve Main Assembly	D	Work In Progress
100007	1	1	Each	Part	Housing	A	Released
100005	2	1	Each	Part	End Cap	A	Released
100008	3	1	Each	Part	Left Button	B	Work In Progress
1...	1	15	Milliliter	Purchased	ICU Button Paint	-	Work In Progress
100004	4	1	Each	Part	Right Button	B	Work In Progress
1...	1	15	Milliliter	Purchased	ICU Button Paint	-	Work In Progress
100002	5	2	Each	Assembly	Valve Assembly	C	Work In Progress
1...	1	1	Each	Part	Valve	B	Released
1...	2	3	Each	Part	O Ring	A	Released
1...	3	1	Each	Part	Valve Spring	A	Released
1...	4	30	Milliliter	Purchased	ICU O-Ring lubricant	A	Released
100016	6	1	Each	Document	ICU Valve Rendering	B	Released
100015	7	1	Each	Document	ICU Valve Rendering - Int...	B	Released
100014	2	1	Each	Document	ICU Valve Instructions	B	In Review
100013	3	1	Each	General	Valve Packaging Assembly	-	Released



You can edit a BOM only if it is displayed in the Multi-level view (BOM tree view) that shows the relationships between the items. You cannot edit a BOM if it is displayed in the First Level or Parts Only list views (the flat BOM view). Any row that you add to the BOM becomes a first-level child item of the top-level item. To add items to a subassembly, you edit that item and add the item rows there.

## Procedure: Deleting Item Rows from an Item BOM

The following steps describe how to delete item rows from an item BOM. When you delete an item from a BOM it is not removed from the Item Master, but rather it is removed from the BOM for the top-level item.

1. In the Item Master, click the Bill of Materials tab. Right-click the item row to be removed.
2. Click Edit Bill of Material > Remove Row. The item row is removed.



**CAUTION:** You receive no warning that the row will be removed. Make sure you are removing the correct row. You can remove only item rows that are first level children of the top-level item. To remove items in subassemblies, you must edit the subassembly item.

## Procedure: Reordering Item Rows in an Item BOM

The following steps describe how to reorder item rows in an item BOM:

1. In the Item Master, click the Bill of Materials tab.
2. Click the any column header to sort first-level child items by the values in the column. Click the same header to invert the sort order.
3. You can also reorder individual rows if there are multiple items with the same value in the column controlling the sort order. To reorder one or more rows, you select and then drag the rows to their new position.

Number	Row
100002	1
100010	1
100003	2
100006	3
100012	4

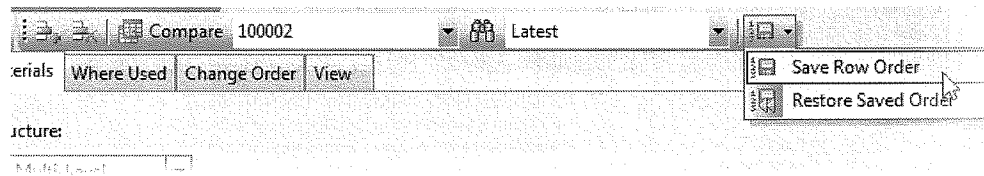
  

Number	Row
100002	1
100010	1
100003	2
100006	3
100012	4

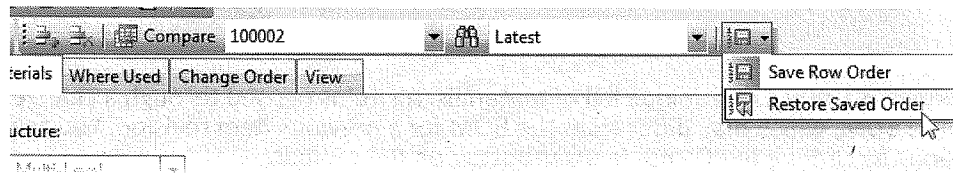
  

Number	Row
100002	1
100012	4
100010	1
100003	2
100006	3

4. On the BOM Item toolbar, click Save Row Order.



- To restore the previous saved BOM order, select Restore Saved Order from the Edit toolbar.



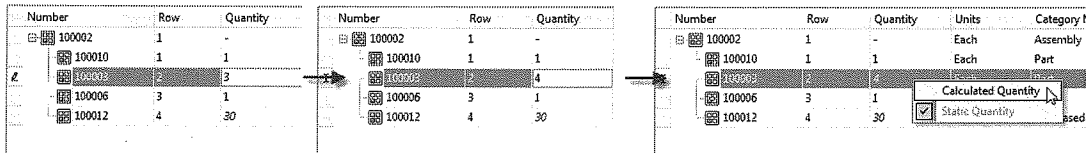
You can reorder only item rows that are first-level child items of the top-level item. You can also reorder the BOM based on the values in a specific column. Click a BOM column header to sort the rows based on the values in that column. Click the same header to reverse the sort order.

### Procedure: Changing BOM Item Quantities

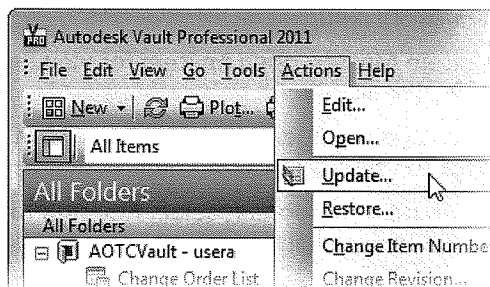
The proper quantities of modeled items are calculated by default. Vault Professional works with the Inventor BOM structure, uses the same units of measure, and automatically adjusts for phantom, reference, or inseparable assemblies.

You can change any quantity in the BOM, including calculated numbers. The following steps describe how to change BOM item quantities.

- In the Item Master, click the Bill of Materials tab. Click the quantity of any item row directly related to the top row.
- Enter a new quantity. This entry is referred to as a static quantity.
- To return to a calculated quantity, select the item row. Right-click the quantity.
- Click Calculated Quantity.



- Click Actions menu > Update. In the Update Item wizard, accept the defaults on each page of the wizard.



- Close the Update Item wizard.

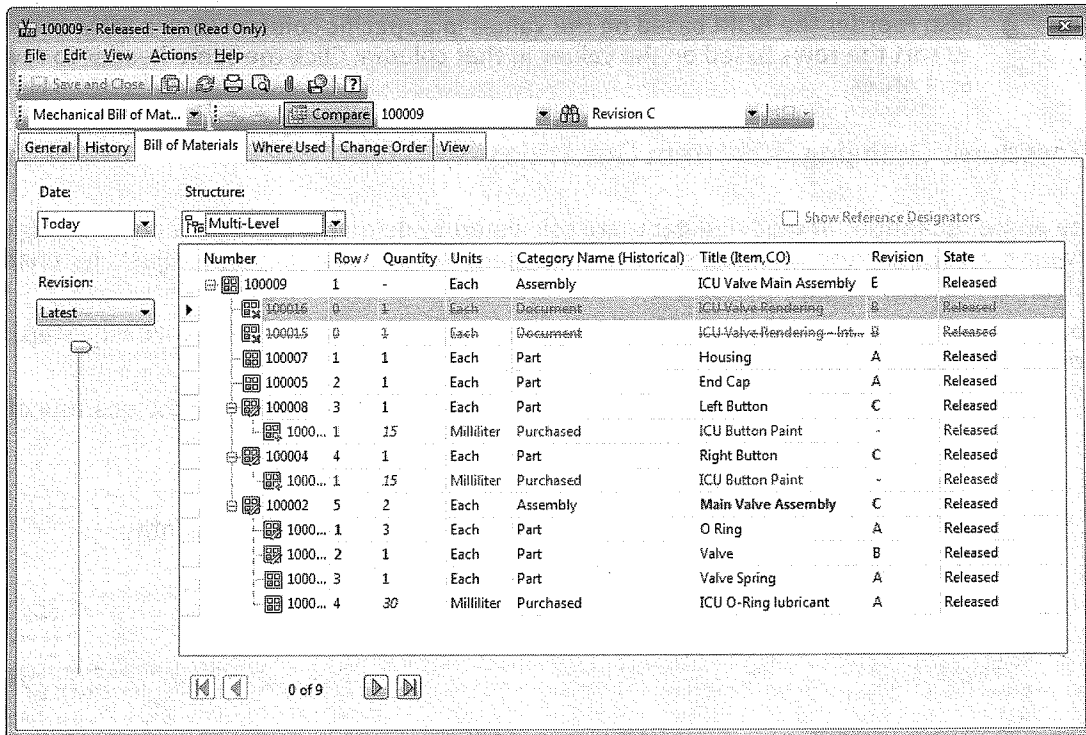


You can only change quantities for first-level child items

# Comparing BOMs

Each revision of an item has a unique bill of materials. All items revised through a change order have an associated BOM, which may differ from the BOM for a previous item revision. You can compare BOM revisions by clicking the Compare BOM button on the toolbar.

You can compare BOM revisions to gain a good perspective on the overall assembly change and status, and to help avoid costly, unnecessary mistakes.



## Procedure: Comparing BOM revisions

The following steps describe how to compare BOM revisions.

1. In the Item Master, open an item for viewing. In the Item dialog box, click the Bill of Materials tab.
2. Use the revision slider to select a base BOM from different revisions, or use the Date list to select a revision that is active on a specific date.
3. On the BOM Item toolbar, select Revision to compare it to the one currently displayed. You can also enter an item number and compare the BOMs of two different items.
4. On the BOM Item toolbar, click Compare.





- Use the navigation controls at the bottom of the Bill of Materials tab to display the changes one at a time. The differences between the two BOMs are highlighted in the preview pane.

Structure: Multi-Level  Show Reference Designators

Number	Row /	Quantity	Units	Category Name (Historical)	Title (Item,CO)	Revision	State
100009	1	-	Each	Assembly	ICU Valve Main Assembly	E	Released
100016	0	1	Each	Document	ICU Valve Rendering	B	Released
100015	0	1	Each	Document	ICU Valve Rendering - Int...	B	Released
100007	1	1	Each	Part	Housing	A	Released
100005	2	1	Each	Part	End Cap	A	Released
100008	3	1	Each	Part	Left Button	C	Released
1000...	1	15	Milliliter	Purchased	ICU Button Paint	-	Released
100004	4	1	Each	Part	Right Button	C	Released
1000...	1	15	Milliliter	Purchased	ICU Button Paint	-	Released
100002	5	2	Each	Assembly	Main Valve Assembly	C	Released
1000...	1	3	Each	Part	O Ring	A	Released
1000...	2	1	Each	Part	Valve	B	Released
1000...	3	1	Each	Part	Valve Spring	A	Released
1000...	4	30	Milliliter	Purchased	ICU O-Ring lubricant	A	Released

2 of 9 Row exists in the revision E of item 100009 but not in the revision C of item 100009

## Key Points

- Items in red do not exist in the displayed BOM.
- Items in blue exist in the displayed BOM, but not in the comparison BOM.
- Items in blue and bold exist in both BOMs, but show differences.

## BOM Output

You can view item BOMs in either tree or list view. Both views can be printed or exported to a Microsoft Excel spreadsheet, a tab-delimited text file, or an HTML page.

You can customize the setup for printing BOMs from the File menu or the toolbar in the Edit Item Record dialog box.

The following illustration shows the use of Print Preview to display the form to be printed.

Preview

File View Background

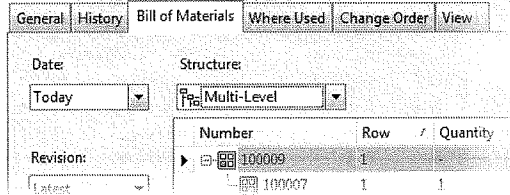
Number	Row	Quantity	Units	Category Name (Historical)	Title (Item,CO)	Revision	State
100009	1	-	Each	Assembly	ICU Valve Main Assembly	E	Released
100007	1	1	Each	Part	Housing	A	Released
100005	2	1	Each	Part	End Cap	A	Released
100008	3	1	Each	Part	Left Button	C	Released
100017	1	15	Milliliter	Purchased	ICU Button Paint	-	Released
100004	4	1	Each	Part	Right Button	C	Released
100017	1	15	Milliliter	Purchased	ICU Button Paint	-	Released
100002	5	2	Each	Assembly	Main Valve Assembly	C	Released
100003	1	3	Each	Part	O Ring	A	Released
100010	2	1	Each	Part	Valve	B	Released
100006	3	1	Each	Part	Valve Spring	A	Released
100012	4	30	Milliliter	Purchased	ICU O-Ring lubricant	A	Released

Page 1 of 1 Zoom Factor: 100%

## Procedure: Formatting and Printing BOMs

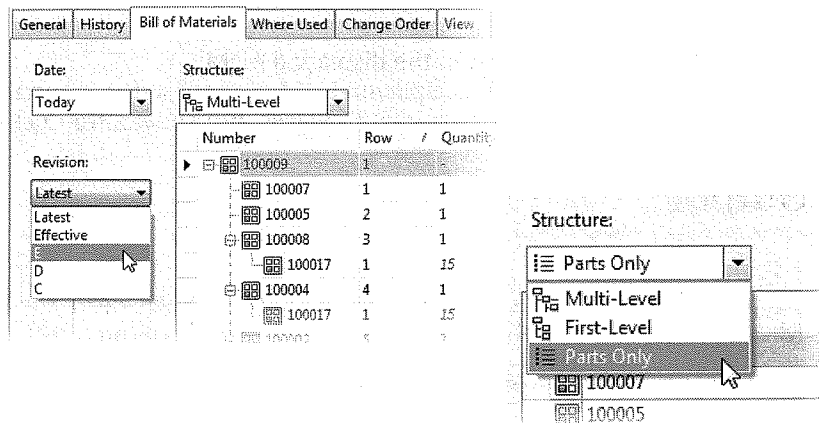
The following steps outline how to prepare and print a bill of materials.

1. In the Open or Edit Item dialog box or in the Preview pane, click the Bill of

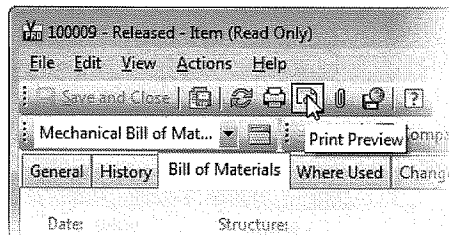


Materials tab.

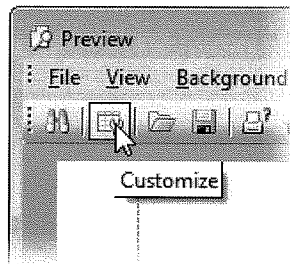
2. Select the BOM revision for the selected item.
3. Select the BOM format from the Structure list.



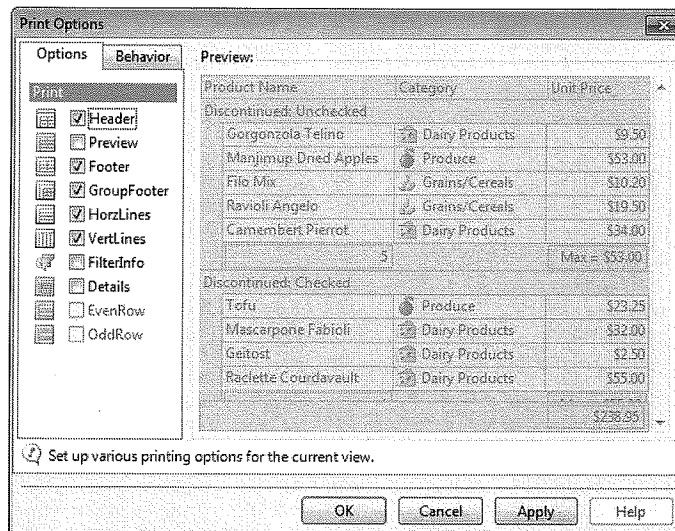
4. Click File menu > Print Preview



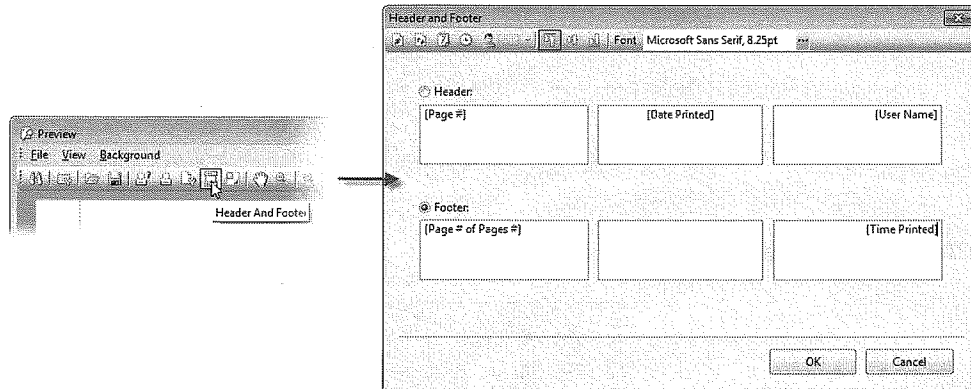
5. In the Print Preview dialog box, click Customize.



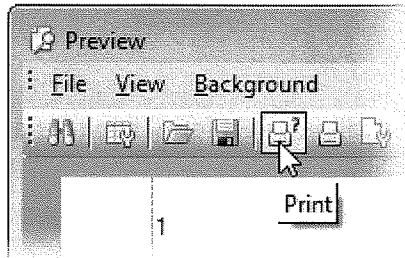
6. In the Printable Component Editor, select format and behavior settings to customize the print out. Click OK.



7. In the Print Preview dialog box, on the toolbar, click Header and Footer or Page Setup to further customize the report.



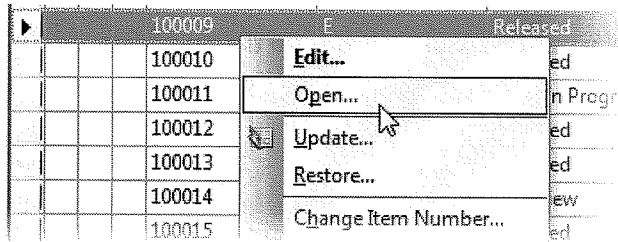
8. Click Print or Print Direct.



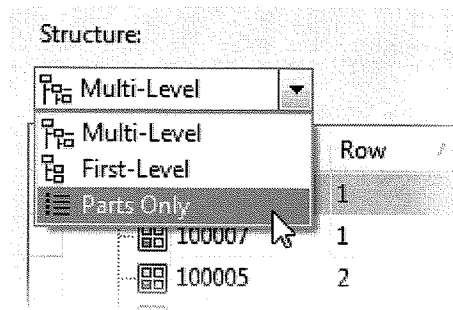
## Procedure: Exporting BOMs

The following steps outline how to export a BOM in a variety of file formats.

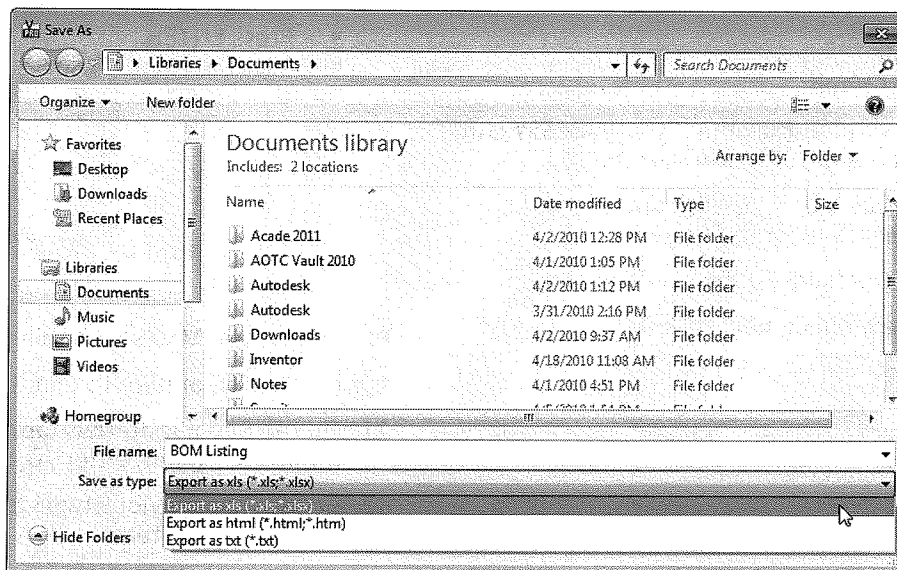
1. In the Item Master window, right-click an item. Click Open.



2. In the Edit Item Record dialog box, click the Bill of Materials tab.
3. Select the BOM format from the Structure list. In this example print the Parts Omlu list of the BOM.



4. Click File menu > Export, or click the Export tool on the Standard toolbar.
5. Select the file type for the export. Enter a file name. Click Save to export the BOM.



# Exercise 1: Work with an Assembly BOM

In this exercise, you manage and edit a product's BOM. You learn to:

- Change BOM quantities.
- Add new items and link items in the BOM.
- Reorder BOM rows.
- View BOMs.
- Redesign the Valve Assembly Packaged Product.
- Compare and export BOMs.

Number	D...	Quantity	Units	Title	Revision
100033	-	-	Each	Valve Assembly Pac...	B
100020	-	1	Each	ICU Valve Main Ass...	-
100021	-	1	Each	ICULBUTN.ipt	A
100022	-	1	Each	ICUHOU5G.ipt	-
100024	-	1	Each	ICUENDCP.ipt	-
100025	-	1	Each	ICURBUTN.ipt	A
100029	-	2	Each	ICUVALVEASSY.iam	A

The completed exercise

## Change BOM Quantities

1. Start Autodesk Vault Professional. Log in using the following information:
  - User Name – usera
  - Password – vault
  - Database – AOTCVault
2. In the Item Master, double-click the ICUVALVEASSY.iam item to edit it. Click the Bill of Materials tab.
3. On the Bill of Materials tab, right-click one of the column headers. Select Customize View.
4. Click Reset to reset the fields to their default state.
5. In the Customize View dialog box, click Fields.

6. Do the following:
  - For Select Available Fields From, select Item Fields.
  - Under Available Fields, select Units.
  - Click Add.
  - If Item Icon is not shown in the Show These Fields in This Order list, add it to the list.
  - Under Show These Fields in This Order, select Units.
  - Click Move Up until it appears below Quantity.
  - Move Item Icon below Number.
  - Click OK.

Show these fields in this order:

Number
Item Icon
Detail ID
Quantity
Units
Title (Item,CO)
Revision
State

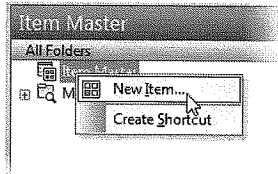
7. In the Customize View dialog box, click Close.
8. On the Bill of Materials tab, select the ICU O-Ring Lubricant item. Do the following:
  - For Quantity, enter 30.
  - Press ENTER.
  - Click Save and Close.

Number	Detail ID	Quantity	Units	T
100002	-	-	Each	IC
100010	-	1	Each	IC
100003	-	3	Each	IC
100006	-	1	Each	IC
100011	-	30	Milliliter	IC

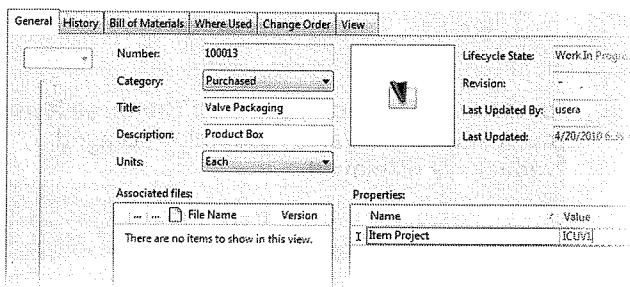
9. In the Item Master, double-click the
10. ICULBUTN.ipt item to edit it.
11. On the Bill of Materials tab, for the quantity of the ICU button paint, enter 20. Click Save and Close.
12. Repeat the previous two steps for the ICURBUTN.ipt item.

## Add New Items and Link Items in the BOM

1. Under All Folders, right-click Item Master.
2. Click New Item.

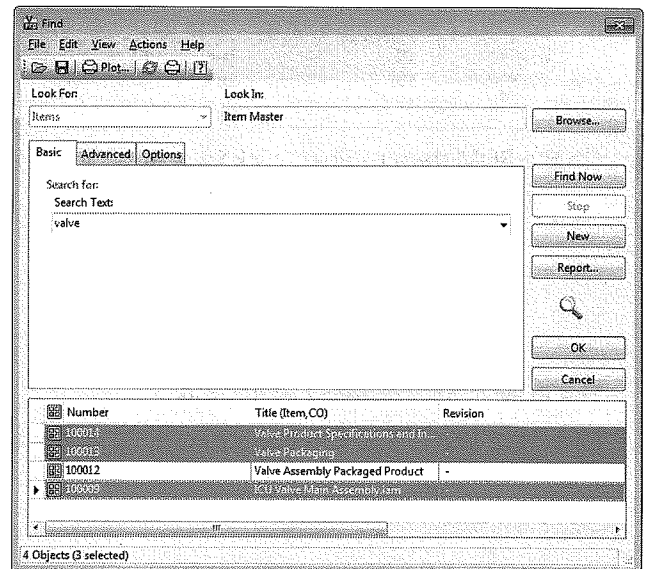


3. Enter the following information for the new item:
  - For Category, select Product.
  - For Item Title, enter Valve Assembly Packaged Product.
  - Press ENTER.
4. To complete the information for the new item, do the following:
  - For Units, verify that Each is selected.
  - Under Item Properties, select the Item Project row.
  - For value, enter ICUV1.
  - Click Save and Close.
5. Under All Folders, right-click Item Master.
6. Click New Item.
7. Enter the following information for the new item:
  - For Category, select Purchased.
  - For Item Title, enter Valve Packaging.
  - Press ENTER.
  - For Item Description, enter Product Box.
  - Press ENTER.
8. To complete the information for the new item, do the following:
  - For Units, verify that Each is selected.
  - Under Properties, select the Item Project row.
  - For value, enter ICUV1.
  - Click Save and Close.



9. Under All Folders, right-click Item Master.
10. Click New Item.

11. Enter the following information for the new item:
  - For Category, select Document.
  - For Item Title, enter Valve Product Specifications and Instructions Sheet.
  - Press ENTER.
  - For Item Description, enter Product Spec.
  - Press ENTER.
12. To complete the information for the new item, do the following:
  - For Units, verify that Each is selected.
  - Under Properties, select the Item Project row.
  - For value, enter ICUV1.
  - Click Save and Close.
13. In the Item Master, double-click the Valve Assembly Packaged Product item to edit it. Click the Bill of Materials tab.
14. Right-click the Valve Assembly Package Product. Click Edit Bill of Material > Add New Row.
15. In the Find dialog box, click the Basic tab if it is not selected already. Do the following:
  - For Search Text, enter valve.
  - Click Find Now.
16. Select the following items in the Found list:
  - ICU Valve Main Assembly.iam.
  - Valve Product Specification and Instructions Sheet.
  - Valve Packaging.
  - Click OK.



- In the Bill of Materials, select the ICU Valve Main Assembly row. Press \* on the numeric keypad to expand the view to its children. Your BOM should look like the following illustration.

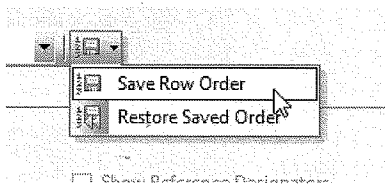
Number	Detail ID	Quantity	Units	Title (Item,CO)
100012			Each	Valve Assembly Packaged Product
100014		1	Each	Valve Product Specifications
100013		1	Each	Valve Packaging
100009		1	Each	ICU Valve Main Assembly.iam
100007		1	Each	ICUHOUSG.ipt
100005		1	Each	ICUENDCP.ipt
100008		1	Each	ICULBUTN.ipt
100015		20	Milliliter	ICU Button Paint
100004		1	Each	ICURBUTN.ipt
100015		20	Milliliter	ICU Button Paint
100002		2	Each	ICUVALVEASSY.iam
100010		1	Each	ICUVALVE.ipt
100003		3	Each	ICURING.ipt
100006		1	Each	ICUSPRNG.ipt
100011		30	Milliliter	ICU O-Ring Lubricant

## Reorder BOM Rows

- Review the rows in the BOM. They are not in the desired order. Company policy requires the packaging to be the last item in the BOM.
- Click the (-) sign to close the ICU Valve Main Assembly.iam tree view.
- Drag the Valve Packaging row to the bottom of the list.
- Drag the Valve Product Specification Sheet down to the last row.

Number	Detail ID	Quantity	Units	Title (Item,CO)
100012			Each	Valve Assembly Packaged Product
100014		1	Each	Valve Product Specifications
100009		1	Each	ICU Valve Main Assembly.iam
100013		1	Each	Valve Packaging

- On the BOM Item toolbar, click Save Row Order.



The BOM is now ordered as desired.

- Click Save and Close. The Valve Assembly Package is complete.

- In the Item Master, right-click Valve Assembly Packaged Product. Select Change State.
- In the Select Lifecycle dialog box, select Released. Click OK.

Notice that all the children (the components) of the Valve Assembly Package were also released.

## View BOMs

- In the Item Master, select the Valve Assembly Packaged Product if it is not selected already.
- In the item detail pane, click the Bill of Materials tab. Review the BOM rows. Notice that the quantity of the O-ring lubricant is 30 milliliters in the ICUVALVEASSY item. (There are two ICUVALVEASSY items.)

Number	Quantity	Units	Title (Item,CO)
100004	1	Each	ICURBUTN.ipt
100015	20	Milliliter	ICU Button Paint
100002	2	Each	ICUVALVEASSY.iam
100010	1	Each	ICUVALVE.ipt
100003	3	Each	ICURING.ipt
100006	1	Each	ICUSPRNG.ipt
100011	30	Milliliter	ICU O-Ring Lubricant
100013	1	Each	Valve Packaging
100014	1	Each	Valve Product Specifications

- For Structure, select Parts Only. Notice the quantity of the ICU O-ring lubricant (60 milliliters). This value is the correct total because there are two ICUVALVEASSY items with 30 milliliters of lubricant each.

Structure:

Parts Only

Number	Quantity	Title (Item,CO)
100003	2	ICUVALVEASSY.iam
100005	1	ICUENDCP.ipt
100006	2	ICUSPRNG.ipt
100007	1	ICUHOUSG.ipt
100010	2	ICUVALVE.ipt
100011	60	ICU O-Ring Lubricant
100013	1	Valve Packaging
100014	1	Valve Product Specifications and Inst
100015	40	ICU Button Paint

- For Structure, select First Level. The three items you linked to the Valve Assembly Packaged Product are displayed.

Structure:

First-Level

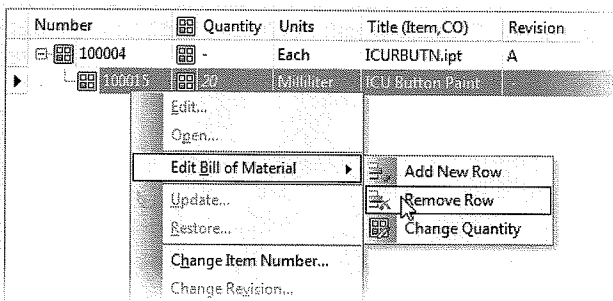
Number	Quantity	Title (Item,CO)
100009	1	ICU Valve Main Assembly.iam
100013	1	Valve Packaging
100014	1	Valve Product Specifications and Instructions

- For Structure, select Multi-Level to return to the structured BOM list.

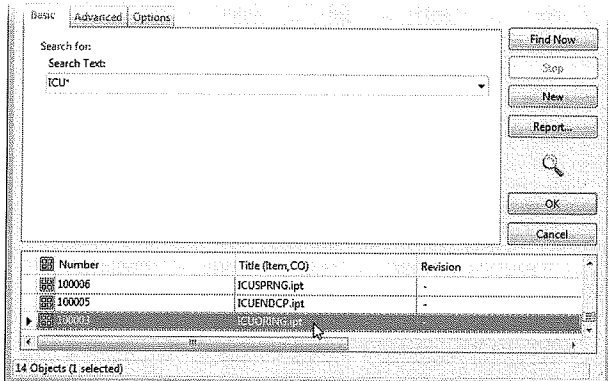


## Redesign the Valve Assembly Package

1. In the Item Master, right-click the ICULBUTN.ipt item. Click Change State.
2. In the Select Lifecycle dialog box, select Work in Progress. Click OK.
3. Repeat steps 1 and 2 to change the lifecycle state to Work in Progress for the ICURBUTN.ipt, ICUVALVEASSY.iam, and Valve Assembly Packaged Product items.
4. Double-click ICURBUTN.ipt item to edit it. On the Bill of Materials tab, do the following:
  - Select the ICU Button Paint row.
  - Right-click the selected row.
  - Click Edit Bill of Material > Remove Row.
  - Click Save and Close.



5. Repeat the previous step to remove the ICU Button Paint row from the ICULBUTN.ipt item.
6. In the Item Master, double-click the Valve Assembly Packaged Product item to edit it. Click the Bill of Materials tab.
7. Select and right-click the top row. Click Edit Bill of Material > Add New Row.
8. In the Find dialog box, do the following:
  - Click the Basic tab if it is not selected already.
  - Under Search Text, enter ICU\*.
  - Click Find Now. A number of items are returned in the search results.
  - Select the ICUORING.ipt row.
  - Click OK.



9. The ICUORING.ipt item is added to the BOM. Do the following:

- Change its quantity to 3.
- Click Save and Close.

Number	Quantity	Units	Title (Item,CO)
100012	-	Each	Valve Assembly Packaged Prod...
100009	1	Each	ICU Valve Main Assembly.iam
100013	1	Each	Valve Packaging
100014	1	Each	Valve Product Specifications an...
100003	3	Each	ICUORING.ipt

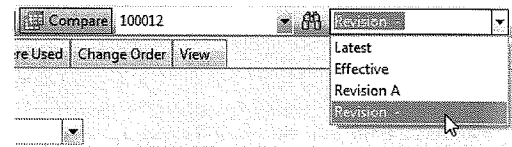
10. In the Item Master, change the lifecycle state of the Valve Assembly Packaged Product item to Released. If prompted to confirm the state change for children, click Yes.

## Compare BOMs between Revisions

11. In the Item Master, right-click the Valve Assembly Packaged Product item and select Open. Click the Bill of Materials tab.

12. In the BOM Item toolbar, do the following:

- Select Revision -.
- Click Compare.

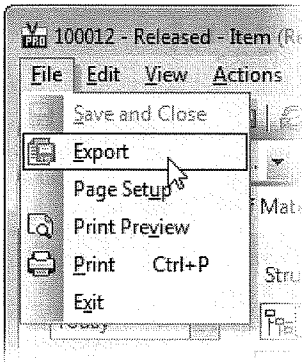


13. Review the changes. All items removed are red and items added are blue. Items in blue and bold differ between the two revisions.

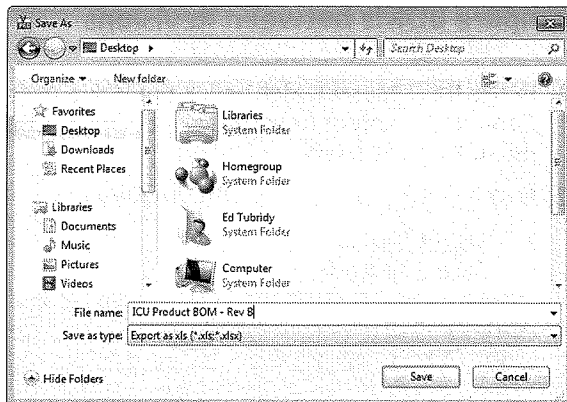
Number	Quantity	Units	Title (Item,CO)	Revision	State
100012	-	Each	Valve Assembly Package	A	Released
100009	1	Each	ICU Valve Main Assembl...	-	Released
100007	1	Each	ICUHOUSG.ipt	-	Released
100005	1	Each	ICUENDCP.ipt	-	Released
100008	1	Each	ICULBUTN.ipt	A	Released
100015	20	Milliliter	ICU Button Paint	-	Released
100004	1	Each	ICURBUTN.ipt	A	Released
100015	20	Milliliter	ICU Button Paint	-	Released
100002	2	Each	ICUVALVEASSY.iam	A	Released
100010	1	Each	ICUVALVE.ipt	-	Released
100003	3	Each	ICUORING.ipt	-	Released
100006	1	Each	ICUSPRNG.ipt	-	Released
100011	30	Milliliter	ICU O-Ring Lubricant	-	Released
100013	1	Each	Valve Packaging	-	Released
100014	1	Each	Valve Product Specificati...	-	Released
100003	3	Each	ICUORING.ipt	-	Released

14. On the BOM Item toolbar, click Compare to turn off the BOM comparison.

15. In the dialog box, click File menu > Export.



16. For File Name, enter ICU Product BOM - Rev B. Click Save.



17. Open Microsoft Excel. Open ICU Product BOM - Rev B.XLS.

18. If the Import Text Wizard dialog box is displayed, do the following:

- Click Next.
- Click Next.
- Click Finish.

	A	B	C	D	E	F	G
1	Number	Item Icon	Quantity	Units	Title (Item.CO)	Revision	State
2	100012	NORMAL	-	Each	Valve Assembly Packaged Product	A	Released
3	100009	NORMAL	1	Each	ICU Valve Main Assembly.iam	-	Released
4	100007	NORMAL	1	Each	ICUHOUSG.ipt	-	Released
5	100005	NORMAL	1	Each	ICUENDCP.ipt	-	Released
6	100008	NORMAL	1	Each	ICULBUTN.ipt	A	Released
7	100004	NORMAL	1	Each	ICURBUTN.ipt	A	Released
8	100002	NORMAL	2	Each	ICUVALVEASSY.iam	A	Released
9	100010	NORMAL	1	Each	ICUVALVE.ipt	-	Released
10	100003	NORMAL	3	Each	ICUORING.ipt	-	Released
11	100006	NORMAL	1	Each	ICUSPRNG.ipt	-	Released
12	100011	NORMAL	30	Milliliter	ICU O-Ring Lubricant	-	Released
13	100013	NORMAL	1	Each	Valve Packaging	-	Released
14	100014	NORMAL	1	Each	Valve Product Specifications and Instructions Sheet	-	Released
15	100003	NORMAL	3	Each	ICUORING.ipt	-	Released

19. Close Vault Professional and Excel.

# Lesson 2: Integration with Autodesk Inventor

## Overview

This lesson describes how to use Autodesk Vault Professional with other applications. The primary focus is the relationship between Autodesk Inventor and Vault Professional BOMs. The lesson also covers working with Vault Professional and Autodesk Vault, AutoCAD®, AutoCAD® Mechanical, and AutoCAD® Electrical.

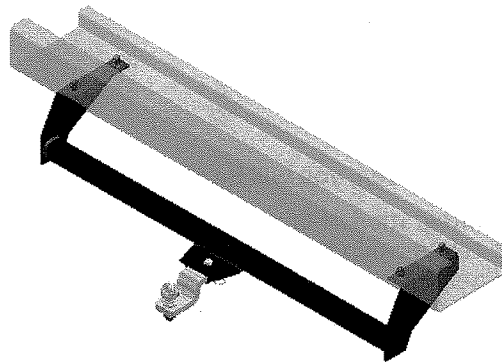
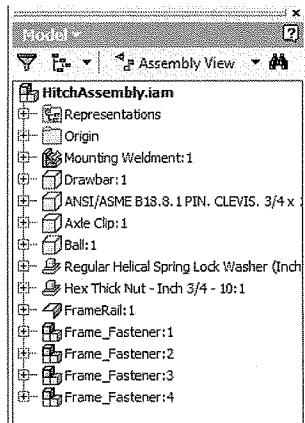
### Objectives

After completing this lesson, you will be able to:

- Describe the integration of Inventor, Vault, and Vault Professional.
- Describe the relationship between an Inventor bill of materials (BOM) and the associated Vault Professional item BOM.
- Work with Autodesk Inventor virtual components.
- Customize content center library components to use with Vault Professional.
- Describe how Vault and Vault Professional work with drawing files.

# About Inventor, Vault, and Vault Professional Integration

Autodesk Vault Professional works with documents and data stored in a vault that is created and managed by Autodesk Vault. Both products are built on a web services foundation, Users (particularly creators and administrators) must be familiar with the relationship between files and properties stored in the vault and items in Vault Professional. Vault Professional users who create Inventor CAD models use Vault to manage works in progress. Users can then use Vault Professional to assign item numbers to vaulted parts and assemblies. You can edit assembly BOMs in both Autodesk Inventor and Vault Professional, and coordinate property information between Autodesk Inventor, Autodesk Vault, and Autodesk Vault Professional.



Number	Revision	State	Title (Item,CO)	Description (Item,CO)	Category Na...
100018	-	Work In Progress	ANSI AISC 2x2x 1/4 - 1200mm	Cross Bar	Part
100019	-	Work In Progress	Hitch Ball	Hitch Ball	Part
100020	-	Work In Progress	end_plate_RH.ipt	End Plate - RH	Part
100021	-	Work In Progress	Draw Bar	Draw bar	Part
100022	-	Work In Progress	DrawBarMountBottomPlate.ipt	Draw Bar Bottom Plate	Part
100023	-	Work In Progress	ANSI/ASME B18.8.1 PIN. CLEVIS. 3/4 x 1.91	Clevis Pin	Purchased
100024	-	Work In Progress	Axle Clip.ipt	Axle Clip	Purchased
100025	-	Work In Progress	ISO 8678 M12 x 25	Cup Head Square Neck B...	Purchased
100026	-	Work In Progress	Hex Thick Nut - Inch 3/4 - 10	Hex Thick Nut	Purchased
100027	-	Work In Progress	Mounting Weldment.iam	Hitch Weldment	Assembly
100028	-	Work In Progress	Regular Helical Spring Lock Washer (Inch) ...	Helical Spring Lock Washer	Purchased
100029	-	Work In Progress	Hitch Assembly	Hitch assembly	Assembly
100030	-	Work In Progress	IS 3063 12	Spring Washer	Purchased

## Application Overviews

Autodesk Inventor is a 3D, parametric CAD application. You can combine individual part models in a hierarchy of assemblies to create a complete digital design. You supply values for intrinsic document properties and can add custom properties to any part or assembly.

Use Autodesk Vault to provide work-in-progress version control for Inventor models and other documents. A vault stores versions of documents, file relationships between documents, and property data associated with each version. You check files out of the vault to modify them in Inventor and check in the new versions to share with your design team.

When you use Autodesk Vault Professional to assign items to these files, users outside the engineering department can access property and bill of materials data from the files stored in a vault.

## Working with Autodesk Vault Professional and Autodesk Vault

Autodesk Vault Professional is an external application that adds manufacturing and release data to documents in the vault. You create an Autodesk Vault Professional item when you assign an item number to a file stored in the vault. Initial property values for the item are extracted from the property information stored in the vault. After it is created, the item is connected to the file in the vault, but property values are largely independent. You can add Autodesk Vault Professional items without associating them to a vault file.

You need to understand how actions in Autodesk Vault Professional affect the associated files in Autodesk Vault because a number of tasks can be completed only when files are checked in to the vault, and lifecycle state changes can affect the state of the associated files in Autodesk Vault.

## Autodesk Vault Professional and Autodesk Vault

Number	Revision	State	Title (Item, CO)
100002	A	Released	ICUVALVEASSY.iam
100003	-	Released	ICUORING.ipt
100004	A	Released	ICURBUTN.ipt
100005	-	Released	ICUENDCP.ipt
100006	-	Released	ICUSPRNG.ipt
100007	-	Released	ICUHOUSG.ipt

File Name	Revision	State
ICU Valve Main Assembly.iam		
ICUENDCP.ipt		
ICUHOUSG.ipt		
ICULBUTN.ipt		
ICUORING.ipt		
ICURBUTN.ipt		
ICUSPRNG.ipt		
ICUVALVE.ipt		
ICUVALVEASSY.iam		

All of the associated files of a released item in Vault Professional are locked in the vault.

## Working with Autodesk Vault Professional and Autodesk Inventor

When you create an item from a part or assembly stored in a vault, Autodesk Vault Professional extracts property information from Autodesk Vault. The property values are typically assigned in Autodesk Inventor, but you can edit values for existing properties in Autodesk Vault. Item properties can be mapped back to the properties in the associated Autodesk Inventor part or assembly document. If you understand the relationship between properties in all three applications, you can effectively integrate Autodesk Vault Professional into an Autodesk Inventor design environment.

An Autodesk Inventor assembly BOM maps information to the BOM in the associated item in Autodesk Vault Professional. Your understanding of this process helps to ensure its accuracy.

Item	Part Number	BOM Structure	Unit QTY	QTY	Stock Number	Description	REV
1		Purchased	Each	1	ANSI/ASME B18.8.1 PIN...	Clevis Pin	
2		Normal	Each	1		Draw bar	
3		Purchased	Each	1		Axle Clip	
4		Inseparable	Each	1		Hitch Weldment	
5		Purchased	Each	1		Helical Spring Lock Washer	
6		Purchased	Each	1		Hex Thick Nut	
7		Normal	Each	1		Hitch Ball	
8		Purchased	Each	4		Cup Head Square Neck Bolt	
9		Purchased	Each	4		Spring Washer	
10		Purchased	Each	4		Hexagon Domed Cap Nuts	

Autodesk Inventor BOM

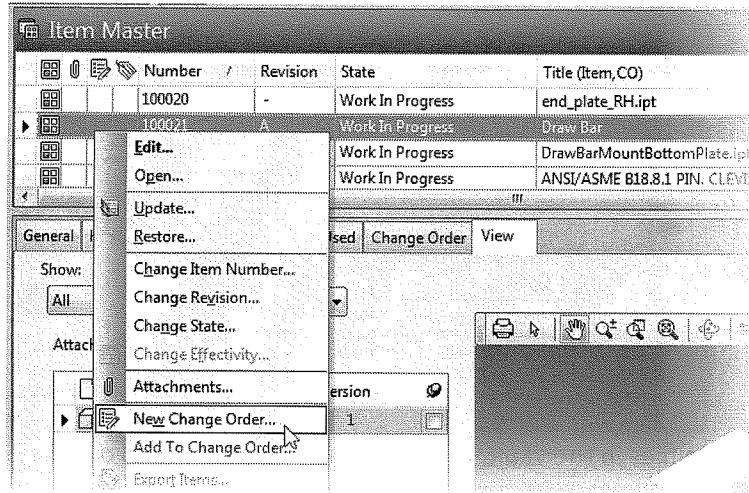
Number	Quantity	Units	Title (Item, CO)	Revision	State
100025		Each	Hitch Assembly	-	Work In Progress
100023	1	Each	ANSI/ASME B18.8.1 PIN. CLEVIS. 3/4 x 1.91	-	Work In Progress
100021	1	Each	Draw Bar	-	Work In Progress
100027	1	Each	Mounting Weldment.ipt	-	Work In Progress
100018	47.244094488189	Inch	ANSI AISC 2x2x1/4 - 1200mm	-	Work In Progress
100020	1	Each	end_plate_RH.ipt	-	Work In Progress
100016	1	Each	end_plate_LH.ipt	-	Work In Progress
100017	1	Each	DrawBarMountTopPlate.ipt	-	Work In Progress
100022	1	Each	DrawBarMountBottomPlate.ipt	-	Work In Progress
100025	4	Each	ISO 8678 M12 x 25	-	Work In Progress
100030	4	Each	IS 3063 12	-	Work In Progress
100031	4	Each	IS 7790 M12	-	Work In Progress
100019	1	Each	Hitch Ball	-	Work In Progress
100028	1	Each	Regular Helical Spring Lock Washer (Inch) ...	-	Work In Progress
100026	1	Each	Hex Thick Nut - Inch 3/4 - 10	-	Work In Progress
100024	1	Each	Axle Clip.ipt	-	Work In Progress

Autodesk Vault Professional BOM

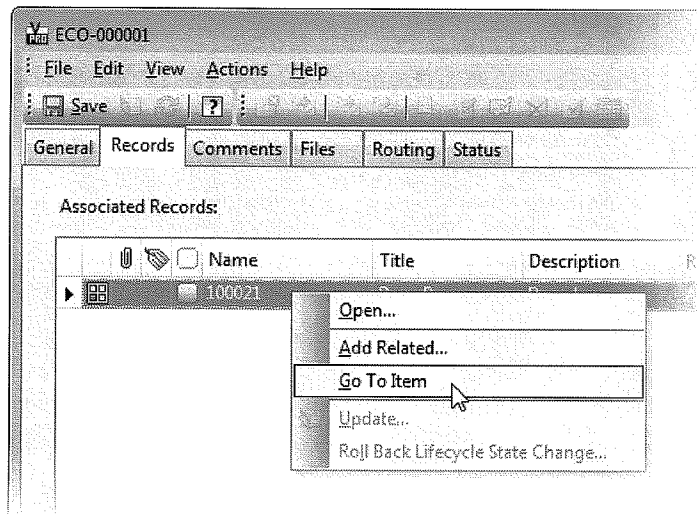
## Example of Application Integration

The following example shows the integration of the three applications. This workflow represents a change order on a Released item. The associated file in the vault is locked when the item is in a Released state.

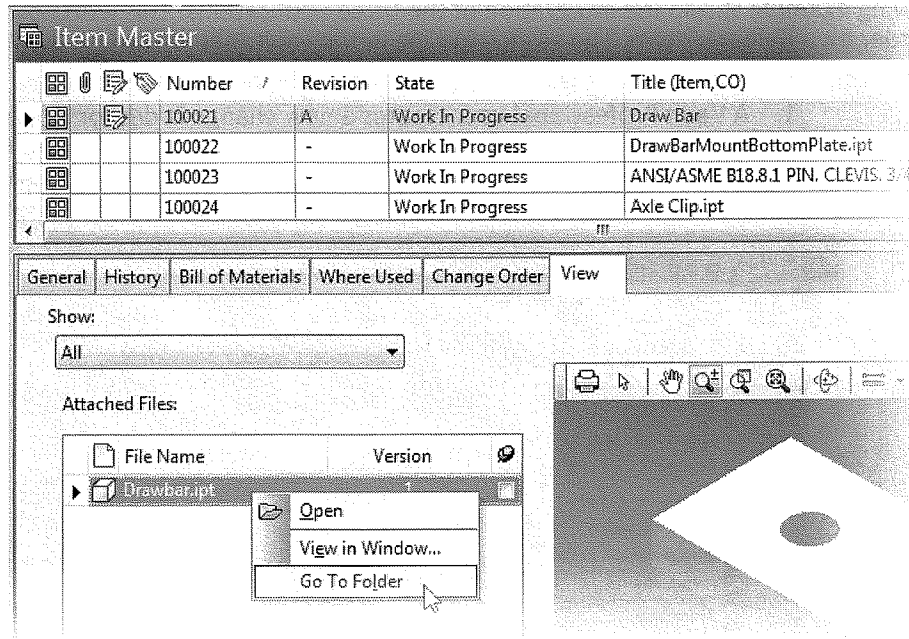
1. A Vault Professional user creates a new change order for a released part or assembly item. On submittal of the change order, the Change Administrator or Responsible Engineer changes the item status changes to Work in Progress creating a new item revision. This action unlocks the part or assembly the vault.



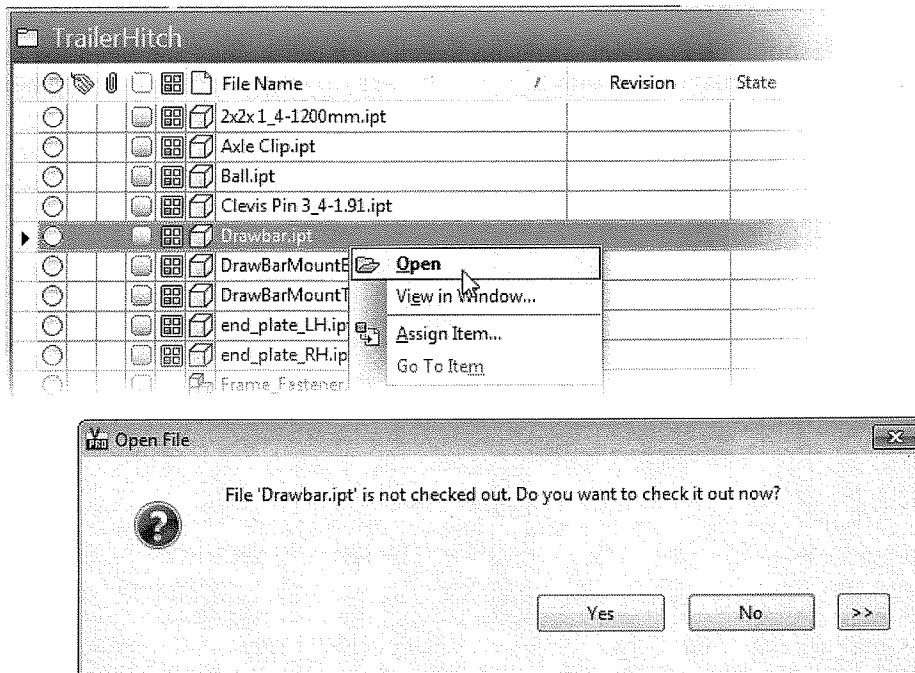
2. When the Responsible Engineer works on the change order, they can open the change order and examine the items associated with it. The items are on the Records tab. From here, the user can directly go to the item.



- Looking at the item, the user can see which file is associated with that needs work and go directly to the vault folder containing the file.

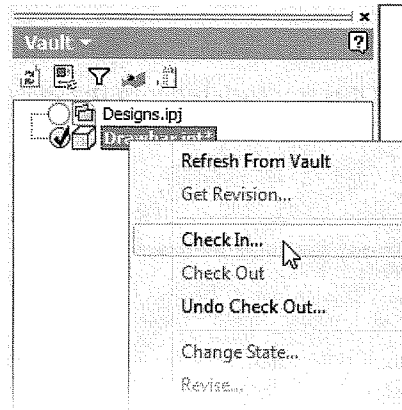


- No looking at the files in the vault, the user can open and checks out the file.

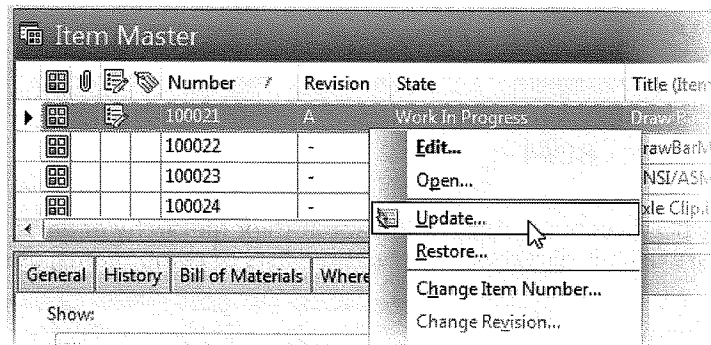




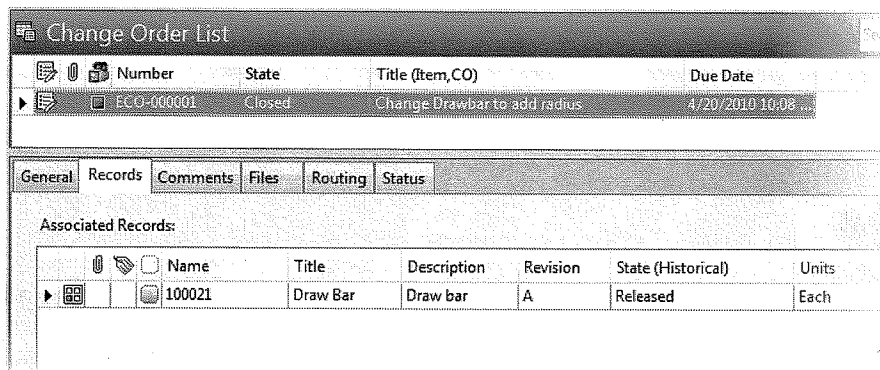
- The Autodesk Inventor user edits the file and checks them back in to the vault.



- The Vault Professional user then updates the item to update the link to the new file version.



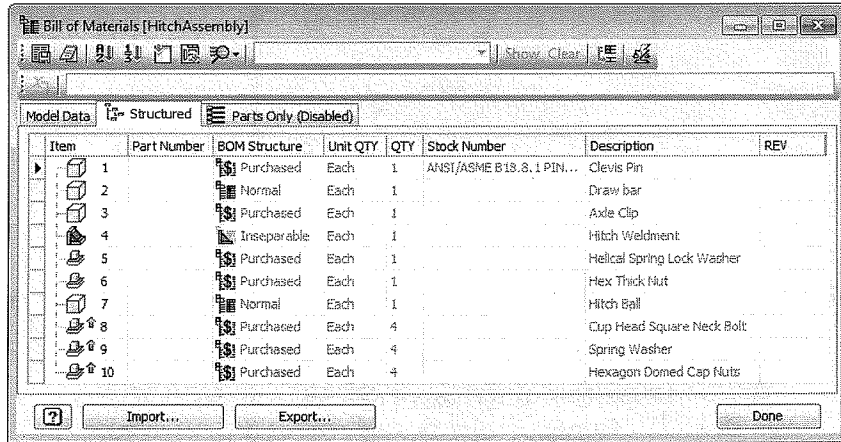
- Finally the change order is completed, returning the item to a Released state. The files are again locked in the vault.



When you check out, edit, and check in a component, you must update the associated item in Autodesk Vault Professional before you can change the lifecycle state of the item. Each item revision is associated with a specific version of the component in the vault. The change order cannot be completed unless the items have been updated.

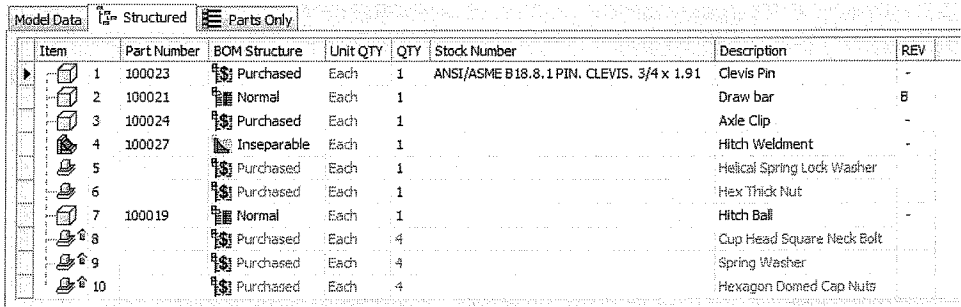
# Inventor BOMs

Information in Inventor assembly BOMs is translated into the BOMs of the associated Vault Professional items.



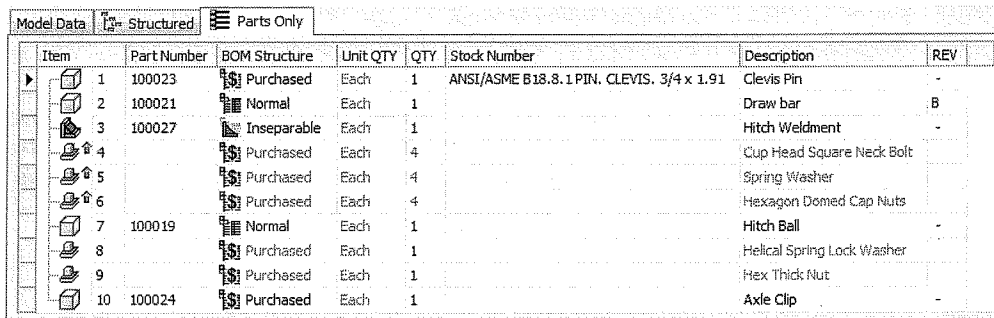
## Definition of Inventor BOM

Inventor assembly BOMs contain information about their hierarchy of parts, subassemblies, and virtual components and are usually displayed as structured lists of components, as shown in the following illustration:



## Parts Only BOM

You can select a Parts Only view that flattens the BOM to a single level and aggregates all parts in the assembly hierarchy as shown in the following illustration:



## BOM Structure

Each part, subassembly, and virtual component in the assembly is assigned a BOM structure that determines the status of the component in the assembly BOM.

The following table explains the display status of individual parts assigned different BOM structure types.

Part BOM Structure	Structured BOM View Status	Parts Only BOM View Status	Notes/Example
Normal	Shown as a single line	Shown as a single line	Default BOM structure for most parts Quantity can be affected by parent BOM structure
Reference	Excluded from view	Excluded from view	Typically assigned to parts that provide reference for the current design
Phantom	Excluded from view	Excluded from view	Skeleton model parts are often assigned a Phantom structure
Purchased	Shown as a single line	Shown as a single line	Assigned to components that are not fabricated
Inseparable	Not normally assigned to parts	Not normally assigned to parts	

The following table outlines the display status of a subassembly and its child components when it is assigned different BOM structure types.

Subassembly BOM Structure	Structured BOM View Status	Parts Only BOM View Status	Notes/Example
Normal	Shown as a single line Child components displayed as subcomponents in the assembly BOM	Excluded from view	Default BOM structure for most subassemblies
Reference	Components and all children excluded from view	Excluded from view	Typically assigned to parts or assemblies that provide reference for the current design
Phantom	Excluded from view Child components promoted to Phantom subassembly level  Quantity of Phantom component affects quantity of promoted children	Excluded from view	A Phantom assembly that groups a bolt, nut, and washers and can reduce model complexity

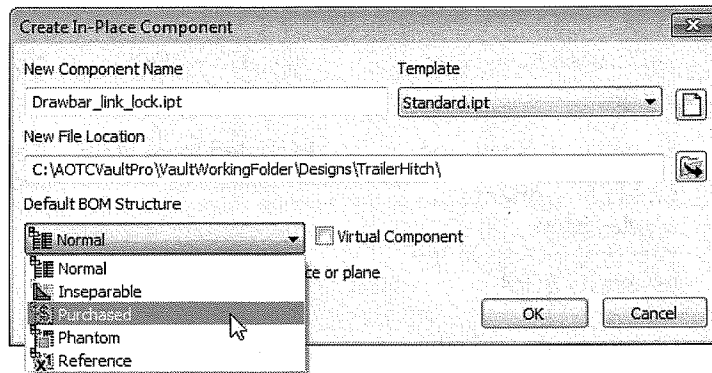
Purchased	Shown as a single line Child components displayed as subcomponents (often not shown in parts list)	Shown as a single line (treated as a part) Child components excluded from view	Assigned to assemblies that are not fabricated
Inseparable	Shown as a single line Child components displayed as subcomponents (often not shown in parts list)	Shown as a single line (treated as a part) Purchased child components promoted and shown Other child components excluded from view	Assigned to assemblies that are not easily disassembled Weldments and riveted assemblies are examples of Inseparable assemblies

A component's BOM structure also determines how the corresponding item is displayed in a Vault Professional BOM.

### Assigning a BOM Structure

Subassemblies retain their current BOM structure when you place them in a higher-level assembly. Parts are assigned Normal BOM structure when placed in an assembly.

The following illustration shows how you select the BOM structure in the Create In-Place Component dialog box.



### Editing a BOM Structure

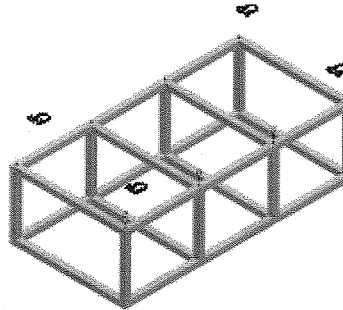
You can change the BOM structure of a component from its default setting to Reference by right-clicking the component in the browser and selecting BOM Structure > Reference. You can restore the default BOM structure using the same steps.

The following illustration shows how you can select any BOM structure for a component in the Bill of Materials dialog box. These options are not available from the browser shortcut menu.

Item	Part Number	BOM Structure	Unit Qty
4	100027	Inseparable	Each
3	100024	Purchased	Each
1	100023	Normal	Each
2	100021	Inseparable	Each
7	100019	Purchased	Each
5		Phantom	Each
6		Reference	Each
8		Purchased	Each
9		Purchased	Each

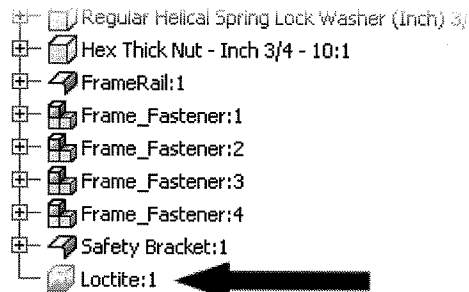
### Example of BOM Structure

You can assign Inseparable BOM structure to the welded frame assembly, as shown in the following illustration. The assembly itself may contain a skeleton part model (Phantom BOM structure), multiple frame members (Normal BOM structure), and purchased components, such as lifting shackles (Normal or Purchased BOM structure).



## Virtual Components

You add virtual (non-geometric) components to assemblies to represent engineering components that cannot be easily modeled.



### Definition of Virtual Components

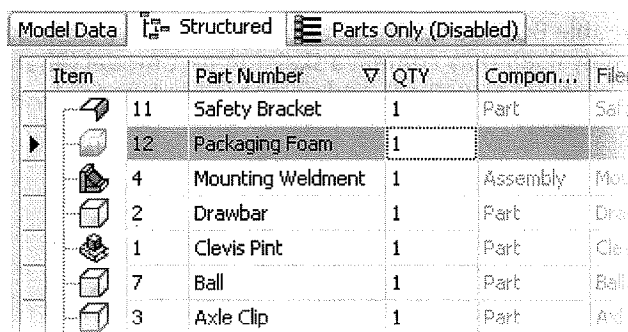
You create virtual components in place in Inventor assemblies. They have no geometry and are not saved as separate files when you save the parent assemblies. Lubricants, glue, and other engineering materials are often represented by virtual parts. You can add any number of virtual components to an assembly.

## Virtual Components and Vault Professional Items

From a BOM perspective, virtual components are similar to user-created items in Vault Professional. You can add a user-created item to the BOM of another item. Similarly, when you add a virtual component to an assembly, it is automatically added to the BOM of the assembly.

When you assign item numbers to an assembly containing virtual components in Vault Professional, each virtual component with Normal, Purchase, or Inseparable BOM structure is assigned a separate item number.

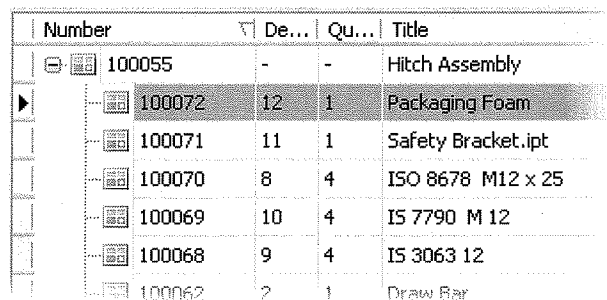
Your company's practices determine whether you should represent something as a virtual component in Inventor, or ignore it in Inventor and add a user-defined item in Vault Professional. You can add key engineering components to Inventor assemblies in the engineering environment. You can add common non-modeled components as items in Vault Professional. As with other items in a Vault Professional BOM, you can override quantity and other values for the item you create from the virtual component.



The screenshot shows the Inventor BOM interface. At the top, there are tabs for 'Model Data', 'Structured', and 'Parts Only (Disabled)'. Below the tabs is a table with columns: Item, Part Number, QTY, Compon..., and Files. The table contains the following data:

Item	Part Number	QTY	Compon...	Files
11	Safety Bracket	1	Part	Saf...
12	Packaging Foam	1		
4	Mounting Weldment	1	Assembly	Mou...
2	Drawbar	1	Part	Draw...
1	Clevis Pint	1	Part	Cle...
7	Ball	1	Part	Ball...
3	Axle Clip	1	Part	Axle...

Inventor BOM with virtual component



The screenshot shows the Vault Professional BOM interface. At the top, there are tabs for 'Number', 'De...', and 'Qu...'. Below the tabs is a table with columns: Number, De..., Qu..., and Title. The table contains the following data:

Number	De...	Qu...	Title
100055	-	-	Hitch Assembly
100072	12	1	Packaging Foam
100071	11	1	Safety Bracket.ipt
100070	8	4	ISO 8678 M12 x 25
100069	10	4	IS 7790 M 12
100068	9	4	IS 3063 12
100062	2	1	Draw Bar

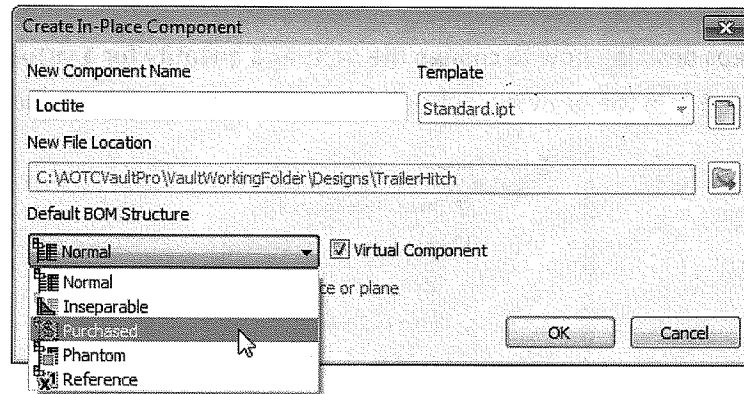
Vault Professional BOM with virtual component

## Creating Virtual Components

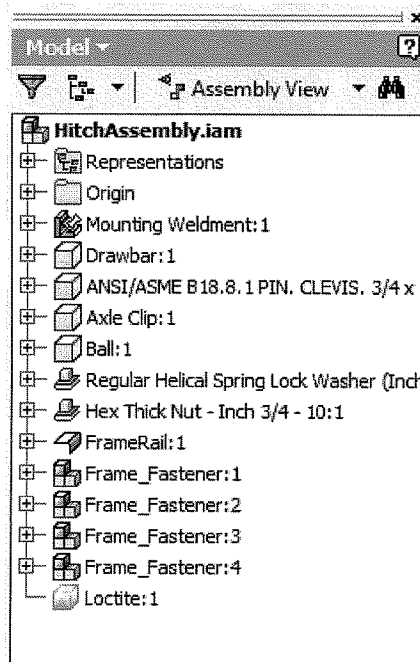
You must create virtual components in place in an assembly. The following steps describe how to create virtual components.

1. On the Assembly panel, click Create Component.
2. In the Create In-Place Component dialog box, select the Virtual Component check box.
3. Under New Component Name, enter a name for the virtual component.

4. Under Default BOM Structure, select a BOM structure from the list. Click OK.



5. The virtual component is listed in the assembly browser.



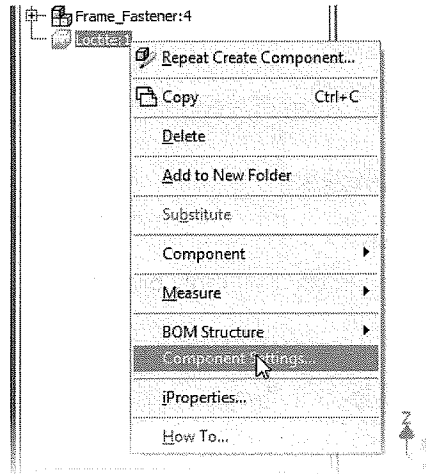
## Editing Virtual Components

Virtual components are not separate files but they contain the same properties present in other Inventor documents. You can edit both their properties and their BOM structure. Although the default units setting for new virtual components is Each, you can change this setting to better reflect the component in the assembly BOM.

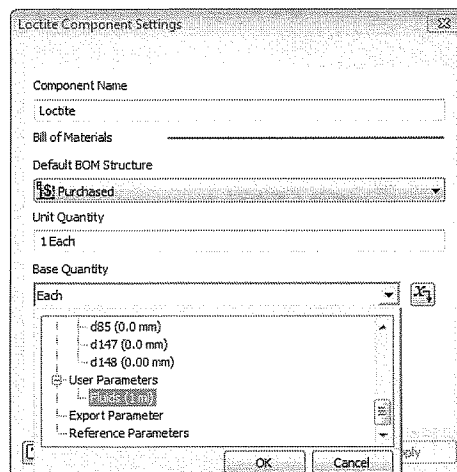
## Procedure: Editing a Virtual Component

The following steps describe how to change the units and quantity for a virtual component.

1. In the browser, right-click the virtual component. Select Component Settings.



2. In the Component Settings dialog box, click the Base Quantity drop down and scroll until you find the appropriate value. Select OK.



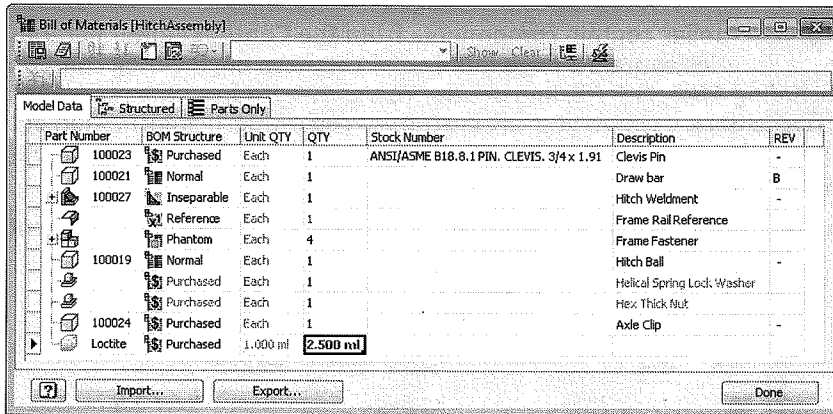
3. In the Unit Quantity field enter the appropriate value.



**NOTE:** If the Base Quantity value is not in the list it can be created by editing the Parameters table and entering a new user-defined parameter. The units associated with the user parameter are assigned to the base quantity field for virtual part.



#### 4. Override the quantity for the virtual part in the assembly BOM.

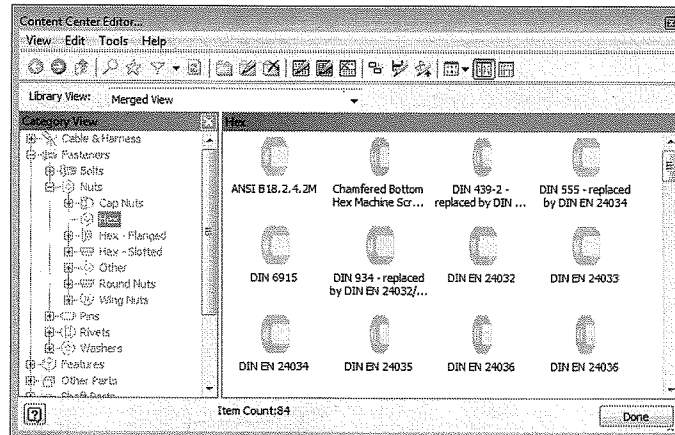


### Guidelines for Virtual Components

- Develop a company or departmental strategy for implementing virtual parts, user-created items, or combination of both.
- Virtual components are not saved as separate files, but rather are contained within assemblies.
- Virtual components with Normal, Purchased, or Inseparable BOM structures are assigned separate item numbers when their parent assemblies are assigned item numbers.
- Virtual components have the same properties as other Inventor documents.

## Modifying Content Center Component Properties

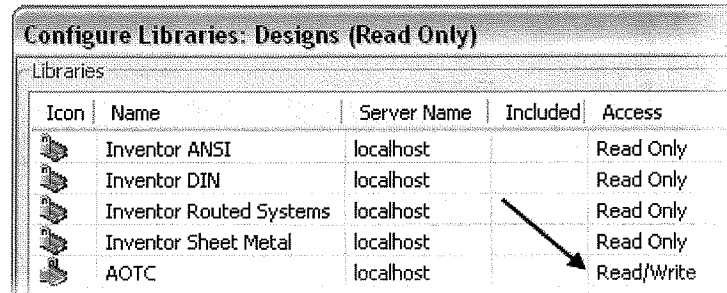
You can customize Content Center library components to integrate them into Vault Professional.



## Content Center Library Components

Many Inventor assemblies contain components from the Content Center libraries that ship with Inventor. These libraries contain a large number of common engineering components from a variety of standards, including ANSI, ISO, JIS, and others. You copy data from the read-only default libraries to a custom read/write library where you can customize the property information in the component family. When you assign an item to an Inventor assembly containing library components, those components are also assigned items.

The following illustration shows a custom read-write library added to the content center libraries.

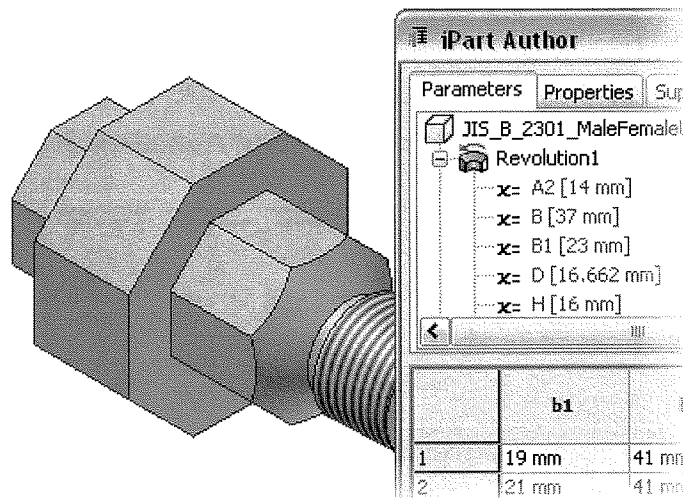


Icon	Name	Server Name	Included	Access
	Inventor ANSI	localhost		Read Only
	Inventor DIN	localhost		Read Only
	Inventor Routed Systems	localhost		Read Only
	Inventor Sheet Metal	localhost		Read Only
	AOTC	localhost		Read/Write

You can also publish your own components to a custom library by creating an iPart factory that includes a table to define the variations in the part. You can include model properties as columns in the table and assign default values for each variation of the part. After you publish the iPart factory to a custom Content Center library, you can place the different versions in assemblies. Each variation retains the property values defined in the original iPart table.

See “iParts” and “Content Center” in the Autodesk Inventor Help for more information on working with and publishing your own library parts.

The following illustration shows an iPart Factory part and the iPart Author table that you use to create the different iPart member definitions.

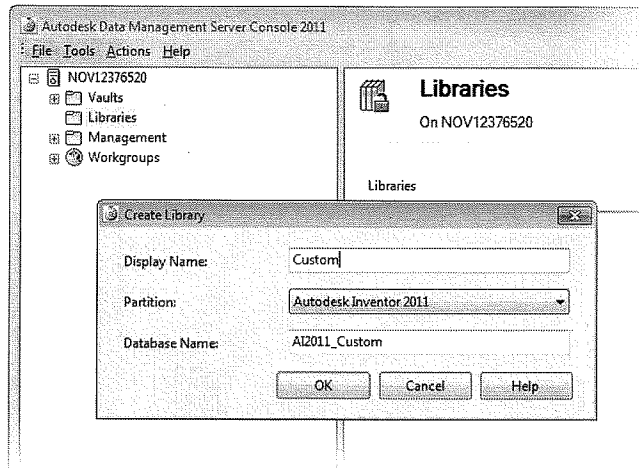


### Procedure: Modifying Properties of Content Center Components

The following steps describe how to copy data from a default read-only library to a custom read-write library and edit the properties in the library table.

1. Log in to the Autodesk Data Management Server as a user with at least Content Center Editor permission.

2. Expand the folders and select Libraries. Right-click and select Create Library.
3. Enter the Display Name and select a Partition based on the Inventor version you are using for the library.
4. Select OK to create the library.



5. In Inventor, open any assembly. Click Tools ribbon and select Editor in the Content Center section.
6. In the Content Center Editor dialog box, do the following:
  - Right-click the category or family to copy. Select Copy To.
  - Click the name of a read-write library.
  - Click Yes to refresh the content in the server.
7. In the read-write library, locate the part family you want to edit. On the List panel, right-click the part family. Click Family Table to display the Family Table dialog box.
8. In the Family dialog box, display the iProperties columns only. Add a new column.
9. In the Column Properties dialog box, enter a column name and column caption. Select a data type for the property.
10. Under Map to Inventor Property, select the Autodesk Inventor property to populate with the value from the new column.
11. Select the Expression check box. Enter a constant string, or use a combination of strings and parameter names to populate the cells based on other values in the table. Click OK.
12. If required, repeat steps 5 through 8 to add other columns.
13. Optionally, delete or suppress rows in the table that are not used in your designs. You can also add rows or edit parameter values to create custom versions of the library part.

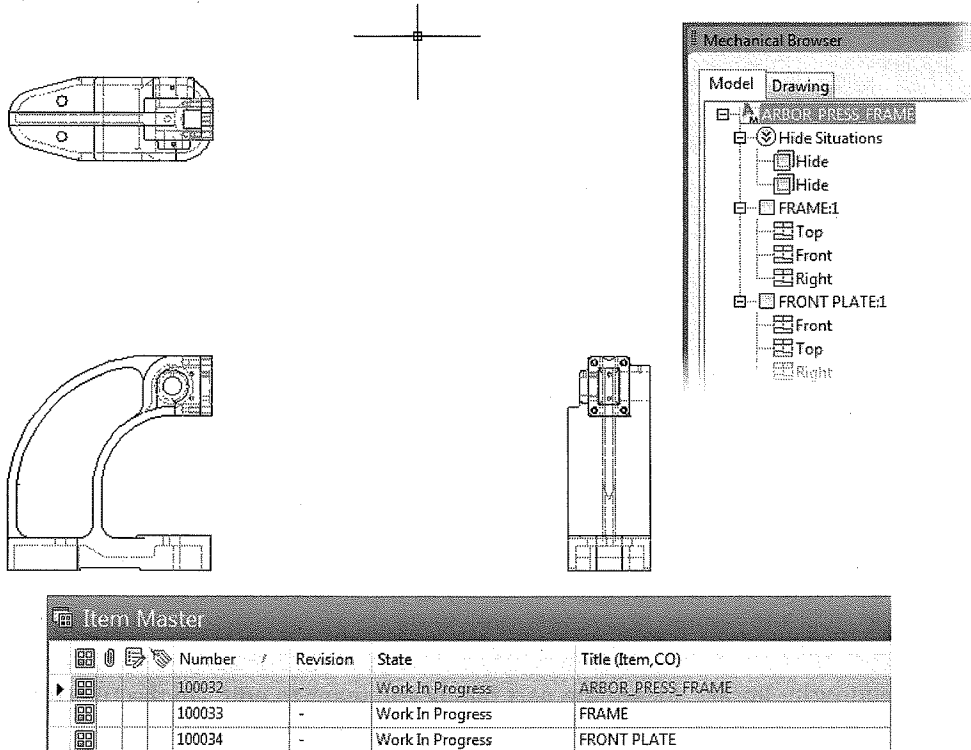
When you place parts from the table into subsequent assemblies, the property values in the library part reflect the values in the columns mapped to Inventor properties.



Any component placed from the Content Center has a default Purchased BOM structure. You can edit this structure in the Bill of Materials dialog box.

## Working with DWG Files

You can use Autodesk Vault Professional with drawing (DWG™) files created in AutoCAD, AutoCAD Mechanical, AutoCAD Mechanical Desktop, AutoCAD Electrical, and Autodesk Inventor.



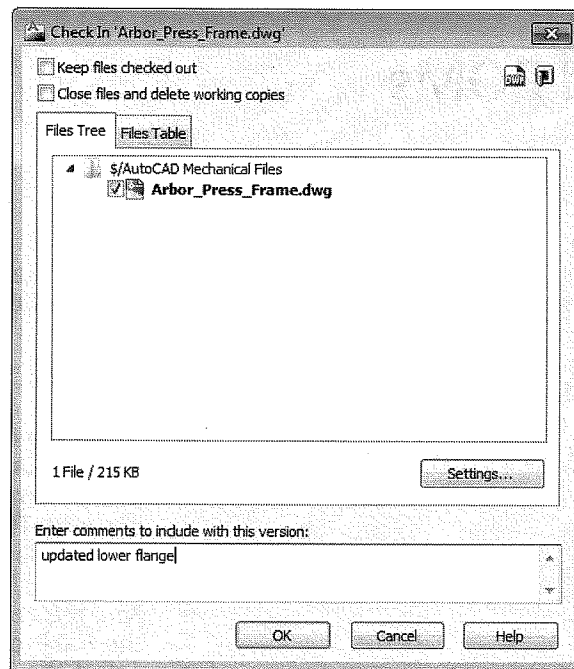
### DWG Files, Autodesk Vault, and Autodesk Vault Professional

Many companies work with a variety of Autodesk CAD software applications. Although the primary focus of Autodesk Vault and Autodesk Vault Professional is to work with data from Autodesk Inventor, you can manage versions and assign items to drawing files in Autodesk Vault.

Always check out and check in drawing files using the Vault ARX application inside your AutoCAD-based software. AutoCAD Electrical users must check out and check in all files in a project at the same time.

When you have checked drawing files into the vault, you can assign items to them using the same technique you use to assign items to Inventor parts and assemblies.

The following illustration shows an AutoCAD Mechanical file being checked in to the vault



When you work with drawing files in Autodesk Vault Professional, consider the following:

- AutoCAD Mechanical and AutoCAD Mechanical Desktop BOM data is used to determine Category. Assembly drawing file BOM data is translated into the item BOM.
- When you assign an item to a drawing file, any externally referenced files (Xrefs) are added as attachments to the item in Autodesk Vault Professional. Always check in the drawing containing the Xrefs to maintain the file relationships.
- Property extraction and mapping between Autodesk Vault Professional and drawing files is not as robust as it is with Inventor documents. No provision exists for writing item property values back to the properties in a drawing file.
- You can control lifecycle status and changes to drawing files with Autodesk Vault Professional engineering change orders. If the vault is set to enforce file locking, you cannot check out a drawing file from the vault unless its lifecycle state is set to Work in Progress.

You can generate 2D drawings in Autodesk Inventor in either Autodesk Inventor's native format (IDW), or in DWG format. You can assign items to both of these file types. If a drawing file does not exist in the vault when you assign an item to its associated part or assembly, you must manually attach the drawing item to its part or assembly item when the drawing is later added to the vault and assigned an item.

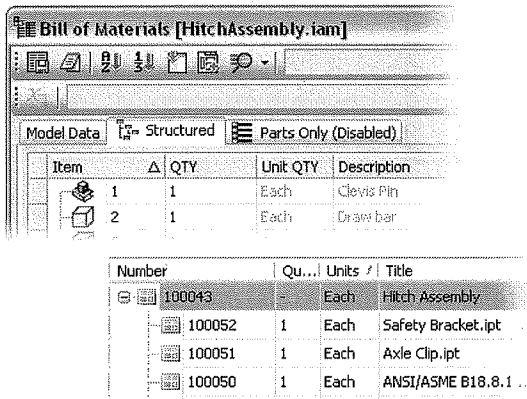
### Example of AutoCAD Files and Vault Professional

Your design team uses AutoCAD or AutoCAD Electrical in combination with Inventor. An AutoCAD drawing contains a 2D reference layout for your Inventor assembly. AutoCAD Electrical drawing files detail electrical requirements for your design and provide pin and wire information for a harness assembly in Autodesk Inventor Professional.

You add the AutoCAD drawing file to the vault. You then attach it to your top-level Inventor assembly file and assign an item to the Inventor assembly. You add the AutoCAD Electrical drawings to the vault. You assign items to the AutoCAD Electrical drawings and use their Vault Professional bills of materials to aid the design.

# Exercise 2: Work with Autodesk Inventor Assemblies and BOMs

In this exercise, you examine an Inventor assembly BOM and how various BOM structure settings affect Vault Professional item creation. You work with components having Normal, Reference, Phantom, Purchased, and Inseparable BOM structures. You add a component to the assembly after assigning an item number to the assembly, and examine how the new component is added to the Item Master.



## Vault Setup

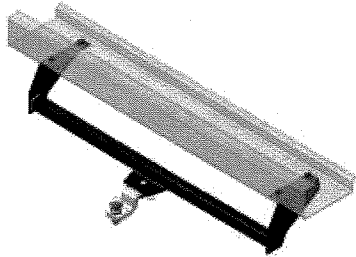
1. Start Autodesk Vault Professional. Log in using the following information:
  - User Name – administrator
  - Password – leave this blank
  - Database – AOTCVault
2. Click Go menu > Vault Explorer. Click Tools menu > Options. If necessary, clear the Show Hidden Files check box. Click OK.
3. In the Vault browser, right-click the Vault Explorer (\$) folder. Do the following:
  - Click Properties.
  - The working folder should be set to C:\AOTCVaultPro\VaultWorkingFolder.
  - Click OK.
4. In the browser, click the Vault Explorer (\$) folder. Do the following:
  - In the list, right-click Designs.ipj.
  - Click Get / Checkout.
  - Click OK.

5. The Title property needs to be re-mapped in order for the item Title property to be displayed properly. Do this:
  - Select the Tools menu > Administration > Vault Settings.
  - Select the Behaviors tab then the Properties button from the Properties group.
  - In the Property Name column find the System property Title (Item, CO).
  - On the Property Definition toolbar select Edit.
  - Select the Mapping tab.
  - Find the entry for Provider: Inventor and select the File Property Component Name.
  - Select the up arrow in the Mapping toolbar to move this entry to the top of the list.
  - Select OK to dismiss the Edit dialog.
  - Select Close to dismiss the Property Definition dialog.
6. Start Autodesk Inventor.
7. In the New File or Open dialog box, click Projects. If Autodesk Inventor was already running, click File menu > Projects.
8. In the Project Editor dialog box, click Browse.
9. Do the following:
  - Browse to C:\AOTCVault Professional\VaultWorkingFolder.
  - Click Designs.ipj.
  - Click Open.
  - Click OK after you are warned about a missing folder.
  - Click Done.
10. Click the Vault tab and then select Log In in the Access group. Log in using the following information:
  - User Name – usera
  - Password – vault
  - Database – AOTCVault

NOTE: If you have installed Inventor with separate log-ins for Vaults and Content Center libraries, select Vault Log In.

## Work with Autodesk Inventor Assemblies and BOMs

- Click the Vault tab and then Open from the Access group. Do the following:
  - Navigate to the Designs\TrailerHitch Folder.
  - Click HitchAssembly.iam.
  - Click Open.
- If prompted to check out the assembly, click No. If prompted to get files from the vault, click Yes to All.

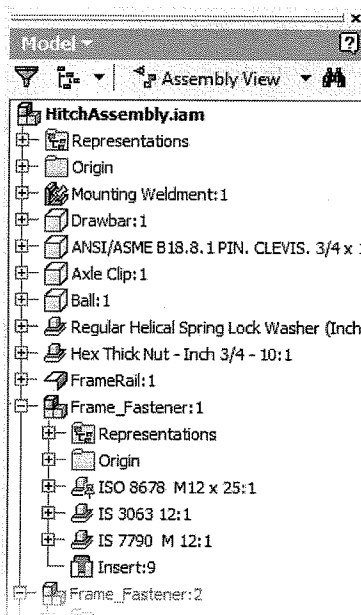


NOTE: If the Resolve Link dialog box is displayed, click Cancel. Open the HitchAssembly.iam file from the vault a second time.

- Examine the assembly browser. The browser is a hierarchical list of the assembly components.

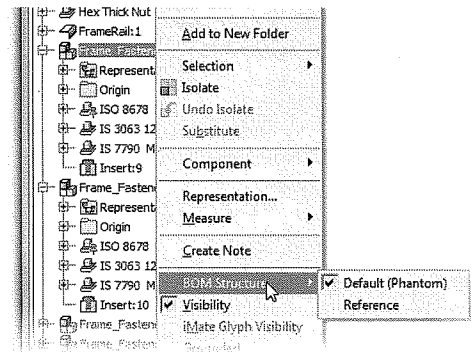
The Mounting Weldment subassembly contains the black components that make up the welded portion of the hitch assembly.

Each instance of the Frame\_Fastener subassembly contains one bolt, one washer, and one nut.



- In the browser, right-click Frame\_Fastener:1.

- Place the cursor over BOM Structure to display the assigned structure of the Phantom assembly.

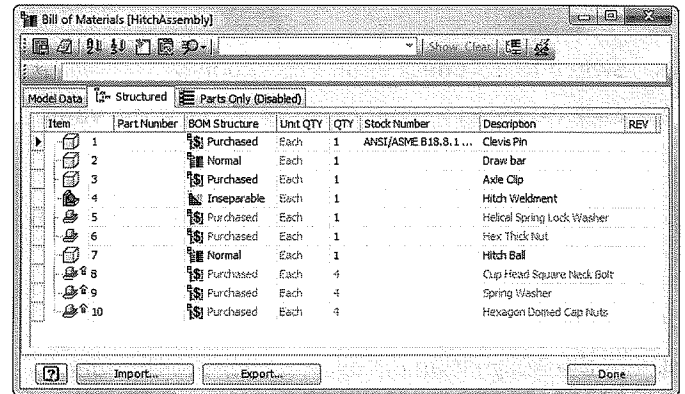


- In the browser, repeat the two previous steps to examine the BOM structure of other components.

For example, the FrameRail:1 component is assigned a Reference BOM structure.

On the Assembly tab click Bill of Materials Manage group.

- In the Bill of Materials dialog box, click the Structured tab.



The Phantom Frame\_Fastener subassemblies are not listed in the BOM. The three child components from the Frame\_Fastener subassembly are displayed as promoted items in the BOM as items 8 - 10. The QTY column displays the number of components in one subassembly (1) multiplied by the number of phantom subassemblies (4).

- If a column is not visible, do the following:
  - In the BOM, right-click a column header.
  - Click Runtime Column Customization.
  - Drag the desired column from the Customization dialog box to desired location on the display.
- Add the Filename column to the display if it is not visible.

- All items appear unavailable because they are not checked out of the vault.

Item	Part Number	Filename	BOM Structure	Units
1		Clevis Pin 3_4-1.91.ipt	Purchased	
2		Drawbar.ipt	Normal	
3		Axle Clip.ipt	Purchased	
4		Mounting Weldment.iam	Inseparable	
5		0.75.ipt	Purchased	
6		3_4-UNC.ipt	Purchased	
7		Ball.ipt	Normal	
8		M12-25.ipt	Purchased	
9		12.ipt	Purchased	
10		M12.ipt	Purchased	

The BOM Structure column displays the assigned BOM structure for each component. The library components are shown as Purchased. The Drawbar and Ball components are Normal. The Mounting Weldment assembly is shown as Inseparable.

- In the Bill of Materials dialog box, click Done. If you get prompted to check out the files select No to All.

### Assign an Item to the Assembly

- Switch to Autodesk Vault Professional.
- Click Go menu > Vault Explorer. Expand the Vault Explorer, Designs, and TrailerHitch folders.

NOTE: The components with the Reference and Phantom BOM structures are included in the vault. The BOM structure affects only items in Vault Professional.

- Right-click HitchAssembly.iam. Click Assign Item.
- In the Assign Item dialog box, click the Number header to sort in ascending order.

In the Assign Item dialog box, the item list reflects the structure of the Inventor BOM. The Reference FrameRail part and the Phantom Frame\_Fastener assembly are not included in the list. The child components in the Phantom Frame\_Fastener assembly are assigned item numbers.

- In the Assign Item dialog box, do the following:
  - Click Next.
  - Click Finish.
  - Click Close.
- In the Item Master, click the Hitch Assembly row.

- In the item pane, click the Bill of Materials tab.

The Inseparable Weldment assembly and all its child items are included in the default tree view.

Number	Quantity	Units	Title (Item,CO)
100014	1	Each	Mounting Weldment.iam
100004	47.244094488189	Inch	ANSI AISC 2x2x1/4 - 1200mm
100016	1	Each	end_plate_RH.ipt
100012	1	Each	end_plate_LH.ipt
100013	1	Each	DrawBarMountTopPlate.ipt
100017	1	Each	DrawBarMountBottomPlate.ipt
100002	4	Each	ISO 8678 M12 x 25
100007	4	Each	IS 3063 I2
100008	4	Each	IS 7790 M12
100006	1	Each	Ball.ipt

NOTE: Your item numbers and column organization may not match the previous illustration.

- Under Structure, select First-Level.

The child items of the Inseparable Weldment assembly are not displayed.

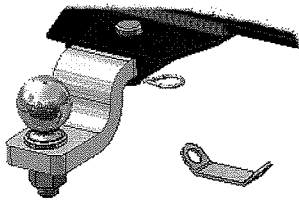
Number	Quant..	Title (Item,CO)	Rev
100002	4	ISO 8678 M12 x 25	-
100003	1	Hex Thick Nut - Inch 3/4 - 10	-
100005	1	Regular Helical Spring Lock Washer (...)	-
100006	1	Ball.ipt	-
100007	4	IS 3063 I2	-
100008	4	IS 7790 M12	-
100009	1	Drawbar.ipt	-
100010	1	ANSI/ASME B18.8.1 PIN. CLEVIS. 3/4 ...	-
100011	1	Axle Clip.ipt	-
100014	1	Mounting Weldment.iam	-

- Under Structure, select Multi-Level.
- Switch to Autodesk Inventor.
- On the Vault tab in the Access group select Place..
- In the Select File from Vault dialog box, navigate to the Vault Explorer(\$)\Desings\TrailerHitch folder. Do the following:
  - Click Safety Bracket.ipt.
  - Click Open.
  - Click in the graphics window background.
  - Right-click in the graphics window and select Done (esc).

A message is displayed, asking you to check out the assembly from the vault. Select Yes. When you add the bracket to the assembly, the assembly is modified.

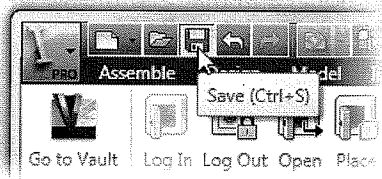


13. Click Yes to All to check out the assembly and all parts. Right-click and then click Done.



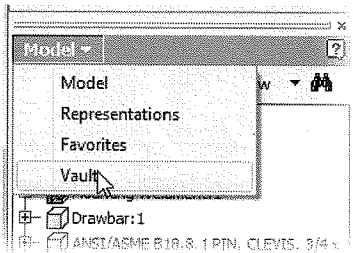
**NOTE:** You typically position the bracket in the assembly with assembly constraints. You are not required to apply the constraints in this exercise.

14. Save the assembly. In the Save dialog box, click OK.



15. In the Assembly browser, click the title bar.

16. From the list, select Vault.



17. In the browser, right-click HitchAssembly.iam.

18. Click Check In.

19. In the Check In dialog box, enter Added safety bracket as a comment. Click OK.

20. Switch to Vault Professional.

21. In the Item Master, right-click the Hitch Assembly row. Click Update.

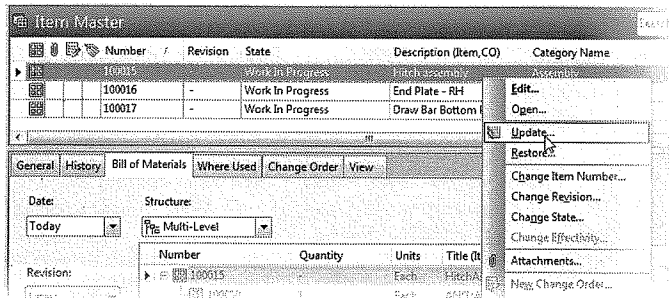
22. In the Item Master, do the following:

- Click Next.
- Click Finish.
- Click Close.

In the Update Item window, notice that the safety bracket part is automatically added to the Item Master.

Number	Quantity	Units	Title (Item,CO)
100015		Each	HitchAssembly
Safety Bracket	1	Each	Safety Bracket.ipt
100010	1	Each	ANSI/ASME B18.8.1 PIN, CLEVIS, 3/4 x 1.57
100009	1	Each	Drawbar.ipt

**NOTE:** Your item numbers do not match the item numbers in the previous illustration.



# Chapter Summary

In this chapter, you learned how to use to Autodesk Vault Professional to work with other applications, including Autodesk Inventor and Autodesk Vault.

Having completed this chapter, you can:

- Manage bills of materials (BOMs).
- Describe the integration of Inventor, Vault, and Vault Professional and the relationship between an Inventor bill of materials (BOM) and the associated Vault Professional item BOM.



# Administering Autodesk Vault Professional

This chapter describes how to manage Autodesk® Vault Professional®. You learn about configuring Items, configuring and mapping Item properties, and configuring Change Orders.

Autodesk Vault Professional is an extension to Autodesk® Vault. Therefore, to effectively manage a Vault Professional installation, you should also be familiar with the following Autodesk Vault management topics.

- Backing up and restoring vaults.
- Moving file stores.
- Detaching vaults.
- Creating and deleting vaults.
- Re-indexing properties.
- Defragmenting databases.
- Using the content indexing service.
- Configure users, groups and folder level permissions.

## Objectives

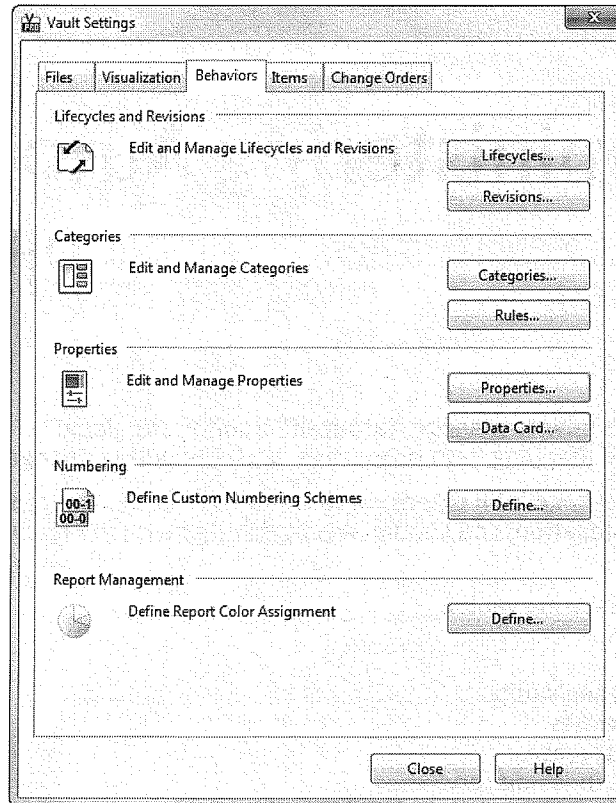
After completing this chapter, you will be able to:

- Create unit and categories, create new Item numbering schemes, and change lifecycle rules.
- Set up Change Orders including routing lists, user-defined properties, and Change Order numbering.

# Lesson 1: Configuring Items

## Overview

This lesson describes how to configure Items. You learn how to create unit and categories, create new Item numbering schemes, and change lifecycle rules.



All of the workflows described in the chapter are access from the Vault Settings dialog shown above. This dialog is displayed by selecting the Tools menu then selecting Administration > Vault Settings. You will need to be logged in as an Administrator to complete these workflows.

## Objectives

After completing this lesson, you will be able to:

- Describe Units of Measure.
- Describe Item categories.
- Create Item numbering schemes.
- Manage lifecycle rules and file locking.
- Configure revision numbering sequences.
- Configure visualization file watermarking.
- Create units of measure, categories, and lifecycle rules.
- Create Item numbering schemes.

# Units of Measure

Every Item is assigned a unit type. You can create new unit types if the supplied units do not meet your company's needs. The following illustration shows the complete set of units that ship with Vault Professional.

Name	Symbol	Base Unit	Conversion Factor
Box	bx	ea	1
Centimeter	cm	cm	1
Each	ea	ea	1
Foot	ft	cm	30.48
Gallon	gal	ml	3785.411
Gram	g	g	1
Inch	in	cm	2.54
Liquid Ounce	lqd oz	ml	29.57353
Liter	l	ml	1000
Meter	m	cm	100
Milligram	mg	g	0.001
Milliliter	ml	ml	1
Millimeter	mm	cm	0.1
Ounce	oz	g	28.34953
Pound	lb	g	453.5923
Quart	qt	ml	946.3531
Square Centimeter	sqcm	sqcm	1
Square Foot	sqft	sqcm	929.0305
Square Inch	sqin	sqcm	6.451601
Square Meter	sqm	sqcm	10000
Yard	yd	cm	91.44003

## About Units of Measure

Unit types define the units of measure for Items. You use unit types to specify the quantity of an Item in a bill of materials. Many Items use a special unit type, each, when the number of required Items is countable. Other Items are assigned specific unit types, such as meters or grams, when a measurable quantity is required, rather than an Item count. Several predefined unit types are supplied, but if those types do not meet your needs, you can define new ones.

Each unit type is derived from a base unit and a conversion factor. For example, centimeters are the base unit for length and all length units are defined with respect to centimeters. You can create new base units if you cannot define the new unit from the existing base units.

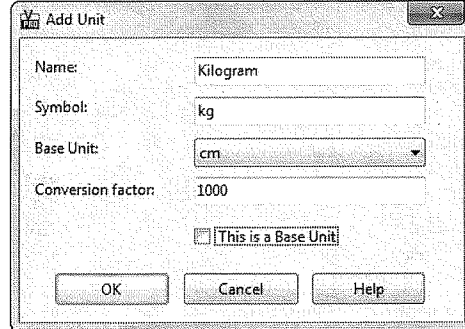
The following illustration shows the length units that are defined using the centimeter base unit. The conversion factor relates the unit to the base unit. For example, one inch is 2.54 centimeters and one foot is 30.48 centimeters.

Name	Symbol	Base Unit	Conversion Factor
Centimeter	cm	cm	1
Each	ea	ea	1
Foot	ft	cm	30.48
Gallon	gal	ml	3785.411
Gram	g	g	1
Inch	in	cm	2.54
Liquid Ounce	lqd oz	ml	29.57353

## Procedure: Create a New Unit of Measure

One of the Items in your product's bill of materials is measured in kilograms. You define a new unit type to support this unit of measure. The new unit uses grams as the base unit.

1. In the Vault Settings dialog select the Items tab.
2. Select Configure in the Units group to display the Units of Measure dialog.
3. On the Units of Measure dialog select New to display the Add Unit dialog.
4. Enter the Name, Symbol, Base Unit and Conversion factor information.



5. Select OK to dismiss the Add Unit dialog.

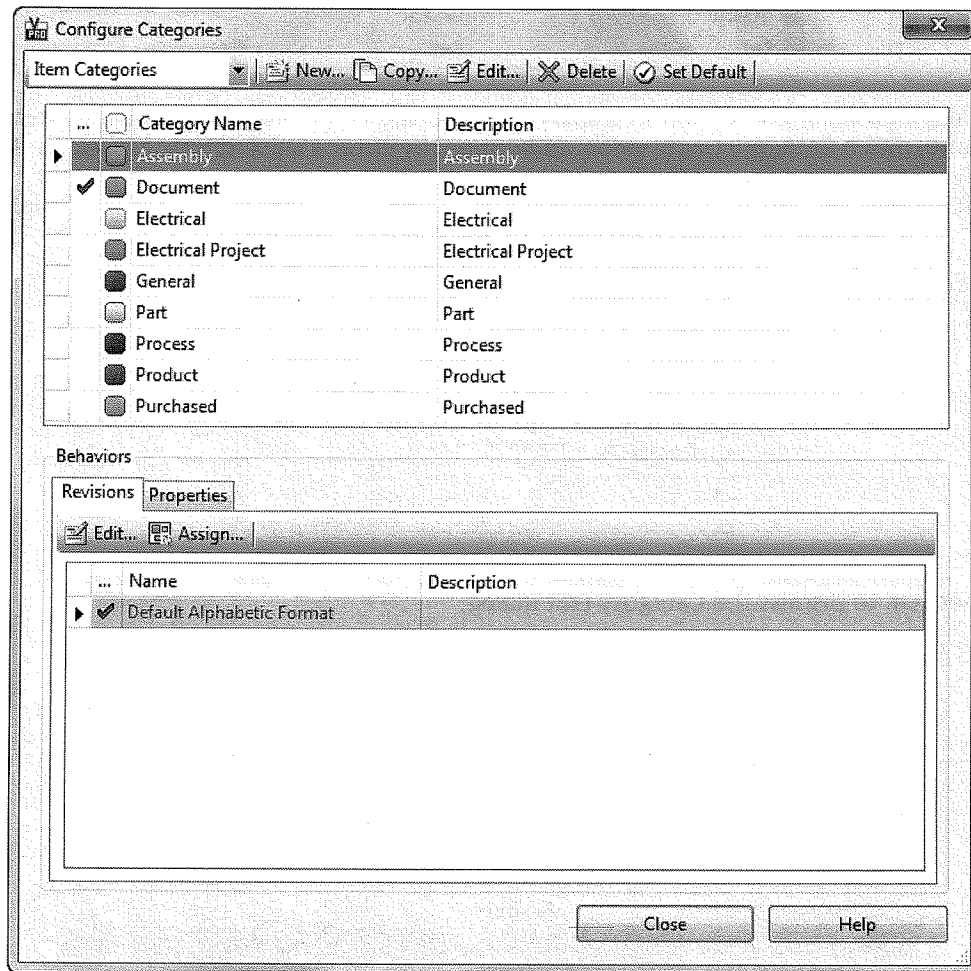
Name	Symbol	Base U...	Conversion Factor
Gram	g	g	1
Milligram	mg	g	0.001
Ounce	oz	g	28.34953
Pound	lb	g	453.5923
Kilogram	kg	g	1000
Milliliter	ml	ml	1
Liter	l	ml	1000

6. The Units of Measure dialog shows the new unit.
7. Select OK to dismiss the Unit of Measure dialog.

# Item Categories

Every Item has a category, such as part, assembly, or product, which helps to identify the Item. Some categories, such as part, assembly, and purchased, are assigned automatically based either on the type of file or the CAD file's bill of materials (BOM). You assign other categories manually when you create Items.

There are several predefined categories, as shown in the following illustration. If these do not match the categories you use, you can create new types to meet your requirements.

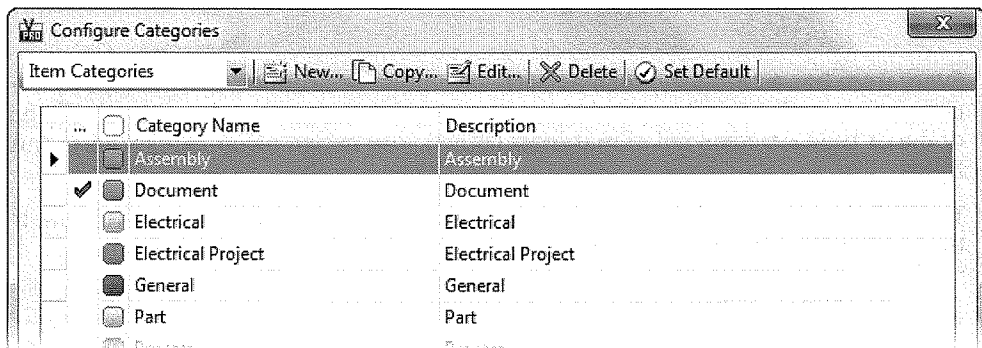


## Procedure: Create a New Item Category

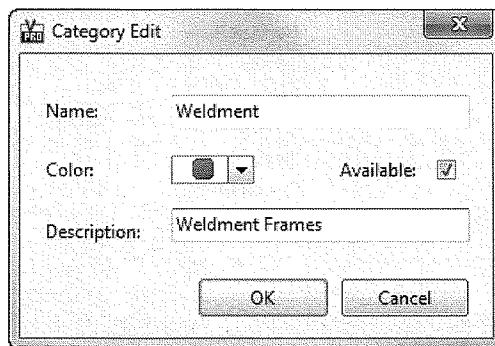
Your company manufactures industrial machinery. Frames are often built by one division of the company and then brought to a central area for assembly. In your current ERP system, you identify the frame as a weldment.

1. In the Vault Settings dialog, select the Behaviors tab and select the Categories button in the Categories group to display the Configure Categories dialog.

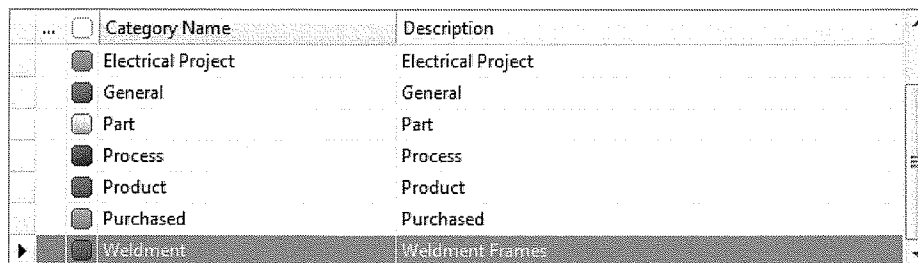
2. Select Item Categories from the drop down list. The Item Categories are displayed.



3. Select New from the toolbar to display the Category Edit dialog. Enter the new Item Category Name, pick a Category Glyph color, and optionally enter a Description. Make sure Available is selected.



4. Select OK to dismiss the Category Edit dialog.
5. The new Item Category is added to the list.

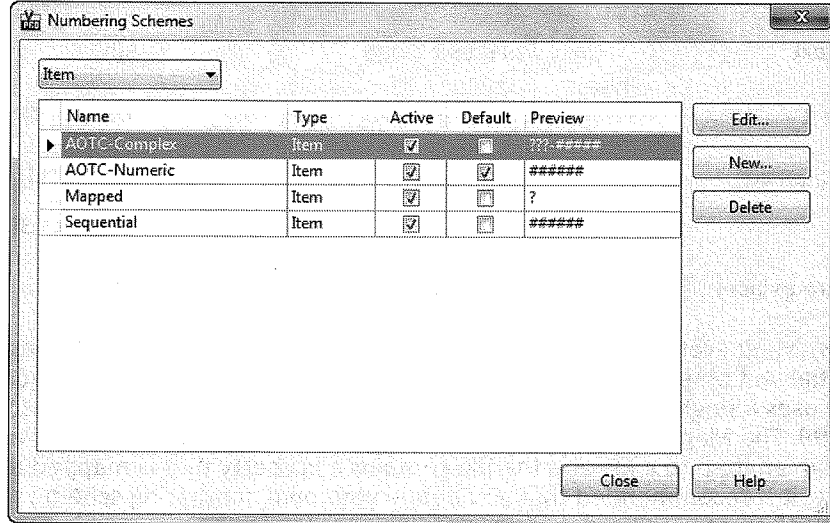


6. Optionally assign a different Revision scheme and set of default properties to add to the Item when it is created.
7. Select Close to dismiss the Configure Categories



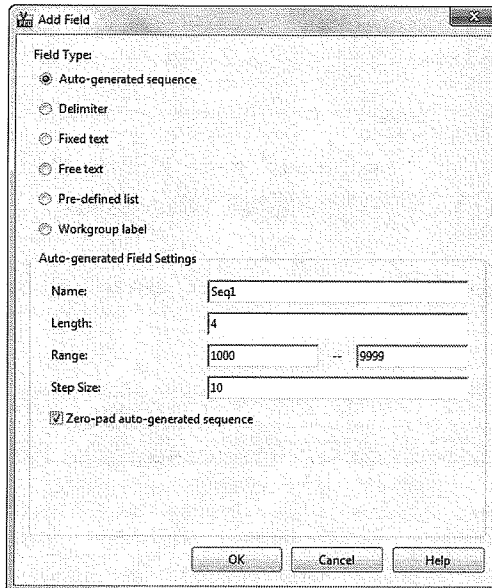
# Item Numbering Schemes

Item numbers uniquely identify Items. When you set up Vault Professional, create Item-numbering schemes to match your company standards.



## Item Number Components

Item numbering schemes can consist of one or more of the following components. For a simple numbering scheme, use a single, automatically generated sequential number. For a complex scheme, combine several components together.

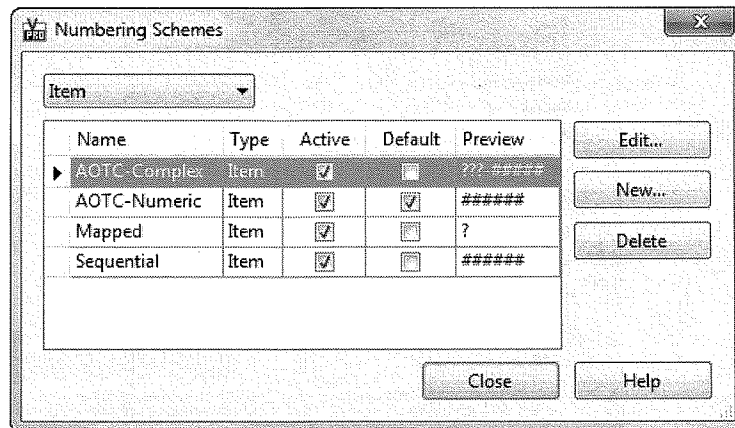


Field type	Description	Examples
Automatically generated sequence	Sequential number	100058
Delimiter	Single character	-
Fixed text	Fixed text string	ABC
Free text	User-entered text string	ANYTHING
Predefined list	List of choices	FAST, STRU, ELEC, OTHR 100, 200, 300, 400, 500
Workgroup label	Workgroup ID	WG1

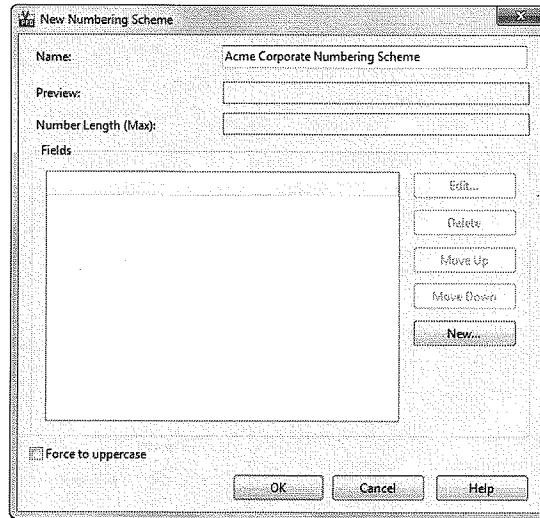
Autodesk Vault Professional is shipped with two predefined Item numbering schemes named Sequential and Mapped. Neither scheme can be modified. The default Sequential Item numbering scheme uses a single, automatically generated number that numbers Items from 00000000 to 99999999. The Mapped Item-numbering scheme accepts a text string. It is automatically used when you assign an Item to a file and the file contains a property that is mapped to the Item's Number property. It is recommended that you define your own numbering scheme rather than using one of the supplied schemes.

### Procedure: Defining an Item Numbering Scheme

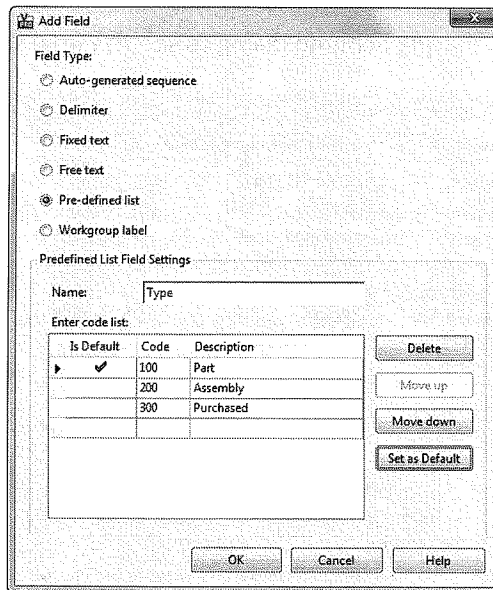
1. In Vault Settings select the Behaviors tab and select Define from the Numbering Scheme's group.
2. The Numbering Schemes dialog appears. Select Item from the drop down list to display the Item Numbering Schemes.



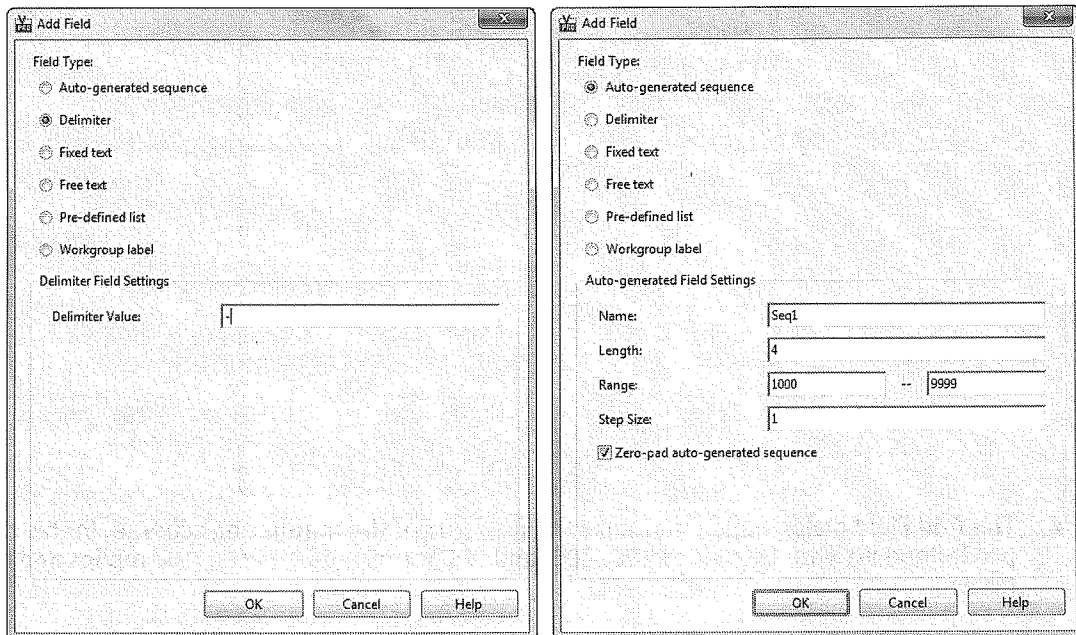
3. Select New to display the New Numbering Scheme dialog. Enter a Name for the new numbering scheme and then select New.



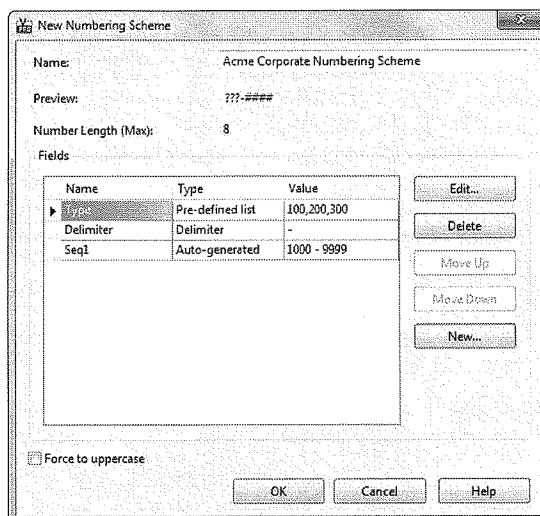
4. The Add Field dialog appears. Create the first part of the numbering scheme. In this case a predefined list with list values 100, 200, and 300 representing Parts, Assemblies and Purchased Items.



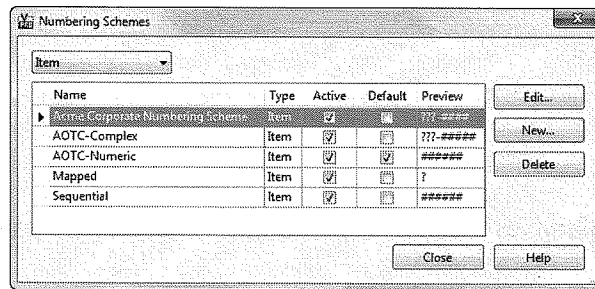
- Enter OK to dismiss the Add Filed dialog. The first part of the sequence is shown in the New Numbering Scheme dialog. Note the preview of how the number will look. Add two more parts to the sequence repeating step 4.



- Return to the New Numbering Scheme dialog to see the final sequence.



7. Select OK to dismiss the New Numbering Scheme dialog and return to the Numbering Scheme dialog.



8. Select the checkbox Default if you wish this to be the default numbering scheme.



Note that numbering schemes that require user input are not good choices for default since in automated processes like Assign Item there is no chance to prompt for the input. In this case the number generated will always use the default value. You will be required to go back and edit the Item if you want to use a different value.

## Guidelines

- Do not use one of the default numbering schemes  
You should define your own numbering scheme rather than using the default, even if you want to use a simple sequential number. If you want to use a single sequential numbering scheme, start the first Item number with a 1 rather than 0 (for example, use 1000001 rather than 0000001) because leading zeros may be suppressed when you share data with other applications.
- Create as many numbering schemes as required  
You can create and use more than one Item numbering scheme, if required. For example, you might use a simple sequential numbering scheme for users who assign Items. After the Items are created, the ERP Manager can renumber Items, using a more complex scheme to make Item numbers compatible with other company systems.
- Consider adding user-defined Item properties to enhance searching  
Although complex numbering schemes can be used to identify categories using fields in the Item number, you can also use Item properties to group and sort Items. Properties are more flexible and are more easily searched than complex Item numbers. For example, if you use a complex Item numbering scheme such as 100-ELEC-10345-545, consider using a simple scheme. Add user-defined properties to Items to include the information that is inherent in the numbering scheme. You can search on the properties to find Items, and new or casual users will be able to better identify and locate Items.

# Configure Item Lifecycle Settings

Item lifecycle States are:

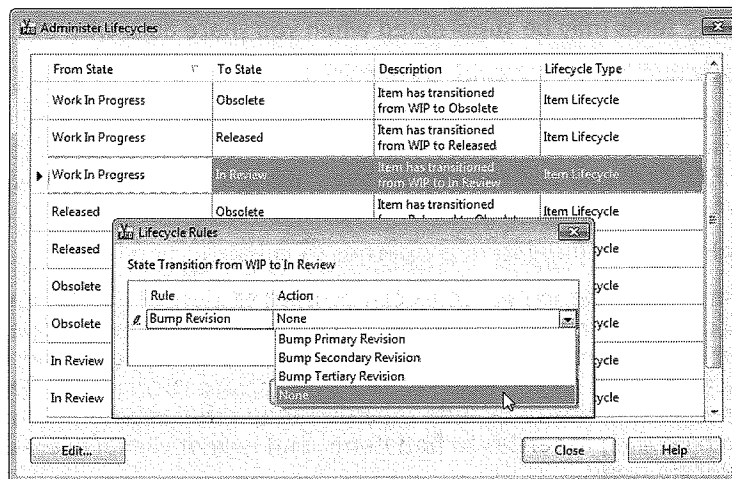
- Work In Progress
- In Review
- Released
- Obsolete

Unlike files, the Item lifecycles States are less flexible. However, there are three options for configuring lifecycle settings:

1. **Rules:** When a lifecycle State is changed the system can automatically create new revisions. In addition, in certain lifecycle States the associated files are locked and cannot be edited.
2. **Configure:** By default the system displays the four lifecycle States as shown in the list above. It is possible to change the name of a lifecycle State to better match your organization's nomenclature.
3. **Security:** By default, Item security (file locking) is applied to files associated with Items. It is possible to disable this globally or on a user or group basis. This gives some flexible to do file modifications to released files and restrict this to a particular user or set of users.

## File Locking

File locking and lifecycle rules significantly affect how users work with Items and files. As an administrator, you must be able to modify lifecycle rules to better suit your company's workflows.



File locking prevents Vault users from inadvertently modifying released or obsolete files without following the correct change procedure. If you turn on file locking and an Item is in any State other than Work in Progress (WIP), the associated vault files are locked and can be viewed but not checked out. File locking maintains the integrity of Items as well as the files to which they are assigned.

In the following illustration, the files are locked because the associated Items are in the released State.

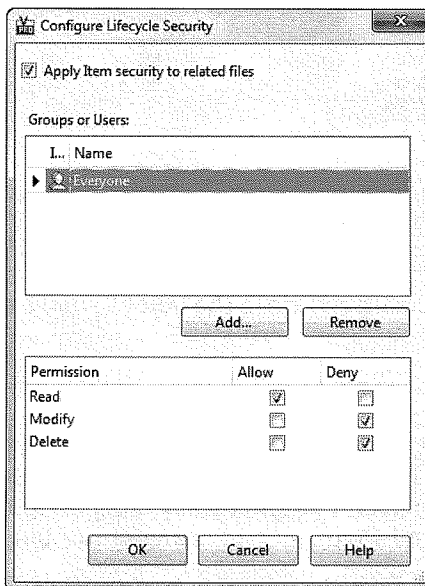
ICU Valve		Search ICU Valve				
File Name	Version	Checked In	Comment	Revision		
ICU Valve Main Assembly.iam	1	4/6/2007 4:25 AM				
ICUENDCP.ipt	1	4/6/2007 4:25 AM				
ICUHOUSG.ipt	1	4/6/2007 4:25 AM				
ICULBUTN.ipt	1	4/6/2007 4:25 AM				

## Item Security Configuration

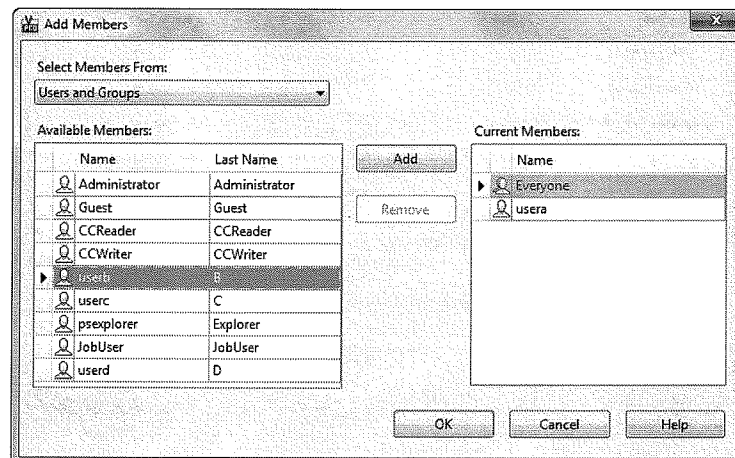
Administrators can override file locking on individual files in the vault. Use caution when unlocking files manually, and remember to lock the file again. Remember, also, that each Item revision is associated with a certain version of a vault file. If you unlock a file to make a minor edit without following the proper change procedure, you may not be able to associate the new version of the file with the released Item.

### Procedure: Change File Security

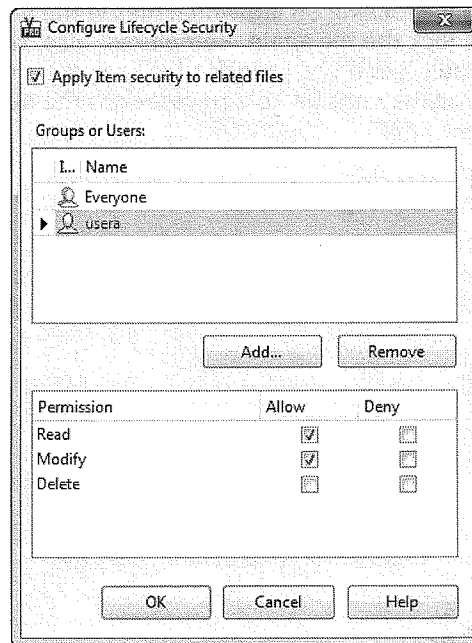
1. In the Vault settings dialog select the Items tab. Select the Security button in the Lifecycles dialog to display the Configure Lifecycle Security dialog. Note that the default setting is to Apply Item security to related files.



2. Select Add to add a user or group to the list of Groups or Users and modify the security. In this example usera is added to the list. Select OK to dismiss the dialog.



- In the Groups and Users list select the new entry. Select which permissions to give them. In this case usera can now modify a file associated with an Item regardless of the lifecycle State.



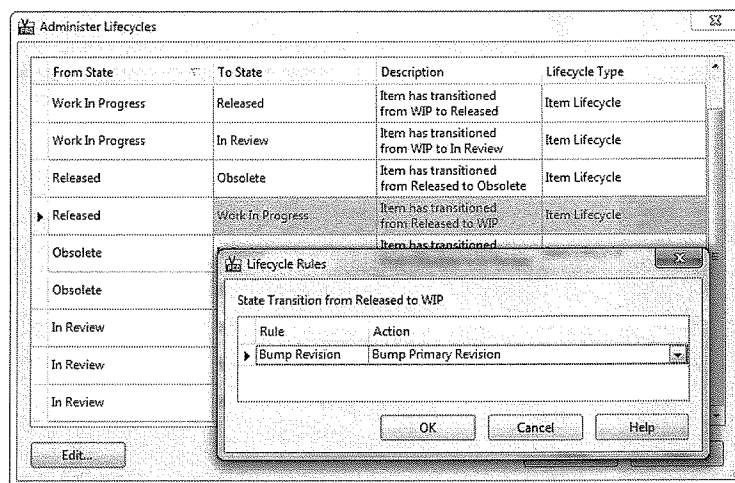
- Select OK to dismiss the dialog and close the Vault Settings dialog.

## Lifecycle Rules

Lifecycle rules determine how an Item's revision changes when the lifecycle State of the Item changes. By default, the following rule is defined; when an Item's State is changed from Released to Work in Progress, the primary revision field is automatically bumped to the next revision. This rule is compatible with file locking and should not be changed without fully understanding the implications.

You can add additional rules if they are required by your company's procedures. For example, you might add a rule that bumps the primary revision whenever an Item's State is changed to Obsolete.

The following illustration shows the default lifecycle rule for changing from Released to Work In Progress. By default, Vault Professional only bumps the revisions for this lifecycle State change.





## Example of Lifecycle States and File Locking

As an administrator, you must fully understand the implications of changing the lifecycle rules, especially if you plan to use file locking and property mapping. To better understand the default lifecycle rule and file locking, consider the following example, as summarized in the table that follows.

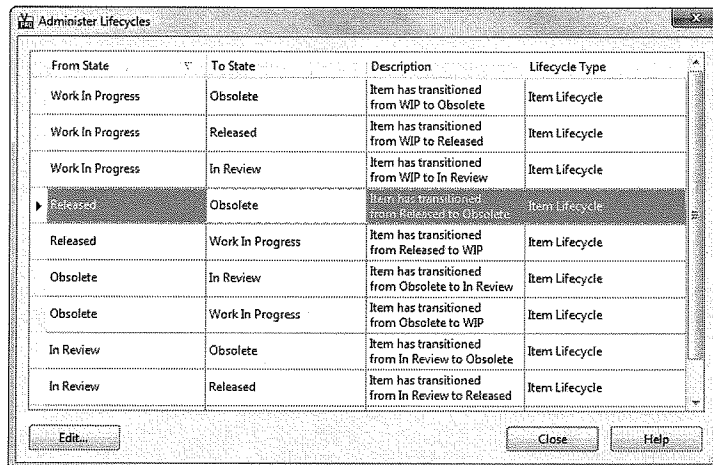
An Item is currently in the Released State at revision A. When the Item is released, the CAD files are locked and cannot be edited. A revision to the Item is required. To change the Item's associated files, you change the Item's State from Released to WIP. Based on the lifecycle rule, the primary revision is automatically bumped to the next value, B. Because the Item is now in the WIP State, the associated files are unlocked and can be edited. When the change is complete and the final files are checked in to the vault, you change the Item's State back to Released. The revision does not change, because, by default, there is no lifecycle rule for the change from WIP to Released. Because the Item is now Released, the associated files are locked and cannot be modified.

Action	Revision	State	Associated Files
None, current status.	A	Released	Locked because Item is not in WIP State. Cannot be modified.
Need to revise Item. Change State to WIP.	B (automatically increments based on the lifecycle rule)	WIP	Unlocked. Users can check out files and work on the change.
Change is approved and completed. Change State to Released. The change of State is either manual, or, if Change Orders are used, the State changes automatically.	B (no change)	Released	Locked. Cannot be modified.

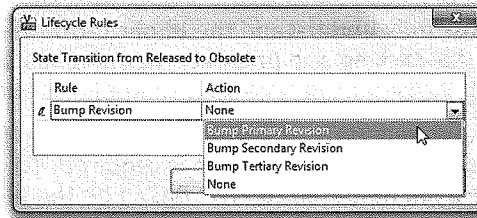
## Procedure: Changing Lifecycle State Rules

This example shows how you can configure the State transitions to bump a revision when an Item is obsolete.

1. In the Vault settings dialog select the Items tab then select the Rules button in the Lifecycles group to display the Administer Lifecycles dialog.
2. In the list select From State Released - To State Obsolete.



3. Select Edit to display the Lifecycle Rules dialog. From the drop down select Bump Primary Revision.



4. Select OK to dismiss the Lifecycle Rules dialog and Close to dismiss the Administer Lifecycles dialog. Close the Vault Settings dialog.

## Configure Lifecycle Settings

By default, Vault Professional ships with the four Item Lifecycle States:

- Work In Progress
- In Review
- Released
- Obsolete

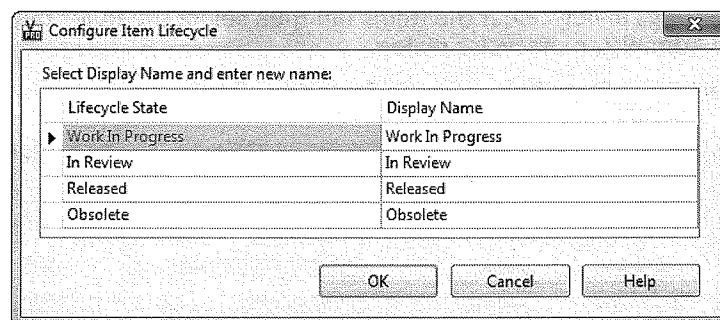
By default these names are displayed in Vault Professional when operating on Items. It is possible to change these names so they better reflect the nomenclature of your organization.

For example, in your organization Items that are being reviewed are marked For Review and Items that are obsolete are designated as Archived. These differ from the default States In Review and Obsolete for Items. The display names for Item Lifecycle States can be changed to reflect this.

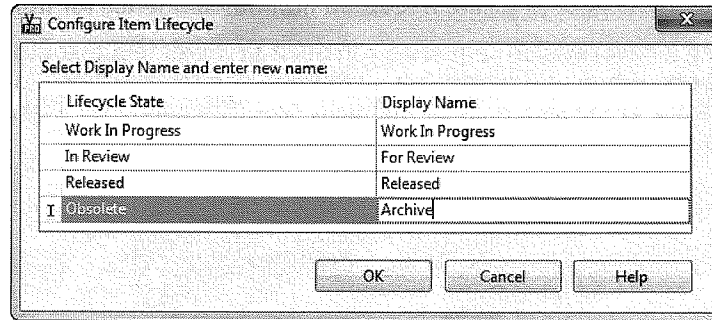
### Procedure: Configure Lifecycle Settings

To change the display names of Item Lifecycle States do the following:

1. In the Vault Settings dialog select Configure from the Lifecycles group in the Items tab to display the Configure Item Lifecycle dialog.



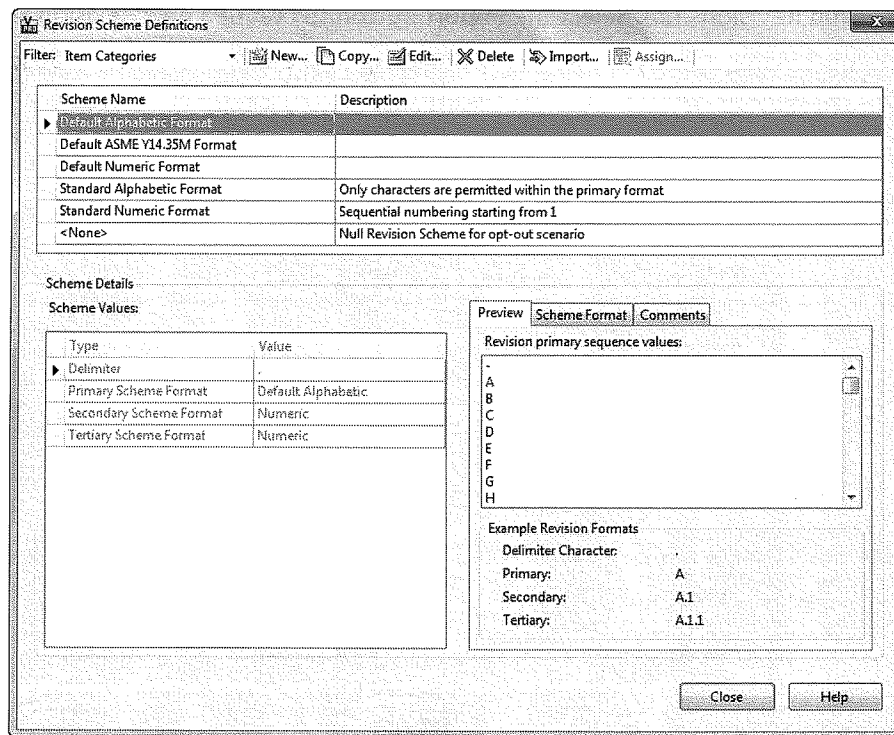
2. Select the Lifecycle State In Review and change the Display Name to For Review. Do the same for the Lifecycle State Obsolete and changed the display name to Archive.



3. Select OK to dismiss the Configure Item Lifecycle dialog and Close on the Vault Settings dialog.

## Item Revision Schemes

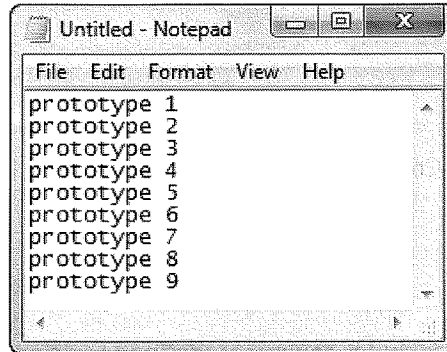
Autodesk Vault Professional includes several predefined revision numbering sequences. You can use one of the predefined sequences or create your own.



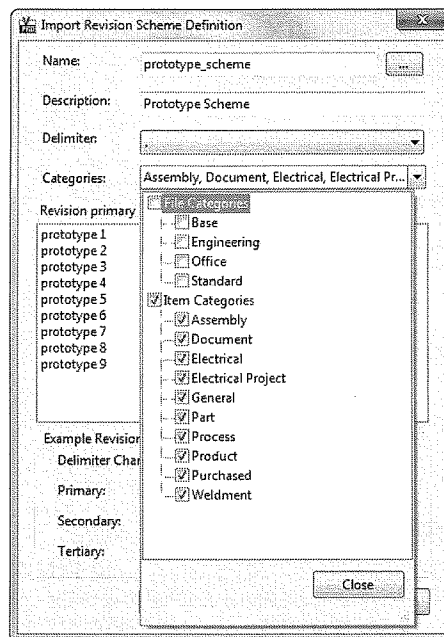
## Procedure: Configuring Revision Numbering Sequences

The following steps show how to create a revision number sequence for Items.

1. Before creating a new revision sequence you must first create a text file that contains all of the revision numbers. When you specify a new revision you must either allow the system to choose the next character in the sequence or manually specify a character that is the imported sequence. An example is shown in the illustration.



2. In the Vault Settings dialog select the Behaviors tab and then select the Revisions button for the Lifecycle and Revisions tab. Select the Import button to create a new Revision Scheme Definitions.
3. In the Import dialog specify the Name by browsing to the file. Then enter a Description and enter which of the Item Categories to associate the revision scheme with.

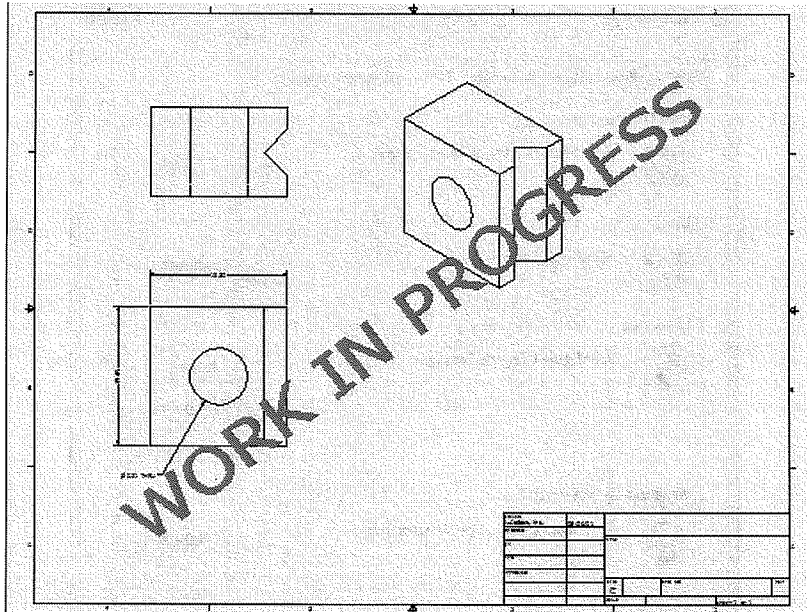


4. Select OK to dismiss the Import Revision Scheme Definition dialog and return to the Revision Schemes Definitions dialog.
5. Select Close to dismiss the Revision Scheme dialog.
6. Close the Vault Settings dialog.

# Configuring Visualization Watermarking

Downstream users of Item drawings need to be aware of the lifecycle status of the underlying Item. As an administrator, you can configure watermarks for visualization files to display a custom message depending on the lifecycle State.

The following illustration shows the watermark on a drawing for which the associated Item is in the Work in Progress State.



There are three choices for selecting the watermark to be displayed on the drawing:

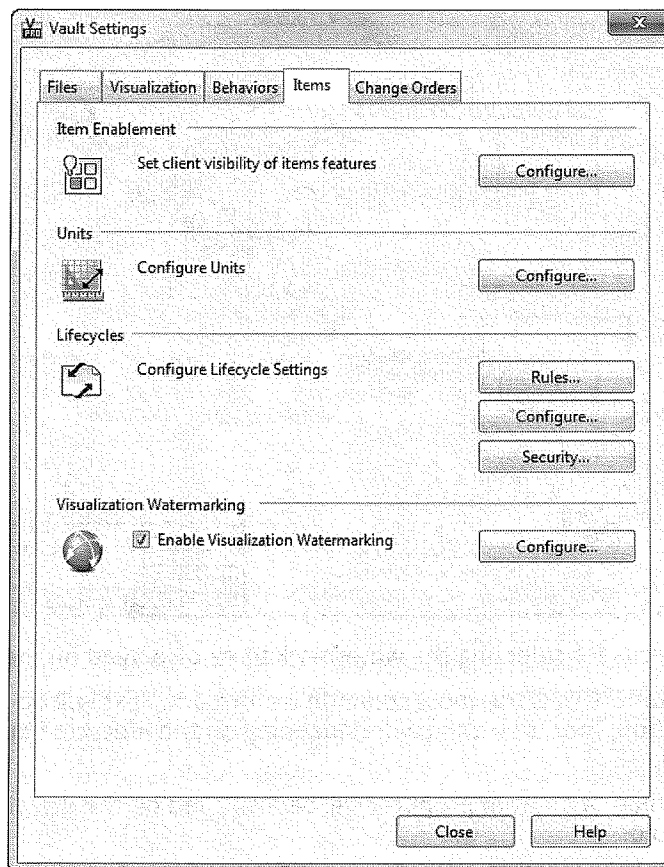
1. **Item lifecycle State:** This is the most common watermark. Text will be displayed on the drawing at a specified location, font, size and color depending on the lifecycle State of the Item that the file is associated with.
2. **Property:** The value of an Item property will be displayed on the drawing at a specified location, font, size and color.
3. **Custom:** A string specified in the Customize Watermark dialog is displayed on the drawing at a specified location, font, size and color.

## Procedure: Configuring Visualization Watermarks

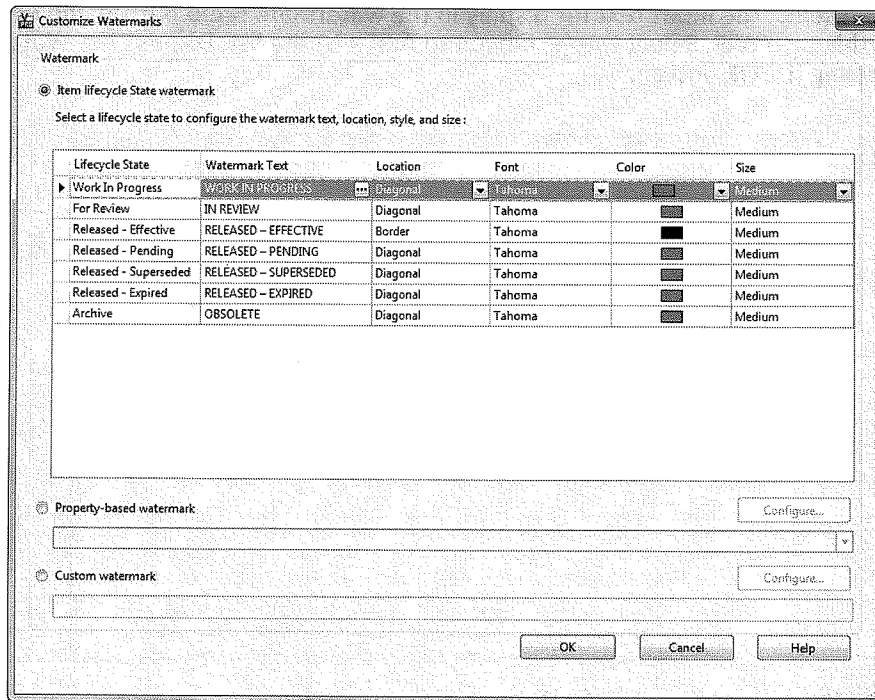
Visualization watermarks are displayed on drawing files associated with Items in the View pane. The actual watermark is determined by the State of the Item that the drawing is associated with.

The following steps show you how to enable and configure visualization watermarking for Items.

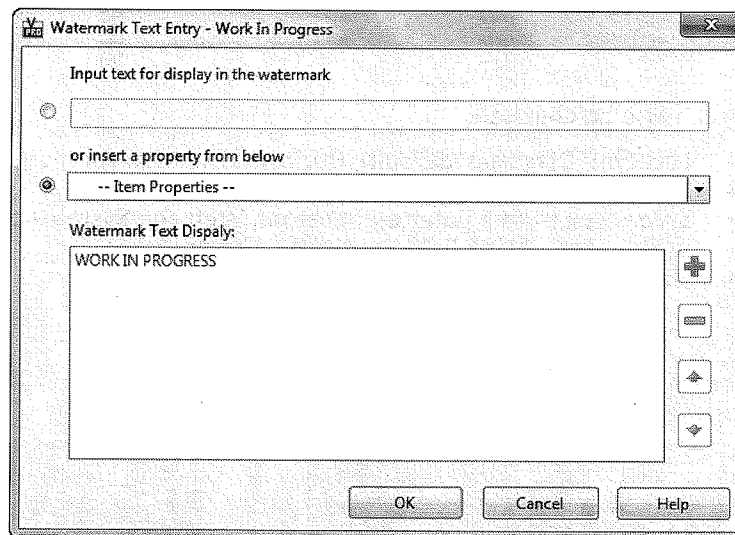
1. In the Vault Settings dialog select the Items tab. In the Visualization Watermarking section ensure that the Enable Visualization Watermarking checkbox is selected.



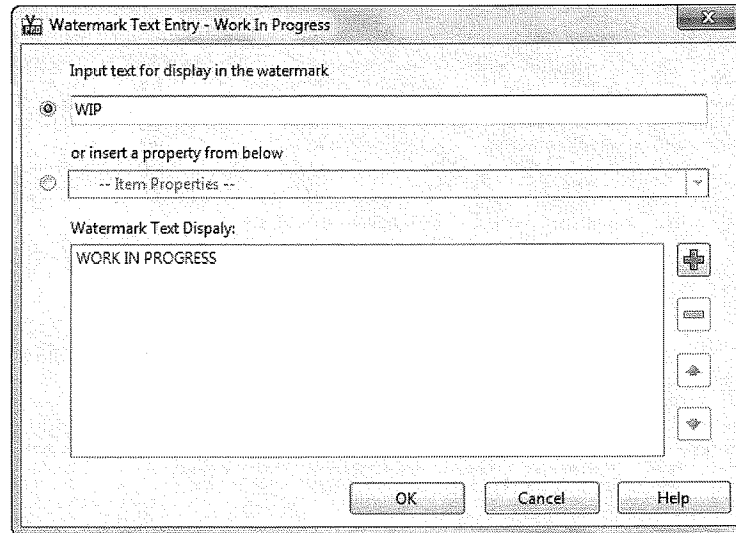
- Select the Configure button from this section to display the Customize Watermarks dialog.



- The default selection is to display Watermark text associated with the current lifecycle State of the Item.
- Specify the Watermark text by selecting the button next to the text to display the Watermark Text Entry dialog.



- The default is to display the Item lifecycle State in upper text. To change the value to another string first select the current water mark text and the select the '-' button to remove it from the list. Then select the Input text for display in the watermark radio button and enter a new line of text in this case WIP. Select the '+' button to Add it to the list. Dismiss the Watermark Text Entry by selecting the OK button.

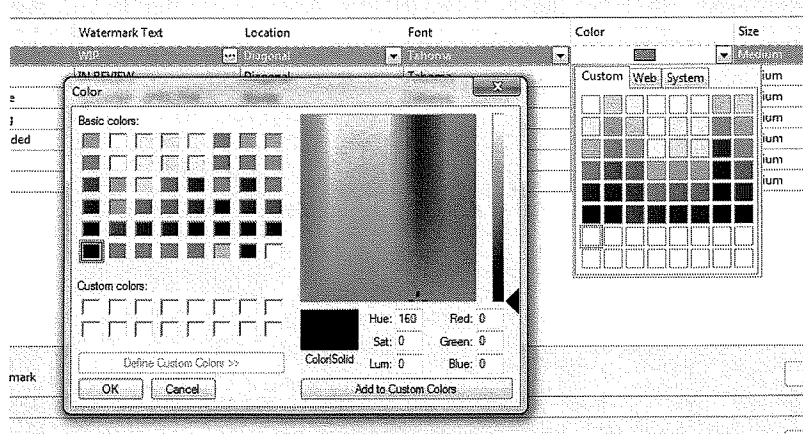


- Examine the new entry in the Customize Watermark dialog.

Lifecycle State	Watermark Text	Location	Font	Color	Size
Work in Progress	WIP	Diagonal	Tahoma		Medium
For Review	IN REVIEW	Diagonal	Tahoma		Medium
Released - Effective	RELEASED - EFFECTIVE	Border	Tahoma		Medium
Released - Pending	RELEASED - PENDING	Diagonal	Tahoma		Medium
Released - Superseded	RELEASED - SUPERSEDED	Diagonal	Tahoma		Medium
Released - Expired	RELEASED - EXPIRED	Diagonal	Tahoma		Medium
Archive	OBSOLETE	Diagonal	Tahoma		Medium

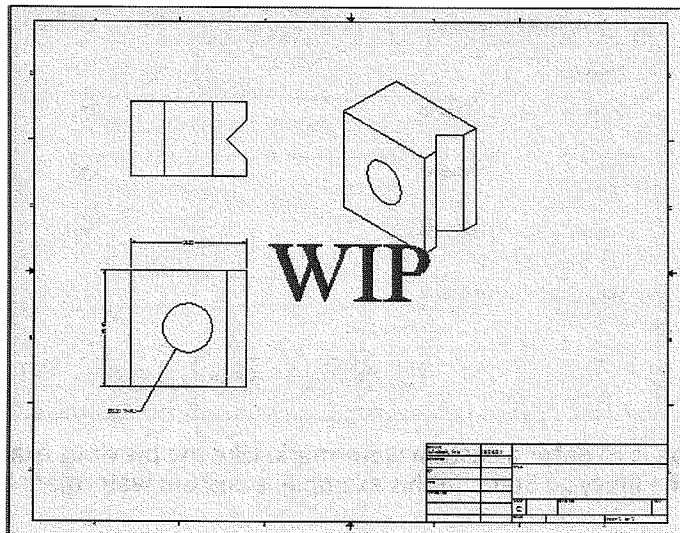
- The following can also be changed:

- Location: Diagonal (default), Horizontal and Border (across the bottom).
- Font: Common Windows fonts.
- Color: Pick from a palette of Custom, Web and Systems colors. You can right-click in one of the blank fields to display a color picker.
- Size: Small, Medium & Large.

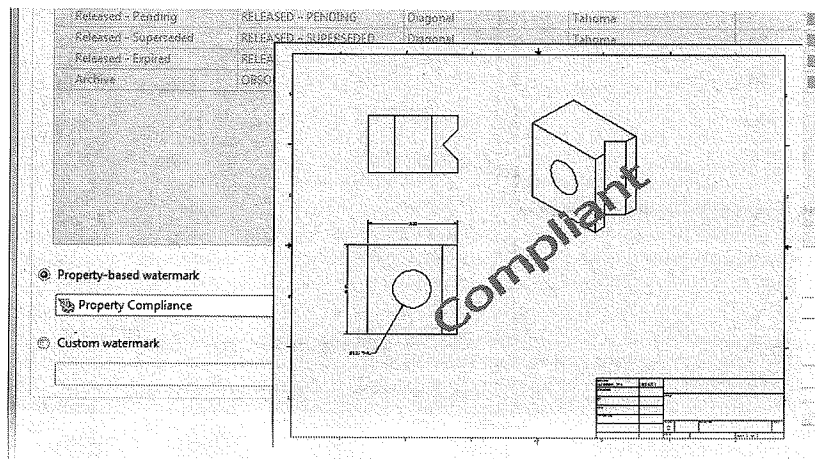




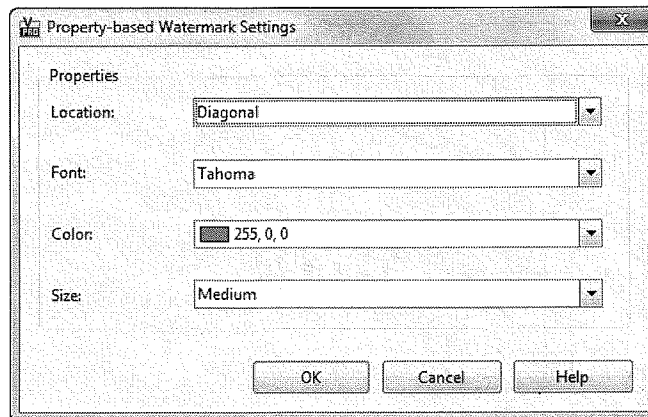
The result of a customized watermark changing the values is shown in the accompanying illustration.



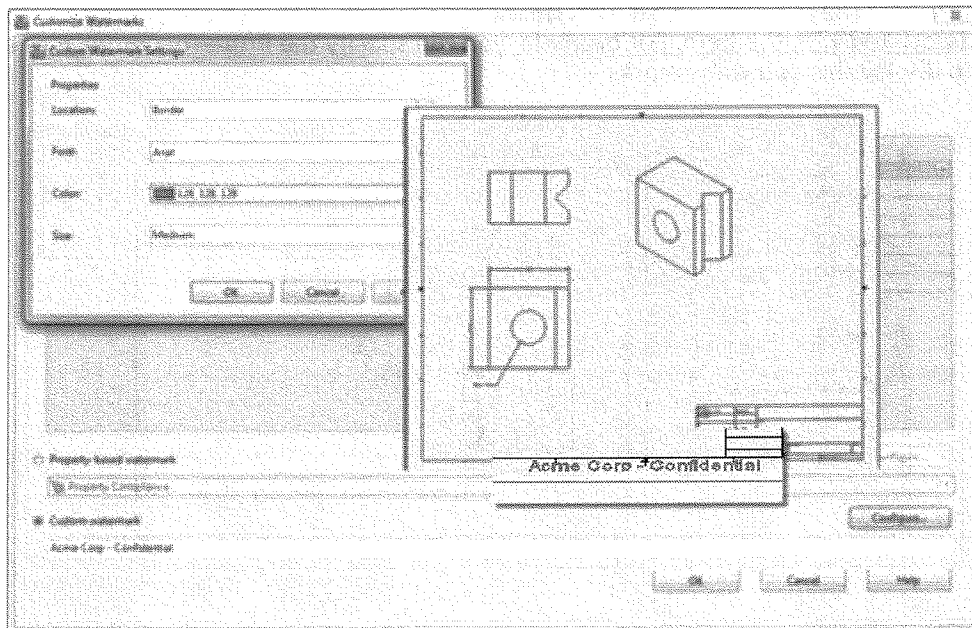
8. Selecting the Property-based watermark radio button allows you to specify any of the properties associated with the Item. For example, you can specify the Property Compliance system property to display this as a watermark.



This can also be customized by selecting the Configure button.



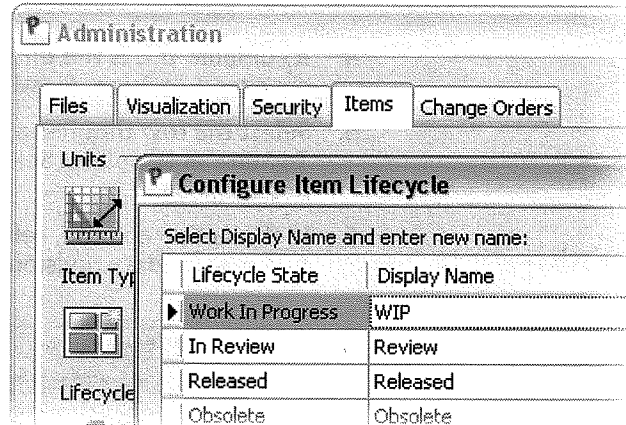
9. The third option is to enter a custom watermark. Like the previous example, this will be displayed regardless of the lifecycle State. In this example, a custom watermark has been added and configured.



10. Select OK to dismiss the Customize Watermark dialog. Close the Vault Settings dialog and refresh the display to see the new watermark.

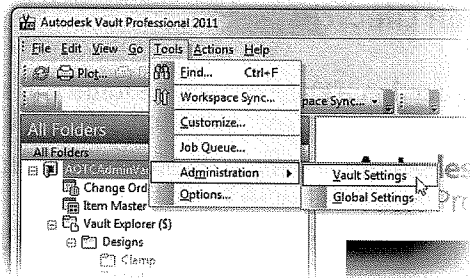
# Exercise 1: Configure Items

In this exercise, you create a new unit and new categories, add a new lifecycle rule, and select a new revision numbering scheme.



The completed exercise

1. Start Autodesk Vault Professional and login with the following information.
  - User Name: Administrator
  - No password
  - Database: AOTCAAdminVault
2. Select the Tools menu then Administration > Vault Settings to display the Vault settings dialog.
3. Do the following:
  - For Name enter Micron
  - For Symbol enter um
  - For Base Unit select centimeters (cm)
  - For the conversion factor enter .0001
  - Make sure the This is a Base Unit is unchecked
4. Select OK to create the new unit.



Name	Symbol	Base Unit	Conversion Fa...
Centimeter	cm	cm	1
Millimeter	mm	cm	0.1
Meter	m	cm	100
Inch	in	cm	2.54
Foot	ft	cm	30.48
Yard	yd	cm	91.44003
Micron	um	cm	0.0001

3. Select the Items tab.

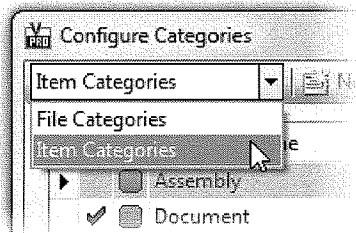
## Unit of Measure

1. Select Configure in the Units section to display the Units of Measure dialog.
2. Select New to display the Add Unit dialog. This is where you will define the new unit – microns.

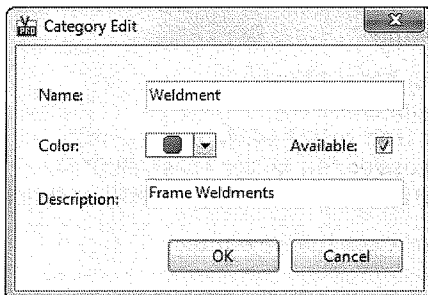
5. Confirm the new unit is added. Select OK to dismiss the Units of Measure dialog and return to the Vault Settings dialog.

## Item Category

1. In the Vault Settings dialog select the Behaviors tab.
2. Select the Categories button in the Categories section to display the Configure Categories dialog.



3. In the Configure Categories toolbar select new to display the Category Edit dialog.
4. In the Category Edit dialog enter the following information:
  - For Name enter Weldment.
  - For the Color select a color of your choice.
  - Select the Available checkbox if not already enabled.
  - For description enter Frame Weldments.



5. Select OK to dismiss the Category Edit dialog and return to the Configure Categories dialog.
6. Select OK to dismiss the Configure Categories dialog and return to the Vault Settings dialog.

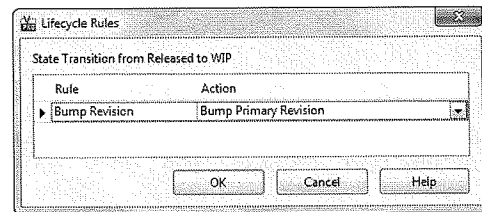
## Lifecycle Rules

1. Select the Items tab again and now select Rules from the Lifecycles section to display the Administer Lifecycles dialog.

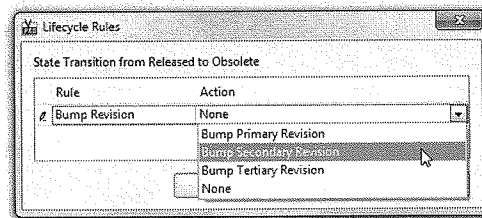
Note that Item Lifecycles are administered separately from File Lifecycles which is found on the Behaviors tab.

2. In the Administer Lifecycles dialog select the row that has a From State of Released and To State of Work In Progress.

3. Now select Edit to see the Bump Revision rule for this lifecycle State change.



4. By default, this is the only Item lifecycle change which changes a revision. Close this dialog by selecting Cancel.
5. Select the row that has a From State of Released and a To State of Obsolete. Select Edit to display the Lifecycle Rules dialog.
6. In the Action column, select the drop down and specify Bump Secondary revision.

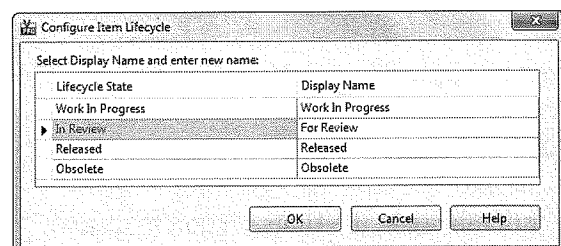


7. Select OK to dismiss the Lifecycle Rules dialog and return to the Administer Lifecycles dialog.
8. Select Close to dismiss the Administer Lifecycles dialog.

Now when a user changes the lifecycle State of an Item from Released to Obsolete the revision will be bumped, for example from B to B.1.

## Configure Item Lifecycle

1. In the same section (Lifecycles) on the Items tab select Configure to display the Configure Item Lifecycles dialog.
2. In the row In Review select the Display Name field and replace In Review with the string For Review.



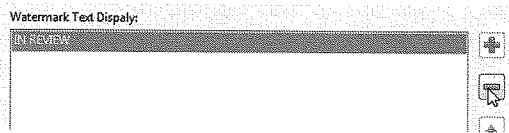
3. Select OK to dismiss the Configure Item Lifecycle dialog.

## Visualization Watermarking

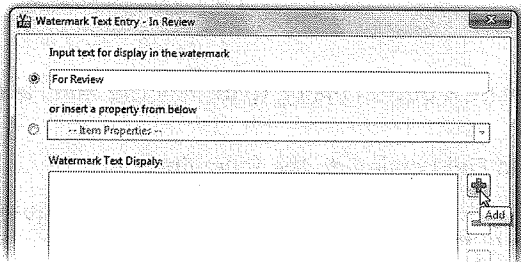
1. On the same (Items) tab select Configure from the Visualization watermarking section to display the Customize Watermarks dialog.
2. Select the row for the Lifecycle State of In Review. We need to change this to be consistent with the change we just made in Configure Item Lifecycle.
3. Select the button next to the Watermark Text IN REVIEW to display the Watermark Text Entry – In Review dialog.

Lifecycle State	Watermark Text	Location
Work In Progress	WORK IN PROGRESS	Diagonal
In Review	IN REVIEW	Diagonal
Released - Effective	RELEASED - EFFECTIVE	Border
Released - Pending	RELEASED - PENDING	Diagonal
Released - Superseded	RELEASED - SUPERSEDED	Diagonal

4. In the Watermark Text Display list Select the current text and then select the '-' button to remove it.



5. Select the Input text for display in the watermark radio button and enter the text For Review.
6. Select the '+' button to add this text to the list.



Select OK to dismiss the Watermark text Entry – In Review dialog and return to the Customize Watermark dialog.

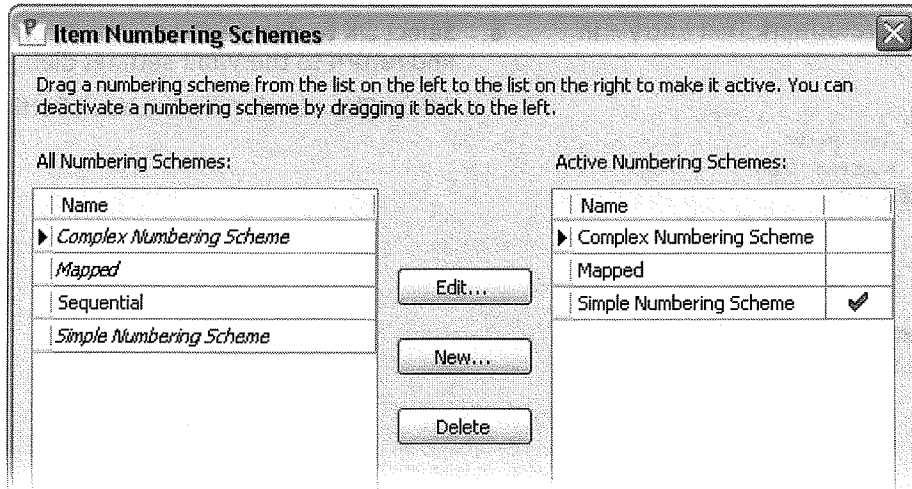
7. Note the change in the Watermark Text for the In Review State.

Lifecycle State	Watermark Text	Location
Work In Progress	WORK IN PROGRESS	Diagonal
In Review	For Review	Diagonal
Released - Effective	RELEASED - EFFECTIVE	Border
Released - Pending	RELEASED - PENDING	Diagonal
Released - Superseded	RELEASED - SUPERSEDED	Diagonal

8. Select OK to dismiss the Customize Watermark dialog and return to the Vault settings dialog.
9. Select Close to dismiss the Vault Settings dialog.

# Exercise 2: Create Item Numbering Schemes

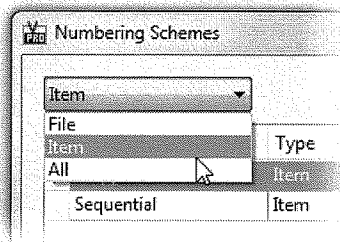
In this exercise, you create two Item numbering schemes. One scheme consists of a simple sequential number. The other is a more complex numbering scheme, with a list, delimiter, and sequential number.



The completed exercise

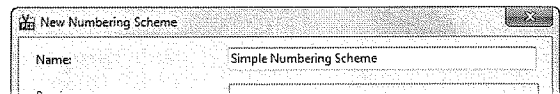
## Create Simple Item Numbering Scheme

1. Select the Behaviors tab in the Vault Settings dialog.
2. In the Numbering section select Define to display the Numbering Schemes dialog.
3. In the Numbering Scheme dialog select the drop down and select Items to display the Item Numbering Schemes.



4. Select New to create a new Item Numbering Scheme.
5. The New Numbering Scheme dialog is displayed.

6. In the Name field enter Simple Numbering Scheme.

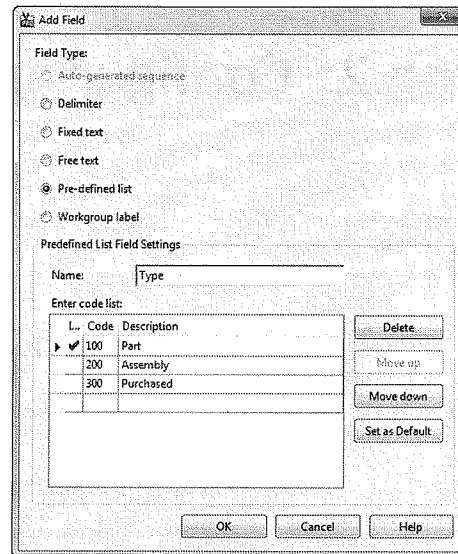


7. Select the new button dialog to display the Add Field dialog.
8. In the Add Field dialog do the following:
  - For Field Type select the Auto-generated sequence radio button.
  - For Name enter Number.
  - For Length enter 6
  - For Range enter 100001 for the starting number and do not change the ending number.
  - Leave Step Size at the default (1).
9. Select OK to return to the Numbering Schemes dialog.

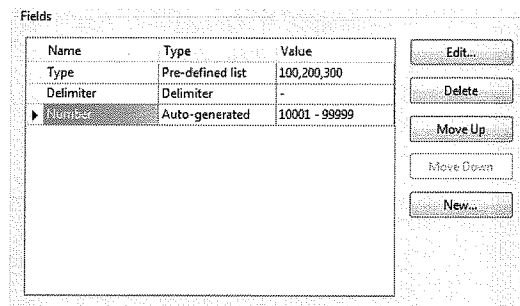
## Create Complex Numbering Scheme

1. Select New to create a new Item Numbering Scheme.
2. The New Numbering Scheme dialog is displayed. In the Name field enter Complex Numbering Scheme.
3. Select the new button dialog to display the Add Field dialog.
4. In the Add Field dialog do the following:
  - For Field Type select the Auto-generated sequence radio button.
  - For Name enter Number.
  - For Length enter 5
  - For Range enter 10001 for the starting number and do not change the ending number.
  - Leave Step Size at the default (1).
5. Select OK to dismiss the Add Field dialog and return to the New Numbering Schemes dialog.
6. Select the new button dialog to display the Add Field dialog.
7. In the Add Field dialog do the following:
  - For Field Type select Delimiter.
  - For Delimiter Value enter '-' (hyphen).
8. Select OK to dismiss the Add Field dialog and return to the New Numbering Schemes dialog.
9. Select the new button dialog to display the Add Field dialog.
10. In the Add Field dialog do the following:
  - For Field Type enter Pre-defined list.
  - In the Predefined List Field Settings section enter Type for the Name.
  - In the first row of the Enter code list: section enter 100.
  - Select the Description field right next to it and enter Part.
  - A second row is added to the list. In the Code field for this new row enter 200.
  - Select the Description field right next to it and enter Assembly.
  - A third row is added to the list. In the Code field for this new row enter 300.
  - Select the Description field right next to it and enter Purchased.
  - Select the first row and select the Set As Default button

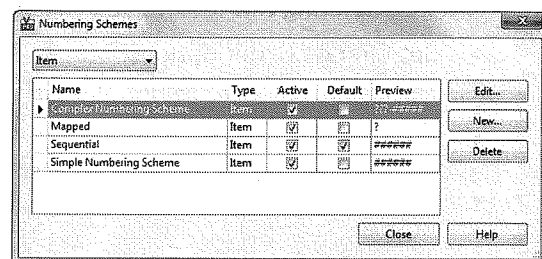
Your entries should look like the following illustration.



11. Select OK to return to the New numbering Scheme dialog.
12. Select the Type row and then select the Move Up button twice to move it to the top of the list.
13. Now select the Delimiter row and select the Move Up button once to move it between the Type and the Number. Your Fields list should appear like the following illustration.



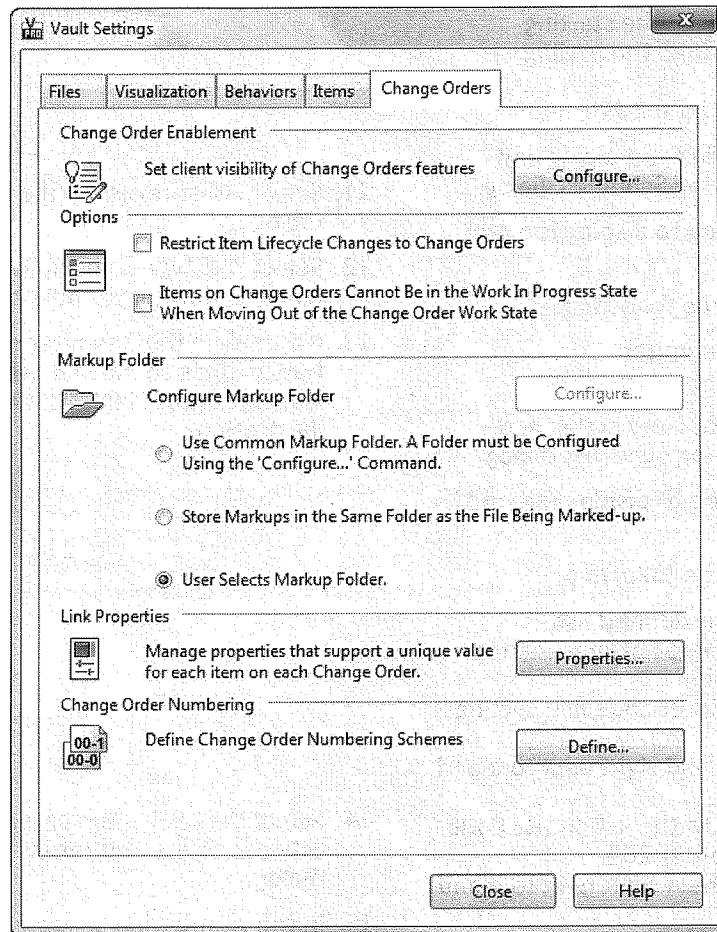
14. Select the OK button to dismiss the New Numbering Scheme dialog and return to the Numbering Schemes dialog.
15. In the Numbering Schemes dialog box select the default checkbox in the Simple numbering Scheme row. This numbering scheme will now be applied to new Items. Select Close to dismiss the Numbering Schemes



# Lesson 2: Configuring Change Orders

## Overview

This lesson describes how to set up and configure Change Orders to better match your company's requirements.



## Objectives

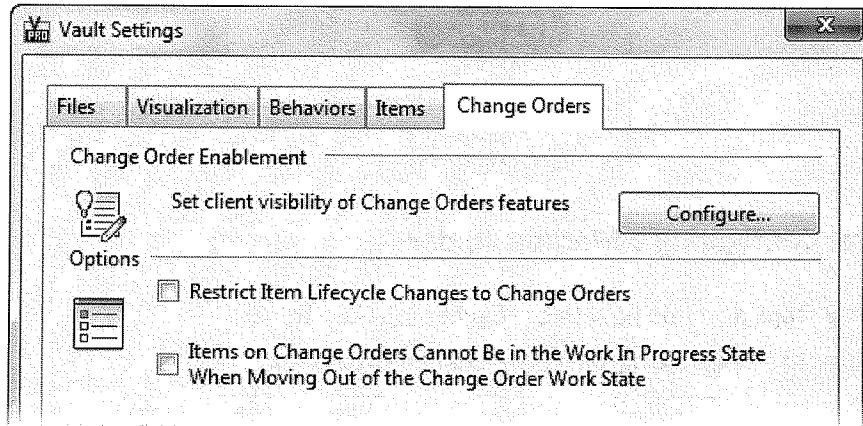
After completing this lesson, you will be able to:

- Set Change Order options.
- Configure a Change Order markup folder.
- Add user-defined properties to Change Orders.
- Define Change Order routing lists.
- Define Change Order numbering schemes.
- Configure email notification.



## Change Order Options

As an administrator, you can set several options for Change Orders that determine Change Order workflows. The Change Orders option settings are shown in the following illustration.



**Restrict Item Lifecycle Changes to Change Orders.**

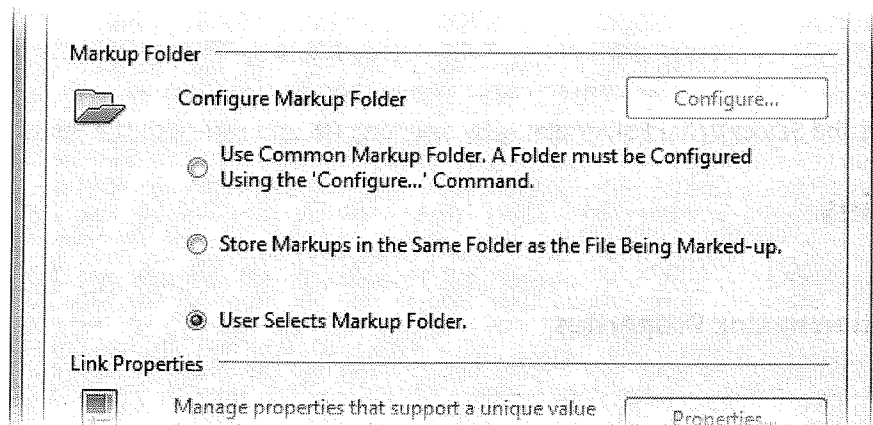
- If on, forces all lifecycle changes to be performed using Change Orders.
- Disables manual lifecycle State changes for any user other than those with the Administrator role.

**Items on Change Orders Cannot Be in the WIP State When Moving Out of the Change Order Work State.**

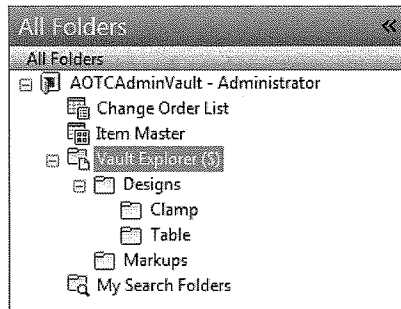
- If on, prevents the Change Order State from moving from the Work State to either the Check or Review States if any of the Items on the Change Order are in the Work In Progress lifecycle State.
- Forces the Change Order participants to set the associated Items' States to In Review when the Change Order is ready to move out of the Work State.

## Configuring a Markup Folder

During the Change Order process, markups are often used to discuss changes. By default, the markup files are placed in the same folder as the associated file. As an administrator, you can enable the user to select a markup folder or you can configure a markup folder in the vault where all of the markup files are stored.



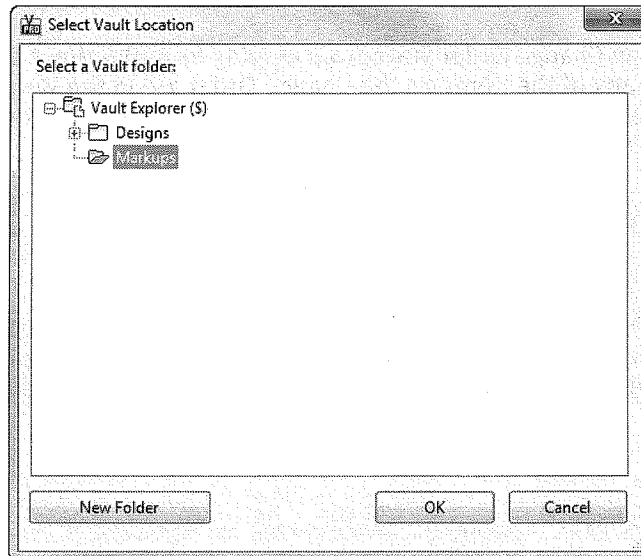
The following illustration shows a markup folder named Markups that was added under the root of the vault.



### Procedure: Configuring a Markup Folder

The following steps describe how to configure a markup folder.

1. In the Vault Settings dialog select the Change Orders tab.
2. In the Markup Folders sections select the Use Common Markup Folder radio button. The Configure button in the same group is now enabled.
3. Select the Configure button to display the Select a Vault Folder dialog.
4. If the folder already exists then select it, otherwise use the New Folder command to create a new folder.



5. Dismiss the Select Value Folder dialog by selecting OK and return to the Vault Settings dialog.

## Link Properties

### Introduction to Link Properties

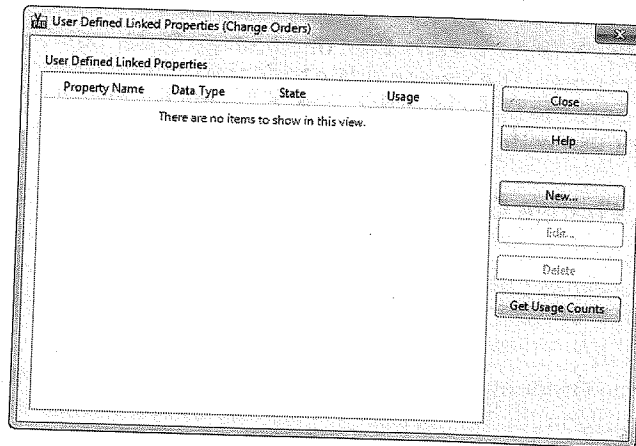
Link properties are unique to Change Orders and allow you to support a unique value for each Item on the Change Order. Link properties are Item properties but only in the context of the Change Order that they are associated with. If the Item is not on a Change Order it does not have this property.

Link Properties are unique in the sense that they are administered in a dialog different than File, Item and Change Order properties. However they do support Property Compliance. The following Change Order shows the two ICU Valve Buttons on a Change Order to remove the paint. The cost of the change for each button is \$400 to change the tooling and update the process documentation.

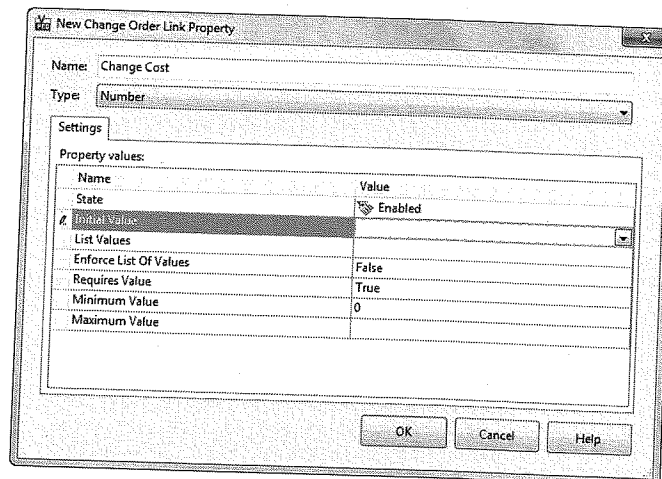
Name	Title	Revision	State (Historical)	Units	Change Cost
100020	ICURBUTN.ipt	B	Released	Each	400
100024	ICULBUTN.ipt	A	Released	Each	400

### Procedure: Adding a Link Property

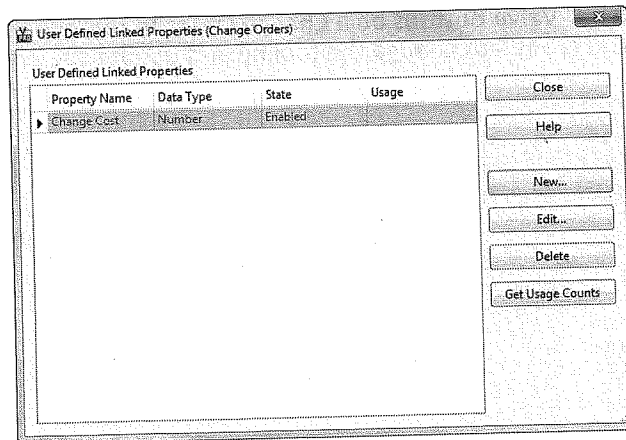
1. In the Vault Settings dialog select the Change Order tab. In the Link Properties section select the Properties button to display the User Defined Linked Properties (Change Order) dialog. There are no default properties shipped with the product.



2. Select New to display the New Change Order Link Property dialog. Enter the Name, select the type from the drop down and then specify Settings for the property. In this case we specified that the property requires a value greater than \$0. Click OK to dismiss the dialog and return to the User Defined Linked Properties (Change Order) dialog.



3. The new link properties appear in the list. Select Close to return to the Vault Settings dialog.



## Change Order Numbering

The default Change Order numbering scheme uses a three-letter prefix, ECO, and an auto-generated, six-digit number. If the supplied Change Order numbering scheme does not match your company standards or does not meet your needs, you can create new Change Order numbering schemes.

If your company standards require more than one Change Order numbering scheme, you can create multiple numbering schemes. The person originating the Change Order can select the appropriate scheme when they create the Change Order. The following illustration shows the creation of a new numbering scheme for use with Change Orders on a specific product in a company.

### Example of Using Change Order Numbering Schemes

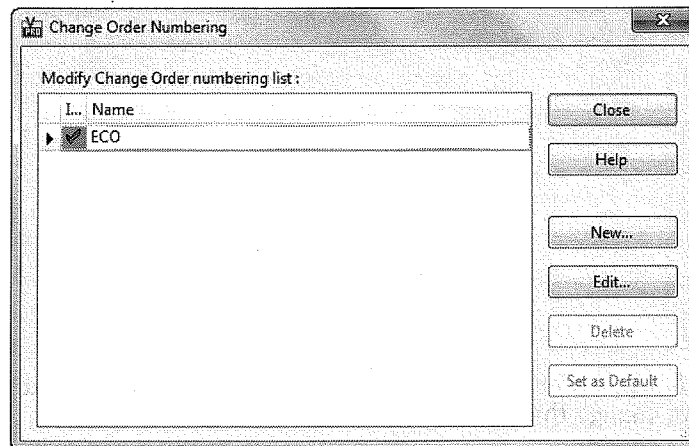
Your company differentiates Change Orders that originate out of the design and manufacturing departments. In Vault Professional, you can differentiate Change Orders using one of the following methods:

1. Create two Change Order numbering schemes to match the numbering scheme that you already use. The person originating the Change Order can select a numbering scheme when creating the Change Order. Users can sort, group, or search by the Change Orders' numbers.
2. Create one new numbering scheme (or use the supplied numbering scheme) and then define a user-defined property that contains a list of the product lines. Users can sort, group, or search by the Change Orders' user-defined property.

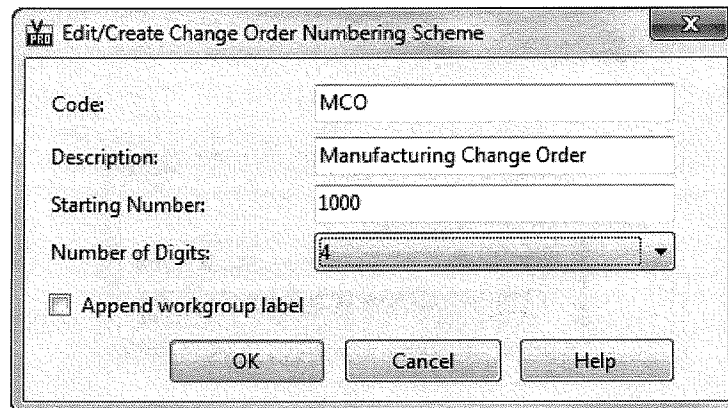
## Procedure: Define a Change Order Numbering Scheme

The following steps describe how to define a new Change Order numbering scheme.

1. In the Vault Settings dialog select the Change Order tab and in the Change Order Numbering section select Define to display the Change Order Numbering dialog.

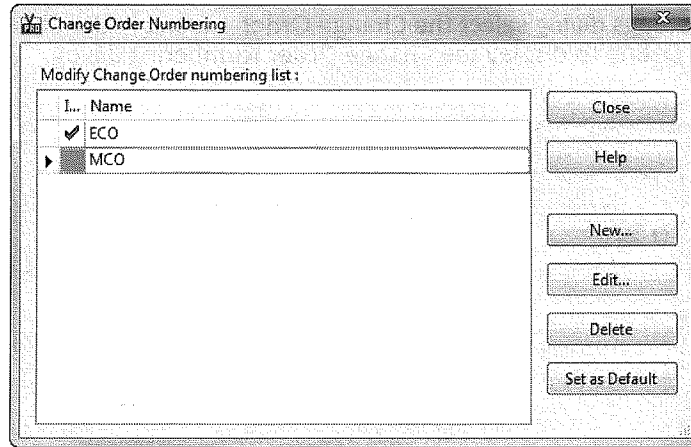


2. Select New to display the Edit/Create Change Order Numbering Scheme dialog. Enter the Code (Prefix), a textual Description, the starting number and a number of digits between 3 and 6 in the drop down. Select the Append workgroup label checkbox if you wish and are using replication.

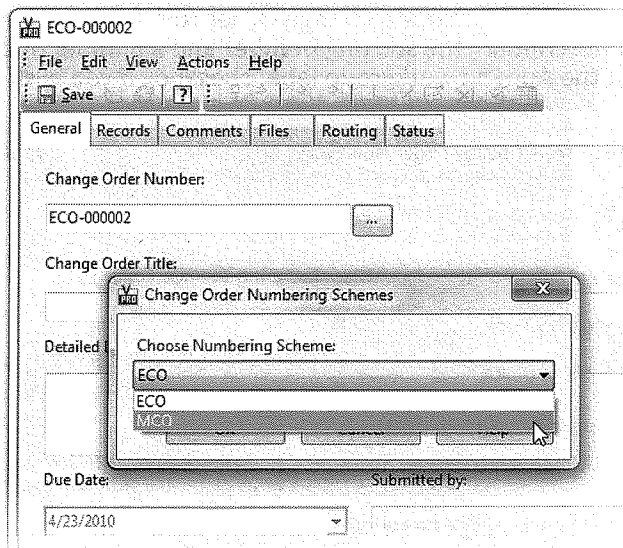


Select OK to dismiss the dialog and return to the Change Order Numbering dialog.

3. If desired, select the new Numbering Scheme and click Set as Default to make this the default Change Order numbering scheme used when a new Change Order is created. Select Close to dismiss the dialog.



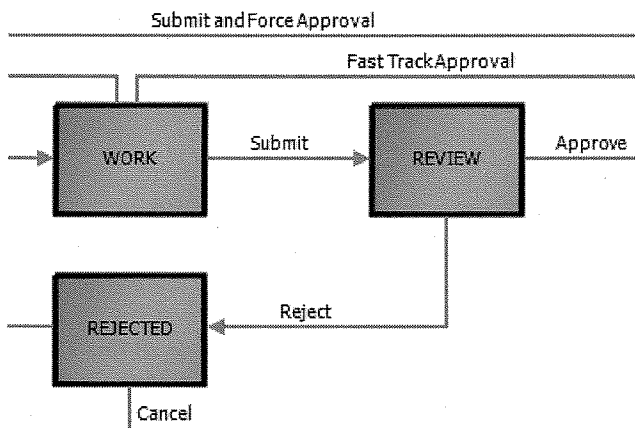
4. When a new change Order is created, the user selects the button next to the Change Order Number field to change the scheme used.



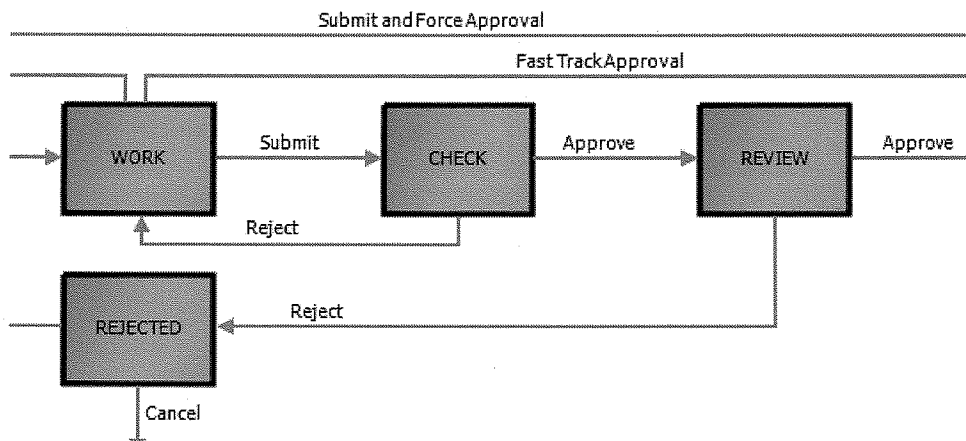
# Routing Definition - Workflow Selection

There are two possible workflows possible with Vault Professional:

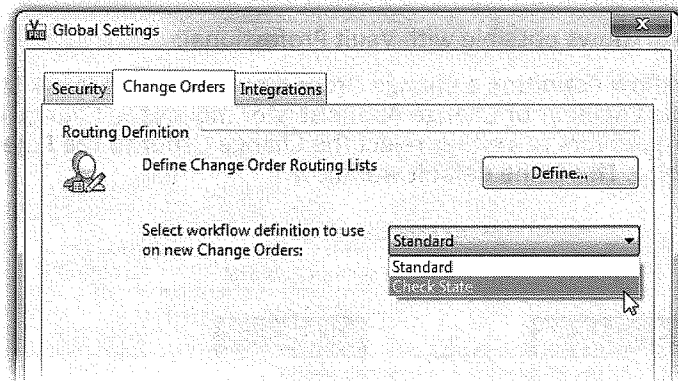
1. **Standard:** In the workflow definition a Change Order moves from the Work State to the Review State. The Responsible Engineer or Change Administrator moves the Change Order out of the Work State and the Approvers can either reject the Change Order to the Rejected State or Approve it to the Approved State. This is the default workflow.



2. **Check State:** In this workflow definition a new State Check and Routing Participant Checker is added to the standard workflow. This is a common workflow where someone checks the work of the Responsible Engineer to insure adherence to company standards, etc. before it is submitted to final review. In this workflow the Responsible Engineer or Change Administrator submits the Change Order to the Check State. There the Checker can either Approve it to the Review State or Reject it back to the Work State.



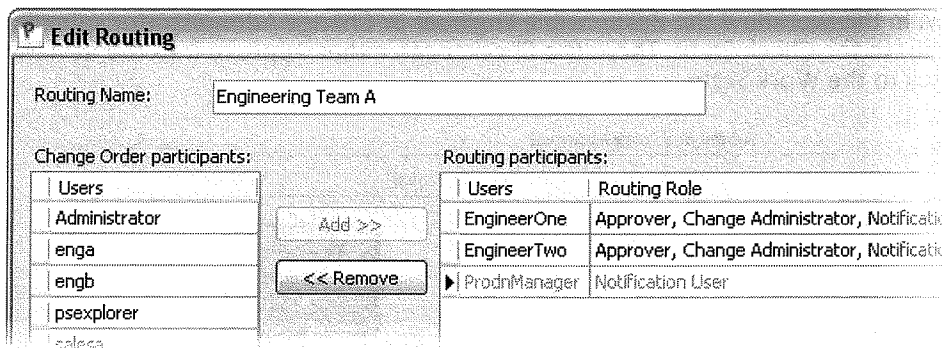
The workflow can be changed by selecting the Tools menu then selecting Administration and Global Settings dialog.



## Routing Definition - Change Order Routing Lists

As an administrator, you define one or more routing lists to define Change Order participants and their roles in the Change Order process. When users create a Change Order, they select which routing list to use. Small companies may need only one routing list and large companies may need many. Because routing lists are shared across all vaults, only one set of routing lists is required regardless of the number of vaults you use.

The following illustration shows the creation of a Change Order routing list.





## Change Order Roles

Change order participants are assigned one or more of the following roles.

Role	Task Availability
Change Requestor	<p>This is the only role that does not need to be explicitly added to a routing. Anyone with Change Order Editor permission can create a Change Order.</p> <ul style="list-style-type: none"> <li>Can submit the new Change Order to the Open State.</li> <li>Can edit or delete the Change Order in the Create State.</li> </ul>
Change Administrator	<p>Participates in all States.</p> <ul style="list-style-type: none"> <li>Is notified when the Change Order enters the Open State.</li> <li>Can submit a Change Order from the Create to the Open State.</li> <li>Can delete the Change Order in the Create State.</li> <li>In the Create State, can edit, submit to the Work State, submit and force approval to the Approved State or can cancel the Change Order.</li> <li>Can change the State of associated Item(s) in the Open State.</li> <li>Can add or remove Items.</li> <li>Can add, remove, and edit user-defined properties.</li> <li>Can add or reply to comments.</li> <li>Only participant who can set effectivity once the Change Order is approved (Change Order moves to Closed State).</li> </ul>
Responsible Engineer	<p>Participates only in the Work State.</p> <ul style="list-style-type: none"> <li>Notified when the Change Order enters the Work State.</li> <li>Can add and remove approvers and reviewers.</li> <li>Can submit to the Review State.</li> <li>Can change the State of the associated Item(s) in the Work State.</li> </ul>
Checker	<p>Participates only in the Check State (when enabled).</p> <ul style="list-style-type: none"> <li>Notified when the Change Order enters the Check State.</li> <li>Can add comments in the Check State.</li> <li>Can approve to the Review State or reject back to the Work State.</li> </ul>
Reviewer	<p>Participates in the Work, optional Check and Review States.</p> <ul style="list-style-type: none"> <li>Notified when the Change Order enters the Review State.</li> <li>Can add or reply to comments in the Work, optional Check, and Review State.</li> <li>Can add attachments and markups.</li> <li>Can add additional reviewers to routing list.</li> </ul>
Approver	<p>Participates in the Review State.</p> <ul style="list-style-type: none"> <li>Notified when the Change Order enters the Review State.</li> <li>Cannot add or reply to comments (must be Reviewer).</li> <li>Only participant who can approve or reject the Change Order in the Review State.</li> </ul>
Notification User	<p>Notified when a Change Order enters the Closed State. Does not participate in Change Order activities.</p>

## Guidelines

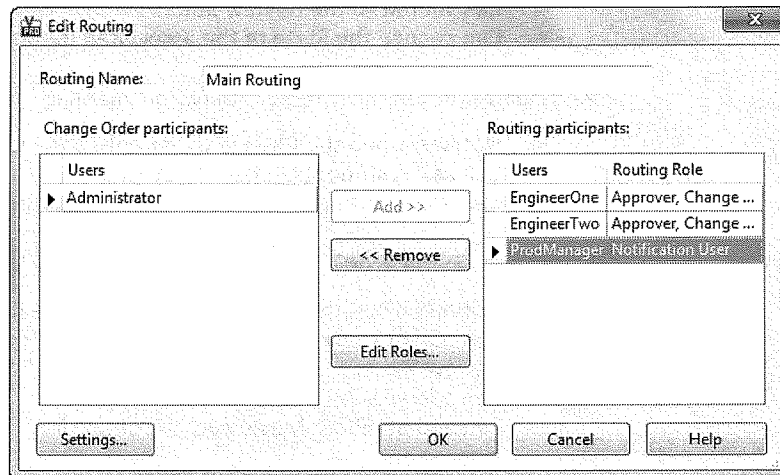
You can use the following guidelines when you create Change Order routing lists:

- Any user with Change Order Editor Permission can create a Change Order, even if the user is not on a Change Order routing list. When a user creates a Change Order, he or she is added to the routing list and assigned the role of Requestor.
- Routing list participants can be changed as the Change Order progresses. A participant on the routing list who wants another user to review the Change Order can add that user as a Reviewer or Notification User, even if the new user is not a participant in the routing list. The administrator can also add or remove approvers and reviewers while the Change Order is active.
- The administrator, Change Administrator, and Responsible Engineer can add and remove Approvers and Change Administrators in the States where they can edit the Change Order.
- There must be at least one Change Administrator, one Responsible Engineer, and one Approver on a routing list. If there is more than one Approver, you can select whether or not unanimous approval is required to approve the Change Order.
- If you turn on the Check State for Change Orders, a routing list must also include a Checker.
- Assign multiple roles where necessary. If one user makes changes to associated files and approves Change Orders, assign that user the Responsible Engineer and Approver roles. If the user does all tasks, assign them all roles.

## Example

A small company wants to track change. They install Autodesk Vault Professional and need to set up a single Change Order routing list. Two engineers are responsible for all aspects of the Change Order process and the production manager wants to be notified of change.

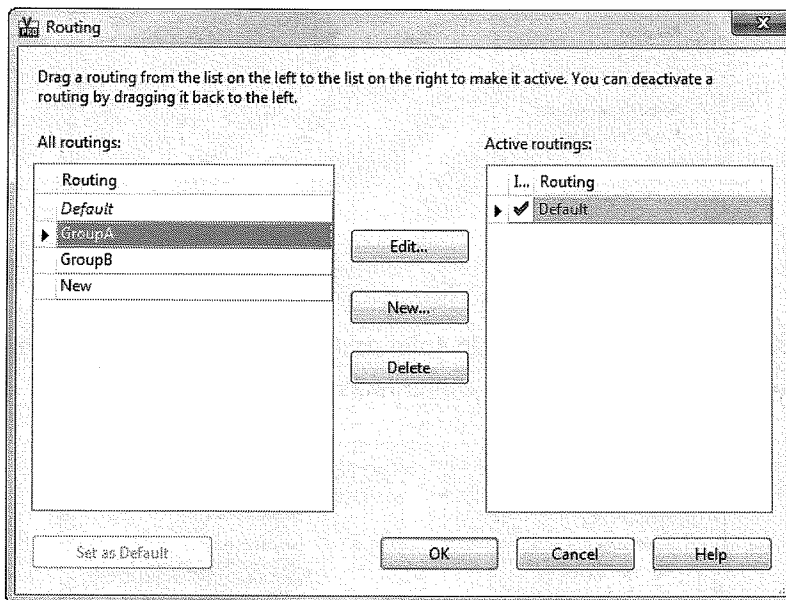
A Change Order routing list is created with three participants. Each of the two engineers is assigned as Change Administrator, Responsible Engineer, and Approver. The production manager is assigned as a Notification User.



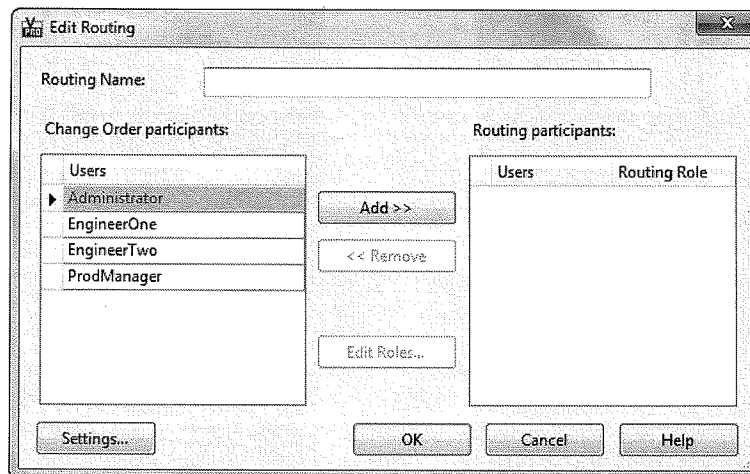
## Procedure: Creating a Change Order Routing List

The following steps outline the creation of a routing list.

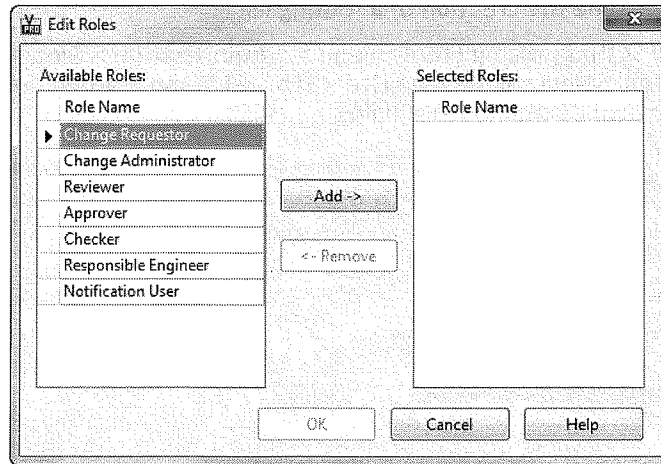
1. Open the Global Settings dialog (Tools menu > Administration > Global Settings) and select the Change Orders tab. Select the Change Order tab and in the Routing definition section select the Define button to display the Routing dialog.



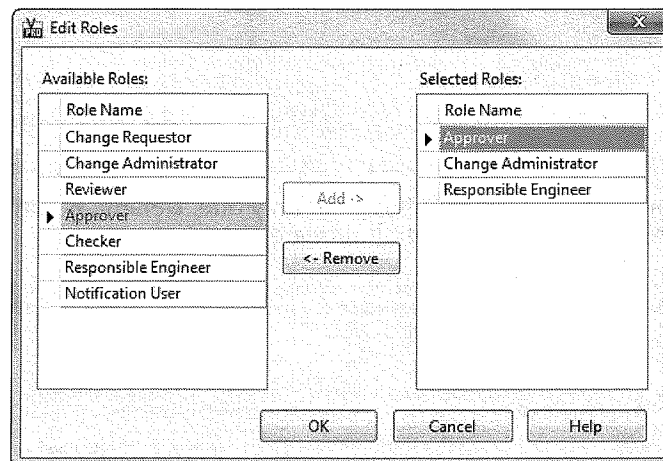
2. A number of Routings have been defined but only one, Default, is currently active and set as the default. Select New to display the Edit Routing dialog.



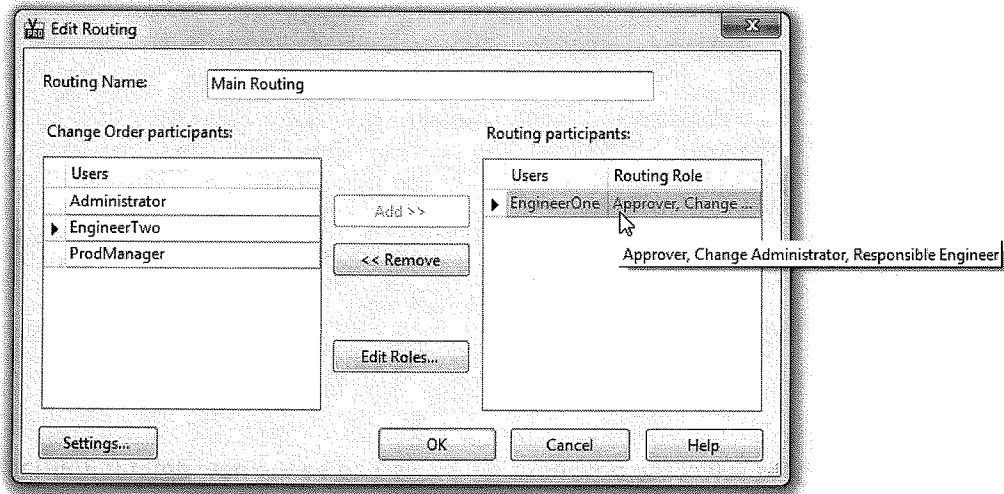
3. Enter a Routing Name. Then select one of the users from the Change Order participants list and select Add to display the Edit roles dialog.



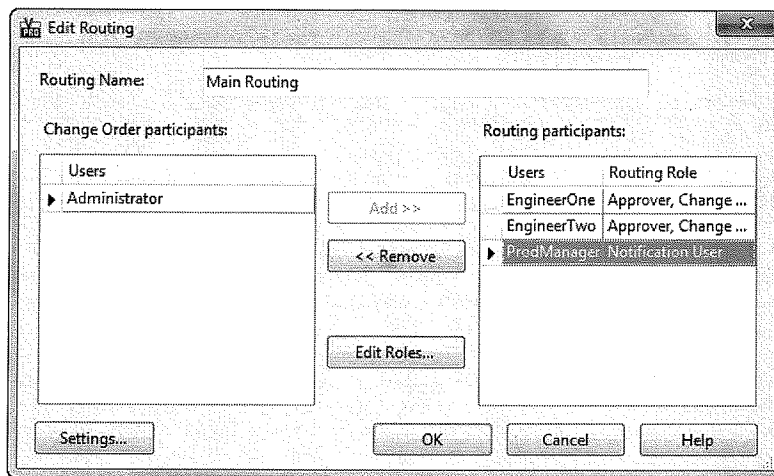
4. Select a role from the list of Available Roles and select Add to add it to the list of Selected Roles.
5. Repeat the previous step to add any additional roles.



- Select OK to return to the Edit Routing dialog. Note the Routing Roles assigned to the first selected user.

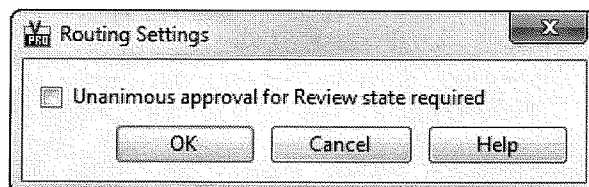


- Repeat steps 3 – 5 to add the rest of the Change Order participants and define their Routing Roles.

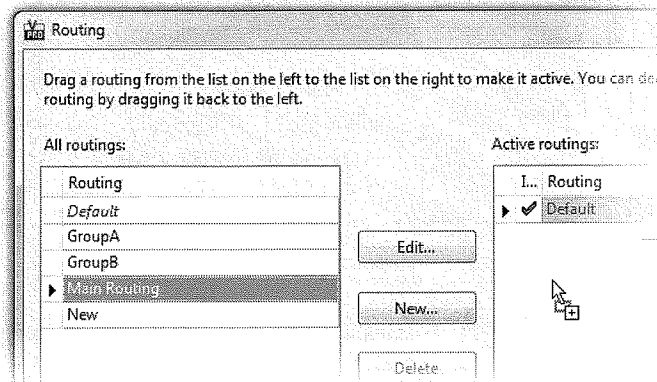


Note that you must add users in the Change Administrator, Responsible Engineer and Approver role. If you are using the optional Check state a Checker must also be added.

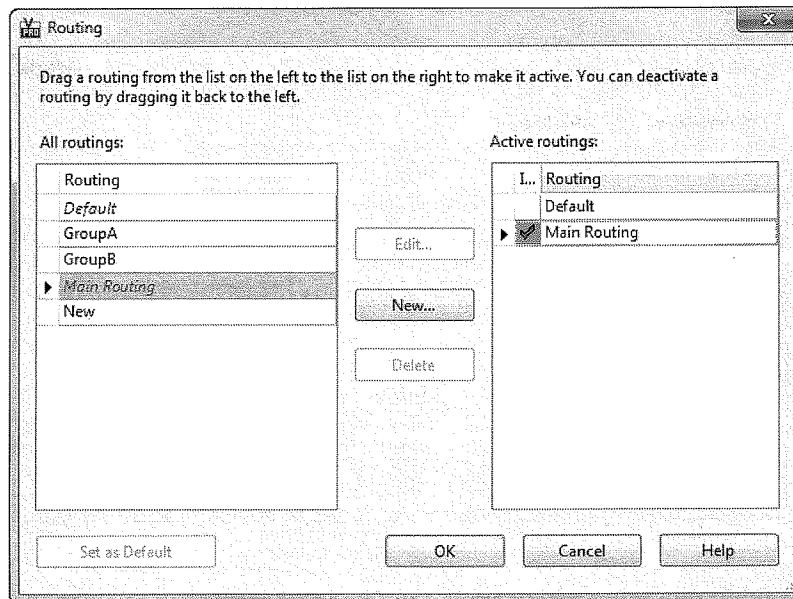
- If you have more than one approver, use the Settings button to display and select the approval type required.



9. Select OK to dismiss the Edit Routing dialog and return to the Routing dialog.
10. In the Routing dialog select the new Routing and drag it from the All routings list to the Active routings list.



11. In the Routing dialog select the new Routing. If this is to be the new default Routing select Set as Default from the lower left part of the dialog.

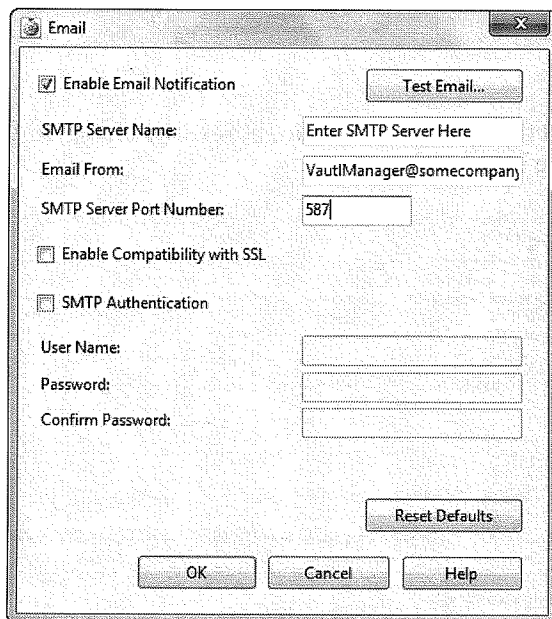


12. Select OK to dismiss the Routing dialog and return to the Global Settings dialog.

## Configure Email Notification

As an administrator, you must configure email settings if you want notifications emailed to participants on the routing list when a Change Order enters a State that requires attention. For example, the Responsible Engineer is notified when the Change Order enters the Work State, Approvers are notified when the Change Order enters the Review State, and Notification Users are notified when the Change Order enters the Closed State.

The following illustration displays the Email dialog box in which you enable email notification and enter the email server information.



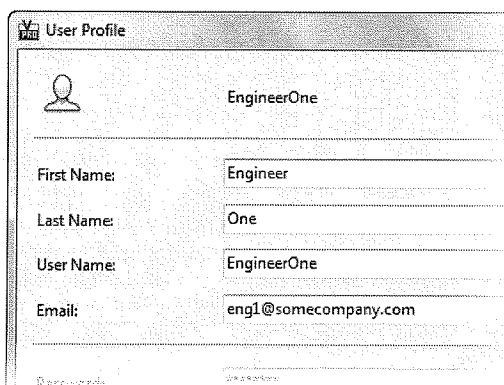
The screenshot shows a dialog box titled "Email" with the following fields and options:

- Enable Email Notification (with a "Test Email..." button)
- SMTP Server Name: Enter SMTP Server Here
- Email From: VaultManager@somecompany
- SMTP Server Port Number: 587
- Enable Compatibility with SSL
- SMTP Authentication
- User Name: [Empty field]
- Password: [Empty field]
- Confirm Password: [Empty field]
- Reset Defaults button
- OK, Cancel, and Help buttons at the bottom.

### Procedure: Configuring Email Notification

The following steps describe how to configure email notification.

1. Make sure that all users that will be participating in Change Orders have email addresses.

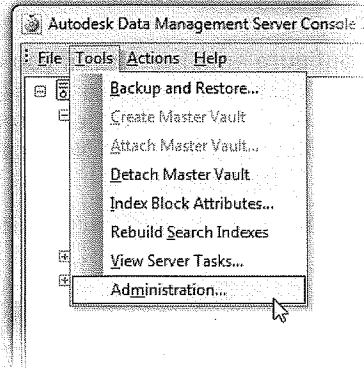


The screenshot shows a "User Profile" dialog box for a user named "EngineerOne". The fields are filled with the following information:

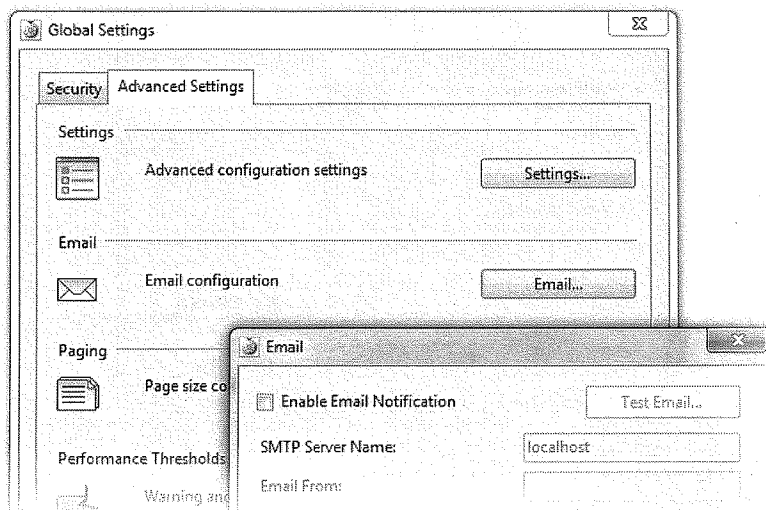
- First Name: Engineer
- Last Name: One
- User Name: EngineerOne
- Email: eng1@somecompany.com

2. Log in to the Autodesk Data Management Server console as the Administrator.

3. In the Tools menu select Administration.



4. Select the Advanced tab to display the Global Settings dialog. In the Email section select the Email button to display the Email dialog.





5. Select the Enable Email Notification and then enter the appropriate SMTP Server Name, and address that will show up in the From address in the email and the SMTP Server Port Number. You may need to specify the other options in the bottom half of the dialog (consult with your IT group).

The 'Email' dialog box contains the following fields and options:

- Enable Email Notification (with a 'Test Email...' button to its right)
- SMTP Server Name: Enter SMTP Server Here
- Email From: VaultManager@somecompany.com
- SMTP Server Port Number: 587
- Enable Compatibility with SSL
- SMTP Authentication
  - User Name: [text box]
  - Password: [text box]
  - Confirm Password: [text box]

Buttons at the bottom: OK, Cancel, Help, and a 'Reset Defaults' button.

6. Use the Test Email button to insure the configuration is correct.

The 'Test Mail Message' dialog box displays the following information:

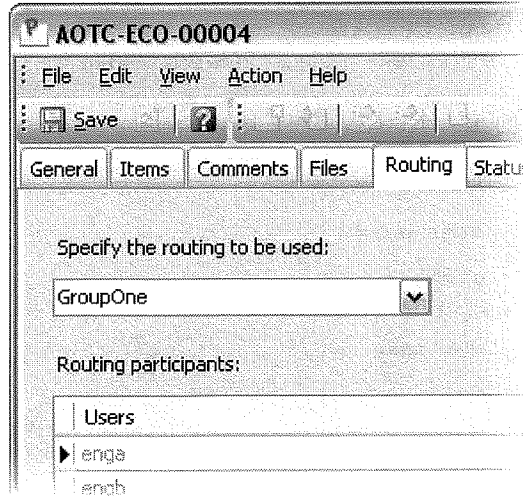
- From: VaultManager@somecompany.com
- To: user@somecompany.com
- Subject: Server console: Test mail message from NOV12376

Buttons at the bottom: Send, Cancel, and Help.

7. Select OK to dismiss the Email dialog and return to the Global Settings dialog.
8. Select OK to dismiss the Global Settings dialog and log out of the Autodesk Data Management Server console.

# Exercise 1: Set Up Change Orders

In this exercise, you set up a markup folder, add a user-defined Change Order property, create a new Change Order numbering scheme, and add a new Change Order routing list.



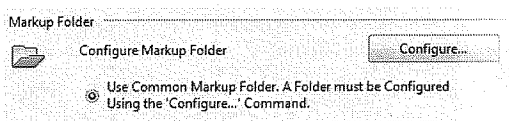
The completed exercise

## Configure Change Orders

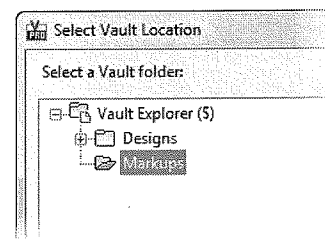
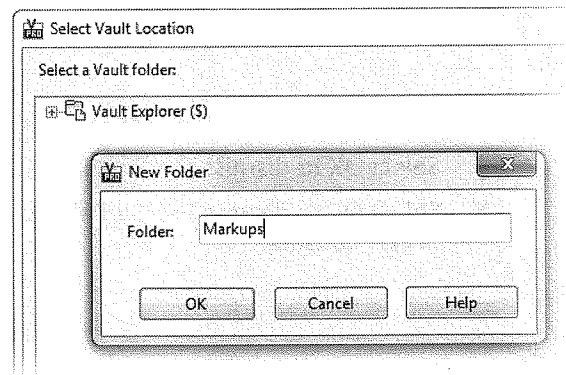
1. Start Autodesk Vault Professional logging in with this information:
  - User Name: Administrator
  - No password
  - Database: AOTGAdminVault
2. Open the Vault Settings dialog by selecting Tool from the menu then Administration > Vault Settings.
3. Select the Change Orders tab and review the default options.
3. Select New Folder to create a new folder named Markup in the Vault Explorer (\$) root folder.
4. Enter Markup in the New Folder Dialog and then OK to dismiss the dialog.

## Markup Folders

1. In the Markup Folder section select the Use Common Markup radio button. The Configure button in the same section is now enabled.
5. Select OK to dismiss the Select Vault Location dialog and return to the Vault Settings dialog.

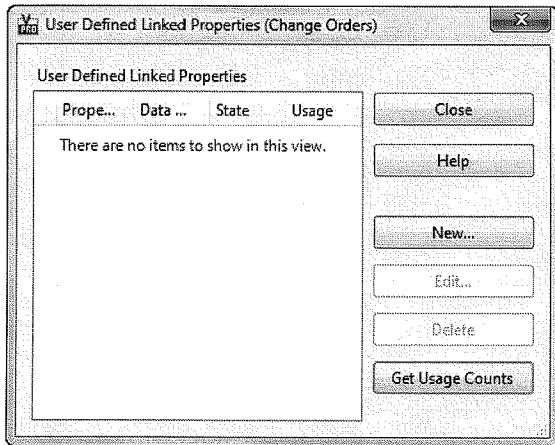


2. Select the Configure button to display the Select Vault Location dialog.



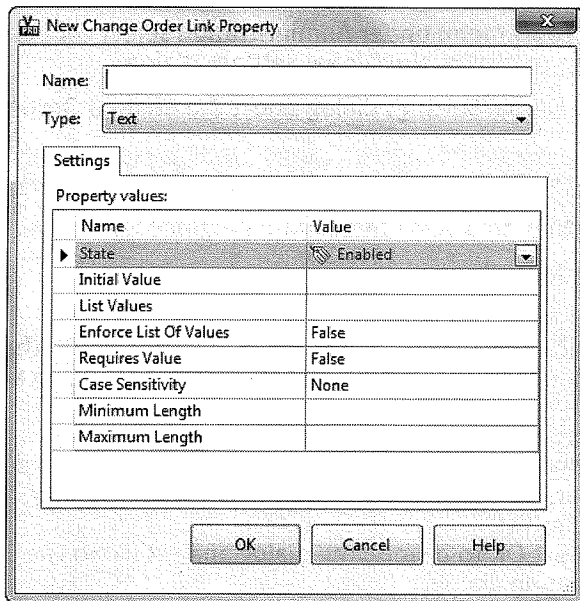
## Add Link Properties

1. In the Vault Settings dialog select the Properties button in the Link Properties section to display the Link Properties dialog.



Note that unlike other properties, there is no default Link Properties.

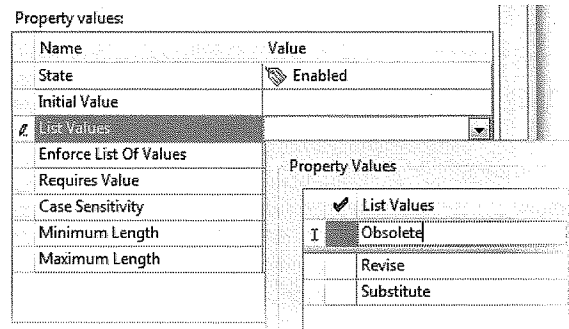
2. Select New to display the New Change Order Link Property dialog.



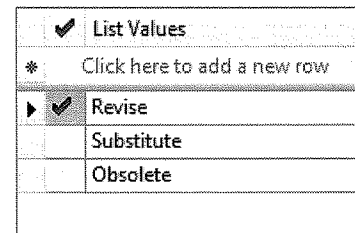
3. Enter the following information for a new Link Property Disposition.
  - Enter Disposition for Name.
  - Keep the Type default Text.
  - In the list Values dialog select the right column to display the List Values

4. In the List Values dialog do the following:

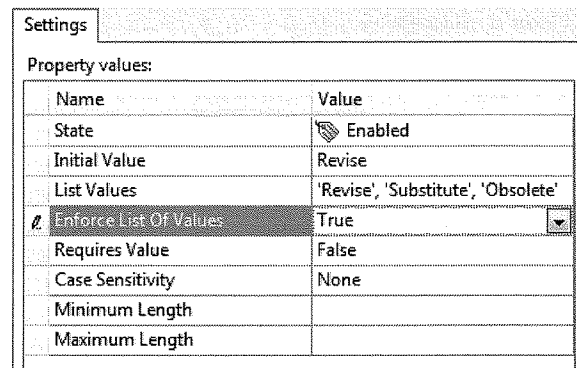
- In the Click here to add new row section enter Revise followed by the enter key.
- Enter Substitute followed by the Enter key.
- Enter Obsolete followed by the Enter Key



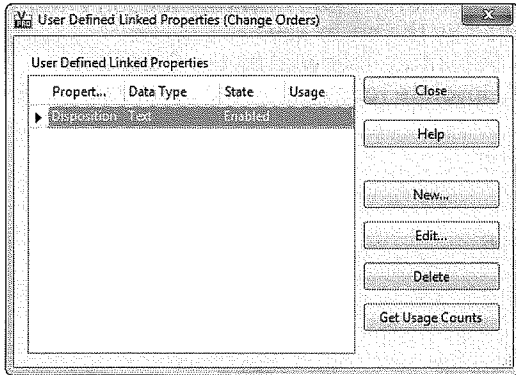
5. Select the entry for Revise and then select Set Initial Value to make this the default value.



6. Select Close to close this dialog and return to the New Change Order Link Property dialog.
7. Finish filling out this dialog by entering:
  - Select True from the drop down to Enforce List of Values.
8. Review the entries. They should look like the following list:

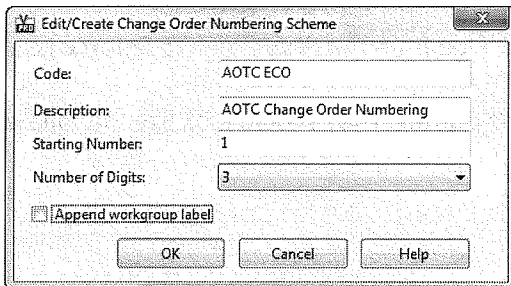


9. Select OK to return to the User Defined Linked Properties (Change Orders) dialog and then Close to return to the Vault Settings dialog.



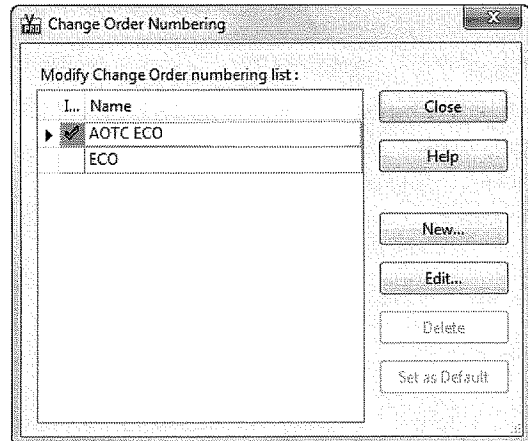
## Change Order Numbering

1. In the Vault Settings dialog select Define in the Change Order Numbering section to display the Change Order Numbering dialog.
2. Select New to create a new Change Order Numbering Scheme.
3. In the dialog that appears enter the following:
  - For Code enter AOTC ECO.
  - For Description enter AOTC Change Order Numbering.
  - For Starting Number enter 1
  - Keep the default number of digits (3).
  - Make sure that the Append workgroup label is unchecked.



4. Select OK to return to the Change Order Numbering dialog.

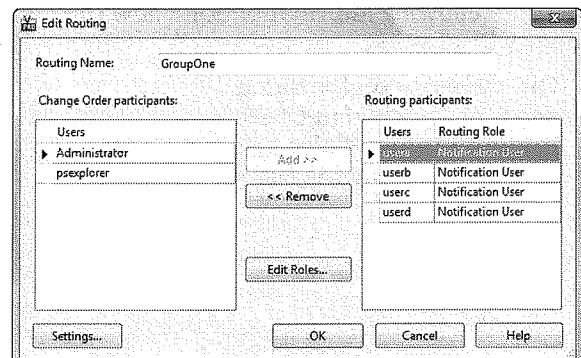
5. Select the new numbering scheme and then select Set as Default button from the lower right section of the dialog to set it as the default.



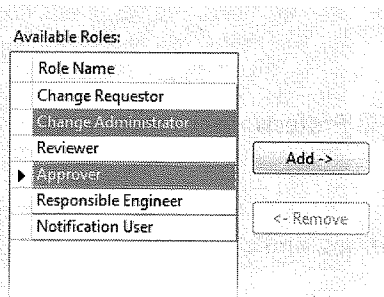
6. Select Close to dismiss this dialog and return to the Vault Settings dialog.

## Create Routing List

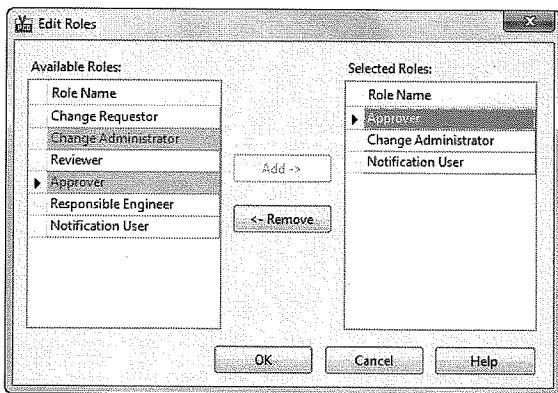
1. Select Close to dismiss the Vault Settings tab.
2. In the Tools menu under Administration select Global Settings to display the Global Settings dialog.
3. On the Global Settings dialog select the Change Orders tab.
4. Select the Define button to display the Routing dialog.
5. Select New to display the Edit Routing dialog.
6. Do the following:
  - For Name enter GroupOne
  - Shift-select usera, userb, userc and userd from the Change Order Participants list and select Add to add them to the Routing Participants.
  - In the Edit roles dialog that appears select Notification User from the Available roles list and then the Add button to add that to the Selected Roles list.
  - Select OK to dismiss the dialog and return to the Edit Routing dialog.



7. In the routing Participants list select usera and then select the Edit Roles button to display the Edit Roles dialog.
8. CTRL-select Change Administrator and Approver from the list.



9. Select the Add button to add these roles to the Selected Roles list.



10. Select OK to dismiss this dialog and return to the Edit Routing dialog.

11. Do the following:

- Select userb in the Routing participants list.
- Select the Edit Roles button.
- In the Edit Roles dialog that appears select Responsible Engineer from the Available Roles list.
- Select Add to add this role in the Selected Roles list.
- Select OK to dismiss the dialog and return to the Edit Routing dialog.

12. Do the following:

- Select userc in the Routing participants list.
- Select the Edit Roles button.
- In the Edit Roles dialog that appears select Approver from the Available Roles list.
- Select Add to add this role in the Selected Roles list.

Select OK to dismiss the dialog and return to the Edit Routing dialog.

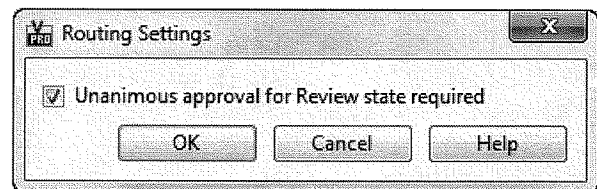
13. Examine the Edit Routing dialog to see the Routing participants and their roles you setup.

Routing participants:

Users	Routing Role
usera	Approver, Change Administrator, Notification User
userb	Notification User, Responsible Engineer
userc	Approver, Notification User
userd	Notification User

14. Select the Settings button from the lower left part of the dialog.

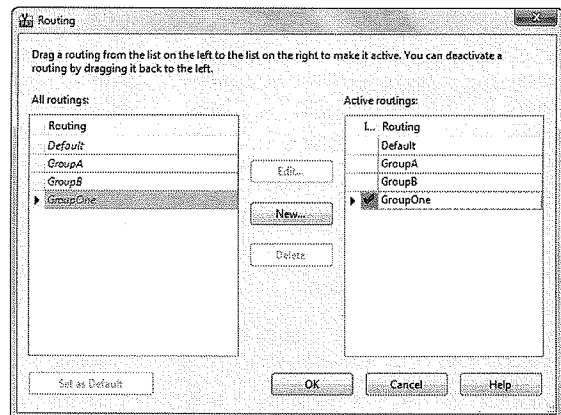
15. Select Unanimous approval for Review state required.



16. Select OK to dismiss this dialog and return to the Edit routing dialog.

17. In the All routings list select the new routing GroupOne and drag it to the Active routings dialog.

18. In the lower left corner of the dialog select the Set as Default button.



19. Select OK to dismiss this dialog and return to the Global Settings dialog.

20. Select Close to close this dialog.

21. Exit Vault Professional.

# Chapter Summary

As a Vault Professional administrator, you need to configure Vault Professional to meet your company's needs.

Having completed this chapter, you can:

- Create unit and categories, create new Item numbering schemes, and change lifecycle rules.
- Create, edit, and map item and change order properties
- Set up Change Orders including routing lists, user-defined properties, and Change Order numbering.

# Reporting

Autodesk Vault Professional provides the ability to generate formatted reports representing data contained in a vault. You can generate reports for files, items, and change orders, and organize the report based on specific properties. For example, a report can display files grouped by a category, summarize currently open change orders, or show the distribution of lifecycle states across a model. Reports can display the data in a variety of ways, including charts, tables, and data sheets. You can also format data using dozens of pre-defined operators.

In this chapter, you learn how to create and modify report templates so that you can customize Vault reports that contain information relevant to your business, in a format that suits your needs.

## Objectives

After completing this chapter, you will be able to:

- Create reports from an advanced search and configure how the data is displayed.
- Identify the different out-of-the box report templates and the information they are formatted to display.

# Lesson 1: Creating Reports

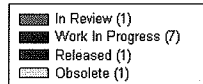
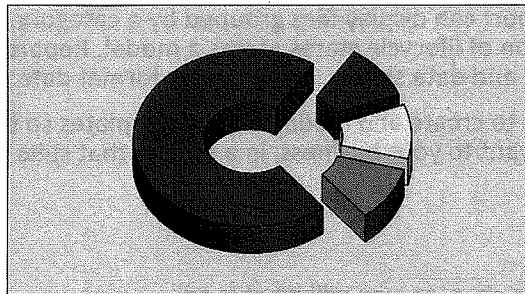
## Overview

In this lesson you learn how to create a report from an advanced search and configure how the report data is displayed.

Use search reports to illustrate details about files, items, and change orders stored in the vault by using charts, tables, and data sheets.

## Autodesk® Item By Items State Report

Generated By: Administrator  
Date: 6/21/2010 4:28:31 AM  
Search  
Conditions:



## Objectives

After completing this lesson, you will be able to:

- Create reports from an advanced search.
- Understand how to use each of the out-of-the box templates included with Autodesk Vault Professional.



## About Reports

Working with reports is a way of illustrating file details for those who do not have direct access to the vault. Reports can be organized to suit the needs of your business and to illustrate certain file, item, or change order details.

Search options specified in the Advanced Find dialog determine which vault objects appear in a report. The properties displayed in the report, as well as the report layout, are specified in a report template file that is selected during the report generation. Through the report template, you have control of the report content, layout, and format.

You generate reports by creating an advanced search with specified parameters and then clicking the report button. After selecting a template for the report, the information is displayed in a window for viewing.

### Example of Creating a Report

A report must be generated to show the current state of the change orders in a particular project. You create an advanced search with the condition that the search return all of the change orders for a specific project folder. Once the search is complete, you generate a report and choose the template that shows the state of each change order. Once the report is generated, you save a copy to the vault and email a copy to the project manager for review.

## Report Templates

Report descriptions for Vault reports are contained in RDLC files stored on the Vault client machine. These report description files are referred to as report templates. Vault report templates are fully RDLC compliant, but Vault requires certain naming conventions in the <DataSet> section of the template for integrating Vault data into the report.

A report template authoring utility is installed with the vault client to help you create simple client report definition files (.rdlc) for storing search data. This utility provides only a raw template structure for categorization purposes. A more sophisticated template authoring tool is required for custom visual layouts.

## Pre-existing Report Templates

When the Vault Client is installed, several pre-existing report templates are provided. The following table describes each template.

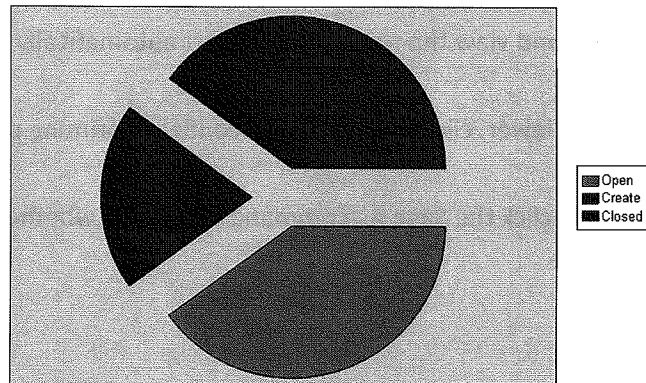
Template Name	Description
ECO Average Close Rate	Displays the average number of days it takes to close an ECO.
ECO By State	Displays the ECOs in groups based on ECO state.
ECO Detail	Displays the ECO Number, Change Order Properties, State, Due Date, and submission information without table formatting.
ECO Status Created on Month	Displays the number of ECOs per State.
ECO Table	Displays the ECO Number, Change Order Properties, State, Due Date, and submission information in table format.
File by Category	Displays the file name, revision, state, comments, and check-in information in a pie-chart organized by category.
File Detail	Displays the file name, revision, state, check-in information, and comments without table formatting.
File Table	Displays the file name, revision, state, check-in information, and comments in a table format.
File Transmittal	Displays the file name, revision, state, vault folder location, and date the version was created for each file.
Item By State	Displays the item information in groups based on state.
Item Detail	Displays the item name, revision, state, type, units, modification information, compliance status, and description without table formatting.
Item Table	Displays the item name, revision, state, type, units, modification information, compliance status, and description in table format.

# Microsoft Report Viewer

Vault uses the Microsoft Report Viewer to generate and display reports. Microsoft Report Viewer contains a full-featured, highly customizable reporting engine to display reports for SQL Server Reporting Services. However, the report viewer can also be run in "local mode" - allowing applications like Vault to provide data for report rendering without requiring the overhead of SQL Server Reporting Services. Vault runs the report viewer in local mode. Report descriptions for Vault reports are contained in RDLC files stored on the Vault client machine.

## Autodesk® Change Orders By State Report

Generated By: Administrator  
Date: 6/21/2010 4:22:19 AM  
Search Root: \$  
Search Conditions:



## Creating Search Reports

To create a search report, you must be familiar with how to generate searches with conditions. Familiarize yourself with the template you intend to use before creating the search. Once you understand which file, item, or change order properties will be displayed, you can specify search conditions to return the desired vault objects for the report.

Report templates may be stored in a local folder or in a vault. During installation, the pre-existing report templates are placed in a local folder at C:\Program Files\Autodesk\Vault <edition> 2011\Explorer\Report Templates.

## Procedure: Creating a New Report

The following steps describe how to create a new search report.

1. Click Find. The find dialog box is displayed.
2. Click the Basic tab or the Advanced tab depending on the type of criteria for which you want to search.
3. Specify the search criteria for this report.
4. Click Report. The Select Report Template dialog box is displayed.
5. Enter the path of a template that you would like to use or click the Browse button to navigate to the desired template. The last selected report template is displayed by default.
6. Click OK to generate a report. If none of the search criteria is set to ask me later, the report is created and displayed automatically.
7. If any of the criteria has a value set to ask me later, the Specify Search Values dialog box is displayed. Specify the search values for the listed properties, and then click OK. The Select Report Template is displayed.
8. Click OK to generate and view the report. The report automatically displays in Microsoft Report Viewer.
9. In Microsoft Report Viewer, click Page Setup to configure printing preferences and to print the report.
10. To export the report, click the Save As command and select whether to export the report as an Excel file or a PDF file.

# Exercise 1: Create a Search Report

In this exercise, you create a search report using a pre-existing template and save the report to the vault.

## Autodesk® System Item Properties Report

Generated By: Administrator  
Date: 6/21/2010 4:34:30 AM  
Search Conditions:

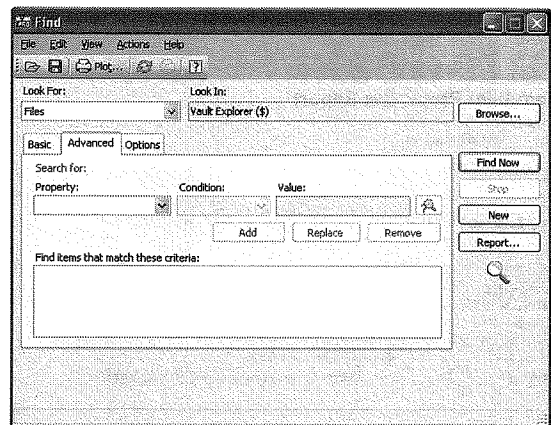
Item Number	REV	State	Title	Type	Units
100001	A	In Review	FemaleEnd.ipt		Each
100002	A	Work In Progress	MaleEnd.ipt		Each
Bushing	A	Released	Small-Alum.ipt		Each
IV6_ED6_03-FemaleEnd	A	Work In Progress	FemaleEnd.iam		Each
IV6_ED6_03-HeimBall12	A	Work In Progress	HeimBall12.ipt		Each
IV6_ED6_03-LinkAdjust	A	Work In Progress	LinkAdjust.iam		Each
IV6_ED6_03-LinkRod	A	Work In Progress	LinkRod.ipt		Each
IV6_ED6_03-MaleEnd	A	Work In Progress	MaleEnd.iam		Each
IV6_ED6_04-LinkRod	A	Work In Progress	LinkRod.iam		Each

The completed exercise

### Create a Search Report

1. Start Autodesk Vault Workgroup or Autodesk Vault Collaboration. Log in using the following information:
  - User Name: **usera**
  - Password: **vault**
  - Database: **AOTCVault**
2. In the navigation pane, click All Folders.
3. Select the Item Master list.
4. Click Find on the toolbar.

5. On the Find dialog box, click the Advanced tab.



6. On the Advanced tab, do the following:
  - Select State from the Property drop-down menu.
  - Select does not contain from the Condition drop-down menu.
  - Enter Obsolete in the Value field.
  - Click Add.

Find items that match these criteria:

State does not contain Obsolete

7. Click Find Now. All of the items not in an Obsolete state are listed.

Number	Title (Item,CO)
IV6_E06_02-LinkRod	LinkRod.ipt
IV6_E06_04-LinkRod	LinkRod.iam
100002	MaleEnd.ipt
100001	FemaleEnd.ipt
Bushing	Small-Alum.ipt
IV6_E06_03-LinkAdjust	LinkAdjust.iam
IV6_E06_03-MaleEnd	MaleEnd.iam
IV6_E06_03-HeimBall12	HeimBall12.ipt
IV6_E06_03-FemaleEnd	FemaleEnd.iam

8. Click Report.
9. On the Select Report Template dialog, do the following:
  - Click the ellipses (...) button.
  - Select Item Table.rdlc on the Select Report Template dialog.
  - Click Open
10. Click OK on the Select Report template dialog. The report is generated and immediately launched in Microsoft Report Viewer.

## Autodesk® System Item Properties Report

Generated By: Administrator  
Date: 6/25/2010 4:34:38 AM  
Search Conditions:

Item Number	REV	State	Title	Type	Units
100001	A	In Review	FemaleEnd.ipt	Each	
100002	A	Work In Progress	MaleEnd.ipt	Each	
Bushing	A	Released	Small-Alum.ipt	Each	
IV6_E06_03-FemaleEnd	A	Work In Progress	FemaleEnd.iam	Each	
IV6_E06_03-HeimBall12	A	Work In Progress	HeimBall12.ipt	Each	
IV6_E06_03-LinkAdjust	A	Work In Progress	LinkAdjust.iam	Each	
IV6_E06_03-LinkRod	A	Work In Progress	LinkRod.ipt	Each	
IV6_E06_03-MaleEnd	A	Work In Progress	MaleEnd.iam	Each	
IV6_E06_04-LinkRod	A	Work In Progress	LinkRod.iam	Each	

11. Click the Save button on the View Report toolbar.
12. Select PDF as the format in which you will save the report.
13. On the Save As dialog, navigate to the desktop.
14. Name the report and click Save to store it on your desktop.

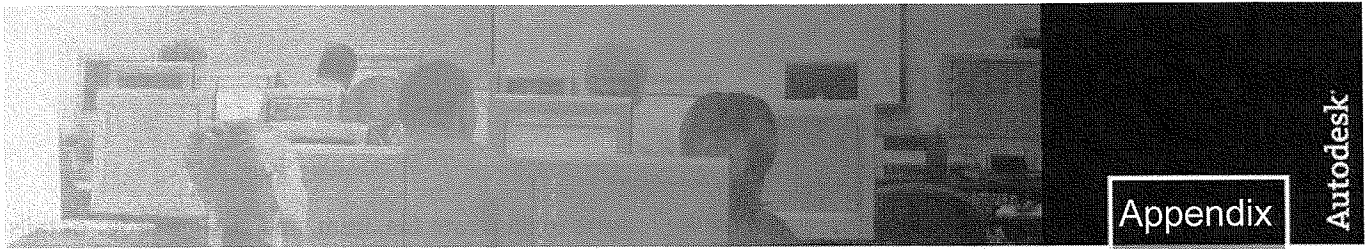
# Chapter Summary

All Autodesk Vault Professional users can create reports to illustrate file, item, and change order details. These reports are useful in understanding design statuses by visually organizing vault data based on specified properties.

You can use existing report templates to display your data in the form of charts, graphs, and tables.

Having completed this chapter, you can:

- Create reports from an advanced search and configure how the data is displayed.
- Identify the different out-of-the box report templates and the information they are formatted to display.



Appendix

A

Autodesk

# Additional Resources

A variety of resources are available to help you get the most from your Autodesk® software. Whether you prefer instructor-led, self-paced, or online training, Autodesk has you covered.

- Learning Tools from Autodesk
- Autodesk Certification
- Autodesk Authorized Training Centers (ATC®)
- Autodesk Subscription
- Autodesk Communities

## Learning Tools from Autodesk

Use your Autodesk software to its full potential. Whether you are a novice or an advanced user, Autodesk offers a robust portfolio of learning tools to help you perform ahead of the curve.

- Get hands-on experience with job-related exercises based on industry scenarios from Autodesk Official Training Guides, e-books, self-paced learning, and training videos.
- All materials are developed by Autodesk subject matter experts.
- Get exactly the training you need with learning tools designed to fit a wide range of skill levels and subject matter—from basic essentials to specialized, in-depth training on the capabilities of the latest Autodesk products.
- Access the most comprehensive set of Autodesk learning tools available anywhere: from your authorized partner, online, or at your local bookstore.
- To find out more, visit <http://www.autodesk.com/learningtools>.



## **Autodesk Certification**

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### **Certification Benefits**

- Rapid diagnostic feedback to assess your strengths and identify areas for improvement.
- An electronic certificate with a unique serial number.
- The right to use an official Autodesk Certification logo.
- The option to display your certification status in the Autodesk Certified Professionals database.

### **For more information:**

Visit [www.autodesk.com/certification](http://www.autodesk.com/certification) to learn more and to take the next steps to get certified.

## **Autodesk Authorized Training Centers**

Enhance your productivity and learn how to realize your ideas faster with Autodesk software. Get trained at an Autodesk Authorized Training Center (ATC) with hands-on, instructor-led classes to help you get the most from your Autodesk products. Autodesk has a global network of Authorized Training Centers that are carefully selected and monitored to ensure you receive high-quality, results-oriented learning. ATCs provide the best way for beginners and experts alike to get up to speed. The training helps you get the greatest return on your investment, faster, by building your knowledge in the areas you need the most. Many organizations provide training on our software, but only the educational institutions and private training providers recognized as ATC sites have met Autodesk's rigorous standards of excellence.

### **Find an Authorized Training Center**

With over 2,000 ATCs in more than 90 countries around the world, there is probably one close to you. Visit the ATC locator at [www.autodesk.com/atc](http://www.autodesk.com/atc) to find an Autodesk Authorized Training Center near you. Look for ATC courses offered at [www.autodesk.com/atcevents](http://www.autodesk.com/atcevents).

Many ATCs also offer end-user Certification testing. Locate a testing center near you at [www.autodesk.starttest.com](http://www.autodesk.starttest.com).

## Autodesk Subscription

Autodesk® Subscription is a maintenance and support program that helps you minimize costs, increase productivity, and make the most of your Autodesk software investment. For an attractive annual fee, you receive any upgrades released during your Subscription term, as well as early access to product enhancements. Subscription also gives you flexible license terms, so you can run both current and previous versions (under certain conditions) and use the software on both home and office computers. In addition, Subscription gives you access to a variety of tools and information that save time and increase productivity, including web support direct from Autodesk, self-paced learning, and online license management.

- Autodesk Subscription offers a way to make software costs predictable. Whether a customer opts for a one-year subscription or a multiyear contract, the costs are known for the entire term of the contract.
- A complete library of interactive learning tools and high-quality, self-paced lessons help users increase their productivity and master new skills. These short lessons are available on demand and complement more in-depth training provided through Autodesk Authorized Training Centers.
- Autodesk Subscription makes managing software licenses easier. Customers have added flexibility to allow their employees to use their Subscription software—in the office or at home. Better yet, designers are entitled to run previous versions of the software concurrently with the latest release under certain conditions.
- Get what you need to stay productive. With web support, Autodesk support technicians provide answers to your installation, configuration, and troubleshooting questions. Web and email communications deliver support straight to your desktop.
- For more information, visit [www.autodesk.com/subscription](http://www.autodesk.com/subscription).

## Autodesk User Communities

Autodesk customers can take advantage of free Autodesk software, self-paced tutorials, worldwide discussion groups and forums, job postings, and more. Become a member of an Autodesk Community today!



Free products are subject to the terms and conditions of the end-user license agreement that accompanies download of the software.

## Feedback

Autodesk understands the importance of offering you the best learning experience possible. If you have comments, suggestions, or general inquiries about Autodesk Learning, please contact us at [learningtools@autodesk.com](mailto:learningtools@autodesk.com).

As a result of the feedback we receive from you, we hope to validate and append to our current research on how to create a better learning experience for our customers.

## Useful Links

### Learning Tools

[autodesk.com/learningtools](http://autodesk.com/learningtools)

### Certification

[www.autodesk.com/certification](http://www.autodesk.com/certification)

### Find an Authorized Training Center

[www.autodesk.com/atc](http://www.autodesk.com/atc)

### Find an Authorized Training Center Course

[autodesk.com/atcevents](http://autodesk.com/atcevents)

### Autodesk Store

[Store.autodesk.com](http://Store.autodesk.com)

### Communities

[autodesk.com/community](http://autodesk.com/community)

### Student Community

[students.autodesk.com](http://students.autodesk.com)

### Blogs

[autodesk.com/blogs](http://autodesk.com/blogs)

### Discussion Groups

[forums.autodesk.com](http://forums.autodesk.com)

